April 5, 2018

Volume I

Draft Proposed Terms of Reference

Environmental Assessment of the Proposed W12A Landfill Expansion, City of London

GOLDER

London CANADA

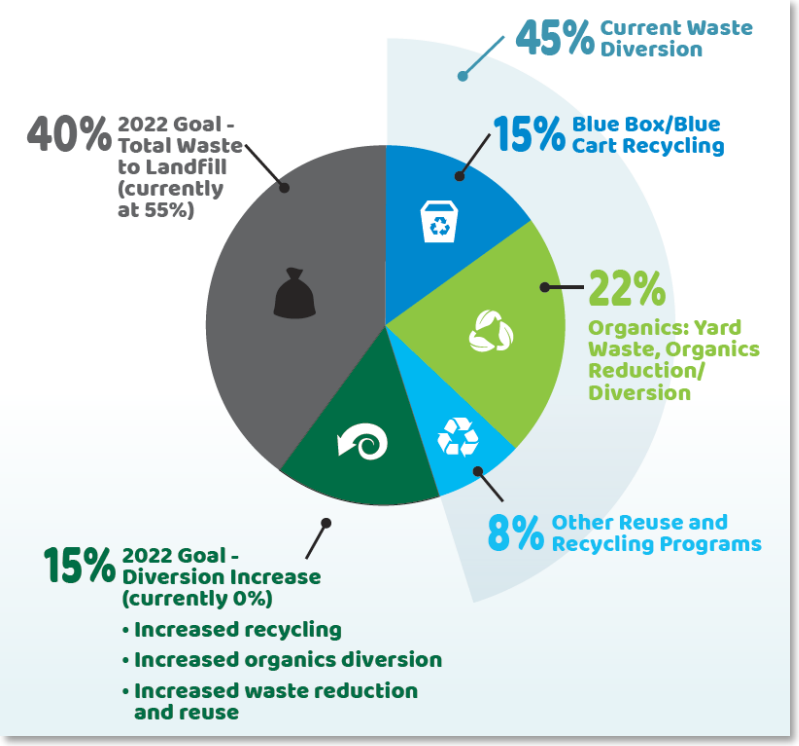
Executive Summary

Phase 1: Preparation of a Terms of Reference:

An Individual Environmental Assessment (EA) for expansion of the W12A Landfill site is being undertaken by the City of London and requires approval under the provincial *Environmental Assessment Act*. The first phase in the EA process is preparation of a Terms of Reference (ToR). Work on the ToR started in March, 2017. The ToR becomes the framework for carrying out the EA.

This is an Executive Summary of the content of the draft proposed ToR, which has been prepared by the City and will be circulated to government review agencies, Indigenous communities, a number of City committees and the public for comment. The comments received will be considered by the City of London in making revisions and preparing the proposed ToR, which will then be submitted to the Minister of Environment and Climate Change (Minister) for a decision. Once approved by the Minister, the ToR provides the framework or work plan that must be subsequently completed to prepare the EA, and the basis for review and approval.

Figure 1 - Residential Waste Diversion

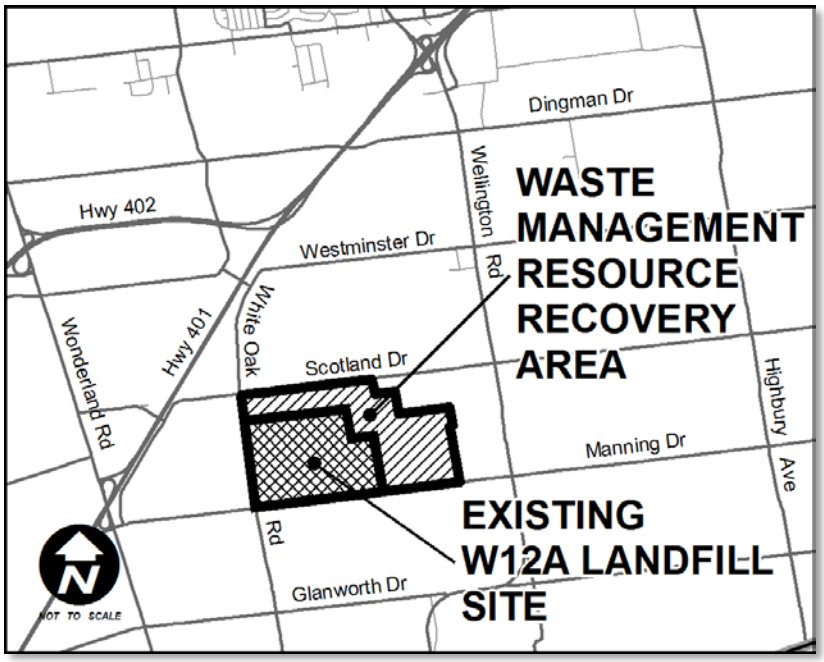


The City of London has implemented many waste diversion programs over the years and has achieved 45% diversion of its residential waste stream (Figure 1). This diversion rate is comparable to other medium to large size municipalities in Ontario with the exception of communities with Green Bin programs. The City has commenced the development of its long-term Resource Recovery Strategy. The first component of the strategy is to complete a 60% Diversion Action Plan to determine how best to increase residential waste diversion to 60% by 2022.

In parallel, and recognizing that despite measures to maximize diversion there will still be waste requiring disposal, expansion of the W12A Landfill site is the approach the City is taking for the long term Residual Waste Disposal Strategy for materials that cannot be diverted.

The W12A Landfill Site

Figure 2 - W12A Landfill Location



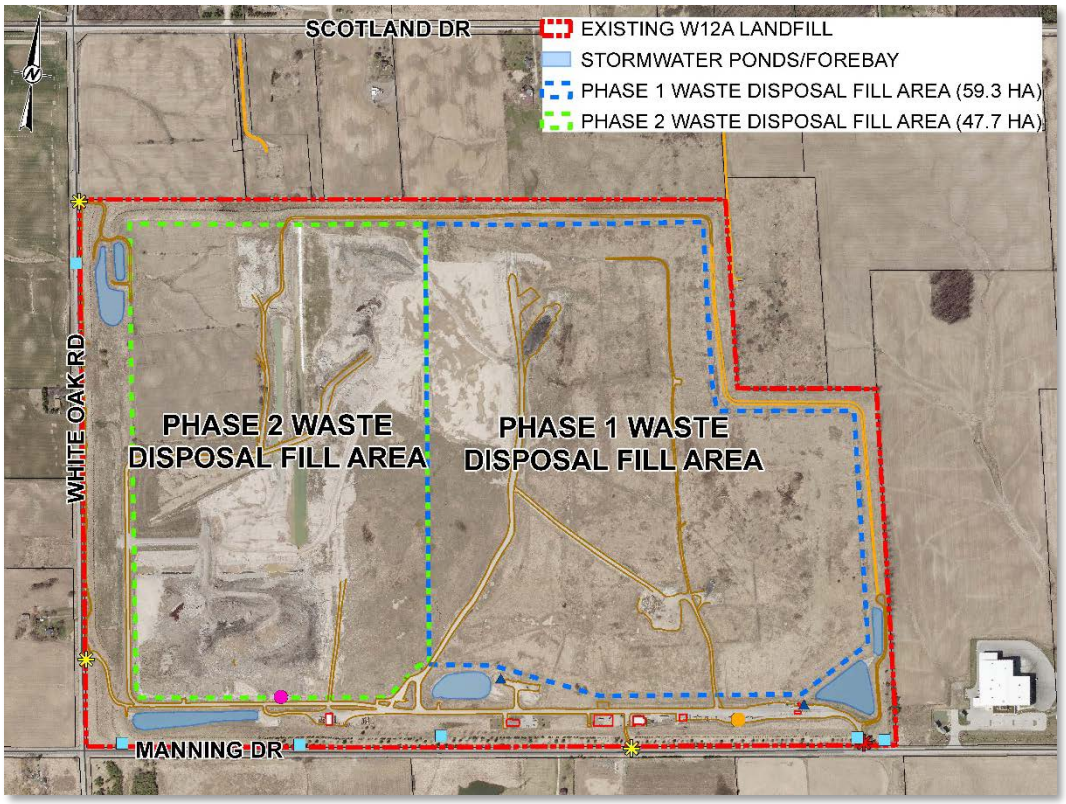
The W12A landfill site is located in the south portion of the City of London, within the western part of the block of land bounded by Manning Drive, Scotland Drive, White Oak Road and Wellington Road South (Figure 2). The site is currently licensed by the Province of Ontario to dispose of waste within a 107 hectare disposal area, which is located within a 142 hectare property. There is an approved site capacity of 12,500,000 cubic metres for waste (about 10,000,000 tonnes), cover soil and final cover. The site is allowed to accept solid non-hazardous waste from a specified area, consisting of the City of London, the Municipality of Thames Centre, the Lake Huron and Elgin Area water treatment plants and Try Recycling Facilities located adjacent to the City's northern boundary. The site can also accept Municipal Hazardous or Special Waste from the City of London, the County of Elgin and the County of Middlesex for transfer off-site for recycling or disposal.

The landfill property is located within the Waste Management Resource Recovery Area, which is a large area of City-owned land identified within the City's Official Plan for future waste management facilities. A City-owned Material Recycling Facility (MRF) is located within these lands just east of the landfill site.

The W12A Landfill Site has been in operation since 1977. The majority of the wastes that it receives are from London residences and some businesses. The remainder of the businesses within the city export their waste for disposal to facilities outside the City. At current disposal rates, the W12A Landfill is expected to reach its approved capacity at the beginning of 2025.

The landfill is divided into two phases (Figure 3). Phase 1 occupies the eastern portion of the disposal area and was filled to capacity in the first 25 years of operation. Phase 2 occupies the remaining western portion and has been constructed with a number of engineering design and operational upgrades (i.e., modern landfill design), and is the active area being used for the residual waste materials generated and requiring disposal. There are engineered collection systems for the leachate (the contaminated liquid produced by precipitation contacting the waste) produced at the site.

Figure 3 - W12A Landfill



For Phase 1 there is a leachate collection system around the perimeter of the disposal area, while for Phase 2 there is a full underdrain collection system below the entire base area. The collected leachate is sent off-site through a piping system for treatment at the Greenway Wastewater Treatment Plant. There is an active landfill gas collection system installed within the completed areas that have received final cover. The collected gas is flared. This gas management system reduces greenhouse gas and odour emissions from the landfill site. There is also a stormwater management system to control the quality and quantity of runoff discharged from the site.

The landfill property and surrounding area is underlain by an extensive deposit of low permeability clayey glacial till soil that provides a natural barrier to control migration of leachate into the groundwater. There are two permeable aquifer zones within the till deposit that are used for water supply from private wells by residences, agricultural and other business purposes in this rural area of the City.

Based on the results from ongoing groundwater and residential well monitoring programs, there is no evidence of leachate effects on the aquifer zones and the W12A Landfill is operating in accordance with the province's requirements in terms of effects on groundwater quality at the property boundary. The W12A Landfill is not having an effect on off-site water well quality.

The ongoing surface water quality monitoring program indicates that the surface water discharged via the stormwater management system meets provincial requirements. The landfill gas monitoring program indicates that landfill gas is not migrating off-site through the subsurface.

Rationale for Expanding the W12A Landfill Site

Since 1969, the City has undertaken a number of waste management planning studies to be able to provide secure, long-term waste management infrastructure for the city. The continued operation of the W12A Landfill site has been a component of the City's long-term plan to provide waste management services since 1977. In 1991 a provincially-appointed arbitrator addressed the City's request to annex additional lands in the Township of Westminster. The arbitrator reported that the W12A Landfill was the most desirable location for a landfill site and that the adjacent lands were likely suitable for an additional landfill site. In the City's 'Vision 96' strategic planning process, it was concluded that the W12A Landfill was a key component of the City's long-term waste management infrastructure.

From 1995 to 1999 the City of London and County of Middlesex were involved in a cooperative long term waste management planning exercise referred to as the London/Middlesex Waste Management plan. This project was 50% funded by the Province. Outcomes of the planning exercise included the approval of the City's long term strategy known as the Waste Management Continuous Improvement System and expansion of the City's Household Special Waste depot to serve the County of Middlesex.

The City commenced the W12A Landfill Area Plan study process in 2005 to study the evolution of the W12A Landfill facility within an overall integrated waste management centre with a planning horizon of 40 years. The study compared seven alternatives that included closing the W12A Landfill and either establishing a new landfill within London or exporting the waste for disposal outside its boundaries, and expanding the W12A Landfill. This study, which included public consultation events, concluded in 2008 and identified the preferred approach as expansion of the W12A Landfill within an integrated resource recovery centre. This was followed by establishment and designation of the Waste Management Resource Recovery Area in the City's Official Plan, and additional public consultation to develop a Community Enhancement and Mitigative Measures Program to involve the community in the site operations and to benefit the community in the area of the landfill site.

As part of developing this ToR, a confirmatory screening assessment of the seven alternatives evaluated in the previous study was completed and the results presented to the public, various committees and City Council. This assessment confirmed that expansion of the W12A Landfill site remains the preferred approach for the City's Residual Waste Disposal Strategy.

It is proposed that additional assessment of long-term waste disposal alternatives (known as 'Alternatives To' the undertaking) will not be part of the EA.

Previous waste management studies and work completed as part of the TOR process concluded that expansion of the W12A Landfill is the most appropriate disposal option. Consequently, the City is proposing not to look at other disposal alternatives as part of the EA.

Description of the Project

Based on previous community engagement activities and ongoing input received, Guiding Principles were developed by the City and approved by City Council to direct the development of the Residual Waste Disposal Strategy. Among these guiding principles, the most support was received for making waste reduction the highest priority, being socially responsible and ensuring that the solution is financially sustainable. In addition, there was support for London managing its waste within its own boundaries.

The W12A Landfill site expansion project will be defined by:

- A 25 year planning period beyond 2025, i.e., until 2050.
- The service area will be expanded to neighbouring municipalities to create a regional service area: The City of London and the Counties of Huron, Perth, Elgin and Lambton and Middlesex will be included in the regional service area. The City of London Council will have the authority to decide which, if any, of these other municipalities will be allowed to use the W12A Landfill for disposal of their wastes, and under what conditions.
- Reduction in the maximum allowable annual tonnage that can be accepted at the landfill from 650,000 tonnes to 500,000 tonnes.
- Achieving 60% residential waste diversion by 2022.

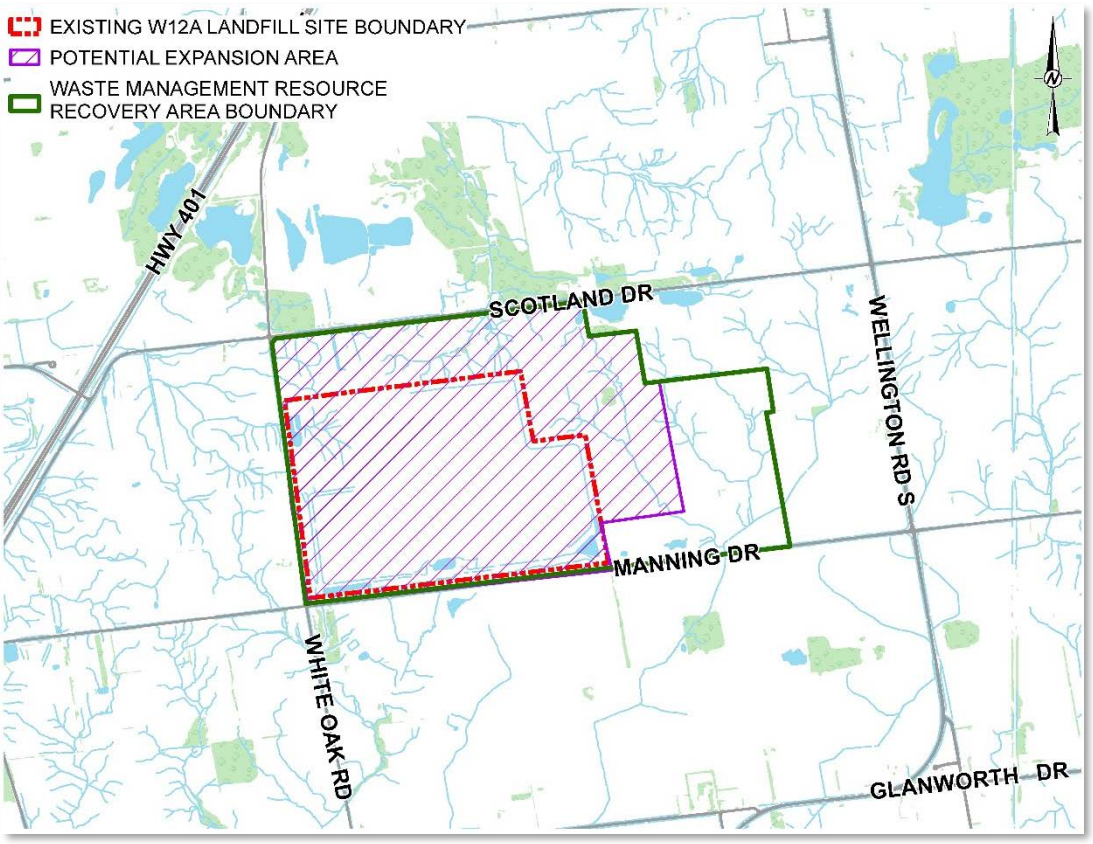
At current disposal rates, the site is expected to reach its approved capacity at the beginning of 2025.
An additional 14,700,000 cubic metres of airspace at the W12A Landfill site, which will about double the current approved capacity, will be required to satisfy disposal requirements for residual waste for the next 25 year period.

To satisfy these disposal requirements, expansion of the W12A Landfill should allow for an additional landfill capacity of 14,700,000 cubic metres.

The different ways in which this additional airspace can be achieved on the W12A Landfill site are known as 'Alternative Methods.' The alternative methods of expanding the W12A Landfill site will be developed and described during the EA and will consist of a vertical expansion above the existing waste disposal area and/or a horizontal expansion to the north and/or to the east within a portion of the Waste Management Resource Recovery Area (Figure 4).

The area proposed for horizontal expansion extends beyond the current landfill site about 300 metres northward to Scotland Drive, and eastward about 420 metres. These expansion alternatives will consist of variations in and combinations of landfill height, landfill area and configuration. It is expected that there will be three or four different landfill expansion alternatives developed at a conceptual level, their potential effects on the environment assessed, and the alternatives then compared to identify the overall preferred expansion alternative.

Figure 4 – Potential Expansion Area



Phase 2: Environmental Assessment

The EA work will be undertaken in a series of nine steps:

Step 1 – Identify the 'Alternative Methods' of landfill expansion (and incorporate conceptual design mitigation measures)

Step 2 – Characterize the existing environmental conditions

Step 3 – Qualitative evaluation of 'Alternative Methods'

Step 4 – Compare the 'Alternative Methods' for landfill expansion and identify the preferred alternative

Step 5 – Determine the net effects of the preferred alternative

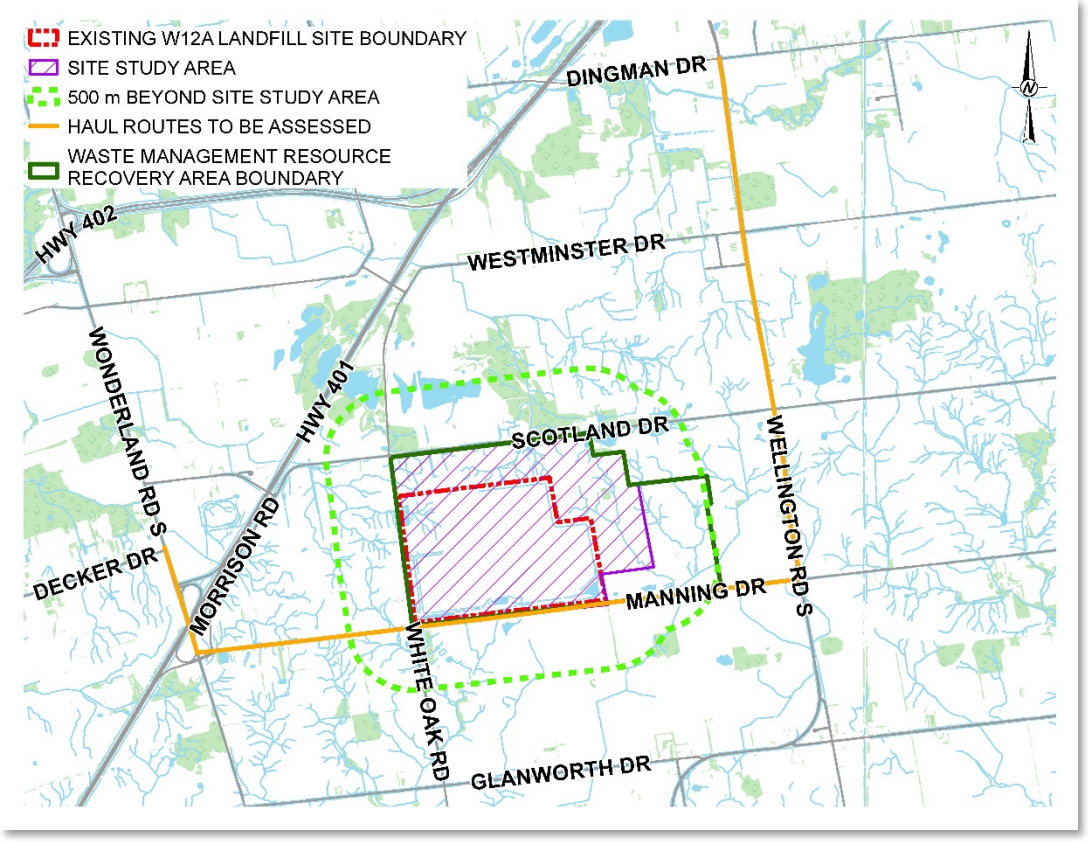
Step 6 – Describe the preferred 'Alternative Method' for landfill expansion;

Step 7 – Consideration of climate change

Step 8 – Cumulative Impact Assessment

Step 9 – Preparation of the EA Study Report

Figure 5 – Proposed Study Areas



Consultation (community engagement) with the public, Indigenous communities, Government review team members, City of London Advisory Committees, and other stakeholders will be ongoing throughout the EA process.

The EA study area is the area within which activities associated with the proposed project will occur and where potential environmental effects will be studied. Three preliminary generic study areas (Figure 5) for the assessment, which may be refined and will be confirmed during the EA, have been identified as follows:

Site Study Area – The existing W12A Landfill Site, located at 3502 Manning Drive and adjacent lands where landfill expansion may occur.

Site-vicinity Study Area – The lands in the area immediately adjacent to the Site Study Area that have the potential to be directly affected by the landfill expansion and activities with the Site Study Area. The extent of the Site-vicinity Study Area will be determined for each of the environmental components. For most environmental components, a Site-vicinity Study Area of 500 metres from the Site Study Area is appropriate.

Wider Study Area – An area that takes on the broader community generally beyond the immediate site vicinity and for specific environmental components may include the entire Municipality.

The components and sub-components of the environment that will be evaluated during the EA such that the potential effects of the proposed landfill expansion alternatives are determined and compared using a set of comparative evaluation criteria, are:

Environmental Components:	Atmosphere (air and noise)
	Geology and Hydrogeology (groundwater quality)
	Surface Water (quality and quantity)
	Biology (aquatic and terrestrial)
Socio-Economic Components:	Land Use
	Agriculture
	Archaeology and Cultural Heritage
	Socio-economic
	Visual Impacts
Technical Components:	Design & Operations
	Transportation

The ToR provides technical work plans for each of these components and sub-components that will be undertaken during the EA study.

Consultation (Community Engagement)

The ToR describes the Community Engagement Program prepared and undertaken by the City for the development of this ToR, as well as the program proposed for the subsequent EA process.

Engagement and consultation with the public and other stakeholders is a key component of the EA process. It enables stakeholders to participate in the planning process and enhance the quality of the project. The key instruments in the Community Engagement Program that were used to engage the public and the other stakeholders and elicit feedback during the ToR preparation are summarized in Table 1). Input received from this program was considered by the City in preparing the draft ToR.

A list of potentially affected Indigenous communities was developed in consultation with the MOECC during the development of this ToR. A program to engage and consult with the eight identified Indigenous communities was carried out considering their specific needs and specific issues. The Indigenous communities were consulted on how they would like to be involved in the EA process. City staff were available to meet with interested Indigenous communities and discuss the proposed project at any time during the development of the ToR.

Table 1 - Key Community Engagement Activities Between March 2017 and January 2018

Community Engagement Activity	Comments
Open Houses	• Two sets of open houses (one in May, one in November 2017) • Each set had an afternoon and evening sessions at two locations plus a follow-up virtual open house on the project website
W12A Landfill Public Liaison Committee	• Existing committee • Provided updates at six meetings
City of London Advisory Committees	• Advisory Committee on the Environment, Agricultural Advisory Committee and Environmental and Ecological Planning Advisory Committee • Attended and presented at two meetings for each advisory committee
Community Liaison Committee	• New committee with members representing various stakeholder groups • Four meetings
Community Events	• Booth at 10 community events (e.g., Sunfest, Lifestyle Home Show, etc.)

Community Engagement Activity	Comments
Project Website	• Getinvolved.London.ca/WhyWasteDisposal • Over 1,300 unique visitors
Letter/email correspondence	• Contacted 275 nearby property owners and residents, 28 landfill customers, 15 stakeholder groups and over 30 government agencies on three occasions (Notice of Commencement and both sets of open houses)
Newspaper and social media advertisements	• Numerous ads at various point in the process

To assist in the comparative evaluation of the expansion alternatives during the EA, the public was asked at open house #2 to rank the environmental components that they considered more important, important and less important. Based on the input received, groundwater quality, aquatic ecosystems and terrestrial ecosystems were the environmental components identified as most important, while cultural heritage landscapes, cultural heritage resources and archaeology were ranked less important.

Following approval of this ToR and during preparation of the EA, a consultation program will be continued to engage the public, businesses, the Government review team, Indigenous communities, as well the various groups and committees during the EA process. Input will be obtained through a number of engagement activities, which will be generally similar to the activities completed during preparation of the ToR.

The Draft EA will be circulated for a seven week public comment period prior to finalization and submission to the MOECC for approval. In addition, consultation specific to individual Indigenous communities will also be carried out.

Other Regulatory Approvals

In addition to EA approval, the W12A Landfill expansion will also require approvals under the *Environmental Protection Act*, the *Ontario Water Resources Act* and the *Planning Act*, and perhaps from the Upper Thames and Kettle Creek Conservation Authorities in terms of a permit to undertake specific works associated with the expansion. These approvals processes are expected be undertaken after EA approval is in place.

Overview of the EA Schedule

The following schedule is anticipated:

Circulation of Draft ToR for public and agency review	April/May 2018
Submission of Proposed ToR for Minister's Approval	August 2018
Approval of ToR	Late 2018/Early 2019
EA Studies and EA Submission for Minister`s Approval	2019 and 2020
Approval of EA	Mid-2021
Other Approvals	2021-2022

It is anticipated that all approvals will be in place to allow final design of the preferred landfill expansion and any required construction prior to the W12A Landfill reaching its currently approved capacity, which is predicted at the beginning of 2025.

Table of Contents

Volume I – Terms of Reference

Tables

Figures

Volume II – Supporting Documents

Supporting Document #1 - W12A Landfill Area Plan

Supporting Document #2 - Residual Waste Projections and Landfill Capacity Assessment

Volume III – Record of Consultation

Appendix A
Community Engagement Plan

Appendix B
Government Review Team

Appendix C
Aboriginal Consultation

Appendix D
ToR Launch Material

Appendix E
Open House #1

Appendix F
Open House #2

Appendix G
Other Engagement

Appendix H
Draft ToR Review

Appendix I
Media Articles

ACRONYMS

Acronym	Definition
AAC	Agricultural Advisory Committee
AADT	Average Annual Daily Traffic
ACE	Advisory Committee on the Environment
AG	Agricultural
BMP	Best Management Practices
C of A	Certificate of Approval
CLC	Community Liaison Committee
CLI	Canada Land Inventory
CO_{2e}	Carbon Dioxide Equivalents
COTTFN	Chippewas of the Thames First Nation
CR&D	Construction, Renovation and Demolition Waste
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EAA	*Environmental Assessment Act* (Ontario)
ECA	Environmental Compliance Approval
EDR	Emergency Detour Route
EEPAC	Environmental and Ecological Planning Advisory Committee
EES	Environmental & Engineering Services
EFW	Energy from Waste
EPA	*Environmental Protection Act (Ontario)*
ER	Environmental Review
ESA	Environmentally Significant Area
EX	Resource Extraction
FAQ	Frequently Asked Questions
GAP	Generally Accepted Principles
GHG	Greenhouse Gases
GIS	Geographic Information System
GRT	Government Review Team
H	Horizontal
HIA	Heritage Impact Assessment
HSW	Household Special Waste
IC&I	Industrial, Commercial and Institutional Waste
KCCA	Kettle Creek Conservation Authority
LF	Landfill
LFG	Landfill Gas
LIO	Land Information Ontario
LOS	Level of Service
LWRIC	London Waste to Resources Innovation Centre
MDI	Mineral Deposit Inventory
MHSW	Municipal Hazardous or Special Waste

Acronym	Definition
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MRF	Materials Recovery Facility
MTCS	Ministry of Tourism Culture and Sport
MTO	Ministry of Transportation Ontario
MU4	Muriel soils (MU4)
NOC	Notice of Commencement
OMB	Ontario Municipal Board
OS	Open Space
O. Reg.	Ontario Regulation
OWRA	Ontario Water Resources Act
PLC	Public Liaison Committee
PORs	Points of Reception
RGP	Resident Geologist Program
SAR	Species at Risk
SOCC	Species of Conservation Concern
SWH	Significant Wildlife Habitat
SWM	Stormwater management
SWMS	Stormwater management system
ToR	Terms of Reference
V	Vertical
WMWG	Waste Management Working Group
WRM	Waste Management and Resource
UTRCA	Upper Thames River Conservation Authority

UNITS OF MEASURE

Acronym	Definition of Units
cm	centimetre
ha	hectare
km	kilometre
m	metre
masl	metres above sea level
mm	millimetre
m^3	cubic metre

GLOSSARY OF TERMS

Term	Definition
'Alternative Methods'	Alternative methods of carrying out the proposed undertaking are different ways of doing the same activity associated with an undertaking. Alternative methods could include consideration of one or more of the following: alternative technologies; alternative methods of applying specific technologies; alternative sites for a proposed undertaking; alternative design methods; and, alternative methods of operating any facilities associated with a proposed undertaking.
'Alternatives To'	Alternatives to the proposed undertaking are functionally different ways of approaching and dealing with a problem or opportunity.
Ambient Air	Open air not enclosed in a structure, machine, chimney or stack.
Aquifer	A layer of permeable soil, i.e., sand and/or gravel, or bedrock through which groundwater flows and can yield enough water to supply wells for use.
Berm	At a landfill site, a narrow mound or ridge comprised of soil (for example, a screening berm used to block the view of the landfill activities from off-site)
Borehole	A hole drilled into the ground to obtain information on the soil, bedrock and groundwater conditions and characteristics. A borehole can be completed as a groundwater monitoring well.
Buffer Area	The part of the landfill site not used for waste disposal, usually between the perimeter of the disposal area and the landfill property boundary.
Certificate of Approval (Waste)	An approval issued by the Ministry of the Environment for the establishment and operation of a waste management site/facility. Now referred to as an Environmental Compliance Approval.

Term	Definition
City of London	The City of London (the proponent); used when referencing the political or corporate administrative body.
CR&D Waste	Waste generated by the Construction, Renovation and Demolition sector of the economy.
Criteria	A description of each environmental component to be considered in the environmental assessment, consisting of the rationale for including the component and the indicator(s) to be used in the assessment.
Waste Management Community Liaison Committee	A group established specifically for this project with the objective of ensuring the diverse interests of multiple stakeholders are equally and adequately represented throughout the EA process.
Cumulative Effects	The net effects of the proposed undertaking combined with the predicted effects of other existing and identified certain and probable projects in the area of the proposed undertaking, where the effects would overlap.
Disposal Area	The area within the landfill property approved for the disposal of residual waste; also referred to as the waste footprint.
Environment	As defined by the *Environmental Assessment Act*, environment means: • Air, land or water, • Plant and animal life, including human life, • The social, economic and cultural conditions that influence the life of humans or a community, • Any building, structure, machine or other device or thing made by humans, • Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or • Any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment	An environmental assessment, commonly known as an individual EA, is a study that is completed by the proponent to assess the potential environmental effects (positive or negative) of an individual project.
Environmental Compliance Approval	An approval issued by the Ministry of the Environment and Climate Change for the establishment and operation of a waste management site/facility.
Environmental Components	Environmental components are different aspects of the physical, biological and human environments.

Term	Definition
Greenfield Site	A parcel of land that has not been previously developed for urban use, i.e., rural or agricultural land or green space.
Groundwater	Water below the ground surface contained in the pore spaces in soil or in openings within the bedrock.
Haul Route	Public roadways used by vehicles transporting waste to a landfill site.
Hazardous Waste	Waste generated from any source that is defined as hazardous by the regulations of Ontario.
Indicators	Specific characteristics of the environmental components that can be measured, qualified, quantified or determined in some way.
IC& I Waste	Waste generated by the Industrial, Commercial & Institutional sector of the economy.
Landfill	An approved site used for the long-term disposal of residual waste.
Landfill Capacity	The volume approved for disposal of residual wastes and cover materials, described in cubic metres. Also referred to as the approved airspace.
Landfill Expansion	An increase in the approved landfill capacity.
Landfill Gas	Gases generated from the anaerobic decomposition of organic waste materials; mainly consisting of methane and carbon dioxide and traces of other gases
Landfill Gas Collection System	The system used to collect the gases generated by decomposition of the waste in the landfill, typically consisting of a network of gas wells and/or horizontal piping attached to vacuum to extract the gas and convey it to a location where the gas can be combusted in a gas flare or processed for subsequent use.
Leachate	The liquid produced when water (typically rainwater or snowmelt) passes through a landfill and contains contaminants as a result of coming in contact with the waste.
Leachate Collection System	The system used to collect leachate generated by a landfill, usually consisting of a network of piping and drainage stone beneath or around the perimeter of the disposal area.
Mitigation Measures	Design features and/or operational approaches used to control the potential effects of the landfill on the environment.
Monitoring Well	An installation at a selected depth in a borehole in which the groundwater level can be measured and groundwater samples obtained for chemical analysis to determine its quality. At a landfill, this information is typically monitored at some frequency over time and is referred to as a groundwater monitoring program.

Term	Definition
Non-hazardous Solid Waste	Waste generated from any source that is defined as non-hazardous and solid by the regulations of Ontario.
Ontario Regulation 232/98	The regulation that governs the design, operation, closure and post-closure of new or expanding waste disposal sites in the province of Ontario.
Proponent	A person, corporation, government agency or other legal entity who: a) Proposes to carry out an undertaking, or b) Is the owner or person having charge, management or control of an undertaking. For this undertaking (project), the proponent is the City of London.
Reasonable Use Guideline (or Concept)	The Ministry of Environment and Climate Change guideline used to determine the acceptable level of impact from landfill leachate on off-site groundwater quality, and used to assess compliance of landfill sites in terms of effects on groundwater resources.
Receptor	A specific location where the effect(s) from a waste management facility may be received. Also referred to as Points of Reception (PORs).
Residential Waste	Waste generated by residences (ranging from singe to multi-residential units).
Residual Waste	The waste material that cannot be diverted through recycling or other processes and requires disposal.
Service Area	The geographic area from which generated waste can be received at a recycling or disposal site, in accordance with the approval for the recycling or disposal site.
(the) Site	(the) W12A Landfill.
Site Life	The period of time during which the W12A Landfill can continue to accept wastes.
Stormwater Management System	An engineered system to manage/control the quantity and/or quality of stormwater runoff from the site, typically consisting of ditches and ponds that discharge to the natural environment.
Surface Water	Water on top of or flowing across the ground surface, i.e., lakes, rivers, ditches.

Term	Definition
Terms of Reference	A document prepared by the proponent and submitted to the Ministry of the Environment and Climate Change for approval. The Terms of Reference (ToR) document sets out the framework for the planning and decision-making process to be followed by the proponent during the preparation of an EA. In other words, it is the City of London's (the proponent's) work plan for what is going to be studied. If approved, the EA must be prepared according to this ToR. The ToR also provides the framework for evaluating the EA.
(the) Undertaking	The activities associated with the EA for the proposed expansion of the W12A Landfill, as described in this ToR. Also referred to as the 'project'.
Waste Generation Rate	The quantity of waste generated by an individual(s) on a daily or annual basis, typically described in tonnes (or kilograms) per person per year.

1.0 Introduction

This is the Terms of Reference (ToR) document (i.e., the work plan or framework for work) for the proposed expansion of the W12A Landfill (the site) by the City of London (the proponent). This section provides an introduction to the project; including the proponent, the purpose of the project, the project location and a general description of the site.

1.1 Identification of the Proponent

The City of London (the City) is the proponent for the proposed project. The City is located in southern Ontario and has a total area of approximately 421 square kilometres (km^2) with a 2016 population of 383,822. The contacts for this project are as follows:

Jay Stanford, M.A., M.P.A.
Director - Environment, Fleet and Solid Waste
Phone: (519) 661-2489 ext. 5411
Fax: (519) 661-2354
E-mail: jstanfor@london.ca

Wesley Abbott, P. Eng.
Project Manager, Solid Waste Management
Phone: (519) 661-2489 ext. 1812
Fax: (519) 661-2354
E-mail: wabbott@london.ca

Mailing Address for the above staff is:
Corporation of the City of London
Solid Waste Management Division, 8th Floor
300 Dufferin Avenue, P.O. Box 5035
London, ON N6A 4L9

1.2 Purpose of the Undertaking

In the City more than one tonne of waste is produced per person each year. This includes both waste generated in residences as well as waste generated by businesses and institutions. Waste is diverted from disposal through numerous waste reduction, reuse, recycling, composting and recovery initiatives that have been implemented by the City and by private and institutional sectors; however, there is still a quantity of waste produced that is not diverted and requires disposal. Waste that cannot be reduced, reused, recycled or composted is considered residual waste.

The residual waste created in London from residences and some businesses is currently disposed of at the City's W12A Landfill. Some of the City's business waste is taken to landfills located outside the City for disposal. At the current disposal rates, this landfill is expected to reach its currently approved capacity at the beginning of 2025.

To plan for the future, the City has commenced the development of two long-term waste management strategies: the Resource Recovery Strategy, and the Residual Waste Disposal Strategy. The Resource Recovery Strategy will include a plan to maximize waste reduction, reuse, recycling, resource recovery, energy recovery and/or waste conversion in an economically viable and environmentally responsible manner. The current residential diversion rate is 45% with the latest comprehensive assessment of existing diversion programs and proposed diversion program enhancements provided in *The Road to Increased*

Resource Recovery and Zero Waste (Road Map 2.0). The only significant diversion component that remains undecided and unimplemented is residential organics management program. The Resource Recovery Strategy is scheduled to be completed in early 2019. An interim step includes the completion of the 60% Diversion Action Plan in 2018 and will include development of programs and an implementation schedule for specific activities to increase the City's diversion rate to 60% for residential waste.

The Residual Waste Disposal Strategy will involve the development of a long-term plan to manage residual waste, which will require obtaining additional residual disposal capacity. Several ways of satisfying this need were assessed (referred to as 'Alternatives To' the undertaking). The assessment of these 'Alternatives To' is described in Section 4 of this document. The preferred 'Alternative To' included the expansion of the W12A Landfill.

The expansion of the W12A Landfill requires an Environmental Assessment (EA) and approval from the Minister of the Environment and Climate Change for Ontario, pursuant to the Ontario *Environmental Assessment Act* (EAA). The purpose of the EA is to obtain approval for expansion of the W12A Landfill.

One of the City of London's responsibilities as an Ontario municipality is to provide residual waste disposal service to its ratepayers. If the W12A Landfill is allowed to reach its currently approved capacity and other possible means of providing disposal service are not pursued by the City, then they will not be able to fulfill this obligation. Because the W12A Landfill is expected to reach its approved capacity early in 2025, the City of London is commencing this EA process at this point in time to allow adequate time for completion of both the required approvals and the implementation of the landfill expansion to be available to receive waste prior to the current remaining disposal capacity being consumed.

This ToR is being submitted to the Ministry of the Environment and Climate Change (MOECC) for approval to carry out an individual EA under the EAA. Through completion of this EA, the City will be able to achieve its primary objective of providing the long-term preferred solution for residual waste disposal for the City.

The City of London will consider the stated purpose of this EA during the EA process and will refine the purpose if required. The final purpose statement will be provided in the EA study report.

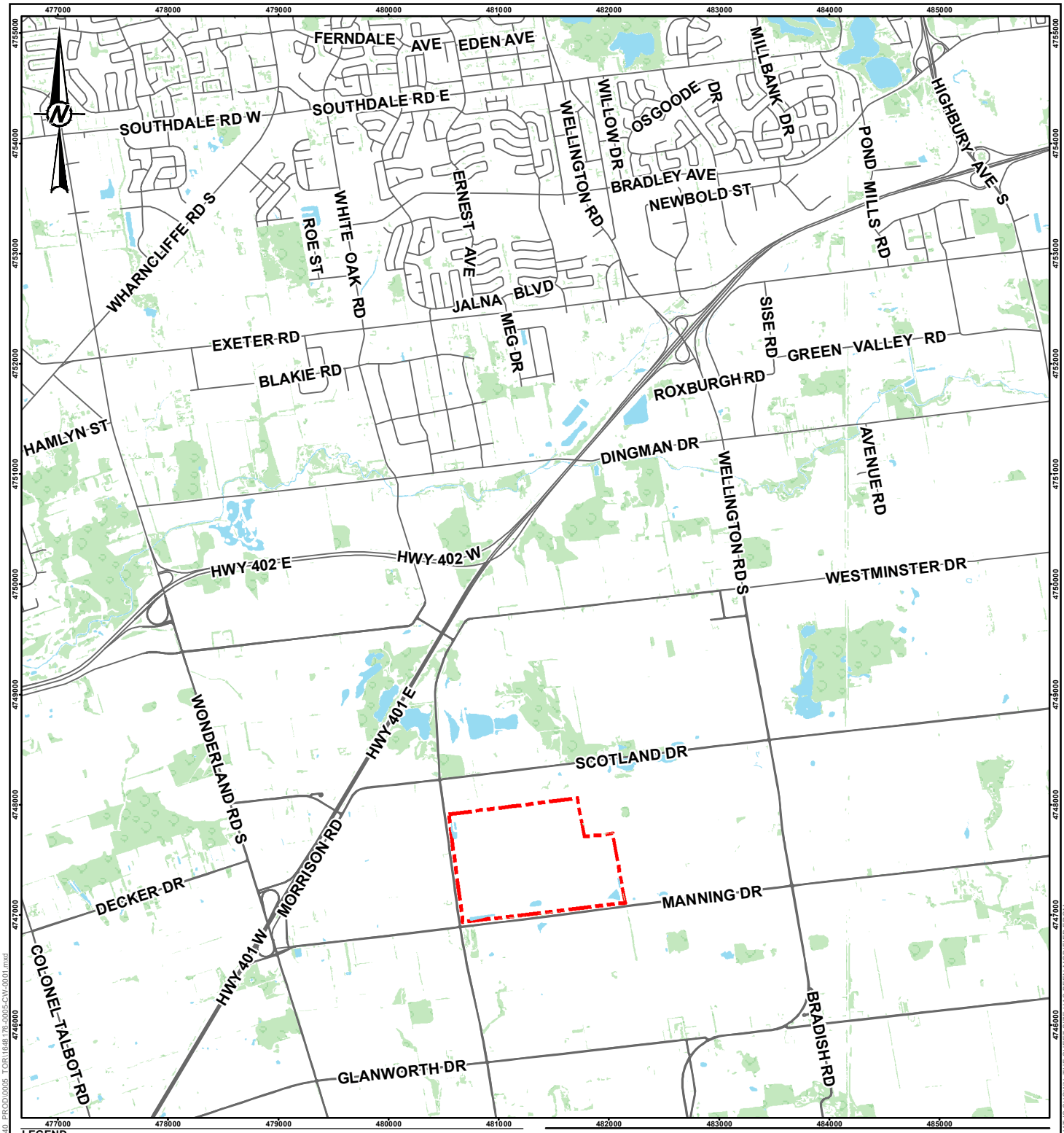
1.3 W12A Landfill Site Description

The W12A Landfill is located at 3502 Manning Drive in the south end of the City of London, Ontario, as shown in Figure 1.3-1. The site is currently approved to accept waste as follows:

- Solid non-hazardous waste, generated from only the following areas:
  - The geographic boundaries of **the City of London**;
  - The geographic boundaries of **the Municipality of Thames Centre;**
  - **Lake Huron Water Treatment Plant** located at 71155 Bluewater Highway, Municipality of South Huron;
  - **Elgin Area Water Treatment Plant** located at 43665 Dexter Line, Municipality of Central Elgin; and
  - **TRY Recycling Plants** located at 21462 and 21463 Clarke Road, Municipality of Middlesex Centre.
- Municipal Hazardous or Special Waste (MHSW) from residents and small quantity generators (businesses with limited amounts of MHSW) from the following areas:
  - The geographic boundaries of **the City of London**;
  - The geographic boundaries of **the County of Middlesex**; and
  - The geographic boundaries of **the County of Elgin**.

Solid, non-hazardous waste is disposed at the site while the MHSW is accepted for transfer to appropriate recycling/processing facilities.

The City owns a number of properties adjacent to and near the W12A Landfill as depicted in Figure 1.3.2. This figure also shows the boundary of the Waste Management Resource Recovery Area, which is an area identified in the City's Official Plan for future waste management facilities and activities including landfilling.



LEGEND

EXISTING W12A LANDFILL SITE BOUNDARY

DRAFT

0 500 1,000 2,000

1:50,000 METRES

REFERENCE(S)
1. SERVICE LAYER CREDITS:
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
KEY PLAN

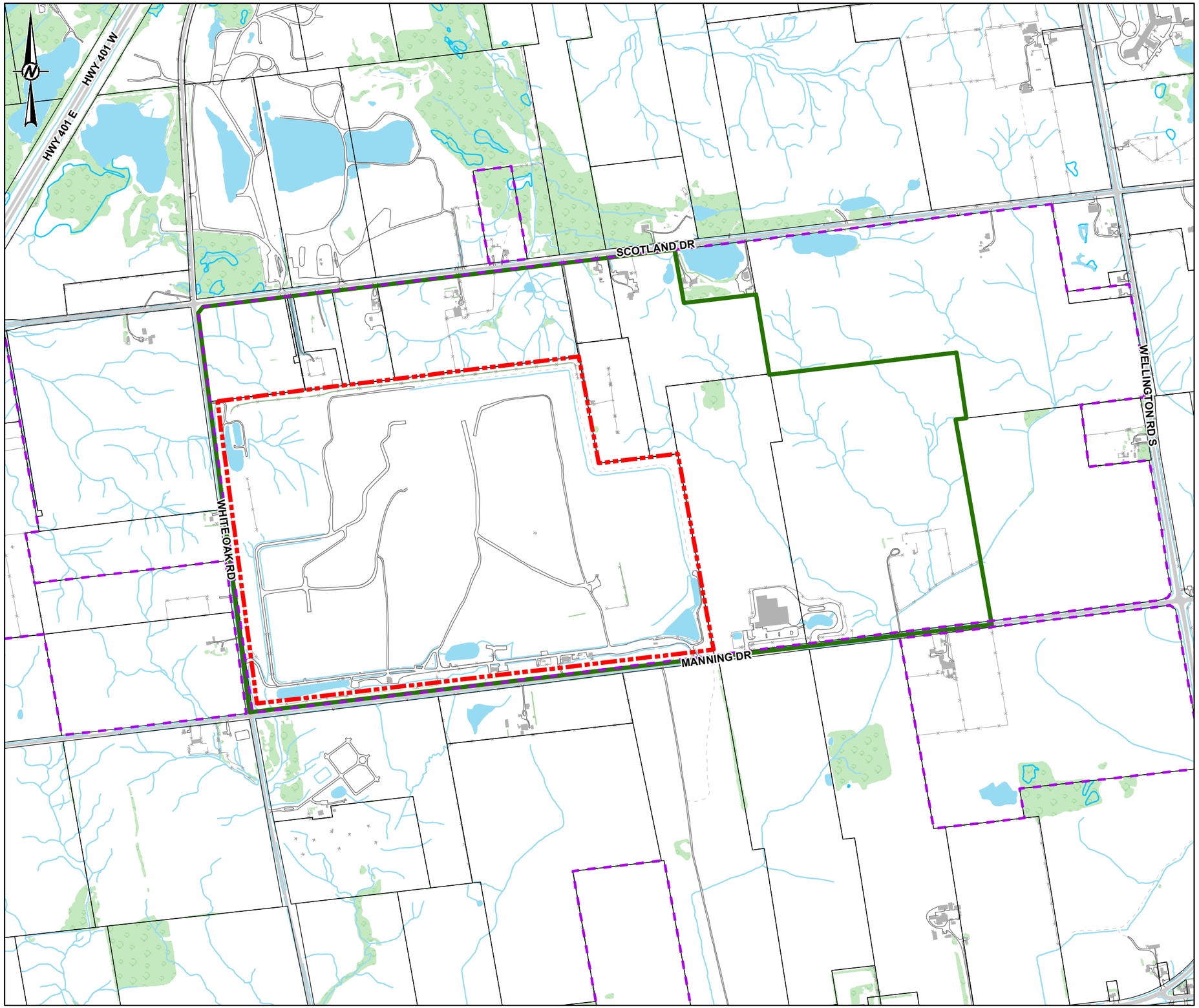
CONSULTANT
Golder Associates

YYYY-MM-DD	2018-01-04
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0005	A	**1.3-1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

Path: \\golder.gds\gal\Ottawa\Active\Spatial IMC\City of London\Site W12A\09 PROJ\1648176\40 PROD\0005 TOR\1648176-0005-GW-0001.mxd



LEGEND

- WATERCOURSE
- DRIVEWAY
- FENCELINE
- TRAIL
- BUILDING FOOTPRINT
- WOODED AREA
- WATERBODY
- CITY OWNED PROPERTY
- WASTE MANAGEMENT RESOURCE RECOVERY AREA BOUNDARY
- EXISTING W12A LANDFILL SITE BOUNDARY

REFERENCE(S)
1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

DRAFT

0 125 250 500
1:12,500 METRES

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
SITE PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-01-04
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0005	A	**1.3-2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
25mm
0

Path: \\golder.gds\ga1Ottawa\Active\Spatial_IM\CityofLondon\Site_W12A\99_PROJ\1648176\40_PROD\0005_TOR\1648176-0005-CW-0002.mxd

1.3.1 Site Development History

In 1969, the City commissioned James F. MacLaren Limited to develop a long-term solid waste disposal plan. The results of the study are contained in the report entitled *Report on Solid Waste Disposal for the City of London* (October 1970). The report recommended that the City proceed with the necessary approvals, detailed design and land acquisition for the development of a new landfill (referred to as W12) to be located on part of Lots 18, 19 and 20 of Concession 5 in the former Township of Westminster.

During site investigations, it was determined that the geological setting of W12 was not suitable for a landfill because a spillway containing granular soils traversed the surficial silty clay soils that are generally predominant in the area. It was also determined that the area south of W12 had thick surficial deposits of silty clay. As a result, the location of the proposed landfill was changed to the area referred to as W12A located on part of Lots 18, 19 and 20 of Concession 6 in the former Township of Westminster.

In April 1973, the City filed an application for a Certificate of Approval (C of A), (now referred to as an Environmental Compliance Approval (ECA)), for a Waste Disposal Site to the MOE for the W12A Landfill. Subsequently, the Environmental Hearing Board held a public hearing in the former Township of Westminster from July 30, 1973 to August 3, 1973 to review the application for the W12A Landfill. The Environmental Hearing approved the application.

On November 13, 1973, the MOE issued a Provisional C of A (#A042102) for the W12A Landfill. The C of A did not permit the disposal of waste until final design plans and specifications were submitted and approved by the MOE.

In 1974, the Ontario Municipal Board (OMB) held a public hearing to address planning issues related to the establishment of a new landfill. As a result of the hearing, the OMB issued an order in January 1975 authorizing the City to acquire the necessary lands to create the W12A Landfill and spend the necessary funds to construct the new landfill. The OMB also directed the former Township of Westminster to amend its zoning by-law and any other necessary by-laws to permit landfilling in the lands referred to as the W12A Landfill.

In 1976, the final design plans and specifications for the W12A Landfill were submitted to the MOE. The original site design consisted of 14 cells covering 107 hectares (ha), five stormwater management ponds, the use of berms and trees to provide screening, a perimeter leachate collection system and a surface water and groundwater monitoring program.
On August 16, 1976 the MOE re-issued C of A #A042102 for the W12A Landfill to permit the disposal of waste in accordance with the submitted plans.

Since 1976, the C of A or ECA has been re-issued or amended sixteen times to permit changes in the operation of the landfill. These changes have included refinement of the environmental monitoring programs, requirement for an annual report, approval of a household special waste (HSW) facility, various design changes and infrastructure upgrades and an expansion of the service area from which waste can be received.

Waste was first disposed of in the landfill during the summer of 1977. At this time, the landfill accepted non-hazardous waste generated from within the boundaries of London.

In 1999, the City received approval to establish a HSW depot at the landfill to accept MHSW from residents and small quantity generators from within the geographic boundaries of London and the County of Middlesex for transfer to appropriate recycling/processing facilities.

In 2015, an Environmental Screening was completed as per *Ontario Regulation (O. Reg.) 101/07* (under the EAA) to expand the service area of the site to include the following locations and types of waste:

- Lake Huron Water Treatment Plant (water treatment plant residuals);
- Elgin Area Water Treatment Plant (water treatment plant residuals);
- TRY Recycling's Clarke Road facility (construction, renovation and demolition (CR&D) recycling process residuals and residential garbage);
- Thames Centre (municipal non-hazardous waste); and
- Elgin County (MHSW).

An Environmental Screening Report was submitted to the MOECC and an amendment to the ECA for the landfill was obtained on May 16, 2016. The expanded service area did not change the approved fill rate (amount of waste the landfill can receive in a year) or the types of waste that can be accepted.

1.3.2 Landfill Site and Landfill Components

The W12A Landfill site has a 107 ha fill area and is located on a 142 ha property.

As described in Section 1.3.1, waste disposal at the W12A Landfill commenced in 1977. Over the first 25 years of operation, approximately 5 million tonnes of waste were deposited at the W12A Landfill in the first six cells that comprise Phase 1. These Phase 1 cells cover 59.3 ha and occupy the eastern portion of the landfill footprint (see Figure 1.3-3). The Phase I cells are labelled Cells 1, 2, 3, 4, 5 East and 5 West on Figure 1.3-3. Landfilling in Phase 1 is complete.

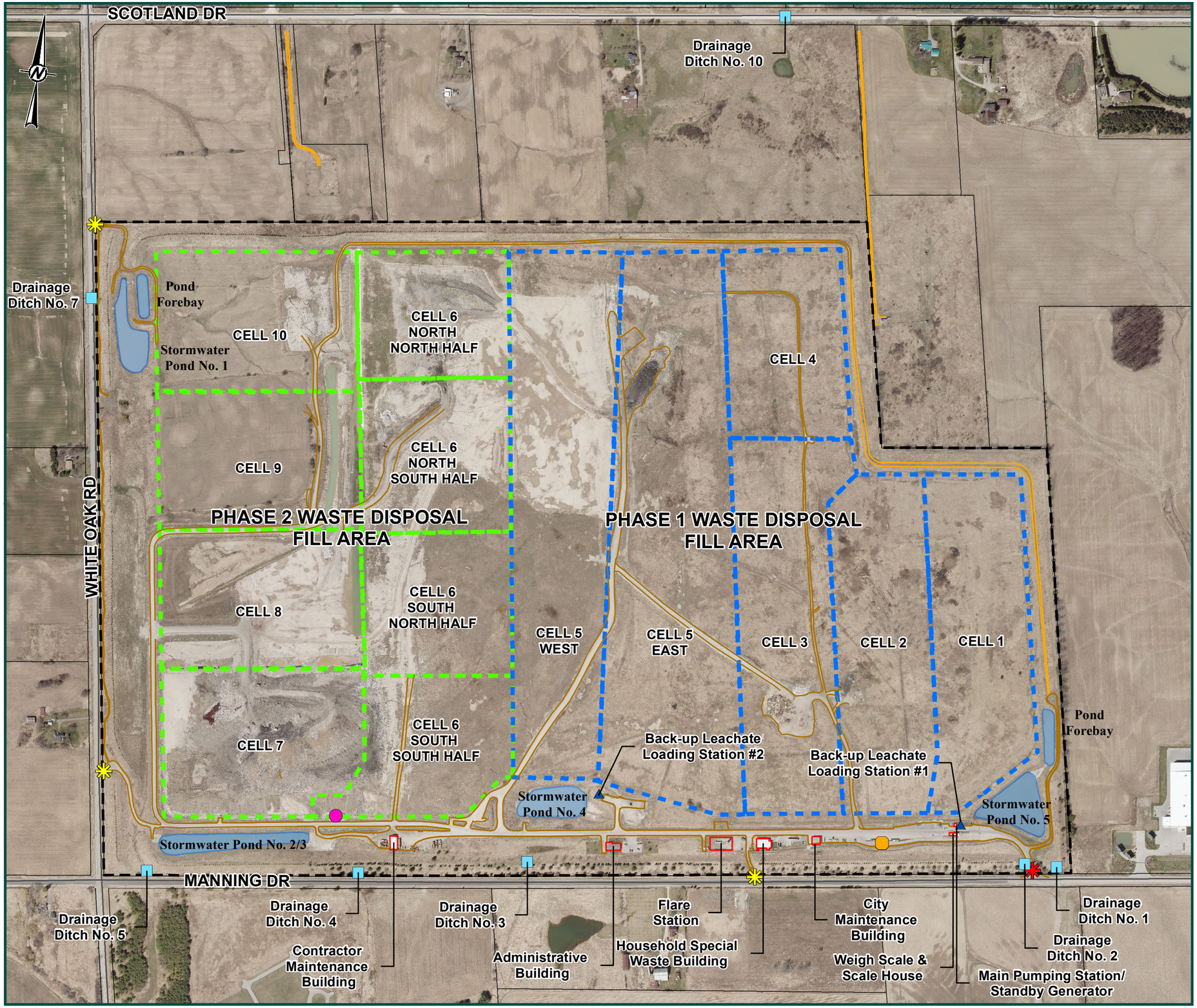
The remainder of the landfill covers 47.7 ha and has been designed to accommodate approximately another 5.5 million tonnes. The area is referred to as Phase 2 as shown on Figure 1.3-3. Phase 2 is divided into eight cells labelled on Figure 1.3-3 as Cells 6 South South Half, South North Half, North South Half and North North Half, and Cells 7 through 10. Cell 7 has been filled and landfilling is currently ongoing in Cell 8; construction of Cell 9 is scheduled for 2018.Phase 2 of the landfill includes a full underdrain leachate collection system that was approved in 2002. Several other engineering upgrades were also approved in 2002 including a landfill gas (LFG) collection system and stormwater management pond upgrades.

The current waste disposal ECA for the site (#A042102) permits annual disposal of 650,000 tonnes of waste, noting that over the past 10 years the site typically receives between 200,000 and 280,000 tonnes of waste per year. The site is operated Monday through Friday from 8 a.m. to 4 p.m. and Saturday from 8 a.m. to 3 p.m.

The total approved airspace of the W12A Landfill (i.e., to hold garbage, daily cover and final cover) for the current site is 12,500,000 cubic metres (m^3). As of January 2018, the remaining approved airspace in Phase 2 is approximately 2.5 million m^3.

The landfill consists of the following major components (shown in Figure 1.3-3):

- **Fourteen landfill cells** divided into two waste disposal fill areas known as Phase 1 and Phase 2.
- **Four stormwater management ponds** that provide flow control (to prevent flooding) and quality control (sediment removal) of drainage from the landfill received by a series of ditches located along the perimeter of the landfill as well as along the access road.
- A **perimeter leachate collection system** for Phase 1 of the landfill and an **underdrain leachate collection system** for Phase 2 of the landfill. Collected leachate is directed through more than 10 kilometres (km) of piping to the on-site leachate pumping station, which sends the leachate off-site via a leachate forcemain connected to the municipal sanitary sewer system for treatment at the Greenway Wastewater Treatment Plant.



LEGEND

- LANDFILL SITE ENTRANCE
- LANDFILL SITE SECONDAY ENTRANCE
- PUBLIC DROP OFF AREA
- MH 701 PUMPING STATION/STANDBY GENERATOR
- LEACHATE STORAGE
- DRAINAGE DITCH
- LANDFILL ACCESS ROADS
- MONITORING ACCESS ROADS
- PHASE 1 WASTE DISPOSAL FILL AREA (59.3 HA)
- PHASE 2 WASTE DISPOSAL FILL AREA (47.7 HA)

PROPERTY INFORMATION

- EXISTING W12A LANDFILL
- STORMWATER PONDS/FOREBAY
- BUILDINGS

REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON
2. CITY OF LONDON AERIAL PHOTOGRAPHY, APRIL 2016
3. SITE FEATURES PREPARED BY CALLON DIETZ INC. LTD., OCTOBER 19, 2016.
4. PROJECT: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

DRAFT

0 75 150 300
1:6,000 METRES

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
EXISTING LANDFILL SITE DEVELOPMENT PLAN

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-01-04
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0005	A	1.3-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: \\golder.gds\gal\Ottawa\Active\Spatial_IM\Cityofl.london\Site_W12A\9_PROJ\1648176\40_PROD\0005_TOR\1648176-0005-CW-0093.mxd

- A **LFG collection system and flare** consisting of 46 active LFG extraction wells and more than 5 km of piping that collect the LFG and carry it to the flare for combustion. This system reduces greenhouse gas (GHG) and odour emissions from the landfill.
- **HSW Depot** that accepts hazardous and special wastes from residents and small businesses for off-site recycling/disposal.
- **Public Drop-off Depot** that accepts household garbage, appliances, Blue Box recyclables (e.g., paper products, plastics, aluminum and steel containers, glass bottles and jars), yard waste, oversized cardboard, electronics, scrap metal, tires and wood for recycling.

1.3.3 Current Landfill Performance

The W12A Landfill has had groundwater, surface water, leachate, water well and LFG monitoring programs since it opened in 1977. The following outlines the results from these monitoring programs for 2017.

Groundwater Monitoring

There are two aquifers below the W12A Landfill - the Upper Aquifer and the White Oak Aquifer. The groundwater monitoring program includes sampling 25 monitoring wells both downgradient and upgradient of the landfill in the Upper Aquifer and the White Oak Aquifer for a wide range of parameters. The test results from 2017 indicate no impacts on the Upper Aquifer or White Oak Aquifer from the W12A Landfill.

Chloride has been identified as the “critical” contaminant (i.e., the parameter that engineering controls and monitoring programs are based on) because it is the only parameter expected to be detected in the downgradient monitoring wells at elevated levels based on the contaminant transport modelling. For this reason, the trigger mechanism for implementation of contingency measures to prevent off-site groundwater impacts is based on chloride concentration levels. There has been no increase in downgradient chloride concentrations as a result of operation of the landfill.

Surface Water Monitoring

Surface water is monitored at six surface water sampling stations (located within the ditches surrounding the landfill). There are four critical contaminants with respect to surface water: un-ionized ammonia, biological oxygen demand, chloride and sulphate. In 2017, there were no exceedances of the trigger concentrations for the critical contaminants.

The City also undertakes sampling directly from the stormwater management ponds that receive runoff from areas that have been landfilled (Ponds 2/3, 4 and 5). In 2017, none of the samples collected from the stormwater management ponds exceeded trigger concentrations for the critical contaminants.

Water Well Monitoring

The two aquifers below the landfill (the Upper Aquifer and the White Oak Aquifer) are both used as sources of drinking water in the surrounding area. Sampling for the purpose of monitoring the off-site water wells is conducted at 3 water wells in the Upper Aquifer and 11 water wells in the White Oak Aquifer (all wells are down-gradient or cross-gradient from the landfill). Indicator parameters are tested annually. Heavy metals are analyzed on a 3-year cycle with the most recent testing occurring in 2017.

The results from 2017 indicated all wells had indicator parameter concentrations below the Reasonable Use Criteria (MOE, 1994). All wells continue to have high iron levels, which have been encountered in private water wells since monitoring began in 1977. Recent iron levels are similar to historical levels. The monitoring results show that the W12A Landfill is not affecting off-site water wells.

LFG Monitoring

The LFG monitoring program consists of:

- continuous air quality monitoring for methane, oxygen and hydrogen sulphate in all on-site buildings;
- periodic “bartests” to determine the methane gas concentrations in the surficial soils in the area adjacent to the fill area;
- periodic testing of LFG to determine its composition; and
- five monitoring events of two LFG monitoring wells installed in the buffer area of the landfill. These monitoring wells were installed at the property boundary opposite the two closest off-site buildings to the waste footprint.

Monitoring of the buildings has never encountered elevated levels of methane or hydrogen sulphate or low levels of oxygen. No bartests were performed in 2017. Historically, the bartests have found that detectable levels of methane do not migrate beyond 10 m from the waste footprint in the areas tested.

No testing of the LFG composition was completed in 2016. Historical testing of the LFG quality has found the LFG to be typical of other landfills with methane ranging from 55% to 60% and carbon dioxide between 40% and 45%, with trace amounts of a few non-methane organic compounds.

Testing of the LFG monitoring wells in 2017 found methane levels were always less than 250 parts per million in both monitoring wells for all sampling events, indicating that LFG is not migrating off-site through the subsurface.

In summary, the landfill monitoring programs indicate that the landfill is performing acceptably and in accordance with provincial requirements in terms of potential effects of leachate on groundwater and surface water, as well as in terms of LFG migration in the subsurface.

Leachate Collection

The amount of leachate that is captured has generally increased over the years as the size of the waste footprint has increased. Approximately 175,000 m^3 of leachate was captured and pumped for off-site treatment in 2017.

Leachate generation is estimated to be approximately 170,000 m^3 per year when the entire landfill footprint has been developed and capped as per the *Hydraulic Evaluation of Landfill Performance (HELP) Modeling* (London, November 2002).

LFG Collection

The amount of LFG that is captured has generally increased over the years as new LFG wells are installed as the waste footprint increases. In 2017, an average of 2,400 m^3 per hour of LFG was captured and flared. This is estimated to be approximately 50% of the gas produced by the landfill.

2.0 The EA Process

This section describes the EA process that applies to the project.

2.1 Ontario EAA

The EAA is a provincial statute that sets out a planning and decision-making process to evaluate the potential environmental effects of a proposed undertaking or project (MOECC, 2010). *O. Reg. 101/07* for Waste Management Projects, which was made under the EAA, states (in part) that some waste management projects, regardless of whether the proponent is public or private, are designated under the EAA. Various projects are then exempted. According to Section 4 of *O. Reg. 101/07*, the increased landfill capacity proposed in this ToR is subject to an EA because more than 100,000 m^3 will be added to the total waste disposal volume for the W12A Landfill. Also, according to *O. Reg. 101/07*, the project is not exempt and is not subject to fulfilling the requirements of the environmental screening process. Accordingly, the City's project is subject to an individual EA process.

An EA under the EAA is a planning study that assesses environmental effects and advantages and disadvantages of a proposed project. The environment is considered in broad terms that include the natural, social, cultural and economic aspects of the environment. In an individual EA, the first step in the process is to develop a ToR for the EA studies (this document is the ToR). Two series of public open houses were hosted by the City as part of the consultation process for the development of the ToR. This draft proposed ToR is being submitted to the MOECC, the Government Review Team (GRT) and the public for review. The final proposed ToR will be submitted to the Minister who will decide whether to approve, approve with conditions, or not approve this ToR. If approved, the ToR becomes the framework for preparation and review of the EA. An overview of the entire approval process was presented to the public as part of Open Houses #1 and #2 and is available in Volume III Appendices E and F.

2.2 Canadian Environmental Assessment Act

The *Canadian Environmental Assessment Act* is a federal statute that requires federal agencies to conduct an EA for designated projects and activities and projects on federal lands. The expansion of a landfill is not a designated project and the proposed undertaking does not involve any federal lands as further explained in Table 8.1-1; therefore, no federal EA is required.

2.3 Organization of the ToR

This submission of documents to the MOECC consists of three volumes: Volume I - Terms of Reference; Volume II – Supporting Documents for the development of this ToR; and Volume III- Consultation Record.

Volume I is organized into the following sections and appendices:

- Section 1.0 provides an introduction to this ToR, identifies the proponent, presents the purpose of the undertaking and describes the existing site;
- Section 2.0 describes the EA process, presents the purpose and organization of this ToR, includes the submission statement (i.e., how this ToR is being submitted for approval), provides justification for focusing the EA, and discusses flexibility in this ToR;
- Section 3.0 provides the rationale and description of the undertaking;
- Section 4.0 presents an assessment of the 'Alternatives To' the undertaking;
- Section 5.0 provides a description of and the rationale for the 'Alternative Methods' of carrying out the undertaking;
- Section 6.0 provides an overview of the existing environmental conditions;
- Section 7.0 provides an overview of the proposed methods for conducting the EA, including the comparative evaluation of alternatives, as well as the definition of study areas;
- Section 8.0 presents the consultation plan (i.e., community engagement program) for developing this ToR and preparing the EA;
- Section 9.0 provides an overview of other regulatory approvals required for the undertaking to proceed;
- Section 10.0 presents the proposed schedule for preparing the EA;
- Section 11.0 provides statements of commitments and monitoring strategies by the City of London to be completed during the EA; and
- Section 12.0 lists the documents referenced in this ToR.

Volume II contains supporting documents that are referred to within this ToR.

Volume III presents the record of the consultation process for the development of this ToR. This includes a summary of events, stakeholder feedback received, and how stakeholder feedback was incorporated into the development of this ToR or a rationale for why it was not considered appropriate for inclusion.

2.4 ToR Submission Statement

The ToR statement indicates how the EA will be prepared. This ToR was prepared in considering the *Code of Practice – Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* (ToR Code of Practice; MOECC, 2014a).

This ToR is submitted to the MOECC for approval in accordance with *O. Reg. 101/07*, and specifically pursuant to subsection 6(2)(c) of the EAA, which allows the proponent to "*…set out in detail the requirements for the preparation of the environmental assessment*" (Ontario, 2010). Subsections 6(2)(c) and 6.1(3) of the EAA enable proponents to 'focus' the EA and 'Alternatives To' to address their specific needs and circumstances.

The City commits to preparing and submitting an EA to the MOECC for review and approval in accordance with the approved ToR as required by subsection 6.1(1) of the EAA, and in accordance with the requirements of subsection 6.1(2) of the EAA.

The subsections that will be addressed by the EA are listed in Table 2.4-1. The exceptions are subsection 6.1(2)(b)(iii) and 6.1(2)(d), which describes and provides the rationale for the 'Alternatives To' the undertaking and advantages and disadvantages of the 'Alternatives To'. The 'Alternatives To' requirement is addressed by this ToR (Section 4.0).

Table 2.4-1: Requirements for the EA

Subsection of EAA (Ontario, 2010)	EA Requirements
6.1(2)(a)	A description of the purpose of the undertaking.
6.1(2)(b)(i)	A description of and statement of the rationale for the undertaking.
6.1(2)(b)(ii)	A description of and statement of the rationale for the 'Alternative Methods' of carrying out the undertaking.
6.1(2)(b)(iii)	A description of and a statement of the rationale for the 'Alternative To' the undertaking.
6.1(2)(c)(i)	A description of the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly by the undertaking.
6.1(2)(c)(ii)	A description of the effects that will be caused or that might reasonably be expected to be caused to the environment.
6.1(2)(c)(iii)	The actions or mitigation measures that are 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.

Subsection of EAA (Ontario, 2010)	EA Requirements
6.1(2)(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.
6.1(2)(e)	A description of any consultation about the undertaking by the City and the results of the consultation.

In accordance with the *ToR Code of Practice* (MOECC, 2014a), the City has chosen to consider 'Alternatives To' the undertaking at the ToR stage and conduct a confirmatory screening during the ToR development process. The confirmatory screening identified the proposed project (i.e., expansion of the W12A Landfill) as the preferred 'Alternative To'. Accordingly, the City is proposing no further consideration of the 'Alternatives To' in the EA. The screening assessment of the 'Alternatives To' is presented in Section 4.0 of this ToR.

2.5 Justification for Submitting a Focused EA

The City intends to proceed under subsections 6(2)(c) and 6.1(3) of the EAA, which allows the proponent to focus the EA. Specifically, the City intends to exclude the 'Alternatives To' assessment during the EA studies because:

- The City has previously considered both landfilling and non-landfilling options for waste management available to the City in the context of a reasonably long-term planning horizon; and,
- The assessment of the 'Alternatives To', including an assessment of the do nothing scenario, has been further reassessed during the preparation of this ToR and is presented in Section 4.0 of this ToR.

The *ToR Code of Practice* (MOECC, 2014a) outlines considerations for focusing a ToR. It allows a proponent to proceed under subsections 6(2)(c) and 6.1(3) if the proponent is further along in the defined planning process and additional detail is known regarding the proposed project.

A study known as the *W12A Landfill Area Plan* (IBI Group, 2008) commenced in 2005 to study the evolution of the W12A Landfill facility towards an integrated waste management centre, including both the landfill site itself and the land areas adjoining the landfill site. Seven landfill evolution alternatives ('Alternatives To') were developed by the study team and from public input and then evaluated as part of this W12A Landfill Area Plan study. The City proposes to use the conclusion of the *W12A Landfill Area Plan* as the basis to prepare the ToR and focus the 'Alternatives To' within the EA. A copy of the W12A Landfill Area Plan report is provided as Supporting Document #1 to this ToR. A summary of the W12A Landfill Area Plan is provided in Section 4.1 of this ToR.

The development of this 2008 plan was an open, transparent and participatory process. A total of four open houses were held throughout its development to inform the public, provide an opportunity for input and exchange and to solicit feedback. An additional four public meetings and numerous individual meetings took place during the development of the Community Enhancement and Mitigative Measures Program. This program was developed in conjunction with the selection of the preferred alternative (establish an Integrated Resource Recovery Centre that includes the expansion of the W12A Landfill) to reduce and address the potential negative effects of the W12A Landfill on neighbouring properties.

As described in the *ToR Code of Practice*, it is allowable for a proponent to proceed under subsections 6(2)(c) and 6.1(3) of the EAA if the proponent is further along in the defined planning process and additional details are known regarding their proposal. As such, the City intends to exclude the 'Alternatives To' assessment during the EA studies because a comparative assessment of 'Alternatives To' was previously conducted that identified the expansion of the W12A Landfill as the preferred 'Alternative To' and a confirmatory screening assessment of alternatives was completed in this ToR (see Section 4.0 of this ToR). The focusing of the EA in this manner is consistent with the purpose of the EAA (Ontario, 2010), which is defined as:

> "*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."*

The W12A Landfill will continue to be operated in accordance with best management practices (BMP), and will ensure the protection of human health and the environment.

The studies to be carried out for the purposes of the EA are discussed in more detail in Section 7.0.

2.6 Flexibility of the ToR to Accommodate New Circumstances

The ToR Code of Practice (MOECC, 2014a) and subsection 6.1(1) of the EAA states that the EA must be prepared in accordance with the approved ToR; however, circumstances may arise that could necessitate minor revisions to this ToR. Accordingly, the ToR Code of Practice (MOECC, 2014a) states that it is important to incorporate flexibility into the ToR to accommodate new circumstances.

Assuming that the Minister of the Environment and Climate Change approves this ToR, some minor adjustments might be required during the preparation of the EA. Flexibility in this ToR would include minor variations such as a change in EA methodology, consultation methods or environmental characterization study methodologies. In addition, circumstances may arise during the EA that do not allow commitments made during the ToR to be fulfilled; if this were to occur, the commitment may be subject to further refinement and adjustments during the EA.

For example, the work plans in this ToR are described at a general level of detail. During the EA, and in consultation with the MOECC and other GRT members, the work plans may be modified or described in greater detail. Another example would be where it was advisable to change study area boundaries should new information become available. EA studies may show effects that are greater or less than anticipated and might require adjustments to the work plans. New or additional data sources might also become known and it would be beneficial to incorporate these into the EA studies.

As another example, modifications to the proposed public consultation program might include the incorporation of additional workshops or meetings in response to a high level of public interest or concern, or the change in format of consultation events to better suit the public's needs. Such modifications would be considered minor changes to this ToR.

Any proposed minor modifications to this ToR would be documented and discussed in advance with the MOECC and would not require an amendment to the ToR. The modifications described above and other similar modifications would be considered minor changes that could be included within the overall scope of this ToR without seeking approval for a formal amendment to the ToR.

3.0 Rationale and Description of the Undertaking

This section describes the City's proposed undertaking and the rationale for the undertaking, including the analysis to estimate the City's disposal requirements.

3.1 Overview of the Rationale

In October 2015 Municipal Council directed City of London staff to proceed with the development of a long-term Resource Recovery Strategy and a Residual Waste Disposal Strategy for the City of London. At that time it was anticipated that the existing W12A Landfill would reach capacity at the beginning of 2025.

The Resource Recovery Strategy involves the development of a plan to maximize waste reduction, reuse, recycling, resource recovery, energy recovery and/or waste conversion in an economically viable and environmentally responsible manner. Resource recovery strategies (i.e., often known as waste diversion strategies) are developed and approved at the local government level and do not require provincial government approval. However, these strategies do serve as input into provincial government decision-making as related to approval of the Residual Waste Disposal Strategy component.

The Residual Waste Disposal Strategy involves the development of a long-term plan to manage residual waste (waste after resource recovery) and involves completion of an Individual EA as prescribed by the MOECC. The Individual EA requires approval by the Minister of Environment and Climate Change and by Cabinet.

It is proposed the Residual Waste Disposal Strategy will:

- Consider expanding the W12A Landfill as outlined in further detail in Section 4.0;
- Find solutions that will manage residual waste until 2050 (25 years beyond the current approved capacity of the W12A Landfill);
- Look at the possibility of allowing neighbouring municipalities to use any new/expanded waste disposal facilities developed by the City, approved by the Province and under conditions approved by Municipal Council;
- Place limits on the amount of residual waste that will be accepted at any new/expanded waste disposal facilities; and
- Be based on a commitment by the City to increase the current London residential (household) waste diversion rate to 60% by 2022 from the current rate of 45%.

3.2 Guiding Principles

Guiding principles have been developed by the City and approved by City Council to direct the development of the Residual Waste Disposal Strategy.

Over the last ten years, there have been numerous community engagement activities with respect to solid waste management in London including:

- 2006 to 2009 – W12A Landfill Area Plan and W12A Landfill Site Community Enhancement and Mitigative Measures Program
- 2007 – *A Road Map to Maximize Waste Diversion in London*
- 2013 – *Road Map 2.0: The Road to Increased Resource Recovery and Zero Waste (and the Interim Waste Diversion Plan 2014 – 2015)*
- 2014 – Public Feedback on Different Garbage and Recycling Collection Frequency Schedules
- 2015 to 2016 – Streamlined EA (Environmental Screening) for Waste Disposal regarding service area expansion
- 2016 – Garbage Container Limits

It is based on these previous community engagement activities and ongoing input received from Municipal Council, a number of Council Advisory Committees, community and business groups, and the W12A Landfill Public Liaison Committee (PLC), that eleven guiding principles (Table 3.2-1) were identified that reflect community values, concerns and priorities at this point in time.

Community and stakeholder input on the guiding principles was completed as part of the community engagement processes for the two strategies. Various community engagement tools (e.g., traditional media, social media, getinvolved.london.ca website, the City's website, open houses, etc.) were used and the final guiding principles were approved in October 2017. All guiding principles received general support from the public with the following ones receiving the most support:

- Make waste reduction the first priority
- Be socially responsible
- Ensure financial sustainability

Table 3.2-1: Guiding Principles

Guiding Principles
Be Socially Responsible – Develop socially acceptable and fair solutions that minimize social impacts, encourage participating and maximize social benefits for residents and businesses and take into account input from residents and businesses.
Ensure Financial Sustainability – Develop financially sustainable solutions that are easy and affordable to maintain by current and future generations and also help to stimulate economic growth within the community.
Ensure Responsibility for Waste Management – Waste management is a fundamental service provided by municipal governments. London should manage residential waste and resources generated within its boundaries. London should ensure that local businesses have access to competitive resource recovery and residual waste disposal options.
Ensure Impacts of Residual Waste Disposal are Minimized – Waste disposal facilities must meet, and if possible, exceed all applicable regulatory standards. London will make all reasonable efforts to reduce and address negative effects of any future residual waste disposal facility through proper design and operation of the facility, as well as providing appropriate mitigation measures to the surrounding community.
Implement more Resource Recovery Solutions – Residual waste needs to be minimized and any waste that is generated needs to be treated as a resource, when practical. Resource recovery includes reuse, recycling, composting, anaerobic digestion and waste conversion to create energy and energy products. Resource recovery will balance environmental, social and financial needs along the road to a waste-free Ontario in the future.
Make the Future System Transparent – Future decisions on the implementation of the Resource Recovery Strategy and Residual Waste Disposal Strategy will continue to be open, accessible, based on best practices and facts, and follow the Corporation of the City of London by-laws, policies and practices to find solutions.
Make Waste Reduction the First Priority – The City's first goal is to reduce the amount of material being generated by residents and businesses that requires management (e.g., encourage food waste avoidance, composting at home, local policies to encourage waste reduction, supporting producer responsibility and other provincial and federal programs).
Prioritize the Community's Health and Environment – The health of London's residents and the environment is a priority in decision-making to minimize negative impacts and to maximize the benefits.
Support Development of Business (contractual) Partnerships – Working together with the private sector will ensure that roles, responsibilities and skills are assigned appropriately such that municipal resources are maximized and the best opportunities for London and potential partners are created.

Guiding Principles
Support Development of Community Partnerships – Working together with local community groups and organizations will help London reach its waste diversion goals and maximize resource recovery more effectively and efficiently.
Work to Mitigate Climate Change Impacts – To reduce the impact on climate change London will identify, assess and implement solutions that reduce GHG emissions associated with its waste management system.

3.3 Problem and Opportunity Assessment

This section discusses the need for additional residual waste management capacity and the W12A Landfill expansion, including a general overview of the current status of waste disposal capacity in Ontario and within the area surrounding London, a description of the City's proposed regional service area, waste management facilities, residual waste generation (after diversion), and disposal requirements.

3.3.1 Current City of London Strategy

The City of London's Waste Management System is based on a Continuous Improvement Strategy (management philosophy) and Sustainable Waste Management. This strategy, which was approved by Municipal Council in 1997, has been the foundation for going forward. It uses an active framework that recognizes integrated waste management as an important environmental service in the community. An overview of the City's current waste management systems, strategy and future requirements is summarized in the following sections.

3.3.2 Existing Diversion Programs

Currently, the City is achieving a residential diversion rate of approximately 45% as a result of a number of programs, which are summarized in Table 3.3-1.

Table 3.3-1: Summary of Existing Waste Diversion Programs

Program	Comments
Curbside, multi-residential, depot and public space Blue Box recycling	The City collects a wide range of recyclables from all curbside households as part of its Blue Box Recycling program. The materials collected in 2017 were newsprint & flyers; household paper; magazines, catalogues & books; paper egg cartons & boxes; cardboard boxes; glass bottles & jars; aluminum food & beverage cans; steel food & beverage cans; foil containers & foil; empty metal paint cans; empty aerosol cans; plastic bottles, jugs, plant pots/trays, large pails & tubs; milk & juice cartons; drink boxes and cardboard cans.
Home Composting	The City sells composters at cost at its four EnviroDepots. In the 1990s the City also sold composters at "truck load sale events". Over the years the City has sold over 55,000 composters. The *Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow* (Corporations Supporting Recycling, 2003) recommends that municipalities assume each composter sold diverts 100 kilograms per year.
Grasscycling	The City stopped collecting grass clippings curbside in 1995 and started promoting grasscycling. Grasscycling refers to leaving grass clippings (i.e., mulching) on the lawn when mowing.
Leaf, yard and Christmas tree material curbside and depot collection	Collected materials are composted at contractor's compost facility (TRY Recycling).
Electronics	Used electronics can be dropped off for recycling at 12 locations within the City including the City's four EnviroDepots.
Tires	Used tires can be dropped off for recycling at over 100 locations within the City including the City's four EnviroDepots.
CR&D material recycling	The City stopped collecting CR&D material in 1995. Material can be taken to the City's four EnviroDepots or at private CR&D recycling facilities.
Scrap metal and appliance recycling	The City stopped collecting scrap metal and appliances in 1995. Scrap metal and appliances can be taken to the City's four EnviroDepots or a scrap metal yard for recycling.

Table 3.3-1: Summary of Existing Waste Diversion Programs

Program	Comments
Textile/small household item reuse/recycling	There are numerous locations throughout London to take textiles and small household items for reuse/recycling including the City's Oxford Street EnviroDepot.
MHSW	The City collects all forms of MHSW at the HSW Depot at the W12A Landfill including paints, solvents, pesticides, oil filters, used oil, antifreeze, batteries, florescent bulbs and tubes, compressed cylinders and empty oil & antifreeze containers. Some of these materials (batteries, florescent bulbs, compressed cylinders and empty oil & antifreeze containers) are also collected at the Oxford Street and Clarke Road EnviroDepots. The materials are shipped to various processing facilities across Ontario licensed to accept this material. The majority of the material is recycled including paint, antifreeze and oil.

3.3.3 Resource Recovery Strategy

As previously discussed, to plan for the future the City has started development of a long term Resource Recovery Strategy. The Resource Recovery Strategy involves the development of a plan to maximize waste reduction, reuse, recycling and resource recovery in an economically viable and environmentally responsible manner.

The Resource Recovery Strategy is scheduled to be completed in 2019. The Resource Recovery Strategy will look at opportunities for advanced resource recovery and increased waste diversion through new, emerging and next generation technologies and where these technologies may play a role in London and area.

An interim step includes the completion of the 60% Diversion Action Plan and will include development of programs and an implementation schedule for specific activities to increase the City's residential diversion rate to 60% by 2022.

Based on current analysis and feedback, the initiatives and programs to achieve 60% diversion are summarized in Table 3.3-2.

Table 3.3-2: Potential 60% Diversion Plan

Component	Diversion Rate	Comment
Existing Diversion	45%	• See Programs in Table 3.3-1
Food Waste Avoidance and more home/community composting	0.5% to 1.5%	• Driven by education and awareness
Organics Management Program	8% to 10%	• Still investigating multi-residential and mixed waste processing options • Minimum diversion of 8% to 10% diversion is based on a curbside source separation program using experience from other Ontario municipalities.
Other Programs	4% to 5%	• Reduction, more recycling, etc.
Total Diversion Rate	60%	

An update on the progress, recommendations and actions arising from the Resource Recovery Strategy will be provided in the EA report.

3.3.4 City of London Support for Provincial Waste Management Goals

While the province recognizes that additional waste disposal is needed to meet demands over the next several years, the goal of the *Waste-Free Ontario Act* and subsequent *Strategy for a Waste-Free Ontario* is to shift from waste disposal to waste diversion and make waste management a carbon neutral industry (i.e., reducing greenhouse gas generation from the waste sector). The City supports these goals and is taking proactive steps toward these goals including:

- The City has committed to increasing its residential waste diversion rate from 45% to 60% by 2022.
- The City is developing a long-term Resource Recovery Strategy to increase diversion beyond 60% after 2022.
- The City plays a leadership role on Food Waste Avoidance both within London and provincially. The City is active in a number of provincial committees that have formed in the past few years to collaborate on this issue. Within London, a number of pilot projects have been initiated to gain a better understanding of the food waste, including the magnitude of the problem and potential approaches to bringing about positive change.

- The Resource Recovery and other associated programs that have been and will be implemented by the City will enable a reduction in the maximum allowable annual tonnage that can be accepted at the W12A Landfill from 650,000 tonnes to 500,000 tonnes (as described in Section 3.4).

- The City has asked municipalities within the proposed regional service area (refer to Section 3.3.7) if they were interested in developing a regional resource recovery strategy. All municipalities expressed an interest in working together (subject to costs) to reduce the need for landfilling.

- The City continues to pursue projects, relationships and partnerships for the purposes of innovation, creativity, best practices and excellence in solid waste management under a banner known as the London Waste to Resources Innovation Centre (LWRIC). The City has working relationships with a number of waste management organizations through LWRIC including Bio-Tech Far Inc. (pyrolysis technology), a business group previously known as Hawthorne Green Key Group (pyrolysis technology), RediCan (gasification technology), TRY Recycling (CR&D waste recycling), Western University (Institute of Chemicals and Fuels from Alternative Resources) and the Canadian Plastics Industry Association.

- The City is a member of a Mixed Waste Processing Working Group comprised of several Ontario municipalities including the City of Toronto, Region of York, Region of Waterloo, Region of Niagara, County of Oxford, and County of Simcoe. This Working Group shares updates, research results, Committee/ Council reports, site visit experience and related operational experiences related to mixed waste processing.

- The City has begun work on development of a 0.5 MegaWatt power plant at the W12A Landfill to convert LFG to green power.

- The City is exploring opportunities to convert LFG not used by the power plant to renewable natural gas.

3.3.5 Disposal Facilities

The City of London is served by one landfill, the W12A Landfill, located in the southern part of the City (refer to Figure 1.3-1). The total approved airspace for the current site is 12,500,000 m^3 and it is estimated that it will reach its approved capacity in early 2025.

3.3.6 Residual Waste Projections – Existing Service Area

The City has completed a detailed assessment of projected residual solid waste generation between 2025 and 2050 taking into consideration Residual Waste Strategy requirements outlined in Section 3.1. This document, titled *Residual Waste Projections and Landfill Capacity Assessment*, is provided as Supporting Document #2 to this ToR and provides this information by developing residual waste quantity projections for the planning period that take into account:

- Population growth;
- Existing and proposed provincial waste diversion targets;
- *Waste-Free Ontario Act*;
- Provincial Strategy for a Waste-Free Ontario Building a Circular Economy (2017c);
- Availability of waste disposal facilities in neighbouring municipalities;
- Waste audit data; and,
- Changing waste technologies.

The key assumptions used in determining the quantity of residual waste to be managed at the expanded W12A Landfill from the existing service area over the 25 year planning period are summarized as follows, the details of which are provided in Supporting Document #2:

- The current residential waste diversion rate in the City of London will increase from its current level of 45% to 60% by 2022.
- The City of London population is projected to grow at a rate of approximately 0.8 to 1% annually, increasing from 394,000 (includes an allowance for post-secondary students) in 2016 to 520,200 in 2050. All residential residual waste generated in the City of London will be disposed at the W12A Landfill.
- The Industrial, Commercial and Institutional (IC&I) diversion rate achieved in the City of London will be 25% by 2025 and 50% by 2050. All IC&I residual waste from London will come to the W12A Landfill by 2025.
- The CR&D diversion rate achieved in the City of London will be 50%. All CR&D residual waste from London will come to the W12A Landfill by 2025.
- The W12A Landfill will continue to dispose of quantities of sewage sludge ash, biosolids, street sweepings, water treatment plant process residuals and contaminated soil.

Based on the above assumptions, the existing service area will generate 9.2 million tonnes of residual waste between 2025 and 2050.

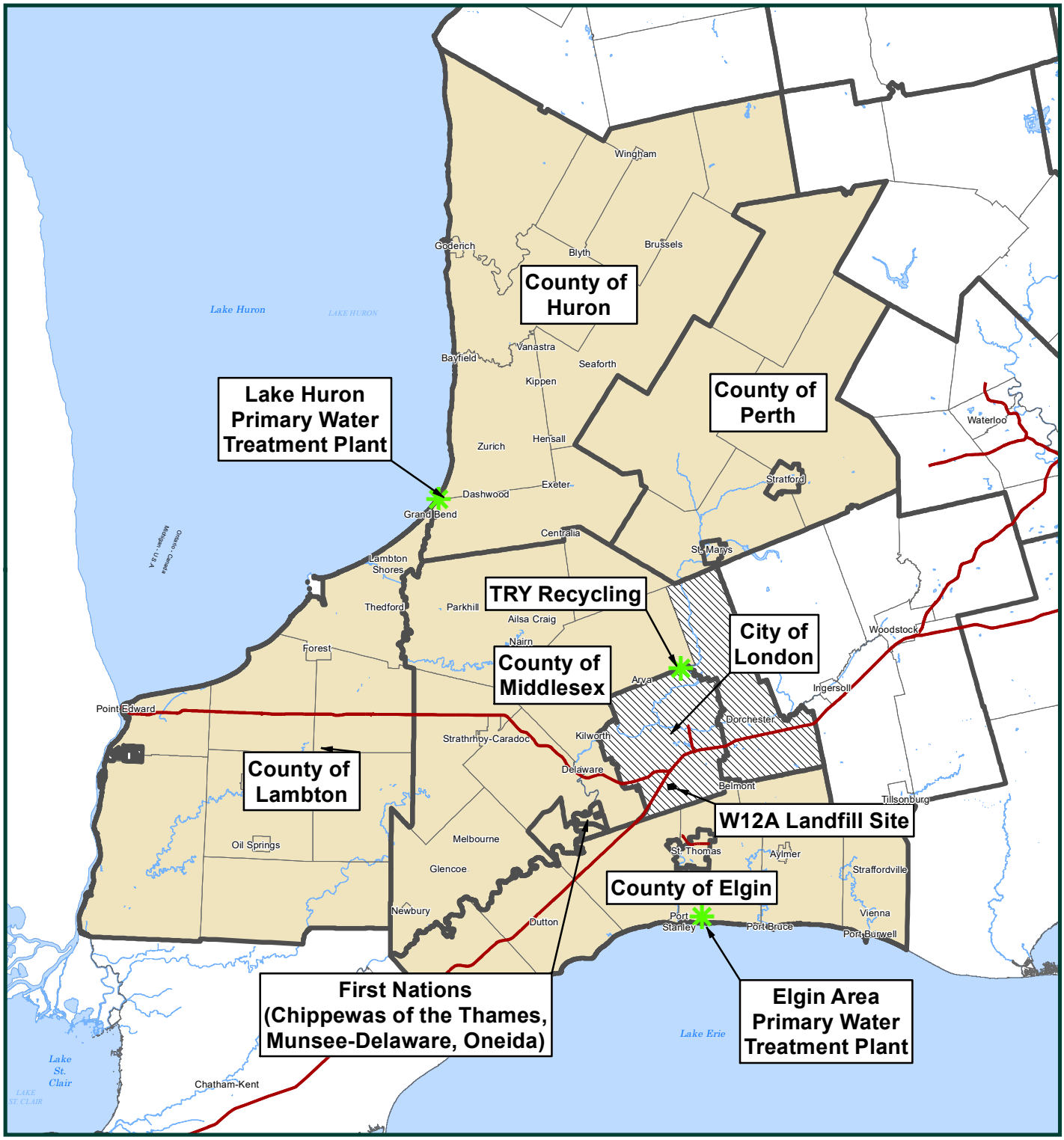
3.3.7 Proposed Regional Service Area

The City is proposing to establish a regional service area. The benefits of a regional service area include: consistency with the *Strategy for a Waste-Free Ontario* (discussed below), addressing a portion of the provincial shortfall in disposal capacity, providing a public disposal option for nearby organizations and municipalities, ensuring that competitive waste disposal pricing is available for municipalities and providing a financial benefit to the City.

The City approached nearby lower and upper tier municipalities to determine their interest in being included in the service area of the W12A Landfill. Based on their responses, a regional service area consisting of the City of London plus Elgin County, Middlesex County, Huron County, Lambton County, Perth County and local First Nation Communities is proposed. The population of Elgin, Middlesex, Huron, Lambton and Perth Counties (including separated cities) as well as local First Nations communities is approximately 420,000. The proposed service area is shown on Figure 3.3-1.

The proposed expansion of the service area for the W12A Landfill aligns with the Ontario government's policy goals under the *Strategy for a Waste-Free Ontario* by:

- **Minimizing the need for the development of landfills** – There are over twenty operating landfills in the proposed W12A Landfill regional service area. The majority of these are small landfills. Providing a local, cost effective, well maintained and environmentally sound disposal alternative will encourage municipalities with small landfills not to expand their landfills after they reach capacity. This will reduce the number of landfills in the service area in the long term. It is also noted that municipalities wishing to use the W12A Landfill will be encouraged to achieve similar diversion objectives as the City of London.
- **Ensuring existing landfills are well maintained –** As noted above, the majority of the over twenty landfills in the proposed service area are smaller landfills. Only four landfills, including the W12A Landfill, have landfill gas collection and flaring systems. Most of the landfills do not have engineered controls for leachate management and some do not have regular groundwater or surface water monitoring programs. The W12A Landfill has a landfill gas collection and flaring system, is located in a favourable hydrogeological setting (e.g., thick deposit of clayey till soils), has a leachate collection system and has landfill gas, surface water and groundwater monitoring programs. In general, waste coming to the W12A Landfill from other locations within the service area will come to a landfill that is well maintained and offers a high level of environmental protection.
- **Reducing GHG Emissions –** As noted above, only four landfills in the proposed service area have landfill gas and collection systems. Having more waste go the W12A Landfill, which has a landfill gas collection and flaring system, will reduce GHG emissions.



LEGEND

- CURRENT SERVICE POINT
- CURRENT SERVICE AREA
- PROPOSED SERVICE AREA

DRAFT

0 10 20 40

1:1,000,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: MTM ZONE 9 VERTICAL DATUM: CGVD28

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
PROPOSED SERVICE AREA

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-01-04
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0005	A	3.3-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

Path: \\golder.gds\gal\Ottawa\Active\Spatial IM\City of London\Site W12A\09 PROJ\1648176\40 PROD\0005 TOR\1648176-0005-CW-0004.mxd

Expanding the service area has the potential to reduce GHG emissions by approximately 80,000 tonnes of carbon dioxide equivalents (CO_{2e}) over the 25 year planning period based on the following:

- The average tonne of garbage produces approximately 0.46 tonnes CO_{2e}. (EPA WARM Model), which is released to the atmosphere at landfills that do not have gas collection and flaring systems;
- It is estimated that the W12A Landfill has a landfill gas capture rate of over 60% (more than 0.28 tonnes CO_{2e} of GHG per tonne of garbage buried);
- The GHG emissions to transport a tonne of waste to the W12A Landfill from within the proposed service area is less than 0.01 tonnes CO_{2e};
- The net GHG reduction for waste that comes to the W12A Landfill instead of a landfill without a landfill gas collection flaring system is 0.27 tonnes CO_{2e} per tonne of garbage (0.28 CO_{2e} - 0.01 tonnes CO_{2e}); and,
- It is estimated that approximately 300,000 tonnes of waste could come to the W12A Landfill from landfills without gas collection systems from within the proposed service area over the next 25 years.

3.3.8 Residual Waste Projections – Proposed Regional Service Area

Residual waste generation projections for the proposed regional service area are provided in the aforementioned Supporting Document #2 Residual Waste Projections and Landfill Capacity Assessment (Appendix G) and summarized below.

Four waste diversion scenarios were considered for the proposed regional service area ranging from no increase in waste diversion to meeting the interim waste diversion goals in *Strategy for a Waste-Free Ontario*. The waste diversion rates for the four scenarios are presented in Table 3.3-3.

Table 3.3-3: Waste Diversion Scenarios

Scenario	2018	2020	2030	2050
Scenario 1 - No increase in waste diversion rates	25%	25%	25%	25%
Scenario 2 - Increase in diversion rates half way towards interim MOECC diversion goals	25%	28%	38%	53%
Scenario 3 - Increase in diversion rates 75% of the way towards interim MOECC diversion goals	25%	29%	44%	66%
Scenario 4 - Achieve 100% of interim MOECC diversion goals	25%	30%	50%	80%

For each waste diversion scenario it was assumed:

- There is no increase in population or per capita waste generation rate in the future.
- Green Lane Landfill owned by the City of Toronto will continue to accept waste from local municipalities until it closes.
- Municipalities would continue to use their existing landfill (24 operating landfills within the proposed regional service area) until it closes.
- The City contacted each of the municipalities within the proposed regional service area to determine their interest in using a regional waste disposal facility. Only municipalities that expressed an interest in using the W12A Landfill were included in residual waste calculations.
- No export of waste outside of the proposed service area (see discussion in Section 3.3.9)

The results of the four scenarios are presented in Table 3.3-4 and show residual waste quantities ranging from 1.0 million to 2.4 million tonnes over the 25 year planning period.

Table 3.3-4: Summary of Residual Waste for Various Waste Diversion Scenarios

Scenario	Residual Waste (millions)	Diversion Rate in 2050	Percentage of MOECC goal[a]
Scenario 1 - No increase in waste diversion rates	2.4	25%	30%
Scenario 2 - Increase in diversion rates half way towards interim MOECC diversion goals	1.7	53%	66%
Scenario 3 - Increase in diversion rates 75% of the way towards interim MOECC diversion goals	1.4	66%	80%
Scenario 4 - Achieve 100% of interim MOECC diversion goals	1.0	80%	100%

Notes a) Calculated by dividing the diversion rate in 2050 by the interim MOECC diversion goal for 2050 (80%).

There are many unknowns associated with implementation of these interim waste diversion goals that will require major changes to how business is done in Ontario including moving to a Circular Economy. It is also noted that previous waste diversion goals adopted by the Province have not been achieved by the desired date. For example, the 25% waste diversion goal which was to have been attained by 1989 but did not happen until more than two decades later.

Considering the above, it is proposed that the residual waste quantities from the proposed regional service area will be estimated by assuming diversion rates for Scenario 3 (achieve 80% of the interim waste diversion goals in Strategy for a Waste-Free Ontario), resulting in 1.4 million tonnes of residual waste.

3.3.9 Waste Export from Proposed Regional Service Area

As noted in the *Strategy for a Waste-Free Ontario* (page 25) - *"while Ontario strives for a waste-free future, there will still be a need for landfill space as we work towards this goal*". Currently Ontario has a lack of landfill capacity to meet its needs and there are limited options for municipalities within the proposed service area to manage their residual waste should their current disposal location not be available.

- **Ontario has a Landfill Capacity Deficit** - Ontario has a net deficit of landfill capacity for residual waste with over 3 million tonnes of solid non-hazardous waste from Ontario being exported to the U.S. annually. Waste projections suggest this deficit will continue for the foreseeable future.
- **Disposal Options outside of the Proposed Service Area -** As small landfills in the proposed regional service area close, the municipalities will need a place to take their residual waste. There are only three landfills in the Province outside of the proposed regional service area that are approved to accept their waste.

  All these landfills are located some distance away (Eastern Ontario Waste Handling Facility (Lafleche landfill) in eastern Ontario, Niagara Waste Systems in Niagara Region and the Essex-Windsor Landfill in Essex County). Their distant location increases the cost and GHG emissions of managing waste from the area. In addition, the Niagara Waste Systems landfill already receives its maximum annual waste allowed and cannot take on new customers; Lafleche landfill receives close to its maximum annual waste allowed (within 10%) and has limited ability to take on new customers; and the Essex-Windsor landfill can only accept waste from a portion of the proposed service area (Lambton County and Elgin County).

Considering the above, it is assumed that waste from the proposed regional service area will not be exported.

3.3.10 Converting Landfill Tonnes to Landfill Volume

The volume of landfill airspace required to accommodate waste is typically calculated by multiplying the number of tonnes of waste to be disposed by the landfill utilization rate. The landfill utilization rate is the amount of space (m^3) needed to manage an average tonne of waste, including daily soil cover material.

The W12A Landfill has received 8,240,000 tonnes since it opened and has used 9,640,000 m^3 of space (excluding final cover) for a historical landfill utilization rate of 0.8 tonnes/ m^3. This is equivalent to approximately 85% of the landfill volume being consumed by waste (assuming an average compacted waste density of 1 tonne/ m^3) and 15% of the landfill volume being consumed by cover material (approximately 5 to 1 waste to soil cover ratio).

There is a range of average waste density and waste to cover ratios used in converting tonnage to volume for the purpose of estimating the required airspace for new or expanding landfills. For expanding landfills, where data is available, it is considered appropriate to use information available from the existing site, with an inherent assumption that in future the nature of the materials to be disposed and the method of placement and compaction will not change significantly from current operations. For example, average compacted densities can range from 0.80 to 1.1 tonnes/m^3, and a 4 to 1 waste to cover ratio is often assumed, with corresponding utilization rates of about 0.64 to 0.9 tonnes/m^3. New landfills are often designed with a utilization rate of 0.64 tonnes/m^3 based on 80% of the landfill volume being consumed by waste (with an average waste density of 0.8 tonnes/m^3) and 20% of the landfill volume being consumed by cover material (approximately 4 to 1 waste to soil cover ratio).

The relatively higher utilization rate achieved by the W12A Landfill is directly attributable to the significant quantity of ash, contaminated soils and other denser materials that the landfill has received in the past. It is anticipated that the utilization rate will be lower in the future because the proportion of "denser" materials will decrease (e.g., less ash in the future as the historical ash quantities included Energy from Waste (EFW) ash, less contaminated soil in the future because of the contaminated soil processing facility opened by GFL in Dorchester in 2013, and more residential and IC&I waste because of the proposed expanded service area).

For the 25 year planning period, a landfill utilization rate of 0.72 tonnes/m^3 (which is the midway point between 0.64 tonnes/m^3 and 0.80 tonnes/m^3) is proposed.

3.4 Need for the Proposed Undertaking

Based on the assessment in Section 3.3, the residual solid waste generated and required to be managed at the W12A Landfill is approximately 9.2 million tonnes from the existing service area and approximately 1.4 million tonnes from the proposed regional service area for a total of 10.6 million tonnes of residual solid waste between 2025 and 2050.

For this amount of projected residual waste to be received at the site there can be a reduction in the maximum allowable annual tonnage that can be accepted at the landfill from 650,000 tonnes to 500,000 tonnes.

For the 25 year planning period, based on a landfill utilization rate of 0.72 tonnes/m^3, an expansion of the W12A Landfill should consider the need for an additional disposal volume of 14,700,000 m^3.

3.5 Description of the Proposed Undertaking

The proposed undertaking is the expansion of the W12A Landfill within the current site boundaries and onto an identified area of adjacent land within the Waste Management Resource Recovery Area (as described in Section 1.3) that is owned by the City.
The proposed undertaking, which will be assessed and refined in the EA process, consists of a sequence of construction and operational components, generally described as follows:

- Filling of the expanded landfill to approved capacity post-EA; and,
- Progressive placement of final cover as disposal in areas of the W12A Landfill is sequentially completed.

The site infrastructure, other site activities and currently operating diversion facilities are anticipated to continue to operate through 2050. To achieve 60% residential diversion by 2022, it is anticipated that new diversion operations or facilities will be required and will be implemented as per the developing Resource Recovery Strategy and as outlined in Section 3.3.3.

In summary, the proposed undertaking consists of a sequence of construction activities and landfilling operations that are typical of operations at the existing W12A Landfill.

4.0 Assessment of 'Alternatives To' to the Project

Section 3.0 provided the rationale for and general description of the undertaking, which is to provide for the disposal of post-diversion residual wastes generated in London and from a number of surrounding municipalities over a 25 year planning period. The City assessed different ways of satisfying this need; in EA terminology, these different ways are referred to as 'Alternatives To' the project. The *ToR Code of Practice* (MOECC, 2014a) defines 'Alternatives To' as "functionally different ways of approaching and dealing with a problem or opportunity", and states that consideration should be given to a reasonable range of alternatives. The *ToR Code of Practice* (MOECC, 2014a) also allows proponents to conduct an initial screening of alternatives before or at the ToR phase to determine the range of 'Alternatives To' be examined in the subsequent EA phase. This is the approach used by the City for this ToR.

The assessment of 'Alternatives To' was conducted in this assessment in two steps. The first step, as described in Section 4.1, was to describe previous studies completed by the City that led to the identification of the expansion of the W12A Landfill site and development of an integrated resource recovery centre as the preferred 'Alternative To'. The second step was to confirm the previous conclusion using a screening assessment of 'Alternatives To' as described in the *ToR Code of Practice* (MOECC, 2014a), considering the current status of long-term waste disposal alternatives available to the City and surrounding municipalities in the region; this is provided in Section 4.2.

4.1 Assessment of 'Alternatives To' Prior to this EA

The City took into account the results of previous waste management planning studies that considered alternative approaches to disposal of residual wastes, as well as previous regulatory and City Council decisions in this regard. These led to the identification of the expansion of the W12A Landfill site and continued operation of this facility as the preferred alternative to provide long-term additional disposal capacity. A summary of these previous studies and decisions is provided below, including reference to public processes and consultation, to demonstrate the considerable amount of work that has already been completed in this regard and an understanding of the reasoning and background context for this EA.

In 1991, the Province appointed an Arbitrator to address a request by the City to annex additional lands, which included the Township of Westminster. The Arbitrator's report references specifically the W12A Landfill as being the most desirable location for such a facility, and describes the adjacent lands as "probably suitable for an additional landfill site". The lands on which the W12A Landfill are located became part of the City of London in 1993 as part of the *London-Middlesex Act* 1992. The development of a new Official Plan for the annexed lands was undertaken through a public strategic planning process known as 'Vision 96', which included an assessment of future land uses including the significance of the W12A Landfill to provide the waste disposal component of the City's waste management infrastructure.

From 1995 to 1999 the City of London and County of Middlesex were involved in a cooperative long term waste management planning exercise referred to as the London/Middlesex Waste Management plan. This project was 50% funded by the Province. Outcomes of the planning exercise included the approval of the City's long term strategy known as the Waste Management Continuous Improvement System and expansion of the City's Household Special Waste depot to serve the County of Middlesex.

A study known as the *W12A Landfill Area Plan* (IBI Group, 2008) commenced in 2005 to study the evolution of the W12A Landfill facility towards an integrated waste management centre, including both the landfill site itself and the land areas adjoining the landfill site within a core study area bounded by White Oak Road and Wellington Road South on the west and east, respectively, and by Scotland Drive and Manning Drive on the north and south, respectively, covering a total area of 397 ha. The study also considered the potential effects on a buffer area consisting of all lands within 1,500 m around the core area. A planning time horizon of 40 years was considered. A copy of the main study report is provided with this ToR as Supporting Document #1 (See Volume II). An overview of the study and its outcome is provided below.

Seven landfill evolution alternatives ('Alternatives To') were developed by the study team and from public input and then evaluated as part of this W12A Landfill Area Plan study. These seven alternatives represent the range of reasonable alternatives that were available to the City. The alternatives evaluated were as follows:

1) Continued use of the existing landfill until its approved capacity is reached in about 2020 to 2025, and then locate a new Greenfield landfill within the municipal boundaries of the City of London;

2) Expand the W12A Landfill - addition of land area to increase the life of the W12A Landfill to the 40-year time horizon;

3) Develop an Integrated Resource Recovery Centre - support on-site recovery of materials and EFW materials brought to the site to achieve the provincial 60% diversion target and thereby extend the landfill life beyond the 40-year time horizon, by means of an expansion of the W12A Landfill;

4) Develop an Industrial Eco-park - capitalize on the use of both garbage and recyclables as raw materials to manufacture new products on-site, to add value to the outputs from the site operations and complete the recycling process. This would require an expansion of the W12A Landfill and add lands for resource recovery and the industrial eco-park;

5) Close the landfill in August 2006 - premature closure of the W12A Landfill requiring the City to export their waste temporarily, then consider a new Greenfield site within the municipal boundaries of the City of London for the next 40 years;

6) Export waste - continue to use the W12A Landfill until its currently approved capacity is reached in 2020 to 2025, and then establish a waste transfer station to export waste for disposal outside of the City; and,

7) Accelerate waste diversion to maximize landfill site life - change the City's waste management system to achieve 60% diversion by 2010 by the addition of lands and facilities to provide a full range of waste management activities including landfill, landfill expansion and resource recovery facilities including mechanical, biological and thermal waste processing. This would involve a large investment in waste and diversion activities and extend the use of the W12A Landfill beyond the 40-year time horizon by means of an expansion of the W12A Landfill.

The basic objectives to be achieved by the W12A Land Area Plan, as reflected by the seven alternatives described above, was to evolve the W12A Landfill and adjoining land area for long-term waste management for the City of London, and by doing so continue to provide waste management services (both diversion and residuals disposal) for the City's residents and businesses. In EAs it is common to consider a Do-Nothing alternative as a basis for comparison of alternatives. However, for the City of London, the Do-Nothing alternative would be to allow the W12A Landfill to reach its approved capacity and not pursue any other solution for waste management for the City. One of the City's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers. As such, the true Do-Nothing alternative was not, and is not an alternative that could even be considered by the City, so it was not considered as a separate alternative in the previous *W12A Landfill Area Plan* study. However, in keeping, with the Code of Practice, the Do-Nothing alternative as described above was added and considered in the confirmatory screening assessment of the same alternatives assessed in the W12A Land Area Plan, which is provided in Section 4.2.

Option 7) from the W12A Landfill Area Plan included accelerated waste diversion to maximize landfill site life by facilities including, but not limited to, resource recovery facilities such as mechanical, biological and thermal waste processing. Through the *W12A Landfill Area Plan* study, these options were evaluated and identified as not preferred for the City of London based on prohibitively high costs and in some cases the continued need for a substantial landfill expansion with the technology. The City of London has continued to review mechanical, biological and thermal waste processing options outside of this EA. More recently, it would appear that these options do not align with the Strategy for a Waste-Free Ontario and the thermal waste processing option is not in alignment with the Province's energy needs. As such, because an alternative utilizing such technologies still does not provide a viable solution for the City of London, this alternative was not revisited in the confirmatory screening assessment provided in Section 4.2.

Technical background studies that evaluated agricultural and archaeological potential, as well as existing natural heritage; hydrology; hydrogeology; land use; built natural heritage; and transportation in the core and surrounding areas were completed as part of the *W12A Land Area Plan* study. The alternatives were evaluated and compared qualitatively using four

categories (natural environment, social/cultural, technical/economic and regulatory/administrative) with a number of sub-criteria used within each category. Each of the criteria were weighted equally and there was no ranking of relative importance in the criteria within in each category or between categories. The rating system used a numeric measure on a one to five scale, and five qualitative measures, as follows:

Rating	Numeric Measure	Qualitative Measure
Strong Positive	5	Indicator shows a significant positive effect for this criterion
Positive	4	Indicator shows some positive effect for this criterion
Neutral	3	Indicator shows no positive or negative effect for this criterion
Negative	2	Indicator shows some negative effect for this criterion
Strong Negative	1	Indicator shows a significant negative effect for this criterion

The comparative evaluation of the seven landfill evolution alternatives also considered sound solid waste management practices, the *City of London Official Plan*, the *Provincial Policy Statement 2005* (which was the version in effect at the time this work was done, and which has not changed significantly in the current 2014 version in terms of waste management as it relates to the W12A Land Area Plan study) and sound land use planning principles. In addition, the City developed a set of Guiding Principles for their solid waste management planning.

The development of the *W12A Landfill Area Plan* was an open, transparent and participatory process. A total of four open houses were held throughout its development between 2005 and 2008 to inform the public, provide an opportunity for input and exchange and to solicit feedback from both the public stakeholders and government agencies.

The evaluation was based on both an assigned numeric measure and a qualitative measure for each alternative. The evaluation considered two perspectives: 1) the City's obligation to and desire to provide sound municipal planning and waste management programs, which included providing landfill disposal within its municipal boundaries; and 2) impact of a specific alternative on the study area.

The results of the comparative analysis of alternatives was as follows:

W12A Landfill Evolution Alternative	Numeric Rating	Qualitative Rating
Continued Use	2.32	Negative
Expand W12A Landfill	3.10	Neutral
Develop an Integrated Resource Recovery Centre	3.71	Positive
Develop an Industrial Eco-Park	3.70	Positive
Close the W12A Landfill in August 2006	2.01	Negative
Export waste	2.64	Neutral/Negative
Accelerate waste diversion to maximize W12A landfill site life	3.67	Positive/Neutral

The evaluation of alternatives in 2006 identified alternatives 3 and 4 as having an overall positive qualitative rating, alternative 7 as having an overall positive/neutral qualitative rating, and alternatives 3, 4 and 7 as scoring closely when a numeric rating approach was applied. Through additional public consultation and consideration by the City, the overall preferred alternative identified and approved by City Council was:

> Develop an Integrated Resource Recovery Centre that includes the expansion of the W12A Landfill for a 40-year time horizon and the development of facilities to promote the diversion/recovery of materials and energy on the adjoining land within the core area. The conclusions of the Plan recognized the need for approvals under the EAA and EPA to expand the W12A Landfill site.

As a result of the *W12A Landfill Area Plan*, a Special Policy Area to be used for both the expanded landfill and the integrated resource recovery centre covering some 288 ha of land was identified and subsequently incorporated into the City's updated Official Plan. This recognized the Special Policy Area as the preferred location within the City for these long-term waste management activities. The land comprising the Special Policy Area is shown on Figure 1.3-2. A Materials Recovery Facility (MRF) was planned, and subsequently implemented, on these lands just east of the landfill site.

An additional four public meetings and numerous individual meetings took place during the development of the Community Enhancement and Mitigative Measures Program associated with the W12A Landfill site and establishment of the Special Policy Area. This Program was developed to reduce and address the potential negative effects of the W12A Landfill and its planned expansion on neighbouring properties and includes the following components: a property value protection and acquisition plan; a community enhancement fund for initiatives within the broader community; and the establishment of a PLC involved in ongoing review and exchange of information related to the operations and performance of the landfill site.

4.2 Confirmation Screening Assessment of 'Alternatives To'

The seven alternatives considered previously in the *W12A Landfill Area Plan* study that concluded in 2008 are still considered to cover the reasonable range of alternatives currently available to the City at the time of preparation of this ToR. The second step in this current assessment was to confirm the conclusion of the previous study by completing a further screening assessment of the same seven alternatives examined in the previous study using the screening questions provided in the *ToR Code of Practice* (MOECC, 2014a).

The description of the seven alternatives remains as described in Section 4.1, noting that the time horizon for this EA is 25 years beyond when the current approved capacity of the W12A Landfill is reached, or a planning period from 2025 to 2050. This planning period is quite similar to the 40 year planning horizon beyond 2005 considered in the previous *W12A Landfill Area Plan*. The assessment of 'Alternatives To' was confirmed and documented during the preparation of this ToR, and was presented to the public, the PLC, the Waste Management Community Liaison Committee (CLC), the Waste Management Working Group (WMWG), Civic Works Committee and City Council.

The CLC and the WMWG are further explained in Sections 8.1 and 8.1.4 of this ToR.

As previously described in the *W12A Landfill Area Plan* study, and as it relates to long-term disposal of residual waste, alternatives 1 and 5 involve closure of the W12A Landfill and establishing a new Greenfield landfill site within the City; alternatives 2, 3, 4 and 7 involve various levels of waste diversion and an expansion of the W12A Landfill; and alternative 6 involves exporting waste for disposal outside the City. Because this EA process only considers alternatives related to long-term waste disposal, in the screening assessment the 7 alternatives were combined into three groups (as described above) based on their common approach to waste disposal.

As discussed in Section 4.1, in EAs it is common to consider a Do-Nothing alternative as a basis for comparison of alternatives. For the City of London, the Do-Nothing alternative would be to allow the W12A Landfill to reach its approved capacity and not pursue any other solution for waste management for the City. One of the City's basic requirements as a municipality is to provide municipal services and infrastructure for its ratepayers. As such, the true Do-Nothing alternative was not, and is not an alternative that could even be considered by the City, so it was not considered as a separate alternative in the previous *W12A Landfill Area Plan* study. However, in keeping, with the Code of Practice, the Do-Nothing alternative as described above was added and considered in the confirmatory screening assessment as shown In Table 4.2-1.

The confirmatory screening assessment consisted of answering the series of screening questions/criteria provided in the *ToR Code of Practice* (MOECC, 2014a), as shown in Table 4.2-1. For each of the questions, a single answer (yes, maybe, no) was reached; the rationale by which the answer was reached for each group of alternatives is provided in Table 4.2-1.

Table 4.2-1: Confirmatory Screening Assessment of 'Alternatives To' the Undertaking

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
1- Does the alternative provide a viable solution to the need? (as defined in Section 3.4 of the ToR)	Yes. Continuing to use W12A Landfill until it reaches its current approved capacity or closing W12A Landfill and short-term exporting of waste and then locating a new Greenfield site within the City would provide long-term waste management.	Yes. Expansion of the W12A Landfill site would provide the City with long-term waste management.	Yes. Noting that this alternative is not consistent with the City's guiding principles to provide a waste management solution within the City, and is dependent on the availability of facilities owned by others to provide waste disposal for the planning period.	No. Allowing the W12A Landfill to be filled to its approved capacity and not having pursued an alternative solution to dispose of residual waste would not provide the City with long-term waste management.
2- Does the alternative use proven technologies?	Yes. Landfilling, whether at W12A Landfill or at other disposal site or at a new Greenfield site location uses proven technologies.	Yes. Landfilling, at W12A Landfill uses proven technologies, which are used in current operations.	Yes. Landfilling at other disposal sites uses proven technologies.	Yes. Landfilling, at W12A Landfill uses proven technologies, which are used in current operations.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
3- Is the alternative technically feasible?	No. Preliminary constraints mapping suggests that there is not a large enough parcel of suitable land within the City boundaries for a new Greenfield landfill.	Yes. All aspects are technically feasible.	Yes. All aspects are technically feasible.	Yes. Continuing to operate the W12A Landfill is technically feasible
4- Is the alternative consistent with provincial government priority objectives (i.e., waste diversion, energy efficiency, source water protection, GHG reduction)?	Yes. The alternative would be designed to satisfy these objectives.	Yes. The alternative would be designed to satisfy these objectives.	No. The increased truck travel distance to export the City's waste in the long-term would increase greenhouse gas production.	No. A municipality not providing residual waste disposal services is not consistent with provincial objectives to responsibly manage wastes, nor with its responsibility as an Ontario municipality to provide waste disposal services.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
5- Is the alternative consistent with the applicable Official Plans?	No. A new Greenfield landfill would require approvals under the Planning Act and Official Plan/Zoning amendments.	Yes.	Yes.	Yes.
6- Will the alternative protect sensitive environmental features?	Yes. Both the existing landfill and approval of a new Greenfield landfill at a site yet to be determined would require these features to be protected during operations and post-closure.	Yes. Approval of an expansion of the W12A Landfill would require these features to be protected during operations and post-closure.	Yes. It is assumed that the approval of the sites where the City waste would be exported for disposal would require these features to be protected during operations and post-closure.	Maybe. Allowing the W12A Landfill to reach capacity and close would protect these features, but not having an alternative available for disposal of residual wastes could result in environmental damage as a result of illegal uncontrolled disposal.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
7- Is the alternative practical, financially realistic and economically viable?	No. Preliminary constraints mapping suggests that there is not a large enough parcel of suitable land within the City boundaries. The siting of a new landfill is expected to be technically and socially challenging, and the approvals, construction and operation of a new landfill would be very costly to the City compared to other alternatives involving expansion of W12A Landfill. Also, for Alternative 1 it may not be possible to have a new site available when the current landfill capacity is reached.	Yes. The expansion of the W12A Landfill would be less costly than other alternatives and could be achieved prior to utilizing the current site capacity.	No. The export of waste to other facilities for disposal represents a significant increase of costs to the City compared to alternatives involving the continued use of W12A Landfill.	No. Allowing the W12A Landfill to be filled to capacity without having an alternative to provide residual waste disposal is not a realistic alternative for the City of London.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
8- Is the alternative within the ability of the proponent to implement?	Yes.	Yes.	Yes.	No. The City of London cannot abdicate its responsibility to provide waste management services to its ratepayers.
9- Can the alternative be implemented within the municipal boundaries of the City of London?	No. Preliminary constraints mapping suggests that there is not a large enough parcel of suitable land within the City boundaries. In addition, the siting of a new landfill within the City of London is expected to be technically and socially challenging.	Yes.	No. Waste would be exported to licensed disposal facilities outside the City.	Yes.
10- Can the alternative be implemented within the City's time frame for additional disposal capacity?	Maybe. It may not be possible to have a new site available when the current landfill capacity is reached.	Yes.	Yes.	No. This alternative would not provide additional disposal capacity.

Screening Criteria	Group 1: Establish new Greenfield landfill site within the City (Alternatives 1 and 5)	Group 2: Expand the W12A Landfill (Alternatives 2, 3, 4 and 7)	Group 3: Export Waste (Alternative 6)	Do- Nothing Alternative
11- Is the alternative appropriate for the City?	Yes.	Yes.	No. This alternative is not consistent with the City's guiding principles or Official Plan to provide a waste management solution within the City.	No. Allowing the W12A Landfill to be filled to its approved capacity and not having pursued an alternative solution to dispose of residual waste generated in the City of London is not an appropriate alternative for the City.
12- Is the alternative able to meet the purpose of the EAA?	Yes.	Yes.	Yes.	Not applicable. This alternative would not require approval under the EAA, since there would be no undertaking.

Notes:
1. No shading indicates a 'Yes' answer to the screening question.
2. Orange shading indicates a 'Maybe' answer to the screening question.
3. Red shading indicates a 'No' answer to the screening question.

4.3 Discussion

The City has undertaken a number of waste planning studies since 1969 with the objective of providing secure, long-term waste management infrastructure for the City. Through these studies, as well as other regulatory processes that involved consultation with the public, the W12A Landfill site was established, its location within the city was recognized as suitable from a planning perspective, and expansion of the landfill beyond its currently licensed capacity was identified. In the most recent study, the *W12A Landfill Area Plan* that was completed in 2008, application of a combination of environmental, technical, and socio-economic factors as well as solid waste planning and land use planning factors identified expansion of the W12A Landfill within the context of a resource recovery centre on adjoining lands as the preferred long-term waste management solution. It is noted that based on ongoing monitoring programs, the W12A Landfill is performing acceptably as expected and in accordance with its ECA; this supports the pursuit of its expansion in accordance with provincial requirements. The City has also advanced their waste diversion practices and is developing new plans to reach 60% residential diversion by 2022 (prior to the W12A Landfill reaching its approved capacity).

The Do-Nothing alternative (allow the W12A Landfill to reach its approved capacity and not pursue any other solution for waste management for the City) an alternative that could be neither considered by the City nor provide a long-term waste management solution, is confirmed as such through the screening assessment. The answer to screening questions 1, 4, 7, 8, 10 and 11 were 'no', including the key question "Does the alternative provide a viable solution to the need?"

From the above confirmatory screening assessment of the three groups that are comprised of the same seven 'Alternatives To' considered in the *W12A Landfill Area Plan* study, the answer to screening questions 1, 2, 6, 8 and 12 is 'yes' and so these questions do not differentiate among the groups. Each of the three groups would satisfy these criteria.

The remaining screening questions differentiate among the groups as follows:

- Group 1 (establish new Greenfield landfill site within the City – Alternatives 1 and 5) does not or may not satisfy screening questions 3, 7, 9 and 10, and there is therefore uncertainty in proceeding with this approach to long-term waste disposal.
  The uncertainties are because a preliminary constraint mapping exercise suggests that there is not a large enough parcel of land suitable for a new landfill within the City limits; siting of a new landfill is expected to be technically and socially challenging; and the costs of a new landfill would be very costly compared to Group 2 that involves expansion of the W12A Landfill. This group does not satisfy screening question 5 since if a new Greenfield landfill site is located, there would be approvals under the *Planning Act* and Official Plan/Zoning amendments required.

- Group 3 (export waste outside the City – Alternative 6) does not satisfy screening questions 4, 7, 9 and 11. Exporting of waste is inconsistent with the City's guiding principles and Official Plan to provide waste management solutions within the City; would represent a significant increased cost to the City compared to Group 2 that involves expansion of the W12A Landfill; and the increased truck travel distance from the City to whatever site the waste is exported would increase GHG emissions.

- Group 2 (expand the W12A Landfill – Alternatives 2, 3, 4 and 7) satisfies all screening questions.

  Of the four alternatives that comprise Group 2, the City has already implemented much of the Alternative 3 approach by construction of a MRF adjacent to the landfill, and re-zoned a large area of land adjacent to the landfill (the Special Policy Area) to permit resource recovery and other waste management functions.

  Based on both the conclusions of the previous waste management studies and this confirmatory screening assessment of alternatives available to the City, the expansion of the W12A Landfill is confirmed as the overall preferred 'Alternative To' to meet the City's long-term residual waste disposal needs. It is proposed that this EA be focused on the development and comparative assessment of 'Alternative Methods' of implementing this preferred 'Alternatives To'.

5.0 Description and Rationale for ‘Alternative Methods’

In EA terminology, ‘Alternative Methods’ are the different ways that the project can be implemented.

The *ToR Code of Practice* (MOECC, 2014a) states that a range of alternatives should be considered, which address the need and are within the proponent’s ability to implement. The alternatives should be determined by the significance of potential environmental effects of the project and the circumstances specific to the proposal, such as the proponent’s situation, timing and financing.

At the ToR stage, the City has chosen to identify the categories or types of ‘Alternative Methods’.

The individual alternatives will be identified, refined and confirmed during the EA. Since the City has already conducted a screening of ‘Alternatives To’ and identified expansion of the W12A Landfill as the preferred alternative for residual waste management, only ‘Alternative Methods’ associated with this alternative are presented in this ToR.

‘Alternative Methods’ are the different ways that the expansion of the W12A Landfill could be implemented. The City will determine ‘Alternative Methods’ of achieving the purpose of the undertaking, which is to expand the W12A Landfill to gain an additional 25 years of disposal capacity involving 14,700,00 m^3 of additional airspace, thereby allowing the site to operate through the year 2050.

During the initial stage of the EA, three or four different landfill expansion alternatives, within the existing W12A Landfill property and a portion of the adjacent Special Policy Area, will be identified and described at a sufficient level of detail (i.e., conceptual designs) so that potential effects of the expanded landfill on each environmental component can be assessed and compared. The expansion alternatives will consist of variations in and combinations of landfill height, landfill area, and configuration.

It is noted that alternatives are limited to vertical expansion and/or lateral expansion to the north and/or east within the Special Policy Area. The development of the alternative expansion configurations (height and slope angles) will include consideration of the geotechnical aspects (i.e., stability and settlement). The characteristics of the existing and proposed site design and engineering system requirements, including conceptual design mitigation measures (i.e., mitigation measures at the conceptual design stage), can affect the environment and site activities such as operational and maintenance requirements. These potential effects will be assessed in the EA.

Preliminary design concepts for the ‘Alternative Methods’ were presented to the public as part of the development of this ToR, as discussed in Section 8.1.3, to illustrate possible ways that 14,700,000 m^3 of airspace could be configured as an expansion to the W12A Landfill site.

There are a number of factors that will govern the configuration and number of different 'Alternative Methods' of landfill expansion. The lateral expansion of the W12A Landfill, both on-site and beyond the existing W12A Landfill property boundary, is limited by the following (refer to Figures 1.3-2 and 1.3-3):

- The currently approved landfill has a low height above ground (approximately 9 metres (m)), a large footprint (107 ha), and a top configuration with its peak near the north side of the landfill and a flat (1%) top slope from north to south. It is expected that this large, low, flat topped landfill will create challenges for developing practical expansion geometries in accordance with *O. Reg. 232/98* requirements for the target airspace of 14,700,000 m^3.
- The potential area for horizontal expansion extends beyond the current landfill property as follows: northward approximately 300 m to Scotland Drive and eastward approximately 420 m. Although there is additional City-owned land further to the east within the Special Policy Area, it will be left available for other waste management uses.
- The geometrical factors need to comply with the requirements of *O. Reg. 232/98*, i.e., landfill sideslopes of 4 horizontal (H):1 vertical (V) or flatter, landfill top slopes not flatter than 20H:1V, below grade sideslopes not steeper than 3H:1V.
- Preliminary geotechnical assessment indicates that the underlying soils do not present a practical design constraint to the height of landfill sideslopes in terms of stability or in terms of subgrade settlement.
- Based on hydrogeological assessment of potential leachate impacts on groundwater quality, it is not anticipated that a geomembrane liner will be required beneath the possible horizontal expansion limits to demonstrate and achieve compliance with the *MOECC Reasonable Use Guideline* (MOE, 1994).
- In view of the above, horizontal expansion areas will continue to utilize the natural low permeability clay till deposit as a natural liner, above which will be constructed a leachate collection piping system with a continuous drainage blanket as set out in *O. Reg. 232/98* (similar to the approach in the current Phase 2 area).
- *O. Reg. 232/98* recommends a buffer width of at least 100 m between the disposal area and the property boundary, and with justification can be reduced to a minimum buffer width of 30 m.
- Visibility of the landfill from off-site vantage points is also an important consideration in developing expansion concepts, since it will be part of the comparative evaluation of expansion alternatives in the EA.
- A perimeter leachate collection system is present around the north and east sides of the Phase 1 area. It will be necessary to ensure that the function of this system, i.e., collection and conveyance of leachate that seeps along the base of the Phase 1 landfill area to the perimeter, continues when the site is expanded.

6.0 Description of Existing Environmental Conditions

The EAA defines the environment in a broad, general sense. The environmental component includes: air quality, noise, geology, hydrogeology and surface water, aquatic and terrestrial ecology. The social component includes: socio-economic, land use and cultural.
The technical component includes: financial and built aspects of the environment.

This section presents an overview of existing environmental conditions on and in the area of the W12A Landfill. As described in the *MOECC Code of Practice* (MOECC, 2014a), the City of London will present a more detailed description of the environmental conditions in the EA Report.

The methods and data sources that will be used to characterize the existing conditions during the EA are described in Table 7.6-1. The following is an overview of existing conditions.

6.1 Atmosphere

The atmosphere component comprises air quality, odour, GHG, and noise. Within the site-vicinity, the atmospheric environment is typical of southwestern Ontario with transportation and agricultural activities contributing to baseline air quality/odour and noise levels. Due to the proximity to Highway 401, Highway 401 activities are expected to be the dominant source of the existing atmospheric environment for air quality, GHG and noise. The ambient conditions also include current landfill operations, which is an existing source of air, odour, GHG, and noise emissions.

In the general area, other sources of odour emissions include farming operations, waste management facilities (e.g., Orgaworld Canada composting facility, StormFisher Environmental anaerobic digester) and industrial operations.

Ambient air quality data is available from an air monitoring station located in London, but there is minimal documentation of existing noise levels.

In terms of odour, landfills can emit two types of odours: garbage odour and LFG odour. Garbage odour is generated by recently disposed waste, and LFG odour is generated during the anaerobic decomposition of organic material in the waste.

6.2 Geology and Hydrogeology

In terms of geological setting, the landfill is located on part of the Westminster moraine, which consists of low permeability till soils identified as the Port Stanley Till. Immediately north of the landfill site, gravel and gravelly sand were formed from the older Catfish Creek drift (located under the Port Stanley Till), or were deposited underneath the Port Stanley Till by subglacial streams.

Major hydrostratigraphic units are divided into aquitards and aquifers. An aquitard consists of low permeability soils that inhibit groundwater flow. An aquifer consists of permeable soils that can transmit large enough quantities of water such that when water wells are installed they produce usable quantities of water.

In terms of the hydrogeological setting, the site is underlain by an aquitard, consisting of low permeability Port Stanley Till, referred to as the Surficial Aquitard. The thickness of the Surficial Aquitard varies from as much as 20 m in the northwest corner of the existing W12A Landfill site, to 15 m or greater below much of the existing landfill, and to about 8 m at the southeast corner of the site along Manning Drive. Groundwater moves downward at an estimated velocity of 1 to 2 centimetres (cm) per year in the Surficial Aquitard.

The next major hydrogeological feature in the region is an aquifer found beneath the Port Stanley Till, consisting of stratified sand and gravel soils, most likely part of the Catfish Creek Drift. These soil deposits comprise the White Oak Aquifer. The aquifer has an irregular vertical distribution with a maximum thickness of approximately 45 m just north of the landfill along Scotland Drive. Groundwater flow in the White Oak Aquifer is in a general north to south/southeast direction.

Some local aquifers consisting of sand and gravel soil layers within the low permeability till soils were probably formed by subglacial processes at the time that the till soils were deposited. One such local aquifer is present underneath the landfill (referred to as the Upper Aquifer) and separates the Port Stanley Till into the Surficial Aquitard and a Lower Aquitard, both of which are above the White Oak Aquifer. The Upper Aquifer is indicated not to be present north of Scotland Drive, but extends south of Manning Drive; groundwater flow in the Upper Aquifer is towards the southeast. These aquifers are not regionally extensive and generally thinner than the White Oak Aquifer.

Limestone bedrock is found approximately 80 to 90 m below the landfill and slopes downwards from north-northeast.

6.3 Surface Water

W12A Landfill is situated on the boundary between two subwatershed areas, Dingman Creek and Dodd Creek. Dingman Creek is a tributary of the Thames River (Lake St. Clair Basin) watershed and Dodd Creek is part of the Kettle Creek (Lake Erie Basin) watershed. The majority of the landfill property falls within the Dodd Creek watershed and a small northerly portion of the landfill falls within the Dingman Creek watershed. Figures 1.3-3 and 6.3-1 shows an overview of the existing environmental conditions. Three surface water features crossing Manning Drive convey runoff from the W12A Landfill property to downstream receiving water systems within the Dodd Creek watershed and one additional surface water feature crossing White Oak Road conveys runoff from the site to a tributary of Dingman Creek. All four tributaries are documented as being seasonally dry, intermittent watercourses with a majority of flow generated as a result of direct runoff during precipitation events.

The on-site drainage network is divided into four general areas with a system of berms, slopes and perimeter drainage ditches directing runoff generated within the W12A Landfill property envelope to four separate stormwater management ponds. Stormwater management ponds 2/3, 4 and 5 are located along the south side of the site and service approximately 130 ha of drainage area within the site. Stormwater management pond 1 is located at the northwest corner of the site and services approximately 15 ha of drainage area that falls

within the Dingman Creek watershed area. All stormwater management ponds have been designed to provide stormwater quality and quantity control of surface water runoff leaving the W12A Landfill property, as per the requirements outlined by MOECC and design criteria published in relevant Subwatershed Studies. The ponds have been designed, or have been retrofitted, to function as standard extended detention wet ponds with over-control of frequent rainfall events to protect downstream features from ongoing erosion and degradation. Three ponds (1, 2/3 and 5) also incorporate sediment forebay areas to aide in settling of suspended solids and improve ease of regularly scheduled maintenance.

Surface water quality is regularly monitored as part of an existing leachate collection system and stormwater management discharge monitoring program. Sampling from all stormwater management ponds is undertaken three times per year after significant rainfall events. Water quality monitoring samples are regularly compared to baseline samples, MOECC water quality targets and the specific Provincial Water Quality Objectives included in the Dingman and Dodd Creek Subwatershed Reports or Conservation Authority Subwatershed report cards.

6.3.1 Biology

The biology component of this study is comprised of terrestrial, wetland and aquatic ecosystems.

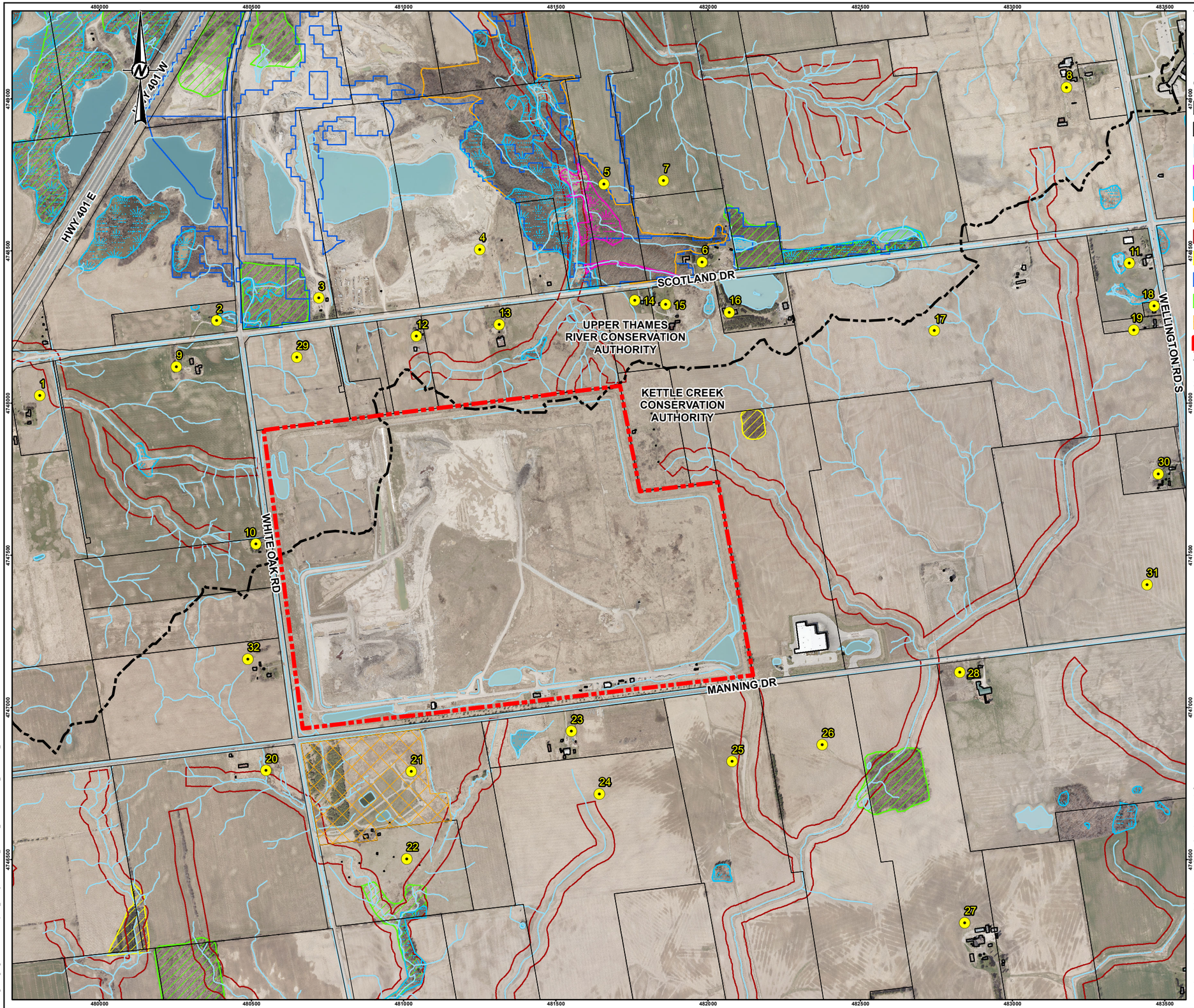
Natural vegetation in the Middlesex region consists primarily of deciduous forest communities (Middlesex County, 2014) including Dry-fresh Deciduous Forest, Fresh-moist Sugar Maple Deciduous Forest and Fresh-moist Poplar-sassafras Deciduous Forest (North-South Environmental Inc., 2009).

Clay to silt textured soils are the predominant type in the Dingman Creek Subwatershed (Delcan, 2005) and areas of imperfect to poor drainage may contribute to the presence of wetlands in the general area. Several man-made or managed drains are also present. Unevaluated woodlands, unevaluated wetlands and a potential Environmentally Significant Area (ESA) are located in the area of the landfill, as well as some successional meadows and thickets.

Previous investigations identified several vegetation community types within the area, including cultural, forest, marsh, open aquatic and swamp communities.

The primary terrestrial features found within the area of the W12A Landfill as shown on Map 5 of the London Plan and Figure 6.3-1 of this ToR include:

- A potential ESA on the north side of Scotland Drive (vegetation patch #10121)
- Significant Woodlands north of Scotland Drive (vegetation patches #10120 and #10122)
- Significant woodland south of Manning Drive (vegetation patch #11068)
- Unevaluated wetlands north of Scotland Drive
- Locally Significant Wetland north of Scotland Drive (Silver Swamp)



LEGEND

- POTENTIAL HERITAGE PROPERTY
- WATERCOURSE
- CONSERVATION AUTHORITY BOUNDARY (WATERSHED DIVIDE)
- PROPERTY FABRIC
- BUILDING FOOTPRINT
- WATERBODY
- LOCALLY SIGNIFICANT WETLAND
- UNEVALUATED WETLAND
- POTENTIAL ENVIRONMENTALLY SIGNIFICANT AREA
- UNEVALUATED VALLEY LAND
- UNEVALUATED VEGETATION PATCH
- SIGNIFICANT GROUND WATER RECHARGE AREA
- SIGNIFICANT WOODLAND
- CEMETERY
- EXISTING W12A LANDFILL SITE BOUNDARY

REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

DRAFT

0 125 250 500

1:12,500 METRES

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
OVERVIEW OF EXISTING ENVIRONMENTAL CONDITIONS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-01-04
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0005	0	**6.3-1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: \\golder.gds\gal\Ottawa\Active\Spatial_IM\CityofLondon\Site_W12A\9b_PROJ\1648176\40_PROD\0005_TOR\1648176-0005-CW-0035.mxd

The primary aquatic features identified in the area include the Shore Drain, Sterling Drain, Bannister Johnson Drain and C.B. Smith Drain. Most of these watercourses have been altered (e.g., channelized) to facilitate drainage for surrounding land use.

Fish habitat has been identified as either Type 2 (generally important but not critical) or Type 3 (marginal/severely degraded). Fish species previously observed were ranked globally as G5 and provincially as S5 (in each case meaning very common and abundant). The benthic macroinvertebrate community is considered of poor quality and is indicative of shallow, eutrophic aquatic habitat.

Previous studies have identified several species of mammals, birds, amphibians and reptiles in the region. The background review has identified known records of several plant, bird, snake, and mammal Species at Risk (SAR) and Species of Conservation Concern (SOCC), and potential Significant Wildlife Habitat (SWH) including features supporting bat maternity colonies, amphibian breeding, and habitat for SOCC. In order to determine the presence/absence of any significant species or features within the study area site-specific field investigations need to be completed.

6.4 Land Use

The area around the W12A Landfill has historically been used for agriculture and the majority of properties remain in active agriculture. The landfill is located approximately 3 km south of the City's Urban Growth Boundary along Highway 401 and within close proximity to the Highway 401 and Highway 402 split. The Westcliff Pit, operated by AAROC Aggregates, and the Gough Pit operated by Brekelmens Holdings are located directly to the north of the site.

The W12A Landfill is designated "Agricultural" in the City of London Official Plan (1989). The area surrounding the Landfill is designated "Agricultural" with some areas identified as "Environmental Review".

A new Official Plan, called *The London Plan*, was approved by the Ministry of Municipal Affairs with modifications on December 28, 2016. *The London Plan* is under appeal and is therefore not in full force and effect. *The London Plan* will be reviewed to assess the City's future direction with regards to land use to the year 2035 as part of the land use assessment. *The London Plan* proposes to designate the W12A Landfill and approximately 150 ha to the north and east of the landfill as "Waste Management Resource Recovery Area".
Land surrounding the "Waste Management Resource Recovery Area" will be designated "Farmland", "Green Space" and "Environmental Review".

The W12A Landfill is zoned “Waste Management and Resource (WRM) Zone 1”. This permits the waste management facility which currently operates on the site. Neighbouring properties (within 1 km) are zoned as follows:

- Agricultural (AG) 2 Zone, which permits a variety of agricultural uses including livestock facilities, forestry uses, farm market, greenhouse farm, nursery, conservation lands, aquaculture, manure storage facility, mushroom farm, compost facility, among others;
- Environmental Review (ER) Zone, which permits conservation lands and works, passive recreational uses, managed woodlot, and agricultural uses;
- Open Space (OS) 3, which permits cemeteries;
- Resource Extraction (EX) Zone, which permits resource extraction operations, farms, wayside pits and forestry uses; and
- Waste Management and Resource (WRM) Zone 1, which permits various waste management uses in addition to landfilling including operation of a MRF.

6.5 Agriculture

As per historical soils mapping of Middlesex County (Hagarty and Kingston, 1992), the soils on and around the W12A Landfill site are identified as Muriel soils (MU4), which contain silty clay loam, silty clay, and occasionally clay loam glacial till deposited by glaciation from the Lake Erie basin. The MU4 soils have moderately well to imperfect soil drainage.

A rectangular area of land on the landfill property is identified as “dump” and labelled as “soils that have not been mapped” (NM) due to the fact that the soils have been disturbed, modified or permanently withdrawn from agricultural use. Adjacent to the area identified as NM is an area identified as Eroded Channel, which continues south of the site to a Valley Complex. Eroded Channel is described as being narrow, shallow channels cut by small streams or creeks.

6.6 Archaeology

The City of London has an archaeological master plan that covers the area on and around the landfill site. Completed in 1996, it indicates that a significant portion of this area has archaeological potential. The City’s master plan is currently undergoing a review to be updated as a new Archaeological Management Plan, but a final updated version is not yet publicly available.

Previous archaeological work completed within the area includes a Stage 1 assessment conducted in 2005 for the *W12A Landfill Area Plan* study (Archaeologix Inc. 2006). It compiled available information about the known and potential cultural resources within the area and provided specific direction for the protection, management and/or recovery of these resources. Other archaeological assessments were completed in the vicinity over the last five years, including a Stage 1-3 assessment of the Highway 401 and Wonderland Road

Interchange in 2015 (New Directions Archaeology Ltd. 2015), a Stage 1-2 assessment of 43 ha at 3242 Manning Drive in 2015 (Golder, 2016b), and a Stage 1-2 assessment of 20.33 ha at 3137 Scotland Drive in 2016 (Golder, 2016a). These assessments resulted in the identification of numerous isolated finds and nine registered archaeological sites, which includes four pre-contact Indigenous sites and five historical Euro-Canadian sites. The registered archaeological sites are located greater than 500 m from the boundary of the W12A Landfill site and the adjacent area proposed for possible expansion.

6.7 Cultural Heritage

The cultural heritage existing conditions review identified the following cultural heritage resources within the W12A Landfill site and adjacent areas, which are listed in Table 6.8-1, shown on Figure 6.3-1 and summarized below:

- Six (6) properties inventoried on the Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels Geographic Information System (GIS) layer;
- Twenty (20) properties adjacent to properties inventoried on the Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer;
- Seven (7) properties with structures that are more than 40 years of age, and may require evaluation for cultural heritage value or interest; and
- Seven (7) properties that contain structures with unknown cultural heritage value or interest.

Each identified resource and associated recommendation for further action is summarized in Table 6.8-1.

Table 6.8-1: Heritage Properties within the W12A Landfill site and adjacent areas

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
1	4166 Scotland Drive	• Adjacent to 5435 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
2	5435 White Oak Road	• Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
3	3900 Scotland Drive	• Adjacent to 5435 White Oak Road and 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
4	3696 Scotland Drive	• Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
5	3583 Westminster Drive	• Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
6	3502 Scotland Drive	• Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house with unknown date of construction.
7	3513 Westminster Drive	• Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house and barn with unknown date of construction.
8	5371 Wellington Road South	• Property includes house and barn that may have been constructed more than 40 years ago.
9	4067 Scotland Drive	• Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
10	5725 White Oak Road	• Adjacent to 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house with unknown date of construction.
29	Assessment Roll # 080020170000000	• Adjacent to 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
12	3801 Scotland Drive	• Property includes house with unknown date of construction.

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
13	3713 Scotland Drive	• Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house that may have been constructed more than 40 years ago.
14	3561 Scotland Drive	• Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house that may have been constructed more than 40 years ago.
15	3465 Scotland Drive	• Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes barn that may have been constructed more than 40 years ago.
16	3405 Scotland Drive	• Property includes house and barn with unknown date of construction.
17	3137 Scotland Drive	• Adjacent to 5751 Wellington Road South, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
11	5529 Wellington Road South	• Property includes house that may have been constructed more than 40 years ago. • Appears at the same location as 3137 Scotland Drive
18	5595 Wellington Road South	• Property includes house with unknown date of construction.
19	5615 Wellington Road South	• Property no longer includes a house.
	3502 Manning Drive	• Adjacent to 4067 Scotland Drive, 6100 White Oak Road, and 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer. • This is the landfill.

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
31	Assessment Roll # 080020139000000	• Adjacent to 5751 Wellington Road South, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
30	5751 Wellington Road South	• Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
20	4069 Manning Drive / 4025 Manning Drive	• Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property possibly includes a barn that may have been constructed more than 40 years ago.
21	6100 White Oak Road	• Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
22	6150 White Oak Road	• Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
23	3691 Manning Drive	• Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
24	Assessment Roll # 080020121000000	• Adjacent to 6100 White Oak Road and 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
25	Assessment Roll # 080020075000000	• Adjacent to 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer
26	Assessment Roll # 080020076000000	• Adjacent to 3424 Glanworth Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer

Reference # on Figure 6.3-1	Civic Address or Assessment Roll #	Description
27	6601 Wellington Road South / 6603 Wellington Road South	• Adjacent to 3424 Glanworth Drive and 3402 Glanworth Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer • Property includes house and barn with unknown date of construction.
28	3243 Manning Drive	• Property includes house that may have been constructed more than 40 years ago.
32	5861 White Oak Road	• Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer.

6.8 Socio-economic

The socio-economic component considers the impact of the landfill expansion on the local economy in terms of employment and municipal finances as well as the effects on residents and communities. The current site is located in a largely rural setting with a small number of residential properties (many of these properties to the north and east are owned by the City of London) and farms located within the adjacent areas. The closest communities are the hamlet of Glanworth located approximately 1.9 km southeast of the site and Shaver Subdivision located approximately 2.0 km to the northeast.

There are no schools, hospitals or religious buildings within the site-vicinity study area. The Islamic Cemetery of London is located to the south of the site.

In terms of business operations, the most notable feature is the Westcliff Pit, operated by AAROC Aggregates, and the Gough Pit operated by Brekelmens Holdings located on the north side of Scotland Drive, just north of the landfill.

The City of London's W12A Landfill received approximately 280,000 tonnes of waste in 2017 and collects waste generated within the City of London, the Municipality of Thames Centre, Lake Huron and Elgin Area Water Treatment Plants and the TRY Recycling Construction and Demolition Recycling Facility located just north of the City. There is also a Household Special Waste (HSW) facility and a public drop off depot for household garbage, appliances, Blue Box recyclables, yard waste, cardboard, electronics, scrap metal, tires and wood. The HSW Depot accepts MHSW waste from the City of London, the County of Middlesex and Oneida Nation of the Thames First Nations.

The landfill currently employs 14 full time and 2.6 full time equivalent seasonal staff working for the City directly and about 4 to 5 full time equivalent staff working for the contractor at the landfill. In 2017, a total of 34 odour complaints were made by local residents; this is higher than in recent years (19 in 2014, 21 in 2015 and 17 in 2016). The landfill's operating costs in 2017 were approximately $3.5 million and revenues were approximately $3.4 million.

6.9 Visual

In comparison to many other large municipal landfills the W12A Landfill is a relatively flat (covers a larger area and is not as high). Nevertheless, the existing W12A Landfill is an anomaly rising approximately 9 to 12 m above an otherwise generally flat landscape. The landfill can be seen from a distance up to 5 km from the south and east, 3 km from the west and 1 km from the north. Close views of the site are mainly seen by local residents and truck drivers on the landfill haul routes. Most people who see the site do so from a distance (at least 1 km) from main traffic routes (e.g., Highway 401 and Wellington Road South).

Depending on the location from which W12A Landfill is visible, features in the immediate landscape such as landscaping and buildings can take visual precedence over the landfill, drawing the viewer's attention away and thereby reducing the visual impact of the landfill. Factors such as seasonal changes to foliage and the type of agricultural crops present can affect visibility.

6.10 Transportation

The Transportation component comprises traffic effects expected along the haul route in the vicinity of the W12A Landfill site. The current designated haul route consists of two options: Manning Drive via Wonderland Road to the west and Manning Drive via Wellington Road South to the east. Until the opening of the Highway 401 and Wonderland Road interchange in late-2015, the Wellington Road South option was the sole haul route. Available existing traffic data reflects a condition prior to the addition of the new interchange. The estimated Average Annual Daily Traffic (AADT) volumes are approximately 500 vehicles per day on Manning Drive, 6,400 vehicles per day on Wonderland Road, and 12,000 vehicles per day on Wellington Road South (north of Manning Drive) within the vicinity of the site. Manning Drive serves as the Emergency Detour Route (EDR) for Highway 401, along which the access to the landfill is also located.

The types of typical road users include regular automobile vehicles, heavy landfill-related vehicles, heavy material recovery (recycling) vehicles, and slow moving / farm vehicles. Based on past studies (2009), it was assessed that under 2016 conditions the roadway network, and the intersections of Manning Drive at Wellington Road South (signalized) and at the W12A Landfill site accesses were expected to operate at acceptable levels of service (LOS).

6.11 Design and Operations

The Design and Operations component comprises the design and operation of the landfill and the site. The design of the W12A Landfill and the operations at the site are approved under ECA No. 042102. The W12A Landfill has been operational since 1977 and currently accepts solid non-hazardous waste generated within the City of London, the Municipality of Thames Centre, Lake Huron and Elgin Area Water Treatment Plants and the TRY Recycling Construction and Demolition Recycling Facility located just north of the City. In addition to the landfill, facilities at the site are inbound and outbound weigh scales, a scalehouse, a small vehicle drop off area, maintenance buildings, an administration building, a HSW facility and a LFG blower and flare compound. The following material is diverted from the landfill: MHSW, appliances, Blue Box recyclables, yard waste, cardboard, electronics, scrap metal, tires and wood.

The landfill is approved to accept 650,000 tonnes of waste per year, but over the past 10 years typically received between 200,000 and 280,000 tonnes of waste per year.

The W12A Landfill has been designed in two phases on a 107 ha footprint to accommodate 12,500,000 m^3 of airspace for waste, daily cover and interim cover. The landfill has buffers beyond the limit of the waste footprint area of 92 m to the south and west and 46 m to the north and east. Phase 1 of the landfill occupies the eastern portion of the footprint and was filled between 1977 and 2002. Phase 1 has six cells that were excavated to an average depth of 3 m below grade. The landfill design approach considered the low-permeability nature of the natural clay till soils below the landfill that hinder the potential downward migration of landfill leachate. The native clay till deposit provides a natural liner.

There are two approaches to leachate collection. Leachate within Phase 1 is collected by a perimeter leachate collection system consisting of 200 millimetre (mm) diameter perforated pipe placed in gravel around the perimeter of the waste footprint. There is a leachate mound within the Phase 1 landfill area. Phase 2 of the landfill has eight cells, of which six have been constructed. Phase 2 was designed with a full underdrain leachate collection system consisting of 200 mm diameter perforated pipes spaced 90 m apart within a clear stone blanket and covered with a geotextile filter and 0.2 m thick protective sand layer. The base of Phase 2 is graded to convey leachate into the perforated pipes and with an overall fall from north to south to a low point at an elevation of 270 m above sea level (masl). The collected leachate from both phases is stored in holding tanks before it is pumped via a pumping station located near the scalehouse through a forcemain along Manning Drive to the Dingman Creek Pumping Station and eventually to the Greenway Wastewater Treatment Plant for treatment.

LFG is collected via buried pipes connecting LFG extraction wells and an extraction blower. The collected gas is sent to an enclosed LFG flare for combustion.

The overall final designed shape of the landfill is generally rectangular. The design of the side slopes ranges from 4H:1V to 6H:1V and the top is sloped at approximately 1% from the south to a peak elevation of the final cover of 293 masl near the north end of the landfill. The final cover design consists of 0.85 m of compacted clay soil and 0.15 m of topsoil. The average height of the landfill above ground surface is about 9 m. In summary, the currently approved W12A Landfill can be described as having a large footprint area and a low height above grade.

7.0 EA Methodology

This section presents the proposed methodology for the completion of the EA and the associated technical studies.

7.1 EA Approach

It is proposed that the EA work will be undertaken in a series of seven steps (further details are provided in Section 7.6) as follows:

- Step 1 – Identify the 'Alternative Methods' of landfill expansion (and incorporate conceptual design mitigation measures);
- Step 2 – Characterize the existing environmental conditions;
- Step 3 – Qualitative evaluation of 'Alternative Methods';
- Step 4 – Compare the 'Alternative Methods' for landfill expansion and identify the preferred alternative;
- Step 5 – Refine the mitigation measures and determine the net effects of the preferred alternative;
- Step 6 – Describe the preferred 'Alternative Method' for landfill expansion;
- Step 7 – Consideration of climate change;
- Step 8 – Cumulative impact assessment; and
- Step 9 – Preparation of the EA Study Report.

Consultation with the public, Indigenous Communities, GRT members, City of London Advisory Committees, and other stakeholders will be ongoing throughout the EA process.

7.2 Study Areas

The proposed methodology that will be used to conduct the EA is provided in the following sections. The EA, which will be carried out in accordance with the approved ToR, will involve the identification of the preferred 'Alternative Method' for the project and the assessment of the effects of the project.

The study area is the area within which activities associated with the proposed project will occur and where potential environmental effects will be studied. Three preliminary generic study areas for the assessment have been identified as follows:

- **Site Study Area** – The existing W12A Landfill Site and adjacent area of land within which landfill expansion may occur.
- **Site-vicinity Study Area** – The lands in the area immediately adjacent to the Site Study Area that have the potential to be directly or indirectly affected by the landfill expansion and activities within the Site Study Area. As described below, the extent of the Site-vicinity Study Area will be determined for each of the environmental components described in Section 7.3.
- **Wider Study Area** – lands generally beyond the Site-vicinity Study Area, which could extend to include the area of the City of London.

The rationale for the definition of these preliminary generic study areas is as follows:

- **Site Study Area** – The area of land within which 'Alternative Methods' of landfill expansion may occur has been defined, and will be limited to the existing W12A Landfill property and a specific portion of the adjacent Special Policy Area to the immediate north and east.
- **Site-vicinity Study Area** – The MOECC Guideline D-4 Land Use on or Near Dumps describes that the most significant potential impacts typically occur within 500 m of the perimeter of the waste disposal area on a landfill site. For this reason, this Guideline distance is often used by Ontario municipalities in their Official Plans to establish a holding zone around landfills; development within these zones requires proponents to demonstrate that their proposed development will not be adversely affected by the landfill site and its operations. For most environmental components, a Site-vicinity Study Area of 500 m from the Site Study Area limits is appropriate. For specific environmental components, the appropriate Site-vicinity Study Area is greater than 500 m from the existing or potential expanded disposal area. It should also be recognized that the W12A Landfill has been in operation for over 40 years, and monitoring and operational data demonstrates compliance with the requirements of its ECA and the limited extent for potential adverse environmental impacts to occur off-Site.
- Wider Study Area – An area that takes in the broader community generally beyond the immediate site-vicinity and for specific environmental components may include the entire municipality.

The preliminary extent of the study area proposed for each of the environmental components to be studied during the EA, together with a rationale, is provided in Table 7.2-1 below.

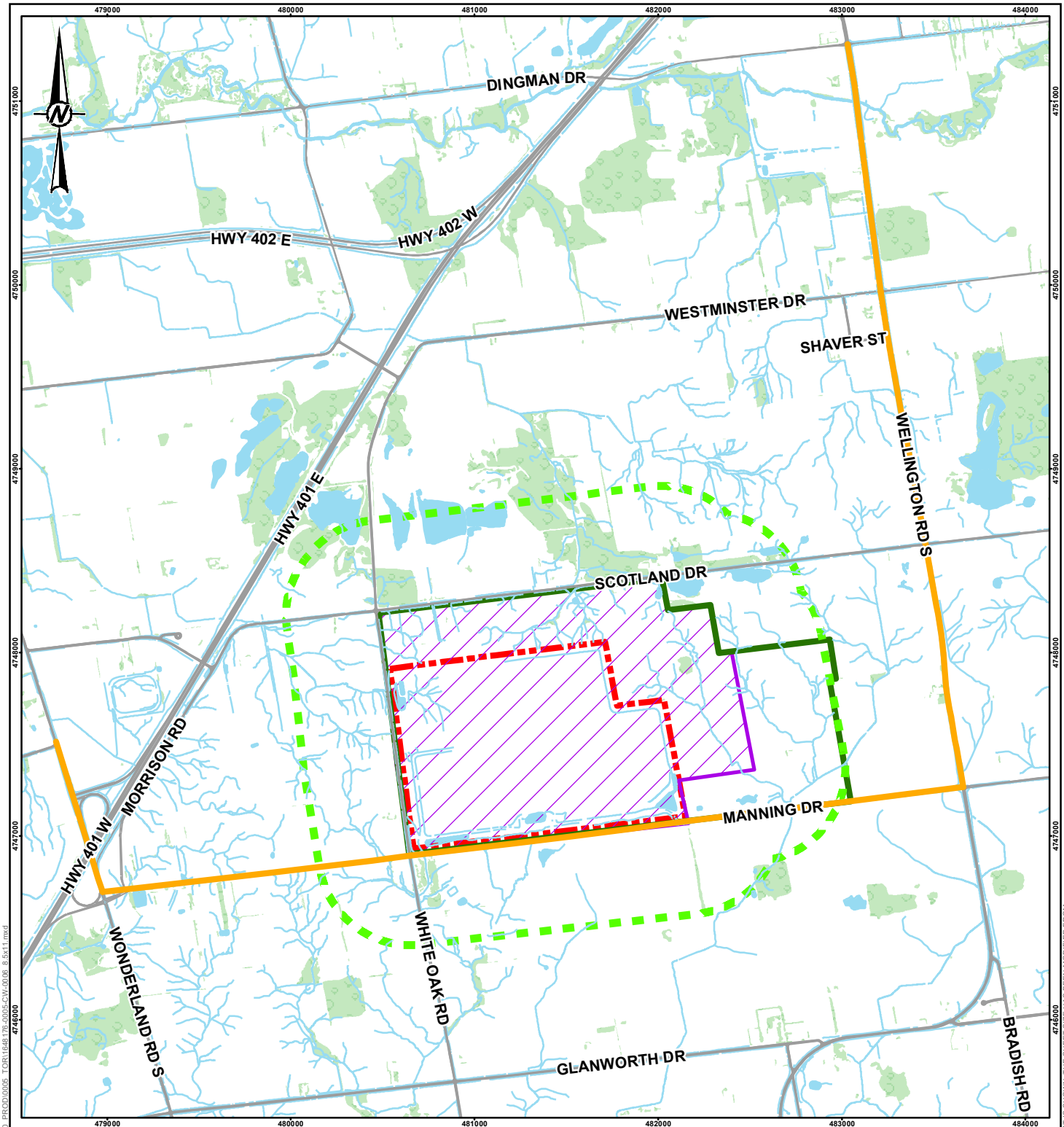
Table 7.2-1: Proposed Preliminary Study Areas

Environmental Component	Preliminary Area(s) to be Studied	Rationale
Atmosphere	Site and Site-vicinity	Air and noise emissions are required to meet provincial requirements at the landfill site boundary or closest sensitive receptors (which are within 500 m of the landfill).
	Site and Site-vicinity	Odour emissions may travel further than 500 m but any effects are expected to be within 1.5 km of the Site Study Area.
	Site-vicinity	To assess haul route noise. See discussion under Transportation for a description on the Site-vicinity Study Area for the haul routes.
Geology and Hydrogeology	Site	Potential effects on groundwater quality have to comply with the MOECC Reasonable Use Guideline at the landfill site boundary.
Surface Water	Site and Site-vicinity	Necessary to include the drainage boundaries of the subwatersheds within which the site is located.
Biology	Site and Site-vicinity	Potential effects on biological resources are expected to be limited to 500 m from the Site Study Area.
Land Use	Site and Site-vicinity	Since there are provincial requirements that govern the potential emissions or discharges from the landfill site, potential effects on land use are expected to be limited to 500 m from the Site Study Area.
Agriculture	Site and Site-vicinity	Since there are provincial requirements that govern the potential emissions or discharges from the landfill site, potential effects on agriculture are expected to be limited to 500 m from the Site Study Area.
Archaeology	Site	Potential disturbance of archaeological resources will be limited to areas associated with the landfill expansion.
Culture	Site and Site-vicinity	In accordance with MTCS requirements for cultural studies, the area of study will extend to approximately 1.5 km from the Site Study Area as shown on Figure 6.3-1.

Environmental Component	Preliminary Area(s) to be Studied	Rationale
Socio-economic	Site, Site-vicinity and Wider	To consider the potential effects of the landfill expansion within 500 m of the Site Study Area and on the broader community.
Visual	Site-vicinity	Off-site vantage points from where the landfill expansion may be visible from as far as 5 kilometres.
Transportation	Site-vicinity	To consist of the haul routes associated with the landfill, specifically Manning Drive between Wellington Road South and Highway 401 and Wellington Road South between Dingman Drive and Manning Drive. Also Wonderland Road South between Decker Drive and Manning Drive (as suggested by public feedback received during Open House #2). As shown on Figure 7.2-1.
Design and Operations	Site	This component relates only to activities associated with the landfill expansion itself

The Site Study Area and the area extending 500 m beyond the Site Study Area are illustrated on Figure 7.2-1. The Wider Study Area is not depicted on this figure.

These preliminary study areas are subject to refinement and will be confirmed during the EA.



LEGEND

- EXISTING W12A LANDFILL SITE BOUNDARY
- SITE STUDY AREA
- 500 m BEYOND SITE STUDY AREA
- HAUL ROUTES TO BE ASSESSED
- WASTE MANAGEMENT RESOURCE RECOVERY AREA BOUNDARY

DRAFT

0 300 600 1,200

1:30,000 METRES

REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
TERMS OF REFERENCE FOR THE ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION

TITLE
STUDY AREAS

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-04-04
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0005	A	**7.2-1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

Path: \\golder.gds\gal\Ottawa\Active\Spatial IM\City of London\Site W12A\09 PRO\11648176\40 PROD\0005 TOR\1648176-0005-GW-0061 8.5x11.mxd

7.3 Environmental Components

As noted in Section 6.0, the environment is defined as those environmental components that may be affected by the project.

The environmental components and sub-components that will be evaluated during the EA are presented in Table 7.3-1.

The environmental components, including socio-economic and technical components, for this EA cover the broad definition of the environment and are:

- atmosphere;
- geology and hydrogeology;
- surface water;
- biology;
- land use;
- agriculture;
- archaeology;
- culture;
- socio-economic;
- visual;
- transportation; and
- design and operations.

Table 7.3-1 outlines each environmental component, including a statement rationalizing why each was included in the EA and the indicators that will be used for determination of potential impacts in the assessment. The data sources that will be used for assessing each of these environmental components are provided in Table 7.6-1. These components and indicators were proposed by the City's EA study team during the development of the ToR and presented to the public at Open House #2 for comment. The feedback received from the public is provided in Table 8.1-4 of this ToR.

These criteria and indicators are preliminary and subject to refinement, and will be confirmed during the EA .

Table 7.3-1: Proposed Environmental Components, Rationale and Indicators for the EA

Component	Sub-component	Rationale	Indicator(s)
Environmental Components			
Atmosphere	Air quality (including dust, odour, GHG)	Landfill expansion and associated operations can produce gases containing contaminants that degrade air quality if they are emitted to the atmosphere. Construction activities associated with landfill expansion and continued landfill operation can lead to levels of particulates (dust) in the air. Landfill operation can also result in odour effects.	• Expected concentrations of air quality indicator compounds (selected regulated air contaminants to represent this type of project) at the property boundary. • Expected site-related odour at sensitive receptors. • Expected GHG emissions.
	Noise	Landfill expansion and associated operations will generate noise that will be emitted into the atmosphere and could affect off-site points of reception (PORs).	• Noise Levels at off-site PORs, or vacant lots that accommodate the future construction of PORs.
Geology and Hydrogeology	Groundwater quality	Contaminants associated with the landfill expansion and associated operations could enter the groundwater and impact off-site groundwater or surface water.	• Expected effect on groundwater quality at the property boundary.

Component	Sub-component	Rationale	Indicator(s)
Surface Water	Surface water quality	Contaminants associated with the landfill expansion and associated operations could seep or runoff into surface water and adversely affect water quality and aquatic life.	• Expected effect on surface water quality in the stormwater management system (SWMS) and within the site-vicinity.
	Surface water quantity	Operations associated with the landfill expansion could alter runoff and peak flows.	• Expected change in peak flows (within the on-site SWMS and at the property boundary). • Expected degree of off-site effects on surface water within the site-vicinity.
Biology	Aquatic ecosystems	Landfill expansion could remove or disturb the functioning of natural aquatic habitats and species, including rare, threatened or endangered species.	• Expected change in surface water quality on-site and within the site-vicinity. • Expected impact on aquatic habitat and biota, including rare, threatened or endangered species within on-site and within the site-vicinity.
	Terrestrial ecosystems	Landfill expansion could remove or disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.	• Expected impact on terrestrial vegetation communities, wildlife habitat, and wildlife, including rare, threatened or endangered species on-site and within the site-vicinity.

Component	Sub-component	Rationale	Indicator(s)
Socio-Economic Components			
Land Use	Current and planned future land uses	Waste disposal facilities could potentially affect the use and enjoyment of sensitive uses in the vicinity of the Site.	• Expected impact on sensitive land uses (i.e., dwellings, churches, and parks within the site-vicinity).
Agriculture	Agriculture	The agricultural land base or agricultural operations may be impacted by the landfill expansion and associated operations.	• Expected effect on agricultural land base and agricultural operations within the site and site-vicinity.
Archaeology	Archaeology	A horizontal landfill expansion has the potential to affect archaeological resources.	• Expected archaeological resources potentially affected on-site.
Culture	Cultural Heritage Landscapes	Identified cultural heritage landscapes can be altered by the landfill expansion. Depending on the nature of identified cultural heritage landscapes, there could be an impact by the ongoing operation of the landfill.	• Expected impact on identified cultural heritage landscapes on-site and within the site-vicinity.
	Cultural Heritage Resources (including built heritage)	Heritage attributes of identified cultural heritage resources could be impacted by the landfill expansion and associated operations.	• Expected impact on the heritage attributes of identified cultural heritage resources on-site and within the site-vicinity.

Component	Sub-component	Rationale	Indicator(s)
Socio-economic	Local Economic	The continued operation of the landfill can influence employment and business in the wider regional area.	• Expected effect on local employment. • Expected effects on local businesses and commercial activity. • Expected effects on municipal finances.
	Residents and Community	Waste disposal facilities can potentially affect the use and enjoyment of their properties by residents in the vicinity of the site.	• Displacement of residents. • Expected interference with use and enjoyment of residential properties (nuisance effects).
Visual	Visual	The landfill expansion can affect the local community by changes in the visual appearance of the site.	• Expected changes in landscape views from off-site.
Technical Component			
Design and Operations	Engineered Containment	Sites that require less engineering to provide protection of off-site groundwater or air quality are typically preferred from a public and regulatory perspective.	• Expected degree of engineered containment and/or controls required.
	Financial	Different methods of landfill expansion can have different costs based on the type and amount of engineering required.	• Estimated costs associated with implementation of expansion alternatives.
Transportation	Traffic	The operations at the landfill can impact the traffic in the surrounding area through changes in truck traffic to/from the landfill.	• Expected effect on traffic along the haul routes in the vicinity of the site.

The nearest airports to the W12A Landfill are the St. Thomas Municipal Airport and the Greater London International Airport. The St. Thomas Airport is located approximately 15 km to the southeast of the landfill, while the Greater London Airport is located approximately 17 km to the northeast of the landfill. In view of these separation distances and given that the landfill already exists; that the proposed project will only extend the use of the site (while maintaining a similar rate of fill); and that there are no known concerns from airport operators, an assessment of the potential effects of the landfill expansion in terms of aviation is not proposed.

If circumstances arise during the EA studies that require modifications to the criteria and/or indicators presented in the ToR, the reason for the modifications would be explained in the EA study report. If additional aspects of the environment that require evaluation are identified during the EA studies, additional criteria and indicators will be developed during the EA, as appropriate and included in the EA consultation process.

7.4 Time Frame

As noted previously, the W12A Landfill is expected to reach capacity early in 2025. Assuming that the necessary approvals will be in place by that time and that the expected life of the expanded landfill is approximately 25 years, then the following time frames are proposed for the assessment:

- operations (2025 to 2050); and
- post-closure (beyond 2050).

Landfilling operation activities will occur throughout the expanded life of the W12A Landfill (i.e., about 25 more years from 2025 to 2050). Leachate collection and treatment, LFG system operation, and site performance monitoring and maintenance activities, will also be ongoing throughout this time frame. During the post-closure period (i.e., beyond 2050), the only activities anticipated are leachate collection and management, LFG system operations, and site performance monitoring and maintenance.

7.5 EA Scope of Work

As noted previously, the City is proposing to undertake the EA in seven steps as described in the following sections.

7.5.1 Step 1 – Identify ‘Alternative Methods’ of Landfill Expansion

As noted previously, the ‘Alternative Methods’ are the different ways the project can be implemented.

The City will determine ‘Alternative Methods’ of achieving the purpose of the undertaking, which is to expand the W12A Landfill to gain an additional 25 years of disposal capacity, thereby allowing the site to operate through the year 2050. During the initial stage of the EA, a reasonable range of expansion alternatives will be identified and described at a sufficient level

of detail (i.e., conceptual designs) so that potential effects of the expanded landfill on each environmental component can be assessed and compared.

Following identification of a reasonable number of alternatives for expansion, the EA project team will conduct a preliminary assessment of potential effects of each alternative for the proposed project. Those works and activities that could potentially adversely affect the environment will be identified. Potential mitigation measures to avoid or reduce the impact will be identified. These proposed mitigation measures (referred to as conceptual mitigation measures) will be incorporated into the conceptual design of the alternatives. These measures could, for example, include appropriate modifications to the existing leachate collection system and/or new mitigation measures. The description and illustration of the conceptual design alternatives will be provided as a section in the EA and will serve as the common basis for predicting the environmental effects of the 'Alternative Methods'.

LFG management requirements for the current and expanded landfill, which has a total airspace in excess of 1,500,000 m^3, are mandated by *O. Reg. 232/98* and *O. Reg. 216/08* (i.e., use of an active gas collection system) and will be conceptually designed as such for the W12A Landfill expansion alternatives.

It should also be noted that landfills are included in the list of facilities to which *O. Reg. 419/05* (air pollution and local air quality) applies. As part of the EA, the City will ensure the requirements of this regulation are addressed in the assessment of potential effects.

7.5.2 Step 2 – Characterize Existing Environmental Conditions

An initial overview of existing environmental conditions is provided in Section 6.0. The existing environment that could potentially be affected by the project will be further described for each of the environmental components. The work plans and methodologies that will be used to characterize existing conditions for each component are presented in Table 7.6-1.

7.5.3 Step 3 – Qualitative Evaluation of 'Alternative Methods'

The EA project team will qualitatively predict the effects for each 'Alternative Method' (i.e., including conceptual design mitigation measures) on the environment. The assessment will be done for each component based on the conceptual designs for each alternative, including mitigation (determined in step 1) and the existing environmental conditions (determined in Step 2).

If the assessment indicates that any additional mitigation measures are required to achieve site compliance with provincial standards, they will be developed and the assessment repeated to incorporate these measures. The EA project team will update and revise the conceptual designs to include any additional mitigation measures. The final conceptual designs will be included in the EA.

In this step, each 'Alternative Method' of the W12A Landfill expansion will be examined to determine if it would ultimately be approvable under the EPA. This screening step is included to eliminate any alternative that would not likely be approvable. Should an alternative be found to not be approvable due to unacceptable net effects (i.e., no further

refinement of mitigation is possible) or technical reasons, then the alternative would be eliminated from further consideration. At this point, the EA project team may also consider additional 'Alternatives To' the project that may have been identified by the public or other parties during the EA process.

7.5.4 Step 4 – Compare the 'Alternative Methods' of Landfill Expansion and Identify the Preferred Alternative

When the alternatives have been finalized, a comparative evaluation of 'Alternative Methods' will be conducted to identify the preferred alternative. The alternatives will be compared using the environmental sub-components and indicators presented in Table 7.3-1. Preliminary feedback on the relative importance of the assessment indicators was received from the City of London Advisory Committees and through public open houses during preparation of this ToR, and further input will be obtained during the initial stages of the EA. This comparative analysis will be undertaken by the EA project team.

As part of this comparison, the advantages and disadvantages of each alternative method will be described.

The outcome of this ranking exercise will then be used in the comparative evaluation to identify the overall preferred expansion alternative.

7.5.5 Step 5 – Refine the Mitigation Measures and Determine the Net Effects of the Preferred Alternative

The prediction of future environmental effects associated with the preferred 'Alternative Method' (assuming that conceptual design mitigation measures are in place) will be provided by each discipline lead as described in Table 7.6-1. Assessment of potential effects will be done using appropriate objectives, standards, policies and regulations. The remaining effects or net effects, if any, will be documented.

Also, a qualitative comparison will be made between the predicted effects of the preferred alternative and the Do-Nothing alternative as defined in Section 4.2 considering the indicators for the environmental components.

7.5.6 Step 6 – Describe the Preferred 'Alternative Method'

The outcome of this step will be the description of the preferred landfill expansion alternative.

In addition, the quantity of leachate generation from the preferred landfill expansion alternative will be predicted, the quality of the leachate associated with the expansion and requiring treatment will be assessed, and a high level assessment of the capability of the existing forcemain to continue to convey the collected leachate to the municipal sewer system and the Greenway Wastewater Treatment Plant to continue to treat the leachate will be carried out and the results provided in the EA study report (Step 9).

7.5.7 Step 7 – Consideration of Climate Change

The 2017 Guide- Consideration of Climate Change in EA in Ontario describes two basic aspects to be considered: 1) Project Effects on Climate Change, and 2) Climate Change Effects on the Project. For this EA, climate change will be assessed as follows:

Project Effects on Climate Change: for the preferred landfill expansion alternative, a quantitative assessment of GHG generation potential associated with the landfill expansion (waste decomposition within the landfill, stationary combustion sources, i.e., flare and building heating, and on-site traffic and mobile equipment) and the GHG reductions resulting from design mitigation measures (active gas extraction system) will be prepared.

Climate Change Effects on the Project: The manner in which climate change has the greatest potential to affect this project is in terms of changes (increases) in precipitation events and associated effects on the performance of the site's SWMS. It is proposed to conceptually design the SWMS for each of the landfill expansion alternatives in compliance with *O. Reg. 232/98*, which requires their SWMSs to be designed for the 100 year storm event. For the preferred landfill expansion alternative, it is then proposed to conduct a sensitivity analysis to assess the performance of the SWMS under the 250-year storm event for the preferred alternative. Depending on the findings of the analysis, the preferred landfill expansion alternative's SWM design may then be modified accordingly. Alternatively, if the SWMS design can be easily adapted in future and/or the potential effects of climate change can be acceptably mitigated, then the design may be left as per the *O. Reg. 232/98* requirements.

Consideration will also be given to the potential effects of climate change on other infrastructure associated with the site, as well as ways that the project could reduce GHG emissions or remove GHG from the atmosphere.

The total estimated GHG emissions associated with the expanded landfill will be compared to the Ontario-wide emissions of GHG.

7.5.8 Step 8 – Cumulative Impact Assessment

The net effects of the proposed project, as determined by the analysis conducted in Step 5, will be combined with the predicted effects of other existing and identified certain and probable projects in the area of the site, where the effects would overlap. The evaluation would consider potential effects on the various components to determine if there are any unacceptable predicted cumulative impacts, as measured against applicable regulatory standards. The study area for the cumulative impact assessment of the project will be determined based on the potential for the W12A Landfill expansion effects to interact with those of other projects, as determined by the impact assessment studies for the proposed project.

7.5.9 Step 9 – Preparation of EA Study Report

A Draft Study EA report will be prepared, consisting of the main EA study report, technical supporting documents as appropriate, and a Consultation Record. The EA study report will include a description of the EA planning process; a summary of consultation efforts; the characterization of existing conditions; a description of each Alternative Method of landfill expansion; the qualitative evaluation of Alternative Methods; the identification and description of the preferred Alternative Method; a summary of the methods and results of the technical studies to assess the impacts from the preferred alternative compared to the applicable regulations, standards and guidelines; consideration of climate change; cumulative impact assessment; and the identification of any proposed mitigation measures, monitoring requirements and commitments to be fulfilled by the City. The EA study report will contain an Executive Summary, a list of references consulted, and appropriate maps illustrating various aspects of the overall undertaking and aspects of the technical component studies.

7.6 Work Plans for the EA

This section presents the proposed approach and work plans for the EA. The proposed work plans present the scope of work required to complete the EA, including the general scope of technical studies for each of the environmental components, and how the effects prediction/assessment will be carried out. The EA methodology is described in the preceding Section 7.5 of this ToR.

The EA work plans may be updated and revised throughout the EA process based on continuing discussions with GRT members.

Table 7.6-1 describes the proposed work plans by environmental sub-component for the description of existing conditions, comparison of ‘Alternative Methods’ and the prediction/assessment of potential effects.

Table 7.6-1: Work Plans

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	**Atmosphere**					
	Air quality (dust, odour and GHG)	• Expected concentrations of air quality indicator compounds (selected regulated air contaminants to represent this type of project) at the property boundary. • Expected site-related odour at sensitive receptors. • Expected GHG emissions.	• Compile and interpret existing Environment Canada or MOECC's air quality monitoring data and meteorological data. • Review available air quality data from Ontario locations outside of London in a similar setting with a landfill, and if considered more representative than local data, consider incorporating it as existing air quality for this assessment • Review aerial photographic mapping. • Review zoning maps.	• Identify the differences in potential air and odour concentrations from emission sources based on their distance and direction to nearest receptors, the property boundary, and site characteristics such as height of the landfill that will influence dispersion. • Identify difference in the alternatives that will impact GHG generation such as the landfill configuration that may impact LFG collection efficiency. • Rank each alternative based on the differences.	• Select air indicator compounds appropriate for the landfill expansion. • Complete air and odour emission estimates based on published emission factors and available literature, as well as a site-specific LFG generation model for input into the dispersion model. • Execute an air quality dispersion model for the currently approved landfill and for an expanded landfill. • Predict worst-case air quality and odour effects for off-site receptors based on an expanded landfill operations scenario. • Calculate GHG emissions based on the expanded landfill.	• Environment Canada or MOECC's regional air quality data, hourly meteorological data and climate normals. • Published emission factors (including odour). • Site-specific LFG generation model. • Preferred 'Alternative Method' landfill phasing plan. • Odour complaints history. • Existing site-specific studies. • Applicable provincial regulations, standards and guidelines.
	Noise	• Noise Levels at off-site PORs, or vacant lots that accommodate the construction of PORs.	• Review aerial imagery. • Review zoning / land use mapping. • Review previously prepared noise studies. • Undertake field program to quantify existing noise levels.	• Identify existing and potential PORs in the vicinity of the landfill. • Identify potential differences in expected noise levels off-site based on the distance and potential line-of-site exposure of the PORs to the landfilling equipment/activities. • Review the direct interaction of the proposed alternative method footprints and existing/potential PORs. • Rank each 'Alternative Method' based on the differences.	• Nosie emission estimates based on available project-specific information, manufacturer's noise data, and consultant's database of similar noise sources. • Establish applicable noise limits in accordance with accepted MOECC practices. • Develop a project/site-specific three-dimensional noise prediction model in accordance with MOECC and internationally accepted standards. • Using the site-specific noise model described above, model the predicable worst-case noise levels from the preferred landfill expansion at identified off-site PORs, and compare them to MOECC noise guidelines. • If required, identify mitigation that can be implemented into the design of the preferred alternative to allow the landfill expansion to achieve compliance with applicable noise limits.	• Landfill equipment list and expected utilization. • Preferred 'Alternative Method' landfill phasing plan. • Existing site-specific noise studies. • Existing noise studies for facilities in the vicinity (if available). • Manufacturer's noise data. • Consultant's database of similar noise studies. • Ministry of Transportation Ontario (MTO) traffic count data or newer data collected as part of this EA.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	**Biology**					

	Aquatic ecosystems	• Expected change in surface water quality on-site and within the site-vicinity.
		• Expected impact on aquatic habitat and biota, including rare, threatened or endangered species within on-site and within the site-vicinity.
			• Habitat assessment of the four (4) watercourses within the site-vicinity study area, to consist of:
			  • Channel Type.
			  • Channel morphology.
			  • Flow characteristics.
			  • Substrates, in-stream cover.
			  • Specialized habitat.
			  • Bank and riparian community characteristics.
			  • Valley form characteristics.
			  • Benthic (macro) Invertebrate Surveys.
				• Identify differences in potential impacts to watercourses.
				  • Temperature.
				  • Sedimentation.
				  • Fish habitat.
				• Rank each 'Alternative Method' based on the differences.
					• Identify areas of disturbance including:
					  • Direct habitat loss/disturbance.
					  • Indirect habitat disturbance.
					  • Impacts to aquatic SAR habitat and species.
					  • Evaluation of short term vs. long-term impacts.
					  • Identify appropriate mitigation measures.
						• *W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study* (Earth Tech, 2005).
						• *Middlesex Natural Heritage Systems Study* (Middlesex County, 2014).
						• *The London Plan* (2016)
						• *City of London Inventory and Evaluation of Woodlands* (North-South Environmental Inc. (2009).
						• *Dingman Creek Subwatershed Study* (Aquafor Beech et.al., 1995) and *Dingman Creek Subwatershed Study Update* (Delcan, 2005).
						• *Dingman Creek Watershed Report Card* (2012).
						• *Dodd Creek Subwatershed Strategy* (Wilcox Betsy, 2005).
						• *Department of Fisheries and Oceans (DFO) Drain Classification and Fish Habitat Data* from the Upper Thames River Conservation Authority (UTRCA) and Kettle Creek Conservation Authority (KCCA).
						• Land Information Ontario (LIO).
						• Ministry of Natural Resources and Forestry (MNRF) SAR List.
						• Natural Heritage Information Centre.
						• DFO.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources

Environmental	Terrestrial ecosystems	• Expected impact on terrestrial vegetation communities, wildlife habitat, and wildlife, including rare, threatened or endangered species on-site and within the site-vicinity.	• Herpetofauna Surveys:
			  • Vernal Pool Surveys.
			  • Auditory Amphibian Surveys.
			  • Visual Amphibian/Salamander Surveys.
			• Bat Habitat Suitability Assessment.
			• Preliminary review of site and site-vicinity identified five (5) features requiring assessment.
			• Snake Cover Board and Area Searches.
			• Breeding Bird Surveys.
			• Ecological Land Classification Confirmation and Floral Inventory.
			• Wetland Community Boundary Delineation.
			• Lepidoptera and Odonata Surveys.
			• SWH Surveys.
				• Identify difference in the alternatives that will impact terrestrial features (removal of habitat, harm or harassment of species, sedimentation, dust, spills and contamination).
				  • Woodlands.
				  • SWH.
				  • SAR and their habitat.
				  • Unevaluated Wetlands.
				  • Potential ESA north of Scotland Drive.
				  • Locally Significant Wetland (Silver Swamp).
				• Rank each 'Alternative Method' based on the differences.
					• Identify potential impacts to SAR, SWH, ESA, wetland and woodlands including:
					  • Direct habitat loss/disturbance.
					  • Indirect habitat disturbance.
					  • Impacts to terrestrial SAR habitat and species.
					  • Evaluation of short term vs long-term impacts.
					  • Vegetation removal.
					  • Potential impacts to species.
					• Implementation of mitigation measures including:
					  • Appropriate setbacks as required.
					  • Obtain permits as required under applicable acts such as the Endangered Species Act.
					  • Siting, installation and monitoring of appropriate erosion and sediment control measures.
					• Follow construction activity timing windows that minimize impacts to species and habitat.
						• *W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study* (Earth Tech, 2005).
						• *Middlesex Natural Heritage Systems Study* (Middlesex County, 2014).
						• *The London Plan* (2016).
						• *City of London Inventory and Evaluation of Woodlands* (North-South Environmental Inc. (2009).
						• *Dingman Creek Subwatershed Study* (Aquafor Beech et. al., 1995) and *Dingman Creek Subwatershed Study Update* (Delcan, 2005).
						• *Dingman Creek Watershed Report Card* (2012).
						• *Dodd Creek Subwatershed Strategy* (Wilcox Betsy, 2005).
						• *DFO Drain Classification and Fish Habitat Data* from the UTRCA and KCCA.
						• (LIO).
						• *MNRF Ontario SAR List* .
						• *Natural Heritage Ontario Reptile and Amphibian Atlas*.
						• *Ontario Breeding Bird Atlas*.
						• *Ontario Butterfly Atlas*.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	**Geology and Hydrogeology**					
	Groundwater quality	• Expected effect on groundwater quality at the property boundary.	• Extensive field investigations and hydrogeological assessments have been completed for the existing landfill site. • The hydrogeological conceptual site model has been verified and major hydrostratigraphic units defined in three dimensions. • Additional field investigations will focus on identified data gaps such as the northern terminus of the Upper Aquifer. • Extensive hydraulic conductivity testing has been completed for the major hydrostratigraphic units; additional testing will be focused on any identified differences between results of the additional field work and the conceptual model.	• Identify the differences between the alternatives that will affect the potential impact on groundwater quality such as waste footprint configuration, direction of groundwater flow, landfill cover type. • Estimate how the differences will affect the groundwater quality. • Rank each 'Alternative Method' based on the differences.	• Prepare a predictive model of landfill performance (contaminant transport model) as per *O. Reg. 232/98*. • Predict worst case concentrations in the groundwater of the Upper Aquifer at the property boundary for key leachate indicator parameters with consideration of reasonable mitigation measures. • Prepare a groundwater monitoring program. • Prepare conceptual trigger mechanism and contingency plan approaches. • Predict the contaminating lifespan.	• Published regional sources and data on regional geological and hydrogeological conditions such as the Middlesex-Elgin Groundwater Study, Source Protection Assessment Reports. • Review MNRF petroleum well records. • Provincial Quaternary and Bedrock Mapping. • Ontario Water Well Records. • Landfill Annual Monitoring Reports. • Previous site characterization reports. • Borehole Logs. • Adjacent property assessment reports.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Environmental	**Surface Water**					
	Surface water quality	• Expected effect on surface water quality in the SWMS and within the site-vicinity.	• Compile and interpret existing annual monitoring reports and supplemental (if required) surface water quality monitoring program data. • Update surface water quality stormwater pond design criteria based on published changes to the Dingman and Dodd Creek Subwatershed Study requirements.	• Identify the differences that may impact changes in surface water quality such as expansion area and potential impacts on the existing SWMS. • Assess any limitations to expand or build new SWM ponds based on landfill expansion designs. • Rank each 'Alternative Method' based on the differences.	• Evaluation of SWM facility expansion/modification or required construction of new on-site facilities and the facilities' ability to mitigate potential changes to water quality. • Modeling of proposed SWMS and comparison with MOECC and Subwatershed specific design criteria.	• Topographic maps. • Air photos. • *Stormwater Management Master Plan* (Earth Tech, 2002). • *Surface Water Background Study* (Dillon, 2005). • Annual water quality Monitoring Reports. • Design and Operations Reports. • Surface water drainage mapping. • Agricultural farm drain mapping. • Watershed/subwatershed reports. • Local climate data. • Published water quantity and flow information from the MOECC, Environment Canada and local Conservation Authorities. • Site reconnaissance. • Flow observations during sampling program.
	Surface water quantity	• Expected change in peak flows (within the on-site SWMS and at the property boundary). • Expected degree of off-site effects on surface water quantity within the site-vicinity.	• Field review of stormwater management and drainage outlet locations. • Update existing conditions assessment of hydraulic capacity, flooding and stream bank erosion. • Review current and historic site photos and aerial imagery. • Update surface water quantity control design criteria based on published changes to the Dingman and Dodd Creek Subwatershed Study requirements.	• Identify the differences that may impact changes in surface water quantity such as expansion area, proposed side slopes of the landfill, proposed landfill cover alternatives, potential changes to watershed divides, and potential impacts on the existing SWMS. • Rank each 'Alternative Method' based on the differences.	• Predict and assess future surface water peak flows and quantity conditions associated with the preferred landfill expansion alternative for a range of storm events (e.g., 2, 5, 10, 25 and 100 year) as required by *O. Reg. 232/98*, as well as consideration of climate change effects. • Evaluate the need for SWM infrastructure to meet *O. Reg. 232/98*, and prepare EA level design for SWMS. • Modeling of proposed SWMS and comparison with MOECC and Subwatershed specific design criteria.	

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	**Agriculture**					
	Agriculture	• Expected effect on agricultural land base and agricultural operations within the site and site-vicinity.	• A field survey of the study areas to document types of farms, farm improvements, cropping patterns, buildings, etc. • Review aerial photographic mapping. • Compile parcel fabric mapping from City. • Review Official Plans and Zoning By-law. • Review Canada Land Inventory (CLI)mapping. • Review Soils of Middlesex County mapping. • Interviews with municipal staff and if necessary, property owners.	• The potential effect of the proposed project alternatives on the existing and potential agricultural use of on-Site and off-site lands will be assessed. • Differences between alternatives will be identified, for example, proximity to livestock, use of prime agricultural areas, etc. • Rank each 'Alternative Method' based on the differences.	• Based on the proposed landfill operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components; the technical and operational considerations component; and groundwater and surface water considerations, the potential effects of the preferred method on existing and proposed off-site agricultural use will be assessed.	• Preferred 'Alternative Method' landfill phasing plan. • Existing site-specific studies. • Applicable provincial regulations, standards and guidelines. • *Provincial Policy Statement* (2014). • *City of London Official Plan* (1989) and *The London Plan* (2016). • City of London Zoning By-law. • Provincial Policy Statement (2014). • Aerial photographic and topographic mapping. • Available soils mapping (Soils of Middlesex County mapping, CLI), municipal drain mapping, and available ownership information based on municipal assessment information and including farm tax credit information. • Field reconnaissance. • Statistics Canada agriculture profiles. • Interviews with farmers, if necessary.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	**Archaeology**					
	Archaeology	• Expected archaeological resources potentially affected on-site.	• Review and update existing background research including archaeological, historical, and environmental literature. • Review updated list of registered archaeological sites within 1 km of the site. • Complete Stage 2 Property Assessment (pedestrian and shovel test pit surveys) to identify archaeological sites that may be present within the site. • Clean, catalogue, and analyze recovered cultural material to determine cultural heritage value or interest of identified archaeological sites.	• Identify archaeological sites that are anticipated to be impacted by expansion alternatives. • Rank each 'Alternative Method' based on the differences.	• Archaeological sites that will be impacted by the preferred expansion alternative may require Stage 3 assessment to determine spatial extent, complete a full evaluation of significance, and determine the need for strategies to mitigate impacts and provide future conservation (Stage 4 mitigation).	• *Stage 1 Archaeological and Built Heritage Assessment, W12A Landfill Area Study* (2006). • Other existing site-specific archaeological assessment reports. • Ontario Archaeological Sites Database. • *Ministry of Tourism, Culture, and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists*. • *City of London's Archaeological Master Plan*.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	**Culture**					
	Cultural Heritage Landscapes	• Expected impact on identified cultural heritage landscapes within the site-vicinity.	• Background research of archival, published & unpublished sources, municipal heritage policies, and historic maps and aerial imagery. • Consultation with municipal heritage planner. • Field investigations to document and evaluate existing conditions.	• Identify the risk of potential direct or indirect impacts using guidance and types identified in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process.* • Rank each 'Alternative Method' based on differences.	• Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present. • Methods to predict potential effects following guidance provided in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process*. • Methods to consist of identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce or avoid impact to protected heritage properties or known or newly identified properties of cultural heritage value or interest.	• Description of proposed expansion alternatives (including construction operations to determine sources of impacts). • Preferred landfill design. • Existing site-specific studies. • Applicable provincial plans, acts, regulations, standards and guidelines, and policies. • Applicable municipal official plans, heritage policies, and guidance.
	Cultural Heritage Resources (including built heritage)	• Expected impact on the heritage attributes of identified cultural heritage resources within the site-vicinity.	• Background research of archival, published & unpublished sources, municipal heritage policies, and historic maps and aerial imagery. • Consultation with municipal heritage planner. • Field investigations to document and evaluate existing conditions.	• Identify the risk of potential direct or indirect impacts using guidance and types identified in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process.* • Rank each 'Alternative Method' based on differences.	• Determine the potential magnitude, reversibility, extent, duration, and frequency of each type of impact, if present. • Methods to predict potential effects will follow guidance provided in the MTCS *Ontario Heritage Tool Kit: Heritage Resources in the Land Use Planning Process.* • Methods will include identifying key vistas and views, sources of direct and indirect impact resulting from construction and operation, and preferred options and conservation measures to reduce or avoid impact to protected heritage properties or known or newly identified properties of cultural heritage value or interest.	• Description of proposed expansion alternatives (including construction operations) to determine sources of potential impacts. • Preferred landfill design. • Existing site-specific studies. • Applicable provincial plans, acts, regulations, standards and guidelines, and policies. • Applicable municipal official plans, heritage policies, and guidance.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	**Land Use**					
	Current and planned future land uses	• Expected impact on sensitive land uses (i.e., dwellings, churches, and parks within the site-vicinity).	• A field survey of the study area to document existing land uses including the number, type and proximity of sensitive land uses. • Review aerial photographic mapping. • Compile parcel fabric mapping from City. • Review Official Plan and Zoning By-law. • Review Provincial Guidelines (e.g., Land Use Compatibility, Guideline D-1, Land Use On or Near Landfills and Dumps, Guideline D-4). • Review Provincial Policy Statement, 2014. • Interviews with municipal staff to confirm development activity planned in the site-vicinity and identify potential planning issues.	• Identify differences in the use and enjoyment of sensitive uses in the site-vicinity. • Differences between alternatives will be identified, for example, proximity to sensitive land uses. • Rank each 'Alternative Method' based on differences.	• Based on the proposed operational practices and/or results of predictive assessments of potential nuisance effects as carried out by other components and the technical and operational considerations component, the potential compatibility of the preferred method with existing and proposed surrounding land use will be assessed.	• Preferred 'Alternative Method' landfill design and phasing plan. • Existing site-specific studies. • Applicable provincial regulations, standards and guidelines. • *Provincial Policy Statement* (2014). • *City of London Official Plan* (1989). • City of London Zoning By-law. • *Land Use Compatibility, Guideline D-1*. • *Land Use On or Near Landfills and Dumps, Guideline D-4*. • Aerial photographic and topographic mapping. • Field reconnaissance. • Discussion with City planning department.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	**Socio-economic**					
	Local Economy	• Expected effect on local employment. • Expected effects on local businesses and commercial activity. • Expected effects on municipal finances.	• Review of current and projected employment numbers (during both construction and operation phases). • Review of municipal revenues and projected change from site expansion. • Review of land use designations and City of London Official Plan. • Interviews with municipal staff to understand potential costs and impacts to services from expanded site (e.g., public works, emergency management systems, transportation). • Review of local business database.	• Identify total increase in employment hours/full time equivalent positions during both construction and operational phases by alternative design. • Identify loss of potential land use for commercial purposes or residential purposes as a result of landfill expansion and associated employment and rental income, respectively. • Rank each 'Alternative Method' based on the differences.	• Re-evaluate property taxes or rent paid to the municipality based on larger property parcel and any potential change in land use designation. • Qualitative assessment of impacts on local businesses from changes at the site, (e.g., loss of patronage, operational impacts.) • Impacts on employment as determined by change in employment numbers and resultant economic impact at the local level. • Calculate amount of increased revenue to the City minus any potential increased costs to determine net economic effect.	• *City of London Official Plan*. • City of London Financial Returns. • Land use designation database.
	Residents and Community	• Displacement of residents. • Expected interference with use and enjoyment of residential properties (nuisance effects).	• Review aerial photography to identify closest residential properties. • Windshield survey of study area to identify residences and businesses (including farms) as well as any other community facilities in the site-vicinity.	• Establish closest residential receptors to each alternative design. • Review of findings from other disciplines – noise, odour, visual, air quality to ascertain any potential nuisance effects on residential receptors. • Rank each 'Alternative Method' based on the differences.	• Evaluate level of nuisance effects once mitigation measures and BMPs have been implemented to determine change from baseline (current) conditions. • Evaluate if the preferred alternative could cause displacement of residents from City-owned property.	• Site related complaints. • Discipline findings – noise, air quality, land use, cultural, visual, agriculture. • Existing site related BMPs.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Social	**Visual**					
	Visual	• Expected changes in landscape views from off-site.	• Using Google Earth mapping software, GeoGratis data of the site and surrounding area, and AutoCAD plans of the currently approved final contours, create a 3D model of the study area, including topography, roads, vegetation, buildings, etc. • Prepare high-level description of the site and study area using this 3D model and aerial photos as reference. • Photograph existing conditions from selected off-site vantage points.	• Prepare 3D models of each proposed landfill expansion 'Alternative Method' and render them with appropriate surface material / vegetation cover (turf, meadow, trees, etc.). • Merge the expansion models with the existing site conditions model. • Merge the site photos with the 3D model to illustrate the impact of each expansion alternative on each of the selected vantage points within the study area. • Apply conceptual level mitigation measures to each alternative. • Identify the degree of visual impact of each 'Alternative Method'. • Rank each 'Alternative Method' based on the differences.	• Use 3D model to identify critical viewsheds that can be mitigated. • Develop a mitigation evaluation matrix to prioritize evaluation criteria (e.g., cost, effectiveness, immediacy, practicality, appearance, long-term maintenance). • Refine conceptual level mitigation measures using 3D models and viewshed analysis. • Assess each mitigation measure using the matrix developed. • Identify and document the potential net effects of the preferred 'Alternative Method' on views from the selected vantage points.	• Google Earth / GeoGratis. • City of London aerial photos. • ACAD drawings of existing landfill and proposed expansion alternatives. • Site photos.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Technical	**Design and Operations**					
	Engineered Containment	• Expected degree of engineered containment and/or controls required.	• Develop three to four alternative design configurations (footprint, height, slopes). • Calculate landfill footprint areas, excavation volumes, elevations, and airspace for each alternative.	• Identify potential impacts of alternatives on the operation of the landfill, considering leachate generation, potential for leachate mounding, slope stability, construction methods, LFG generation and excess soil management. • Rank each 'Alternative Method' based on the differences.	• Prepare landfill phasing plan. • Prepare overall materials balance (excavation, cover and fill requirements). • Establish a geotechnical model for the site and complete a geotechnical assessment of preferred alternative (the expected settlement performance and stability of the landfill configuration). • Assess the effects that short and long-term settlements may have on the operations of the new cells. • Prepare estimate of LFG generation. • Develop an estimate of the quantity of leachate generated from the expansion. • Prepare conceptual design of LFG management system and leachate collection system.	• Annual environmental monitoring reports. • Results of Hydrologic Evaluation of Landfill Performance model. • Currently approved design and operations report. • Existing site-specific studies (on-site subsurface investigations, geotechnical reports). • Topographic mapping, soils mapping, available water well records. • *O. Reg. 232/98*. • Commercial software specifically developed to assess slope stability.
	Financial	• Costs associated with implementation of expansion alternatives.	Estimated cost for alternative designs.	• Identify potential cost implications of alternatives. • Rank each 'Alternative Method' based on the differences.	• Develop an estimate of probable cost for construction and operation for the preferred alternative.	• Existing cost information from the City.

Category	Component / Sub-component	Indicator(s)	Data Collection and Field Work	Qualitative Evaluation of 'Alternative Methods'	Prediction of Potential Effects for the Preferred 'Alternative Method'*	Data Sources
Technical	**Transportation**					
	Traffic	• Expected effect on traffic along the Haul Route.	• Obtain available recent traffic data (2016/2017) for selected intersections and corridors within the haul route study area. • Collect Turning Movement Count (TMC) data for Manning Drive at White Oak Road, Wonderland Road, Wellington Road South, and primary site access locations, including vehicle classifications for regular automobiles, heavy goods vehicles, and slow moving / farm vehicles. • Collect AADT volumes on Wonderland Road, Manning Drive, and Wellington Drive. • Obtain signal timing data for Manning Drive at Wellington Road South and Wellington Road South at Dingman Drive. • Site visit to confirm geometric conditions and observe operating conditions in context.	• Assessing existing traffic conditions based on Haul Route and other common users. • Identify the differences in traffic operations (both strategic and operational) by evaluating the alternatives for landfill expansion. • Rank each 'Alternative Method' based on the differences.	• Assess existing hourly and daily carrying capacity of the Haul Route study area roads. • Assess existing intersection LOS and other performance metrics for the haul route study area intersections to confirm overall intersection and critical movement performance (capacity and delay). • Assess future traffic operation and safety requirements of defined study area (adjacent roadway and haul route) conditions. • Assess potential intersection geometric requirements for mitigation. Undertake warrants to confirm auxiliary lane and/or intersection control requirements, as necessary. • Assess sensitivity/impacts of partial haul route closure or activation of Highway 401 emergency detour route (up to 2 alternatives).	• TMC, AADT, and signal timing data. • Additional tonnage and resulting number of trucks to site due to expansion. • Collision history statistics. • Existing site-specific and related studies, consultant observations, and available City planning and engineering documents.

Notes: * Any 'Alternative Method' identified as preferred that is determined to have predicted effect(s) in excess of provincial thresholds, regulations or guidelines will be assessed to determine if the unacceptable effect(s) can be mitigated. If the effect(s) cannot be mitigated to below the provincial thresholds, regulations or guidelines, that 'Alternative Method' will be abandoned as the preferred 'Alternative Method' and the next most favourable 'Alternative Method' will be identified as preferred and evaluated

8.0 Consultation

The Consultation Record for the development of this ToR is provided in Volume III of the ToR documentation. This section of the ToR presents an overview of the results of consultation and engagement carried out during the development of this ToR, in consideration of the *MOECC's Code of Practice: Consultation in Ontario's Environmental Assessment Process* (Consultation Code of Practice; MOECC, 2014b). The City has developed a Consultation Plan (referred to by the City as a Community Engagement Program) for the development of this ToR as well as the subsequent EA process. A copy of this Consultation Plan/Community Engagement Program is provided in Volume III Appendix A. A summary of the proposed Plan for conducting the EA is presented in Section 8.2.

A summary of the consultation and engagement activities conducted during the development of the ToR is provided in Section 8.1. For ease of reference, the engagement activities are presented sequentially from the beginning of this ToR process. The first and second open houses were held during the development of this ToR. The third and fourth open houses are proposed to be held during the EA.

8.1 Record of Consultation Activities during the ToR

Engagement of and consultation with the public and other stakeholders is a key component of the EA process. It enables stakeholders to participate in the planning process and enhance the quality of the project. The key vehicles in the Community Engagement Program that were used to engage the public and the other stakeholders and elicit feedback were open houses, the establishment of the Waste Management CLC, the existing W12A Landfill PLC, letter/email correspondence, the City's Residual Waste Disposal Strategy website (the EA Website) and newspaper and social media advertisements.

It is noted that the Waste Management CLC is a new liaison committee whose purpose is to ensure that the diverse interests of multiple stakeholders are equally and adequately represented through diversification in membership throughout the EA process by encouraging the participation of key individuals representing specific stakeholder groups.

The objectives of the Community Engagement Program for preparation of this ToR were to:

- engage stakeholders from the beginning of the process through the use of a variety of consultation events and activities including open houses, letters/emails, and the project website, and establishment of the Waste Management CLC;
- to ensure that there are adequate opportunities for stakeholders to learn about the project and to provide input, feedback and comments concerning the project and EA process, and that these comments are considered by the EA project team;
- engage local elected officials to ensure that they are provided with regular and timely information concerning this ToR development process;

- engage stakeholders as early as possible in the development of this ToR for the EA and to facilitate their involvement in the process in ways that meet their needs;
- ensure the engagement process is open, transparent and inclusive;
- document all issues and concerns identified by the public, agencies and other stakeholders and to demonstrate how these concerns and issues have been incorporated into the final ToR (this document); and
- fulfill the EA process public consultation requirements.

Additional information regarding the Waste Management CLC is provided in the Community Engagement Program in Volume III Appendices A and G.

Details of the engagement related to the development of this ToR is documented within the Volume III Consultation Record. The tables in the following sections summarize the primary engagement activities that have occurred throughout the development of this ToR.

8.1.1 Notice of Commencement

The EA process was initiated by publishing a Notice of Commencement (NOC) in The Londoner newspaper on March 30, 2017 and April 6, 2017 (Volume III Appendix D1), as required under the EAA. The NOC provided a brief overview of the proposed undertaking, the location of the undertaking, the EA process, a description of how interested stakeholders can become involved in the project and participate in the CLC, information about the proponent, and how to contact the EA Project Team with comments and questions. The invitation to join the Waste Management CLC was printed in The Londoner separate from the NOC on April 13, 2017.

The NOC was also posted on the project website on April 6, 2017 and can be found at: https://getinvolved.london.ca/WhyWasteDisposal (Volume III Appendix D1). Further details of material on the website are also included in Volume III Appendix D2.

During development of the NOC, Frequently Asked Questions (FAQ) were also developed and used with various mailouts as and when appropriate and posted on the project website. A copy of these FAQs, identified as FAQ #1, are provided in Volume III Appendix D1.

Additionally, introduction letters accompanied by the NOC and in some instances the FAQs were emailed or mailed to the following stakeholders between March 29, 2017 and April 3, 2017 (see Volume III Appendices C2 and D3):

- 31 GRT members (see Volume III Appendix B for the initial list and subsequent GRT lists as the ToR has evolved); and
- 9 Indigenous Communities and the Southern First Nations Secretariat.

The NOC and FAQ were also mailed to over 200 properties located within a 2 km radius of the Waste Management and Resource Recovery Area, 32 businesses that use the W12A Landfill, 5 community groups, 49 neighbouring regional municipalities and the PLC members between March 28 and 30, 2017 (see Volume III Appendices D3 and D4). The area selected for the mail out was based on the W12A Landfill Community Enhancement and Mitigative Measures Program (which was developed in conjunction with the local community) that generally provides for mitigative measures to properties located within 1.5 km or less of the W12A Landfill site. The notification zone for the EA was extended an additional 500 mm to include the nearby hamlets of Glanworth and Shaver subdivision.

Table 8.1-1 summarizes the GRT responses received following the NOC. Copies of the correspondence are provided in Volume III Appendix D5.

Table 8.1-1: Stakeholder Responses

Stakeholder	Stakeholder Comment	City of London's Response	Status and where addressed in ToR
Anjala Puvananathan, Canadian Environmental Assessment Agency	The *Canadian Environmental Assessment Act*, 2012 focuses federal environmental reviews on projects that have the potential to cause significant adverse environmental effects in areas of federal jurisdiction and applies to physical activities described in the *Regulations Designating Physical Activities*. Based on the information provided, your project does not appear to be described in the Regulations. Kindly review the Regulations to confirm applicability to the proposed project. If you believe the project is not subject to a federal environmental assessment, and do not submit a project description, we kindly request that you remove the Canadian Environmental Assessment Agency from your distribution list.	No response required. The City self-assessed and does not believe this project is described in the Regulations. The Canadian Environmental Assessment Agency was removed from the project contact list.	Updated GRT list available in Volume III Appendix B.
Transport Canada, EA Program	Transport Canada does not require receipt of all individual or Class EA related notifications. Request that project proponents self-assess the need to consult with Transport Canada.	No response required. Transport Canada was removed from the project contact list as the Project will not interact with federal property nor will it require approval or authorization under any Acts administered by Transport Canada.	Updated GRT list available in Volume III Appendix B.
Stephanie Rocca, Ministry of Northern Development and Mines (MNDM)	With respect to the geology and mineral potential, the Resident Geologist Program of the Ontario Geologist Survey has completed the following regarding the proposed Landfill Expansion project area: 1. the Ministry's Mineral Deposit Inventory for mineral occurrences: There are no known mineral occurrences on or within 1 km of the proposed project area. 2. the project area is underlain by Paleozoic rock consisting of Dundee formation limestone. Drift thickness mapping shown in ARIP 78, Aggregate Resources Inventory of the County of Middlesex and the City of London indicates thick drift (greater than 15 m) covers the project area. 3. the Ministry's Assessment File Report Inventory database to determine whether past mineral exploration activity has been reported for the proposed area: there are no assessment files for this area. 4. the GIS-based "Metallic Mineral Potential Estimation Tool" to get an estimation of the mineral potential of the proposed project area: low metallic mineral potential is estimated for the area (19). 5. groundwater Study 5, Karst of Southern Ontario and Manitoulin Island for identified karst hazard: there are inferred karst features in the project area. 'Inferred karst" areas represent areas where direct observations could not be made but where rock type is predominantly carbonate and may be susceptible to karst processes. 6. reviewed the NOC of ToR for the Proposed Landfill Expansion in the City of London to assess the potential environmental considerations identified. However, given that there are no conflicts identified with the proposed project and geology or mineral resource potential, MNDM has no concerns.	No response required. The MNDM was removed from the project contact list.	Updated GRT list available in Volume III Appendix B.

Stakeholder	Stakeholder Comment	City of London's Response	Status and where addressed in ToR
Joseph Muller, MTCS	The MTCS's interest in this EA project relates to its mandate of conserving Ontario's cultural heritage, which includes: • Archaeological resources, including land-based and marine; • Built heritage resources, including bridges and monuments; and, • Cultural heritage landscapes. Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources. While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Indigenous Communities may have knowledge that can contribute to the identification of cultural heritage resources, and it is suggest that any engagement with Indigenous Communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources. Screen the project with the MTCS *Criteria for Evaluating Archaeological Potential* to determine if an archaeological assessment is needed. If this EA project area exhibits archaeological potential, then an archaeological assessment should be undertaken by an archaeologist licenced under the *Ontario Heritage Act*, for submittal of the report directly to the MTCS for review. The MTCS *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether this EA project may impact cultural heritage resources. If potential or known heritage resources exist, MTCS recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Send the HIA to the MTCS for review, and make it available to local organizations or individuals who have expressed interest in review. All technical heritage studies and their recommendations are to be addressed and incorporated into EA projects. Advise the MTCS whether any technical heritage studies will be completed for your EA project, and provide them to the MTCS before issuing a Notice of Completion. If the screening identifies no known or potential cultural heritage resources, or no impacts to these resources, include the completed checklists and supporting documentation in the EA report or file.	Noted. When the ToR is approved, MTCS will be advised of the studies to be completed.	No change to the draft ToR.
Joe Gordon, KCCA	KCCA is interested in engaging in further discussions and providing input for this project throughout the EA process.	No response required, KCCA remains on the GRT list.	No change to the draft ToR.
Dale B. Arndt St. Thomas Municipal Airport	The St. Thomas planning department confirmed the proposed expansion of the landfill is 15,727 m from the St. Thomas airport. The proposed landfill expansion is just outside the 15 km limit.	No response required, the St. Thomas Municipal Airport remains on the GRT list.	No change to the draft ToR.

Stakeholder	Stakeholder Comment	City of London's Response	Status and where addressed in ToR
Steve Faulkner, London International Airport	As we discussed, the London Airport has no objection to the expansion of the existing landfill site located at 3502 Manning Drive. I appreciate you including us in your consultations.	No response required, the London International Airport remains on the GRT list.	No change to the draft ToR.
Jodie Lucente MTO	While MTO has reviewed materials available on the website, we wish to request any/all reports and plans, trucking routes and detour plans, etc. available to date regarding the proposed W12A Landfill Expansion.	No response required at this time as there are no reports or plans on, trucking routes and detour plans, etc.. The MTO remains on the GRT list.	No change to the ToR.
Laura Warner Ministry of Natural Resources and Forestry	Please note that a screening of natural heritage (including SAR) or other resource values for the project has not yet been completed. Please also note that it is the City's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals. Please refer to the attached *SAR Reference Guides* for a list of threatened and endangered species that may occur in your area to further inform an initial background information review for your project. Also attached is Aylmer District's *SAR Reference Material Memo* intended to introduce and explain the reference guide that is attached. Please refer to Aylmer District's *SAR Screening Process Technical Bulletin* (attached) for information about the process for seeking Endangered Species Act 2007 advice, including the information required and where to submit a request.	No response required. The SAR Reference Guides are already included to be reviewed in the EA in Section 7.6.	No change to the ToR.
	There may be petroleum wells within the proposed project area. Please consult the Ontario Oil, Gas and Salt Resources Library website (www.ogsrlibrary.com) for the best known data on any wells recorded by MNRF. Please reference the 'Definitions and Terminology Guide' listed in the publications on the Library website in order to better understand the well information available. Any oil and gas wells in your project area are regulated by the Oil, Gas and Salt Resource Act, and the supporting regulations and operating standards. If any unanticipated wells are encountered during development of the project, or if the proponent has questions regarding petroleum operations, the proponent should contact the Petroleum Operations Section at 519-873-4634.	The City is in agreement with the reviewer's request to review this in the EA.	A review of petroleum wells within the site study area has been included in the groundwater work plan in Section 7.6 of the draft ToR.
	Some Municipal projects may be subject to the provisions of the Public Lands Act or Lakes and Rivers Improvement Act. Please review the information on MNRF's web pages provided below regarding when an approval is required or not. Please note that many of the authorizations issued under the Lakes and Rivers Improvement Act are administered by the local Conservation Authority. After reviewing the information provided, if you have not identified any of MNRF's interests stated above, there is no need to circulate any subsequent notices to our office.	The City has reviewed the relevant material and the Public Lands Act and Lakes and Rivers Improvement Act do not apply to this proposed EA.	No change to the draft ToR.

8.1.2 Open House #1

The first open house series occurred as follows:

May 24, 2017	May 25, 2017
Horton Street Goodwill Industries (3rd floor) 255 Horton Street (at Wellington), London 2 - 4 p.m. and 5 – 8 p.m.	Lambeth Community Centre 7112 Beattie Street, London 2 - 4 p.m. and 5 – 8 p.m.

The open houses were advertised in the The Londoner newspaper on May 11 and 18, 2017; on the City website between May 11 and 25, 2017; in the London Free Press on May 13 and 20, 2017; on the City's Facebook page and Twitter on multiple dates; on posters at select City facilities; on the City's e-news on May 18, 2017; and on the London Environmental Network website. All material is provided in Volume III Appendix E1.

Letters or emails were sent to the GRT, Indigenous Communities, local businesses that use the existing landfill, neighbours within 2 km of the Waste Management and Resource Recovery Area, community groups, neighbouring regional municipalities and PLC members between May 11 and May 17, 2017 and examples of this correspondence is provided in Volume III Appendices C3 and E2.

This open house provided a general overview of current City of London waste management programs, the EA process, the W12A Landfill site features, assessment of the proposed 'Alternatives To', a description of the preferred 'Alternative To', and how stakeholders can be involved in the EA process.

The purpose of the open house was to inform the public of the project and seek input on the EA Process, the proposed community engagement program, the assessment of 'Alternatives To' residual waste disposal, the preferred "Alternative To", and next steps for the project. A total of 25 display boards (20 related to the EA) were featured at Open House #1. Copies of the information available at the open house, the feedback sheets, FAQs #2, blank sign in sheets, the project website content and photos of the open house are provided in Volume III Appendix E3.

This event was designed to provide opportunities for attendees to speak directly with the City and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations.

Key representatives from the City and their EA consultants in attendance at Open House #1 included:

- Jay Stanford, Director – Environmental Programs, Fleet and Solid Waste, City of London;
- Wesley Abbott, Project Manager – Solid Waste Management, City of London;
- Mike Losee, Division Manager – Solid Waste Management, City of London;
- John Whitworth, Manager – Solid Waste Facilities, City of London;
- Anne Boyd – Manager – Waste Diversion Programs;
- Andre Joseph, Manager – Solid Waste Management;
- Jane Kittmer – Solid Waste Planning Coordinator;
- Jessica Favalaro – Solid Waste Planning Coordinator;
- Trish Edmond, EA Project Manager, Golder Associates Ltd.;
- Paul Smolkin, EA Project Director, Golder Associates Ltd; and
- Paul van der Werf, Waste Planning and Diversion Specialist, 2cg Inc.

A total of 21 and 44 people attended Open House #1 on May 24 and 25, 2017, respectively. The overall atmosphere of the open house was professional, courteous and respectful.

MTCS requested a copy of the open house material after the event (Volume III Appendix E4). Comments were received through completion of the formal feedback sheet from five people. In addition, two email exchanges and a phone call were received where the public provided feedback. The public also provided thoughts on the City's facebook page. Overall, meeting attendees were satisfied with the information presented and provided positive feedback on the quality of the information materials and answers provided. A summary of the formal feedback comments is provided in Table 8.1-2 and a copy of the completed comment sheets, emails, phone record and facebook posts are included in Volume III Appendix E5.

Table 8.1-2: Summary of Comments on Comment Sheets from Open House #1

Comment Received	City of London Response	Status and where addressed in ToR
1. General comments regarding the project: • The landfill expansion is needed to keep London waste in London instead of trucking waste out to other municipalities. • The open house was very informative and detailed. • Blue box is too small. • Concerned about the management of runoff and leachate that flows onto neighbouring property through the Shore Municipal Drain. How will it be engineered? Can the existing stormwater management ponds handle a 1 in 100 year storm? • Believe the expansion is necessary and the land is ready and developed but diversion must be increased.	Noted.	Stormwater management requirements for the expansion will be evaluated during the EA. [ToR Table 7.6-1 under Surface Water]
1. Do you understand the need for the proposed W12A Landfill expansion? 4 of 5 said yes • Need to landfill local and regional wastes at a central location that is properly managed and operated. • Burn the waste. • Needed for years to come and process must be initiated now.	Noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	No further action required. [Described in ToR Section 4.1]

Comment Received	City of London Response	Status and where addressed in ToR
2. Is a solution that will manage Residual Waste (garbage) until 2050 (25 years beyond the current approved capacity of the W12A Landfill) appropriate? 4 of 5 said yes • Too expensive to transport waste outside of London. • Burn it if done correctly. • If it stays a local landfill. • Must be coupled with further recycling.	Noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	No further action required. [Described in ToR Section 4.1]
3. Do you think it is acceptable to allow neighbouring municipalities to use any new waste disposal facilities developed by the City of London? 2 of 5 said yes • Not too many. • There will be increased truck traffic. What is the effect on nearby community of Glanworth? Will make it undesirable to live there due to nuisance effects. Roads will deteriorate and who will pay? • Defeats the purpose of a landfill expansion for the community.	Other neighbouring municipalities could only use the expanded landfill under conditions approved by Municipal Council.	Potential for increase in traffic and nuisance effects will be considered in the EA. [ToR Section 3.3.2, Table 7.6-1]
4. Should there be limits on the amount of Residual Waste that will be accepted at any new waste disposal facility? 3 of 5 said yes • It goes somewhere and don't want to encourage illegal dumping. • Recycling should be optimized so little garbage is left to be landfilled.	Noted.	No further action required. [ToR Section 3.3.2]

Comment Received	City of London Response	Status and where addressed in ToR
5. Should the City commit to increasing the current household waste diversion rate to 60% by 2022 from the current rate of 45%? 5 of 5 said yes • But how? • Make this a priority.	Noted.	No further action required. [ToR Section 3.3.3]
6. Do you have any suggestions, comments or concerns for consideration regarding the proposed expansion of the W12A Landfill? • A landfill is always going to be needed and we would pay more for trucking out of town. • Have more than just a landfill by adding in appropriate complementary businesses. • Look into burning; lesser of two evils. • Make producers (particularly packaging producers) be financially responsible to promote better/less packaging. • The landfill expansion must be coupled with a requirement that diversion be increased, including multi residential buildings. Education will be a key component.	Noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	No further action required. [Described in ToR Section 4.1]
7. Do you have any suggestions, comments or concerns for consideration in the development of the draft Terms of Reference? • Focus on reducing waste not increasing land area to bury it.	Noted. See the City's progress on the Resource Recovery Strategy.	No further action required. [ToR Section 3.3.3]
8. Do you understand how the Environmental Assessment process works? 4 of 5 said yes	Noted.	No further action required.

8.1.3 Open House #2

The second open house series occurred as follows:

November 29, 2017	November 30, 2017
Horton Street Goodwill Industries (3rd floor) 255 Horton Street (at Wellington), London 2 - 4 p.m. and 5 – 8 p.m.	Lambeth Community Centre 7112 Beattie Street, London 2 - 4 p.m. and 5 – 8 p.m.

The Open Houses were advertised in the The Londoner newspaper on November 16 and 23, 2017; on the City's calendar; on the City website; by London.ca public notices November 16 and 23, 2017; in the London's City Green publication; on the City's Facebook page on November 26, 2017; on posters at select City facilities; on the City's e-news on November 13 and 17, 2017; on the London Environmental Network and on the project website. All material is provided in Volume III Appendix F1.

Letters or emails were sent between November 14 – 16 to the GRT, Indigenous Communities, local businesses that use the existing landfill, neighbours within 2 km of the Waste Management and Resource Recovery Area, community groups and PLC members. Individuals who signed up at Open House #1 were sent an email on November 27, 2017. One person was sent a letter on November 27.

At these open house sessions the public learned about the proposed content of the Draft ToR (overall work plan for the project) including existing site conditions, preliminary landfill expansion concepts (known as 'Alternative Methods'), the proposed methodology and technical studies for evaluating and comparing the 'Alternative Methods', and how to be involved in the EA process.

A main focus of the open house was to inform the public and seek input on the preliminary conceptual 'Alternative Methods' for landfill expansion and the criteria to be used to comparatively evaluate the 'Alternative Methods'. A total of 38 (19 related to EA) display boards were featured at Open House #2. Copies of the information available at the open house, the feedback sheets, FAQs #3, blank sign in sheets, the project website content and photos of the open house are included in Volume III Appendix F3.

This event was designed to provide opportunities for attendees to speak directly with the City and the EA consulting team. Attendees were asked to sign in and were encouraged to fill out a comment sheet to provide feedback and recommendations.

Key representatives from the City and their EA consultants in attendance at Open House #2 included:

- Jay Stanford, Director – Environmental Programs, Fleet and Solid Waste, City of London;
- Wesley Abbott, Project Manager – Solid Waste Management, City of London;
- Mike Losee, Division Manager – Solid Waste Management, City of London;
- Jane Kittmer – Solid Waste Planning Coordinator;
- Jessica Favalaro – Solid Waste Planning Coordinator
- Trish Edmond, EA Project Manager, Golder Associates Ltd.;
- Paul Smolkin, EA Project Director, Golder Associates Ltd; and
- Paul van der Werf, Waste Planning and Diversion Specialist, 2cg Inc.

A total of 34 and 43 people attended Open House #2 on November 29 and 30, 2017, respectively. The overall atmosphere of the open house was professional, courteous and respectful.

MTCS requested a copy of the Open House material after the event (Volume III Appendix F4). Comments were received through completion of the formal feedback sheet from 34 people. In addition, one email exchange was received where the public provided feedback. Overall, meeting attendees were satisfied with the information presented and provided positive feedback on the quality of the information materials and answers provided. A summary of the formal feedback comments is provided in Table 8.1-3 and Table 8.1-4 and copies of the completed comment sheet portions related to the ToR and email are provided in Volume III Appendix F5. The formal feedback sheet asked if participants understood the preliminary alternative Design Concepts presented at the open house and all respondents to the question (31) said yes.

Table 8.1-3: Summary of Comments on Comment Sheets from Open House #2

Comment Received	City of London Response	Status and where addressed in ToR
Stop collecting wood furniture as garbage, provide free garbage tags with calendar	Comment noted. No response required.	Will be considered during development of Resource Recovery Strategy.
Suggest asking for maximum capacity	Comment noted. No response required.	No further action required.
Prefer Design Concept 3, individuals should get more involved with their own garbage	Comment noted. No response required.	No further action required.
Inquiring about berms or screening with increased height, reduction methods for odour control, impact on neighbouring cemetery property, would like to see cross sections of all design concepts, show human scale, visual impact across the street	Comments noted. No response required.	Mitigation measures for visual and odour will be considered in the EA as and where required [ToR Table 7.6-1]. It is anticipated that cross-sections will be prepared through the 'Alternative Methods' that are developed during the EA phase for comparative evaluation. [ToR Section 5.0].
Prefer Design Concept 3 1C, plant a 5:1 ratio for every tree removed, allow other municipalities to use landfill as long as they follow the standards, recommended resource recovery strategies include clear bags, textile recovery, organic diversion and food waste education	Comments noted. No response required.	No further action required. [ToR Section 3.3.2].

Comment Received	City of London Response	Status and where addressed in ToR
Green bins recommended with incentives and enforcement before building a mixed waste processing plant, strongly support thermal conversion of waste incineration	Comments noted. Preliminary review as part of the Resource Recovery Strategy determined that EFW alternative is not viable for the City of London (e.g., high cost, requires large amounts of combustible material, still need landfill expansion).	Will be considered during development of Resource Recovery Strategy. [Thermal technologies discussed in ToR Section 4.1].
Prefer landfill to expand vertically (go up) than horizontally (go sideways) in the future, encourage community to get involved with their waste, alternative collection methods- private contractors or homeowners	Comments noted. No response required.	No further action required. [ToR Section 5.0].
Learn from other cities and countries for RRS (ban plastic bags, zero waste stores, packaging bans, more bulk facilities), restaurant food wastes go to homeless, more recyclable products, ban straws, disposable napkins etc. Public should be more informed about recycling rules and composting options	Comments noted. No response required.	Will be considered during development of Resource Recovery Strategy.
Concerned about the impact of high winds on landfill, impact on wildlife habitat	Comments noted. No response required.	Potential impacts to air quality and biology will be studied during the EA. [ToR Table 7.6-1].

Comment Received	City of London Response	Status and where addressed in ToR
Inquiring about the application of gas purifying when more LFG generated, allow ALL plastics and metals to be recovered, only allow containers and no bags at curb	Comments noted. No response required.	No further action required. [Regarding possible use of LFG, ToR Section 3.3.4].
Landfilling is strongly not recommended, prefer recycling and garbage processing factories to save environment and create jobs, enforcement is suggested	Comments noted. No response required.	No further action required.
Inquiring about the pros & cons of each concept, more open house events, good location and times	Comments noted. No response required.	No further action required. [ToR Section 7.5.4].
Inquiring about the pros & cons of each concept, requesting more information at future open houses to be presented about Resource Recovery Strategy	Comments noted. No response required.	The conceptual 'Alternative Methods' will be refined during the EA [ToR Section 7.5.4]; the Resource Recovery Strategy will be finalized and more information will be provided in subsequent Open Houses.
Encouraging creativity when implementing the Resource Recovery Strategy to create jobs become a leader in waste recovery	Comments noted. No response required.	Will be considered during development of Resource Recovery Strategy.
Prefer user pay to work in conjunction with a reduced container limit, clear bags, and incentives to encourage waste reduction	Comments noted. No response required.	Will be considered during development of Resource Recovery Strategy.

Comment Received	City of London Response	Status and where addressed in ToR
Include cost information on waste diversion programs from other municipalities	Comments noted. Cost information from other municipalities will be included in Resource Recovery Strategy.	No further action required.
Prefer Design Concept 3, prefer to not expand service area, prefer green bins program with bi-weekly pickup for regular waste	Comments noted. No response required.	No further action required.
Prefer Design Concept 1, traffic study should include Wonderland Rd from Wharncliffe Rd S. The use of landfill from other municipalities should be strictly limited	Comments noted. No response required.	Haul Route study area as defined at Open House #2 did not include Wonderland Road. Haul Route study area for the EA modified as a result of this comment and verbal comments received at the open house. [ToR Section 7.2].
Add a tree line around perimeter to capture windblowns, reduce wind speed over landfill, added a complaint that there was no tax reduction from using plastic bags to paper bags for leaves	Comments noted. No response required.	Potential nuisance effects will be studied during the EA. [ToR Table 7.6-1].
Inquiring about the coverage of farm loss revenue from land expansion in Design Concepts 1B and 1C	Comments noted. No response required.	Potential agricultural and socio-economic impacts will be

Comment Received	City of London Response	Status and where addressed in ToR
		evaluated during the EA. [ToR Table 7.6-1].
Too many garbage trucks on Wonderland Rd S - need more lanes and upgrades to road, requesting municipal water	Comments noted. No response required.	Haul route study area as defined at Open House #2 did not include Wonderland Road. Haul route study area for the EA modified as a result of this comment and verbal comments received at the open house. [ToR Section 7.2].
Prefer Design Concept 1C, suggest waste collection on one side of the road only to reduce air pollution	Comments noted. No response required.	No further action required.
Concern about the increased odour level as landfill height raised, inquiring if sludge from Greenway Wastewater Treatment Plant is still taken to landfill	Comments noted. No response required.	Potential air quality impacts will be evaluated during the EA. [ToR Table 7.6-1].
Prefer Design Concept 1, but leave 2 & 3 for distant future	Comments noted. No response required.	No further action required.
No green bins as it is too expensive for taxpayers, expand landfill as required	Comments noted. No response required.	No further action required.
Not in favour of expanding the landfill so high – concerned about odour carrying farther. Opposed to expanding service area	Comments noted. No response required.	Potential air quality impacts will be evaluated during the EA. [ToR Table 7.6-1].

Table 8.1-4 summarizes the ranking of individual environmental components based on the submission of comment sheets and engagement during Open House #2 (see Volume III Appendix F5). A simple ranking of the environmental components based on the feedback received was completed where three points were awarded for each person who ranked an environmental component “more important”, two points for each person who ranked an environmental component “important” and one point for each person who ranked an environmental component “less important”.

Table 8.1-4: Ranking of Environmental Components

Environmental Component	Environmental Sub-component	More Important	Important	Less Important	Ranking Order
Atmosphere	Air quality (including dust, odour and GHG)	23	9	0	3
	Noise	5	16	11	15
Geology and Hydrogeology	Groundwater quality	29	3	0	1
Surface Water	Surface water quality	22	10	0	5
	Surface water quantity	15	12	5	7
Biology	Aquatic ecosystems	24	8	0	2
	Terrestrial ecosystems	23	9	0	3
Land Use	Current and planned future land uses	11	17	3	9
Agriculture	Agriculture	10	20	2	10
Archaeology	Archaeology	5	12	15	16
Culture	Cultural heritage landscapes	2	12	18	18
	Cultural heritage resources (including built heritage)	3	14	15	17
Socio-economic	Local economic	11	17	2	8
	Residents and community	18	13	1	6
Visual	Visual	9	10	13	14
Transportation	Traffic	8	15	9	13
Design and Operations	Technical considerations	13	12	7	11
	Financial considerations	12	11	9	12

Based on the input received, groundwater quality, aquatic ecosystems and terrestrial ecosystems were the environmental components identified as most important, while cultural heritage landscapes, cultural heritage resources and archaeology were ranked least important.

8.1.4 Other Engagement

During this ToR various public and City committees and groups have been advised of on-going activities and their opinions solicited as and when appropriate. As already mentioned in Section 8.1, a new Waste Management CLC was struck for this project. The invitation to join this committee, distribution list, terms of reference, and meeting agendas and summaries are provided in Volume III Appendix G4.

The City Advisory Committee on the Environment (ACE), the Agricultural Advisory Committee (AAC), the Environmental and Ecological Planning Advisory Committee (EEPAC) and W12A Landfill PLC are all regular City committees and groups who have been advised of the status of this project. Details of meetings where the ToR has been discussed are provided in Volume III Appendices G1, G2, G3 and G5 for the ACE, AAC, EEPAC and PLC, respectively.

The WMWG is a new working group of Municipal Council consisting of six councillors and the Mayor with the purpose of monitoring and advising on activities related to the Resource Recovery Strategy and Residual Waste Disposal Strategy and EA. This is intended to provide a more effective and focused structure for members of the Civic Works Committee and Municipal Council to review, provide input and approve the necessary actions for the successful development and implementation of both Strategies. The WMWG list of reports, meeting agendas and meeting minutes are provided in Volume III Appendix G6.

Note that additional details on these groups and committees is provided in the City's Community Engagement Program document in Volume III Appendix A.

During this ToR the City also provided information, advertised and consulted during community events such as Gathering on the Green, Sesquifest, Sunfest, Our City e-news letter, etc. Copies of the various information and feedback are provided in Volume III Appendix G7.

8.1.5 Other Comments

Outside the engagement events, some comments have been received by City throughout the development of the ToR. These comments were received either through the project website commenting feature or by direct email to the project team and summarized in Table 8.1-5.

Table 8.1-5: Other Comments

Commenter	Date Received	Comment Received	City of London Response	Status	Location in ToR
Comments from getinvolved.london.ca What do you think?	March 30, 2017 to September 22, 2017	13 individuals provided written comments. • Support organics program 54% • More focus on public space waste diversion 18% • Improve waste collection 62% • Support waste reduction by manufacturers 15% • Pro alternative waste reduction 23% • More focus on multi-res and business recycling 15%	Comments noted. No response required.	No further action required.	Volume III Appendix D6
Comments from getinvolved.london.ca Comments on Draft Guiding Principles	March 30, 2017 to September 22, 2017	6 individuals provided written comments. • Support green bin 17% • Focus on Resource Recovery 33% • More focus on multi-res recycling 17% • Support waste reduction by manufacturers 17% • Unrelated 83%	Comments noted. No response required.	No further action required.	Volume III Appendix D6

Commenter	Date Received	Comment Received	City of London Response	Status	Location in ToR
Comments from getinvolved.london.ca What do you think?	September 22, 2017 to January 18, 2018	8 individuals provided written comments. • Support organics program 50% • Improve waste collection 38% • Lower container limit 25% • Improve recycling program 50% • Pro alternative waste reduction 13% • Against green bin 13%	Comments noted. No response required.	No further action required.	N/A
Facebook comments	From November 26, 2017 post	21 individual comments received • Support green bin 33% • Improve waste collection 24% • Against green bin 14% • Comments about Open House 9% • Support alternative waste disposal 9% • Waste diversion is producer's responsibility 9%	Comments noted. No response required.	No further action required.	Volume III Appendix F5
Comments from getinvolved.london.ca Virtual Open House	December 14, 2017 to January 15, 2018	2 individuals provided comments • Support landfill closure, build new landfill in the north end of city • Support alternate technology (landfill reclamation)	Comments noted. No response required.	No further action required.	N/A

Commenter	Date Received	Comment Received	City of London Response	Status	Location in ToR
Facebook comments	From December 22, 2017 post	6 individual comments received • Support organics diversion 17% • Unrelated 83%	Comments noted. No response required.	No further action required.	Volume III Appendix F5
Aerobic Landfill Technologies Inc.	January 14, 2018	Aerobic Landfill Technologies Inc. is a company that specializes in aerobic degradation of waste to reclaim landfill space and mitigate the long term risks of waste management activities. Our process could be used to reclaim the old landfill site safely and in an environmentally friendly manner to be reused as new landfill space without any need for landfill expansion. Our technology and technologies like it can also be used at the new site to create a mixed waste processing and reuse system that negates the need for any long term storage and therefore no actual landfill to be replaced at the site.	The City discussed with Aerobic Landfill Technologies Inc. this opportunity. This technology has not yet been used in Ontario and further research is require before this technology can be considered “proven”.	No further action required.	Volume III Appendix F5

8.1.6 Draft Proposed Terms of Reference

An initial draft of the Proposed ToR was shared with the MOECC for a high level review in January 2018. Comments and questions were provided by the Environmental Assessment and Permissions Branch (EA, noise and wastewater) and the Southwest Region (planner/EA coordinator, air quality, groundwater and surface water). These comments and questions are provided in disposition tables in Volume III Appendix H1 along with responses from the City and how the comments were included in the updated draft Proposed ToR. In general, the comments received focused on meeting the requirements of the Code of Practice for preparing ToR (MOECC, 2014a), better outlining the project need particularly as it relates to provincial waste policies and better describing the study area and studies to be completed in the EA. A conference call occurred with the EA Branch and the City on March 22, 2018 to review specific comments. The summary of this call is provided in Volume III Appendix H1.

8.1.7 Consultation with Indigenous Communities during the ToR Phase

A list of potentially affected Indigenous Communities was developed in consultation with the MOECC during the development of this ToR (see Volume III Appendix C1). A program to engage and consult with Indigenous Communities was carried out considering their specific needs and specific issues. The Indigenous Communities were consulted on how they would like to be involved in the EA process.

The following Indigenous Communities and groups were contacted as part of the distribution of the NOC:

- Aamjiwnaang First Nation;
- Bkejwanong Territory (Walpole Island);
- Caldwell First Nation;
- Chippewas of the Thames First Nation (COTTFN);
- Oneida Nation of Thames;
- Delaware Nation (Moravian of the Thames);
- Munsee-Delaware Nation; and
- Southern First Nations Secretariat.

Communication tools available to Indigenous Communities include meetings or presentations for individual Indigenous Communities, smaller discussion groups with interested persons/groups by phone and/or in-person on specific topics, site tours, copies of information and email correspondence.

Each of the communities identified were sent a NOC, notices of open houses, and invitations to participate in the EA and discussions about potential benefits and effects of the project on Indigenous Community interests (see Volume III Appendices C2, C3 and C5). City staff were available to meet with interested Indigenous Communities and discuss the proposed project at any time during the development of the ToR.

To date, only the COTTFN have requested additional information and/or meetings with the City.

8.1.7.1 Chippewas of the Thames First Nation

On September 7, 2017 the City of London met with the COTTFN to discuss the Residual Waste Disposal Strategy and EA and the Resource Recovery Strategy. The current status of each strategy was discussed and the next steps provided. The information discussed is provided in a summary in Volume III Appendix C4.

On February 11, 2018 the City of London met with the COTTFN a second time to provide more up to date details on the Residual Waste Disposal Strategy and EA and the Resource Recovery Strategy. Areas of particular interest to the COTTFN included protection of groundwater, migration of methane gas, the archaeology study and planting of native vegetation and areas that will be disturbed. There were five follow up actions as a result of this meeting as follows:

1. The City (Environmental & Engineering Services - EES) is to provide a link to the annual report for the W12A Landfill (http://www.london.ca/residents/Garbage-Recycling/Garbage/Pages/W12A-Landfill-Site.aspx).
2. The City (EES) will follow-up with Golder Associates about using COTTFN staff to assist with field work required for the archaeology study. The field work is likely to take place in fall 2018.
3. The City (EES) will organize a tour of various City facilities including the MRF, W12A Landfill and possibly some other City locations such as Greenway Wastewater Treatment Plant, etc. for COTTFN staff and members of the Antler River Guardians of the Four Directions. The tour is expected to take place in July 2018.
4. The City (EES) should investigate using native trees and grasses when doing plantings at the landfill. Rochelle Smith can be provide further guidance on this matter including project examples if more details are necessary.
5. The City (EES) will make sure that staff in Community and Economic Innovation (Government and External Relations) are aware of the training and awareness opportunities provided by COTTFN for Treaties and Culture.

8.2 Proposed Consultation Plan for EA

Following approval of this ToR and during preparation of the EA, a consultation program will be continued to engage the public, businesses, the GRT, Indigenous Communities, as well the various groups and committees interested during the EA process. Input will be obtained through a number of engagement activities, as proposed below. In addition to the engagement activities described below, consultation specific to individual Indigenous Communities will also be carried out. These additional activities are described in Section 8.3. The results of the engagement program conducted by the City during preparation of the EA will be presented in the EA Report.

The proposed consultation activities for the EA studies are as follows:

- **Open House #3** will present the approved ToR, describe the EA process, inform the public about each of the 'Alternative Methods' for landfill expansion being considered, the criteria for the comparative evaluation of those landfill expansion alternatives and the results of the comparison, and invite participation and comment regarding the 'Alternative Methods' and comparison;
- **Open House #4** will present the proposed EA and inform the public about the identification of the preferred alternative for landfill expansion, as well as inform them of the results of the existing conditions studies and the predicted effects of the preferred alternative, and the commitments London is making to mitigate any adverse effects;
- **Project Website** to inform the public on the EA process, public engagement activities and to solicit comments from the public;
- **Letters and emails** to the GRT members, Indigenous Communities and interested parties to provide information and invite feedback;
- **Group and Committee meetings** to discuss the EA project and provide feedback as applicable; and
- **Circulation of Draft EA** for public comment prior to finalization and submission to the MOECC. There will be a seven week review period provided for the draft EA.

There are a number of key decision-making milestone points when consultation will occur during preparation of the EA. The main milestone is reviewing the developed 'Alternative Methods', the evaluation criteria and indicators to be applied to 'Alternative Methods' and reviewing the recommended 'Alternative Method' identified through the comparative evaluation process at Open House #3. In addition the presentation of the proposed EA at Open House #4 is another key decision-making milestone.

During the EA there may be issues raised or disputes during preparation of the EA that may be difficult to resolve. The City will attempt to resolve all issues or disputes to reach a resolution that is amenable, recognizing that interests of multiple stakeholders and/or regulations may sometimes dictate a resolution that may not be desirable to all parties. In the event that a mutually agreeable resolution is not achieved, the matter will be referred to the MOECC for guidance.

8.3 Proposed Indigenous Community Engagement Program for EA

It is recognized that Indigenous Communities have specific interests and rights with regard to consultation on projects that might potentially affect them. The consultation with Indigenous Communities will provide insight into the potential effects on Indigenous Communities, including the potential effects on use of lands for traditional purposes. It is also recognized that Indigenous Communities may have specific and differing needs with regard to how they would like to be consulted. To address these interests, the City will continue to inform Indigenous Communities about the proposed project and invite their participation in the EA process.

The City will continue to meet with interested Indigenous Communities and discuss the proposed project at any time during the EA study process.

9.0 Other Regulatory Approvals

In addition to EA approval, the W12A Landfill expansion will require approval under the EPA and the *Ontario Water Resources Act* (OWRA). The City proposes to seek EA approval prior to proceeding with the EPA approval process. The following sections provide an overview of the approvals that may be required in addition to the EA approval process. The approvals required will be dependent on the preferred 'Alternative Method' of expansion and will be described in the EA Report. It is noted that the following list of other regulatory approvals may be refined as the EA study progresses, and the final description of other regulatory approvals will be described in the EA study report.

9.1 Environmental Protection Act

The EPA, Section 27 stipulates that *"…no person shall use, operate, establish, alter, enlarge or extend a waste management system or a waste disposal site except under and in accordance with an environmental compliance approval [ECA]*." The application for the waste ECA under Part 5 of the EPA must be supported by a detailed report that complies with *O. Reg. 232/98* Landfilling Sites and describes the proposed design and operations of the W12A Landfill site.

Additionally, the site will require an air and noise ECA as per Part 9 of the EPA.

9.2 Ontario Water Resources Act

The OWRA, Section 53 states *"…no person shall use, operate, establish, alter, extend or replace new or existing sewage works except under and in accordance with an environmental compliance approval."*. Sewage works in this context refer to collecting, transmitting, treating and/or disposing of stormwater. An ECA amendment from the MOECC for 'sewage works' is expected to be required for stormwater works associated with the expanded landfill.
The application must be supported by a document assessing potential impacts to the environment and relevant environmental standards that must be met.

9.3 Planning Act

Ontario *Planning Act* applications are separate from the EA, but may share impact assessment studies and other common elements. An Official Plan amendment is not anticipated, at this time, to be required. A Zoning By-law amendment will be required for an expansion that extends beyond the current landfill site property limits.

9.4 Conservation Authority Approvals

Conservation Authorities are responsible for issuing permits for any construction in, or alteration of, watercourses under *O. Reg. 163/06*.

The site is located within the jurisdiction of both the UTRCA and the KCCA. If required for the purposes of implementing the preferred alternative, Conservation Authority approval will be obtained.

9.5 Federal Approvals

At this time, it is not expected that any federal approvals will be required as described in Table 8.1-1.

10.0 EA Schedule

A draft proposed ToR was made available to the MOECC, Indigenous Communities, GRT, stakeholder committees and the public in late April 2018. A series of open houses about the proposed ToR were conducted on November 29 and 30, 2017.

The submission of this ToR to the Minister occurred in XXXX after comments received on the draft proposed ToR were incorporated.

EA timelines are dependent on the Minister's decision about this ToR and the EA cannot proceed without an approved ToR. A decision about the approval of this ToR is anticipated in late 2018/early 2019. The EA is expected to be completed and the application documents submitted in mid-2020.

It is assumed that the EA application documents in final form will be reviewed by the GRT members, Indigenous Communities, stakeholder committees and the public. It is proposed that any supplementary evaluations, responses and/or clarifications required by this review process will be documented by addendum to the EA or other appropriate method.

As previously mentioned, the proposed project will also require approvals for the W12A Landfill expansion under the EPA and the OWRA. Monitoring requirements for the proposed project will be developed as part of EPA or OWRA approvals processes. The City is proposing to submit applications for EPA/OWRA approval and supporting documents following receipt of EA approval.

11.0 Commitments and Monitoring Strategy

The EA Report will include a comprehensive list of commitments made by the City of London during the development of this ToR.

11.1 Commitments

A list of commitments made during the development of this ToR and during consultation is contained in Table 11.1-1.

Table 11.1-1: List of Commitments

ID	Commitment
1	The City has committed to a target of 60% residential waste diversion by 2022.
2	When requested, the City of London will meet with individuals or groups at their convenience to assist them with understanding the project information and providing input, for example, if they are unable to participate in planned public consultation events or require more information.

The EA Report will also include a comprehensive list of commitments made by the City during the preparation of the EA studies and during consultation throughout the EA process. These commitments include, but are not limited to, the following:

- All commitments relating to impact management measures (such as mitigation measures);
- Additional works and studies to be carried out;
- Monitoring;
- Public consultation;
- Contingency planning; and
- Documentation and correspondence.

11.2 Compliance and Effects Monitoring

Mitigation measures are designed to avoid or reduce potential adverse effects from the undertaking.

The City of London commits to developing a monitoring framework during the preparation of the EA. The monitoring framework will consider all phases of the proposed undertaking. The monitoring will include:

- Compliance monitoring; and
- Effects monitoring.

A description of the proposed effects monitoring programs for the expanded landfill will be prepared. It is anticipated that the detailed effects monitoring requirements for the project will ultimately be determined through the conditions of EPA/OWRA approval. Compliance monitoring is an assessment of whether an undertaking has been constructed, implemented and/or operated in accordance with the commitments made during the preparation of the EA and the conditions of the EAA. Compliance monitoring and contingency measures will be designed to detect and immediately respond to potential problems and unanticipated effects. Effects monitoring will involve activities designed to determine and verify the anticipated effects of the undertaking.

12.0 References

Aquafor Beech Limited, Beak Consultants Limited, Development Engineering Limited, Geomatics International Inc., The Lura Group, Henricks and Associates and Upper Thames River Conservation Authority. (1995). Dingman Creek Subwatershed Study Phases II to V. A report prepared for the City of London.

Archaeologix Inc. (2006). Archaeological and Built Heritage Assessment (Stage 1) W12A Landfill Area Study, City of London.

The City of London. (2016). The London Plan. https://www.thelondonplan.ca/digital-copy.

The City of London. (2013). The Road to Increased Resource Recovery and Zero Waste (Road Map 2.0)

The City of London. (1989). City of London Official Plan.

Corporations Supporting Recycling (CSR). (2003). The Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow.

Delcan. (2005). Dingman Creek Subwatershed Study Update. Prepared by Delcan Corporation with contributions from Stantec Consulting Limited and Cummings Cockburn Limited. Available at: https://www.london.ca/city-hall/master-plans-reports/reports/Documents/Dingman-Creek-Subwatershed-Study-Update%20Volume%201%20Main%20Report.pdf.

Dillon Consulting. (2005). City of London W12A Landfill Area Plan Study Surface Water Background Study.

Dillon Consulting. (2012). Hydraulic Evaluation of Landfill Performance (HELP) Modeling for the City of London.

Earth Tech Canada Inc. (2005). W12A Landfill Area Plan Study – Ecological Background Study and Natural Heritage Study.

Earth Tech Canada Inc. (2002). Stormwater Management Master Plan W12A Landfill Area Plan Study City of London.

Golder Associates Ltd. (2016a). Stage 2 Archaeological Assessment, 3137 Scotland Drive, Part of Lot 16, Concession 6, Former Geographic Township of Westminster, now City of London, Middlesex County, Ontario. Revised report on file with the Ministry of Tourism, Culture, and Sport. Toronto, Ontario.

Golder Associates Ltd. (2016b). Stage 1-2 Archaeological Assessment, 3243 Manning Drive, Part of Lots 16 and 17, Concession 7, Former Geographic Township of Westminster, now City of London, Middlesex County, Ontario. Revised report on file with the Ministry of Tourism, Culture, and Sport. Toronto, Ontario.

Government of Canada. (2012). *Canadian Environmental Assessment Act.* S.C. 2012, c. 19, s. 52.

Government of Ontario (Ontario). (2017a). *Environmental Protection Act,* R.S.O. 1990, Chapter E.19. Last amended November 2017.

Government of Ontario (Ontario). (2017b). *Ontario Water Resources Act,* R.S.O. 1990, Chapter O.40. Last amended December 2017.

Government of Ontario (Ontario). (2017c). Strategy for a Waste-Free Ontario: Building the Circular Economy.

Government of Ontario (Ontario). (2016). *Waste-Free Ontario Act*, R.S.O. 2016, Chapter O.12.

Government of Ontario (Ontario). (2010). *Environmental Assessment Act,* R.S.O. 1990, Chapter E.18. Last amended October 2010.

Government of Ontario (Ontario). (2007). *Ontario Regulation 101/07: Waste Management Projects. Environmental Assessment Act*.

Government of Ontario (Ontario). (2005). *Ontario Regulation 419/05: Air Pollution – Local Air Quality. Environmental Protection Act*.

Government of Ontario (Ontario). (2008). *Ontario Regulation 216/08: Landfilling Sites. Environmental Protection Act.*

Government of Ontario (Ontario). (1998). *Ontario Regulation 232/98. Landfilling Sites*. Last Updated: October 2011. *Environmental Protection Act*.

Hagerty, T.P. and Kingston, M.S. (1992). Resources Management Branch, Ontario Ministry of Agriculture and Food, Guelph. The Soils of Middlesex County (Volume 1 & 2) - Report No. 56 of the Ontario Centre for Soil Resource Evaluation.

IBI Group. (2008). W12A Landfill Area Plan (for the City of London).

MacLaren Limited. (1970). Report on Solid Waste Disposal for the City of London.

Middlesex County. (2014). Middlesex Natural Heritage Systems Study: A study to identify natural heritage systems in Middlesex County. Project management by Upper Thames River Conservation Authority in cooperation with Middlesex County Conservation Authorities. Available at: http://thamesriver.on.ca/watershed-health/natural-heritage-studies/middlesex-natural-heritage-systems-study-2014/.

Ministry of the Environment (MOE). (1994). Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities. Guideline B-7 (formerly Policy 15-08):

MOE Program Development Branch: Ontario Ministry of the Environment and Energy, April 1994, 8 p.

Ministry of the Environment and Climate Change (MOECC). (2017). Considering climate change in the environmental assessment process. October 2017.

Ministry of the Environment and Climate Change (MOECC). (2014a). Ontario MOECC Code of Practice for Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario. January 2014.

Ministry of the Environment and Climate Change (MOECC). (2014b) Consultation in Ontario's Environmental Assessment Process. 2014.ew Directions Archaeology Ltd. (2015). Stage 1 Archeological Assessment of Wonderland Road, City of London, Project # P018-465-2013.

North-South Environmental Inc. (2009). Inventory and Evaluation of Woodlands: City of London. Available at: https://www.london.ca/business/Resources/Guideline-Documents/Documents/reference-docs/Inventory-Evaluation-of-Woodlands-August-2009.pdf.

UTRCA. (2012). Dingman Creek Watershed Report Card. Available at: http://thamesriver.on.ca/wp-content/uploads//WatershedReportCards/RC_Dingman.pdf.

Wilcox, Betsy. (2005). Dodd Creek Community Based Watershed Strategy.

United States Environmental Protection Agency (EPA). (2016). Waste Reduction Model (WARM). Version 14.