2.0 OVERVIEW OF METHODOLOGY

This section of the EASR provides an overview of the approach used in the EA. More detailed descriptions are provided in the approved TOR work plans and in Sections 7.0 to 13.0 of this EASR below.

The EA included evaluation of alternative Sites and identification of a preferred Site; development of Site development concepts and identification of the preferred concept; evaluation of leachate treatment and disposal options; characterization of the existing environment and assessment of environmental effects of the preferred Site development concept; evaluation of Site-related traffic and completion of EPA and OWRA technical supporting work.

2.1 Assessment Methodology

Taggart Miller undertook the EA in accordance with the approved TOR. The approach generally was to complete the EA studies using an EPA/OWRA level of detail in accordance with the TOR – approved work plans. While the EPA/OWRA application for the CRRRC will be submitted only after an EA approval is received, the information necessary to support the EPA/OWRA applications has been prepared and is submitted with this EA documentation to support the EA.

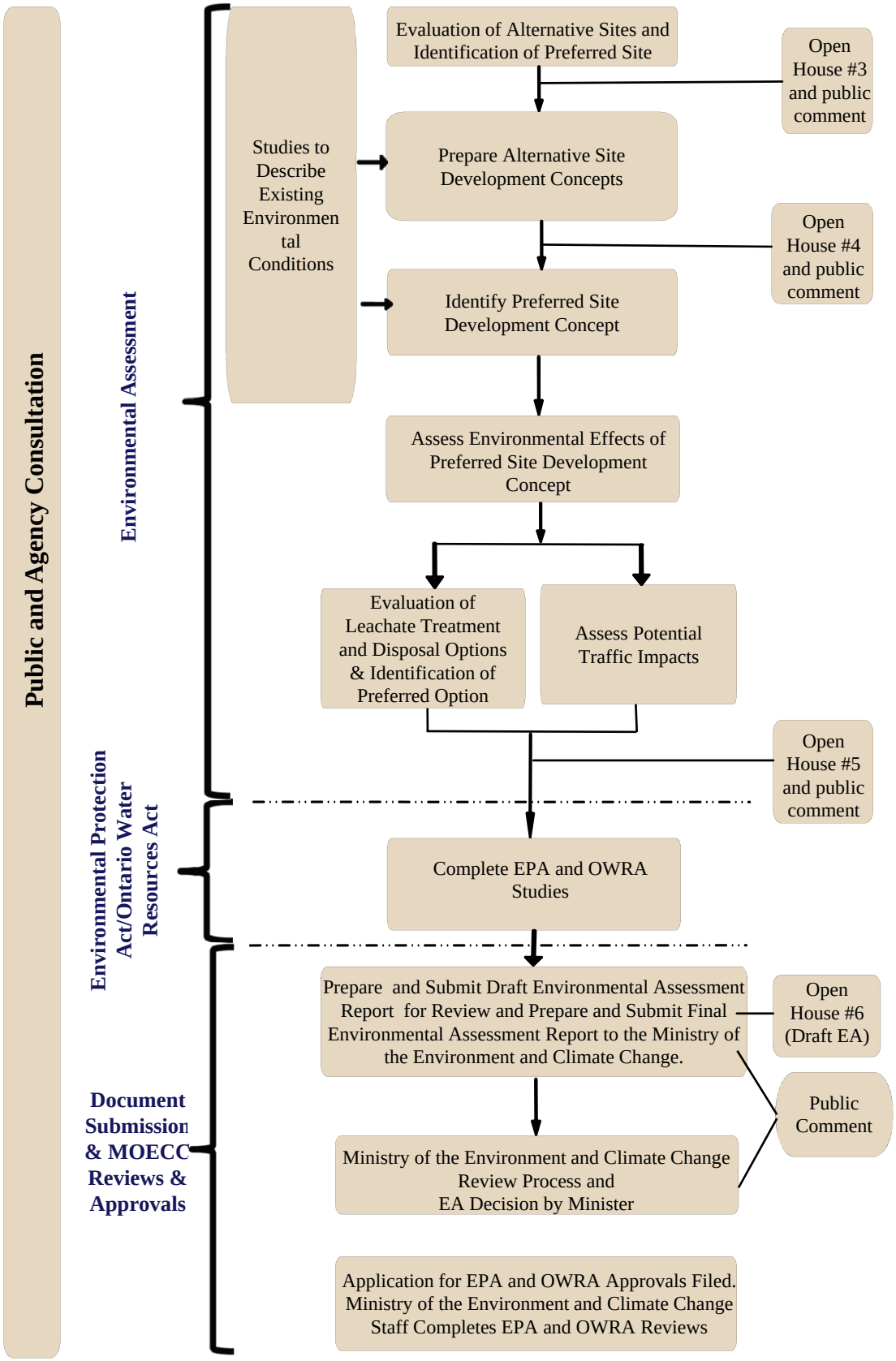
The overall EA/EPA/OWRA process is illustrated in Figure 2.1-1. The first step in the process was to undertake a comparative evaluation of the two alternative Sites and identify a preferred Site. The methods used to complete this step are described in Section 2.2.

Following identification of the Boundary Road Site as preferred, the EA studies and EPA/OWRA studies were then completed for the Boundary Road Site in three phases, as follows:

- Phase 1 was the completion of EA level assessments (using EPA level of detail where appropriate);
- Phase 2 was completion of EPA level activities; and
- Phase 3 was completion of the EA application and documentation package, including the supporting EPA/OWRA level information.

The tasks and methods used to complete this work are summarized in Sections 2.3 to 2.5.

Work plans for the individual environmental components/technical disciplines for the Boundary Road Site are contained in the approved TOR (Appendix A). The approved work plans were used to define baseline conditions and for the assessment of impacts/effects from the preferred Site development concept for the Boundary Road Site. The work plans are provided in the approved TOR (Appendix A).



NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

EA/EPA PROCESS FLOW CHART

Golder Associates

PROJECT No. 12-1125-0045			PHASE No. 4500	
DESIGN	PLE	Nov. 2013	SCALE AS SHOWN	REV.0
GIS	--	--		
CHECK	PLE	Aug. 2014	FIGURE 2.1-1	
REVIEW	PAS	Aug. 2014		

2.2 Comparative Evaluation of Alternative Sites and Identification of Preferred Site

The first step in the process was to undertake a comparative evaluation of the two alternative Sites and identify a preferred Site. This step consisted of three tasks:

- Task 1: describe the alternative Sites;
- Task 2: describe existing conditions through published information and field investigations/assessments for both Sites; and
- Task 3: conduct a comparative evaluation of the two Sites and select a preferred Site.

Taggart Miller secured two potential Sites for development of the proposed CRRRC. These are shown in Figure 1.4-1. The first Site is referred to as the North Russell Road Site. It is located in the northwest part of the Township of Russell, about five kilometres south of Provincial Highway 417 between Boundary Road and the Vars exits. The second Site is referred to as the Boundary Road Site. It is located in the east part of the City of Ottawa just southeast of the Highway 417/Boundary Road interchange.

In the second task, existing conditions for each Site and environmental component were described using published information and preliminary field investigations/assessments on and in the vicinity of each of the Sites. In the third and final task the alternative Sites were compared using the components, criteria, indicators and data sources presented in Appendix A of the approved TOR (Appendix A).

Section 7.0 of this report summarizes the results of the comparative evaluation of alternative Sites, which identified the Boundary Road Site as the preferred Site. Consequently, only the Boundary Road Site assessment work is summarized in the following sections.

2.3 Phase 1 – Boundary Road Site Assessment – Identify Preferred Site Development Concept and Assess Predicted Effects

Taggart Miller completed EA studies on the Boundary Road Site using the environmental components and the study areas described below.

Environmental components were evaluated for the preferred Site development concept at the Boundary Road Site, as specified in the approved TOR:

- Atmosphere (air quality/odour and noise)
- Geology, Hydrogeology & Geotechnical
- Surface Water
- Biology
- Land Use & Socio-economic (including visual)
- Cultural & Heritage Resources (including archaeology)
- Agriculture
- Traffic

The environmental components listed above were assessed using three (3) generic study areas as follows:

- Site – the lands secured by Taggart Miller for the proposed CRRRC at the Boundary Road Site ("the Site");
- Site-vicinity – the lands in the vicinity of the Site (generally 500 metres of the Site boundaries, but modified as determined appropriate for specific environmental components); and
- Haul Routes – the main haul/access route(s) to the Site from Highway 417.

Table 2.3-1 provides a summary of the study area boundaries for each environmental component.

Table 2.3-1: Summary of Environmental Component Study Areas

Environmental Component	On-Site	Site-vicinity	Haul Routes	Modification	Rationale
Atmosphere – Air Quality	✓	✓			
Atmosphere – Noise	✓	✓	✓		
Geology, Hydrogeology & Geotechnical *	✓	✓			
Surface Water	✓	✓		Sub-watershed	To capture the regional context
Biology	✓	✓			
Land Use	✓	✓	✓		
Socio-economic	✓	✓		Ottawa	To capture additional characteristics and census area
Visual	✓	✓			
Cultural Heritage Resources	✓	✓		250 metres	As generally accepted by the Ministry of Tourism, Culture and Sport (MTCS)
Archaeology	✓	✓		3 kilometres	In accordance with Standards and Guidelines for Consulting Archaeologists (MTCS, 2011)
Agriculture	✓	✓		2 kilometres	To capture additional characteristics
Traffic			✓		

Note: * A Regional geology assessment was completed over a 15 by 20 kilometre area.

The assessment of the net impacts at the Boundary Road Site was completed via six tasks as follows and described below:

- Task 1: Complete Assessment of Existing Environment (see Section 8.0 of this EASR);
- Task 2: Identify Preferred Site Development Concept (see Sections 9.0 and 10.0);
- Task 3: Assess Environmental Effects of Preferred Site Development Concept (see Section 11.0);
- Task 4: Assess Haul Route/Traffic (see Section 11.0);
- Task 5: Evaluate Leachate Management Options and Identify Preferred Option (see Section 12.0); and
- Task 6: Cumulative Impact Assessment (see Section 13.0).

The methods used to complete each task are described in the following sections.

2.3.1 Task 1: Complete Assessment of Existing Environment

An initial overview of existing conditions had been developed during the site comparison exercise that led to the identification of the Boundary Road Site as preferred. In this task the existing environment that could potentially be affected by the CRRRC at the Boundary Road Site was further described by the study team within study areas for each of the environmental components listed in Section 2.3. The methods used to complete the assessment of the existing environment are contained in Appendix C-2 (Boundary Road Work Plans) of the approved TOR (Appendix A).

The Atmospheric component was comprised of two subcomponents for the purposes of the Boundary Road Site EA assessment: air quality and noise. Information on existing conditions was obtained from existing data sources, including information available from Environment Canada and the Ontario Ministry of the Environment and Climate Change (MOECC) air quality monitoring data from local stations. Site reconnaissance was conducted to confirm Site conditions. Noise measurement surveys were conducted to determine baseline noise levels at potentially sensitive Points of Reception (PORs).

The Geology, Hydrogeology & Geotechnical component included consideration of groundwater quality, groundwater quantity, seismic and geotechnical conditions. Existing conditions data was updated by compiling and interpreting regional geological information to assess the bedrock structure and the potential for major faults, and conducting a review of information and features in relation to the potential for activity/movement along bedrock faults or in response to seismic events. Subsurface investigations were undertaken to characterize the overburden, geology and physical properties at the Site. Reconnaissance surveys were conducted to document the location and nature of significant subsurface features. Hydraulic conductivity was characterized, seasonal variations in groundwater levels were measured and groundwater samples were collected and analyzed to characterize groundwater quality. A conceptual model of geologic and hydrogeological conditions in the area was prepared.

The Surface Water component included consideration of existing surface water quantity and surface water quality. Surface water quality samples were collected at selected locations and analyzed for a suite of chemical and metal parameters. Surface water flow data upstream and downstream of the Site were summarized. An event based hydrologic model was used to calculate surface water runoff peak flow rates in the area of the proposed facilities for a range of design storms as set out in O. Reg. 232/98 (MOE, 1998a).

The Biology component consisted of an evaluation of existing terrestrial ecosystems and aquatic ecosystems. Readily available literature, data and agency material were identified, obtained and used to assist in describing natural features in the area including past natural feature surveys for the Site and Site-vicinity. A number of Site visits were conducted to verify and assess published information. Several terrestrial surveys were conducted including avian (breeding raptor, owl, breeding birds, eastern Whip-poor-will, Common Nighthawk and Chimney Swift); mammals/deer yard usage; amphibian; reptile; butterfly and dragonfly; and Species at Risk (SAR). Aquatic surveys included fish and benthic community surveys in appropriate seasons.

The Land Use and Socio-economic component considered land uses, employment and economics and visual aesthetics. The study team conducted field reconnaissance to describe the existing visual conditions of the Site from various off-Site viewpoints, reviewed the conceptual Site grading plan, aerial mapping and published information, including Statistics Canada census data. Existing environment information related to current and future land uses was collected during the comparison of alternative Sites and was re-confirmed during this task.

The Cultural & Heritage Resources component considered the cultural landscape and built heritage, and archaeological resources subcomponents. The study team completed an archaeological assessment and cultural heritage evaluation report on-Site and in the vicinity of the Boundary Road Site. An evaluation of properties was completed based on O. Reg. 9/06 (MTCS, 2006) of the *Ontario Heritage Act*.

The Agriculture component considered agricultural land and agricultural operations. The study team completed reconnaissance and Site-specific field studies to confirm data from available information sources. An agricultural capability evaluation was also completed. Cropping patterns and agricultural operations on the Site and adjacent lands were documented. Farm buildings were assessed with respect to current use and potential (original) use. Meetings were held with farmers and local municipal officials to obtain information about agricultural operations.

The Traffic component included consideration of traffic volume and the roadway network. A detailed study of the existing traffic and roadway network was completed, including identifying municipal and provincial design criteria and standards.

2.3.2 Task 2: Identify Preferred Site Development Concept

Two Site development concepts were prepared for the Boundary Road Site. Preparation of the Site development concepts considered many factors including: approximate area required for each facility component, alternative footprints/layouts, Site drainage, maximum landfill elevation and possible airspace requirements, leachate management requirements, Site roads and internal Site traffic flow and geotechnical characteristics.

As described in Section 9.0 of this EASR, input was sought from the public, the MOECC and Aboriginal communities on the alternate Site development concepts. Using the input received and the professional judgement of the study team, the concepts were compared and a preferred Site development alternative – Alternative A – was selected as described in Section 9.0 of this report.

2.3.3 Task 3: Assess Environmental Effects of Preferred Site Development Concept

In this task the EA study team predicted and assessed the net effects of the preferred Site development concept on the existing environment taking into account in-design and other mitigation measures as appropriate. Following are summaries of the methods used. The methods used to assess the effects of each environmental component are described in more detail in Appendix C-2 (Boundary Road Work Plans) of the approved TOR (Appendix A).

The Atmospheric team predicted and assessed air quality and odour emissions from the preferred Site development concept in relation to MOECC standards and criteria. Air emissions including landfill gas (LFG) collection and energy production, on-Site haul roads, excavation operations, waste processing equipment, composting, etc. were estimated. An atmospheric dispersion model (AERMOD) (US EPA, 2013) was used for the predictions and assessment. Noise emissions from equipment, haul roads, excavation operations, etc. were predicted (for worst case scenarios at sensitive PORs) using an ISO 9613 prediction model (ISO, 1993 and 1996).

The Geology, Hydrogeology & Geotechnical team used predictive models to assess the performance of the landfill component as per O. Reg. 232/98 (MOE, 1998a). The potential for change to recharging groundwater conditions and off-Site groundwater resources was evaluated using a flow model. In terms of seismicity, probabilistic seismic hazard models were used to provide estimates of the severity of earthquake shaking and assess the landfill stability. Consideration of seismic hazards for proposed structures at the CRRRC is accounted for in the building code.

The Surface Water team predicted and assessed future surface water runoff, peak flow and water quality conditions for a range of design storm events such as the 2, 5, 25 and 100 year storms. These predictions were compared to existing pre-development conditions to assess surface water quality and quantity impacts from the CRRRC.

Using impact predictions provided by study teams assessing other environmental components, the Biology study team assessed potential effects using both quantitative and qualitative methods.

Similarly, the Land Use and Socio-economic study team assessed potential effects on existing and proposed future land use in the area based on the preferred Site development concept and impact predictions from other study teams. Employment and economic data related to the proposed CRRRC were predicted and assessed, including employment, tax revenue, business impacts and value of goods and services to be generated. A visual assessment was completed using a 3D model of the proposed Site.

The Cultural & Heritage Resources team undertook an archaeological assessment and cultural heritage evaluation in relation to the Boundary Road Site.

The Agriculture study team assessed the potential impact of the CRRRC in relation to on-Site and off-Site agricultural land use. Using the results of predictive assessments carried out by the Atmospheric, Groundwater and Surface Water study teams, the potential effects on agricultural uses was assessed. Potential impacts considered included compatibility of land use, constraints on types of crops, crop yields and limitations on livestock facilities, location and type.

The traffic impact assessment is described below under Task 4: Assess Haul Route/Traffic.

2.3.4 Task 4: Assess Haul Route/Traffic

As a result of the comparative evaluation of the two Sites as described in Section 7.0, the Boundary Road Site was identified as the preferred Site. As such, and in accordance with the approved TOR, the Traffic study team assessed the effects of truck traffic to the Boundary Road Site from Highway 417 and at local intersections. The expected volume and distribution of Site generated trips were estimated. Road improvements or new construction requirements were identified. Potential effects on farm related traffic were also assessed.

2.3.5 Task 5: Evaluate Leachate Management Options and Identify Preferred Option

The evaluation of leachate management options was conducted by the Design and Operations and Surface Water teams. The Surface Water team provided effluent discharge criteria for on-Site treatment alternatives. The D&O team identified options and evaluated them. A number of on-Site leachate treatment technologies were screened and a preferred on-Site treatment option was selected based on demonstrated performance and cost-effectiveness. Off-Site treatment options were then evaluated and alternatives to convey leachate to available off-Site leachate treatment alternatives were considered. A comparison of the preferred on-Site and potential off-Site leachate management options was completed using the criteria provided in Appendix B of the TOR (Appendix A) and the preferred option – trucking to ROPEC – was identified.

2.3.6 Task 6: Cumulative Impact Assessment

The EA team identified one additional certain or probable project/development in the area of the Site. The predicted effect of this project/development was estimated based on publically available information. In addition, existing neighbouring land uses were considered. Each environmental component study team contributed to the assessment. The predicted net effects of the proposed CRRRC project were considered together with the likely overlapping effects of the other identified projects/developments in the area of the Site.

2.4 Phase 2 – EPA Studies

EPA studies and information are reported in two volumes (III and IV). This following section presents an overview of methods used for Task 7: Complete EPA Level Activities for Proposed CRRRC.

2.4.1 Hydrogeology Study Report

Additional analysis was completed as required to address specific approval requirements under the EPA and OWRA. The applications for EPA/OWRA approval for the CRRRC will be submitted following approval of the EA. These applications must be accompanied by a report describing the existing geological, hydrogeological, hydrological and geotechnical conditions of the proposed CRRRC, and the detailed prediction of impacts associated with the preferred Site development concept. This report includes an assessment of the service lives of the engineered components of the disposal component of the CRRRC as compared to its predicted contaminating lifespan and also includes a detailed monitoring program, trigger mechanism and conceptual contingency plans. This report, which is commonly referred to as the ‘Hydrogeology Study Report’, has been prepared and is being submitted as a supporting document to this EASR and is included in Volume III.

2.4.2 Design and Operations Report

A D&O Report is also required to support the EPA/OWRA applications, specifically under Sections 9 and 27 of the EPA and Section 53 of the OWRA. The D&O Report is also being submitted as a supporting document to this EASR and is contained in Volume IV. It contains the following assessments, designs and components:

- Stormwater management (SWM);
- Leachate management;
- Acoustic management;
- Air quality and odour assessment; and
- Site design and operations.

2.5 Phase 3 – Completion of EA Documentation Package

This EASR, together with the reports necessary for the applications for approval under the EPA and OWRA, are being submitted to the MOECC as a single package (contained in four individual volumes). This combined submission is intended to meet the requirements of all of the MOECC approval processes for the proposed CRRRC (overall Site development, residuals disposal component, diversion components and ancillary operational features). The formal EPA/OWRA applications including the required details on financial assurance, will be submitted only once the EA is approved. Depending on the EA conditions of approval or comments received on the EA, it may be necessary to supplement the EPA/OWRA reports already submitted as part of this EASR package. It is anticipated that this will be done in the form of addenda.