

**Warwick Landfill Expansion
Environmental Assessment
Terms of Reference**

Submitted By:
Canadian Waste Services Inc.

October, 1999



October 14, 1999

Mr. David Smith
Environmental Assessment and Approvals Branch
Ministry of the Environment
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Dear Mr. Smith:

Re: Amended Terms of Reference, Warwick Landfill Expansion, Canadian Waste Services Inc.

Canadian Waste Services (CWS) is pleased to submit this amended Terms of Reference (ToR), for the Warwick Landfill Expansion for review and approval.

The ToR submitted in August 1999 has been amended as a result of the comments received from the Ministry of the Environment (MOE), local municipalities, the public, and review agencies. Explanations for these amendments are provided below.

In order to make it clear that issues of expansion, capacities, landfill footprints, heights and buffers would be studied during the Environmental Assessment ("EA"), the ToR was amended by:

- omitting the last four words in the fourth paragraph - page 1;
- adding references to buffers in the first paragraph - page 4;
- adding the word "further" to the second bullet point in section 2 - page 5;
- modifying the first paragraph under the heading "Alternatives to be Evaluated" - page 6;
- adding a third paragraph to the heading - page 6;
- modifying the description of the "west alternative" - page 6;
- modifying Figure 3 - Landfill Footprint Alternatives;
- changing first paragraph - page 8;
- including new information under "end use alternatives" - page 10.

To remove any doubt concerning the breadth of the diversion and recycling activities which CWS proposes to carry out, the last two paragraphs of page 11 above the heading "Public Consultation" have been modified. In the same regard, changes to item 4 in Table A1 of Appendix A and Table B6 in Appendix B were made.

The ToR now broadens the scope of public consultation to be undertaken during the development of the EA. Those changes are represented on page 11 of the ToR as well as by additions to the first paragraph on page 12.

As a point of clarification, the ToR now indicates in Appendix B that reference to the Township of Warwick includes the former Village of Watford.

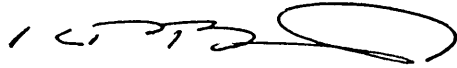
The MTO concerns are addressed in B4 of Appendix B with the inclusion of reference to the "Haul Routes" and the interchange with Highway 402.

Two further changes were made: the fourth full paragraph on page 4 was removed as was the last paragraph under the heading "Introduction" on page 5.

We have sent a copy of this letter and the amended ToR to all interested stakeholders. We invite them to make further submissions to the MOE within two weeks of receipt of this letter and the amended ToR to your office.

Thank you for your assistance in this matter. Please contact the undersigned regarding any questions or clarifications regarding the submission.

Yours truly,
CANADIAN WASTE SERVICES INC.

A handwritten signature in black ink, appearing to read 'K. Bechard', with a large, stylized flourish at the end.

Kevin Bechard
Divisional Vice President
Facility Development

Table of Contents

Letter of Transmittal

	Page
1. Introduction.....	1
2. The Contents of the Environmental Assessment Document.....	5
3. Alternatives to be Evaluated.....	6
3.1 Landfill “Footprint” Area Alternatives.....	6
3.2 Access Route Alternatives.....	8
3.3 Leachate Treatment Methods.....	8
3.4 End Use Alternatives.....	10
4. Environmental Assessment Methodology.....	10
4.1 Evaluation of Alternative Methods.....	10
4.2 Overall Assessment of the Undertaking.....	11
5. Public Consultation.....	11
6. Agency Consultation.....	13

List of Figures

Figure 1. Site Location.....	2
Figure 2. Site Plan.....	3
Figure 3. Expansion Alternatives.....	7
Figure 4. Access Route Alternatives.....	9

Appendices

- A. Evaluation Criteria
- B. Study Areas and Methods

Accompanying Background Reports (Separately Bound)

(For Information Only - Not for Approval)

- Background Doc. 1:** Description of Canadian Waste Services Inc.
- Background Doc. 2:** Description and History of the Existing Warwick Landfill Site
- Background Doc. 3:** CWS Reasons for the Environmental Assessment Application
- Background Doc. 4:** Description of the Environment Potentially Affected
- Background Doc. 5:** Rationale for Limiting the Consideration of “Alternatives To”
- Background Doc. 6:** Rationale for the “Alternative Methods” to be Evaluated in the Environmental Assessment
- Background Doc. 7:** EA Planning Framework
- Background Doc. 8:** Public Consultation
- Background Doc. 9:** Agency Consultation
- Background Doc. 10:** CWS Community Commitments Agreement
- Background Doc. 11:** Index to Substantive Amendments and Additions in the Terms of Reference
- Background Doc. 12:** Warwick Landfill 1997/98 Annual Monitoring Report

1. Introduction

Canadian Waste Services Inc. (CWS) is an integrated solid non-hazardous waste management company that has grown over the last three years to become an industry leader in Canada (see Background Document #1). To realize the company's full potential, CWS must ensure sufficient systems capacity to continue and grow its business, including the need for additional capability for the disposal of solid, non-hazardous waste (see Background Document #3). The Warwick Landfill has been identified by the company as the candidate for expansion to receive wastes from primarily central and western Ontario.

The planning for major waste management projects in Ontario requires approval under the Environmental Assessment Act (EA Act)¹. At the request of CWS, the province has designated the lands proposed for the Warwick Landfill Expansion as an "undertaking" to which the EA Act will apply. The stated purpose of this proposed Environmental Assessment (EA) is:

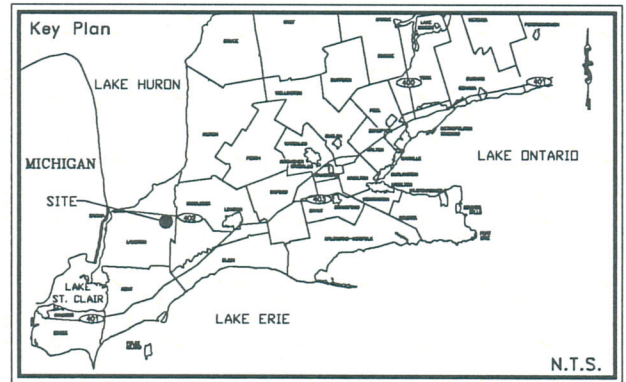
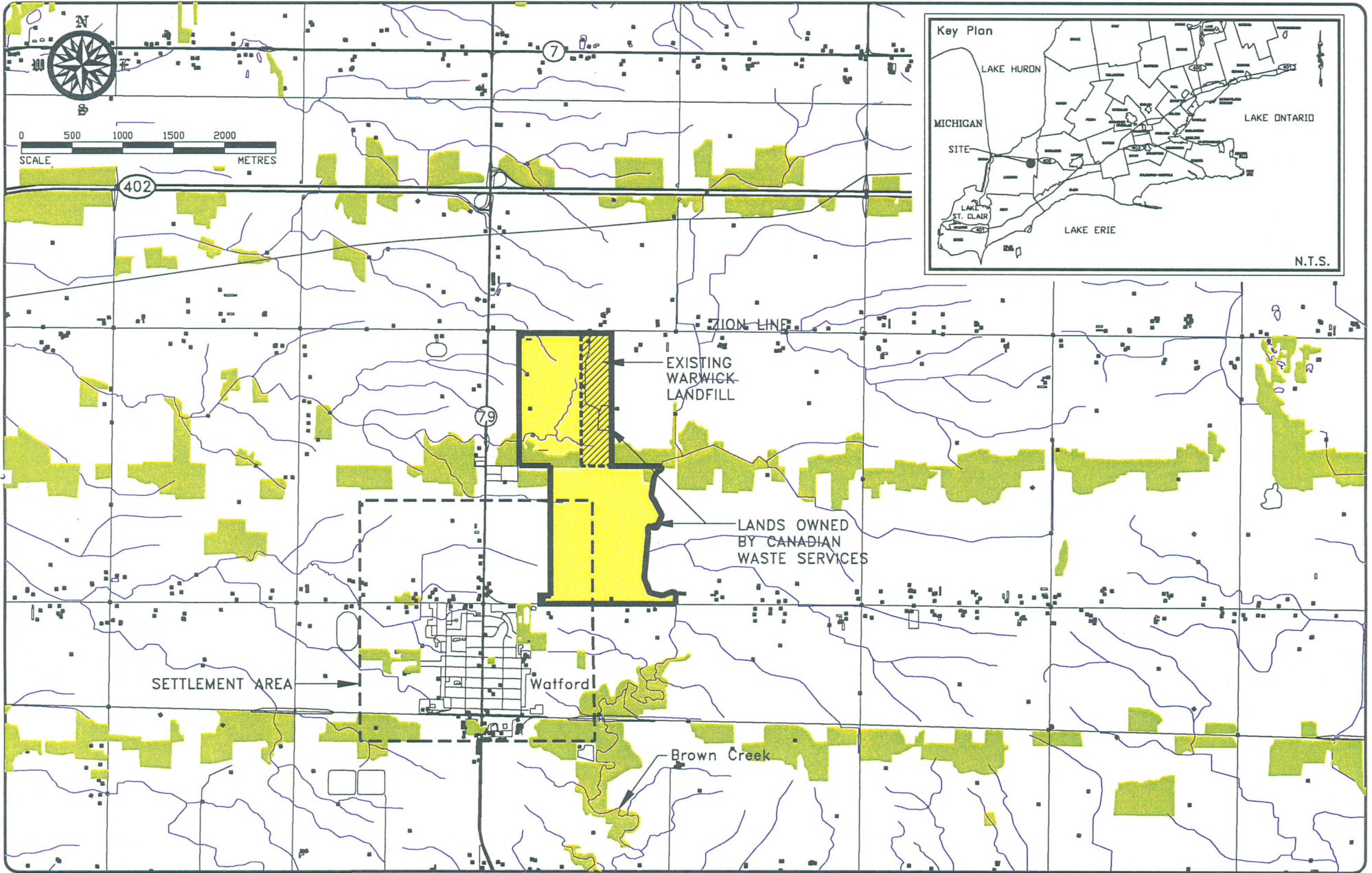
To provide a maximum of 750,000 annual tonnes of additional disposal capacity west of the Greater Toronto Area.

The Warwick Landfill is located on Part of Lot 20, Concession III South of Egremont Road (SER), Township of Warwick in the County of Lambton as shown in Figure 1. The site operates under Certificate of Approval A 032203 issued on October 21, 1991. Approximately 21 ha of the site have been used for waste disposal, with about 11 ha yet to be excavated and filled. Approximately 1.35 ha of the landfill is currently active and under operation with the remainder of the landfilled area being capped and vegetated. Background Document #2 contains further information about the current landfill.

CWS proposes to apply to accept up to 750,000 tonnes per year of domestic, commercial, industrial and institutional solid non-hazardous waste generated within Ontario. Contaminated soil that meet Ontario Regulation 347 requirements for solid non-hazardous waste landfills will be included in this waste quantity, and may be used for daily cover. No hazardous waste or liquid waste will be accepted at the site. The primary market region of the landfill is the western and central portion of Ontario; however, a province-wide service area will be requested to provide CWS with flexibility to accept waste from other regions of their Ontario-wide marketplace. The site would have an operating life of about 25 years.

The proposed landfill expansion is intended to occur on portions of the lands that CWS owns at and surrounding the current landfill site (Figure 2). CWS will be examining different alternative layouts (or "footprints") for the waste disposal area within these lands in the EA, in consultation with the public and government agencies. In accordance with the province's new Landfill Standards (Regulation 232/98), suitable buffer areas, minimum of 100 metres, will also be provided between the expanded landfill

1. As amended by the Environmental Assessment and Consultation Improvement Act (1996).

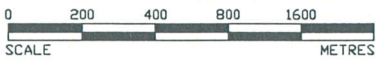
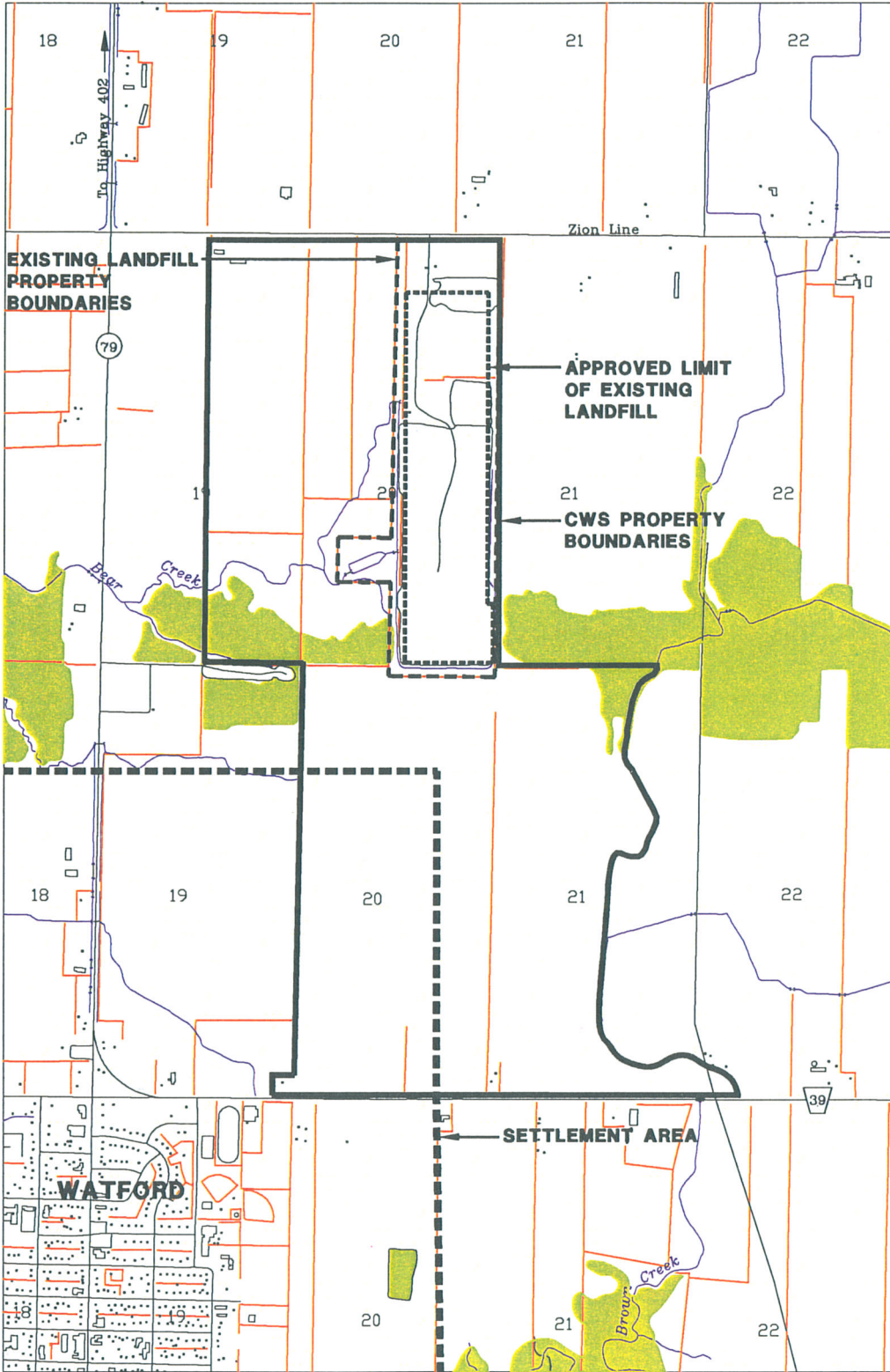


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CANADIAN WASTE SERVICES, INC.
 DRAWING NO. 1

WARWICK LANDFILL EXPANSION
 SITE LOCATION
 WARWICK LANDFILL
 TOWNSHIP OF WARWICK, ONTARIO

WM CANADIAN WASTE
 A WASTE MANAGEMENT COMPANY

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2 FIGURE	DWN BY: J.M.C. DATE: 04/08/99 CHK BY: S.C.H. SCALE: 1:20,000	WARWICK LANDFILL EXPANSION SITE PLAN		<table border="1"> <thead> <tr> <th>REV</th> <th>DATE</th> <th>DWN BY</th> <th>APP BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	REV	DATE	DWN BY	APP BY	DESCRIPTION																				
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Terms of Reference

Warwick Landfill Expansion Environmental Assessment

footprint and all CWS property boundaries. These buffer zones will be used for internal roads, drainage, stormwater controls, leachate/gas management facilities, and landfill structures such as scales, maintenance shops and offices.

Several alternative routes to bring traffic from Highway 402 to the site entrance on Zion Line will be examined during the EA, as will the effects on local, secondary routes to the landfill.

Landfill leachate will be contained and collected on-site. In order to protect groundwater beneath the landfill, CWS proposes to develop and evaluate a design following the “hydraulic trap” principle. This design will be further developed and assessed during the EA to show that it meets all of the site-specific performance requirements set by the Landfill Standards. Different alternatives for treating and disposing of the leachate that is to be collected will be evaluated during the EA.

Landfill gas will be managed by an active gas collection system.

The first step in the Environmental Assessment (EA) has been for CWS, in consultation with affected stakeholders, to prepare and submit a Terms of Reference² to the Ministry of Environment (MOE), for the Minister’s review and approval. The approved Terms of Reference (ToR) will serve to guide the preparation of the EA, including consultation and subsequently, the review of the EA document³ by the MOE and others.

This ToR has been prepared in consultation with interested parties or stakeholders in the EA process. These parties have included the MOE, the Township of Warwick, the Warwick Landfill Public Liaison Committee, the Warwick Watford Landfill Committee, individual local residents, other local municipalities, the County of Lambton, and representatives of other provincial government agencies. The ToR, as submitted to the Minister for approval, consists of the following:

Section 2: Describes the contents of the EA document that will result from the assessment.

Section 3: Presents the alternatives that are to be evaluated in the EA.

Section 4: Introduces the general methodology to be used in carrying out the EA.

Section 5: Demonstrates that public consultation will be carried out during the EA.

Section 6: Demonstrates that government agencies will be consulted during the EA.

Appendix A: Lists the evaluation criteria that are intended to be used for the EA.

Appendix B: Identifies the studies and study areas for the EA.

2. *Subsection 6(1) of the Environmental Assessment Act.*

3. *The EA document will be prepared in accordance with the requirements set out in subsections 6(2)(c) and 6.1 (3) of the EA Act and with such requirements as may be prescribed by regulation.*

Terms of Reference

Warwick Landfill Expansion Environmental Assessment

The ToR is accompanied by the following series of *Background Documents* that provide additional information regarding the development of the ToR, **but do not form part of the ToR submitted for approval by the Minister:**

- Background Doc. 1:**..... Description of Canadian Waste Services Inc.
- Background Doc. 2:**..... Description and History of the Existing Warwick Landfill Site
- Background Doc. 3:**..... CWS Reasons for the Environmental Assessment Application
- Background Doc. 4:**..... Description of the Environment Potentially Affected
- Background Doc. 5:**..... Rationale for Limiting the Consideration of “Alternatives To”
- Background Doc. 6:**..... Rationale for the “Alternative Methods” to be Evaluated in the Environmental Assessment
- Background Doc. 7:**..... Proposed Evaluation Methodologies
- Background Doc. 8:**..... Public Consultation
- Background Doc. 9:**..... Agency Consultation
- Background Doc. 10:**..... CWS Community Commitments Agreement
- Background Doc. 11:**..... Index to Substantive Amendments and Additions
- Background Doc. 12:**..... Warwick Landfill 1997/98 Annual Monitoring Report

Following approval of the ToR, the EA will proceed in conjunction with a joint application for the landfill expansion under Ontario’s *Environmental Protection Act* (EPA). The EPA governs primarily on-site technical and engineering matters, and it provides for the Certificate of Approval that will govern the construction, operation and closure of the site. Other approvals may also be required before the landfill expansion can be built; Background Document #7 includes a list of those that might be expected.

2. The Contents of the Environmental Assessment Document

Upon completing its EA process, CWS will prepare and submit an EA Report for review and approval that will contain the following:

- A description of the *purpose* of the undertaking, as stated in Section 1.
- A further *definition and description* of the undertaking.
- A description of the *environment potentially affected* by this undertaking.
- An assessment of the *alternative methods* of carrying out the undertaking. The preferred alternative will be selected from the range of alternatives identified in Section 3.2 of this ToR.

Terms of Reference

Warwick Landfill Expansion Environmental Assessment

- A description of the *effects that will be caused or that might reasonably be expected to be caused on the environment* by the undertaking or the alternatives.
- A description of *mitigation measures* that are necessary to prevent or reduce significant adverse effects on the environment.
- An evaluation of the *advantages and disadvantages* to the environment as a result of the undertaking and the alternatives.
- A description of *consultation* undertaken by CWS in association with the environmental assessment.

CWS has chosen to prepare the ToR in accordance with clause 6(2)(c) and subsection 6.1(3) of the *Environmental Assessment Act*. Should the Warwick Landfill Expansion not prove to be environmentally acceptable during the course of the detailed investigations after consideration of mitigative measures, which are part of the EA work, CWS will suspend its Environmental Assessment and re-evaluate other options for providing the needed waste disposal capacity.

3. Alternatives to be Evaluated

In the course of carrying out the environmental assessment, CWS will assess what expansion capacities, what landfill footprints, heights and buffers would be environmentally appropriate for the Warwick site.

The EA will not include an assessment of alternatives to the expansion of the Warwick Landfill.

Alternative methods for carrying out the undertaking will be considered and assessed during the EA as detailed below.

3.1 Landfill “Footprint” Area Alternatives

CWS, in consultation with public and government stakeholders, has established two alternatives for the potential waste disposal area within their property boundaries:

West Alternative: Expansion on CWS property to the west of the existing landfill (potentially including undeveloped portions of the existing landfill site).

Central Alternative: Expansion in the central part of CWS’s holdings.

Figure 3 illustrates these two alternatives.

Terms of Reference

Warwick Landfill Expansion Environmental Assessment

In addition, note that variations in height, depth, and buffer widths will be combined with these alternatives during the evaluation to determine site capacity for each alternative.

3.2 Access Route Alternatives

CWS, in consultation with stakeholders during the ToR development, identified the following alternative access routes for regional access to the site from Highway 402:

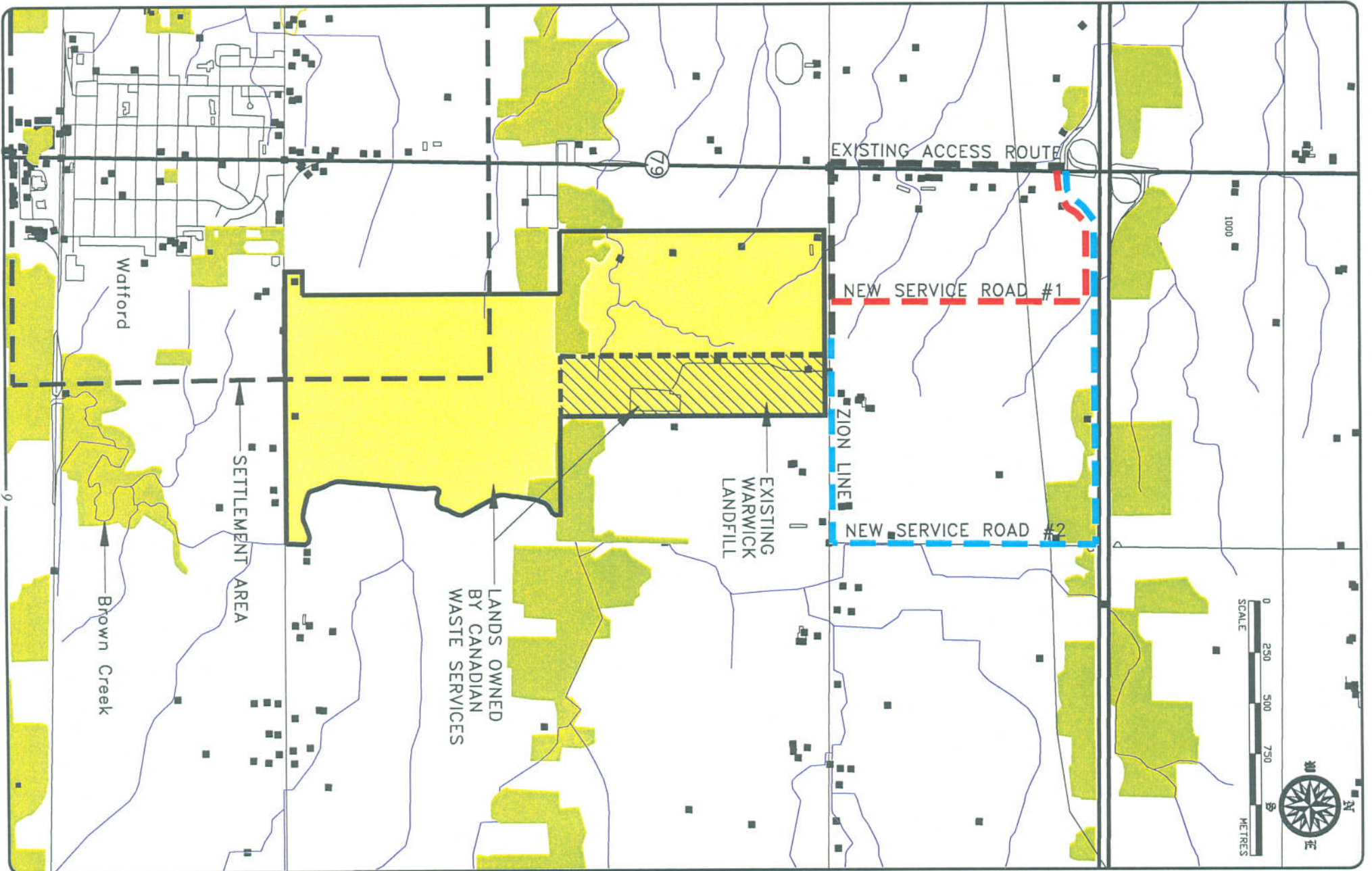
- | | |
|-----------------------------|--|
| Existing Haul Route: | County Road 79 south to Zion Line, then east to the site entrance. |
| New Service Road #1: | A new service road east from the existing Highway 402/County Road 79 interchange, then south to Zion Line near the site entrance. |
| New Service Road #2: | A new service road east from the existing Highway 402/County Road 79 interchange, then south to Zion Line along the opened road allowance, then west to the site entrance. |

The different alternatives are illustrated in Figure 4.

3.3 Leachate Treatment Methods

The following is a list of leachate treatment alternatives that will be considered for the Warwick Landfill expansion:

- full on-site treatment with no liquid effluent discharge (e.g., evaporation);
- full on-site treatment with discharge of effluent to surface water;
- on-site pre-treatment with discharge via new forcemain to an upgraded Watford Sewage Treatment Plant;
- on-site pre-treatment with discharge via truck haulage to an upgraded Watford Sewage Treatment Plant;
- on-site pre-treatment with discharge via truck haulage to another Sewage Treatment Plant (e.g., London);
- off-site disposal of raw leachate via truck haulage to the Blackwell Road Sarnia Leachate Treatment Plant; and
- leachate re-circulation (in combination with any other alternative(s)).



4 FIGURE

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CANADIAN WASTE SERVICES, INC.

DRAWING NO. 6

WARWICK LANDFILL EXPANSION
 ACCESS ROUTE ALTERNATIVES

WARWICK LANDFILL
 TOWNSHIP OF WARWICK, ONTARIO

WM CANADIAN WASTE
 A WASTE MANAGEMENT COMPANY

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3.4 End Use Alternatives

During the EA, CWS will propose one or more end uses for the site and consult with the stakeholders to determine if there are others. CWS will either: enter into a formal evaluation and decision process regarding a preferred alternative and establish a preference based on consensus among the stakeholders; or agree on a process to determine the final end use at a later date, closer to the time of site closure.

The selection from the foregoing alternative methods will form the basis for the landfill design concept. As a minimum the EA document will establish:

- the footprint dimensions, footprint area and footprint location;
- the top landfill elevation, bottom landfill elevation, basic landfill contours for the slopes and the volumetric capacity; and
- other fundamental design concepts including leachate treatment, haul routes and end use.

4. Environmental Assessment Methodology

This section presents an introduction to the work that is necessary to meet the requirements for the preparation of the EA, as set out previously, and for the technical approvals under the EPA, since CWS is proposing a joint application.

The EA will be carried out in two main parts. The first part will deal with the evaluation of alternative methods, in this case, different methods of designing and operating the landfill expansion. The different alternatives will be compared and preferred methods will be selected. Once this is completed, the second part of the EA will be undertaken. It will involve an overall impact assessment of the landfill expansion, in parallel with the development of the more detailed design and operating plan for the landfill. Each of these steps is discussed further in the following sections.

4.1 Evaluation of Alternative Methods

The range of alternative methods to be considered in the EA were identified in Section 3 of this ToR. They will be evaluated through a comparative evaluation of their net effects on the environment. A comparative evaluation means that the differential impacts between two or more options will be described and assessed (e.g., “Option A produces more noise than Option B”).

Terms of Reference

Warwick Landfill Expansion Environmental Assessment

The assessment criteria contained in Appendix A will be used in order to differentiate between and compare alternatives. Appropriate study methods will be developed for each comparative evaluation. The comparative evaluation will be carried out in consultation with the public and government agency stakeholders.

4.2 Overall Assessment of the Undertaking

A comprehensive impact assessment of the landfill expansion will be completed to determine the net effects that will be caused, or that might reasonably be caused, on the environment (i.e., the advantages and disadvantages to the environment). This includes consideration of any mitigation that might be necessary to reduce or eliminate impacts, and the appropriate monitoring, contingency plans and impact management plans.

The baseline conditions for the impact assessment will account for the presence of the existing landfill and any future changes that are expected in the area. A range of operating periods for the landfill will be examined.

The criteria to be used in the assessment are attached as Appendix A, while the proposed study areas and study methods are included as Appendix B. The criteria, study areas and study methods are not intended to be absolute. If significant new issues or concerns arise during the course of the EA, CWS will be flexible in considering their inclusion. These methods, and any others which might be used, will conform to commonly acceptable industry and government practices.

One of the EA criteria that CWS has committed to consider deals with the effect of CWS's proposed landfill expansion on the 3R's programs in Ontario.

During the EA, in co-operation with local government, CWS will consider what further measures can be implemented on-site to increase the diversion of material from landfilling for beneficial use. CWS has also committed to consider additional facilities that it could develop in its Ontario wide system to increase diversion of waste from landfill, for beneficial use. Selected measures will be included in the description of the proposed undertaking in the EA.

5. Public Consultation

Community involvement has been important to CWS from the outset of the project. The consultation program undertaken during the ToR phase, and proposed for the Environmental Assessment itself, has been developed using the following principles:

Terms of Reference

Warwick Landfill Expansion Environmental Assessment

- the process will be clear, open and inclusive;
- stakeholder concerns will be identified early in the process, and addressed in project work;
- there will be multiple consultation opportunities, using a number of techniques, at key decision-making points in the project; and
- issues and concerns, and CWS's responses to them will be documented as part of the project.

Public consultation will meet or exceed the requirements of the *Environmental Assessment Act*. It will be flexible, and may be amended through input from the community and other key stakeholders. In addition, CWS commits to consulting with key public stakeholders, prior to starting the EA, regarding the development of appropriate schedules for input to the various EA consultation activities.

The key public stakeholders that are proposed to be included in the EA public consultation activities include:

- local residents living in the site vicinity;
- members of the Public Liaison Committee (PLC) or similar committee with a revised mandate;
- members of the Warwick Watford Landfill Committee (WWLC); and
- other interested members of the public.

CWS will work with the Township and other interested stakeholders to organize and support a committee to be involved in the review and development of the proposed facility operating plan.

A number of public consultation activities are proposed for the EA phase of the project:

- ongoing meetings with the PLC and WWLC;
- key contact interviews with community leaders;
- telephone and 'face-to-face' interviews with representatives of community facilities;
- consultation with local residents;
- letters to non-resident property owners;
- newsletter(s);
- public open houses/workshops;
- operation of the toll-free information line (1-800-555-3561);
- media communications; and
- preparation of a consultation report for inclusion in the EA submission.

6. Agency Consultation

The key agency stakeholders that are proposed to be included in the EA agency consultation activities include:

- Township of Warwick;
- County of Lambton;
- Town of Petrolia;
- Village of Alviston/Township of Brooke; and
- various government agency review representatives and other interested agencies⁴.

The process for peer review funding during the EA phase will be negotiated between CWS, the Township of Warwick, and other interested parties.

CWS consultants will meet with the respective technical agencies prior to the finalization of the EA work plans to confirm details of the studies to be completed. As background technical studies become available during the preparation of the EA, they will be copied to these agency contacts for review and comment prior to their incorporation into the formal EA application document, which will also be circulated in draft form for agency review and comment.

Reasonable time will be provided to all agencies during the EA for consultation and review.

4. As per the Agency Contact List developed in consultation with the MOE Environmental Assessment Branch.

Appendix A

Evaluation Criteria

Appendix A

Proposed Environmental Assessment Criteria

Table A1 presents the comprehensive list of environmental assessment criteria that are proposed for the Warwick Landfill Expansion project. The criteria have been grouped into four major categories:

- Public Health and Safety;
- Natural Environment and Resources;
- Social and Cultural; and
- Economics.

In addition, each category has been further grouped into three general study areas:

- Impacts On-Site and in the Site Vicinity;
- Impacts Along the Haul Routes; and
- Community Impacts.

(Note that Appendix B contains more detailed definitions for the study areas that are specific to each study to be carried out during the environmental assessment.)

Table A1: Proposed Environmental Assessment Criteria

<p>1. <u>Public Health and Safety</u></p> <p>a) Impacts On-Site and in the Site Vicinity</p> <ul style="list-style-type: none">• Explosive hazard due to gas accumulation in confined spaces• Effects due to exposure to landfill gas• Effects due to fine particulate exposure• Effects due to contact with leachate-impacted groundwater or surface water• Flood hazard• Disease transmission via insects or vermin <p>b) Impacts Along the Haul Routes</p> <ul style="list-style-type: none">• Risk of contact with spilled hazardous or dangerous waste materials• Potential for traffic collisions (including pedestrians and farm equipment)• Effects due to fine particulate exposure <p>c) Community Impacts</p> <ul style="list-style-type: none">• Aviation impacts due to gull interference
<p>2. <u>Natural Environment and Natural Resources</u></p> <p>a) Impacts On-Site and in the Site Vicinity</p> <ul style="list-style-type: none">• Loss/displacement of surface water resources• Disruption/diversion of surface water resources

- Impact on the availability of groundwater supply to wells
- Effects on baseflow quantity/quality
- Loss of terrestrial ecosystems
- Loss of aquatic ecosystems
- Disturbance to terrestrial ecosystems
- Disturbance to aquatic ecosystems
- Displacement of agricultural land
- Sterilization of industrial mineral resources
- Displacement of forestry resources
- Displacement of recreational resources
- Disruption to recreational resources

b) Impacts Along the Haul Routes

- Disturbance to terrestrial ecosystems
- Disturbance to aquatic ecosystems
- Disruption to recreational resources

3. Social and Cultural*

a) Impacts On-Site and in the Site Vicinity

- Displacement of residents from houses
- Disruption to use and enjoyment of residential properties due to nuisance effects
- Disruption to use and enjoyment of public facilities and institutions due to nuisances
- Disruption to local traffic networks
- Visual impact of the landfill
- Nuisance associated with vermin
- Displacement of cultural resources
- Disturbance to cultural resources due to nuisance effects
- Displacement/destruction of archaeological resources
- Level of public service provided by the landfill
- Effects on other public services

b) Impacts Along the Haul Routes

- Disruption to use and enjoyment of residential properties due to nuisance effects
- Disruption to use and enjoyment of public facilities and institutions due to nuisances
- Disruption to local traffic networks along the haul routes
- Disturbance to cultural resources due to nuisance effects

c) Community Impacts

- Changes to community character
- Changes to community cohesion
- Level of community service provided by the landfill
- Compatibility with municipal land use designations and official plans

4. Economics*

a) Impacts On-Site and in the Site Vicinity

- Displacement of businesses (including farms)
- Disruption to businesses (including farms) due to nuisance effects
- Property value impacts

b) Impacts Along the Haul Routes

- Disruption to businesses (including farms) due to nuisance effects
- Property value impacts

c) Community Impacts

- Property value impacts
- Business losses (regional, e.g., tourism)
- New business opportunities related directly to landfill construction and operation
- New business opportunities in related industries and services
- Public costs for indirect liabilities
- Direct employment in landfill construction and operation
- Indirect employment in related industries and services
- Effects on the municipal tax base
- Effect on the cost of service to customers

d) Provincial/Federal Impacts

- Effects on the provincial/federal tax base
- Effects on provincial diversion programs

Note: "Nuisance" is taken to include noise, dust, odour, visibility, gulls, and traffic congestion.

** The rural and agricultural nature of the area is noted. "Residences" are to include farms. "Traffic" will include agricultural vehicles. "Businesses" are to include agri-businesses.*

Appendix B

Study Areas and Methods

Appendix B

Study Areas and Methods

This appendix describes the impact assessment studies that are proposed to be carried out during the environmental assessment of the Warwick Landfill Expansion. Each of the following sections of the appendix deals with one of the studies and identifies the consultant who will be responsible. A table in each section summarizes three items:

1. *The environmental assessment criteria that each study will be addressing.*

These are drawn from the comprehensive list of environmental assessment criteria proposed for the environmental assessment (see Appendix A).

2. *The study areas that will be used to address each of the criteria.*

The study areas are not based on a fixed or arbitrary distance. Instead, they were developed specifically for each of the proposed environmental assessment criteria. However, the criteria, and the study areas, fall into three major groupings:

- On-site and in the site vicinity;
- Along the haul routes; and
- In the general community (including the Township and County).

Reference to the Township of Warwick should be read to include the former Village of Watford.

In this context, “site” is taken to mean the landfill footprint (working area) plus the buffer zones around the footprint (typically 100 m wide). “Haul route” is taken to mean the portion of the access route to the site between the Highway 402 interchange and the site entrance.

3. *The methods that will be used for each of the proposed studies.*

A overview is provided of the key elements of each of the studies, within the context of the overall study methodology detailed in the main text of the ToR. It should be noted that the project is proceeding under a joint EAA/EPA application, so the studies outlined here deal with both requirements.

The design of the landfill expansion will proceed in parallel with the impact assessment process. The design will be led by Henderson Paddon Environmental Inc. following the province’s Landfill Design Standards (Reg. 232/98).

B1. Noise and Vibration Assessment

Consultant: *Aercoustics Engineering Limited*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Disturbance to terrestrial ecosystems • Disturbance to aquatic ecosystems • Disruption to recreational resources • Disruption to use and enjoyment of residential properties due to nuisance effects • Disruption to use and enjoyment of public facilities and institutions due to nuisances • Disturbance to cultural resources due to nuisance effects • Disruption to businesses (including farms) due to nuisance effects <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Disturbance to terrestrial ecosystems • Disruption to recreational resources • Disruption to use and enjoyment of residential properties due to nuisance effects • Disturbance to cultural resources due to nuisance effects • Disruption to businesses (including farms) due to nuisance effects 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3.5 km of the site.* <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Within 500 m of the haul route on either side.* 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Measurement of ambient noise levels on the existing landfill and at the property boundary, including trucks and heavy machinery. • Measurement of community noise levels with and without the existing landfill in operation. • Noise level measurements in conformance with MOE guideline NPC-103/203. • Modelling of the noise levels from the expanded landfill (construction, operation and closure) using the ISO 9613 Environmental Sound Propagation Model. • Preparation of noise level contours for the landfill vicinity and along the haul route. • Comparison of predicted noise levels to limits established by the MOE's "Noise Guidelines for Landfill Sites". • Identification of further mitigation, where necessary, to reduce noise levels. • Recommend monitoring, contingency plans and triggering mechanisms, as required. • Recommend procedures for responding to noise complaints.

* Subject to adjustment following initial modelling results.

B2. Air Quality Assessment

Consultant: *RWDI Inc.*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Effects due to fine particulate exposure • Disruption to recreational resources • Disruption to use and enjoyment of residential properties due to nuisance effects • Disruption to use and enjoyment of public facilities and institutions due to nuisances • Disturbance to cultural resources due to nuisance effects • Disruption to businesses (including farms) due to nuisance effects • Effects due to green house gas emissions <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Effects due to fine particulate exposure • Disruption to recreational resources • Disruption to use and enjoyment of residential properties due to nuisance effects • Disturbance to cultural resources due to nuisance effects • Disruption to businesses (including farms) due to nuisance effects 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within a minimum of 3 km of the site.* <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Within 500 m of the haul route on either side.* 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Assemble background data regarding climate, meteorological conditions, and existing air quality. • Estimate dust emission levels (TSP, PM10 criteria) from landfill operations and other sources (e.g., agriculture, road traffic, etc.). • Prepare computer model of dust levels (TSP, PM10) and calibrate to existing conditions. • Model the predicted dust levels with the landfill expansion and compare to MOE standards. • Assemble data on landfill gas quality from literature and samples from the existing landfill. • Determine the capture efficiency of the gas collection system and the resultant gas emission rates. • Prepare and calibrate a computer model of the landfill gas and odour emissions. • Model the predicted VOC and odour levels with the landfill expansion and compare to MOE standards. • Evaluate results and recommend additional mitigation, if required. • Recommend monitoring, contingency plans and triggering mechanisms, as required.

* Subject to adjustment to a larger zone if demonstrated from initial modelling results.

B3. Archaeological and Heritage Resources Assessment

Consultant: *Archaeological Services Inc.*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Displacement of cultural resources • Disturbance to cultural resources due to nuisance effects • Displacement/destruction of archaeological resources <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Disturbance to cultural resources due to nuisance effects 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site, and within 250 m of the site for built heritage features. <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Within 100 m of the haul route on either side. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Research with Canadian Heritage Information Network, Ontario Archives, County, Township and landowners regarding known archaeological and cultural features. • Field surveys by site inspection, ploughed field reconnaissance, and test pits. • Artifact recovery and identification. • Detailed photographic logs of all cultural landscapes and built heritage features. • Recommendations regarding further recovery or mitigation.

B4. Transportation Assessment (Traffic Impact Study)

Consultant: *Cansult Group Limited*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Risk of contact with spilled hazardous or dangerous waste materials • Potential for traffic collisions (including pedestrians and farm equipment) • Disruption to local traffic networks • Disruption to local traffic networks along the haul routes 	<p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • The main haul route and associated entrances/exits and interchanges (currently Zion Line west from the site and County Road 79 north to and including the interchange with Highway 402*). • Other secondary haul routes, to the site that will be used for local waste deliveries. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Background data collection including road conditions, traffic levels, accident statistics, school bus routes, railway activities and growth projections. • Twelve-hour traffic count surveys at intersections along the preferred haul route (two weekday and two weekend counts at each location). • Assess the current level of road performance and condition. • Identify new sources of traffic, both landfill and non-landfill. • Assess impact of landfill expansion in terms of peak traffic volumes (car and truck), roadway performance levels, and safety issues. • Recommend additional mitigation, if required (e.g., road improvements, turning lanes, etc.). • Recommend monitoring, contingency plans and triggering mechanisms, as required.

* Or any other haul route identified as the preferred alternative.

B5. Landfill Gas Assessment (Methane)

Consultant: Comcor Environmental Limited

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none">Explosive hazard due to gas accumulation in confined spaces	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none">Within the property boundaries (landfill and buffer zones).	<p><i>Key Elements:</i></p> <ul style="list-style-type: none">Assessment of the performance and capture efficiency of the gas collection system in terms of preventing off-site subsurface gas migration.Examine the potential for gas utilization.Recommend additional mitigation, if required.Recommend monitoring, contingency plans and triggering mechanisms, as required.

B6. Economic Assessment

Consultant: PriceWaterhouseCoopers Limited

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Displacement of businesses (including farms) • Disruption to businesses (including farms) due to nuisance effects • Property value impacts <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Disruption to businesses (including farms) due to nuisance effects • Property value impacts <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Property value impacts • Business losses (regional, e.g., tourism) • New business opportunities related directly to landfill construction and operation • New business opportunities in related industries and services • Public costs for indirect liabilities • Direct employment in landfill construction and operation • Indirect employment in related industries and services • Effects on the municipal tax base • Effect on the cost of service to County residents <p><i>In the Province:</i></p> <ul style="list-style-type: none"> • Effects on the provincial/federal tax base • Effects on provincial diversion rates 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site; within 1 km of the site for primary effects; and within 3 km of the site for secondary effects. <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Adjacent to the primary and secondary haul routes. <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Warwick Township. • Lambton County. • <p><i>In the Province:</i></p>	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Inventory, analysis and impact assessment of existing businesses including interviews and surveys. • Baseline property value evaluation and comparison to assessed values. • Review of property value impacts at other landfill sites. • Predictions of property value effects. • Fiscal analysis of the impact on municipal finances (revenues and expenditures). • General economic analysis including employment (levels, type and distribution), incomes, business opportunities. • Recommendations for mitigation and impact management.

B7. Agricultural Assessment

Consultant: *ESG International*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Displacement of agricultural land • Displacement of businesses (including farms) • Disruption to businesses (including farms) due to nuisance effects <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Disruption to businesses (including farms) due to nuisance effects 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3 km of the site. <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Adjacent to the primary and secondary haul routes. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Collection of background data regarding: CLI soil capabilities and other soils information; drainage; farm operations; census statistics. • Inventory of farm operations and related agri-business within the study areas, and selected interviews and surveys. • Evaluation against Provincial Policy Statements for agriculture. • Analysis of the potential for effects on: property fragmentation; crop pattern interference; machinery movement interference; and daily/seasonal farm activities. • Recommendations for mitigation and impact management.

B8. Natural Environment and Resources Assessment

Consultant: Gartner Lee Limited

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Flood hazard • Disease transmission via insects or vermin • Loss/displacement of surface water resources • Disruption/diversion of surface water resources • Loss of terrestrial ecosystems • Loss of aquatic ecosystems • Disturbance to terrestrial ecosystems • Disturbance to aquatic ecosystems • Displacement of forestry resources • Displacement of recreational resources • Disruption to recreational resources <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Disturbance to terrestrial ecosystems • Disturbance to aquatic ecosystems • Disruption to recreational resources <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Aviation impacts due to gull interference 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3 km of the site. • Surface water studies to include Bear Creek watershed (to its main branch 7 km downstream) and Brown Creek watershed <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Adjacent to the primary and secondary haul routes. <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Within 8 km of the landfill site for airport assessment. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Gather background information from: Water Survey of Canada; Ministry of Natural Resources; St. Clair Region Conservation Authority; local municipalities; and naturalist clubs. • Characterization of existing surface water resources and geomorphology through seasonal flow measurements, sampling and water quality testing. • Characterization of existing terrestrial ecosystems through spring (breeding birds; flowering vegetation) and summer (late blooming plants) field work. • Characterization of existing aquatic ecosystems through downstream fish surveys and benthic invertebrate sampling. • Assessment of the possible effects of the landfill expansion on immediate and downstream water resources. • Recommendations for mitigation and impact management, where required. • Recommendations regarding monitoring and contingency plans.

B9. Social Assessment

Consultant: IER Planning, Research and Management Services

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Displacement of residents from houses • Disruption to use and enjoyment of residential properties due to nuisance effects • Disruption to use and enjoyment of public facilities and institutions due to nuisances <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Disruption to use and enjoyment of residential properties due to nuisance effects • Disruption to use and enjoyment of public facilities and institutions due to nuisances <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Changes to community character • Changes to community cohesion 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3.5 km of the site. <p><i>Along the Haul Routes:</i></p> <ul style="list-style-type: none"> • Adjacent to the primary and secondary haul routes. <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Warwick Township • Lambton County • “Community” as defined in consultation with the stakeholders. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Background data collection including: Census and Statistics Canada data; local planning information; and assessment roll data. • Field survey and mapping of residences and community facilities/services. • “Kitchen table” meetings with the nearest residents to the site and along the haul routes (held during ToR phase). • Meetings with community leaders, ratepayer’s groups, Public Liaison Committee, Warwick Watford Landfill Committee and municipal officials. • Meetings or telephone interviews with community facility representatives. • Contact with non-resident land owners. • Review findings from other technical studies (e.g., noise, air quality, etc.) and public consultation results. • Analysis of the potential social impacts and recommendations for further mitigation. • Input to the development of a Community Commitments Agreement.

B10. Hydrogeology and Geotechnical Assessment

Consultant: Jagger Hims Limited/Alston Associates Inc.

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Effects due to contact with leachate-impacted groundwater or surface water • Impact on the availability of groundwater supply to wells • Effects on baseflow quantity/quality • Sterilization of industrial mineral resources 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 500 m of the site for detailed investigations. • Regional context to be provided within 5 to 10 km of the site based on watershed boundaries. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Assessment of leachate characteristics and contaminating life span. • Background and regional data collection including: water well and oil/gas borehole records, published maps, reports and studies (including the University of Waterloo study); previous data from the existing landfill site. • Updating of local water well locations and use, including municipal wells. • Drilling of new boreholes (located to provide comparable information for all footprint alternatives) to bedrock, down-hole geotechnical testing, and the installation of groundwater piezometers. • Water level measurements in new and existing monitors, and private water wells. • Test selected wells through hydraulic and gas pressure measurements and “slug” tests. • Test groundwater samples taken from selected wells. • Computer modelling simulations of groundwater flow (FLONET, FLOWPATH) and contaminant movement (POLLUTE). • Assessment of the operating life of the leachate control system(s) relative to the leachate contaminating lifespan. • Settlement and slope stability calculations, related to expansion excavation(s) and waste placement depth. • Impact assessment and recommendations regarding additional mitigation, as required. • Recommendations regarding monitoring and contingency plans.

B11. Visual Assessment

Consultant: *BAKER Turner Inc.*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Visual impact of the landfill 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3.5 km of the site. 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Describe baseline conditions. • Define the “viewshed” for the existing landfill and the proposed landfill expansion (i.e., areas where the landfill will be able to be seen); use tethered helium balloons if required. • Calculate receptor-based visual impact values for each stage of the operation that account for distance, view angle, and visible area of the landfill. • Generate impact zones. • Generate photo-realistic simulations of the completed landfill for selected locations around the site. • Recommend additional mitigation (e.g., screening) and input to the impact management plan.

B12. Land Use Assessment

Consultant: *Weston Consulting Group Limited*

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Level of public service provided by the landfill • Effects on other public services <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Level of community service provided by the landfill • Compatibility with municipal land use designations and official plans 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3.5 km of the site. <p><i>In the Community:</i></p> <ul style="list-style-type: none"> • Warwick Township. • Lambton County. 	<p><i>Key Elements: *</i></p> <ul style="list-style-type: none"> • Identify and define existing land uses • Preparation of an updated assessment map and database for the local area. • Review of County and Township official plans, zoning documents and policies. • Meetings with municipal officials. • Forecast of area land uses in the future, with and without the landfill expansion (i.e., baseline conditions). • Recommend mitigation and land use related input to the impact management plan, if required.

* Note that Weston Consulting will be carrying out concurrent planning approvals as well.

B13. Air Emissions Health Assessment

Consultant: Cantox Environmental Inc.

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • Effects due to exposure to landfill gas 	<p><i>On-Site and in the Site Vicinity:</i></p> <ul style="list-style-type: none"> • On-site and within 3 km of the site (subject to adjustment following initial modelling results). 	<p><i>Key Elements:</i></p> <ul style="list-style-type: none"> • Establish baseline concentrations of chemicals in the local environment (air, water, soil, plants). • Identify chemicals of greatest concern based on baseline testing and MOE guidelines, starting from the following list recommended by the MOE: <ul style="list-style-type: none"> ⇒ 1,1-dichloroethane ⇒ 1,2-dichloroethane ⇒ chloroethane ⇒ trichloroethylene ⇒ 1,1,2-trichloroethane ⇒ benzene ⇒ vinyl chloride ⇒ 1,1-dichloroethylene ⇒ methylene chloride ⇒ methyl mercaptan ⇒ butan-2-ol ⇒ hydrogen sulphide ⇒ bromodichloromethane ⇒ 1,1,2,2-tetrachloroethane ⇒ ethyl mercaptan ⇒ octane ⇒ dimethylsulphide • Determine the exposure pathways (e.g., breathing, gardening, local produce). <p><i>(Continued ..)</i></p>

B13. Air Emissions Health Assessment

Consultant: Cantox Environmental Inc. (continued)

Environmental Criteria to be Assessed	Proposed Study Area(s)	Study Methods
		<p>Key Elements: (Continued ..)</p> <ul style="list-style-type: none"> • Determine the exposure pathways (e.g., breathing, gardening, local produce). • Establish the potential human receptors associated with the exposure pathways, their sensitivities and distribution relative to the landfill. • Calculate the cumulative chemical exposure for the various receptors over time using both stochastic and deterministic computer models. • Compare exposures to regulatory limits set by MOE, Health Canada, Environment Canada, U.S. EPA and World Health Organization. Where limits are unavailable, establish interim limits based on current scientific research. • Calculate Exposure Ratios (ER), adjusted for bioavailability and including a frequency distribution forecast. • Assist with recommendations regarding additional facility mitigation to reduce or eliminate any exposure impacts, if necessary. • Recommend any necessary monitoring.