



Elliot Lake

- **City of Elliot Lake**
Solid Waste Management Plan
Environmental Assessment Report

January 2016
(rev July 2016)

Legal Notification

This report was prepared by **exp** Services Inc. for the account of the **City of Elliot Lake**.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **Exp** Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

Executive Summary

In 2002, the City of Elliot Lake completed a review of its waste management program and concluded that it needed to develop a long term strategy for the management of its solid waste. Solid waste is currently being disposed at the City-owned and operated landfill site located approximately 1.5km south of the City of Elliot Lake and 1.0km north of Esten Lake. The existing municipal landfill has been in operation since 1982 and is on pace to reach capacity by 2020.

The City commenced an Environmental Assessment (EA) process with the objective to create a long term (20 to 25 year) waste management plan. An EA Terms of Reference (TOR) was developed that defined the work plan for EA process and was approved by the Ministry of Environment and Climate Change (MOECC) in 2009. The City completed a Solid Waste Management Plan in 2012 that identified, consulted on, and evaluated waste reduction, diversion and disposal options to provide the City with a long term sustainable waste management strategy. The Solid Waste Management Plan provided the technical direction and support for the EA which assessed waste disposal alternatives for post-diversion waste in greater detail.

The study area for the EA is the area within the City's municipal boundaries. The existing environment that would be affected by any waste disposal undertaking is described as the following:

- Social-cultural Environment - The City of Elliot Lake has a population of 11,348 people (based on the 2011 census). Most (55%) of the City's population is of working age (age 15 to 64), while 35% of the City's population is aged 65 and over.
- Technical/Infrastructure – The City of Elliot Lake is located on Highway 108, approximately 26 km north of the TransCanada Highway. The City has a local municipal airport for charter flights and private aircraft usage. Municipal services include water, sewer, roads and solid waste management.
- Natural Environment - The City of Elliot Lake is located on the Canadian Shield within a vast rural hinterland. The local forest is a transitional forest typically comprised of sugar maple, yellow birch, white birch, trembling aspen, white and red pine, white spruce and balsam fir. Numerous lakes are located within the City's boundaries, including Elliot Lake, Gullbeak Lake, Esten Lake, Quirke Lake and Ten Mile Lake. The area has changing geography as one moves from south to north. In the southern townships (McGiverin, Esten and Proctor), the bedrock geology consists mainly of gneissic tonalite suite, with some nipissing sills. Moving northward, the middle three townships (Bolger, Gunterman and Joubin) consist of volcanic rocks, and various sandstone and siltstone formations. Gneissic tonalite suite is again encountered in the northern portions of the Elliot Lake.
- Economic Environment - The area was established as a result of large uranium discoveries in the area in 1953. Today, approximately 4.6% of Elliot Lake's labour force is employed in the mining and oil and gas extraction industry, and 2.8% of Elliot Lake's labour force is employed in the agriculture, forestry, fishing and hunting industry. In recent times, the majority of the economy has been diversified and built on retirement living, recreational activities and the cottage industry. Eighteen percent of the area's main industries are the health care and the social assistance industry and 16.5% is employed in the retail trade industry.
- Legal/Jurisdictional - The City of Elliot Lake is governed by an elected mayor and city council and has an Official Plan, dated October 19, 2006. The City's Official Plan identifies the existing municipal landfill area as "Waste Management Facility (Open)" and places it outside of the Community Improvement Area. The City owns the land where the current landfill is located.

The EA considered a number of solid waste disposal alternatives after the application of at-source diversion, including:

- Thermal Processing (for example, incineration and gasification);
- Biological Processing (a process similar to composting where the wastes are stabilized so that the amount of leachate and greenhouse gases they emit are minimized);
- Physical Processing (where garbage is pre-processed before going to landfill to remove recyclable or other materials);
- Building a new landfill;
- Expanding the existing landfill;
- Additional At-Source Diversion (for example, recycling and composting programs);
- Export (ship the waste out to another waste management facility for disposal); and
- Do Nothing (maintain the status quo, which is the baseline alternative).

The alternatives were evaluated based on criteria established in the EA's TOR and refined during the EA process. The criteria were organized into the following categories: natural environment, economic/financial, technical, social/cultural, and legal. The preferred alternative was to expand the existing landfill because it has the lowest economic/financial and social/cultural impacts.

The alternative methods considered for the landfill expansion included the following:

- North/South Expansion – an expansion of the landfill area in a north/south direction;
- Westward Expansion – expansion of the landfill area to the west of the existing landfill area;
- Eastward Expansion – expansion of the landfill area to the east of the existing landfill area;
- Southeast Expansion – expansion of the landfill area to the southeast of the existing landfill area, with limited expansions to the north and south; and,
- Vertical Expansion – adding to the approved elevation of the existing landfill area.

Alternative methods for implementing the landfill expansion were also evaluated based on natural environment, economic/financial, technical, social/cultural, and legal criteria. The following table outlines the evaluation criteria and indicators used to evaluate the alternative methods.

Evaluation Category/ Criteria	Indicator
<i>Natural Environment</i>	
Air Quality and Noise Impacts	Relative amount of noise/air impacts
Potential Quality/Quantity Impacts on Ground and Surface Water	Contamination of ground or surface water
Potential Impacts on Environmentally Sensitive Areas and Species	Impacts on species at risk (birds, bats, snakes) and disruption of sensitive habitat
Potential Impacts on Vegetation	Clearing of wooded or other vegetated areas
Geological	Topographical constraints based on underlying geological features
Geotechnical	Feasibility to manage geotechnical constraints/site considerations
<i>Economic/Financial</i>	
Capital Cost	Cost to construction alternative
Operation and Maintenance Cost	Ongoing operation and maintenance costs
Disruption to Businesses	Number of businesses disrupted

Technical	
Compatibility with Existing Infrastructure	Amount and type of existing infrastructure incompatible with alternative
Design and Operational Flexibility	Ability of alternative to provide design and operational flexibility or allow for future expansion
Social/Cultural	
Potential Conflicts with Land Uses	Number and types of land use conflicts
Potential Impacts on Residential Areas	Number and types of impacts on residential areas
Potential Impacts on Parks and Recreational Areas	Number and types of impacts on parks and recreational areas
Potential Impacts on Institutional Facilities	Number and types of impacts on institutional facilities
Potential Impacts on Archeological and Cultural Resources	Archeological potential in expansion area
Potential Traffic Impacts	Number and types of traffic impacts
Legal	
Type of Property Acquisition Required	Amount of property acquisition required
Complexity of Required Approvals	Relative number and complexity of approvals for alternative

A comparative evaluation of the alternative methods showed that they shared similar advantages and disadvantages for the criteria outlined in the table above; however, the evaluation supported the southeastern expansion as the preferred undertaking due to the following advantages the other alternative methods did not have:

- Geological – Expansion of the landfill in a southeastern direction conforms to the natural geological surfaces;
- Capital Cost – The cost for the southeastern expansion would be relatively lower than the other alternative methods because it would follow the natural contours and would not require extensive excavation.

The proposed landfill expansion would need to accommodate an additional 25 years of waste disposal needs for the City of Elliot Lake. Based on an estimated fill rate of 12,000m³ per year, the expansion would need to allow for an additional 300,000m³ of capacity, plus an additional 75,000m³ for final cover, for an approximate volume of 375,000m³. Therefore, the proposed expansion of the existing municipal landfill by 375,000m³ would provide the City with solid waste disposal capacity to the year 2045.

The potential effects of the landfill expansion and mitigation measures to reduce impacts have been identified as follows:

- Natural Environment
 - Air quality and noise impacts may include nuisances due to odours and dust. A noise and landfill gas assessment will be completed during the Environmental Compliance Approval (ECA) process and will outline mitigation measures if air and noise standards are in exceedance of the standards or other impacts such as dust become an issue. However, noise and odour levels are not expected to increase compared to current levels.
 - Potential quality/quantity impacts on ground and surface water from contact with garbage will be mitigated by diverting leachate and surface water to the existing sand filter for treatment.
 - An investigation of potential impacts on environmentally sensitive areas and species indicated that the anticipated net effects would be low and that avoidance of disturbance to any potential bird or bat roosting activity could be achieved through use of timing windows for construction activities.

- Potential impacts to vegetation are anticipated to be in the form of vegetation removal to accommodate the expansion of the facility. The majority of expansion area has previously been disturbed; however, efforts to reduce impacts through vegetation management plans, vegetation protection measures, silt/sediment controls to protect aquatic habitat and timing windows for construction activities to avoid impacting wildlife or aquatic habitat and communities will be employed.
- Economic/Financial
 - The economic impact of the landfill expansion is approximately \$2.42M in capital cost, which will be managed through the City's capital budget process. Furthermore, there is no anticipated increase for operating cost.
- Technical
 - The expansion would be a continuation of the existing landfill operation; therefore, there are no negative impacts anticipated to the existing infrastructure.
 - The proposed design of the landfill expansion would not impact on the facility's current design and operational flexibility.
- Social/Cultural
 - The existing landfill is approximately 1 km from the closest residential, commercial or institutional building/area and 600 m from land that is currently vacant but designated as residential in the City's Official Plan; therefore, no negative impacts are anticipated to these areas.
 - Screening for archeological potential and for built heritage resources and cultural heritage landscapes concluded that the existing landfill site has low archeological potential and low potential for built heritage or cultural heritage landscape on the property. Therefore, no impact on archeological or cultural resources are expected. However, if archaeological finds are discovered during construction activities, the Ministry of Tourism, Culture and Sport (MTCS) will be notified and a licensed archaeologist engaged to monitor the site.
 - The landfill expansion is not anticipated to have an impact on traffic.
- Legal
 - The City owns the landfill property; therefore, no legal impacts are anticipated. While the landfill expansion would require Environmental Assessment Act (EAA) and Environmental Protection Act (EPA) approvals, landfill facilities are the most common option for waste disposal and therefore, while rigorous, the approval process is well established and documented.

The City conducted a number of consultation activities to engage the public, government agencies, Aboriginal communities and other stakeholders on the Solid Waste Management Plan and EA which included:

- Development of a Solid Waste Management Plan which hosted two public open houses to inform the public and stakeholders on the problem and potential solutions, evaluation of the potential solutions, and recommendations to manage the City's solid waste into the future;
- Publishing a Notice of Commencement of the EA;
- A public information event during the EA to review the "alternatives to" the undertaking and the results of their evaluation, and to describe the proposed landfill expansion and receive comments;
- Presentation of project updates to the City's Public Services Committee;
- Distribution of the draft EA report to the MOECC, government agencies, and to First Nations and other Aboriginal communities for their comments on the evaluation process and recommendations; and,
- Amending the EA report to reflect comments received.

Table of Contents

Executive Summary	i
Table of Contents	v
1 Introduction.....	1
1.1 Background	1
1.2 Study Proponent.....	2
1.3 Legislation and Acts Governing the Undertaking	2
1.4 Study Area and Planning Horizon.....	3
2 Statement of Purpose.....	5
2.1 Purpose of the Undertaking	5
2.2 Current Solid Waste Management System.....	5
2.2.1 Waste Disposal Site	5
2.2.2 Existing Programs and Services.....	6
2.3 Potential for Increased Waste Diversion	7
2.4 Projected Waste Management Needs	7
2.5 Limitations of the Existing Waste Management System	9
3 Planning Process.....	9
3.1 Process Overview.....	9
3.1.1 Terms of Reference	9
3.1.2 Long Term Solid Waste Management Plan.....	9
3.1.3 Further Evaluation of Alternatives.....	10
3.2 List of Studies and Reports.....	13
3.3 Terms of Reference Requirements.....	14
4 Description of Study Area Existing Environment	16
4.1 Socio-Cultural Environment	16
4.2 Technical / Infrastructure	17
4.3 Natural Environment	17
4.4 Economic Environment.....	18
4.5 Legal / Jurisdictional	18
5 Identification of “Alternatives to”	19
5.1 Thermal Processing.....	19
5.2 Mechanical Biological Treatment.....	21
5.3 Landfill	22

5.3.1	Landfill Expansion	22
5.3.2	New Landfill Site	22
5.4	Additional At-Source Diversion	23
5.5	Export of Waste	23
5.6	Do Nothing.....	24
6	Evaluation of “Alternatives to”	24
6.1	Comparative Evaluation of “Alternatives To” the Undertaking	24
6.2	Evaluation Criteria	24
6.3	Evaluation of “Alternatives to”	28
6.4	Recommended Alternatives to the Undertaking	40
6.4.1	Discussion	40
6.4.2	Comparative Evaluation of Net effects	42
6.4.3	Recommended Alternative to the Undertaking	47
7	Description of Local Environment	50
7.1	Technical/Infrastructure	50
7.2	Site Physiography.....	50
7.3	Area Geology and Hydrogeology.....	51
7.4	Flora and Fauna	52
7.5	Archaeological Potential and Cultural Heritage	52
7.6	Socio-economic and Financial.....	53
7.7	Legal/Jurisdictional	53
8	Identification and Evaluation of “Alternative Methods”	55
8.1	Screening and Evaluation Process for Alternative Methods	55
8.2	Identification of “Alternative Methods”.....	57
8.3	Evaluation of “Alternative Methods”.....	59
9	Potential Environmental Effects.....	63
9.1	Overview.....	63
9.2	Natural Environment.....	63
9.2.1	Air Quality and Noise Impacts	63
9.2.2	Potential Quality/Quantity Impacts on Ground and Surface Water.....	64
9.2.3	Potential Impacts on Environmentally Sensitive Areas and Species	65
9.2.4	Potential Impacts on Vegetation	65
9.3	Economic/Financial.....	66
9.3.1	Capital Cost	66
9.3.2	Operation and Maintenance Cost	66

9.3.3	Disruption to Businesses	66
9.4	Technical	67
9.4.1	Compatibility with Existing Infrastructure.....	67
9.4.2	Design and Operational Flexibility	67
9.5	Social/Cultural.....	67
9.5.1	Potential Conflicts with Land Uses.....	67
9.5.2	Potential Impacts on Residential Areas.....	68
9.5.3	Potential Impacts on Parks and Recreational Areas.....	68
9.5.4	Potential Impacts on Institutional Facilities.....	68
9.5.5	Potential Impacts on Archaeological and Cultural Resources.....	68
9.5.6	Potential Traffic Impacts (including avian impact on local airports)	69
9.6	Legal.....	69
9.6.1	Type of Property Acquisition Required.....	69
9.6.2	Complexity of Required Approvals.....	69
10	Identification of the Undertaking.....	70
10.1	Overview.....	70
10.2	Landfill Expansion.....	70
10.3	Leachate Management	75
10.3.1	Existing Leachate Management Program	75
10.3.2	Proposed Leachate Management Program.....	81
10.4	Stormwater Management	82
11	Commitments and Monitoring	85
11.1	Design and Construction	85
11.2	Ground and Surface Water Monitoring	86
11.3	Leachate Management	87
11.4	Noise, Dust and Odour	87
11.5	Pests.....	87
11.6	Litter.....	88
12	Required Approvals.....	90
13	Stakeholder Consultation	92
13.1	Solid Waste Management Plan.....	92
13.1.1	Public Information Centre #1	92
13.1.2	Public Information Centre #2	93
13.1.3	Submission of Solid Waste Management Plan.....	93
13.2	Environmental Assessment	94

13.2.1	Notice of Commencement	94
13.2.2	Newsletter.....	95
13.2.3	Public Information Centre	95
13.2.4	Site Liaison Committee	96
13.2.5	Review of Draft EA Reports.....	96
13.2.6	First Nations and Aboriginal Consultation	98

Appendix A: Environmental Assessment Act (Section 6)

Appendix B: Terms of Reference

Appendix C: Long Term Solid Waste Management Plan

Appendix D: Archaeological Potential and Built Heritage/Cultural Landscape Screening Checklist

Appendix E: Record of Consultation

Appendix F: Natural Heritage Inventory Report

Appendix G: Groundwater and Surface Water Assessment

Appendix H: Glossary of Terms and Abbreviations

List of Figures

Figure 1: Study Area Map.....	4
Figure 2: Planning Process.....	12
Figure 3: Location of Current Landfill Site	51
Figure 4: City of Elliot Lake Official Plan Land Use Schedule A-1	54
Figure 5: Landfill Expansion Concepts	58
Figure 6: Original Approved Final Contours (1984)	72
Figure 7: Proposed Landfill Expansion	73
Figure 8: Site Plan (Existing and Proposed Limits of Fill)	74
Figure 9: Leachate Monitoring Water Sampling Locations	76
Figure 10: Leachate Monitoring Program Time Series - Iron (2004 - 2014)	78
Figure 11: Leachate Monitoring Program Time Series - Manganese (2004 - 2014).....	78
Figure 12: Leachate Monitoring Program Time Series - Hardness (2004 - 2014)	79
Figure 13: Leachate Monitoring Program Time Series - Sodium (2004 - 2014)	79
Figure 14: Leachate Monitoring Program Time Series - Alkalinity (2013 - 2014).....	80
Figure 15: Leachate Monitoring Program Time Series - Nitrate (2004 - 2014)	80
Figure 16: Leachate Monitoring Program Time Series - Total Dissolved Solids (2013 - 2014)	81
Figure 17: Proposed Stormwater Management Plan Catchment Area	84

List of Tables

Table 1: Fulfillment of EAA Requirements	3
Table 2: Projection of Solid Waste Generation and Disposal	8
Table 3: Terms of Reference Requirements.....	14
Table 4: Evaluation Criteria for Alternatives To	26
Table 5: Evaluation of Thermal Processing Disposal Alternative.....	29
Table 6: Evaluation of MBT Alternative	31
Table 7: Evaluation of Landfill Expansion Alternative	33
Table 8: Evaluation of New Landfill Alternative.....	35
Table 9: Evaluation of Waste Export Alternative.....	37
Table 10: Evaluation of “Do Nothing” Alternative.....	39
Table 11: Summary of Estimated Costs	41
Table 12: Comparative Evaluation of Net Effects	43
Table 13: Summary of Evaluation Scoring	47
Table 14: Summary of Alternative Disposal System Advantages and Disadvantages	48
Table 15: Screening and Evaluation Process for Alternative Methods	55
Table 16: Evaluation Criteria and Indicators for Alternative Methods	60
Table 17: Comparative Evaluation of Alternative Methods	61
Table 18: Summary of Monitoring and Reporting Commitments	85
Table 19: Proposed Designated Contaminants of Concern and Maximum Allowable Concentrations	86
Table 20: Summary of Consultation Milestones	94

1 Introduction

1.1 Background

The City of Elliot Lake is a Northeastern Ontario community located in Algoma District. In 2011, Elliot Lake had a population of 11,348¹.

In 2002, the City completed a review of its waste management program and concluded it needs to develop a long term strategy for management of its solid waste. The City commenced an Environmental Assessment (EA) process with the objective to create a long term (20 to 25 year) waste management plan. An EA Terms of Reference (TOR) was developed and approved by the Ministry of Environment and Climate Change (MOECC) that defined the EA process. The first step of the process was to complete the Solid Waste Management Plan to identify, consult on, and evaluate waste reduction, diversion and disposal options and provide the City with a long term sustainable waste management system.

The development of the City's Long Term Solid Waste Management Plan was completed in two stages.

The first stage was the development of the Solid Waste Management Plan (SWMP) document itself. The planning process for the SWMP included a community consultation, which included two open houses to first discuss possible options for waste reduction, diversion and disposal, and then to present the preferred options.

In addition to identifying options for diverting more of the City's solid waste from disposal, the planning process also reviewed options for addressing the City's need for additional disposal capacity. The result of the review was the identification of expanding the current landfill as the preferred disposal option and a recommendation that the City initiate an Environmental Assessment for the expansion.

The next stage in the development of the City's Solid Waste Management Plan was to evaluate a preferred facility that would be subject to EA approval, to manage the projected residual waste volumes that will require disposal over the planning period. This report documents the work that was completed as part of the process which followed the approved TOR. This report includes the following sections:

- Section 1: provides an introduction to the EA, including information on the legislation governing the EA, the study area and the planning horizon.
- Section 2: describes the purpose for the undertaking, including a description of the City's current solid waste management system and the City's projected solid waste management needs.
- Section 3: Describes the planning process for this EA, including the TOR, the SWMP and the EA itself.
- Section 4: Describes the existing natural, social and economic environment of the study area.
- Section 5: Identifies the "alternatives to" the undertaking (i.e., the options for solid waste disposal).

¹ Statistics Canada. 2011 Census.

- Section 6: Presents the evaluation of the “alternatives to” the undertaking.
- Section 7: Provides a detailed description of the local environment by the undertaking.
- Section 8: Presents the identification and evaluation of alternative methods for the undertaking.
- Section 9: Summarizes the potential environmental effects from the undertaking.
- Section 10: Presents a description of the preferred undertaking.
- Section 11: Describes the commitments and monitoring for the undertaking.
- Section 12: Describes the other approvals required for the undertaking.
- Section 13: Describes the stakeholder consultation completed for this process.

1.2 Study Proponent

The proponent for this study is:

City of Elliot Lake
45 Hillside Drive N.
Elliot Lake
Ontario
P5A 1X5
Contact: Robert deBortoli, CAO

1.3 Legislation and Acts Governing the Undertaking

The process for this EA is governed by the Ontario *Environmental Assessment Act* (EAA). Section 2 of the EAA states the EAA's purpose:

The purpose of this Act is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment. R.S.O. 1990, c. E.18, s. 2.

As noted in Section 3 of the Act, the EAA applies to:

- (a) enterprises or activities or proposals, plans or programs in respect of enterprises or activities by or on behalf of Her Majesty in right of Ontario or by a public body or public bodies or by a municipality or municipalities;
- (b) major commercial or business enterprises or activities or proposals, plans or programs in respect of major commercial or business enterprises or activities of a person or persons, other than a person referred to in clause (a), designated by the regulations;
- (c) an enterprise or activity or a proposal, plan or program in respect of an enterprise or activity of a person or persons, other than a person or persons referred to in clause (a), if an agreement is entered into under section 3.0.1 in respect of the enterprise, activity, proposal, plan or program. R.S.O. 1990, c. E.18, s. 3; 2001, c. 9, Sched. G, s. 3 (3).

The City of Elliot Lake is therefore bound by the EAA when considering the options for a long-term solid waste disposal solution. Table 1 summarizes the City's fulfillment of the EAA requirements in developing its long-term solid waste disposal solution.

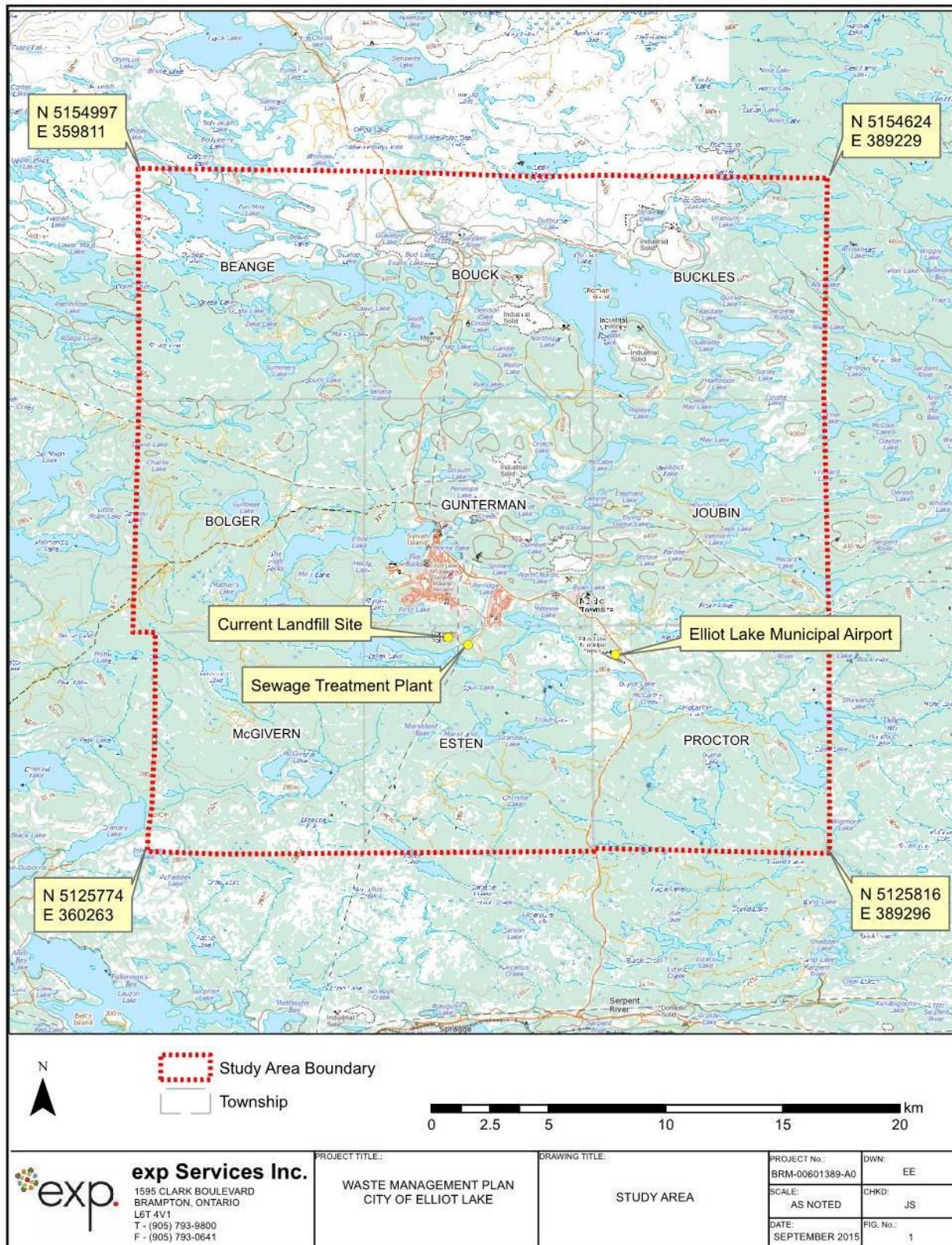
Table 1: Fulfillment of EAA Requirements

EAA Requirement	Description	Date of Completion
Section 6 (1)	Preparation of Terms of Reference (TOR)	Oct 2008
Section 6 (4)	Approval of TOR	March 2009
Section 6.1 (1)	Preparation of Draft EA in Accordance of TOR	March 2015
Section 6.2 (1)	Submission of EA to the MOECC	February 5, 2016

1.4 Study Area and Planning Horizon

The City of Elliot Lake is located mid-way between Sudbury and Sault Ste. Marie along the TransCanada Highway. The study area for this EA is bounded by the municipal boundaries of the City, which covers more than 75,000 ha. A map of the study area is provided in Figure 1.

Figure 1: Study Area Map



2 Statement of Purpose

This Section presents the current and projected future solid waste management needs of the City of Elliot Lake, including its existing waste management system and landfill disposal capacity.

2.1 Purpose of the Undertaking

The purpose of this undertaking is to provide the City with a long term solution of managing the City's residual solid waste over a 25-year planning period. The preferred solution is to be selected using decision-making criteria that balances the City's environmental, social and economic needs. The decision making process is documented throughout the EA report.

2.2 Current Solid Waste Management System

The following paragraphs provide a summary of the City's existing waste management system, including its waste disposal and diversion operations.

2.2.1 Waste Disposal Site

The City's solid waste is disposed at the City-owned and operated landfill site. The existing landfill is located approximately 1.5 km south of the City of Elliot Lake and 1.0 km north of Esten Lake. The landfill site operates under Amended Provisional Certificate of Approval No. A560810, issued October 31, 2006 and Industrial Sewage Works Certificate of Approval No. 3-1055-98-996, issued January 4, 1999. The landfill area itself covers approximately 7.4 ha on a site that is approximately 15.7 ha. The legal description of the site location (as indicated on the Amended Provisional Certificate of Approval) is:

The City of Elliot Lake Municipal Landfill Site (Scott Road)
Part of Parcel 8310, Algoma East Section
Part 1, 2 and 3, Reference Plan 1R-4831
City of Elliot Lake, District of Algoma.

The existing municipal landfill has operated since 1982 and is on pace to reach capacity by 2020, based on a current fill rate of 12,000 m³ per year (about 6,700 tonnes). The landfill was designed as a natural attenuation type disposal facility. Natural attenuation landfills do not have a liner, but instead rely on natural soils to filter, dilute, or otherwise prevent leachate from contaminating groundwater. In 1998, the City installed a sand filter treatment system on the west side of the site as a preventative measure to avoid potential landfill-related impacts on the local environment. Leachate from the landfill is filtered through a 1,500 m² sand filter bed.

The City's 2012 SWMP examined the City's waste disposal needs and consulted on the possible options for managing the City's residual waste. The SWMP identified expansion of the City's existing landfill as the preferred waste disposal option over the others considered (a new landfill site, thermal treatment, and export).

2.2.2 Existing Programs and Services

2.2.2.1 Residential

Currently, Elliot Lake has the following programs in place to manage its solid waste:

- Garbage Collection;
- Leaf and Yard Waste Collection, including collection of yard waste in the spring and a leaf collection day in the fall;
- Two-Stream Recycling Collection (Fibres and Containers);
- Recycling Depot;
- Household Hazardous Waste Drop-off Days; and
- Electronic Waste Drop-off Days.

In 2009, Elliot Lake generated approximately 3,791 tonnes of residential solid waste. Of this, 812.9 tonnes, or 21 percent², was diverted through the blue box program, hazardous waste collection events, backyard composting, recycling depot/deposit return collection and seasonal leaf and yard waste collection.

Curbside collection services for household garbage is provided weekly to residents in single family dwellings, while a bin collection service is provided to multi-family units. Recycling services are provided weekly and on the same day as garbage collection, although fibre and container streams are collected every other week.

Every year during May, a Spring Clean-up Week is performed by the City. During this time, the City allows residents to set out large items and debris that does not normally qualify for collection the rest of the year. Certain items and appliances need to have harmful products removed (such as Freon from refrigerators and freezers) and be properly tagged by the resident. Refrigerator and freezer doors must be removed prior to collection. This also includes leaf and yard waste materials which at other times of the year are to be disposed of by householders at their own expense.

Household hazardous waste is not permitted in the garbage stream and is not collected regularly by the City. Residents are encouraged to drop off hazardous material at the City's annual designated "Household Hazardous Waste Collection Event". Residents are encouraged to separate and store any hazardous materials until such events occur. Drop off is free of charge for residents.

Backyard composting is a voluntary diversion option for residents. Residents can divert yard waste, food scraps and paper products in these receptacles. According to comments from community members online, some residents are reluctant to compost because they feel the composting process will attract animals³. The Ministry of Natural Resources and Forestry (MNRF) has agreed with this position in the past and suggests that residents only place grass and hedge clippings in an outdoor composter. It also recommends indoor worm composters for food waste.

² 2009 WDO data call

³ <http://www.elliottlakestandard.ca/ArticleDisplay.aspx?e=1755741&auth=&archive=true>

2.2.2.2 Industrial, Commercial and Institutional

Generally, the management of waste from the industrial, commercial or institutional (IC&I) sector is outside of a municipality's jurisdictional responsibility. However, all IC&I waste generated in Elliot Lake is disposed at the City's landfill. The development of policies and enforcement for IC&I waste disposal is typically the responsibility of the Province of Ontario. For example, waste from IC&I sector is governed mainly by provincial regulations (O.reg 102/94), which covers requires designated organizations to:

- Conduct waste audits;
- Prepare a waste reduction work plan; and
- For major packaging users, to conduct packaging audits and packaging reduction work plans.

2.3 Potential for Increased Waste Diversion

Development of the City's SWMP included an assessment of the City's solid waste stream and recommendations on how the City could increase the amount of waste diverted. The analysis found that the City could potentially divert another 33 percent of its waste stream, which would bring its waste diversion rate to nearly 55 percent. The SWMP's recommendations included:

- Expand the existing leaf and yard waste composting program by allowing residents to drop off their leaf and yard waste at a municipal depot;
- Develop and implement a comprehensive waste management promotion and education strategy;
- In phases, design and implement a source separated organics collection and composting program; and
- Optimize the City's existing blue box recycling program.

While the diversion programs will ultimately help the City to divert more waste from landfill in the long term, the required time to implement the programs and bring them up to maturity will mean that the programs will not significantly delay the closure of the City's current landfill.

2.4 Projected Waste Management Needs

Table 2 projects the total amount of solid waste generated by the City over the planning period. Between 2012 and 2038, the City will require enough capacity to dispose of about 155,000 tonnes of solid waste.

Table 2: Projection of Solid Waste Generation and Disposal

Year	Population	Res. Waste Generated Annually (tonnes)	ICI Waste Generated Annually (tonnes)	Total Waste Generated Annually (tonnes)	Total Residential Waste Diverted Annually (tonnes)	Total Waste Disposed (tonnes)	Cumulative Waste Generation (tonnes)
2012	11,308	2,762	4,486	7,248	507	6,741	6,741
2013	11,269	2,753	4,470	7,223	521	6,702	13,443
2014	11,230	2,743	4,455	7,198	603	6,595	20,038
2015	11,191	2,733	4,439	7,173	691	6,482	26,520
2016	11,152	2,724	4,424	7,148	867	6,281	32,801
2017	11,113	2,714	4,408	7,123	984	6,139	38,940
2018	11,074	2,705	4,393	7,098	1,100	5,998	44,938
2019	11,036	2,696	4,378	7,073	1,181	5,892	50,830
2020	10,997	2,686	4,363	7,049	1,262	5,787	56,617
2021	10,959	2,677	4,347	7,024	1,309	5,715	62,333
2022	10,921	2,668	4,332	7,000	1,356	5,644	67,976
2023	10,883	2,658	4,317	6,975	1,403	5,572	73,549
2024	10,845	2,649	4,302	6,951	1,398	5,553	79,102
2025	10,807	2,640	4,287	6,927	1,393	5,534	84,635
2026	10,770	2,631	4,272	6,903	1,388	5,514	90,150
2027	10,732	2,621	4,257	6,879	1,384	5,495	95,645
2028	10,695	2,612	4,243	6,855	1,379	5,476	101,121
2029	10,658	2,603	4,228	6,831	1,374	5,457	106,578
2030	10,621	2,594	4,213	6,807	1,369	5,438	112,016
2031	10,584	2,585	4,198	6,784	1,364	5,419	117,435
2032	10,547	2,576	4,184	6,760	1,360	5,400	122,836
2033	10,510	2,567	4,169	6,736	1,355	5,381	128,217
2034	10,473	2,558	4,155	6,713	1,350	5,363	133,580
2035	10,437	2,549	4,140	6,690	1,346	5,344	138,924
2036	10,401	2,540	4,126	6,666	1,341	5,325	144,249
2037	10,364	2,532	4,111	6,643	1,336	5,307	149,556
2038	10,328	2,523	4,097	6,620	1,332	5,288	154,845

Notes and Assumptions:

- Annual population growth rate of -0.35%, based on Statistics Canada 2006 and 2011 populations for Elliot Lake.
- Growth rate of solid waste follows population growth rate.
- Total waste generated based on 7,350 tonnes generated in 2008 (Terms of Reference), with 2801 tonnes from the residential sector (Waste Diversion Ontario 2008 datacall).
- Residential waste diversion includes activities described in SWMP, assuming 6 to 7 years for programs to reach maturity.
- Potential Diversion of ICI waste not included.
- Landfill cover is not included.

2.5 Limitations of the Existing Waste Management System

The information presented in the previous sections demonstrate that the City of Elliot Lake currently does not have the disposal capacity required to adequately manage its waste in the long term. Even with the waste diversion initiatives identified in the SWMP, the City would exceed the landfill's capacity near 2017 and be in violation of the landfill operating approvals.

3 Planning Process

3.1 Process Overview

This section describes the planning process for this project. A summary of the overall process is depicted in Figure 2.

3.1.1 Terms of Reference

The Terms of Reference (TOR) for this Environmental Assessment was prepared in 2008 and approved by the Minister of the Environment and Climate Change (MOECC) on March 11, 2009. A copy of the TOR is provided in Appendix B.

3.1.2 Long Term Solid Waste Management Plan

The next step in the planning process was the development of the City's Long Term Solid Waste Management Plan (SWMP), which was completed in 2012. After preliminary discussions with the MOECC, the City completed a solid waste management plan, which would provide technical direction and support for the EA. The SWMP was prepared in four phases, including:

- Phase 1, where the current system was reviewed and an assessment conducted of the City's solid waste management needs;
- Phase 2, where potential solutions to the City's solid waste management needs were identified;
- Phase 3, where the feasibility of identified solid waste management options were assessed and evaluated; and
- Phase 4, where the recommended solid waste management program for Elliot Lake was identified.

The SWMP considered a number of solid waste diversion and disposal alternatives identified in the TOR for review and evaluation. The process was conducted in consultation with the public and community and agency stakeholders. Two public information centres (PICs) were held at key phases during the SWMP development. The first was held in Phase 2 and was used to describe Elliot Lake's current solid waste management system and performance and to review and obtain comment on possible solid waste diversion and disposal options. A second PIC was held in Phase 3 to review the results of the evaluation process, present the preliminary preferred waste diversion and disposal options, and obtain feedback from the public. The draft SWMP including recommendations, was presented to City Council and posted on the City website for public review.

The SWMP recommendations included adding the following diversion programs to the City's solid waste management program:

- Enhancing the City's current leaf and yard waste program by adding a drop-off program;
- Implementing a comprehensive solid waste management promotion and education strategy;
- Phasing in source-separated organics collection program; and
- Optimization of the City's blue box recycling program.

The SWMP identified expansion of the City's existing landfill as the preferred disposal option for the City and further evaluation.

A copy of the SWMP is provided in Appendix C.

3.1.3 Further Evaluation of Alternatives

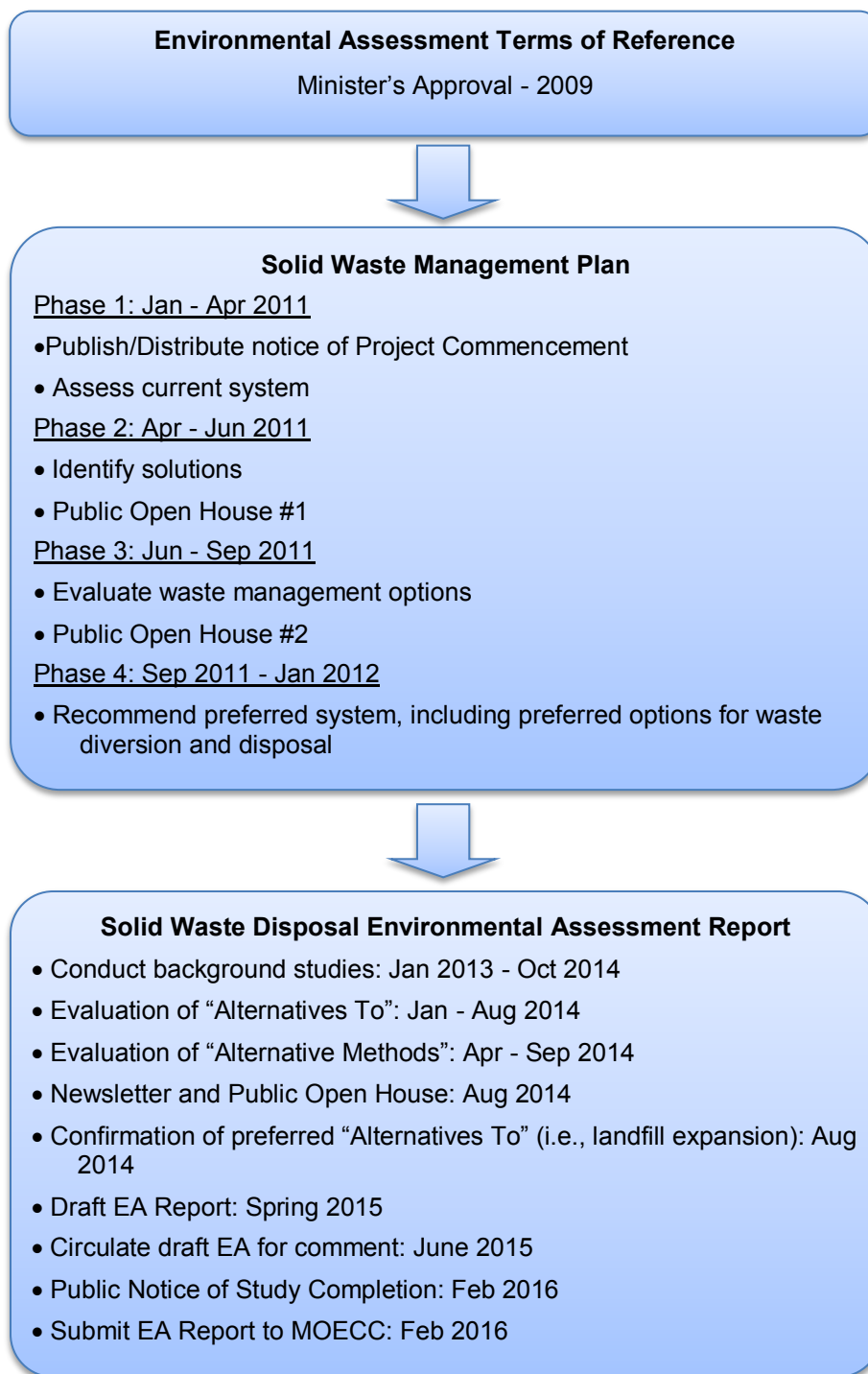
The supporting information provided through the SWMP process was then to be evaluated further and confirmed through the remaining part of EA process and included the following steps:

- Consultation with the MOECC on the process to be followed including First Nations/Aboriginal consultation;
- Publication of the Notice of Commencement and distribution to First Nations/Aboriginal communities and review agencies;
- Review of existing background information and initiation of new studies. A list of studies and reports reviewed are listed in Section 3.2. New EA studies conducted include a Natural Sciences Screening Report, Existing Conditions Report, and a Groundwater and Surface Water Impact Assessment.
- Review and evaluation of alternative solid waste disposal options (i.e., alternatives to), which included:
 - Identification of the alternatives to (based on the SWMP), which included:
 - Thermal processing;
 - Biological processing;
 - Physical processing;
 - Landfill (including a new site or expansion);
 - Additional at-source diversion;
 - Export; and
 - Do nothing.
 - Selection of evaluation criteria for alternatives to;
 - Evaluation of the alternatives to based on the evaluation criteria; and
 - Identification of the recommended alternative to.

- Review and evaluation of alternative methods for the recommended “alternative to” (landfill expansion), which included:
 - Identification of options for the landfill expansion;
 - Screening of landfill expansion options based on feasibility;
 - Selection of evaluation criteria for the screened alternative methods (i.e., expansion options);
 - Evaluation of the alternative methods; and
 - Selection of a recommended alternative method;
- Publication of a newsletter and holding a PIC to review the EA evaluation process and outcome; and
- Preparation, consultation and submission of the EA report.

More information on the consultation conducted for this process is available in section 14 and in Appendix E (Record of Consultation).

Figure 2: Planning Process



3.2 List of Studies and Reports

The following studies and reports were reviewed or prepared as part of this EA process:

- Abraham, E.M. And Robertson, J.A. *McGiverin and Esten Townships; Ontario Geological Survey, Map M2185, scale 1:31,680*. 1970.
- AECOM. *City of Elliot Lake Waste Management Plan Environmental Assessment Terms of Reference*. Prepared for the City of Elliot Lake. October 2008.
- City of Elliot Lake. *City of Elliot Lake Asset Inventory and Community Profile*. March 2014.
- Earth Tech (Canada) Inc. *City of Elliot Lake 2007 Annual Monitoring Report, Project No. 104010*. 2008.
- Earth Tech (Canada) Inc. *Waste Management Study, Final Report*. November 2002
- Environment Canada, *Technical Document for Batch Waste Incineration*, January 2010.
- Environmental Quality Branch Environmental Protection Division, *Waste to Energy A Technical Review of Municipal Solid Waste Thermal Treatment Practices*. Environmental Quality Branch Environmental Protection Division, 2011.
- Exp Services Inc. *Groundwater and Surface Water Impact Assessment, Proposed Elliot Lake Landfill Expansion*. March 2013.
- Exp Services Inc. *Proposed Landfill Expansion Design Brief*. May 2014.
- Federation of Canadian Municipalities. *Solid Waste as a Resource Review of Waste Disposal Options*. 2010
- Genivar. *Addendum to Draft Report on Evaluation of "Alternatives To" and Selection of a Preferred Disposal System (Appendix VII Net Cost calculations: Improved System Assumptions)*. 2007.
- Government of Ontario. *Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites*. January 2012.
- Henderson, P. And Halstead, J.M. *Quaternary geology of the Elliot Lake area; Ontario Geological Survey, Open File Map 193, scale 1:50,000*. 1992.
- LGL Limited. *Elliot Lake Landfill Site Expansion Existing Conditions Report*. November 2014.
- LGL Limited. *Elliot Lake Landfill Site Expansion Natural Sciences Screening Report*. March 2014.
- Morrison Beatty Limited, 1980. *Hydrogeological Investigation of Proposed Town of Elliot Lake Landfill*. February 1980.
- Ontario Ministry of Natural Resources. *Northshore Forest Management Plan, Wildlife and Forestry Map*. March 6, 2009.
- Ontario Ministry of Natural Resources. *Northshore Forest Management Plan, Mining Lands Fabric and Topography Map*.
- Pinchin Environmental. *2011 Annual Monitoring Report, Elliot Lake Landfill, Elliot Lake, Ontario*. June 2012.

- Pinchin Ltd. *2014 Water Quality Monitoring Assessment, Esten Township Elliot Lake Landfill, Elliot Lake, Ontario. Prepared for City of Elliot Lake.* March 31, 2015.
- Planscape. *Official Plan for the City of Elliot Lake. Office Consolidation. Land Use Schedule A-1.* Prepared for the City of Elliot Lake. September 25, 2006.
- Planscape. *Official Plan for the City of Elliot Lake. Office Consolidation.* Prepared for the City of Elliot Lake. October 19, 2006.
- Recycling Council of Alberta. *Morrison Beatty Limited. Hydrogeologic Investigation of Proposed Town of Elliot Lake Landfill.* February 1980.
- Recycling Council of Alberta. *Municipal Solid Waste Options: Integrating Organics Management and Residual Treatment/Disposal.* April 2006,
- Stantec. *Halifax Regional Municipality Waste Resource Strategy Update.* January 2013.

3.3 Terms of Reference Requirements

As per Ontario's *Preparing and Reviewing Environmental Assessments in Ontario Code of Practice* (January 2014), below is a table summarizing how this EA addressed the requirements of the approved TOR.

Table 3: Terms of Reference Requirements

Requirement	TOR Section	How Requirement was Addressed	EA Report Section(s)
25-year planning period	4	Planning horizon for EA is 25 years	1.4
Potential consideration of contingency or surplus disposal capacity	4.1	Capacity of facility considered in waste generation estimates	1.4, 2.3, 2.4, 6.3, 9.2
To be included in list of "Alternatives to": thermal processing; biological processing; physical processing; landfill; additional at-source diversion; export; and do nothing	5.1.1	Listed "alternatives to" were included in the EA process	5
Evaluation of waste management systems rather than components	5.1.2	Included in development of Solid Waste Management Strategy	2.2, 2.3, 3 Appendix C
Site selection to consider only unconstrained lands considered reasonably available and accessible in "alternative methods" evaluation	5.2	As preferred solution site is unconstrained.	Appendix F
Site selection process to follow the seven-level process	5.3	Included in SWMP and EA	NA

Requirement	TOR Section	How Requirement was Addressed	EA Report Section(s)
EA to include detailed description of environment in study area, potential environmental impacts, and mitigation methods	6	Included in EA process	4, 6, 8, 9, 10
Comparative net effects evaluation of "alternatives to"	8.1	Included in EA process	Section 6
Proposed evaluation methodology and criteria for "alternatives to" evaluation to be reviewed in consultation with the public and government review agencies	8.1.1	<ul style="list-style-type: none"> • Two Public Information Centres (PIC) held during development of Solid Waste options • One PIC held during EA to review alternatives, evaluation, and preferred disposal option • Project information sent to agencies as part of consultation process 	Section 14 Appendix C, E
Proposed evaluation methodology for site selection process	8.2	Evaluation criteria identified, vetted via public consultation and applied to options.	Sections 6,7,9,10
A monitoring framework is to be developed under the EA that considers all phases of the identified undertaking, and may include monitoring to ensure compliance and/or effects on the environment	9	Monitoring framework developed	Sections 11, 12
Parties to be consulted during the EA Study include government and agencies, the general public, and aboriginal peoples.	Section 10.1	Government and agencies, the general public and aboriginal peoples were consulted during this process.	Section 14 Appendix C, E
Minimum scope of consultation activities	Section 10.2, table 10-1	Minimum scope of consultation activities completed	Section 14 Appendix C, E
Consultation with the Aboriginal community	10.2.1	Aboriginal community consulted	Section 14 Appendix C, E
Communication strategy to be maintained and updated, including: <ul style="list-style-type: none"> • Newsletter • Public information centres • Public Services Committee meetings • Project website 	10.2.1	Communication strategy followed, including: <ul style="list-style-type: none"> • Distribution of newsletter • Public information centres • Presentations at Public Service Committee meetings • Information posted on the Town's website 	Section 14 Appendix C, E

Requirement	TOR Section	How Requirement was Addressed	EA Report Section(s)
City of Elliot Lake Newsletter	10.2.2	Newsletter prepared describing the project and promoting the public information centre	Section 14 Appendix E
Public Information Centres	10.2.3	<ul style="list-style-type: none"> Two Public Information Centres (PIC) held during development of Solid Waste options One PIC held during EA to review alternatives, evaluation, and preferred disposal option Project information sent to agencies as part of consultation process 	Section 14 Appendix C, E
Meetings/Presentations with Public Services Committee	10.2.4	Updates provided to Public Services Committee	Section 14 Appendix E
Issues resolution	10.3	No issues arose requiring resolution.	Section 14
Variations to the Terms of Reference	12	EA process followed the intent and overall procedure outlined in the TOR with some minor variances.	Section 5 Section 6 Section 8 Section 13
Identification of other approvals required	13	Approvals required have been identified	Section 13
Project description to be prepared for circulation to federal authorities to determine if there is a trigger under the CEAA	13.1.1	Circulation of project notices and draft EA report to Federal agencies	Section 14
Draft EA Report to be made available for agency/public review prior to formal submission	14	Draft EA circulated for agency/aboriginal/public review	Section 14

4 Description of Study Area Existing Environment

4.1 Socio-Cultural Environment

The City of Elliot Lake has a population of 11,348 people, based on the 2011 census. This is a decrease of about 1.7 percent from the 2006 census. Compared to the Canadian average of 14.8 percent, 35 percent of the City's population is aged 65 and over is larger. The percentage of working age population (age 15 to 64) was 54.7, compared to the national average of 68.5 percent. This reflects the number of retirees living in the community and the City's efforts to sell itself as a retirement community.

4.2 Technical / Infrastructure

Elliot Lake is located 26 km north of the TransCanada Highway (Hwy 17) on Highway 108. A local airport provides landing and terminal facilities for charter flights and private aircraft usage. The city is cellular serviced and is connected to a fibre optic cable enabling high speed broadband access for business and residential users. Municipal services include water, sewer, roads and waste management.

4.3 Natural Environment

The City of Elliot Lake is located on the Canadian Shield within a vast rural hinterland. The area contains significant renewable and non-renewable resources, such as forests, minerals, mineral aggregate and water.

Elliot Lake's local forest is a transitional forest typically comprised of sugar maple, yellow birch, white birch, trembling aspen, white and red pine, white spruce and balsam fir.

Numerous lakes are located within the City's boundaries, including Elliot Lake, Gullbeak Lake, Esten Lake, Quirke Lake and Ten Mile Lake. Maps from the City's Official Plan Land Use Schedule C (Natural Heritage Features and Environmental Protection Areas) and the values maps from the Northshore Forest Management Plan⁴ identify numerous sensitive areas and habitats, including:

- Wetlands, distributed throughout the City's area;
- Deer yards, clustered primarily in the Esten and Proctor Townships (south), Bolger Township (west), and Bouck Township (north);
- Moose wintering and aquatic feeding areas, located in clusters in various locations within the City's boundaries;
- Heron nesting sites, distributed sporadically throughout the rural areas of the City; and
- Aquatic habitat and spawning areas in many of the lakes across the City, including habitat for Rainbow Trout, Lake Trout, Brook Trout, and warm water fish habitat.

The Bedrock Geology and Mineral Resources map included in the Northshore Forest Management Plan shows a changing geography as one moves from south to north. In the southern townships (McGiverin, Esten and Proctor), the bedrock geology consists mainly of gneissic tonalite suite, with some nipissing sills. Moving northward, the middle three townships (Bolger, Gunterman and Joubin) consist of volcanic rocks, and various sandstone and siltstone formations. Gneissic tonalite suite is again encountered in the northern portions of the Elliot Lake.

The Metallic Mineral Potential Estimation Tool (MMPET) provides an index value of about 50 to 70 over most the City, although a band in the range of 70 to 80 runs east/west across the centre of the City, through the townships of Bolger, Gunterman and Joubin.

⁴ Ontario Ministry of Natural Resources. Northshore Forest Management Plan, Wildlife and Forestry Map. March 6, 2009.

4.4 Economic Environment

The City of Elliot Lake was founded in 1955 and formally became a city in 1991. The City was established as a result of large uranium discoveries in the area in 1953. The mining industry supported the City until the mid-1990's, when mines began to close due to depleted reserves and low prices. While the economy has shifted, much of Elliot Lake's land remains tied to the resource extraction industry, as most of Gunterman Township and large portions of Bouck and Buckles Townships are under land patents and leases and large portions of Beange, Bouck, Buckles, Bolger, Gunterman and Joubin Townships have active mineral claims⁵. Approximately 4.6 percent of Elliot Lake's labour force is employed in the mining and oil and gas extraction industry⁶.

Forestry is also key economic activity in Elliot Lake, although only 2.8 percent of Elliot Lake's labour force is employed in the agriculture, forestry, fishing and hunting industry⁷. The Northshore Forest Management Plan's *Areas Selected for Operations* Composite Map identifies 13 areas of various sizes selected for forest harvesting between 2010 to 2020. These areas are primarily in the southern and western townships (Eston, McGivern, Bolger and Beange), with some in Joubin and Proctor Townships as well.

Today, Elliot Lake's economy has been diversified and built on retirement living, recreational activities and the cottage industry. Elliot Lake's main industries are the health care and social assistance industry (18.0 percent of the labour force) and the retail trade industry (16.5 percent of the labour force).

4.5 Legal / Jurisdictional

The City of Elliot Lake is governed by an elected mayor and city council.

The City's has an Official Plan, dated October 19, 2006. Land Use Schedule A-1 of the City's Official Plan identifies the existing landfill area as "Waste Management Facility (Open)" and places it outside of the Community Improvement Area⁸. According to Section 4.21 of the Official Plan, "it is a policy of Council to make adequate provision for the management and recycling of waste materials through the provision of a waste management facility and participation in a recycling program⁹."

The City currently owns the land where the current landfill is located.

⁵ Ontario Ministry of Natural Resources. Northshore Forest Management Plan, Mining Lands Fabric and Topography Map.

⁶ City of Elliot Lake. *City of Elliot Lake Asset Inventory and Community Profile*. March 2014.

⁷ Ibid.

⁸ Planscape. *Official Plan for the City of Elliot Lake. Office Consolidation*. Land Use Schedule A-1. Prepared for the City of Elliot Lake. September 25, 2006.

⁹ Planscape. *Official Plan for the City of Elliot Lake. Office Consolidation*. Prepared for the City of Elliot Lake. October 19, 2006.

5 Identification of “Alternatives to”

The development of the Terms of Reference (TOR) for this EA included a “long list” of potentially available ways to manage the City’s residual waste (i.e., “alternatives to”), which was then screened for reasonableness and for inclusion in the TOR. The alternatives identification and screening processes were undertaken in consultation with the public.

The “alternatives to” that have been identified for consideration in this EA include:

- Thermal Processing (for example, incineration and gasification);
- Biological Processing (a process similar to composting where the wastes are stabilized so that the amount of leachate and greenhouse gases they emit are minimized);
- Physical Processing (where garbage is pre-processed before going to landfill to remove recyclable or other materials);
- Landfill;
- Additional At-Source Diversion (for example, recycling and composting programs);
- Export (ship the waste out to another waste management facility for disposal); or
- Do Nothing (maintain the status quo, which is the baseline alternative).

“Biological Processing” and “Physical Processing” are discussed below under the heading of “Mechanical Biological Treatment”.

5.1 Thermal Processing

Disposal of garbage can be achieved either through incineration or other waste technologies collectively known as Advanced Thermal Treatment. However, thermal treatment does not eliminate entirely the need for a landfill site. Thermal treatment offers the benefit of reducing waste volumes, which in turn increases the lifespan of a landfill, and the potential for recovering energy from the process. However, the capital and operational costs can be significant.

In general, Thermal Treatment involves a high temperature process (>700C) that either combusts the solid waste (incineration) or converts it into a gas. Based on the amount of solid waste treated, energy can also be derived from the gasification and combustion process. This conversion greatly reduces the quantity of waste for disposal while in most applications. The technologies required can vary in complexity, cost and economies of scale. Based on the application, wastes can be fed into an incinerator on a continuous basis, or the material can be incinerated in batches. Most models offer flexibility regarding power source and fuel consumption. Thermal treatment processes require catalyst to start the process such as electricity, diesel fuel, fuel oil, natural gas or propane.

Thermal treatment can reduce the amount of waste requiring landfill by up to 90 percent by volume, or 70 percent by weight. While thermal treatment can handle most wastes, its efficiency depends on the heat value (BTU) of the materials being processed. For example, glass and metals have little heat value, while plastics and fibres have more. While these types of processes can reduce the volume of waste, a waste disposal site or landfill is still required to manage the remaining waste residue known as ash.

There are various forms of thermal treatment to manage municipal solid waste and convert into forms of energy. These involve the decomposition of carbon-based materials using an indirect source of heat and result in a synthetic, combustible gas. The common types of technologies include incineration (combustion), gasification, pyrolysis, and plasma-arc. Pyrolysis is undertaken in the absence of oxygen, while gasification and plasma-arc use a limited amount of oxygen. The limited use or absence of oxygen results in the production of fewer air emissions at the thermal treatment source compared to combustion type thermal treatment technologies.

A key issue related to these technologies is the release of pollutants into the atmosphere. Waste must be incinerated at a high temperature (in excess of 1,000°C) in order to safely destroy wastes. In addition, not all types of municipal waste can be incinerated using this option. Materials that include mercury, asbestos, heavy metals, and composed largely of metals and/or glass should not be incinerated.

For a municipality producing roughly 4,000 tons of waste per year, such as Elliot Lake, Environment Canada recommends a dual chamber controlled air incinerator¹⁰ technology. When properly operated and maintained, these configurations can handle a wide range of wastes and attain dioxin, furans and mercury emission levels below Canada-wide Standards.

Several private companies offer products suitable for Elliot Lake and examples of similar systems can be found around the world:

- Peccioli Italy ~ 5 Tons per Day using WTEC's Batch Oxidizing System (BOS)
- Skagway, Alaska ~ 8 Tons per Day using Eco-Waste's Thermal Oxidation Unit (TOU)
- Prudhoe Alaska ~ 7 Tons per Day using EnerWaste's Batch Oxidizing System (BOS)
- Wemindji, Quebec ~ 3 Tons per Day using Eco Waste Solutions' Oxidizer ECO Model

When deciding on a specific incineration model and operating the machinery, it is important to consider the following:

- Waste Characteristics – The composition of waste will have an effect on temperature and fuel consumption in various sections of the incinerator. For example, materials with high moisture content (e.g. food waste) require more fuel in order to evaporate the moisture in order to properly incinerate the materials.
- Incinerator Loading – To properly load an incinerator, the operator needs to determine the source of wastes, weigh the waste to determine how much is being incinerated and most importantly portion the waste based on the anticipated heating value. As mentioned earlier, certain incinerators are designed for low heat value waste. Making sure each batch of waste falls within a predetermined heat value range is critical to operating the incinerator.
- Controlling Air – The amount of air in an incinerator is one of the main ways to control operating temperature. Under ideal circumstances the amount of oxygen within the combustion chamber is just enough to oxidize the carbon and hydrogen in the waste. Too little air will cause temperatures to drop and not allow the waste to incinerate sufficiently, while too much air causes incineration to speed up and release excess amounts of volatile gases. This in turn increases the operating temperature of the incinerator and has the potential to damage the machinery. Most large scale models include automatic temperature

¹⁰ *Technical Document for Batch Waste Incineration*, Environment Canada, January 2010.

control systems, but small scale incinerators often do not and require a trained operator to constantly monitor the temperature profile of the machine.

Capital costs for equipment able to handle such capacity ranges from \$4M to \$10M. This includes land acquisition, engineering and design, assembly and shipping. Operating costs range from \$150k to \$600k per year (\$50/tonne to \$200/tonne, based on 2009 disposal rates). This cost includes fuel, maintenance and labour. It is important to note that fuel and labour costs are variable and change throughout the lifespan of the incinerator. For example, batch incinerators can require two to four labourers to operate and 1,000 to 2,000 litres of fuel per month depending on the type of technology.

Some of the costs associated with purchasing and operating an incinerator can be offset if energy and/or heat recovery systems are included. The amount of heat or energy recovered depends largely on the heat value of the waste being incinerated and the amount of waste incinerated.

5.2 Mechanical Biological Treatment

The mechanical and biological treatment (MBT) of the City's solid waste can incorporate a number of waste management technologies, such as a materials recycling facility, or a composting or digestion facility. Typical outcomes of a mechanical biological treatment facility may include:

- Residual waste is pre-treated before being disposed (e.g., in a landfill);
- Recyclable materials not sorted out at curbside can be recovered through mechanical sorting of the residual waste;
- Biodegradable waste is diverted (i.e., reduced in volume) from disposal through the composting or digestion of the residual waste;
- The residual waste is stabilized into an inert, compost-like product; and
- Biogas is recovered for energy recovery (depending on the biological treatment).

Solid waste entering a MBT facility must first be pre-sorted before being processed. This would include the removal of large items such as chairs, carpets, mattresses and other bulky wastes. The waste then undergoes mechanical waste preparation, which may include bag splitters to open bags, hammer mills and shredders to reduce the size of material, rotating drums to help sort materials, and other machinery.

The next stage is to sort the waste so it can be directed to the appropriate end use, such as recycling, composting or waste stabilization. The mechanical equipment used to sort the materials can vary, but can include equipment such as trammels and screens, magnetic and eddy current separators for ferrous and non-ferrous metals, optical separators, and so on. Manual separation can also be used to assist with the mechanical separation.

The biological portion of an MBT process can take place either before or after the mechanical separation. This portion stabilizes the organic portion of the waste (e.g., food waste) through either an aerobic or anaerobic process. The volume of the organic matter is reduced during the stabilization process, and the product output is a stabilized material with minimized off-gassing after disposal. Depending on the biological process used, biogas can be captured for energy recovery.

MBT does not replace the need for disposal, but rather it stabilizes and reduces the volume of the material going for disposal.

As MBT processes are more common in Europe compared to North America, few cost examples are available. The Region of Niagara and the City of Hamilton examined waste stabilization as part of their 2005 – 2007 Waste Plan study and assessed costs at about \$128 per tonne for MBT processing and disposal. This includes the total capital costs of \$130M annualized over 25 years and annual operating costs for the landfill site and MBT facility of about \$13.1M, to manage 151,200 tonnes of waste annually¹¹.

Halifax Regional Municipality (HRM) recently completed an update of its Waste Resource Strategy in January 2013, which included a review of its waste processing and disposal facility. HRM's front-end processing and disposal facility cost \$170/tonne, which includes capital, operating and perpetual care costs. The Front-End Processing (FEP) facility had an annual operating cost of \$7.2 million and processed 140,500 tonnes of waste. The FEP facility forwarded about 25,100 tonnes of waste to the Waste Stabilization Facility, which cost approximately \$1.7 million to operate¹².

As the City of Elliot Lake generates less than 7,000 tonnes of waste annually, the annual cost per tonne for MBT would likely be significantly more than landfilling due to lack of economy of scale.

5.3 Landfill

Landfilling waste is the most common method of disposing of waste in Ontario. As the City's current landfill site is nearing its capacity, the landfill options available to the city are to expand the current landfill or to site a new landfill. The City disposes 12,000 m³ of disposal capacity and there is no significant population growth forecasted therefore, any new landfill or landfill expansion will require approximately 300,000 m³ of disposal capacity for a 25-year planning period.

The landfill options are discussed below.

5.3.1 Landfill Expansion

The City has identified that it has sufficient land available at its existing landfill site to provide for an expansion. Expanding the current landfill site would involve completing an Environmental Assessment (EA) and applying for an amendment to the site's Environmental Compliance Approval (ECA) under the Environmental Protection Act (EPA). Once approved, the site expansion would be engineered, constructed and operated in accordance with the ECA.

The cost for the approval process and constructing the expansion area would be between \$1,000,000 and \$3,000,000. Operational costs would be comparable to that of the current landfill site.

5.3.2 New Landfill Site

Another alternative for waste disposal is to site and build a new landfill. Two types of landfill are available for consideration: a natural attenuation landfill and a sanitary landfill. Attenuation landfills require some engineering design. Attenuation is a process whereby contaminants generated in a landfill are managed, removed or reduced in concentration. Attenuation involves the processes of dilution, filtration, chemical reaction and transformation and may be accomplished naturally. Sanitary

¹¹ Genivar. *Addendum to Draft Report on Evaluation of "Alternatives To" and Selection of a Preferred Disposal System (Appendix VII Net Cost calculations: Improved System Assumptions)*. 2007.

¹² Stantec. *Halifax Regional Municipality Waste Resource Strategy Update*. January 2013.

landfills have the most extensive designs and are equipped with leachate control, geotextile wall linings, treatment systems, and in some cases gas management infrastructure.

The cost to design and construct a new site would range between \$3,500,000 and \$5,000,000. Operational costs would be comparable to the current landfill. Other factors that must be taken into consideration that can make siting a new landfill difficult include social and environmental issues. Generally, the public is opposed to developing new landfill sites, and a cursory review of the study area shows that it would be difficult to find sufficient land free of environmental constraints that would prevent approval of a new site.

5.4 Additional At-Source Diversion

The City's 2012 SWMP (see Appendix C) included a technical analysis and public consultation on various waste diversion alternatives that led to four recommendations for the City to enhance its waste diversion program:

- Expand the existing leaf and yard waste composting program by allowing residents to drop off their leaf and yard waste at a municipal depot;
- Develop and implement a comprehensive waste management promotion and education strategy;
- In phases, design and implement a source separated organics collection and composting program; and
- Optimize the City's existing blue box recycling program.

These improvements could potentially help the City divert nearly 50 percent of its residential municipal solid waste from disposal, or about 1,400 tonnes per year.

While these waste diversion alternatives will be used to help calculate the amount of residual waste requiring disposal, they are not in themselves a means of disposing of the waste, and so will not be included in the evaluation of waste disposal alternatives.

5.5 Export of Waste

Shipping waste to another landfill outside of Elliot Lake is an option that requires new infrastructure such as a solid waste transfer station (approximate capital cost of \$500,000). The City's SWMP reports that the approximate per tonne cost for garbage collection and disposal is about \$171 per tonne (\$94 per tonne for garbage collection and \$77 per tonne for disposal). Exporting of waste has an approximate cost of \$200 to \$250 per tonne, based on a 300km shipping distance. Therefore, this option would not only be more expensive than the current system but could ultimately run into problems if the receiving site decides to discontinue service, much like the issues Toronto encountered with Michigan.

Possible locations for exporting waste include Sudbury (161km), Sault St. Marie (199km), and Blind River (60km).

5.6 Do Nothing

The EAA requires that the “Do Nothing” alternative be included in the evaluation of alternatives. The “Do Nothing” alternative, whereby the City maintains the status quo, is included as a baseline alternative. This alternative is not a viable option, under this alternative the landfill site would exceed its capacity and violate its environmental approval.

6 Evaluation of “Alternatives to”

6.1 Comparative Evaluation of “Alternatives To” the Undertaking

The evaluation of the ways to manage the waste remaining after diversion (“alternatives to” the undertaking) included a comparison of the advantages and disadvantages associated with each alternative which, in turn, was defined using a net effects analysis. The step-by-step methodology used in the net effects analysis of “alternatives to” for this study, based on the methodology described in the TOR, is as follows:

- Step 1 -The disposal alternatives were assembled into a range of alternative proposed waste disposal systems with each being capable of managing all of the residual waste stream (see Section 5);
- Step 2 -Data collection was undertaken to apply each of the comparative evaluation criteria to the alternative proposed waste management systems. The evaluation criteria are described in Section 6.2.
- Step 3 -The evaluation criteria was applied to each of the proposed waste management systems and potential impacts identified (see Section 6.3).
- Step 4 -Each of the potential effects identified at Step 3 was considered with respect to the availability of measures to mitigate (i.e. measures that may be applied to reduce or eliminate impacts) or enhance (measures that may be applied to improve or increase the magnitude of a benefit or positive effect) the effects, and to identify the residual or ‘net effects’ (see Section 6.3).
- Step 5 -The net effects associated with each proposed waste management system under each comparative criterion was compared and a list of relative advantages and disadvantages associated with each alternative proposed waste disposal option developed (see Section 6.4 and Table 11); and,
- Step 6 - The relative advantages and disadvantages of each alternative proposed waste disposal option in the context of priorities established in consultation with the public was examined and the preferred disposal option was selected (see Section 6.4 and Table 11).

6.2 Evaluation Criteria

The TOR for this EA identified a set of criteria to be used in the evaluation of the “Alternatives to the Undertaking”. These included:

Natural Environment

- Environmental burden at a global or macro-environmental scale.

- Consumption / preservation of non-renewable environmental resources.
- Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site.
- Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials.

Economic/Financial

- Net system costs per tonne of waste managed including facility costs, residual disposal, etc.
- Sensitivity of system costs and affordability to external financial influences.

Technical

- Technical risks associated with waste management alternative.

Social/Cultural

- Potential for land use conflicts from siting of facilities required for alternative.

Legal

- Legal / contractual risks associated with waste management alternative.

The SWMP process also produced a set of criteria for evaluating the alternatives being developed. The identified criteria, which incorporate feedback from the public during the SWMP consultations, included:

- Environmental impacts (positive and negative impacts, including the potential effect on waste diversion);
- Cost effectiveness and affordability;
- Economic development;
- Social and cultural acceptability;
- Ease of implementation; and
- Proven track record of the technology/program.

The evaluation criteria for the “Alternatives to” being considered in this EA process integrates the criteria from the SWMP process with that of the TOR. The evaluation criteria are provided in Table 4. No feedback on the criteria were provided from the public during the EA.

Table 4: Evaluation Criteria for Alternatives To

Environmental Category	Evaluation Criteria	Indicators	Data Sources
Natural Environment	<ul style="list-style-type: none"> • Environmental burden at a global or macro-environmental scale. • Consumption / preservation of non-renewable environmental resources. • Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site. • Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials. 	<ul style="list-style-type: none"> • Amount and/or type of emissions generated/offset due to disposal alternative • Amount of non-renewable resources conserved • Amount of disturbance of terrestrial and aquatic environment • Increase or decrease in waste diversion rate 	<ul style="list-style-type: none"> • City of Elliot Lake Solid Waste Management Plan • Elliot Lake landfill studies/reports • Published data sources/reports/articles • Project studies/reports • Ministry of Natural Resources and Forestry, Northshore Forest Management Plan • Aerial mapping
Economic / Financial	<ul style="list-style-type: none"> • Net system costs per tonne of waste managed including facility costs, residual disposal, etc. • Sensitivity of system costs and affordability to external financial influences. • Potential for local economic development. 	<ul style="list-style-type: none"> • Cost per tonne • Type or amount of potential revenue off-sets • Cost items outside of municipality's influence to control • Potential employment (long term) 	<ul style="list-style-type: none"> • City of Elliot Lake Solid Waste Management Plan • Published data sources/reports/articles • Project studies/reports

Technical	<ul style="list-style-type: none"> • Technical risks associated with waste management alternative. • Proven track record of alternative. • Ease of implementation 	<ul style="list-style-type: none"> • Types of technical risks associated with alternative • Availability of examples where technology used with similar tonnage • Types of barriers to implementation 	<ul style="list-style-type: none"> • City of Elliot Lake Solid Waste Management Plan • Elliot Lake landfill studies/reports • Published reports/articles
Social/Cultural	<ul style="list-style-type: none"> • Potential for land use conflicts from siting of facilities required for alternative. • Social acceptability of the alternative. • Potential Impact on cultural heritage resources. • Potential impact on archaeological resources. 	<ul style="list-style-type: none"> • Number or types of land use conflicts • General attitude of public toward alternative • Degree of potential for built/cultural heritage resources • Degree of archaeological potential 	<ul style="list-style-type: none"> • City of Elliot Lake Solid Waste Management Plan • City of Elliot Lake Official Plan • Published data sources • Archaeological screening
Legal	<ul style="list-style-type: none"> • Legal / contractual risks associated with waste management alternative. 	<ul style="list-style-type: none"> • Facility ownership • Type of potential legal consequences 	<ul style="list-style-type: none"> • City of Elliot Lake Solid Waste Management Plan • Project team experience

The TOR included the criterion “potential air quality and noise impacts - related to Haul Routes and Sites.” During the EA study, it was concluded that the application of impacts related to haul routes and sites was not directly applicable to disposal alternatives or technologies; rather, the criterion was more applicable to the comparative evaluation of different sites, as differences in location of the disposal solution would influence the degree of impact related to haul routes and sites. As TOR criteria are considered proposed and allowance is made in the TOR for adjustment, the criterion was removed. However, potential air impacts of the alternatives to were considered in the Natural Environment criterion “environmental burden at a global or macro-environmental scale” and where applicable potential noise impacts were considered under the Social/Cultural criterion “potential for land use conflicts from siting of facilities required for alternative.”

6.3 Evaluation of “Alternatives to”

Tables 5 to 10 describe the evaluation of the “alternatives to” against the evaluation criteria.

Table 5: Evaluation of Thermal Processing Disposal Alternative

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Natural Environment			
Environmental burden at a global or macro-environmental scale	<ul style="list-style-type: none"> Combustion of MSW would generate emissions of CO₂, dioxins, furans, particulates and other trace gasses. 	<ul style="list-style-type: none"> Emission controls used to manage levels of emissions. MOECC guidelines set allowable levels of emissions. 	<ul style="list-style-type: none"> Reduced methane emissions from landfill. Net increase of airborne pollution.
Consumption / preservation of non-renewable environmental resources	<ul style="list-style-type: none"> No impact on consumption/ preservation of non-renewable resources. Energy recovery can offset fossil fuel consumption. Alternative has potential to recover metal from residue waste for recycling. 	<ul style="list-style-type: none"> Potential to add pre-processing to recover recyclable material, at added capital and operating cost. 	<ul style="list-style-type: none"> While some metal may be recovered from thermal processing residue, it is anticipated that these amounts will be minimal, and therefore there will be no significant impact or benefit to recycling. Net decrease in emissions of greenhouse gasses if energy recovered and used to offset fossil-fuel use.
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	<ul style="list-style-type: none"> Footprint of waste management facility may damage or disrupt natural environment. Landfill site still needed to manage ash residue. Potential impact on aquatic resources from leachate. 	<ul style="list-style-type: none"> Leachate can be collected and/or managed appropriately. Reduction of waste through incineration would reduce size of landfill needed and overall size of waste management facility. 	<ul style="list-style-type: none"> Potentially smaller disruption to habitat by smaller footprint required for waste management facility.
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	<ul style="list-style-type: none"> No impact on diversion rate. Potential for recovery of some metal material from ash residue. 	<ul style="list-style-type: none"> Include technology for recovery of metals from ash residue. 	<ul style="list-style-type: none"> Some increased recovery of metals from ash residue.
Economic / Financial			
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	<ul style="list-style-type: none"> Estimated capital costs ranging between \$4M to \$10M. Annual operating costs ranging between \$50 to \$200 per tonne. Potential for revenue or cost-offset through energy recovery uncertain. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Estimated capital costs ranging between \$4M to \$10M. Annual operating costs ranging between \$50 to \$200 per tonne. Potential for revenue or cost-offset through energy recovery uncertain.
Sensitivity of system costs and affordability to external financial influences	<ul style="list-style-type: none"> Fuel requirement for operation results in high sensitivity to fluctuation in fuel prices. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> High sensitivity to fluctuation in fuel prices.
Potential for local economic development	<ul style="list-style-type: none"> Economic development from hiring of local staff to run facility. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Economic development through hiring of local staff to run facility.
Technical			
Technical risks associated with waste management alternative	<ul style="list-style-type: none"> Incorrect operation of facility could cause pollution. Facility failure would impede the City's ability to manage its solid waste disposal requirement. 	<ul style="list-style-type: none"> More rigorous pollution control design measures. Employ staff to manage facility that have appropriate technical skills. 	<ul style="list-style-type: none"> Some risk related to meeting environmental standards.
Proven track record of alternative	<ul style="list-style-type: none"> Limited operational examples of technology at required scale. 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Alternative not a proven option.
Ease of implementation	<ul style="list-style-type: none"> Ability to contract an appropriate facility vendor with technology to meet environmental, social and economic requirements. Ability to select a facility site that meets social and environmental approval. 	<ul style="list-style-type: none"> Could place EOI for small-scale thermal processing facilities, conduct background research such as a project. Rigorous and transparent process management and stakeholder engagement. 	<ul style="list-style-type: none"> Potential that alternative will not be a viable solution. Would require additional investigation.

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Social/Cultural			
Potential for land use conflicts from siting of facilities required for alternative	<ul style="list-style-type: none"> • Could conflict with land use designations. • Waste facilities have potential to create nuisance problems (e.g., litter, odours). 	<ul style="list-style-type: none"> • Proper facility design, operation and maintenance can help to reduce nuisance issues. Thermal processing facility likely to have fewer litter and odour issues than landfill site. • Siting criteria can help to minimize land use conflicts. 	<ul style="list-style-type: none"> • Large study area and low population density indicates good potential to resolve siting conflicts.
Social acceptability of the alternative	<ul style="list-style-type: none"> • Public rejection of alternative. 	<ul style="list-style-type: none"> • Some support received for thermal processing during public consultation for SWMP. • Rigorous and transparent public engagement regarding the technology. 	<ul style="list-style-type: none"> • Some support received for a thermal facility, although uncertain whether wider community would provide support. • After public engagement process, public reception to technology may remain mixed.
Potential impact on cultural heritage resources	<ul style="list-style-type: none"> • Built/cultural heritage screening concluded low potential for built or cultural heritage resources. 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA
Potential impact on archaeological resources	<ul style="list-style-type: none"> • Archaeological potential screening concluded low archeological potential. 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA
Legal			
Legal / contractual risks associated with waste management alternative	<ul style="list-style-type: none"> • Vendor could relinquish responsibility for facility if facility under private ownership. • City could face legal consequences if facility does not operate properly and causes environmental issues. 	<ul style="list-style-type: none"> • Ensure sustainable long term contract with vendor. • Ensure requirements for approvals and monitoring described in implementation studies. 	<ul style="list-style-type: none"> • Successful long term operation of facility.

Table 6: Evaluation of MBT Alternative

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Natural Environment			
Environmental burden at a global or macro-environmental scale	<ul style="list-style-type: none"> Air emissions that do not meet Canadian standards. Contribution to greenhouse gas accumulation in global atmosphere. 	<ul style="list-style-type: none"> Methane emissions from anaerobic stabilization able to be captured for energy recovery or flared. 	<ul style="list-style-type: none"> Overall reduction in GHG reductions compared to landfilling.
Consumption / preservation of non-renewable environmental resources	<ul style="list-style-type: none"> Potential for recovery of recyclable materials and contribution to climate change from mechanical processing. 	<ul style="list-style-type: none"> Upgrade of diversion technologies as they become available and economically feasible to do so. 	<ul style="list-style-type: none"> Increased diversion of recyclables from disposal.
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	<ul style="list-style-type: none"> Footprint of waste management facility may damage or disrupt natural environment. Landfill site still needed to remaining waste. Potential impact on aquatic resources if landfill leachate leaks into environment. 	<ul style="list-style-type: none"> Leachate can be collected and managed appropriately. Reduction of waste through MBT processing would reduce size of landfill needed, although mechanical and biological processing facilities would require space. 	<ul style="list-style-type: none"> Potentially smaller disruption to habitat loss by smaller footprint required for waste management facility.
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	<ul style="list-style-type: none"> Potential for increased capture of recyclables. Stabilized material could potentially be used as landfill cover, or minimize the amount of landfill cover required. 	<ul style="list-style-type: none"> Upgrade of diversion technologies as they become available and economically feasible to do so. 	<ul style="list-style-type: none"> Potential for increased capture of recyclables. Stabilized material could potentially be used as landfill cover, or minimize the amount of landfill cover required.
Economic / Financial			
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	<ul style="list-style-type: none"> Approximately \$130 to \$170 per tonne, not including capital costs. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Approximately \$130 to \$170 per tonne, not including capital costs.
Sensitivity of system costs and affordability to external financial influences	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Potential for local economic development	<ul style="list-style-type: none"> Local staff required for front-end sorting and to manage stabilization process compared to existing landfill. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Staff required for front-end sorting and to manage stabilization process.
Technical			
Technical risks associated with waste management alternative	<ul style="list-style-type: none"> Technology proven at larger scale but not for smaller scale operations. Technically complex procedure to deal with relatively small amount of waste potentially costly system to repair and maintain. 	<ul style="list-style-type: none"> Pilot testing of desired technology. 	<ul style="list-style-type: none"> Improved assessment of technology at smaller scale. Increased risks due to system breakdown.
Proven track record of alternative	<ul style="list-style-type: none"> Technology proven at larger scale but not for smaller scale operations. 	<ul style="list-style-type: none"> Pilot testing of desired technology. 	<ul style="list-style-type: none"> Some technical risk to meet City's requirements.
Ease of implementation	<ul style="list-style-type: none"> Siting of facility could be problematic due to it being a solid waste facility and the potential for odours. As communities are traditionally not in favour of new waste processing facilities or technology, potential public opposition would require additional effort for engagement of stakeholders and process management. 	<ul style="list-style-type: none"> Pilot testing of desired technology. Ensure effective public engagement and transparency in the project's implementation. 	<ul style="list-style-type: none"> Additional investigation required to ensure appropriateness of technology.

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Social/Cultural			
Potential for land use conflicts from siting of facilities required for alternative	<ul style="list-style-type: none"> Waste facilities have potential to create nuisance problems (e.g. blown litter, odours). 	<ul style="list-style-type: none"> Proper facility design, operation and maintenance can help to reduce nuisance issues. Siting criteria can help to minimize land use conflicts. 	<ul style="list-style-type: none"> Large study area and low population density indicates good potential to resolve siting conflicts.
Social acceptability of the alternative	<ul style="list-style-type: none"> Recovery of non-separated recyclables and stabilization likely would be viewed favourably, although residents may have issue with cost. Potential nuisance issues. Type of operation is relatively new and unknown in Ontario, and as such may be difficult to gain public acceptance. 	<ul style="list-style-type: none"> Proper facility design, operation and maintenance can help to reduce nuisance issues. Rigorous and transparent public engagement. 	<ul style="list-style-type: none"> After public engagement process, public reception to technology may remain mixed.
Potential impact on cultural heritage resources	<ul style="list-style-type: none"> Built/cultural heritage screening concluded low potential for built or cultural heritage resources. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Potential impact on archaeological resources	<ul style="list-style-type: none"> Archaeological potential screening concluded low archeological potential. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Legal			
Legal / contractual risks associated with waste management alternative	<ul style="list-style-type: none"> Requirement of environmental approvals and monitoring activities. Potential for municipality to contract out operation/ownership of facility. Limited opportunity for competition and expertise related to technology due to Elliot Lake's remote geographic location and lack of available market for MBT technology in central Canada. 	<ul style="list-style-type: none"> Enter into long term design/build/operate agreement with contractor with extensive experience in these types of facilities. Ensure requirements for approvals and monitoring described in implementation studies. 	<ul style="list-style-type: none"> Potential for municipality to contract out operation/ownership of facility. Facility operating within its environmental approval and ongoing monitoring requirements.

Table 7: Evaluation of Landfill Expansion Alternative

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Natural Environment			
Environmental burden at a global or macro-environmental scale	<ul style="list-style-type: none"> Landfills can emit methane, CO₂, and other trace gasses. Contribution to greenhouse gas accumulation in global atmosphere. 	<ul style="list-style-type: none"> Potential measures to mitigate greenhouse gases include recovery/reduction of biodegradable waste, landfill gas capture, etc. Feasibility of measures to be assessed on on-going basis. 	<ul style="list-style-type: none"> Landfills can emit methane, CO₂, and other trace gasses. Contribution to greenhouse gas accumulation in global atmosphere.
Consumption / preservation of non-renewable environmental resources	<ul style="list-style-type: none"> No impact on diversion programs. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No impact on diversion programs.
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	<ul style="list-style-type: none"> Expansion may require clearing of trees, which provide terrestrial habitat. Leaks or leachate plumes could impact watercourse or groundwater. 	<ul style="list-style-type: none"> Natural heritage assessment used to identify and avoid sensitive habitat. Leachate collection and monitoring system to avoid impact on habitats. 	<ul style="list-style-type: none"> Minimized impact on sensitive habitats.
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	<ul style="list-style-type: none"> No impact on diversion rate. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No impact on diversion rate.
Economic / Financial			
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	<ul style="list-style-type: none"> No impact. Similar capital and operating cost to existing landfill site (\$77/tonne). Estimated capital cost of \$1M to \$3M. 	<ul style="list-style-type: none"> Ensure competitive contracting process to get best possible price for service. 	<ul style="list-style-type: none"> No change to existing operating costs.
Sensitivity of system costs and affordability to external financial influences	<ul style="list-style-type: none"> Limited sensitivity to external financial influences. Alternative can be achieved using local resources. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Limited sensitivity to external financial influences.
Potential for local economic development	<ul style="list-style-type: none"> Limited effect on economic development. Local contractor and/or staff required to operate facility. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Limited effect on economic development.
Technical			
Technical risks associated with waste management alternative	<ul style="list-style-type: none"> Common risks associated with landfill management of solid waste include potential for leachate, landfill gas, blown litter, nuisance issues. 	<ul style="list-style-type: none"> Ensure facility design and operations manage risks. Ensure design and contract management completed by a qualified engineer. 	<ul style="list-style-type: none"> Minimal impact due to managed risks.
Proven track record of alternative	<ul style="list-style-type: none"> Landfilling has proven track record, as it is most common method of disposal. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Landfilling has proven track record, as it is most common method of disposal.
Ease of implementation	<ul style="list-style-type: none"> Implementation requirements of alternative well understood due to common practice of landfilling in Ontario and would be continuation of existing practice. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Implementation requirements well understood.
Social/Cultural			
Potential for land use conflicts from siting of facilities required for alternative	<ul style="list-style-type: none"> Existing site is zoned for landfill. Potential nuisance impacts on neighbouring properties. 	<ul style="list-style-type: none"> Landfill site is 1 km from existing neighbourhood and 600 m from vacant land planned as residential. Proper facility design, maintenance, operations and contingencies to minimize impacts. 	<ul style="list-style-type: none"> Minimal impacts due to mitigation measures and remoteness of location.

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Social acceptability of the alternative	<ul style="list-style-type: none"> Potential impacts includes public opposition to expansion. 	<ul style="list-style-type: none"> Expansion minimizes impacts compared to siting new landfill. Rigorous and transparent public engagement process. No opposition to expansion noted during SWMP process. 	<ul style="list-style-type: none"> Public acceptance of alternative.
Potential Impact on cultural heritage resources	<ul style="list-style-type: none"> Built/cultural heritage screening concluded low potential for built or cultural heritage resources. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Potential impact on archaeological resources	<ul style="list-style-type: none"> Archaeological potential screening concluded low archeological potential. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Legal			
Legal / contractual risks associated with waste management alternative	<ul style="list-style-type: none"> Facility will require environmental approvals and on-going monitoring and reporting. 	<ul style="list-style-type: none"> Ensure requirements for approvals and monitoring described in implementation studies. 	<ul style="list-style-type: none"> Facility operating within its environmental approval and ongoing monitoring requirements.

Table 8: Evaluation of New Landfill Alternative

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Natural Environment			
Environmental burden at a global or macro-environmental scale	<ul style="list-style-type: none"> Land use: landfill site removes land from use for other purposes and can impact neighbouring uses. Impact on natural environment, leachate, litter. Impact on air quality, landfills can emit methane, CO₂, and other trace gasses. Contribution to greenhouse gas accumulation in global atmosphere. 	<ul style="list-style-type: none"> Develop appropriate siting criteria to evaluate social and environmental issues. Design landfill to minimize or eliminate leachate and litter issues. 	<ul style="list-style-type: none"> Land use restricted to landfilling. Reduced impact on natural environment.
Consumption / preservation of non-renewable environmental resources	<ul style="list-style-type: none"> No impact on diversion programs. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No impact on diversion programs.
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	<ul style="list-style-type: none"> Footprint of new waste management facility would require of terrestrial habitat through tree clearing and topsoil removal. Leaks or leachate could impact watercourse or groundwater. 	<ul style="list-style-type: none"> Natural heritage assessment used to identify and avoid sensitive habitat. Leachate collection and monitoring system to avoid impact on habitats. 	<ul style="list-style-type: none"> Footprint of new waste management site would disrupt natural environment. Risk of leachate impact on surface and groundwater.
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	<ul style="list-style-type: none"> No impact on diversion rates. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No impact on diversion rates.
Economic / Financial			
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	<ul style="list-style-type: none"> Similar operating cost of existing landfill site (\$77/tonne). Capital costs range between \$3.5M to \$5M. 	<ul style="list-style-type: none"> Ensure competitive contracting process to get best possible price for service. 	<ul style="list-style-type: none"> No effect to operating cost. Increased capital cost.
Sensitivity of system costs and affordability to external financial influences	<ul style="list-style-type: none"> Potential sensitivity to external financial influences, in particular cost to acquire land for new facility. If site is not on City-owned land, the City would then have to negotiate with property owner to acquire land. 	<ul style="list-style-type: none"> Preference of site would be on publicly owned lands. 	<ul style="list-style-type: none"> Limited sensitivity to external financial influences.
Potential for local economic development	<ul style="list-style-type: none"> 2 to 3 staff required to operate and monitor facility. Potential economic development in area selected for new site may be limited or constrained. 	<ul style="list-style-type: none"> Siting location to consider potential impact on economic development of areas near potential sites. 	<ul style="list-style-type: none"> Limited effect on economic development.
Technical			
Technical risks associated with waste management alternative	<ul style="list-style-type: none"> Common risks associated with landfill include for leachate, landfill gas, blown litter, nuisance issues. 	<ul style="list-style-type: none"> Ensure facility design and operations manage risks. Ensure design and contract management completed by a qualified engineer. 	<ul style="list-style-type: none"> Minimal impact due to managed risks.
Proven track record of alternative	<ul style="list-style-type: none"> Landfilling has proven track record, as it is most common method for solid waste disposal in North America. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> Landfilling has proven track record.
Ease of implementation	<ul style="list-style-type: none"> Potential for significant public opposition, as selecting a new landfill site can be a contentious topic for communities. 	<ul style="list-style-type: none"> Conduct open and transparent site selection process while engaging community. 	<ul style="list-style-type: none"> Site selection a potentially long and contentious process.

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Social/Cultural			
Potential for land use conflicts from siting of facilities required for alternative	<ul style="list-style-type: none"> Land would be rezoned for use as a landfill and could not be used for other purposes. Potential nuisance impacts on neighbouring properties. Potential traditional and current uses of selected site by Aboriginal communities and by City residents would be disrupted. 	<ul style="list-style-type: none"> Proper facility design, maintenance, operations and contingencies to minimize impacts. Site selection process to avoid lands that provide recreational, subsistence or traditional use. 	<ul style="list-style-type: none"> Potential for land use impacts.
Social acceptability of the alternative	<ul style="list-style-type: none"> Potential impacts include public opposition to siting of new landfill. 	<ul style="list-style-type: none"> Rigorous and transparent public engagement process in selecting new site. 	<ul style="list-style-type: none"> Public opposition.
Potential impact on cultural heritage resources	<ul style="list-style-type: none"> Built/cultural heritage screening concluded low potential for built or cultural heritage resources. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Potential impact on archaeological resources	<ul style="list-style-type: none"> Archaeological potential screening concluded low archeological potential. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Legal			
Legal / contractual risks associated with waste management alternative	<ul style="list-style-type: none"> Facility will require environmental approvals and on-going monitoring and reporting. 	<ul style="list-style-type: none"> Ensure requirements for approvals and monitoring described in implementation studies. Facility would be City owned. 	<ul style="list-style-type: none"> Minimal risk.

Table 9: Evaluation of Waste Export Alternative

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Natural Environment			
Environmental burden at a global or macro-environmental scale	<ul style="list-style-type: none"> Emission of greenhouse and other gasses from disposal site, plus emissions related to hauling of waste to disposal site. 	<ul style="list-style-type: none"> If available, use of bio-diesel or carbon neutral fuels could reduce greenhouse gas emissions from transport. 	<ul style="list-style-type: none"> Emission of greenhouse and other gasses from disposal site, plus emissions related to hauling of waste to disposal site.
Consumption / preservation of non-renewable environmental resources	<ul style="list-style-type: none"> Increased consumption of fossil fuels (due to shipping of waste) 	<ul style="list-style-type: none"> If available, use of bio-diesel or carbon neutral fuels could reduce consumption of non-renewable resources. 	<ul style="list-style-type: none"> Increased consumption of fossil fuels
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	<ul style="list-style-type: none"> Export of waste would be to existing waste management facility, so there would be no new immediate disruption or destruction of terrestrial habitat. However, the input of Elliot Lake's waste would result in the receiving landfill site closing or having to expand in fewer years. Leachate from landfill could impact aquatic habitat. Building of new transfer station would likely occur on the existing landfill site. Some terrestrial habitat may be disrupted to provide clear space for structure. 	<ul style="list-style-type: none"> Landfill leachate collected and treated before it is released to environment, minimizing impact on aquatic habitat. Placement of transfer station to minimize disruption of terrestrial habitat. 	<ul style="list-style-type: none"> Potential for habitat disruption or destruction displaced to another community and at a later date. Potential for habitat disruption at landfill site to build new transfer station.
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	<ul style="list-style-type: none"> No impact or effect on waste diversion rate. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> While exporting of waste should not impact diversion programs, a robust waste diversion program should increase diversion from disposal.
Economic / Financial			
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	<ul style="list-style-type: none"> Cost could range from \$115 - \$225 per tonne, depending on location of facility. Estimated capital cost for new transfer station \$500,000 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Potential for increased operating costs.
Sensitivity of system costs and affordability to external financial influences	<ul style="list-style-type: none"> Tip fees would be controlled by receiving facility, proponent has no cost control. Fuel required for transport results in high sensitivity to fluctuation in fuel prices. 	<ul style="list-style-type: none"> Long-term contracts could provide some degree of protection against cost increases. 	<ul style="list-style-type: none"> Proponent has limited control over cost escalation. High sensitivity to fluctuation in fuel prices.
Potential for local economic development	<ul style="list-style-type: none"> No potential for local economic development. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No potential for local economic development.
Technical			
Technical risks associated with waste management alternative	<ul style="list-style-type: none"> No technical risks. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> No technical risks.
Proven track record of alternative	<ul style="list-style-type: none"> Waste export a common practice, but exporting municipalities face risk that receiving site will discontinue service. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Waste export a common practice, but exporting municipalities face risk that receiving site will discontinue service.
Ease of implementation	<ul style="list-style-type: none"> Challenges finding a suitable site willing to accept waste from the Proponent. Destination landfill may be required to change its government approval. 	<ul style="list-style-type: none"> Begin search for and then negotiations with external landfill site well in advance of when the City would require the disposal capacity. Enter into a long term contract. 	<ul style="list-style-type: none"> Search and negotiations required to secure disposal capacity at external landfill site.

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Social/Cultural			
Potential for land use conflicts from siting of facilities required for alternative	<ul style="list-style-type: none"> Limited, as export of waste would be to existing site. Existing site could have nuisance issues with its local neighbours. Existing landfill site currently in practice as a waste management facility, so no additional disturbance to public anticipated. 	<ul style="list-style-type: none"> Proper facility design, maintenance and operations to minimize nuisance factors such as odours, litter. 	<ul style="list-style-type: none"> Potential nuisances at site mitigated by operating procedures.
Social acceptability of the alternative	<ul style="list-style-type: none"> Potential opposition from residents, as no support was raised for this option during SWMP process. Potential opposition from residents in the community receiving waste. 	<ul style="list-style-type: none"> Clear explanation of option benefits to Elliot Lake residents and residents from the community receiving the waste. 	<ul style="list-style-type: none"> Potential for public disapproval.
Potential impact on cultural heritage resources	<ul style="list-style-type: none"> Built/cultural heritage screening concluded low potential for built or cultural heritage resources. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Potential impact on archaeological resources	<ul style="list-style-type: none"> Archaeological potential screening concluded low archeological potential. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Legal			
Legal / contractual risks associated with waste management alternative	<ul style="list-style-type: none"> Contract required with waste hauler and the host landfill site. Approvals and monitoring responsibility of owner/operator of host landfill facility. ECA approval would be required for new transfer station. 	<ul style="list-style-type: none"> As necessary, City to obtain assistance in negotiating long-term contracts with waste hauler and receiver. Host landfill facility to ensure requirements for approvals and monitoring are met. 	<ul style="list-style-type: none"> Potential for contractual risks with waste hauler and host landfill provider. Host landfill facility operating within its environmental approval and ongoing monitoring requirements. ECA approval would be required for new transfer station.

Table 10: Evaluation of “Do Nothing” Alternative

Category/Criteria	Potential Impacts	Measures to Mitigate or Enhance	Net Effect
Natural Environment			
Environmental burden at a global or macro-environmental scale	<ul style="list-style-type: none"> Landfills can emit methane, CO₂, and other trace gasses. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Increase of uncontrolled emissions.
Consumption / preservation of non-renewable environmental resources	<ul style="list-style-type: none"> No impact on diversion programs. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> No impact on diversion programs.
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	<ul style="list-style-type: none"> Increased risk of leachate leaks as landfill site exceeds capacity. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Increased risk of leachate leaks as landfill site exceeds capacity.
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	<ul style="list-style-type: none"> No impact on diversion rates. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> No impact on diversion rates.
Economic / Financial			
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	<ul style="list-style-type: none"> Similar operating cost of existing landfill site. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Similar operating cost of existing landfill site.
Sensitivity of system costs and affordability to external financial influences	<ul style="list-style-type: none"> Limited sensitivity to external financial influences. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Limited sensitivity to external financial influences.
Potential for local economic development	<ul style="list-style-type: none"> Potential to harm economic development as risk of landfill site to surrounding increases due to exceeding capacity. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Potential to harm economic development as risk of landfill site to surrounding increases due to exceeding capacity.
Technical			
Technical risks associated with waste management alternative	<ul style="list-style-type: none"> Exceeding capacity of landfill site makes environmental management of site more difficult. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Increased technical risk due to exceeded capacity.
Proven track record of alternative	<ul style="list-style-type: none"> Exceeding capacity of landfill site against regulations. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Exceeding capacity of landfill site against regulations.
Ease of implementation	<ul style="list-style-type: none"> No steps required. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> No steps required.
Social/Cultural			
Potential for land use conflicts from siting of facilities required for alternative	<ul style="list-style-type: none"> Potential for nuisances to increase as landfill site exceeds its capacity. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Potential for nuisances to increase as landfill site exceeds its capacity.
Social acceptability of the alternative	<ul style="list-style-type: none"> Socially unacceptable for landfill site to exceed capacity indefinitely. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Socially unacceptable for landfill site to exceed capacity indefinitely.
Potential impact on cultural heritage resources	<ul style="list-style-type: none"> Built/cultural heritage screening concluded low potential for built or cultural heritage resources. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Potential impact on archaeological resources	<ul style="list-style-type: none"> Archaeological potential screening concluded low archeological potential. 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA
Legal			
Legal / contractual risks associated with waste management alternative	<ul style="list-style-type: none"> Exceeding landfill capacity against MOPE regulations. Liability of City for environmental impacts resulting from exceeded capacity. 	<ul style="list-style-type: none"> No mitigation/enhancement measures taken in “do nothing” alternative. 	<ul style="list-style-type: none"> Exceeding landfill capacity against MOPE regulations. Liability of City for environmental impacts resulting from exceeded capacity.

6.4 Recommended Alternatives to the Undertaking

The net effects of the alternatives are discussed below, followed by a recommendation for the preferred “alternative to”. A comparative scoring of the net effects and comparison of the advantages and disadvantages are provided in Section 6.4.3.

6.4.1 Discussion

Natural Environment

The alternatives rated as most preferred with respect to the “Natural Environment” category of evaluation criteria are Mechanical/Biological Treatment (MBT) and expansion of the existing landfill. The waste stabilization process of MBT would help to minimize both air emissions and leachate generation by stabilizing the organic content of the City’s waste stream. It could also potentially increase the diversion of recyclables from disposal by recovering those recyclables not captured in the City’s recycling program, thereby further reducing greenhouse gas and other emissions from the extraction of non-renewable resources. Expansion of the existing landfill was rated as most preferred because, as the site is already designated a solid waste area, it would have limited disruption to the terrestrial and aquatic environment. While organics recovery has not been identified as a priority in the City’s SWMP, it is an option that could be implemented in the future as a greenhouse gas mitigation measure.

Thermal processing and siting of a new landfill site were both ranked as moderately preferred. While a Thermal Processing facility has potential to emit fewer greenhouse gasses than a landfill, it has potential to generate other emissions, such as dioxins and heavy metals. Some disruption of habitat may be necessary to build the facility, which could potentially be located at the existing landfill site.

Building a new landfill site would have similar greenhouse gas and other emissions (and mitigation measures) compared to expanding the existing site; however, building a new landfill site would likely cause greater disruption to the natural environment through the clearing of additional land. During the SWMP process, a cursory review of the study area showed that it would be challenging to identify a new site free of either environmental or natural resource constraints.

Exporting waste is the least preferred option with respect to the natural environment, as any of its intrinsic environmental impacts would be added to by the emissions from transporting the waste to the disposal site.

MBT and thermal processing could potentially aid in the recovery of recyclable material, as the MBT process would remove some recyclable material in its pre-sort, while thermal processing could recover recyclable materials in its pre-sort and recover some metals after the residual waste has been processed. However, the anticipated recoveries are not anticipated to be sizable, considering the amount of residual solid waste being processed. The other alternatives would not have any benefit or impact on the amount of recyclable material recovered.

Economic/Financial

The most preferred alternative with respect to economic/financial criteria was the landfill expansion, as it has the lowest operating cost and second lowest capital cost (see Table 11 for summary of estimated costs). An expanded landfill also provides the City with a secure long term disposal

alternative and control over disposal costs. Developing a new landfill site has similar benefits, but would have greater capital costs, and thus is considered moderately preferred.

Exporting the City’s waste would minimize its capital costs, but it would likely leave the City with higher disposal costs and leave it with little control over future escalating transport and disposal fees. For example, the City’s costs could escalate with fuel cost and tipping fee increases, items upon which the City has limited or no cost control.

Thermal processing and MBT both have high capital and operating costs compared to the landfill alternative, especially considering the poor economy-of-scale the City would experience due to its relatively low tonnage. While a partnership with a neighbouring municipality could provide economies of scale required to make this alternative cost effective, a joint venture is unlikely to be feasible due to the considerable distances between population centres, which would contribute to significant transport-related costs.

The contribution to economic development from the alternatives are all limited and would be due to employment from capital works and operations.

Table 11: Summary of Estimated Costs

Alternative	Operating Cost / Tonne	Capital Cost
Thermal Processing	\$50 to \$200 / tonne	\$4M to \$10M
MBT Processing	\$130 to \$170 / tonne	Insufficient data
Landfill Expansion	\$77/tonne	\$1M to \$3M
New Landfill Site	\$77/tonne	\$3.5M to \$5M
Waste Export	\$115 to \$225/tonne	\$500,000 for new transfer station

Technical

From a technical perspective, the design and operation of a landfill is a common technique used to dispose of the majority of solid waste across North America for decades. The conditions at Elliot Lake’s current landfill site are such that an expansion is technically feasible. The technical risks associated with operating a landfill site are well known and can be adequately managed if the proper landfill management techniques are followed. For these reasons, the landfill expansion and new landfill options were considered most preferred.

With respect to MBT and thermal processing, the study team were unable to identify examples of MBT being operated cost-effectively at a small scale, and thermal processing typically requires larger volumes of waste to ensure combustion occurs at a sufficient temperature and duration to sufficiently destroy contaminants in the waste stream. These procedures are also more technically complex than a landfill, and as such a technical risk would be that the processing facility does not perform adequately. This would likely incur additional costs for the City and could potential place the City in non-compliance with its approvals.

There are no technical risks associated with exporting waste.

Social/Cultural

From a social/cultural perspective, the landfill expansion is the preferred approach. While thermal processing did receive support from some members of the community, it is not clear whether this option would be widely supported, especially in consideration of higher costs compared to other

alternatives. The concept of MBT would likely be supported, although the costs of such a facility would likely be a concern.

The City's landfill is an established facility that has been used by the community for more than 30 years. Siting a new landfill site could be a publicly contentious process and would remove a parcel of land from use for any other interest.

Legal

From a legal perspective (including government approvals), exporting waste would be the preferred alternative. The site receiving the City's waste would hold the responsibility for obtaining all necessary government approvals, conducting monitoring and reporting activities, and correctly following regulations for a waste disposal facility. If the City were to export its waste, the City would likely be required to enter into a disposal contract with the waste receiver, which could place conditions on the type or amount of waste the City could ship for disposal.

The City would be required to obtain all necessary environmental approvals and meet monitoring and reporting requirements for the other disposal alternatives, although they may vary depending on the type of facility.

6.4.2 Comparative Evaluation of Net effects

Table 12 provides a comparative evaluation of the net effects, as presented in the previous tables. The numerical scoring is based on a range from 1 to 5, where:

- A score of **1** indicates an alternative is **least preferred** for that criterion;
- A score of **3** indicates an alternative is **moderately preferred** for that criterion; and
- A score of **5** indicates an alternative is **most preferred** for that criterion.

The alternative with the highest overall score was considered most preferred.

Table 13 summarizes the scoring based on criteria category, followed by a comparison of advantages and disadvantages in Table 14.

Table 12: Comparative Evaluation of Net Effects

Category/Criteria	Thermal Processing	MBT	Landfill Expansion	New Landfill	Waste Export
Natural Environment					
Environmental burden at a global or macro-environmental scale	3 Reduced methane emissions from landfill, but generation of some other emissions.	5 Overall reduction in GHG reductions compared to landfilling.	4 Reduced landfill emissions if SSO diversion programs in place.	4 Reduced landfill emissions if SSO diversion programs in place.	1 Emission of greenhouse and other gasses from disposal site, plus emissions related to hauling of waste to disposal site.
Consumption / preservation of non-renewable environmental resources	3 No significant impact or benefit to recycling. Net decrease in emissions of greenhouse gasses if energy recovered and used to offset fossil-fuel use.	5 Increased diversion of recyclables from disposal.	3 No impact on diversion programs.	3 No impact on diversion programs.	1 Increased consumption of fossil fuels to ship residual waste requiring disposal.
Potential for destruction or disruption of sensitive terrestrial and/or aquatic habitats at an eventual site	3 Thermal processing and disposal facility would have a footprint of about 2 to 5 acres. A new site may require the displacement of habitat unless a brownfield location or the existing landfill site is used. However, sensitive terrestrial and/or aquatic habitats would not be included in the selection of alternative sites.	3 The MBT facility would have a footprint of about 2 to 5 acres, plus area required for disposal of residuals. A new site may require the displacement of habitat unless a brownfield location or the existing landfill site is used. However, sensitive terrestrial and/or aquatic habitats would not be included in the selection of alternative sites.	5 Minimized impact on sensitive habitats.	1 Footprint of new waste management site to disrupt about 20 acres of natural environment. Sensitive habitat would be avoided as much as possible.	5 No or minimal disruption of habitat.

Category/Criteria	Thermal Processing 3	MBT 5	Landfill Expansion 3	New Landfill 3	Waste Export 3
Potential to increase diversion rate from disposal and/or make best use of residual (post-diversion) waste materials	No significant change to waste diversion rate.	Potential for increased capture of recyclables. Stabilized material could potentially be used as landfill cover, or minimize the amount of landfill cover required.	No impact on diversion programs.	No impact on diversion programs.	No impact or effect on waste diversion rate.
Economic / Financial					
Net system costs per tonne of waste managed including facility costs, residual disposal, etc.	1 Estimated capital costs ranging between \$4M to \$10M. Annual operating costs ranging between \$50 to \$200 per tonne. Potential for revenue or cost-offset through energy recovery uncertain.	2 Approximately \$130 to \$170 per tonne, not including capital costs.	5 Similar operating cost of existing landfill site (\$79/tonne).	4 Similar operating cost of existing landfill site (\$79/tonne). Capital costs range between \$3M to \$5M.	4 Cost could range between \$115 to \$225/tonne per tonne, depending on location of facility and tip fee charge.
Sensitivity of system costs and affordability to external financial influences	1 Operating costs directly related to cost of fuel, due to fuel requirement of thermal facilities.	3 Operating costs moderately sensitive to increases in cost of fuel and energy.	5 Limited sensitivity to external financial influences.	5 Limited sensitivity to external financial influences.	1 Municipality has limited control over cost escalation.
Potential for local economic development	2 Limited potential for economic development.	3 Additional staff may be required for front-end sorting and to manage stabilization process.	1 No effect on economic development.	1 Limited effect on economic development.	5 No potential for local economic development.

Category/Criteria	Thermal Processing	MBT	Landfill Expansion	New Landfill	Waste Export
Technical					
Technical risks associated with waste management alternative	3 Elevated potential of not meeting environmental standards due to small scale and inability to run combustion facility continuously.	3 Technology proven at larger scale but not for smaller scale operations. Increased risks due to system breakdown	4 Risks of landfilling managed through design, operations, and on-going monitoring and reporting.	4 Risks of landfilling managed through design, operations, and on-going monitoring and reporting.	5 No technical risks
Proven track record of alternative	1 Technology not widespread at required small scale.	1 Technology proven at larger scale but not for smaller scale operations.	5 Landfilling has proven track record, as it is most common method of disposal.	5 Landfilling has proven track record, as it is most common method of disposal.	5 Waste export a common practice, but exporting municipalities face risk that receiving site will discontinue service.
Ease of implementation	2 Additional investigation required to ensure appropriateness of technology.	2 Implementation and operational challenges can be addressed by contracting qualified contractors.	5 Straight-forward implementation.	3 Site selection a potentially long and contentious process.	5 Straight-forward implementation.
Social/Cultural					
Potential for land use conflicts from siting of facilities required for alternative	4 Large study area, low population density, and potential to site on existing landfill site indicates good potential to resolve siting conflicts.	4 Large study area, low population density, and potential to site on existing landfill site indicates good potential to resolve siting conflicts.	5 Minimal nuisances due to operating procedures and remoteness of existing location.	1 Potential nuisances mitigated by operating procedures and location of new site.	5 Potential nuisances at site mitigated by operating procedures.

Category/Criteria	Thermal Processing 4	MBT 5	Landfill Expansion 5	New Landfill 1	Waste Export 3
Social acceptability of the alternative	Some support received for a thermal facility, although uncertain whether wider community would provide support.	Recovery of non-separated recyclables and stabilization likely would be viewed favourable, although residents may have issue with cost.	Alternative would be socially acceptable.	Siting a new landfill site commonly unfavoured by general public.	No support for option expressed during SWMP process.
Legal	3	3	3	3	1
Legal / contractual risks associated with waste management alternative	Environmental approvals and ongoing monitoring required for thermal facility and for waste management facility.	Requirement of environmental approvals and monitoring activities. Potential for municipality to contract out operation/ownership of facility	Facility will require environmental approvals and on-going monitoring and reporting.	Facility will require environmental approvals and on-going monitoring and reporting.	Contract required with waste receiver. Approvals and monitoring responsibility of owner/operator of receiving facility.

6.4.3 Recommended Alternative to the Undertaking

Table 14 below provides a summary of the evaluation scoring. A summary of observations about the scoring include:

- The landfill expansion alternative received the highest overall score.
- The MBT alternative received the highest score for natural environment, followed closely by the landfill expansion alternative.
- The landfill expansion alternative received the highest score for the economic/financial and social/cultural categories.
- The landfill expansion alternative was also among the highest scoring alternatives in the legal category, along with thermal processing, MBT and the new landfill alternatives.
- Waste export received the highest score in the technical category, following closely by landfill expansion.

Table 13: Summary of Evaluation Scoring

Category/Criteria	Thermal Processing	MBT	Landfill Expansion	New Landfill	Waste Export
Natural Environment	12	18	15	11	10
Economic / Financial	2	5	10	9	5
Technical	6	6	14	12	15
Social/Cultural	8	9	10	2	8
Legal	3	3	3	3	1
Total	31	41	52	37	39

Based on the results of the evaluation, the recommended disposal alternative is the expansion of the landfill. The key advantages of this alternative over the other alternatives include the following:

- It provides the City with a means to dispose of its waste in a way that reduces impact on the environment compared to the other alternatives;
- Expansion of the current landfill site means that no other lands will be removed from development or recreational opportunities for the purpose of a landfill site;
- It provides the lowest cost per tonne of waste disposed;
- It provides the City with the security of control over future disposal capacity and costs; and,
- Modern landfills that minimize damage to the environment are a proven technology in North America.

A summary of advantages and disadvantages for the various alternatives is provided table 14.

Table 14: Summary of Alternative Disposal System Advantages and Disadvantages

Alternative	Thermal Processing	Mechanical/Biological Treatment	Landfill Expansion	New Landfill Site	Waste Export
Criteria					
Natural Environment	<p>Advantages</p> <p>Would reduce some emissions compared to landfill (GHG, nitrogen oxide, carbon monoxide, particulates).</p> <p>Potential for net decrease in fossil fuel use if energy recovered.</p> <p>Potentially smaller disruption to habitat loss due to smaller footprint required for waste management facility.</p> <p>Disadvantages</p> <p>Can produce negative air emissions compared to landfill (heavy metals, dioxins).</p>	<p>Advantages</p> <p>Overall reduction in GHG emissions compared to landfilling.</p> <p>Increased diversion of recyclables from disposal.</p> <p>Potentially smaller disruption to habitat loss by smaller footprint required for waste management facility.</p> <p>Stabilized material reduces the amount of waste requiring disposal and could potentially be used as landfill cover, or minimize the amount of landfill cover required.</p>	<p>Advantages</p> <p>Reduced greenhouse gas emissions if organics diversion programs in place.</p> <p>Land use already designated for waste disposal.</p> <p>Disadvantages</p> <p>Air emissions emitted from landfill, such as nitrogen oxides, particulate matter.</p>	<p>Advantages</p> <p>Reduced greenhouse gas emissions if organics diversion programs in place.</p> <p>No impact on diversion programs.</p> <p>Disadvantages</p> <p>Footprint of new waste management site to disrupt natural environment.</p> <p>Air emissions emitted from landfill, such as nitrogen oxides, particulate matter.</p>	<p>Advantages</p> <p>No or minimal non-local disruption of habitat.</p> <p>Disadvantages</p> <p>Emission of greenhouse and other gasses from disposal site, plus emissions related to hauling of waste to disposal site.</p> <p>Increased consumption of fossil fuels.</p>
Economic/Financial	<p>Advantages</p> <p>Potential for revenue or cost-offset through energy recovery uncertain.</p> <p>Potential for economic development.</p> <p>Disadvantages</p> <p>High cost: estimated capital costs: \$4M to \$10M, operating costs: from \$50 to \$200 per tonne.</p> <p>Sensitivity to external financial influences i.e. fuel costs</p>	<p>Advantages</p> <p>Staff required to operate and maintain facility.</p> <p>Disadvantages</p> <p>Significant capital and operating cost.</p>	<p>Advantages</p> <p>No increase in operating cost.</p> <p>Limited sensitivity to external financial influences.</p>	<p>Advantages</p> <p>No increase to operating cost.</p> <p>Limited sensitivity to external financial influences.</p> <p>Disadvantages</p> <p>Higher capital cost than some alternatives.</p>	<p>Disadvantages</p> <p>Higher operating cost than some alternatives.</p> <p>Municipality has limited control over cost escalation.</p> <p>Security of long term disposal solution.</p>
Technical	<p>Disadvantages</p> <p>Technology not proven at City's small scale.</p> <p>Would require additional investigation to ensure appropriateness of technology, such as a feasibility study, EOI, pilot study.</p>	<p>Disadvantages</p> <p>Technology proven at larger scale but not for smaller scale operations.</p>	<p>Advantages</p> <p>Landfilling is proven technology and common practice, no technical risks.</p>	<p>Advantages</p> <p>Landfilling is proven technology and common practice, no technical risks.</p>	<p>Advantages</p> <p>No technical risks.</p>

Alternative	Thermal Processing	Mechanical/Biological Treatment	Landfill Expansion	New Landfill Site	Waste Export
Criteria					
Social/Cultural	<p>Advantages</p> <p>SWMP indicated support for thermal technology.</p> <p>Disadvantages</p> <p>While some support expressed at public consultation for SWMP, uncertain whether community as a whole would support a thermal processing facility particularly due to high cost of alternative.</p>	<p>Advantages</p> <p>Large study area and low population density indicates good potential to resolve siting conflicts.</p> <p>Disadvantages</p> <p>Recovery of non-separated recyclables and stabilization likely would be viewed favourable, although residents may have issue with cost.</p>	<p>Advantages</p> <p>Land has already been taken out of use for anything but a landfill.</p> <p>Existing site is well established and has been in use for decades.</p>	<p>Disadvantages</p> <p>A new site removes land from future use for social/cultural activities. Siting a new landfill site commonly not favoured by general public.</p>	<p>Advantages</p> <p>No new or expansion of landfill required.</p> <p>Disadvantages</p> <p>No support for option expressed during SWMP process.</p>
Legal	<p>Advantages</p> <p>Potential for municipality to contract out operation/ownership of facility.</p> <p>Disadvantages</p> <p>Facility will require environmental approvals and on-going monitoring and reporting.</p> <p>Complex construction and operating vendor contract required to minimize risk to the alternative. Potential for contractual issues.</p>	<p>Advantages</p> <p>Potential for municipality to contract out operation/ownership of facility.</p> <p>Disadvantages</p> <p>Facility will require environmental approvals and on-going monitoring and reporting.</p> <p>Complex construction and operating vendor contract required to minimize risk to the alternative. Potential for contractual issues.</p>	<p>Advantages</p> <p>Potential for municipality to contract out operation/ownership of facility.</p> <p>Disadvantages</p> <p>Facility will require environmental approvals and on-going monitoring and reporting.</p>	<p>Advantages</p> <p>Potential for municipality to contract out operation/ownership of facility.</p> <p>Disadvantages</p> <p>Facility will require environmental approvals and on-going monitoring and reporting.</p>	<p>Advantages</p> <p>Potential for municipality to contract out operation/ownership of facility.</p> <p>Disadvantages</p> <p>Long term contract required with waste receiver, potential for contractual issues.</p>

7 Description of Local Environment

7.1 Technical/Infrastructure

The landfill site is located directly south of the City's main urban area and is approximately 1 km from the nearest residential area. Access to the landfill site is provided through Treatment Plant Road, which is a paved road that is also used to access the City's wastewater treatment plant. The entrance to the site is gated and includes a small building that serves as an office space. A paved ramp and weigh station is also located at the entrance of the landfill site.

The current landfill site was initially designed to operate as a natural attenuation site. A leachate collection toe drain and sand filter system were installed at the west boundary of the landfill in 1998. Leachate is currently collected and filtered through a 1,500m² sand filter bed. This leachate management system is a preventive measure to reduce metal concentrations, convert ammonia and nitrite into nitrate, and reduce suspended solids of the effluent discharged from the landfill. The existing leachate collection and treatment system includes:

- A collection dike to intercept runoff from the western part of the fill area;
- A perforated collection pipe (toe drain at west end of site) to collect runoff and leachate; and
- A sand filter to treat drainage and leachate, which is then discharged into a natural wetland.

A monitoring program is currently in place to monitor leachate, groundwater and surface water quality, in accordance with the MOECC's Amended Provisional CofA for the landfill site and Industrial Sewage Works (ISW) CofA Number 3-1055-98-996. The leachate collection system and monitoring program are described in more detail in Section 11.3

7.2 Site Physiography

The current landfill is located in an elongated massive granite bedrock depression that is open to the east and west and sloped down to the west. (Earth Tech 2008). Drainage is toward a nearby wetland, which in turn drains through First Creek and Angel Creek to Esten Lake (see Appendix G for the Groundwater and Surface Water Assessment report).

Figure 3: Location of Current Landfill Site



Background Image Source: The Atlas of Canada. <http://atlas.gc.ca/toporama/en/index.html>.

The site is bounded to the north and south by steep tree-covered ridges of Precambrian bedrock. Existing waste is located in the bedrock depression. The bedrock in the depression is covered by glacial till or sand and gravel. Localized relief exceeds 50 m. The east part of the Site slopes moderately eastward toward the Site entrance and the Elliot Lake wastewater treatment plant.

7.3 Area Geology and Hydrogeology

The Site is situated in an elongated bedrock depression which is open to the east and west. The site is bounded to the north and south by steep, tree-covered ridges of Precambrian bedrock.

The Site is underlain by thin (generally less than 1 m), discontinuous soils over bedrock. The west part of the Site is occupied by recent organic deposits comprising peat, muck and marshland material. The east part of the Site, in the vicinity of the Site entrance, contains a localized area of sandy alluvium. The bedrock comprises Archean massive to porphyritic granite intruded by Proterozoic dykes and sills of Nipissing diabase/gabbro. Differential erosion around the hard, resistant Nipissing intrusive rocks accounts for the bedrock valley and generally rugged topography around the Site. The east part of the Site is underlain by shallow soils (nil to 1.3 m) in the Site's bedrock valley between the existing waste fill area and the Site entrance.

The site physiography controls hydrogeological conditions at the Site. The bedrock valley floor slopes in two directions. The west part of the valley (where the existing waste fill area is located) slopes westward toward a wetland. The east part of the valley (where waste fill expansion is proposed) slopes eastward toward the Site entrance. The apex (or "saddle") of this valley floor is located at the east edge of the existing waste fill area.

Morrison Beatty Limited (1980) described the west part of the Site as a groundwater discharge area, with groundwater flow in thin soils toward the west discharging to a nearby stream in the centre of the wetland.

The landfill site is located in two separate drainage areas. In the west part of the Site, drainage from surrounding bedrock ridges flows towards the landfill and then westward to a nearby wetland. The wetland drains via First Creek to Angel Creek and then to Esten Lake. In the east part of the Site, drainage is towards the centre of the valley and the Site access road, then eastward toward the Site entrance. A drainage channel near the Site entrance drains southward to a larger stream 60 m to the south. This stream, which flows along the north side of the Elliot Lake wastewater treatment plant, flows to the southwest and eventually discharges to Esten Lake approximately 450 m southwest of the Site entrance.

Additional geotechnical/groundwater and surface water information is provided in the Groundwater and Surface Water Assessment provided in Appendix G.

7.4 Flora and Fauna

The landfill is located in a bedrock depression surrounded by steep treed ridges to the north and south and a mineral marsh to the west. Entrance to the site is by means of an asphalt access road from the east, which is primarily bordered by deciduous and mixed forest communities.

Vegetation in the area east of the existing landfill site is characteristic of a young early successional vegetation community. Trees are small in size, generally the same age and dominated entirely by White Birch with little-to-no understory. Non-native early successional ground cover species further reflect the disturbed nature of the community. A pocket of Sugar Maple, Red Maple and White Birch are present on a large rock outcrop that contains a plateau with a mixture of Sugar Maple, Red Maple and White Birch to the south east of the active landfill area. The area to the east of the active landfill that remains represents the largest vegetation community on site dominated by Hemlock and Cedar with occasional Yellow Birch, Red Oak, Sugar Maple, Large Toothed Aspen, and White Spruce.

A field survey was conducted to search for evidence of wildlife habitat. Several species were documented to occur, including Black Bear and White-tailed Deer. Evidence of pathways used by small and large mammals was also documented within the woodlands adjacent to the active landfill. The nature of the landfill and areas of exposed waste tend to attract wildlife to what is considered an easy and reliable food source. The presence of wildlife is not unexpected; however, a landfill site would not be considered significant habitat. Riparian areas associated with First Creek and Angel Creek located to the west and southwest of the landfill are likely to provide more suitable movement corridors.

At the eastern boundary of the area considered for expansion, there is a swamp/meadow marsh community documented as potential fish habitat. The feature is adjacent to the existing access road.

7.5 Archaeological Potential and Cultural Heritage

A screening for archaeological potential was completed using the Ministry of Tourism, Culture and Sport's (MTCS) "Criteria for Evaluating Archeological Potential" checklist (form 0478E). The result of the checklist was that the site had low archeological potential and that an archeological assessment would not be required.

A screening for cultural heritage was completed using MTCS's "Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes" checklist (form 0500E). The screening concluded that there is low potential for built heritage or cultural heritage landscape on the property.

A copy of each completed checklist is provided in Appendix D.

7.6 Socio-economic and Financial

Overall, the existing landfill is in a relatively isolated location with significant buffer, drainage, and leachate management options available to accommodate landfill expansion. The site is also in close proximity to the City of Elliot Lake municipal wastewater treatment plant. The existing landfill is a proven and established land use with no operating concerns.

Based on the SWMP, the net annual solid waste management cost for the City is \$606,314 (2009). This includes:

- \$284,391 per year for garbage collection (or \$94/tonne);
- \$486,727 per year for recycling collection, net of recycling revenues (\$171/tonne); and
- \$235,196 per year to operate the landfill site (or \$77/tonne).

Tipping fees for the landfill site include:

- Residential household waste (three garbage bags or less): no charge
- Household, construction and demolition, and bulky waste: \$60 per tonne
- Appliances (drained of Freon), sorted scrap metal, grass clippings and yard trimmings: no charge.

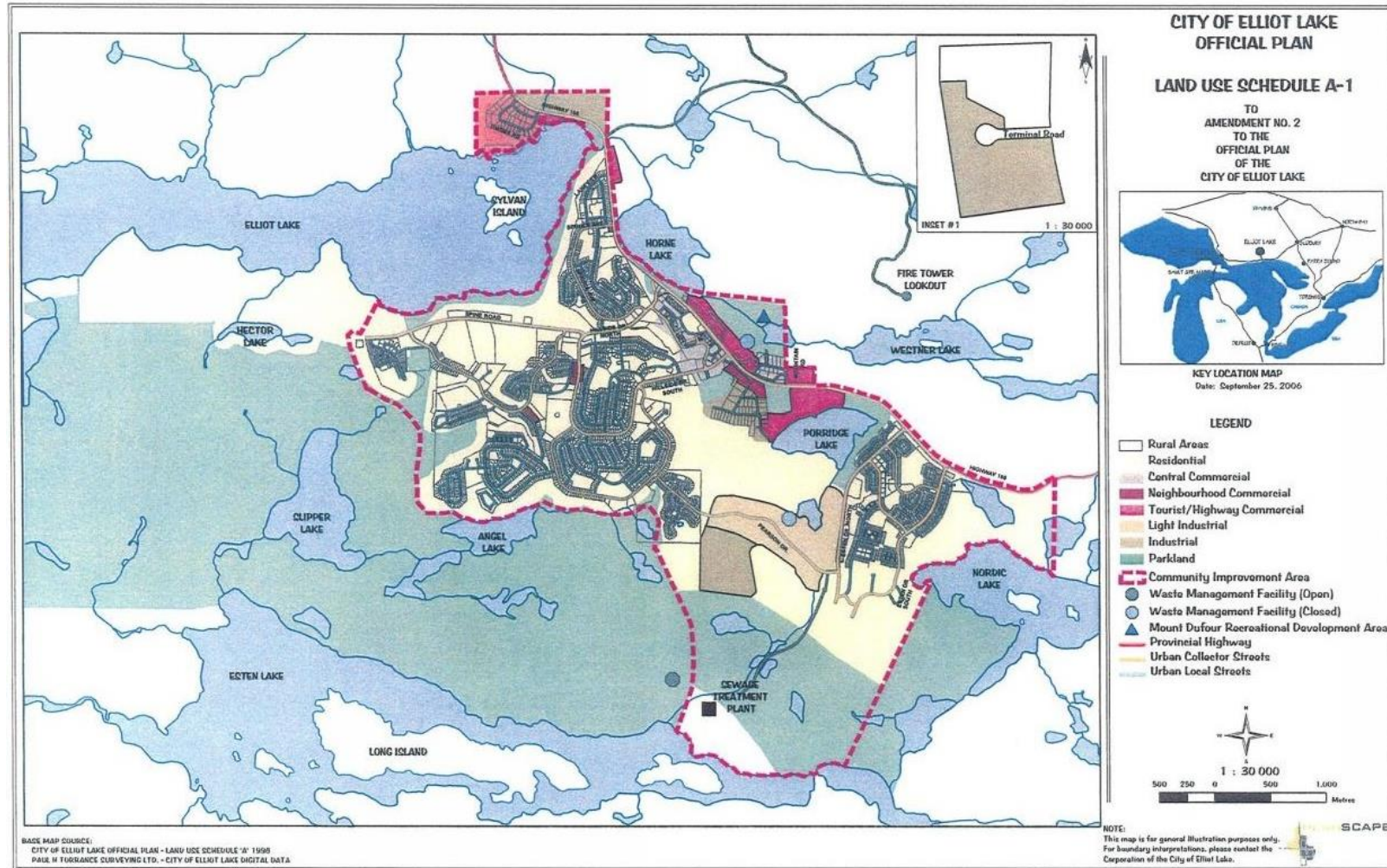
7.7 Legal/Jurisdictional

As noted in Section 4.5, Land Use Schedule A-1 of the City's Official Plan identifies the existing landfill area as "Waste Management Facility (Open)" and places it outside of the Community Improvement Area. The area surrounding the waste Management Facility (open) in all four directions is forested and designated as "parkland" in Schedule A-1¹³. Schedule A-1 is provided on the following page as Figure 4.

The City currently owns the land where the existing landfill is located (CL 2854, Part 1).

¹³ Planscape. *Official Plan for the City of Elliot Lake. Office Consolidation*. Land Use Schedule A-1. Prepared for the City of Elliot Lake. September 25, 2006.

Figure 4: City of Elliot Lake Official Plan Land Use Schedule A-1



8 Identification and Evaluation of “Alternative Methods”

8.1 Screening and Evaluation Process for Alternative Methods

The TOR for this EA included a process for the screening and evaluation of alternative methods to carry out the undertaking. As noted in Section 8.2 of the TOR, this methodology was intended to identify a preferred site for a new solid waste management facility. However, for the purposes of this EA, no new solid waste management site is required, as the preferred alternative to is to expand the existing landfill. To ensure alignment with the TOR, the methodology used to identify and evaluate landfill expansion options was kept consistent with the TOR. Table 16 presents the methodology for screening and evaluating alternative methods as described in the TOR and how the steps were applied in this EA. In short, the steps for screening and evaluating the alternative methods included:

- Identification of options for the landfill expansion;
- Screening of landfill expansion options based on feasibility;
- Selection of evaluation criteria for the screened alternative methods (i.e., expansion options);
- Evaluation of the alternative methods; and
- Selection of a recommended alternative method;

Table 15: Screening and Evaluation Process for Alternative Methods

Step	Section 8.2 TOR	Application in EA
1	Apply siting constraints to entire study area and identify those lands considered unconstrained for the siting of a processing and/or disposal facility. The proposed siting constraints are included in Appendix “C” – Table C-1. Lands within the study area which are constrained by any of the exclusionary criteria would be screened out for the purpose of moving forward in the site selection process.	The site of the expansion was already determined as the pre-existing landfill site. As such, this step does not apply. (While this step did not apply with respect to landfill expansion, a cursory review of the study area was made during the SWMP process, and it was clear that it would be difficult to identify a new site sufficiently clear of environmental constraints).
2	Identify a minimum site size requirement for the type of facility to be sited based on the preferred alternative selected.	The minimum size requirement of the expansion was determined in the EA and will be confirmed during detailed design.

Step	Section 8.2 TOR	Application in EA
3	Identify a “long-list” of siting opportunities in the un-constrained lands through a review of publicly owned lands and the issuance of a request for “willing host” properties. Review the “long-list” of sites to ensure that a reasonable range of alternatives are included on the list (e.g. sites in both municipalities, sites in both an urban and rural setting, etc.).	A long-list of expansion alternatives were identified and included a reasonable range of alternatives for expanding the landfill. These are described in Section 7.2.
3 b - optional	Optional. If it is determined that there is not a reasonable range of siting opportunities on the “long-list”, then a review of privately owned lands in the study area would be undertaken to identify additional siting opportunities with the same or better attributes than those publicly owned and “willing host” sites on the list. The owners of identified properties would be approached to determine if a negotiated acquisition of the property is feasible. Review the “long-list” of sites to ensure that a reasonable range of alternatives are included on the list.	The expansion would be taking place on the existing landfill site, which is owned by the municipality. As such, a review of privately-owned lands was not necessary.
3 c - optional	Optional. If it is still determined that there is not a reasonable range of siting opportunities on the “long-list”, then the constraints applied at Step 1 would be reviewed and relaxed in consultation with the public and government agencies. Steps 2 and 3 and, if necessary, 3(b) would then be re-applied. Step 3(c) would be repeated, as required, to arrive at a reasonable “long-list”. Only if absolutely necessary, the expropriation of privately held lands would be considered. This would be the approach of last resort for the purpose of siting a facility.	As the optional Step 3b was not required, neither was optional step 3c.

Step	Section 8.2 TOR	Application in EA
4	As a rule-of-thumb, a “long-list” site evaluation will be carried out if there are more than three (3) sites remaining after the application of siting constraints and consideration of available siting opportunities. The purpose of this level of evaluation is to eliminate less preferred sites from the list of sites under consideration using broad-based technical, economic and social criteria. The proposed “long-list” evaluation criteria are included in Appendix “C” - Table C-2. Their application would result in the identification of a “short- list” of alternative sites.	As there were more than three alternative methods identified, the long list was screened to determine a short list of alternative methods. As stated in the TOR, the purpose of this level of evaluation is to eliminate less preferred sites from the list of sites under consideration using broad-based criteria. The criteria in Table C-2 were strictly concerned with alternative sites and were not applicable to methods of expansion. The alternative methods for the landfill expansion alternatives were screened based on the physical constraints of the site. This screening is described in Section 9.
5	Evaluate the “short-list” of alternative sites using the same net effects analysis methodology described in Section 7.1 for the evaluation of “Alternatives to” resulting in the identification of a siting preference. The “short-list” comparative evaluation criteria are included in Appendix “C” - Table C-3.	The short-list of alternative methods were evaluated based on the evaluation criteria listed in Appendix C - Table C-3 of the TOR. The evaluation is provided in Section 9.

8.2 Identification of “Alternative Methods”

The evaluation of “alternative methods” considered five options for expanding the City’s existing landfill. The options were selected based on available directions in which expansion could occur. These included:

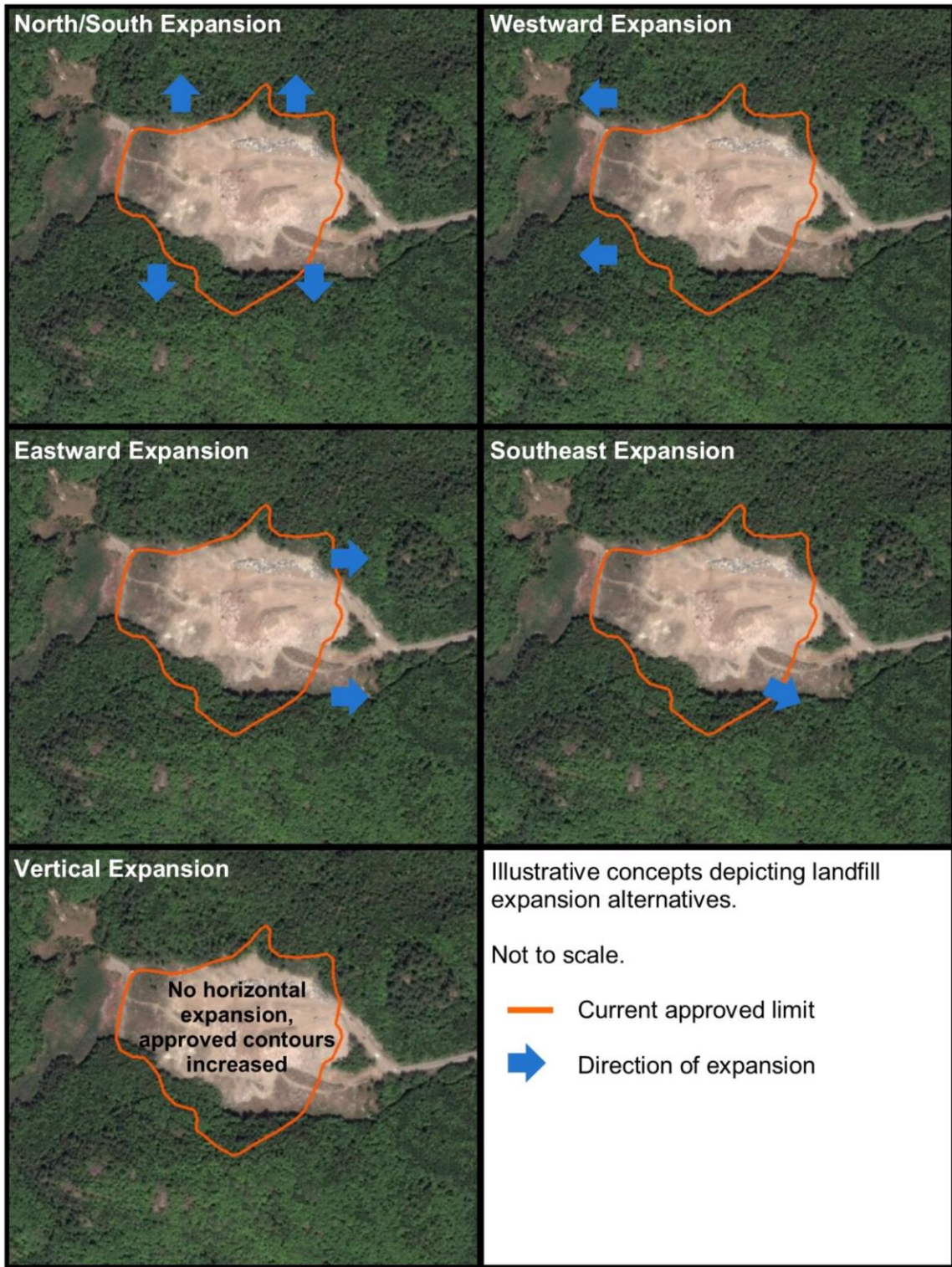
1. North/South Expansion – an expansion of the landfill area in a north/south direction;
2. Westward Expansion – expansion of the landfill area to the west of the existing landfill area;
3. Eastward Expansion – expansion of the landfill area to the east of the exiting landfill area;
4. Southeast Expansion – expansion of the landfill area to the southeast of the existing landfill area, with limited expansions to the north and south; and,
5. Vertical Expansion – adding to the approved elevation of the existing landfill area.

Figure 5 illustrates the expansion alternatives.

Evaluation of these methods is discussed in the following sections, beginning with a description of the local environment (i.e., the landfill area).

The evaluation of the “Alternative Methods is discussed in Section 9.

Figure 5: Landfill Expansion Concepts



8.3 Evaluation of “Alternative Methods”

The landfill topography and geography create a number of limiting factors that restrict the feasibility of some expansion options. The restrictions are discussed below in relation to five preliminary alternative methods that were considered for the expansion:

- Method 1 - North/South Expansion – The landfill area is constrained by steep bedrock ridges to its north and south. While some limited expansion to the north and south could be viable, a general expansion to these areas would not provide the capacity necessary for a long term solution. Therefore, expansion primarily in a north or south direction was not carried forward for further evaluation.
- Method 2 - Westward Expansion – The current landfill area is located within a bedrock depression that slopes and drains primarily to the west. The western edge of the existing fill area is adjacent to a wetland that drains through First Creek and Angel Creek to Esten Lake. A sand filter is located on the western side of the landfill site to act as a natural filter for ground and surface water. Because of the wet conditions on this side of the site, the presence of the stream, and concerns for potential erosion and drainage issues, a westward expansion was not considered viable and was not carried forward for further evaluation.
- Method 3 - Eastward Expansion – The review of site conditions indicated that an eastward expansion on the southern half of the landfill Site would be suitable for expansion. This option was carried forward for further evaluation.
- Method 4 - Southeast Expansion – An expansion of the landfill site that followed the natural contours of the site would lead the expansion in a southeast direction from the landfill. This was considered to be a potentially feasible option and was carried forward for further evaluation.
- Method 5 - Vertical Expansion – The originally approved contours had a top elevation of 335 masl. In discussions with City staff, it was learned that development to the originally approved elevation would create a steep slope and relatively small plateau at the top elevation contour which would create an unsafe work area for the landfill equipment. A vertical expansion would exacerbate this issue. Therefore, vertical expansion of the landfill area was not carried forward for further evaluation.

Based on the preliminary screening above, Method 3 – Eastward Expansion and Method 4 – Southeast Expansion was carried forward for further evaluation. The two landfill expansion options were then evaluated against the criteria outlined in Table C-3 of the TOR for the evaluation of alternative methods and as updated through the consultation process. While the criteria for “Alternative methods” in the TOR were designed for siting of a new processing and/or disposal facility rather than an expansion, the criteria have been applied to the alternatives for expansion. Table 16 describes the criteria and indicators used to evaluate the alternative methods, followed by the comparative evaluation in Table 17. The comparative evaluation shows that the eastern and the southeastern expansions have similar results for most of the evaluation criteria. However, the following evaluation criteria supported the southeastern expansion as follows:

- Geological – The eastern expansion is bounded by an upward rising slope, which would constrain the expansion. Excavation into the slope would be required if the expansion were to continue in an eastward direction. Alternatively, expansion of the landfill in a southeastern direction conforms to the natural geological surfaces.

- Capital Cost – The eastward expansion would require excavation into the eastward slope, which would add additional cost to the landfill expansion project. The expansion costs for the southeastern expansion would be relatively lower because it would follow the natural contours and would not require extensive excavation.

Based on the comparative evaluation, the southeastern expansion is considered the preferred alternative method.

Table 16: Evaluation Criteria and Indicators for Alternative Methods

Evaluation Category/ Criteria	Indicator
<i>Natural Environment</i>	
Air Quality and Noise Impacts	Relative amount of noise/air impacts
Potential Quality/Quantity Impacts on Ground and Surface Water	Contamination of ground or surface water
Potential Impacts on Environmentally Sensitive Areas and Species	Impacts on species at risk (birds, bats, snakes) and disruption of sensitive habitat
Potential Impacts on Vegetation	Clearing of wooded or other vegetated areas
Geological	Topographical constraints based on underlying geological features
Geotechnical	Feasibility to manage geotechnical constraints/site considerations
<i>Economic/Financial</i>	
Capital Cost	Cost to construction alternative
Operation and Maintenance Cost	Ongoing operation and maintenance costs
Disruption to Businesses	Number of businesses disrupted
<i>Technical</i>	
Compatibility with Existing Infrastructure	Amount and type of existing infrastructure incompatible with alternative
Design and Operational Flexibility	Ability of alternative to provide design and operational flexibility or allow for future expansion
<i>Social/Cultural</i>	
Potential Conflicts with Land Uses	Number and types of land use conflicts
Potential Impacts on Residential Areas	Number and types of impacts on residential areas
Potential Impacts on Parks and Recreational Areas	Number and types of impacts on parks and recreational areas
Potential Impacts on Institutional Facilities	Number and types of impacts on institutional facilities
Potential Impacts on Archeological and Cultural Resources	Archeological potential in expansion area
Potential Traffic Impacts (including avian impact on local airports)	Number and types of traffic impacts
<i>Legal</i>	
Type of Property Acquisition Required	Amount of property acquisition required
Complexity of Required Approvals	Relative number and complexity of approvals for alternative

Table 17: Comparative Evaluation of Alternative Methods

Evaluation Criteria	Method 3 – Eastward Expansion	Method 4 – Southeast Expansion	Preferred
Natural Environment			
Air Quality and Noise Impacts	Expansion would have potential air quality and noise impacts	Expansion would have potential air quality and noise impacts	Both alternatives equally preferred
Potential Quality/Quantity Impacts on Ground and Surface Water	Potential impacts can be mitigated through natural attenuation and/or the site's existing infrastructure	Potential impacts can be mitigated through natural attenuation and/or the site's existing infrastructure	Both alternatives equally preferred
Potential Impacts on Environmentally Sensitive Areas and Species	Potential impacts on species at risk (birds, bats, snakes) minimized through construction timing windows and staff education	Potential impacts on species at risk (birds, bats, snakes) minimized through construction timing windows and staff education	Both alternatives equally preferred
Potential Impacts on Vegetation	Expansion eastward would require some clearing of wooded area	Expansion southeastward would require some clearing of wooded area	Both alternatives equally preferred.
Geological	Eastward expansion bounded by natural slope; would require some excavation into slope for sufficient landfill space	Southeast expansion would follow the site's natural contours, minimizing any required excavation	Southeast expansion preferred , as expansion follows natural contours of site and minimizes any required excavation
Geotechnical	Expansions would have similar geotechnical design considerations, If subgrade is excavated to near bedrock elevations, there should be little stability concerns (pending detailed geotechnical investigation). Eastward expansion would require additional stability considerations as excavation of natural slope will be required.	Expansions would have similar geotechnical design considerations, If subgrade is excavated to near bedrock elevations, there should be little stability concerns (pending detailed geotechnical investigation).	Southeast expansion preferred , as expansion follows natural contours of site and minimizes any required excavation and as such minimizes geotechnical stability analyses
Economic/Financial			
Capital Cost	Higher relative capital cost compared to southeast expansion, as the eastward expansion would require excavation.	Lower capital cost relative to eastward expansion, as no slope excavation would be required.	Southeast expansion preferred , as the cost of expansion would be relatively lower than eastward expansion
Operation and Maintenance Cost	Expansions would have similar operation and maintenance costs	Expansions would have similar operation and maintenance costs	Both alternatives equally preferred
Disruption to Businesses	No disruption to businesses	No disruption to businesses	Both alternatives equally preferred

Evaluation Criteria	Method 3 – Eastward Expansion	Method 4 – Southeast Expansion	Preferred
<i>Technical</i>			
Compatibility with Existing Infrastructure	No incompatibility with existing infrastructure	No incompatibility with existing infrastructure	Both alternatives equally preferred
Design and Operational Flexibility	Eastward expansion has design and operational flexibility; additional lifts could potentially be added if future capacity required	Southeast expansion has design and operational flexibility; additional lifts could potentially be added if future capacity required	Both alternatives equally preferred
<i>Social/Cultural</i>			
Potential Conflicts with Land Uses	No potential conflicts with land uses	No potential conflicts with land uses	Both alternatives equally preferred
Potential Impacts on Residential Areas	No potential impacts on residential areas	No potential impacts on residential areas	Both alternatives equally preferred
Potential Impacts on Parks and Recreational Areas	No potential impacts on parks and recreational areas	No potential impacts on parks and recreational areas	Both alternatives equally preferred
Potential Impacts on Institutional Facilities	No potential impacts on institutional facilities	No potential impacts on institutional facilities	Both alternatives equally preferred
Potential Impacts on Archeological and Cultural Resources	Low archeological potential	Low archeological potential	Both alternatives equally preferred
Potential Traffic Impacts (including avian impact on local airports)	No potential traffic impacts from continuation of disposal at existing site	No potential traffic impacts from continuation of disposal at existing site	Both alternatives equally preferred
<i>Legal</i>			
Type of Property Acquisition Required	None (land owned by City)	None (land owned by City)	Both alternatives equally preferred
Complexity of Required Approvals	Similar level of complexity for approvals for both expansions	Similar level of complexity for approvals for both expansions	Both alternatives equally preferred

9 Potential Environmental Effects

9.1 Overview

The criteria used in the evaluation of the alternative methods were used as the basis to evaluate the potential net effects of the preferred landfill expansion method. These are discussed further below. The evaluation discusses the approaches developed or identified through this EA study that would eliminate or minimize any potential negative effects. Each potential net effect is described as being either high, medium, low, or nil. These ratings are defined as follows:

- High: the proposed expansion would have an on-going and significant or direct impact on the component of the environment being considered;
- Medium: the proposed expansion would have some residual impacts on the component of the environment being considered;
- Low: the proposed expansion would have little impact on the component of the environment being considered; and
- Nil: the proposed expansion would have no impact on the component of the environment being considered.

9.2 Natural Environment

9.2.1 Air Quality and Noise Impacts

Air quality impacts may include nuisance odours and dust. Nuisance odours may be generated by the waste being landfilled or from landfill gas emitted from the site. These odours would be managed by minimizing the active working face and applying daily cover, as well as using interim cover as required over inactive areas of the landfill. Areas filled to capacity would be closed and overlain with a constructed final cover and the establishment of vegetation.

Dust impacts would be minimized by using suitable road construction materials and completing routine road maintenance, which may include the application of dust suppressants.

More detailed information on landfill gas emissions and dust impact for the expanded waste footprint will be detailed in an Air Emissions and Dispersion Modelling Report prepared in support of an application for an Environmental Compliance Approval (ECA), as required.

Noise levels from regular operations are not expected to increase compared to current levels. Noise levels may increase while the expansion is being constructed, but it is anticipated that these increases can be mitigated by general operational controls at the site. There are few noise receptors near the landfill site, as it is in a remote location (approximately 1 kilometre from the nearest residential neighbourhood) and surrounded by forest cover on all sides. A detailed noise assessment will be conducted when applying for the EPA approval.

Anticipated Net Environmental Effects

It is anticipated that the impact on air quality and noise at and around the landfill site would be **LOW**.

9.2.2 Potential Quality/Quantity Impacts on Ground and Surface Water

The quality of leachate or groundwater would not be expected to decrease due to the increased fill area, as groundwater in this expansion area is believed to flow towards the leachate management system. However, more groundwater could be exposed to fill, which may cause water quality entering the leachate management system to degrade. Contaminated surface water and leachate would be directed to the existing on-site leachate attenuation and treatment system west of the site that would be expanded if needed to accommodate any additional flows. A new leachate collection system (toe drain, leachate sump and pump, forcemain) would be constructed east of the landfill if it is determined that leachate from the east part of the landfill drains easterly and not westerly toward the existing sand filter system. All leachate collected from the site would be conveyed to the existing or expanded sand filter system or directly to the City's waste water treatment plant (WWTP), located in close proximity to the landfill, as determined during the ECA approvals process. Furthermore, a low permeability cap would be used for final cover, reducing the amount of leachate generated as less rainfall would infiltrate into the fill.

With respect to surface water, the installation of a low permeability cap coupled with an expanded landfill area could result in increased surface runoff. If all of the increased runoff is conveyed to the sand filter, then the sand filter could be exposed to higher peak flows and higher treatment volumes.

The general approach to manage potential impacts to ground and surface water quantity and quality would be to maintain and use existing leachate and runoff controls with the addition of drainage swales along the north and south perimeter to convey runoff to the existing sand filter system. The new swales would be designed, at a minimum, for a storm with a two-year return period with excess runoff overflowing into the surrounding natural area. If required, storage ponds and low slope swales can be used to attenuate peak flows and reduce sediment load on the sand filter.

The detailed design of the leachate and drainage system would be prepared during the ECA application process and would consider:

- Calculation of the impact of increased surface area and low permeability cover to leachate and runoff generation rates; and
- A performance review of the sand filter to determine if additional loading can be managed with the existing footprint or if an expansion to the filter is required.

Inspection would be carried out weekly for visual evidence of leachate seeps. Where leachate seeps are identified, the area would be isolated from the surface water drainage system until the seep is repaired. Repair of leachate seeps would commence as soon as possible.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on ground and surface water quality and quantity would be **LOW**.

9.2.3 Potential Impacts on Environmentally Sensitive Areas and Species

While no environmentally sensitive areas were identified in the project area, the Natural Sciences investigation did identify the following environmentally sensitive areas in proximity to the project area:

- An unevaluated wetland is located west of the project area; however, this area would not be impacted by the landfill expansion since the expansion would be situated on topography that slopes away from the wetland.
- An Environmentally Significant Area (sensitive wildlife) further west of the landfill site, as identified by the City of Elliot Lake Official Plan. It appears this area is associated with First Creek. No detail was available regarding the species utilizing the area. As the proposed landfill expansion would be located in the opposite direction from this feature, and would be situated on topography that slopes away from the area, this area would not be impacted.

A desktop and field investigation were conducted to assess for potential impacts on Species at Risk (SAR). Two SAR were observed on-site: the Northern Myotis and the Bald Eagle. The Northern Myotis is a bat that is classified (COSSARO) as endangered. Northern Myotis are threatened by a disease known as white nose syndrome, caused by a fungus that grows in humid cold environments, such as the caves and mines where bats hibernate. Hibernation occurs from October or November to March or April, most often in caves or abandoned mines. The Northern Myotis is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon. During the field investigations, no potential hibernacula were identified on the site. Calls of bat activity were analyzed to the species level and included 7 calls for this species at one location. The Natural Sciences investigation concluded that avoidance of disturbance to any potential roosting activity could be achieved through use of timing windows for construction activities to avoid roosting periods.

The Bald Eagle is considered a species of special concern. During the December 2012 field investigations, a group of juvenile and adult eagles was observed feeding on material on the active landfill face. Individuals were also observed during the summer 2014 field surveys. No stick nests were observed in the project area during the field investigations. The Natural Sciences investigation concluded that the birds are likely using the landfill for scavenging purposes rather than breeding.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on Environmentally Sensitive Areas and Species would be **LOW**.

9.2.4 Potential Impacts on Vegetation

The preferred expansion alternative would require some clearing of vegetation, including forest communities containing Hemlock, Yellow Birch, Sugar Maple, and Poplar. Where forested communities are affected, impacts are anticipated to be in the form of vegetation removal to accommodate the expansion of the facility. The removal of trees is associated with the loss of habitat for wildlife, and although activity in the forest edges appeared to be limited in the surveys conducted, the adjacent contiguous woodland where higher quality habitat occurs would experience edge disturbance effects associated with expansion activities. Examples of edge disturbance include exposure to noise, light, and wind effects associated with landfill construction and operation in areas of woodland that were previously buffered from these disturbances by existing vegetation. Such disturbances may alter the present structure and composition of vegetation communities to more

edge-tolerant species. Where impacts are unavoidable, efforts to reduce impacts through vegetation management plans, vegetation protection measures, silt/sediment controls to protect aquatic habitat and timing windows for construction activities to avoid impacting wildlife or aquatic habitat and communities would be employed. Where feasible, expansion would occur within already disturbed areas to minimize impacts to the adjacent woodlands. Pre-stressing of trees and vegetation to edge effects can also be considered to allow the adjacent forest community to acclimatize to edge conditions in advance of future expansion of the active landfill area.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on vegetation would be **LOW**.

9.3 Economic/Financial

9.3.1 Capital Cost

The estimated capital cost for the landfill expansion is approximately \$2.42M. This includes:

- Site Design and Construction: \$745,000
- Leachate Management: \$403,600
- Stormwater Management: \$80,000
- Access Roads: \$62,500
- Final Cover: \$500,000
- Engineering and Contingencies: \$627,000

9.3.2 Operation and Maintenance Cost

With the exception of the installation and monitoring of a number of new monitoring wells, the operating and maintenance cost will not significantly change from the cost to manage the existing site.

9.3.3 Disruption to Businesses

The landfill site is located approximately 1 km from the nearest neighbourhood and is not proximate to any businesses. The expansion would not be likely to cause any significant change in operations or increase in the amount of waste hauled to the site. Therefore, no negative impacts to businesses would be expected from the expansion.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on local businesses would be **NIL**.

9.4 Technical

9.4.1 Compatibility with Existing Infrastructure

The proposed landfill expansion would result in a continuation of operations of the existing facility. As there are no current incompatibilities of the existing operation with existing infrastructure, the proposed expansion would be a continuation of and therefore, be compatible with existing infrastructure.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on the landfill's compatibility with existing infrastructure would be **NIL**.

9.4.2 Design and Operational Flexibility

The proposed design of the landfill expansion would not impact on the facility's current design and operational flexibility. For example, should the site require additional capacity in the future, this could potentially be achieved through the construction of additional lifts. Furthermore, execution of the landfill expansion does not prevent or preclude the City from implementing other waste management diversion, processing or disposal programs.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on the landfill's design and operational flexibility would be **NIL**.

9.5 Social/Cultural

9.5.1 Potential Conflicts with Land Uses

The landfill site is situated outside of the City's Community Improvement Area. It is approximately 1 km from the closest existing neighbourhood and 600 m from land that is currently vacant but designated as residential in the City's Official Plan.

The closest active facility to the landfill site is the municipality's wastewater treatment facility, which is located approximately 600 m from the landfill site. Expansion of the landfill would not be expected to interfere with the operation of the wastewater treatment facility or conflict with other land uses.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on local land uses would be **NIL**.

9.5.2 Potential Impacts on Residential Areas

As noted above, the landfill site is located approximately 1 km from the closest neighbourhood. The land between the neighbourhood and landfill site is undulating and densely forested.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on residential areas would be **NIL**.

9.5.3 Potential Impacts on Parks and Recreational Areas

The landfill site is not immediately proximate to any parks or recreational areas.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on parks and recreational areas would be **NIL**.

9.5.4 Potential Impacts on Institutional Facilities

There are no institutional facilities located within 1 km of the landfill site.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on institutional facilities would be **NIL**.

9.5.5 Potential Impacts on Archaeological and Cultural Resources

A screening was completed for archeological potential and for built heritage resources and cultural heritage landscapes. The screenings concluded that the project area had low archeological potential and low potential for built heritage or cultural heritage landscape on the property. Therefore, no impact on archeological or cultural resources are expected.

If deeply buried archaeological finds are discovered during construction activities, MTCS should be notified promptly as a licensed archaeologist may be required to immediately monitor the site.

In the event that human remains are found, the local police must be notified immediately, followed at once by notification to MTCS.

Anticipated Net Effects

It is anticipated that the impact of the proposed landfill expansion on archeological and cultural resources would be **LOW**.

9.5.6 Potential Traffic Impacts (including avian impact on local airports)

The expansion of the landfill site would not lead to an increase in the amount of waste delivered for disposal. Therefore, the expansion would not be expected to lead to an impact in traffic impacts. Furthermore, daily cover (soil) would be applied to the waste disposed which would deter birds from scavenging.

Anticipated Net Effects

It is anticipated that the potential traffic impacts including avian impact on local airports, arising from the proposed landfill expansion would be **LOW**.

9.6 Legal

9.6.1 Type of Property Acquisition Required

The City currently owns the property where the landfill expansion would occur. Therefore, no property acquisition would be required.

9.6.2 Complexity of Required Approvals

The landfill expansion would require EA and EPA approvals. EA studies have determined that the landfill expansion is a feasible option as a long term disposal solution for the City. In Canada, landfill facilities are the most common option for waste disposal and therefore, while rigorous, the approval process is well established and documented.

With respect to the Ontario *Adams Mine Lake Act* (2004), the proposed expansion does not include expansion of the disposal area into any lake or wetland as defined by the Act; therefore, the proposed expansion is within compliance of the *Adams Mine Lake Act*.

The complexity of required approvals, arising from the proposed landfill expansion would be **MEDIUM**.

10 Identification of the Undertaking

10.1 Overview

The proposed landfill expansion would accommodate an additional 25 years of waste disposal needs for the City of Elliot Lake. Based on an estimated fill rate of 12,000m³ per year, the expansion would need to allow for an additional 300,000m³ of capacity, plus an additional 75,000m³ for final cover, for an approximate volume of 375,000m³.

A survey completed in April 2012 by Paul H. Torrance Surveying Ltd. Calculated that the estimated remaining volume in the landfill site until closure was approximately 145,000 m³. However, in 2013 approximately 10,000 m³ of demolition waste was deposited in the landfill. Based on an estimated 20% of remaining volume required for final cover and a fill rate of approximately 12,000 m³ per year, the landfill is estimated to reach capacity in 2020. Therefore, the proposed expansion would provide the City with solid waste disposal capacity to the year 2045.

The proposed expansion would be designed and constructed to mitigate potential negative impacts to the surrounding environment. This includes surface and ground water, noise, dust, litter, odour, and vector control.

10.2 Landfill Expansion

The final design of the expanded City of Elliot Lake Landfill would consider all relevant environmental and regulatory requirements (see Section 12). These would include (but not be limited to) the following design considerations:

- Establish and maintain adequate buffer zones;
- Geotechnical and hydrogeological constraints;
- Protection of adjacent and surrounding ground and surface water resources;
- Site operations to address and control noise, dust, odour, litter, and pest issues;
- Site monitoring and record keeping for annual reporting and environmental certification; and
- Site management, monitoring, and development of contingency plans as necessary.

The proposed expansion area would be excavated and graded as needed so that a minimum area of landfill is open at any time to precipitation infiltration and leachate generation. In general, the base of the expansion area footprint would be excavated to near bedrock elevation. Base grades would promote leachate flow to the leachate management system (LMS) and clean surface water would be directed away from the landfill and LMS. The perimeter of the new footprint would include a 1.5 to 2 m high soil berm with 1:1 side slopes that would be keyed into the underlying soil to contain leachate within the area. The specifications for the berm footings will be established after completion of a comprehensive geotechnical investigation. In shallow soils, it is likely that the berm will be keyed into bedrock, even if the soils are >600 mm in places. In thicker soils, the 600 mm specification may be more appropriate, but only after completion of the geotechnical investigation and design.

The proposed final contours, excluding final cover are shown in Figure 5. The final contours of the expanded landfill would have maximum side slopes of 4 horizontal to 1 vertical (4:1) on the west, 8:1

on the east and a top slope of about 5 percent. The maximum elevation of the landfill, including final cover, would be approximately 328 masl.

Figure 6 depicts the original approved final contours (1984). The side slopes are 4H:1V from the edge of the existing fill area to the top elevation of 335 masl. Construction of the site to those elevations and side slopes had commenced; however, it was learned that development of the site to the originally approved elevation is not reasonable.

The proposed new final contours (Figure 7) alter the 1984 approved final contours by reducing the 335 masl final contour to 328 masl, expanding the fill area by about 0.79 ha, and flattening the slope to the east. The east slope would become 6 percent and would be suitable for future access to the top of fill area. The access road to the fill area will have a maximum grade that does not exceed 10 percent. The east limit of waste is beyond the limit of waste shown in the 1984 drawings. At the ECA design stage, a detailed assessment of grades would be undertaken to integrate the proposed final contours into adjacent site topography, provide drainage control and leachate management, and confirm the final landfill expansion volume. The final contour design modification at the ECA approvals stage would not result in an increase in the proposed landfill volume. The ECA application will include detailed calculations confirming the volumetric capacity based on the geometric design of the site and confirmation of the sufficiency of the expanded space within the City-owned land of the 15.7 hectare site. Figure 8 presents a site plan comparing the existing approved and proposed expanded limits of fill.

Preparation of the fill area would begin as soon as the City received an approval to its current operating ECA to allow for solid waste disposal operations to continue uninterrupted. Advanced site and Fill Area preparation activities would include:

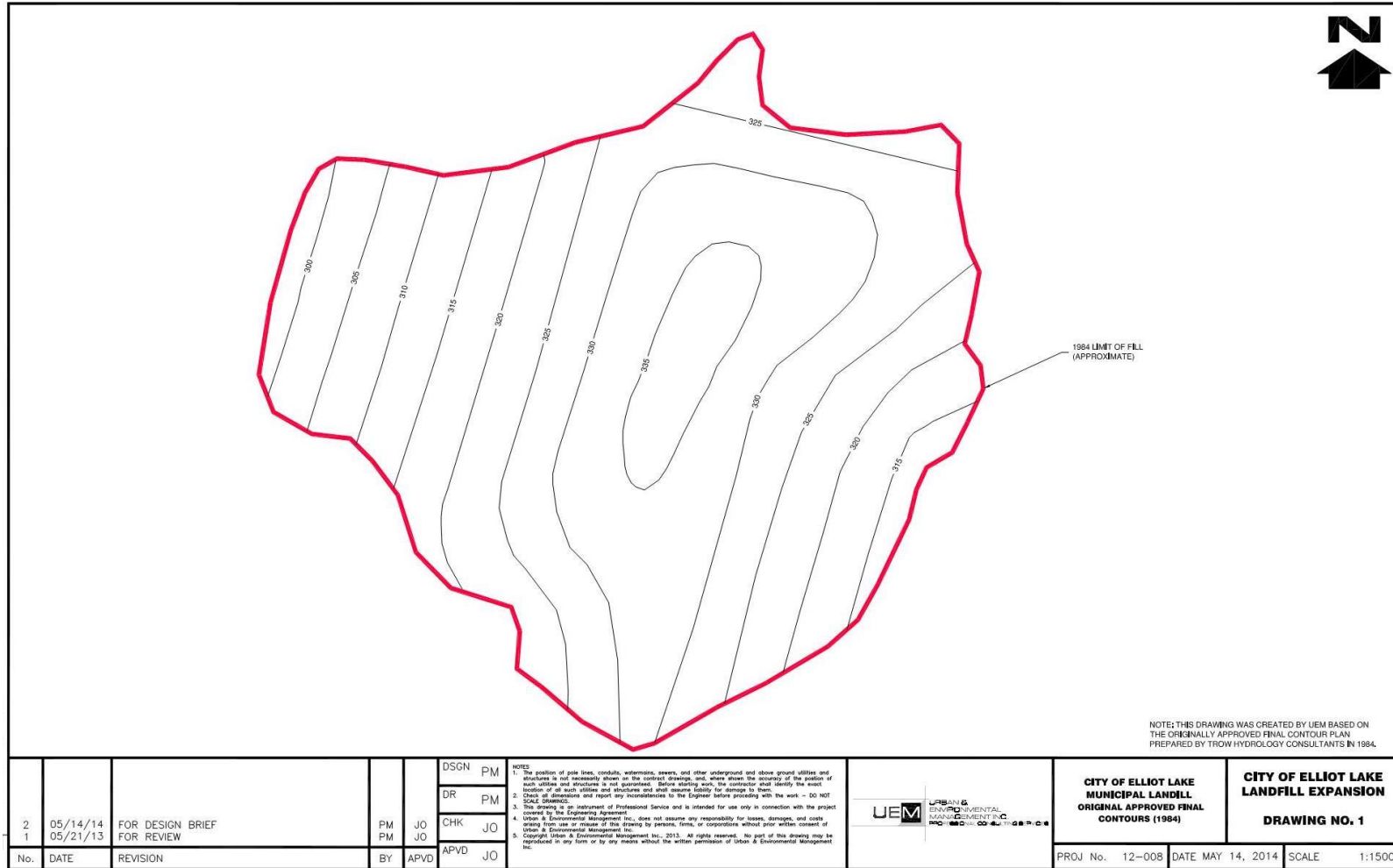
1. Undertaking a detailed topographic survey of the fill area and surrounding area to complete final detailed design drawings;
2. Clearing and grubbing of the new Fill Area and removal of stockpiles in the area;
3. Construction of the perimeter berm, drainage swales and culverts;
4. Grading of the Fill Area to promote leachate flow to the sand filter system;
5. Relocation of access roads and construction of new roads;
6. Relocation of site facilities and construction of new operating/storage areas; and
7. Construction of and new leachate collection and treatment system (if needed).

The new fill area would be graded in accordance with approved design drawings to effectively manage and separate runoff and leachate. Along the perimeter of the Fill Area, a 1.5 to 2 m high berm would be constructed for drainage control. Soil for the perimeter berm would be obtained on site if possible or supplemented by imports if necessary.

The landfill expansion will not extend the waste disposal site into any of the nearby water bodies, thereby confirming with Section 27 (3.1) of the Environmental Protection Act, which states that "Despite subsection (1), no person shall use, operate, establish, alter, enlarge or extend a waste disposal site where waste is deposited in a lake. 2004, c. 6, s. 7 (1).¹⁴"

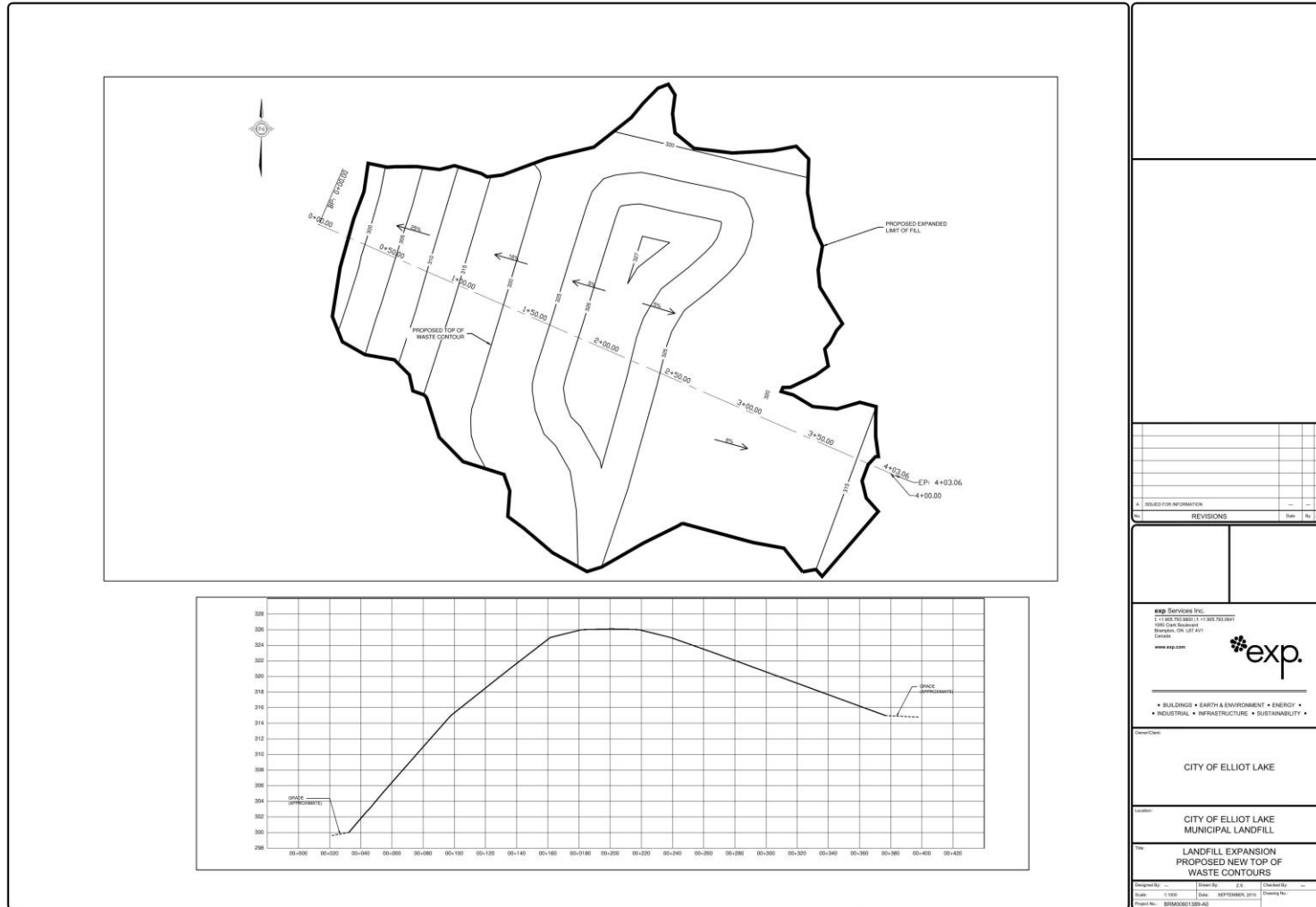
¹⁴ Environmental Protection Act, R.S.O. 1990, c. E.19. Section 27 (3.1).

Figure 6: Original Approved Final Contours (1984)



2 1	05/14/14 05/21/13	FOR DESIGN BRIEF FOR REVIEW	PM PM	JO JO	DSGN	PM	NOTES: 1. The position of pole lines, conduits, waterlines, sewers, and other underground and above ground utilities and structures is not necessarily shown on the contour drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting work, the contractor shall identify the exact location of all such utilities and structures and shall assume liability for damage to them. 2. Check all dimensions and report any inconsistencies to the Engineer before proceeding with the work - DO NOT SCALE DRAWINGS. 3. This drawing is an instrument of Professional Service and is intended for use only in connection with the project covered by the Engineering Agreement. 4. Urban & Environmental Management Inc. does not assume any responsibility for losses, damages, and costs arising from use or misuse of this drawing by persons, firms, or corporations without prior written consent of Urban & Environmental Management Inc. Copyright Urban & Environmental Management Inc., 2013. All rights reserved. No part of this drawing may be reproduced in any form or by any means without the written permission of Urban & Environmental Management Inc.	UEM URBAN & ENVIRONMENTAL MANAGEMENT INC. 200-883-0000	CITY OF ELLIOT LAKE MUNICIPAL LANDFILL ORIGINAL APPROVED FINAL CONTOURS (1984)	CITY OF ELLIOT LAKE LANDFILL EXPANSION DRAWING NO. 1			
					BR	PM					CHK	JO	APVD
No.	DATE	REVISION	BY	APVD				PROJ No.	12-008	DATE	MAY 14, 2014	SCALE	1:1500

Figure 7: Proposed Landfill Expansion



No.	REVISIONS	Date	By	App

exp. Services Inc.
 17150 260 Street | #1000-700-0001
 1600 Glenborough |
 Burnaby, BC V5L 4Y1
 Canada
 www.exp.com

exp.

• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
 • INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

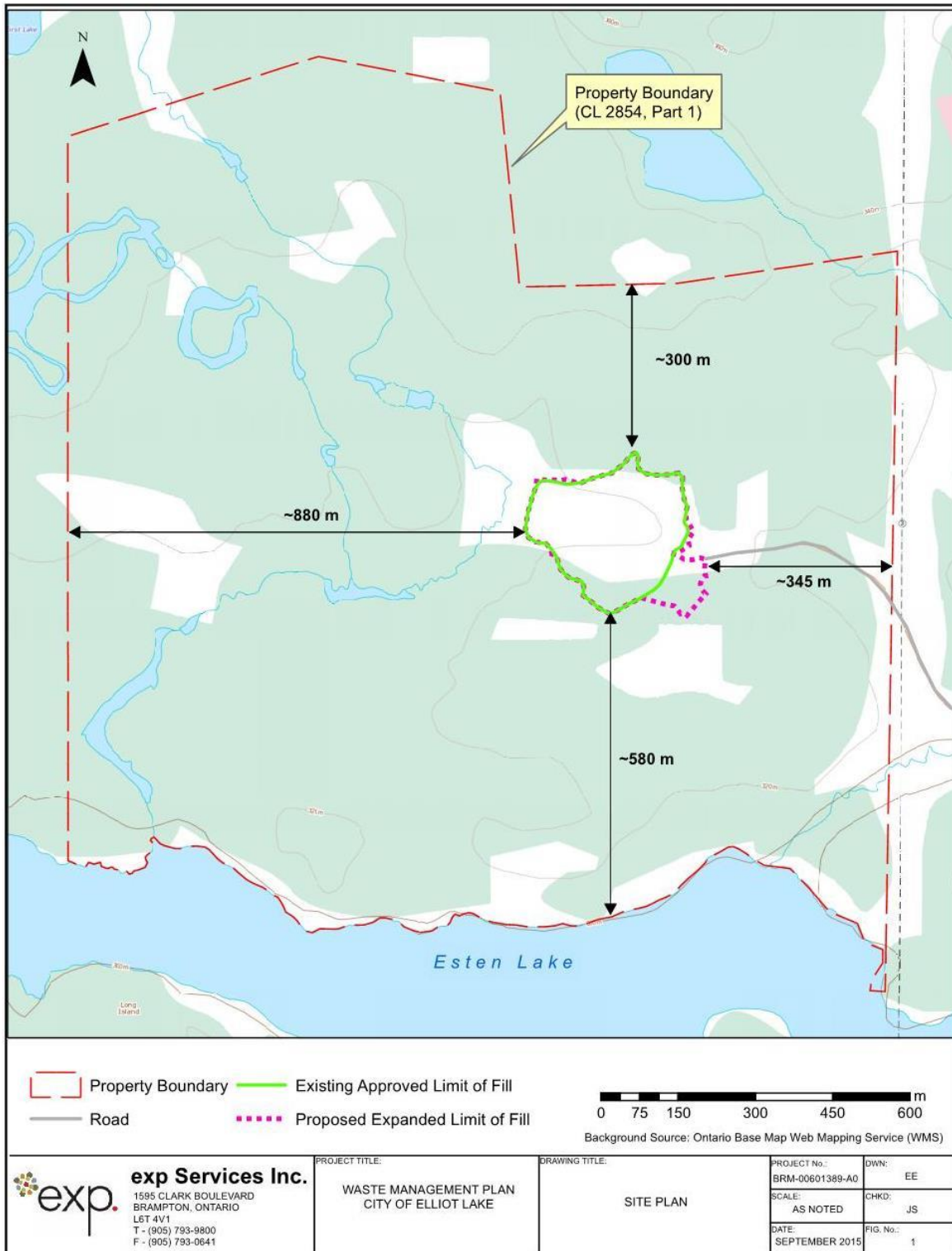
CITY OF ELLIOT LAKE

CITY OF ELLIOT LAKE
 MUNICIPAL LANDFILL

LANDFILL EXPANSION
 PROPOSED NEW TOP OF
 WASTE CONTOURS

Designed by: ---	Drawn by: J.S.	Checked by: ---
Scale: 1:1000	Date: 28/07/2015	Drawing No.: ---
Project No.: 20140001300-00		

Figure 8: Site Plan (Existing and Proposed Limits of Fill)



10.3 Leachate Management

10.3.1 Existing Leachate Management Program

The current landfill site was initially designed to operate as a natural attenuation site. A leachate collection toe drain and sand filter system were installed at the west boundary of the landfill in 1998. Leachate is currently collected and filtered through a 1,500m² sand filter bed. This leachate management system is a preventive measure to reduce metal concentrations, convert ammonia and nitrite into nitrate, and reduce suspended solids of the effluent discharged from the landfill. The existing leachate collection and treatment system includes:

- A collection dike to intercept runoff from the western part of the fill area;
- A perforated collection pipe (toe drain at west end of site) to collect runoff and leachate; and
- A sand filter to treat drainage and leachate, which is then discharged into a natural wetland.

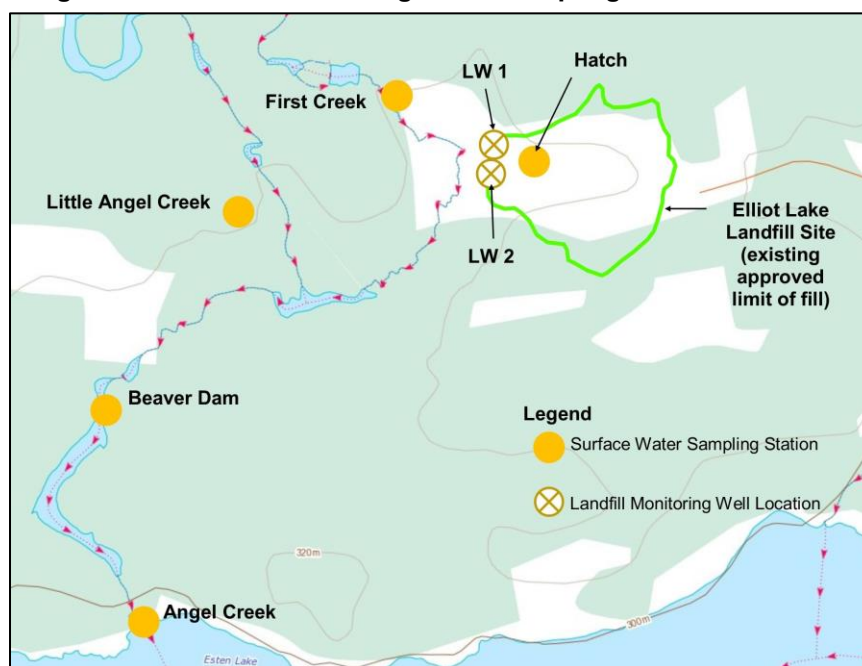
A monitoring program is currently in place to monitor leachate, groundwater and surface water quality, in accordance with the MOECC's Amended Provisional CofA for the landfill site and Industrial Sewage Works (ISW) CofA Number 3-1055-98-996. The monitoring program consists of the following tasks:

- Leachate, groundwater and surface water samples are collected in three times per year (once each in the spring, summer and fall); sampling locations are depicted in Figure 9);
- Leachate samples are collected from the leachate collection system, which consists of a maintenance hole upstream of the sand filter bed;
- Ground water samples are collected from monitoring wells LW-1 and LW-2 are near the toe of the landfill and downgradient of the leachate collection and sand filtration system (less than 30 m downgradient from the sample hatch);
- Surface water samples are collected at four stations: First Creek, Little Angel Creek (which is also known as Upper Angel Creek), Beaver dam and Angel Creek. The stations each have their own specific monitoring purpose:
 - First Creek – upstream of leachate discharge point, acts as background surface water monitoring station;
 - Little Angel Creek – located upstream of confluence of Angel Creek with First Creek, which drains from landfill drainage area;
 - Beaver dam – located on Angel Creek; downstream of confluence of Angel Creek with First Creek; monitors potential impacts to Angel creek near confluence;
 - Angel Creek – located on Angel Creek near Asten Lake; monitors potential landfill impacts to Angel Creek prior to discharge to Asten Lake.
- Leachate, groundwater and surface water samples are analyzed for the following parameters:
 - Dissolved metals;
 - Hardness;
 - Nitrite;

- Nitrate;
- Total phosphorus;
- Phosphate;
- Chemical Oxygen Demand (COD);
- Biological Oxygen Demand (BOD; and
- Phenls.

Since 2013, the City has also collected water samples from a drilled well located near the wastewater treatment plant (approximately 800 m southeast of the landfill) for the purpose of collecting background groundwater quality data¹⁵.

Figure 9: Leachate Monitoring Water Sampling Locations



Background Image Source: The Atlas of Canada. <http://atlas.gc.ca/toporama/en/index.html>
Sample locations: Pinchin Environmental. 2014 Annual Monitoring Report Elliot Lake Landfill. March 2015.

The 2014 monitoring report presents the monitoring results for that and previous years. Some key observations from the 2014 Monitoring Report include:

- The 2014 leachate samples from the sample hatch exceeded the MOECC's Reasonable Use Criteria (RUC) for iron, manganese, sodium, alkalinity, hardness, nitrate and nitrate.

¹⁵ Pinchin. 2014 Water Quality Monitoring Assessment, Esten Township, Elliot Lake Landfill, Elliot Lake, Ontario. March 31 2015.

- With the exception of aluminum, all of the values for these seven parameters were elevated in the leachate samples relative to the downgradient groundwater samples from LW-1 and LW-2.
- RUC exceedances were noted for the non-health related parameters at downgradient monitoring wells LW-1 and LW-2 for one or more of the chemical parameters aluminum, iron, manganese and hardness. These parameters are aesthetic objectives and operational guidelines, which are non-health related.
- One RUC exceedance was noted for health related parameter lead at LW-1 during the summer and fall of 2014; however, the lead results were still below the ODWS.
- With the exceptions of the exceedances noted above, the Guideline B-7 RUC is met for all other parameters at LW-1 and LW-2.
- Elevated values of trace metals found in the surface water sample locations downstream of the landfill site (Beaver Dam and Angel Creek) are also found in the background surface water sample locations (Little Angel Creek and First Creek). This indicates that the elevated levels of trace metals in surface water are being affected by impacts that may or may not be related to the landfill.
- Levels for total phosphorous are elevated at the First Creek surface water station (upgradient of the landfill) as well as the Beaver dam and Angel Creek locations (downgradient of the landfill).

Data from the monitoring program comparing various parameters at the leachate hatch and LW-1 and LW-2 help illustrate the performance of the landfill's filter system (see Figures 10 - 16). The results consistently show that the contaminant levels in LW-1 and LW-2 are significantly lower than in the leachate sample hatch. Given the proximity of the sample locations, this indicates that the sand filter bed has been effective in attenuating leachate contaminant levels.

Figure 10: Leachate Monitoring Program Time Series - Iron (2004 - 2014)

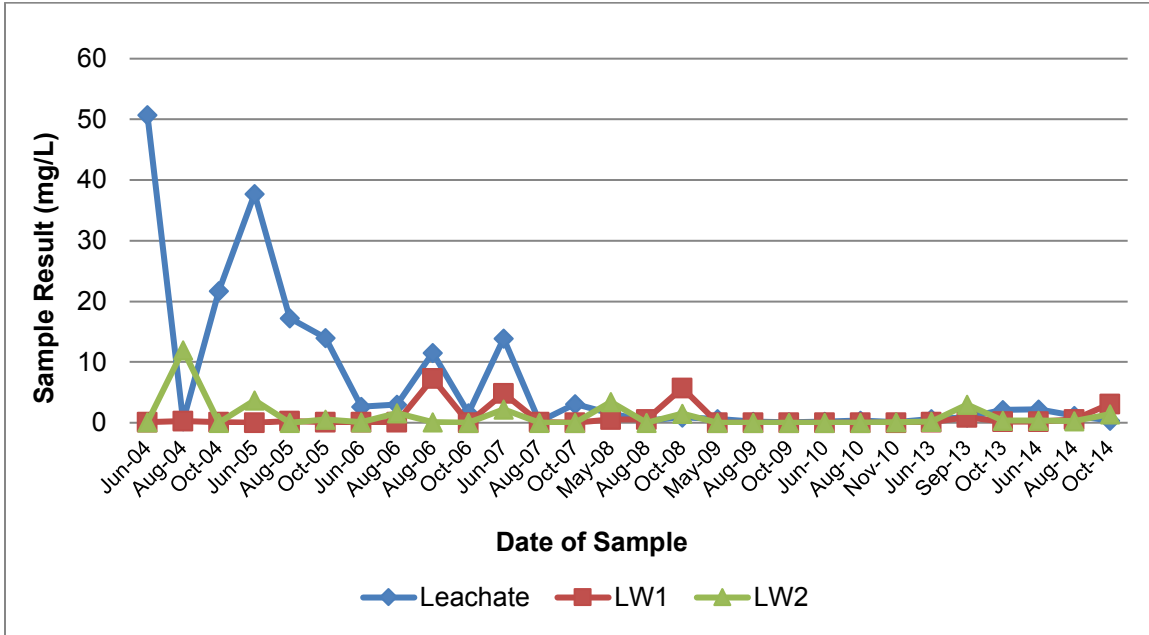


Figure 11: Leachate Monitoring Program Time Series - Manganese (2004 - 2014)

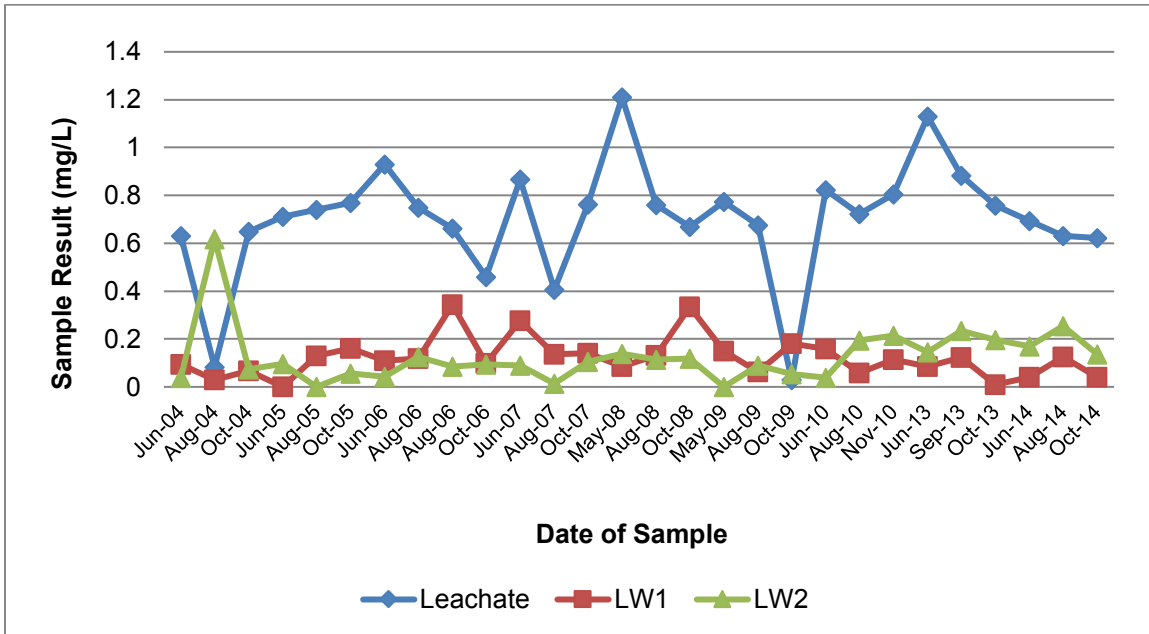


Figure 12: Leachate Monitoring Program Time Series - Hardness (2004 - 2014)

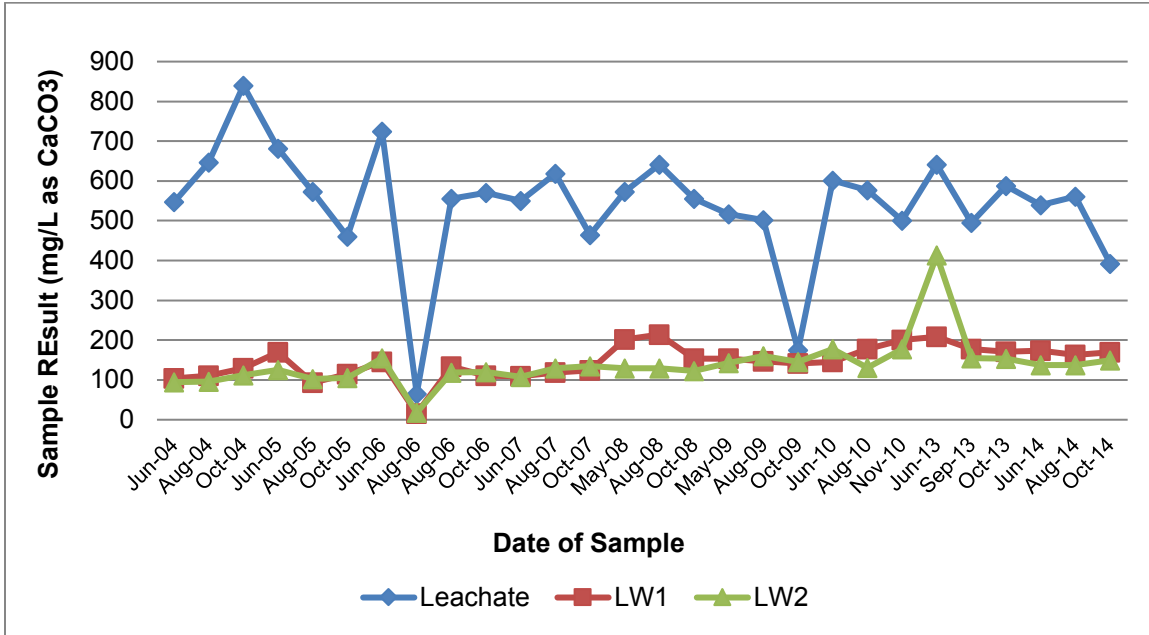


Figure 13: Leachate Monitoring Program Time Series - Sodium (2004 - 2014)

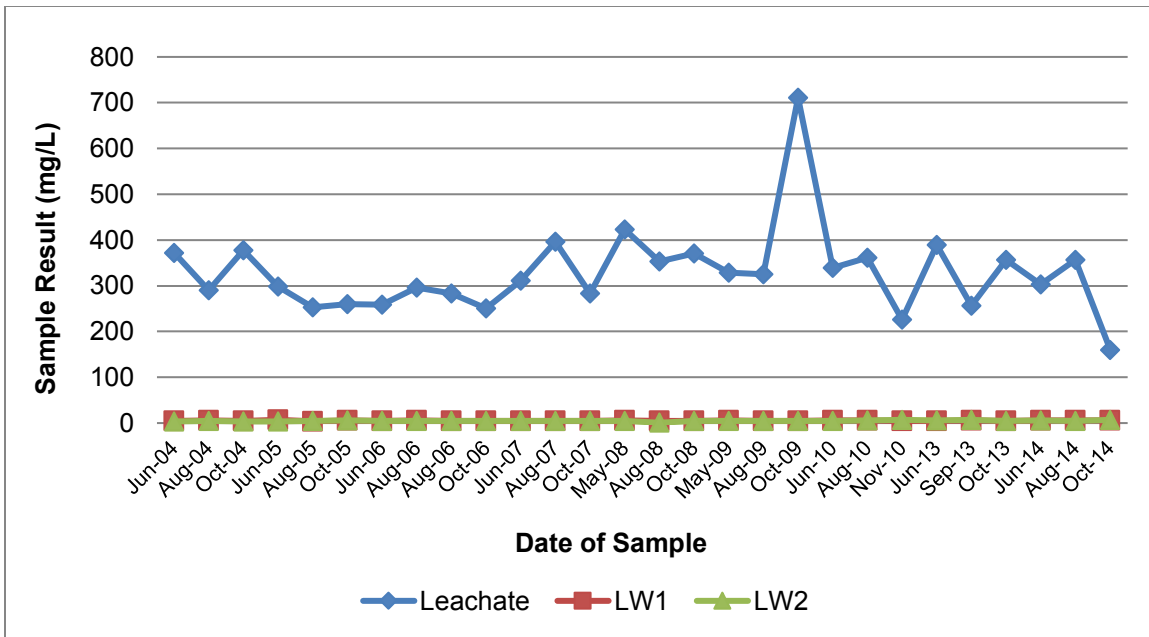


Figure 14: Leachate Monitoring Program Time Series - Alkalinity (2013 - 2014)

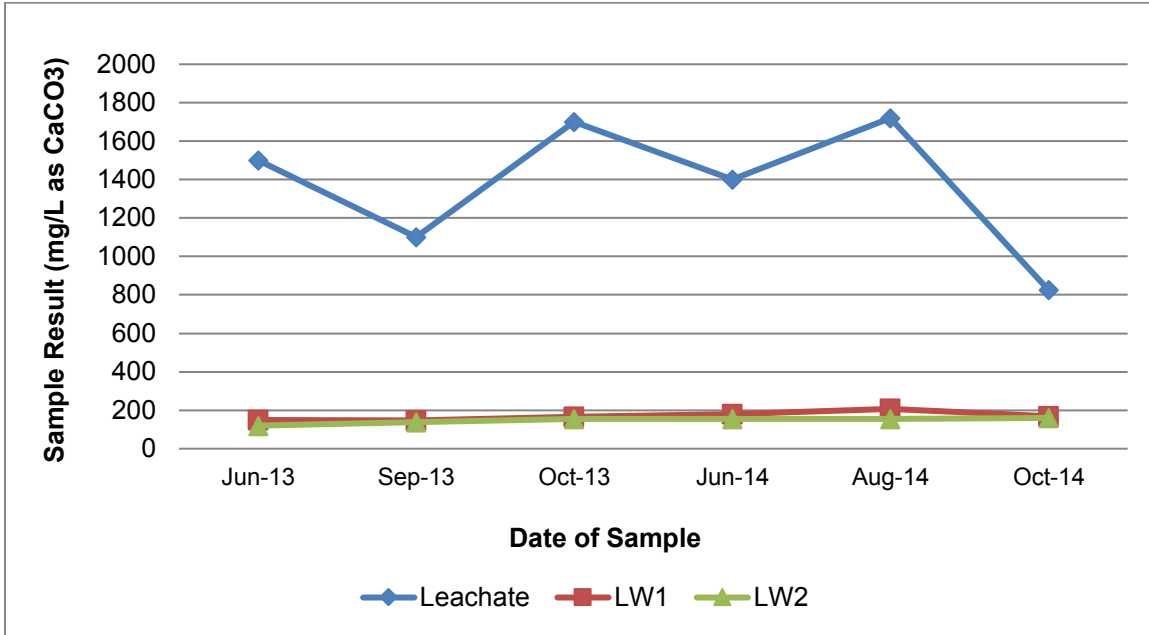


Figure 15: Leachate Monitoring Program Time Series - Nitrate (2004 - 2014)

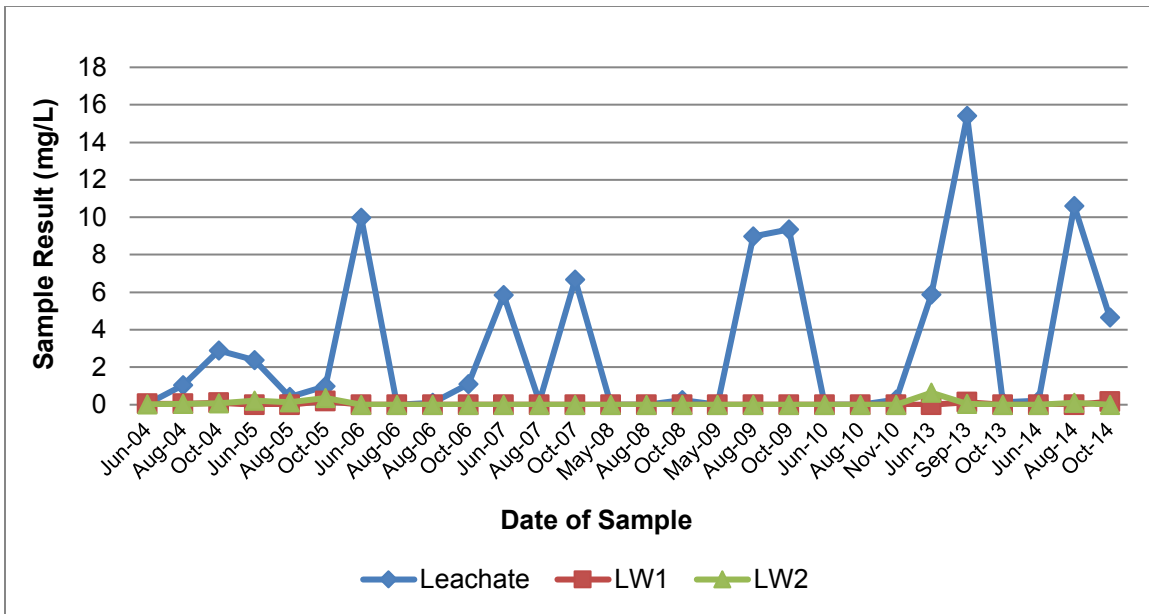
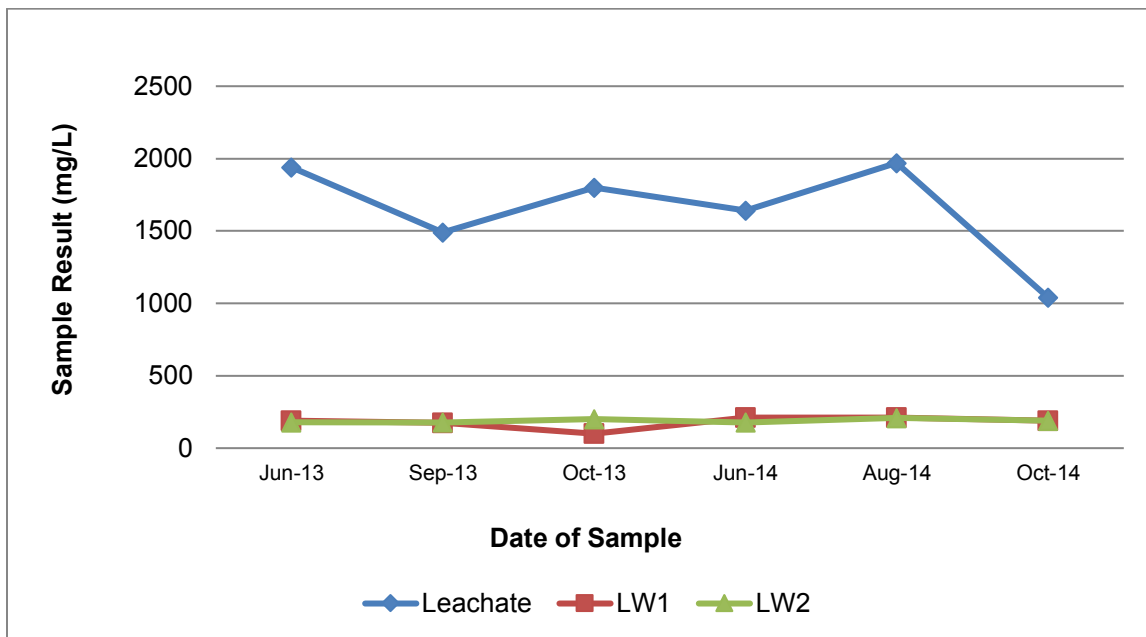


Figure 16: Leachate Monitoring Program Time Series - Total Dissolved Solids (2013 - 2014)



10.3.2 Proposed Leachate Management Program

The existing footprint of the approved (1984) landfill area is about 6.15 ha. The increase of 0.79 ha represents an increase of about 13% in footprint area, therefore an increase in the order of 13% in leachate generation is estimated. It is expected that the sand filter should be able to manage this increase in the quantity of leachate. Based on a moisture surplus infiltration of 540 mm/year and a landfill footprint increase of 0.79 ha, it is estimated that the expanded landfill area could generate approximately 4,250 m³/year of additional leachate, although this amount may be reduced by application of landfill sloping, compaction and cover.

Contaminated surface water and leachate would be directed to the existing on-site leachate attenuation and treatment system west of the site that would be expanded if needed to accommodate any additional flows. A new leachate collection system (toe drain, potential leachate sump and pump, or forcemain) would be constructed east of the landfill if it is determined that leachate from the east part of the landfill drains easterly and not westerly toward the existing sand filter system. All leachate collected from the site would be conveyed to the existing or expanded sand filter system or directly to the City's waste water treatment plant (WWTP), located in close proximity to the landfill. Based on discussions with the WWTP operators, it has been concluded that the WWTP would have sufficient capacity to manage leachate from the landfill. The WWTP may be able to accept leachate without pre-treatment; however, these options would be reviewed and determined during the ECA approval process.

The WWTP is located less than 1 km from the landfill itself, and less than 300 m from the landfill property boundary. While options for transporting leachate to the WWTP would be reviewed during the ECA approval process, the methods would include either pipe or truck. Based on the preliminary estimate of additional leachate generated, up to 327 truckloads per year would be required to transport the extra leachate to the WWTP facility (assuming a capacity of 13 m³ per truckload). However, this is likely a high estimate, as a portion of this leachate would be directed to the sand

filter. Each method of transporting the leachate would have their own environmental advantages and disadvantages or risks, including:

- Transport of leachate from landfill to WWTP via pipe:
 - Advantages: fewer greenhouse emissions compared to transport by truck.
 - Disadvantages or risks: potential for leachate spill due to failure in pipe, possible disturbance to border of wooded area along road from installation.
- Transport of leachate from landfill to WWTP via truck:
 - Advantages: Uses existing infrastructure (road) and does not require installation of pipe.
 - Disadvantages or risks: potential of spillage from truck during loading, transport and unloading; emissions of greenhouse gases and other tailpipe emissions from truck during transport.

A number of methods would be assessed for use to help reduce the generation of leachate, including:

- Progressive placement of final cover as the fill area reaches approved elevations;
- Use of impermeable tarps or alternate daily cover systems over active fill areas; and
- Spray irrigation during the summer to reduce leachate management costs.

The costs and benefits of implementing such methods would be examined as part of the ECA approval. The detailed design of the leachate and drainage system during the ECA process for the proposed system would also consider:

- Calculation of the impact of increased surface area and low permeability cover to leachate and runoff generation rates;
- A performance review of the sand filter to determine if additional loading can be managed with the existing footprint or if an expansion to the filter is required; and,
- Routine operation and monitoring of the leachate management system in accordance with the ECA requirements, and maintenance and inspection to ensure that landfill leachate is contained, managed, and successfully treated and disposed.

The ECA application will include the final design of the site, including a detailed evaluation of the system performance and if required, alternative appropriate methods to ensure the Site meets MOECC guidelines for leachate quality.

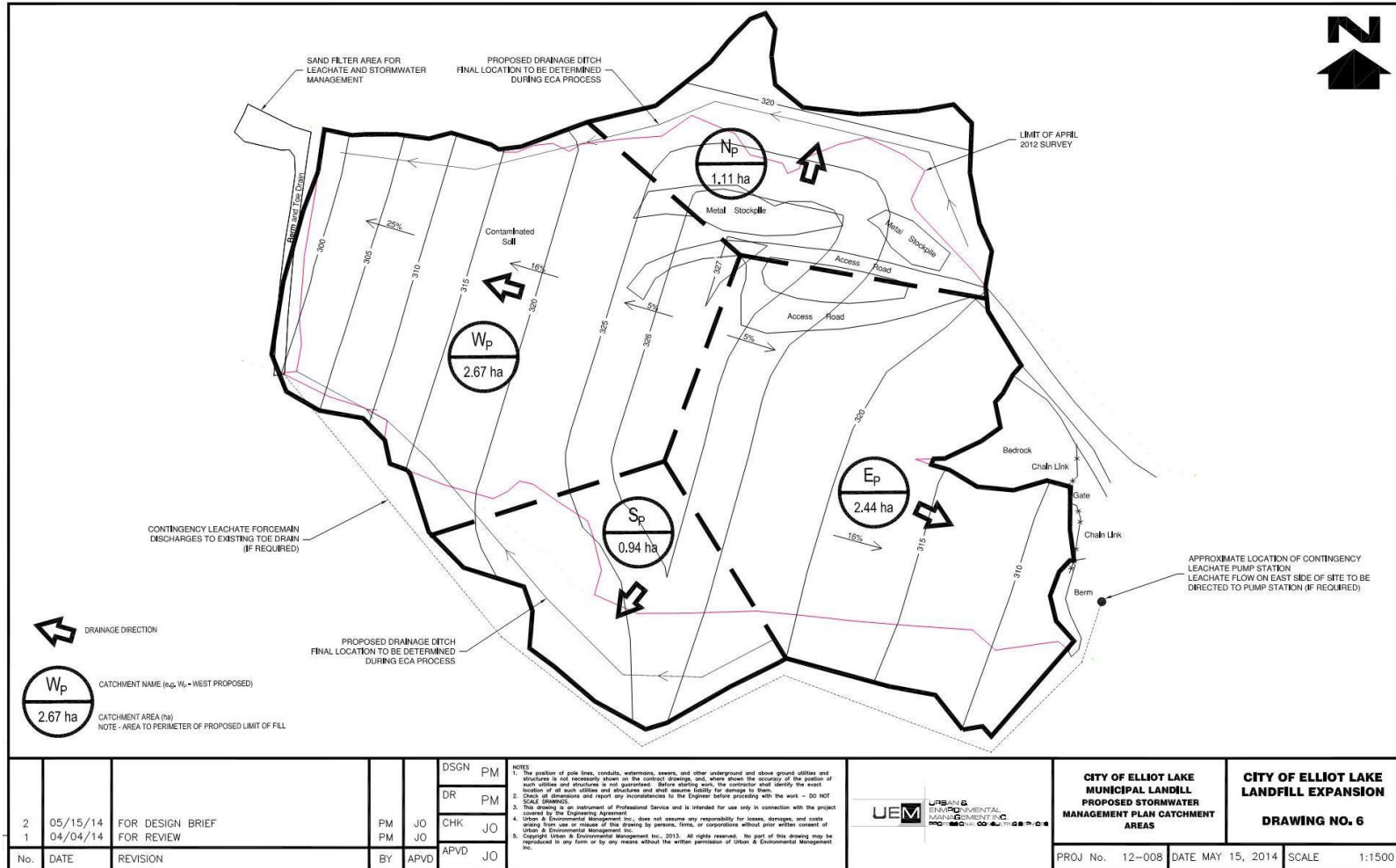
10.4 Stormwater Management

Figure 17 depicts the proposed stormwater management plan catchment areas, which would be confirmed during detailed design. The eastern 2.4 ha of the landfill would drain to the east, which would be consistent with the landfill site's current surface drainage. The proposed surface drainage to the west is also consistent with existing surface drainage. Based on the proposed final contours, approximately 1.1 ha would drain towards the north, while about 0.9 ha would drain to the south.

This northward and southward drainage would be a change from existing conditions and would require swales at the toe of the slope to intercept this runoff. The new swales would be sloped

toward the sand filter and would be designed to convey a design storm to the sand filter, while higher flows would overflow onto the surrounding undisturbed area. The use of low permeability final cover material could result in higher peak flows in all directions, in which case storage ponds could be required to attenuate peak flows before final discharge. The figure also depicts a provisional leachate pump station and forcemain in the event that some leachate flows to the eastern edge of the limit of fill. If required, storage ponds and low slope swales could be used to attenuate peak flows and reduce sediment load on the sand filter.

Figure 17: Proposed Stormwater Management Plan Catchment Area



11 Commitments and Monitoring

Implementation of the expansion would include a monitoring program to ensure potential environmental and nuisance issues are detected early and resolved. A summary of monitoring and reporting commitments is provided in Table 18, followed by a description of the commitments.

Table 18: Summary of Monitoring and Reporting Commitments

Area of Focus	Commitments	Reporting	Timelines
Design and Construction	Compliance monitoring plan to be completed	Daily monitoring and inspection of site construction	Plan - during EPA approval stage and amendment of ECA Monitoring - during construction
Ground and Surface Water Monitoring	Update and implement groundwater and surface water monitoring program	Annual Landfill Monitoring Reports	Plan - during EPA approval stage and amendment of ECA Monitoring - During site expansion and operations
Leachate Management	Weekly visual inspection for leachate seeps, with repairs to be completed as soon as possible.	Annual Landfill Monitoring Reports	During site operation
Leachate Management	Confirmation of the leachate management approach and design to be included in (ECA) application.	ECA Supporting Documentation Annual Landfill Monitoring Reports	Plan - during EPA approval stage and amendment of ECA Monitoring - during operations
Noise Air and Dust	Ongoing monitoring and mitigation of operational noise, dust and odour	Complaints reported in Annual Landfill Monitoring Reports	During site operation
	Noise bylaw requirements observed at site	Complaints reported in Annual Landfill Monitoring Reports	During site operation
Pests	Application of daily cover to reduce presence of pests	Annual Landfill Monitoring Reports	Annual Landfill Monitoring Reports
	Bear mitigation measures incorporated into updated operations and maintenance manual	Updated operations and maintenance manual provided during ECA amendment application	Operations and maintenance manual updated during ECA amendment application process
Litter	Litter mitigation measures applied	Complaints reported in Annual Landfill Monitoring Reports	During site operation
Predictive Monitoring Program & Contingency Planning	Implementation of Predictive Monitoring Program & Contingency Planning	<ul style="list-style-type: none"> Annual Landfill Monitoring Reports Reporting to MOECC as incidences occur 	During site operation

11.1 Design and Construction

A plan that outlines the steps and contingencies that will be completed for compliance monitoring and to monitor for offsite impacts during the design and construction stages of the expansion will be identified during the EPA approval stage as part of the City's amendment to its ECA. Monitoring activities will include daily monitoring and inspection of the site construction to ensure the construction activities are within MOECC compliance and do not cause offsite impacts e.g. good

industry practices will be adhered to during the construction phase such as the use of a silt fence where and when necessary to control erosion and mitigate impacts.

11.2 Ground and Surface Water Monitoring

A robust groundwater and surface water monitoring program would be conducted during the Site expansion and operation. The principal objectives of the initial monitoring phase will be to establish background groundwater quality, source leachate “strength,” delineation of the leachate-impacted groundwater plume, designated contaminants and CDCs at the CAZ boundaries. It is recommended that, during the initial phase, all monitoring wells be monitored two (2) times annually in the spring and autumn. Eventually, as Site conditions and leachate impacts become better understood, it is anticipated that monitoring frequency could be reduced. Such changes could be provided as recommendations in the routine monitoring reports currently provided to the MOECC by the City of Elliot Lake and would be discussed with the local MOECC office prior to making any changes in the monitoring program.

It is recommended that, during the initial phase of monitoring, the following designated contaminants of concern and maximum allowable concentrations (cm) be established for the CAZ boundaries:

Table 19: Proposed Designated Contaminants of Concern and Maximum Allowable Concentrations

Designated Contaminant	cm Units (mg/L)
Total Dissolved Solids	410
Nitrate as N	2.52
Sodium	100.6
Chloride	126.6
Dissolved Org. Carbon	3.75

During the ECA application process, an upset level for each parameter will be established in consultation with MOECC to act as “triggers” or provide an early warning for increased contamination levels. The “trigger” levels will be established based on concentrations of the designated contaminates in undiluted leachate (cL) and the established maximum allowable concentrations of the designated contaminants at the CAZ boundary (cm). “Trigger” levels (cT) should be established for the designated contaminants in each monitoring well based on relative distance from the fill area and the CAZ boundary. Loading estimates will be calculated in the EPA approval application and in future monitoring reports.

Details of the monitoring program for the Site expansion - including the number and location of new monitoring wells onsite - will be outlined during the EPA approval process. The new monitoring program will adhere to the MOECC’s Reasonable Use guidelines to ensure groundwater quality is maintained within acceptable parameters. The monitoring program will also describe the requirements for future annual monitoring reports submitted to the MOECC, including:

- Contaminant loading estimates;
- Borehole logs for monitoring wells;
- Information on monitoring well designs;

- The landfill site's contingency plan, including trigger criteria;
- Where groundwater discharges to surface water, comparison of monitoring results to PWQOs or APVs;

11.3 Leachate Management

Inspection would be carried out weekly for visual evidence of leachate seeps. Where leachate seeps are identified, the area would be isolated from the surface water drainage system until the seep is repaired. Repair of leachate seeps would commence as soon as possible.

The full details of the leachate management approach and design will be included in (ECA) application. This will include specific details of the efficacy of the existing leachate management system and the proposed design for the expanded leachate management system.

11.4 Noise, Dust and Odour

The prevailing winds in this area are typically across the site from northwest to southeast on average clear and most snowy days. These conditions have the potential to cause odour, dust and litter nuisance.

Operational noise, litter, dust, and odour would continue to be monitored and mitigated to the extent possible. Operation setbacks and adjustments to operating plans (relocate portable litter fencing, cease operations temporarily, water access roads etc.) could be made depending on prevailing weather conditions, material processing activities and visual aesthetics.

The requirements of the City of Elliot Lake noise bylaw would be observed at the site. The municipality and its operators would continue to ensure that heavy equipment would be operated respecting noise emissions, operator safety, cost-effective performance, etc. No significant increase to the site's daily operation would be expected therefore, the noise level would remain unchanged.

All internal site roads would be wetted and/or treated with approved dust suppressants when necessary.

This site would be managed to avoid potential odour-producing materials and/or operating conditions. Cover material would be applied to the waste to reduce odours. Should odour problems develop, consideration would be given to temporarily suspending or revising operating procedures or adding additional cover in problem areas. Should odour problems continue for several working days, the responsible operations would be suspended until the problem can be addressed.

11.5 Pests

Rodent, bird and/or insect problems would be reduced with the application of daily cover to the waste. While bears scrounging for food have not posed health and/or safety or other concerns to date, bear mitigation measures will be incorporated into the next update of the landfill's operations and maintenance manual. Cover material would be applied to the waste to reduce potential impacts. Should problems develop, appropriate action would be taken.

11.6 Litter

Litter would continue to be controlled by the following measures:

- Cover material applied to the waste;
- Perimeter fencing, portable fencing, and trees and shrubs would continue to trap litter before it leaves the site;
- Vehicles hauling waste to the site would continue to be required to be covered in accordance with site regulations;
- Adequate, suitably trained and equipped staff would continue to be available on-site during hours of operation to pick up, collect, and control debris; and
- Adjacent lands and surrounding roadways would continue to be routinely inspected and cleared of litter.

11.7 Predictive Monitoring Program & Contingency Planning

The contingency plans provided below identify potential remedial measures that could be implemented in the event the predictive monitoring program indicates potential adverse environmental impacts. The contingency plan that would be implemented would depend on the cause and location of the problem, and the remedial measure best suited to address the problem.

The predictive monitoring program would provide the necessary information to compare with trigger levels. When monitoring information shows exceedances of trigger levels the following actions would be undertaken:

- Investigation into observed and noted exceedances.
- Consultation with the Ministry of the Environment and Climate Change and others if necessary.
- Implementation of the appropriate contingency measure, which may include (to be confirmed during the detailed design of the expansion and development of the ECA application supporting documents):
 - Covering of the waste disposal area to reduce infiltration;
 - Expansion of the contaminant attenuation zone;
 - Enhanced monitoring;
 - Installation of a leachate collection system; and/or
 - Installation of a pump and treat system, among other things.

The contingency plan is described below and will be confirmed during detailed design and the ECA application process. It will be included in the approval application and noted in future monitoring reports.

Investigation

Upon exceedance of a trigger level, an investigation would be undertaken to confirm whether the exceedance is related to landfill or non-landfill sources. During investigation, supplementary activities may be conducted to assist with the investigation. Possible investigative measures include:

- Inspection to identify potential contaminant sources such as leachate seeps; surface water collection system improvement requirements, leachate collection system failure; signs of vandalism of monitoring wells, or other potential site or equipment damage.
- Inspection of adjacent land for specific activities e.g. salting of adjacent roads, unusual activities etc.
- Review of monitoring information to determine potential trends.
- Review of monitoring information to determine if the exceedance is localized or wide-spread.

Consultation

If it is confirmed that a trigger level has been exceeded, the City would contact the MOECC to discuss the results of the investigation and determine if implementation of contingency measures is warranted. Alternatively, it could be agreed that other actions are more appropriate (i.e. modify trigger mechanisms to reflect changing conditions or new data, etc.).

Implementation

If implementation of a contingency measure would be required, a review of available remedial works would be conducted and detailed design drawings submitted to the MOECC for approval if necessary. This would be followed by construction, updating of site drawings, and continued monitoring and reporting.

Emergency Action Plan

This section of the report discusses measures that would be implemented in the event of serious adverse impacts. Emergency conditions are those which pose an immediate risk to life, health or safety, the environment and/or property and require an urgent or immediate response. Examples of possible emergency situations include injuries or hazards to persons, fires, explosions, natural disasters, large or difficult to contain spills or any other urgent situation where emergency support services are required. In the event of an emergency, the following actions would be taken:

1. Contact the local emergency services.
2. Site operators would endeavor to contain the emergency but not take unnecessary risks.
3. Emergency personnel would be briefed on the situation.
4. Site managers would assist emergency personnel in any manner possible.
5. Representatives of MOECC, the municipality and the facility operator would be contacted and apprised of the situation.

Ground & Surface Water

Surface runoff from the landfill would be managed on site. Remediation of any detected off-site contamination would require identification of the source followed by development and implementation of a source-specific control and runoff retention plan. It would be possible to reduce contaminant levels in the groundwater system by improving the final cover system on the existing fill area to promote runoff and reduce infiltration. To address potential off-site groundwater contamination from the landfill, the primary contingency measure would be the installation of a hydraulic barrier and or interceptor system adjacent to the waste disposal area(s).

Spills

The site supervisor and other appropriate parties would be advised of any spills. If there would be a large spill of a potentially hazardous chemical e.g. diesel fuel, the appropriate Emergency Services and Spills Action Centre (MOECC) would be notified immediately. The type of remedial action would depend on the nature and severity of the spill. Advice will be immediately sought from MOECC and the municipality. Remedial actions would occur as quickly as possible. Equipment available on-site would be used as appropriate. Absorbent pads and soil would be used as needed to control spills. Spill/fire control equipment would be examined monthly by site supervisors.

Gas Management

The landfill site does not meet the required threshold set out in the MOECC regulation to necessitate a gas management system, however, the use of gas vents or interceptor trenches and barriers would be considered if landfill gas migration were to become problematic.

12 Required Approvals

All landfill development in Ontario is subject to the Environmental Assessment Act (EA), Part V of the Environmental Act (EPA), and the Ontario Waste Resources Act as follows:

- Section 27 of the EPA: Requires an Environmental Compliance of Approval (ECA) obtained from the MOECC for the establishment, operation, alteration or enlargement of a landfill site. The ECA defines the capacity, the types of wastes accepted, any necessary conditions for design and operation and how a site is to be closed and monitored.
- EPA Regulation 347 (R.R.O. 1990 Regulation 347): Provides definitions of waste as well as designates, classifies and exempts waste sites. Also, establishes standards for waste disposal sites and waste management systems.
- EPA Regulation 232/98: Describes the standards required for landfill designs, operation, closure, post-closure care and financial assurance. The standards apply to waste landfill sites larger than 40,000m³.
- EPA Regulation 217/08: Applies to waste disposal sites with capacities larger than 1.5 million cubic meters and requires these sites to use gas collection and flaring equipment.
- The Ontario Waste Resources Act: Requires any leachate collection system which discharges to surface waste obtain approval from the Ministry of Environment and Climate Change. Also, any surface waste discharge from a landfill must meet water quality standards as defined by the Act. If landfill discharge drains into a sewer, it must meet local sewer use bylaws and requirements of the receiving wastewater treatment plant.
- Environmental Assessment Act (EAA): Depending on the proposed capacity of the landfill, approval under the EAA may be required. If required, a broader view of the environment must be taken and issues beyond the effects on the natural environment have to be addressed such as cultural, social and economic factors. Public consultation and public hearings could also be required under the Act.

As Section 27 of the EPA requires an ECA be obtained from the MOECC for the establishment, operation, alteration or enlargement of a landfill site, the City would therefore either be required to amend its existing Certificate of Approval or to apply for a new ECA.

The approval process would require a detailed assessment of the site as required by Regulation 232/98, "Landfill Standards, A Guideline on the Regulatory Requirements for New or Expanding Landfilling Sites". The assessment would include¹⁶:

- A design report that includes the detailed plans, specifications and descriptions for the design of the site, including noise control measures (Section 6 of the regulations);
- Description of the buffer area (Section 7 of the regulations);
- A hydrogeological assessment (Section 8 of the regulations);
- A surface water assessment (Section 9 of the regulations);
- Groundwater protection measures (Section 10 of the regulations);
- Leachate disposal procedures (Section 11 of the regulations);
- Leachate contingency plans (Sections 12 and 27 of the regulations);
- Surface water control (Section 13 of the regulations);
- Subsurface migration and atmospheric emissions of landfill gas (Sections 14 and 15 of the regulations); and,
- Operation and maintenance procedures (Section 16 of the regulations)¹⁷.

The design of the landfill expansion would need to comply with all applicable Ministry policies, standards and guidelines, including the MOECC's Guideline B-7 (Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities). The technical details necessary for the application of the reasonable use approach to disposal sites requesting approval for expansion can be found in Procedure B-7-1 "Determination of Contaminant Limits and Attenuation Zones." The document provides guidance for:

- Determining quantitatively the acceptable levels of various contaminants originating in disposal sites and impinging on adjacent properties; and
- Assessing the suitability of a contaminant attenuation zone and the limits of a disposal site.

Any alteration of the existing system or installation of new system or stormwater management facilities will require an approval under Section 20.2 of Part II.1 of the EPA. This may involve changing the WWTP's ECA and possibly a Class EA.

¹⁶ Design considerations with respect to O.Reg. 232/98 will be confirmed with MOECC during the detailed design phase.

¹⁷ Government of Ontario. *Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites*. January 2012.

13 Stakeholder Consultation

The process to develop Elliot Lake's Solid Waste Management Plan included numerous points of consultation with the public, agencies, the aboriginal community and other stakeholders. The consultation followed the communications strategy outlined in Section 10 of the TOR, including:

- Project newsletter;
- Public information centre (PIC);
- Meetings/presentations to the City's Public Services Committee; and
- Posting information on the City's website.

The consultation process began with the development of the City's EA TOR. Once the TOR was approved, the City embarked on the development of a solid waste management strategy. Consultation initiatives for that phase consisted of posting information in the local newspapers and on the City's website, distributing a newsletter at a key portion of the project, holding PICs, and making presentations to City Council. The consultation process demonstrated that there was very little interest from the public and no interest from the Aboriginal communities for this project. Furthermore, no opposition to the project was received. A summary of the consultation events is discussed below.

13.1 Solid Waste Management Plan

13.1.1 Public Information Centre #1

The first PIC during that the SWMP planning process took place on May 25, 2011 and was used to gather input from local residents on what Elliot Lake's long term goals should be, what disposal and diversion options could be used, and on criteria each of the options should be evaluated against.

Eight members of the community attended, six of whom submitted comments.

A number of specific diversion options were reviewed at the open house. Most residents were in favour of enhancing the collection of recyclable materials, while others were also in favour of increasing education and initiating the curbside collection of compostable material. When residents were asked which policy changes should be considered, the most accepted options were mandatory recycling by-laws, full or partial user pay for garbage collection and using blue transparent bags for recycling. It was also suggested that Elliot Lake's solid waste management activities should minimize any associated impacts on the environment.

Based on comments received through the public workshop, the disposal options with the most support were building an energy-from-waste facility, expanding the existing disposal site and establishing a new landfill site.

After the discussion on diversion and disposal options, residents were asked to create a prioritized list of evaluation criteria. Residents agreed upon the following criteria for evaluating disposal and diversion options:

- Environmental impacts (positive and negative) (including effect on waste diversion);
- Cost effectiveness/affordability;

- Economic development;
- Social/cultural acceptability;
- Ease of implementation; and
- Track record of technology/program (proven results).

Residents at the PIC clearly stated that the environmental impact, whether positive or negative, should be the highest priority. Cost effectiveness and affordability were the second highest priorities, followed by economic development (job creation), social and cultural acceptability and ease of implementation.

A copy of the notice, display boards and summary of comments from the PIC are included in Appendix E.

13.1.2 Public Information Centre #2

A second PIC was held for the SWMP process on September 15, 2011. The purpose of the PIC was to review the preferred options with the community.

Approximately eight residents attended. General discussion among the attendees confirmed acceptance of the preferred options.

One written comment was received. It noted that that tip fees should be applied to the ICI sector.

No issues or concerns were raised regarding the City's waste management program or the preferred waste management options presented.

A copy of the notice, display boards and the comment received are provide in Appendix E.

13.1.3 Submission of Solid Waste Management Plan

The results of the Strategy process and recommendations were presented to Council for review and approval. The SWMP was approved at the September 17, 2012 meeting of the City's Public Services Committee. A copy of the Solid Waste Management Strategy was posted on the City's website for review.

The agenda and minutes from the meeting are provided in Appendix E, including reference to the meeting topic in the September 24 2012 minutes of the Seniors' Action Group of Elliot Lake.

13.2 Environmental Assessment

This section presents the consultation activities that took place during the Environmental Assessment. The key consultation milestones are summarized in Table #20.

Table 20: Summary of Consultation Milestones

Consultation Milestone	Timing
Notice of Commencement	January 2013
Newsletter	July 2014
Public Information Centre	August 2014
Draft EA Report	June 2015
EA Submission	February 2016

13.2.1 Notice of Commencement

The EA process was initiated through a notice of commencement, which was advertised January 19, 2013 in the Elliot Lake Standard, posted on the City website, and distributed to stakeholders, including First Nations and Aboriginal organizations. The mailing included a cover letter for the notice of commencement, a copy of the notice, and a consultation form for interested stakeholders to complete and send back (see Appendix E).

The notice of commencement was sent to the following organizations:

Agencies

- Ministry of the Environment and Climate Change
- Ministry of Aboriginal Affairs
- Aboriginal Affairs and Northern Development Canada

First Nations / Aboriginal Groups

- Atikameksheng Anishnawbek (Whitefish Lake First Nation)
- Aundeck-Omni Kaning
- Batchewana First Nation (Ojibwa of Batchewana)
- Garden River First Nation
- M'Chigeeng First Nation
- Mississauga #8 First Nation
- Moose Deer Point First Nation
- Sagamok Anishnawbek First Nation
- Serpent River First Nation
- Sheguiandah First Nation
- Sheshegwaning First Nation
- Thessalon First Nation

- Wikwemikong Unceded Indian Reserve
- Whitefish River First Nation
- Zhiibaahaasing First Nation
- Métis Nation of Ontario
- Métis National Council
- Historic Saugeen Métis
- Chiefs of Ontario
- The Union of Ontario Indians (UOI)
- Mamaweswen, The North Shore Tribal Council Secretariat
- United Chiefs and Councils of Mnidoo Mnising (Manitoulin)
- Historic Sault Ste Marie Métis Council
- North Channel Métis Council

The Ministries of Environment and Climate Change and of Aboriginal Affairs as well as Aboriginal Affairs and Northern Development Canada each provided input into the consultation list for Aboriginal and First Nation stakeholders, which was incorporated into the list above.

A consultation form was received from the Thessalon First Nation, who asked to be kept informed.

13.2.2 Newsletter

A newsletter was issued the last week of July 2014 to update the community of the process and advise them of the PIC. The newsletter was available on the City's website and made available in public places such as City Hall and the Elliot Lake Public Library. The two-page newsletter included content on:

- Background on the process;
- The date and location of the PIC (referred to as an Open House in the newsletter);
- The purpose of the EA;
- The results of the evaluation of disposal options; and
- Encouragement to provide comments and information on where to send them.

A copy of the newsletter is provided in Appendix E.

13.2.3 Public Information Centre

A PIC was held in Elliot Lake on August 13, 2014 to discuss the project with the public. The notice of PIC was advertised in the Elliot Lake Standard as well as in a newsletter that was made available on the City's website and distributed to residents.

The purpose of the PIC was to provide an overview of the study to the public, review the "alternatives to" undertaking and the results of their evaluation, and to describe the proposed landfill expansion.

Approximately 3 people attended the open house.

Comments were invited, but none were received.

A copy of the notice and display boards are provided in Appendix E.

13.2.4 Site Liaison Committee

Section 10.2 of the TOR (Table 10-1) mentions the provision of opportunities to form a Site Liaison Committee consisting of resident, agency and other interested representatives to review and provide input on site specific studies, as well as focused information sessions. The City explored this option, but there was limited community interest in the solid waste management plan study and no interest was identified to form such a committee. Instead, the City's Public Services Committee was used for project updates and briefings.

13.2.5 Review of Draft EA Reports

Draft copies of the EA reports were sent to review agencies for their comments.

In June 2015, a draft of the EA report was distributed to the MOECC, other stakeholder agencies, and to First Nations and Aboriginal organizations for their comments on the evaluation process and recommendations. The list of First Nations and Aboriginal organizations was updated based on feedback from the MOECC. The organizations included that received a draft EA report include:

Agencies

- Ministry of Environment and Climate Change
- Ministry of Aboriginal Affairs
- Canadian Environmental Assessment Agency
- Ministry of Government Services
- Department of Fisheries and Oceans
- Health Canada
- Transport Canada
- Ministry of Tourism, Culture and Sport
- Ministry of Health and Long-Term Care
- Ministry of Health and Long-Term Care, Sudbury and District Health Unit
- Ministry of Municipal Affairs & Housing
- Ministry of Natural Resources and Forestry
- Ministry of Northern Development and Mines
- Ministry of Agriculture, Food and Rural Affairs
- Rainbow District School Board

- Ministry of Community and Social Services

First Nations / Aboriginal Groups

- Atikameksheng Anishnawbek (Whitefish Lake First Nation)
- Aundeck-Omni-Kaning
- Chippewas of Nawash First Nation
- Henvey Inlet First Nation
- Historic Saugeen Métis
- M'Chigeeng First Nation
- Mamaweswen, The North Shore Tribal Council Secretariat
- Métis Nation of Ontario
- Métis National Council
- Sagamok Anishnawbek First Nation
- Saugeen First Nation
- Sheshegwaning First Nation
- Serpent River First Nation
- Thessalon First Nation
- Whitefish River First Nation
- Wikwemikong Unceded Indian Reserve
- Zhiibaahaasing First Nation
- Union of Ontario Indians (UOI)
- United Chiefs and Councils of Mnidoo Mnising (Manitoulin)

Comments received from the MOECC and other stakeholder agencies were incorporated into the EA report.

While the Aundeck Omni Kaning First Nation acknowledged receiving the EA report, no feedback on the report was received from the First Nations and Aboriginal organizations.

A revised EA report was provided to the MOECC for their review December 15, 2015. The MOECC provided additional comments, which were incorporated into the EA report. On January 21, 2016, the MOECC provided an updated circulation list for the EA submission. The circulation list for the final EA report (sent by February 5, 2016) included the following organizations:

Agencies

- Ministry of the Environment and Climate Change
- Ministry of Natural Resources and Forestry
- Ministry of Tourism, Culture and Sport

- Ministry of Municipal Affairs and Housing
- Ministry of Health and Long-Term Care
- Algoma Public Health
- Transport Canada

First Nations / Aboriginal Groups

- Bar River Métis Community
- Historic Sault Ste. Marie Métis Council
- Mississauga #8 First Nation
- North Channel Métis Council
- Sagamok Anishnawbek First Nation
- Serpent River First Nation

The Notice of Completion was e-mailed, faxed and sent by hard copy to the Thessalon First Nation.

A copy of correspondence related to the EA report drafts (and any other agency correspondence) is provided in Appendix E.

13.2.6 First Nations and Aboriginal Consultation

Considerable effort was made to ensure that stakeholder Aboriginal and First Nations organizations and communities were identified and provide an opportunity to comment during the EA process. These steps included:

- Early engagement with the MOECC on Aboriginal consultation requirements;
- Correspondence with the Ministry of Aboriginal Affairs (MAA) and Aboriginal Affairs and Northern Development Canada (AANDC) to request their input on the aboriginal stakeholder list;
- Updating the Aboriginal stakeholder contact list based on the feedback received from the MAA and AANDC;
- Distribution of the notice of commencement, cover letter and consultation form to updated Aboriginal stakeholder contact list (with one response received);
- Consultation with the MOECC to update the Aboriginal consultation list for distribution of the draft EA report; and
- Distribution of draft EA report to Aboriginal stakeholder contact list (one response received acknowledging report from Aundeck Omni Kaning First Nation, indicating they did not have interest).

Appendix A: Environmental Assessment Act (Section 6)



Environmental Assessment Act

R.S.O. 1990, CHAPTER E.18

Last amendment: 2010, c. 16, Sched. 7, s. 1.

Terms of reference

6. (1) The proponent shall give the Ministry proposed terms of reference governing the preparation of an environmental assessment for the undertaking. 1996, c. 27, s. 3.

Same

(2) The proposed terms of reference must,

- (a) indicate that the environmental assessment will be prepared in accordance with the requirements set out in subsection 6.1 (2);
- (b) indicate that the environmental assessment will be prepared in accordance with such requirements as may be prescribed for the type of undertaking the proponent wishes to proceed with; or
- (c) set out in detail the requirements for the preparation of the environmental assessment. 1996, c. 27, s. 3.

Same

(3) The proposed terms of reference must be accompanied by a description of the consultations by the proponent and the results of the consultations. 1996, c. 27, s. 3.

Public notice

(3.1) The proponent shall give public notice of the proposed terms of reference and shall do so by the prescribed deadline and in the manner required by the Director. 2000, c. 26, Sched. E, s. 2 (2).

Same

(3.2) The public notice must indicate where and when members of the public may inspect the proposed terms of reference and state that they may give their comments about the proposed terms of reference to the Ministry. It must also contain such other information as may be prescribed or as the Director may require. 2000, c. 26, Sched. E, s. 2 (2).

Notice to clerk of a municipality

(3.3) The proponent shall give the information contained in the public notice to the clerk of each municipality in which the undertaking is to be carried out and shall do so by the deadline for giving the public notice. 2000, c. 26, Sched. E, s. 2 (2).

Notice to other persons

(3.4) The proponent shall give the information contained in the public notice to such other persons as the Director may require and shall do so by the deadline for giving the public notice. 2000, c. 26, Sched. E, s. 2 (2).

Public inspection

(3.5) Any person may inspect the proposed terms of reference in the places and at the times set out in the public notice. 2000, c. 26, Sched. E, s. 2 (2).

Comments

(3.6) Any person may comment in writing on the proposed terms of reference to the Ministry and, if the person wishes the comments to be considered by the Minister in deciding whether to approve the proposed terms of reference, shall submit the comments by the prescribed deadline. 2000, c. 26, Sched. E, s. 2 (2).

Approval

(4) The Minister shall approve the proposed terms of reference, with any amendments that he or she considers necessary, if he or she is satisfied that an environmental assessment prepared in accordance with the approved terms of reference will be consistent with the purpose of this Act and the public interest. 2000, c. 26, Sched. E, s. 2 (3).

Mediation

(5) Before approving proposed terms of reference, the Minister may refer a matter in connection with them to mediation and section 8 applies with necessary modifications. 1996, c. 27, s. 3.

Deadline

(6) The Minister shall notify the proponent whether or not the proposed terms of reference are approved and shall do so by the prescribed deadline. 1996, c. 27, s. 3.

Same

(7) Different deadlines may be prescribed with respect to proposed terms of reference that are referred to mediation and with respect to those that are not. 1996, c. 27, s. 3.

Preparation of environmental assessment

6.1 (1) The proponent shall prepare an environmental assessment for an undertaking in accordance with the approved terms of reference. 1996, c. 27, s. 3.

Contents

- (2) Subject to subsection (3), the environmental assessment must consist of,
- (a) a description of the purpose of the undertaking;
 - (b) a description of and a statement of the rationale for,
 - (i) the undertaking,
 - (ii) the alternative methods of carrying out the undertaking, and
 - (iii) the alternatives to the undertaking;
 - (c) a description of,
 - (i) the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly,
 - (ii) the effects that will be caused or that might reasonably be expected to be caused to the environment, and
 - (iii) the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment,by the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking;
 - (d) an evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking; and
 - (e) a description of any consultation about the undertaking by the proponent and the results of the consultation. 1996, c. 27, s. 3.

Exception

(3) The approved terms of reference may provide that the environmental assessment consist of information other than that required by subsection (2). 1996, c. 27, s. 3.

Submission of environmental assessment

6.2 (1) The proponent shall submit an environmental assessment for an undertaking to the Ministry. 1996, c. 27, s. 3.

Amendment or withdrawal

(2) After it is submitted to the Ministry, the proponent may amend or withdraw the environmental assessment at any time before the deadline for completion of the Ministry review of the environmental assessment. 1996, c. 27, s. 3.

Same

(3) The proponent may amend or withdraw the environmental assessment after the deadline for completion of the Ministry review only upon such conditions as the Minister may by order impose. 1996, c. 27, s. 3.

Same

(4) The Minister may by order amend or revoke conditions imposed under this section. 1996, c. 27, s. 3.

Public notice of submission

6.3 (1) The proponent shall give public notice of the submission of the environmental assessment and shall do so by the prescribed deadline and in the manner required by the Director. 1996, c. 27, s. 3.

Same

(2) The public notice must indicate where and when members of the public may inspect the environmental assessment and state that they may give their comments about it to the Ministry. It must also contain such other information as may be prescribed or as the Director may require. 1996, c. 27, s. 3.

Notice to clerk of a municipality

(3) The proponent shall give the information contained in the public notice to the clerk of each municipality in which the undertaking is to be carried out and shall do so by the deadline for giving the public notice. 1996, c. 27, s. 3.

Notice to other persons

(4) The proponent shall give the information contained in the public notice to such other persons as the Director may require and shall do so by the deadline for giving the public notice. 1996, c. 27, s. 3.

Public inspection of environmental assessment

6.4 (1) Any person may inspect the environmental assessment in the places and at the times set out in the public notice. 1996, c. 27, s. 3.

Comments

(2) Any person may comment in writing on the undertaking or on the environmental assessment to the Ministry and, if the person wishes the comments to be considered during the preparation of the Ministry review, shall submit the comments by the prescribed deadline. 1996, c. 27, s. 3; 2000, c. 26, Sched. E, s. 2 (4).

Appendix B: Terms of Reference



Appendix C: Long Term Solid Waste Management Plan



Appendix D: Archaeological Potential and Built Heritage/Cultural Landscape Screening Checklist



Appendix E: Record of Consultation



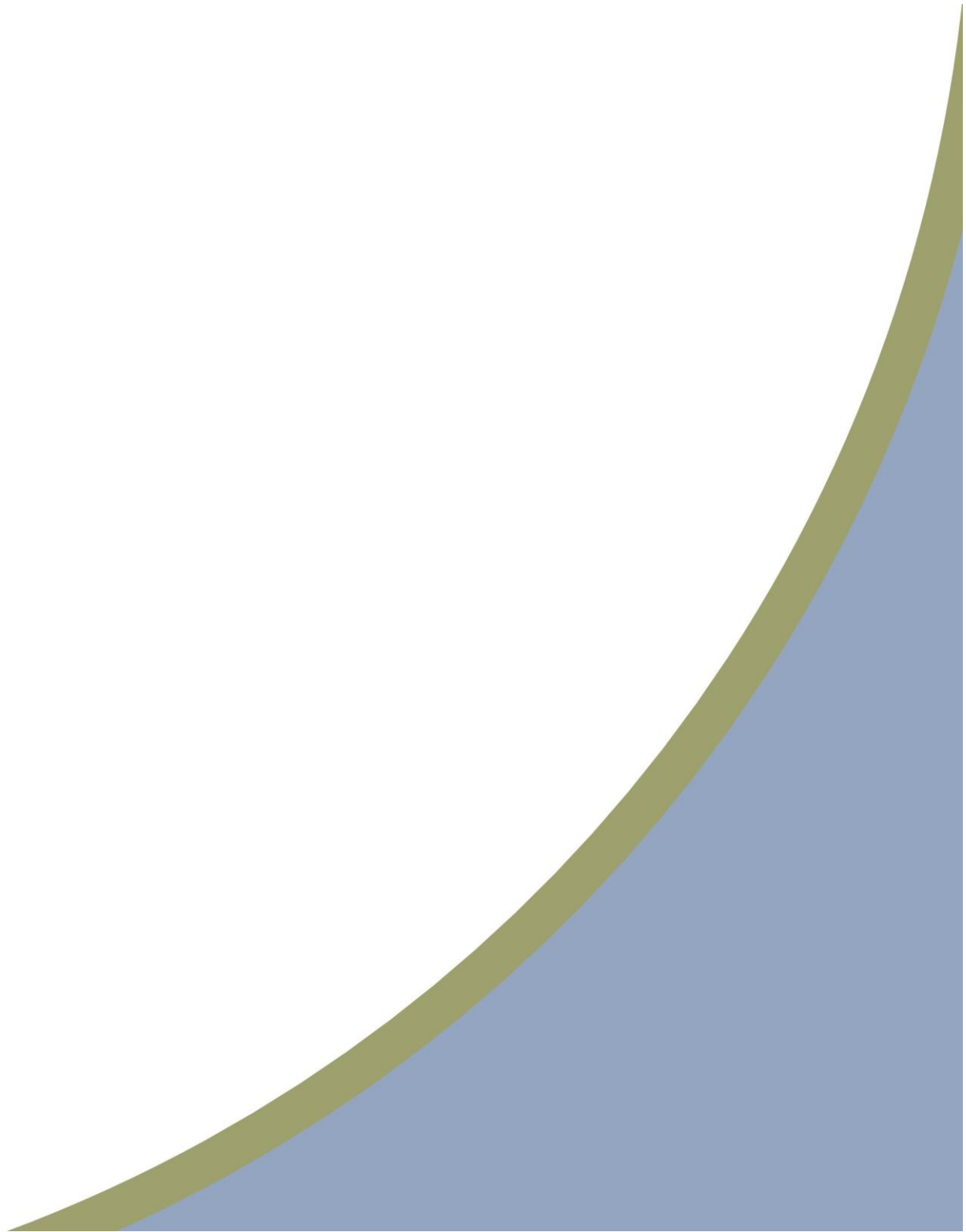
Appendix F: Natural Heritage Inventory Report



Appendix G: Groundwater and Surface Water Assessment



Appendix H: Glossary of Terms and Abbreviations



Glossary of Terms and Abbreviations

The following is a glossary of uncommon terms and abbreviations used in this EA Report and supporting documents.

A7 Air Emission Guidelines: Air emission guidelines developed by the Ministry of the Environment (MOE) to govern combustion and air pollution control requirements for new municipal waste incinerators in the Province of Ontario.

Aerobic Treatment: Treatment of organic waste with access to/addition of oxygen (e.g. windrow composting).

Air Emissions: for stationary sources, the release or discharge of a pollutant from a facility or operation into the ambient air either by means of a stack or as a fugitive dust, mist or vapour.

Alternative Disposal Technology (ADT): Technologies, other than landfill, capable of disposing municipal waste (e.g. incineration, EFW, gasification, pyrolysis, etc.).

Anaerobic Treatment: Treatment of organic waste without access to/addition of oxygen (e.g. anaerobic digestion)

Anaerobic Decomposition: Reduction of the net energy level and change in chemical composition of organic matter caused by microorganisms in an oxygen-free environment.

Anaerobic Digestion (AD): See definition for anaerobic treatment. Anaerobic treatment method for waste through which biogas is formed from the decomposition of the organic stream.

Approved Site or facility: A landfill site or waste management facility with a valid Certificate of Approval.

Ash: The mineral content of a product remaining after complete combustion (see 'bottom ash' and 'fly ash').

'At-Source': referring to a waste minimization or management activity at the source of waste generation (e.g. at the household, at the business, etc.)

Baling: Compacting solid waste into blocks to reduce volume and simplify handling.

Biocell: A cell in which organic waste is decomposed biologically in an aerobic process and landfill gas is extracted.

Biodegradable: Capable of decomposing under natural conditions.

Biogas: Gas formed during the anaerobic decomposition of organic material, mainly consisting of methane and carbon dioxide.

Biological Treatment: A treatment technology that uses bacteria to consume organic waste.

Bottom Ash: The non-airborne combustion residue from burning pulverized coal in a boiler; the material which falls to the bottom of the boiler and is removed mechanically; a concentration of non-combustible materials, which may include toxins.

Briquetting: The compaction of waste into small bricks to be burned in an incinerator. Bricks are easier to manage and have a higher calorific value than regular uncompacted waste.

British Thermal Unit (BTU): Unit of heat energy equal to the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit at sea level.

Buffer Area: That part of a landfilling site that is not a waste fill area.

Bulky Waste: Large items of waste materials, such as appliances, furniture, large auto parts, trees, stumps.

Calorific Value: The amount of heat produced by a specific material type when combusted under specific conditions. Calorific Value is usually expressed in Calories or Joules per kilogram (ie. Cal/Kg or J/Kg).

Candidate Site: Property identified as suitable for consideration as a potential site for a waste management facility.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Carcinogenic: Capable of causing the cells of an organism to react in such a way as to produce cancer.

Catalyst: A substance that changes the speed or yield of a chemical reaction without being consumed or chemically changed by the chemical reaction.

Cells: Holes where waste is dumped, compacted, and covered with layers of dirt on a daily basis.

Certificate of Approval: A license or permit issued by the Ministry of the Environment for the operation of a waste management site/facility.

Class Environmental Assessment (EA): A planning process for an approved group of projects that are carried out routinely and have predictable and mitigatable effects.

Cogeneration: The consecutive generation of useful thermal and electric energy from the same fuel source.

Combustion: 1. Burning, or rapid oxidation, accompanied by release of energy in the form of heat and light. 2. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable inorganics such as carbon dioxide and water.

Combustion Chamber: The actual compartment where waste is burned in an incinerator.

Combustion Product: Substance produced during the burning or oxidation of a material.

Commercial Waste: All solid waste emanating from business establishments such as stores, markets, office buildings, restaurants, shopping centers, and theatres.

Compactor: Tracked vehicle used to crush and compact waste at a landfill, to reduce volume.

Compost: The relatively stable humus material that is produced from a composting process in which bacteria in soil mixed with garbage and degradable trash break down the mixture into organic fertilizer.

Composting Facilities: 1. An offsite facility where the organic component of municipal solid waste is decomposed under controlled conditions; 2. an aerobic process in which organic materials are ground or shredded and then decomposed to humus in windrow piles or in mechanical digesters, drums, or similar enclosures.

Composting: The controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

Construction and Demolition Waste (C&D): Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.

Contingency Plan: A plan developed to be implemented should some aspect of the project need to be altered or some aspect of the operation fail (i.e. "Plan B").

Cover Material: Material used to cover compacted solid waste in a sanitary landfill, typically soil. Alternatives to soil are now being investigated, including non-hazardous ash from incinerator facilities.

Design and Operation (D&O): A document (plan/report), required for obtaining a Certificate of Approval, which describes in detail the function, elements or features of a landfill site/facility, and how a landfill site/facility would function including its monitoring, and control/management systems.

Digestion: The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants.

Disposal: Final placement or destruction of wastes. Disposal is typically accomplished through use of approved sanitary landfills or incineration with or without energy recovery.

Disposal Facilities: Repositories for solid waste, including landfills and combustors intended for permanent containment or destruction of waste materials. Excludes transfer stations and composting facilities.

Diversion Rate: The percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, or re-used.

Dump: A site used to dispose of solid waste without environmental controls.

Ecological/Environmental Risk Assessment (ERA): A scientific method used to examine the nature and magnitude of risks from the exposure of plants and animals to contaminants in the environment.

Economies of Scale: The reduction in operation and administrative staffing costs and reduction in redundancy of positions and equipment through implementing larger scale undertakings.

Electrostatic Precipitator (ESP): A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Emissions: gases released into the atmosphere.

Emissions Trading: The creation of surplus emission reductions at certain stacks, vents or similar emissions sources and the use of this surplus to meet or redefine pollution requirements applicable to other emission sources. This allows one source to increase emissions when another source reduces them, maintaining an overall constant emission level. Facilities that reduce emissions substantially may "bank" their "credits" or sell them to other facilities or industries.

Energy-from-waste (EFW): The recovery of useful energy in the form of heat and/or power from the thermal treatment of waste. Generally applied to incineration, pyrolysis, gasification but can also include the combustion of landfill gas and gas produced from anaerobic digestion.

Energy Recovery: The recovery of useful energy in the form of heat and/or power from the thermal treatment of waste. Generally applied to incineration, pyrolysis, gasification but can also include the combustion of landfill gas and gas produced from anaerobic digestion.

Environment (as it relates to the Environmental Assessment Act): Environment is defined under the Environmental Assessment Act as follows:

- (a) air, land or water,
- (b) plant and animal life, including human life,
- (c) the social, economic and cultural conditions that influence the life of humans or a community,
- (d) any building, structure, machine or other device or thing made by humans,
- (e) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or
- (f) any part or combination of the foregoing and the interrelationships between any two or more of them.

Environmental Assessment (EA): A systematic process that is conducted in accordance with applicable laws or regulations aimed at assessing the effects of a proposed undertaking on the environment. Includes evaluation of need, alternatives, impacts, and mitigative, remedial, monitoring and/or compensatory measures.

Environmental Assessment Act (EAA): An Ontario Act to provide for the protection; conservation; and, wise management of Ontario's environment. To achieve this, the EAA ensures that environmental problems or opportunities are considered and their effects are planned for before development or building takes place.

Environmental Protection Act (EPA): An Ontario Act to provide for the protection and conservation of the natural environment.

Environmental Assessment Terms of Reference (EATOR): An Environmental Assessment Terms of Reference outlines the work plan for the study to be undertaken in an Environmental Assessment.

Environmental Site Assessment (ESA): A systematic process of determining whether a specific property is or may be subject to actual or potential contamination.

Exports: In solid waste programs, municipal solid waste and recyclables transported outside the municipal jurisdiction or locality where they originated.

Expression of Interest (EOI): A preliminary document prepared by an outside source documenting their interest in a proposed project and a very general set of qualifications they possess that would make them eligible to participate further in the project.

Ferrous Metals: Magnetic metals derived from iron or steel; products made from ferrous metals include appliances, furniture, containers, and packaging like steel drums and barrels. Recycled products include processing tin/steel cans, strapping, and metals from appliances into new products.

Flue Gas: The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Fluidized Bed Incinerator: An incinerator that uses a bed of hot sand or other granular material to transfer heat directly to waste. Used mainly for destroying municipal sludge.

Fly Ash: Non-combustible residual particles expelled by flue gas.

Fugitive Emissions: Emissions not caught by a capture system.

Gasification: Conversion of solid material such as coal or waste into a gas for use as a fuel.

Gigajoule (GJ): A measurement of Energy. A typical single family household (approx. 2000 sq. ft.) uses approximately 60 to 90 GJ annually for heating (NRCan).

Greenhouse Effect: The warming of the Earth's atmosphere attributed to a buildup of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while making the infra-red radiation atmosphere opaque to infra-red radiation, thereby preventing a counterbalancing loss of heat.

Greenhouse Gas: A gas, such as carbon dioxide or methane, which contributes to potential climate change.

Hazardous Waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Household Hazardous Waste (HHW): See Household Special Waste(HSW).

Household Special Waste (HSW): Hazardous products used and disposed of by residential as opposed to industrial consumers. Includes paints, stains, varnishes, solvents, pesticides, and other materials or products containing volatile chemicals that can catch fire, react or explode, or that are corrosive or toxic.

Household Waste (Domestic Waste): Solid waste, composed of garbage and rubbish, which normally originates in a private home or apartment house. Domestic waste may contain a significant amount of toxic or hazardous waste.

Hydrolysis: Decomposition of a chemical compound by reaction with water, such as the dissociation of a dissolved salt or the catalytic conversion of starch to glucose.

Impact Studies: Studies that predict negative consequences (if any) of a proposed undertaking. Air, visual, environmental, traffic, hydrogeological, noise, health risk, land use and hydrological Impact Studies are required under the Environmental Protection Act.

Imports: In solid waste programs, municipal solid waste and recyclables transported into the municipal jurisdiction or locality for processing or final disposition (but that did not originate in that jurisdiction or locality).

Incineration: A treatment technology involving destruction of waste by controlled burning at high temperatures with the overall aim of reducing the volume of waste; e.g., burning waste to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Incinerator: A furnace for burning waste under controlled conditions.

Industrial, Commercial & Institutional (IC&I) Waste: Combination of wastes generated by industrial, commercial and institutional sectors that are not typically picked up at the curb or accepted at public drop-off facilities as part of the municipal waste collection process. These wastes are primarily managed by way of contract with private waste management service providers.

Industrial Waste: Unwanted materials from an industrial operation; may be liquid, sludge, solid, or hazardous waste.

Institutional Waste: Waste generated at institutions such as schools, libraries, hospitals, prisons, etc.

Integrated Waste Management System: The combination of reduction, diversion and disposal alternatives comprising one waste management system. For example – home composting, blue box recycling, source-separated organics composting, incineration, and landfilling could all form part of an integrated waste management system.

Landfills: Sanitary landfills are disposal sites for non-hazardous solid wastes spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day.

Leachate: Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in industrial sites, farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.

Leachate Collection System: A system that gathers leachate and pumps it to the surface for treatment.

Lift: In a sanitary landfill, a compacted layer of solid waste and the top layer of cover material.

Limestone Scrubbing: Use of a limestone and water solution to remove gaseous stack-pipe sulfur before it reaches the atmosphere.

Liner: A relatively impermeable barrier designed to keep leachate inside a landfill. Liner materials include plastic, dense clay and composites.

Magnetic Separation: Use of magnets to separate ferrous materials from mixed municipal waste stream.

Mass Burn Incineration: The incineration of waste without any initial pre-treatment or separation of wastes.

Materials Recovery Facility (MRF): A facility that processes residentially collected mixed recyclables into new products available for market.

Mechanical Separation: The separation of wastes by material type using trammels, cyclones, and various screens.

Mediation: An attempt to bring about a peaceful settlement or compromise between disputants through the objective intervention of a neutral party.

Mitigation: Measures taken to reduce adverse impacts on the environment.

Mixed Municipal Waste: Solid waste that has not been sorted into specific categories (such as plastic, glass, yard trimmings, food waste, etc.)

Modular Facility: A facility designed to allow for an expansion by adding new capacity with very little changes to the existing facility.

MOECC: Ontario Ministry of the Environment and Climate Change. Formerly the Ministry of the Environment (MOE).

Moisture Content: The percentage of a material that is water.

Monitoring: Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, plants, and animals.

Municipal Solid Waste (MSW): Common garbage or trash generated by industries, businesses, institutions, and homes.

Non-combustible Waste: Waste which cannot be incinerated even if energy is added. (e.g. stone and metals).

Non-Ferrous Metals: Nonmagnetic metals such as aluminum, lead, and copper. Products

made all or in part from such metals include containers, packaging, appliances, furniture, electronic equipment and aluminum foil.

Ontario Regulation 101 (O. Reg. 347): a regulation under the Environmental Protection Act that specifies standards and approval requirements for waste management sites and systems in Ontario.

Operating and Maintenance Costs: Usually expressed annually, operation and maintenance costs are a sum of money to operate and maintain the facility in operating order (ie, labour, utilities, equipment repairs, materials, supplies, etc.).

Open Burning: Uncontrolled fires in an open dump.

Open Dump: An uncovered site used for disposal of waste without environmental controls.

Organic: Referring to or derived from living organisms. In chemistry, any compound containing carbon.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Pelletizing: The compaction of waste into small pellets to be burned in an incinerator. Pellets are easier to manage and have a higher calorific value than regular uncompacted waste.

Pilot Tests: Testing a waste management technology under actual site conditions to identify potential problems prior to full-scale implementation.

Plasma-Arc Reactor: An incinerator that operates at extremely high temperatures and that is generally used to treat highly toxic wastes that do not burn easily.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Pollution: Generally, the presence of a substance in the environment that because of its chemical composition or quantity prevents the functioning of natural processes and produces undesirable environmental and health effects.

Post-Closure: The time period following the shutdown of a waste management or manufacturing facility; for monitoring purposes.

Potable Water: Water that is safe for drinking and cooking.

Precipitator: Pollution control device that collects particles from an air stream.

Proponent: Proponent means a person/persons who: 1) carries out or proposes to carry out an undertaking, or 2) is the owner or person having charge, management or control of an undertaking.

Putrescible: Able to rot quickly enough to cause odours and attract flies.

Pyrolysis: Decomposition of waste and its constituent chemicals by extreme heat.

Receptor: The person, plant or wildlife species that may be affected due to exposure to a contaminant.

Recycle/Reuse: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e. recycling of aluminum cans, paper, and bottles, etc.).

Refuse Derived Fuel (RDF): Waste that has been processed to remove non-combustible materials. RDF can be compacted or compressed through processes such as pelletizing or briquetting. Pelletized or Bricked RDF is easy to manage and handle, and also usually has a higher calorific value because of the increased density and reduced moisture content.

Refuse Reclamation: Conversion of solid waste into useful products; e.g., composting organic wastes to make soil conditioners or separating aluminum and other metals for recycling.

Reserve Capacity: Extra treatment capacity built into solid waste and wastewater treatment plants and interceptor sewers to accommodate flow increases due to future population growth.

Residential Waste: Waste generated in single and multi-family homes, including newspapers, clothing, disposable tableware, food packaging, cans, bottles, food scraps, and yard trimmings other than those that are diverted to backyard composting.

Residual: Amount of a pollutant remaining in the environment after a natural or technological process has taken place; e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after it passes through a scrubbing or other process.

Resource Recovery: The process of obtaining matter or energy from materials formerly discarded. **Scrubber:** An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Self Hauled Wastes: Wastes that are delivered to a waste management facility by the waste generator.

Siting: The process of choosing a location for a facility.

Source Reduction: Reducing the amount of materials entering the waste stream from a specific source by redesigning products or patterns of production or consumption (e.g., using returnable beverage containers). Synonymous with waste reduction.

Source Separated Organics (SSO): Organics separated by the household or business that

include food wastes and leaf and yard wastes. Source separated organics are collected by a separate collection vehicle and sent for processing/composting.

Source Separation: Segregating various wastes at the point of generation (e.g., separation of paper, metal and glass from other wastes to make recycling simpler and more efficient).

Special Waste: Items such as household hazardous waste, bulky wastes (refrigerators, pieces of furniture, etc.) tires, and used oil.

Stack: A chimney, smokestack, or vertical pipe that discharges used air.

Stakeholder: Any organization, governmental entity, or individual that has a stake in or may be impacted by a given approach to environmental regulation, pollution prevention, energy conservation, etc.

Terms of Reference: refer to Environmental Assessment Terms of Reference.

Thermal Treatment: Use of elevated temperatures to treat wastes.

Tipping Fee: A monetary fee paid to dispose of waste at a disposal facility.

Toxic Waste: A waste that can produce injury if inhaled, swallowed, or absorbed through the skin.

Transfer Station: Facility where solid waste is transferred from collection vehicles to larger trucks or rail cars for longer distance transport.

Undertaking: is defined in the Environmental Assessment Act as follows:

1. An enterprise or activity or a proposal, plan or program in respect of an enterprise or activity by or on behalf of Her Majesty in right of Ontario, by a public body or public bodies or by a municipality or municipalities,
2. A major commercial or business enterprise or activity or a proposal, plan or program in respect of a major commercial or business enterprise or activity of a person or persons other than a person or persons referred to in clause (1) that is designated by the regulations, or
3. An enterprise or activity or a proposal, plan or program in respect of an enterprise or activity of a person or persons, other than a person or persons referred to in clause (a), if an agreement is entered into under section 3.0.1 in respect of the enterprise, activity, proposal, plan or program; ("enterprise")

User Fee: Fee collected from only those persons who use a particular service, as compared to one collected from the public in general.

Venturi Scrubbers: Air pollution control devices that use water to remove particulate matter from emissions.

Volume Reduction: Processing waste materials to decrease the amount of space they occupy, usually by compacting, shredding, incineration, or composting.

Waste: Unwanted materials left over from a manufacturing process. Refuse from places of human or animal habitation.

Waste Characterization: The process of identify the various components, including quantities, and materials found within a waste stream.

Waste Exchange: Arrangement in which companies exchange their wastes for the benefit of both parties.

Waste Feed: The continuous or intermittent flow of wastes into an incinerator.

Waste Generation: The weight or volume of materials and products that enter the waste stream before recycling, composting, landfilling, or combustion takes place. Also can represent the amount of waste generated by a given source or category of sources.

Waste Generator: The individual, household, establishment or business engaged in an activity that generates a specific waste or wastes.

Waste Management Facility / Site: A facility or site utilized in as a part of the waste management system.

Waste Management System: Any facilities or equipment used in, and any operations carried out for, the management of waste including the collection, handling, transportation, storage, processing or disposal of waste, and may include one or more waste disposal / processing sites.

Waste Minimization: Measures or techniques that reduce the amount of wastes generated during industrial production processes; term is also applied to recycling and other efforts to reduce the amount of waste going into the waste stream.

Waste Reduction: Using at-source reduction, reuse, or composting to prevent or reduce waste generation.

Waste Stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that is recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."

Waste-to-Energy Facility/Municipal-Waste Combustor: Facility where recovered municipal solid waste is converted into a usable form of energy, usually via combustion.

White Goods: Usually large household appliances such as washing machines, dishwashers, and refrigerators/freezers.

Yard Waste: The part of solid waste generated at the household in the yard composed of grass clippings, leaves, twigs, branches, and other garden refuse.