APPENDIX TSD#1-A

Atmospheric Component

February 2013

Atmospheric Component
Appendix TSD#1-A

COMPARATIVE EVALUATION OF ALTERNATIVE SITES

TAGGART GROUP OF COMPANIES

miller THE MILLER GROUP

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INTRODUCTION

Two properties that are owned or have been optioned by Taggart Miller have been identified for the proposed Capital Region Resource Recovery Centre (CRRRC) (the Alternative Sites). The Alternative Sites are described below:

- **North Russell Road Site (NRR Site)** – located in the northwest part of the Township of Russell about three kilometres east of the boundary with the City of Ottawa, and about five kilometres south of Provincial Highway 417 between the Boundary Road and Vars exits. The property consists of about 193 hectares (476 acres) of contiguous lands on Part of Lots 18 and 19, Concessions III and IV, Township of Russell.
- **Boundary Road Site (BR Site)** – located in the east part of the City of Ottawa, in the former Township of Cumberland and just southeast of the Highway 417/Boundary Road interchange. The property is on the east side of Boundary Road, east of an existing industrial park, north of Devine Road and west of Frontier Road. The property consists of about 175 hectares (430 acres) of land on Lots 23 to 25, Concession XI, Township of Cumberland.

The CRRRC is proposed to provide facilities and capacity for recovery of resources and diversion of material from disposal generated by the industrial, commercial and institutional (IC&I) and construction and demolition (C&D) sectors primarily in Ottawa and secondarily a portion of eastern Ontario, for management and utilization of surplus and contaminated soils, as well as landfill disposal capacity for material that is not diverted.

1.0 ASSESSMENT CRITERIA, INDICATORS AND DATA SOURCES

The atmospheric component compared the Alternative Sites using the following criterion:

- Which site is preferred regarding potential effects due to air quality and noise?

The indicator is:

- The number, type and location of off-Site receptors in the Site-vicinity (within 500 metres (m) of the Site boundary).

The data sources used included aerial photographic mapping and field reconnaissance, land-use and zoning maps and consultation with Russell Township and the City of Ottawa (as required).

2.0 PRELIMINARY DESCRIPTION OF EXISTING ENVIRONMENT

The following sections describe the existing environmental conditions for the atmospheric component at each of the Alternative Sites based on the preliminary investigations and assessments.

2.1 Air Quality – General

The existing concentrations of indicator compounds in the region were noted as background information. The number and location of off-Site sensitive receptors in the Site-vicinity were evaluated. The Ontario Ministry of the Environment (MOE) considers potential receptors to be "sensitive receptors", where sensitive receptors are locations such as residential dwellings, childcare facilities, hospitals, hotels, campsites and places of worship.

Indicator compounds represent compounds that may be emitted from Site operations, waste processing and landfilling operations. Particulate matter is typically associated with airborne dust from vehicles travelling on on-Site paved roads and unpaved roads/haul routes, as well as material loading and unloading activities. Products of combustion (NO_X, NO_2, SO_2 and CO) are associated with the exhaust from on-Site vehicles. Potential emissions of hydrogen sulphide, vinyl chloride, methane and subsequent odours are the result of breakdown of waste material within the landfill or associated with the proposed organics processing (anaerobic digestion).

In Ontario, limits and guidelines for regulating air quality are established under Ontario Regulation (O. Reg.) 419/05 (Air Pollution – Local Air Quality) (MOE 2005). These include standards, point-of-impingement (POI) guidelines and ambient air quality criteria (AAQC) for various compounds (MOE 2012). The AAQC are commonly used in assessments of general air quality in a community, whereas the standards and POI guidelines are used to assess specific impacts of an individual facility for compliance and permitting requirements. The limits outlined in O.Reg. 419/05 must typically be met at the property line of the facility. For certain compounds, typically nuisance-based (such as odour), compliance is evaluated at the specific sensitive receptors.

In addition, there are two sets of federal objectives and criteria; namely, the National Ambient Air Quality Objectives (NAAQOs) and the Canada-Wide Standards (CCME 1999). The federal objectives and standards are benchmarks that are used to facilitate air quality management on a regional scale, and provide national goals for outdoor air quality that protect public health, the environment or aesthetic properties of the environment.

2.1.1 Existing Air Quality

In characterizing the existing environment for air, no Site-specific air quality monitoring was conducted. Instead, background air quality was determined from MOE monitoring stations. The closest air quality monitoring stations to the proposed Undertaking are the two stations located in Ottawa: Ottawa Downtown and Ottawa Central. The relative locations of the air monitoring stations to the two alternative Sites for the proposed Undertaking are summarized in Table 2.1-1.

Table 2.1-1: Location of Air Monitoring Stations

City	Station ID	Location	Lat/Long	Average Distance to Sites (km)	Direction
Ottawa Downtown (Ottawa DT)	51001	Outside Site-Vicinity	44.1502528, -77.3955	22	West-Northwest (generally upwind)
Ottawa Central (Ottawa C)	51002	Outside Site-Vicinity	45.033333 -75.675	23	West-Northwest (generally upwind)

At each station, not all compounds have the same data availability, as the monitoring of some compounds is added to the station while others are discontinued. Table 2.1-2 provides a summary of the monitoring data available from each of these stations.

Table 2.1-2: Availability of Ambient Air Quality Data

Compound	Ottawa DT	Ottawa C
SPM	N/A	N/A
PM_{10}	N/A	N/A
$PM_{2.5}$	2003-2011	2007-2011
NO_x	2000-2011	2007-2011
NO_2	2000-2011	2007-2011
SO_2	2001, 2003-2011	2007-2009
CO	2001, 2003-2011	2007-2009

Note: "NA" indicates that data for the compound were not available at that station.

The historic monitoring data for the two stations evaluated indicate that the compound levels in the area are typical when compared to other locations in Southeastern Ontario. All measured values were below their respective AAQC values. The existing values considered to be representative of background air quality are outlined in Table 2.1-3. Generally, the 90^{th} percentile of measured concentration is considered representative of local background air quality.

Table 2.1-3: Background Air Quality Values (90th Percentile, Average for Annual Only)

Compound	Averaging Period	Ottawa DT (µg/m³)	Ottawa C (µg/m³)
$PM_{2.5}$	24-hour	12.26	9.92
NO_X	1-hour	62.07	37.62
	24-hour	57.12	35.17
	Annual	28.76	16.92
NO_2	1-hour	45.14	31.98
	24-hour	38.83	26.01
	Annual	20.45	13.30
SO_2	1-hour	7.86	5.24
	24-hour	7.64	6.02
	Annual	2.94	2.52
CO	1-hour	722.65	389.38
	8-hour	827.44	449.51

Note: µg/m^3 = micrograms per cubic metre

These stations are considered indicative of background air quality levels for both the NRR Site and the BR Site. The ambient air quality for the assessment of the preferred Site will include the contribution from all project works and activities from the preferred Site, as well as the background air quality concentrations. A separate assessment will be conducted to determine compliance with O. Reg. 419/05, which requires evaluation of project works and activities only (i.e., no background air quality added).

2.2 North Russell Road Site

2.2.1 Air

As described in Section 2.1, in Ontario compliance is determined at the property line of the Facility for the majority of compounds. The potential impact of compounds associated with the Undertaking at the property will be based on the actual design of the operations (e.g., number and types of equipment, size of open landfill working area, landfill gas collection systems), which are not fully defined at this point in time. For compounds with nuisance based effects, such as odour, compliance is based on distance to the sensitive receptor (also referred to as point-of-reception [POR]). All concentrations associated with project works and activities decrease with distance from the Site, therefore those PORs located closest to the Undertaking have the greatest potential for air quality impacts.

Based on the Site reconnaissance, 25 sensitive receptors have been identified within the Site-vicinity as shown on Figure 2.2-1. Of these, 13 are located adjacent to the property line, mostly on the west side of the Site. Two PORs were identified on the NRR Site property; however it is understood that these would be removed when the Undertaking is established, therefore they were not considered in the analysis.

LEGEND

- POINT OF RECEPTION
- WATER COURSE
- PROPERTY BOUNDARY

500 250 0 500

SCALE 1:20,000 METRES

NOTE

THIS FIGURE IS TO BE READ IN CONJUCTION WITH THE ACCOMPANYING APPENDIX TSD1-A

REFERENCE

BACKGROUND IMAGERY - BING MAPS AERIAL (C) 2010 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2012.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT
ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE
NORTH RUSSELL ROAD SITE ATMOSPHERIC RECEPTORS

Golder Associates
Ottawa, Ontario

PROJECT NO. 12-1125-0045			SCALE AS SHOWN	REV. 0
DESIGN	DD	JAN. 2013	FIGURE 2.2-1	
GIS	PJM	JAN. 2013		
CHECK	PLE	AUG. 2014		
REVIEW	PAS	AUG. 2014		

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2.2.2 Noise

The PORs located in the NRR Site-vicinity may be defined as Class 3 rural, as per MOE Publications NPC-232 and NPC-233 (MOE 1995a, 1995b). A Class 3 area can best be described as a rural area with an acoustical environment that is dominated by natural sounds, having little road traffic. The sound level limit for the PORs in a Class 3 area can be described as follows:

The energy averaged sound level (L_{eq}) produced by a source at a POR location in any one hour period should not exceed the greater of; the energy averaged sound level produced by road traffic in the same hour period, or 45 dBA [decibals] in the daytime period of 07:00-19:00, or 40 dBA in the evening period of 19:00-23:00 and 40 dBA in the night-time period of 23:00-07:00.

Twenty-five PORs have been identified as being the most sensitive potential receptors in the vicinity of the Undertaking as shown on Figure 2.2-1.

2.2.3 Summary of NRR Site Considerations

Table 2.2-1: Summary of NRR Site Considerations

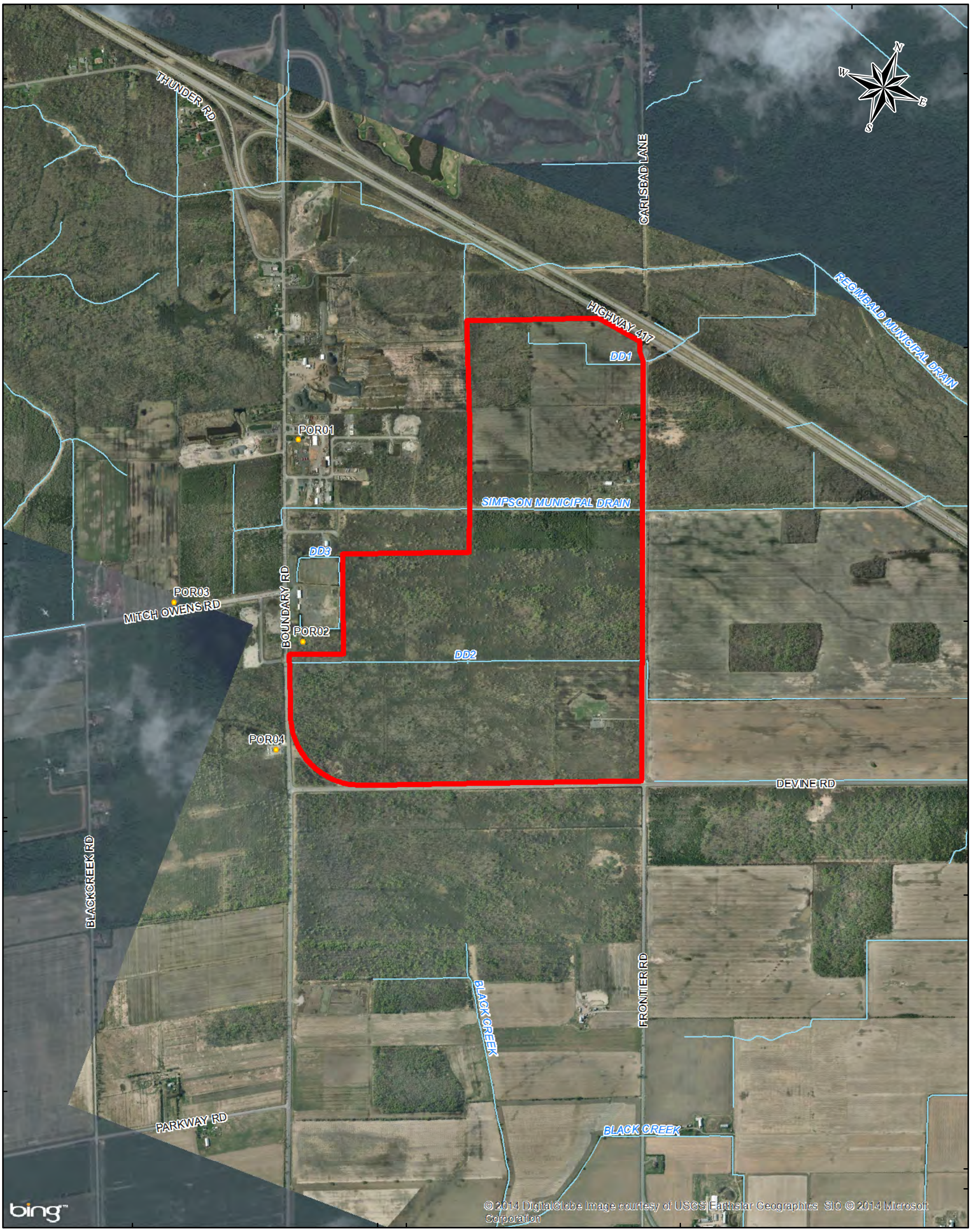
Component	Summary of Site Considerations
Atmospheric	■ Existing background air quality levels are below current AAQC limits. ■ Existing noise levels consistent with a Class 3 area as defined by the MOE in NPC-232 (i.e., 45 dBA daytime and 40 dBA nighttime). ■ Quiet rural environment. As such, the Undertaking is expected to likely result in a change to existing noise levels. ■ Relatively long alternative off-Site haul routes, with variable amounts and types of adjacent land uses as described in the traffic assessment in Appendix TSD#1-I. ■ Twenty-five PORs in the Site-vicinity (i.e., within 500 metres of the Site boundary). ■ Thirteen of these PORs adjacent to the Site boundaries.

2.3 Boundary Road Site

2.3.1 Air

As described in Section 2.1, in Ontario compliance is determined at the property line of the Facility for the majority of compounds. The potential impact of compounds associated with the Undertaking at the property will be based on the actual design of the operations (e.g., number and types of equipment, size of open landfill working area, landfill gas collection systems), which are not fully defined at this point in time. For compounds with nuisance based effects, such as odour, compliance is based on distance to the POR. All concentrations associated with project works and activities decrease with distance from the Site, therefore those PORs located closest to the Undertaking have the greatest potential for air quality impacts.

Based on the Site reconnaissance, 4 sensitive receptors have been identified within the Site-vicinity as shown on Figure 2.3-1. Of these, only one is directly adjacent to the property line and all are on the west side of the Site. Three receptors were identified on the BR Site property; however it is understood that these have been acquired and will be removed when the Undertaking is established, therefore they were not considered in the evaluation.



LEGEND

- POINT OF RECEPTION
- SURFACE WATER FEATURE
- PROPERTY BOUNDARY

500 250 0 500

SCALE 1:15,000 METRES

NOTE

THIS FIGURE IS TO BE READ IN CONJUCTION WITH THE ACCOMPANYING APPENDIX TSD1-A

REFERENCE

BACKGROUND IMAGERY - BING MAPS AERIAL (C) 2010 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
AERIAL PHOTOGRAPHS PURCHASED FROM THE CITY OF OTTAWA.
LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2012.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 18

PROJECT
ENVIRONMENTAL ASSESSMENT OF THE
CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE
BOUNDARY ROAD SITE
ATMOSPHERIC RECEPTORS

Golder Associates
Ottawa, Ontario

PROJECT No. 12-1125-0045			SCALE AS SHOWN	REV. 0.0
DESIGN	DD	JAN. 2013	FIGURE 2.3-1	
GIS	PJM	JAN. 2013		
CHECK	PLE	AUG. 2014		
REVIEW	PAS	AUG. 2014		

Path: N:\Active\Spatial_IM\Miller_Paving_Ltd\CRRRC\GIS\MXDs\12-1125-0045\Reporting\Phase4000\TSD1\121125045-4000-0110-2.3-1_BoundaryRdSite_POR.mxd

2.3.2 Noise

The PORs located in the BR Site-vicinity may be defined as Class 2 urban for PORs in proximity to Highway 417 and Class 3 rural for PORs further away from the highway, in accordance with MOE Publications NPC-205 (MOE 1995c), NPC-232 and NPC-233 (MOE 1995a, 1995b). A Class 2 area can best be described as an urban/suburban blend; whereby sound levels are moderately high during the day (typically 0700-1900) but decrease during the evening (typically 1900-2300) and night-time hours (typically 2300-0700).

The sound level limit for the PORs in a Class 2 area is described as follows;

The energy averaged sound level (L_{eq}) produced by a source at a POR location in any one hour period should not exceed the greater of; the energy averaged sound level produced by road traffic in the same hour period, or 50 dBA in the daytime period of 07:00-19:00, or 45 dBA in the evening period of 19:00-23:00 and 45 dBA in the night-time period of 23:00-07:00.

Existing noise levels for the Class 3 PORs for the BR Site would be similar to those at the NRR Site (i.e., 45 dBA daytime and 40 dBA nighttime).

Four PORs have been identified as being the most sensitive receptors in the vicinity of the Undertaking as shown on Figure 2.3-1.

2.3.3 Summary of BR Site Considerations

Table 2.3-1: Summary of BR Site Considerations

Component	Summary of Site Considerations
Atmospheric	■ Existing background air quality levels are below current AAQC limits. ■ Existing noise levels consistent with Class 2 and Class 3 areas as defined by the MOE in NPC-205 and NPC-232, respectively (i.e., 50 dBA daytime / 45 dBA nighttime and 45 dBA daytime / 40 dBA nighttime). ■ Traffic along Highway 417 results in higher background noise levels. As such, the Undertaking is expected to result in a relatively small change to existing noise levels. ■ Relatively short off-Site haul route with mostly commercial adjacent land uses as described in the traffic assessment in Appendix TSD#1-I. ■ Four PORs in the Site-vicinity (i.e., within 500 metres of the Site boundary). ■ One POR adjacent to the Site boundary.

3.0 SITE COMPARISON – ATMOSPHERIC

3.1 Comparison of Sites

In comparing the NRR Site and the BR Site with respect to air and noise, the number of PORs within 500 metres of the Site boundary was the approved indicator. The BR Site has far fewer PORs that could be potentially affected due to air and noise emissions from the Undertaking and is therefore the preferred Site for this criterion.

In comparing the two Sites, the following conclusions can be made:

- There are far fewer PORs in the Site-vicinity of the BR Site;
- The existing noise levels at some of the PORs in the Site-vicinity of the BR Site will have an elevated background noise level due to Highway 417:
  - These PORs will experience a smaller change in noise levels due to the Undertaking;
- There are far fewer PORs directly adjacent to the BR Site boundary;
- Considering that the prevailing wind direction is from the west, in terms of PORs and potential associated effects, there are no PORs immediately east (downwind) of the BR Site; and,
- The off-Site haul route for the BR Site is shorter and will result in smaller changes in noise levels due to the proximity to Highway 417.

3.2 Results of Site Comparison

Based on the comparative analysis summarized above, the BR Site is the preferred alternative for both air and noise constituents of the atmospheric environment.

REFERENCES

Canadian Council of Ministers of the Environment (CCME). 1999. *Canadian Environmental Quality Guidelines. Available at: http://www.ccme.ca/publications/ceqg_rcqe.html*

Ontario Ministry of the Environment (MOE). 1995a. Sound Level Limits for Stationary Sources in Class 3 Areas (Rural). October 1995.

MOE. 1995b. Information to be Submitted for Approval of Stationary Sources of Sound. October 1995.

MOE. 1995c. Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban). October 1995.

MOE. 2005. Ontario Regulation 419/05 – Air Pollution - Local Air Quality.

MOE. 2012. Summary of Standards and Guidelines to support Ontario Regulation 419/05 – Air Pollution – Local Air Quality (including Schedule 6 of O.Reg.419/05 on Upper Risk Thresholds (sorted by contaminant name). Standards Development Branch PIBS 6569e01.