

## Acoustic Assessment Report

Spencer Pit

Prepared for: Tri City Lands Ltd.

Disclaimer – Please note, Conestoga-Rovers & Associates (CRA) changed its name to GHD Limited on July 1, 2015. This document was originally submitted under the CRA name prior to this date. However, in the interest of continuity, the CRA name will remain on this document after July 1, 2015.

### **Conestoga-Rovers & Associates**

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## Section 1.0 Introduction

Conestoga-Rovers & Associates (CRA) was retained to prepare an Acoustic Assessment Report (AAR) for the proposed Tri City Lands Ltd. (Tri City) Spencer Pit site (Site) located at the border of Cambridge and Guelph, Ontario, in accordance with the Aggregate Resources Act (ARA) administered by the Ministry of Natural Resources (MNR), and the Environmental Protection Act (EPA) administered by the Ontario Ministry of the Environment (MOE).

The ARA requires an AAR to be submitted along with the Category 3 Class 'A' License Application. This AAR also fulfills the acoustic assessment requirement under the EPA.

Tri City is planning to operate an aggregate (sand and gravel) extraction and processing site located at 6939 Wellington Road 124 in Guelph, Ontario (Site). The Site has 5 separate extraction areas referred to as "Area 1", "Area 2", "Area 3", "Area 4A", and "Area 4B", as well as a "Temporary Plant Site" and a "Permanent Plant Site", where the wash pond and scrap storage will be located. The "Temporary Plant Site" will be located as indicated on Figure 1a. The "Permanent Plant Site" will be constructed as indicated on Figure 1b. Operations will start in "Area 1" and progress to "Area 4B" and may occur at any of these areas simultaneously. The operations will involve a front end loader moving material to a screener to separate material into sizes, which will then be transported via trucks to a set of impact and cone crushers where the material will be reduced to smaller sizes. Products will then be washed and transported off-site for delivery to customers.

The Site may operate Monday through Friday from 7:00 a.m. to 7:00 p.m. Shipping is expected to occur Monday through Friday from 6:00 a.m. until 7:00 p.m. as well as Saturdays from 6:00 a.m. until 6:00 p.m.

The AAR presented herein provides an evaluation of the potential off-site noise impacts from the Site's significant environmental noise sources during normal operations. The AAR was prepared consistent with the following MOE guidance:

- NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October 1995
- "Appendix A – Supporting Information for an Acoustic Assessment Report or Vibration Assessment Report Required by a Basic Comprehensive C of A" as specified in the MOE guidance entitled "Basic Comprehensive Certificates of Approval (Air) – User Guide", April 2004
- NPC-300, "Stationary and Transportation Sources – Approval and Planning", October 2013
- NPC-103, "Procedures", August 1978

The Site is located on land currently zoned for Agricultural use. The lands surrounding the Site are designated as Agricultural, Mineral Aggregate Area, Hazard and Extractive Industrial and Mineral Aggregate Resources Areas Land uses. A zoning map and definitions are provided in Appendix A.

The Site is located in an Acoustical Class 1 area based on heavy traffic observed along Hespeler Road/Wellington Road 124.

The Site topography was included in this analysis.

## **Section 2.0 Noise Source Summary**

This AAR focused on the sound emissions from the noise sources identified at the Site with the potential to adversely impact the sensitive receptors. The Noise Source Summary is provided in Table 1 and the significant noise source locations are identified on Figures 1a and 1b. CRA evaluated the following significant noise sources identified by the Cadna modelling ID number:

- Three truck travel routes (Sources T1, T2, and T4)
- Front end loader travel routes (Sources T3, T5 – T8 )
- One wash plant (Source S1)
- One impact crusher (Source S2)
- One cone crusher (Source S3)
- One screener (Source S4)
- One idling truck at scale (Source T6 or T9 depending on operating scenario)

All significant steady-state noise sources have been included in this AAR. There are no expected sources of impulse noise or vibration at the Facility.

## **Section 3.0 Point-of-Reception Summary**

The identification of appropriate sensitive point(s)-of-reception is necessary to conduct the assessment for the Site. A "point-of-reception" is any point on the premises of a person where sound, originating from other than those premises, is received. The point-of-reception may be located on permanent or seasonal residences, hotels/motels, nursing/retirement homes, rental residences, hospitals, campgrounds, schools, or places of worship.

The objective of this AAR is to determine the predictable worst-case 1-hour equivalent sound level (1-hour Leq) at the worst-case point(s)-of-reception. The worst-case point(s)-of-reception is (are)

defined as the sensitive receptor(s) with the greatest potential exposure to the Site noise sources due to proximity and direct line-of-sight exposure.

The worst-case sensitive point(s)-of-reception (POR) are:

- POR1 – nearest façade of a single-storey residence on Hespeler Road approximately 200 metres (m) south west of the site (1.5 m above grade [AG])
- POR1A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR2 – nearest façade of a two-storey residence on Hespeler Road approximately 40 m south west of the site (4.5 m AG)
- POR2A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR3 – nearest façade of a single-storey residence at the intersection of Hespeler Road and Kossuth Road approximately 100 m north west of the site (1.5 m AG)
- POR3A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR4 – nearest façade of a two-storey residence on Hespeler Road approximately 100 m west of the site (4.5 m AG)
- POR4A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR5 – nearest façade of a two-storey residence on Hespeler Road approximately 40 m north west of the site (4.5 m AG)
- POR5A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR6 – nearest façade of a single-storey residence on Hespeler Road approximately 40 m north west of the site (1.5 m AG)
- POR6A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR8 – nearest façade of a single-storey residence on Hespeler Road approximately 40 m north west of the site (1.5 m AG)
- POR8A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR9 – nearest façade of a single-storey residence on Hespeler Road approximately 120 m north of the site (1.5 m AG)
- POR9A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)
- POR10 – nearest façade of a single-storey residence on Hespeler Road approximately 200 m north of the site (1.5 m AG)
- POR10A – outdoor leisure area within 30 m of POR1 in the direction of the Site (1.5 m AG)

The locations of the worst-case PORs are identified on Figures 1a and 1b.

To be conservative, all POR locations within 1,000 m of the Site were considered; however, the noise impact at the worst-case and most exposed PORs are presented herein.

## **Section 4.0 Sound Level Data**

### **4.1 Noise Specifications**

Noise data for the trucks and front-end loaders travel routes was obtained from the Department for Environment Food and Rural Affairs (DEFRA) document titled "Construction Noise Database (Phase 3) – Database of noise emissions from equipment used on construction and open sites", dated September 2008. Data specific to sand and gravel operations was used for consistency.

### **4.2 Short-Term Steady State Sound Level Measurements**

Short-term sound level measurements were necessary in order to assess the worst-case off-site potential noise impact since manufacturer specifications were not available.

Short-term sound level measurements of representative equipment located at Tri City's Petersburg site were taken using a Bruel-Kjaer 2250 System inclusive of a Type 1 Precision Sound Level Meter (SLM), Model 2250 (Serial Number 2619795); and a 1/2-inch free field condenser microphone Model 4189 (Serial Number 2616511). The SLM was calibrated and checked at 114 decibels (dBA) before and after each measurement period using a Bruel-Kjaer Type 4231 Acoustic Calibrator (Serial Number 2477782).

The sound descriptor used in the impact evaluation is the 1-hour Leq, which is a time weighted energy average of the source. The Leq sound measurements consisted of short-term readings taken over an observation time of 15 second intervals with the detector in slow response using A-weighting, such that the sound levels are reported in units of dBA. All measurements were recorded and stored in the SLM. In accordance with NPC-103 "*Procedures, August 1978*" (NPC-103), at least three measurements were taken for each of the Site noise sources.

Sound level measurements were taken at a reference distance depending on the height of the source(s) being measured and proximity to other noise sources. The location and reference distance were selected to ensure that the measurement was a valid representation of the dominant source(s) being measured. The measurement location was selected in order to measure the sound emitted in the direction of the worst-case exposure in line with the nearby sensitive receptors wherever possible and/or to minimize the influence of other noise sources and directivity issues.

The noise measurement data is summarized in Table C.1.



### 4.3 Baseline Noise Assessment

A Baseline Noise Assessment (BNA) was conducted at a suitable location along Hespeler Road/Wellington Road 124 and was situated between all receptors in order to quantify the existing background sound levels.

The BNA was conducted using a Larson-Davis 820 Long-Term SLM, Model 820 (Serial Number 1949); and a ½ - inch free field condenser microphone Model 2560 (Serial Number 3390). The system was calibrated and checked at 114 decibels (dBA) before and after the measurement period using a Larson-Davis CAL200 Acoustic Calibrator (Serial Number 4206). The equipment continuously monitors sound and generates sound levels and statistics of interest for each one-hour measurement interval.

Unattended continuous monitoring was conducted for a period of over 7 days and included a full weekend. Noise data was collected at Location 1 (L1) from September 11, 2013, to September 19, 2013. Location L1 was approximately 2 m above grade and is presented on Figure 1A and 1B.

The background sound levels were significantly elevated due to traffic along Hespeler Road/Wellington Road 124.

Short-term sound level measurements were also taken along Hespeler Road/Wellington Road 124 in front of POR1/POR2, POR3 and POR8. Measurements were consistent with the long-term measurement data.

Short-term sound level measurements along Hespeler Road/Wellington Road 124 were taken using a Bruel-Kjaer 2250 System inclusive of a Type 1 Precision Sound Level Meter (SLM), Model 2250 (Serial Number 2619795); and a 1/2-inch free field condenser microphone Model 4189 (Serial Number 2616511). The SLM was calibrated and checked at 114 decibels (dBA) before and after each measurement period using a Bruel-Kjaer Type 4231 Acoustic Calibrator (Serial Number 2477782).

Meteorological weather conditions during the noise-monitoring period were obtained from the Environment Canada website. The Guelph Turfgrass weather station data was used to estimate adverse weather conditions that could have affected the sound level measurements and were considered in validating the minimum background levels.

The measurement data is presented in Table B.1.

### Section 5.0 Assessment Criteria

Assessment criteria may be determined for a POR based on the MOE's minimum exclusionary sound level limits in comparison to the background sound levels experienced in the area. The "background

sound level" is defined as the sound level present in the environment that is produced by noise sources other than those from the Site, and would include traffic sound levels and sound from neighboring industrial/commercial activity. The higher of the two assessment criteria is selected for purpose of assessment.

The Site is located in an Acoustic Class 1 Area based on the proximity to Hespeler Road/Wellington Road 124.

Class 1 Areas have the following generic minimum sound level limits expressed as a 1-hour Leq:

| <i>Time of Day</i>      | <i>Minimum Sound Level</i> |
|-------------------------|----------------------------|
| 7:00 a.m. to 11:00 p.m. | 50 dBA                     |
| 11:00 p.m. to 7:00 a.m. | 45 dBA                     |

Since the BNA conducted showed that the existing 1-hour Leq values are significantly elevated due to heavy traffic, the following site specific site limits were used for the purpose of the AAR:

| <i>Point-of-Reception</i> | <i>Time of day</i>           |                              |
|---------------------------|------------------------------|------------------------------|
|                           | <i>7:00 a.m. – 7:00 p.m.</i> | <i>7:00 p.m. – 7:00 a.m.</i> |
| POR1                      | 64 dBA                       | 58 dBA                       |
| POR1A                     | 67 dBA                       | 61 dBA                       |
| POR2                      | 64 dBA                       | 58 dBA                       |
| POR2A                     | 67 dBA                       | 61 dBA                       |
| POR3                      | 61 dBA                       | 55 dBA                       |
| POR3A                     | 63 dBA                       | 57 dBA                       |
| POR4                      | 63 dBA                       | 57 dBA                       |
| POR4A                     | 65 dBA                       | 59 dBA                       |
| POR5                      | 64 dBA                       | 58 dBA                       |
| POR5A                     | 67 dBA                       | 61 dBA                       |
| POR6                      | 64 dBA                       | 58 dBA                       |
| POR6A                     | 68 dBA                       | 62 dBA                       |
| POR8                      | 66 dBA                       | 60 dBA                       |
| POR8A                     | 75 dBA                       | 69 dBA                       |
| POR9                      | 63 dBA                       | 57 dBA                       |
| POR9A                     | 66 dBA                       | 60 dBA                       |
| POR10                     | 64 dBA                       | 58 dBA                       |
| POR10A                    | 68 dBA                       | 62 dBA                       |

Site specific limits were determined based on the lowest measured 1-hour Leq for both the daytime and nighttime periods as shown in Table B.2. The lowest measurements were recorded on Sunday, September 15, 2013, at 4:00 a.m. and 7:00 a.m. The above site-specific limits are considered to be conservative as there is typically less traffic on weekends and no overnight Site operations except for loading and shipping for special public contracts. When the Site would typically operate, the 1-hour Leq sound levels were higher than these two data points that were selected, therefore the assessment was highly conservative.

## Section 6.0 Impact Assessment

The worst-case assessment of steady-state noise sources at the selected points-of-reception was based on representative noise specifications and measured sound level data. Cadna A Acoustical Modelling Software (Cadna A), version 4.4, was used to model the potential impacts of the significant noise sources. Cadna A calculates sound level emissions based on the ISO 9613-2 standard "Acoustics – Attenuation of Sound during Propagation Outdoors".

The worst-case cumulative unattenuated sound levels estimated at the receptor(s) included attenuation affects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity, as applicable for all significant noise sources off-site buildings were input as intervening structures.

Cadna A modelling assumptions used in this AAR included:

- Noise Sources: All sources were modelled using the 1/1 octave band data from source measurements or approved reference materials. Moving point-line sources are based on the input sound level data and the physical dimensions of the travel path for the mobile sources.
- Noise Source Elevation: The heights of the sources are summarized in Table C.1 of Appendix C.
- Reflection Order: A maximum reflection order of 1.0 was used to evaluate indirect noise impact from one reflecting surface.
- Ground Absorption: An absorption value of 1.0 was used to represent the ground cover for areas surrounding the Site and a value of 0.5 was used for gravel cover on the Site. Absorption values of 0.25 and 0 were used to represent paved roads and adjacent quarry ponds.
- Receptor elevation: POR receptor heights were modelled appropriately to represent the worst-case elevation as detailed in Section 3.
- Time-weighted Adjustment: No time-weighted adjustments were applied to any sources.
- Tonality: Sources S1 to S4 were observed to be tonal and assigned a 5 dBA penalty.

CRA acknowledges the potential for nighttime deliveries at this Site, therefore, two operational scenarios were evaluated:

- Normal daytime extraction activities (7:00 a.m. to 7:00 p.m.) – Areas 1 to 4B
- Nighttime shipping activities (6:00 a.m. to 7:00 p.m.) – Main truck route, front end loader and scalehouse (Sources T1, T7, and T9)

The cumulative worst-case attenuated one-hour Leq sound levels were estimated at the PORs for Areas 1 through 4B and the shipping operations are summarized in Tables 2A through 2F, respectively. The estimated sound levels meet the criteria outlined in Section 5.0 and are based on the construction of a 4 m tall berm along the Site's property line. For the purposes of the AAR, it was assumed that the equipment was operating at the worst-case location in relation to the nearest POR and within 40 m of the boundary of each area.

The berm will be constructed in sections depending on the location of the operations. Berm sections 1 and 3, as indicated on Figures 1a and 1b, will be constructed prior to start of Site operations and will remain in place until the end of operations. Berm section 2 will be constructed prior to start of operations in Area 3 and will remain until the end of Site operations. The berm construction and other site preparation activities are exempt from ECA approval requirements. The extent, heights and location of the berm sections are presented on Figures 1a and 1b.

## Section 7.0 Conclusions

The attenuated steady-state sound levels estimated at the existing PORs are below the site-specific sound level limits, as summarized in Table 3.

## Section 8.0 Technical Recommendations

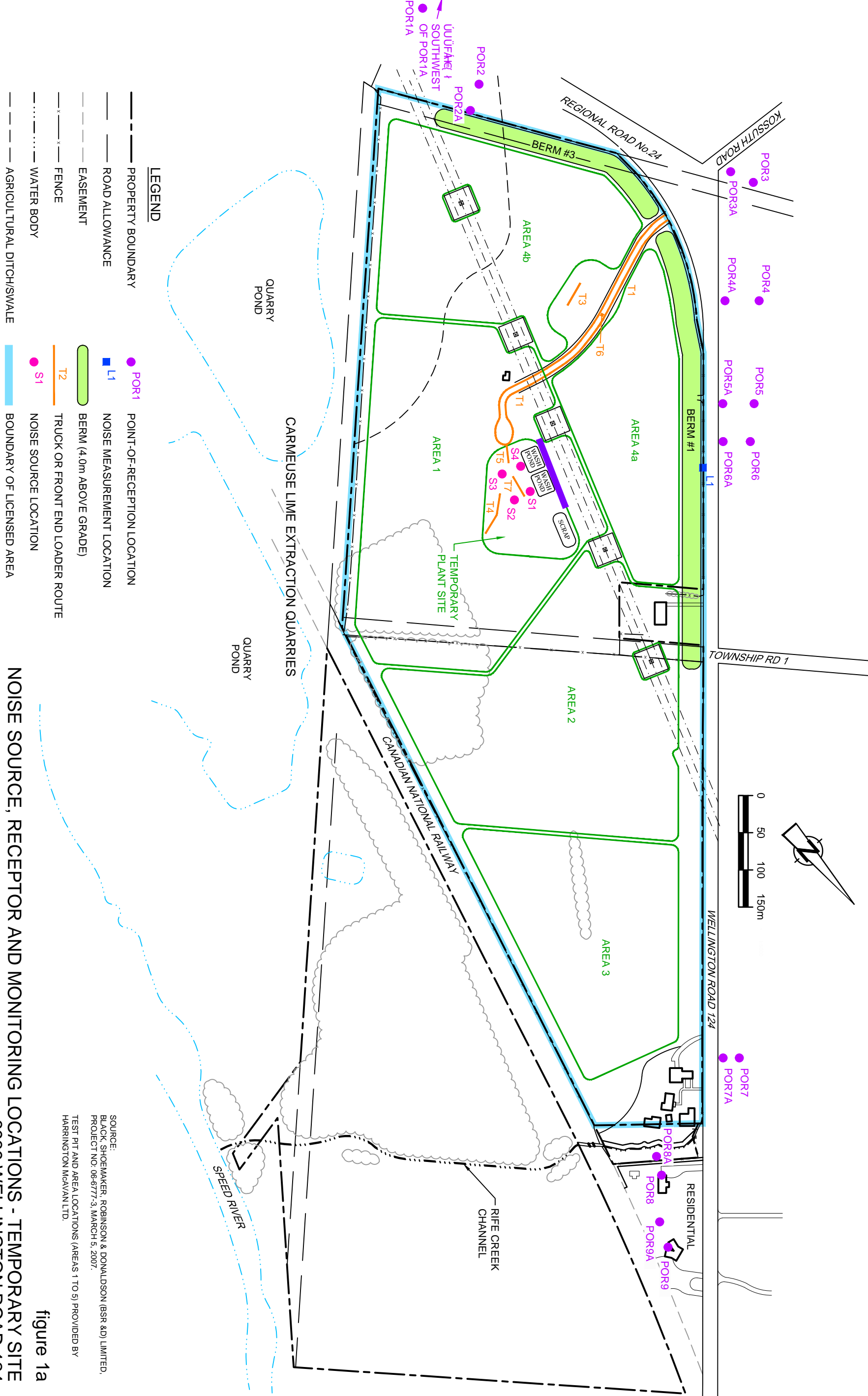
The following list outlines CRA's technical recommendations that are necessary to ensure that the on-site noise generation and the off-site environmental noise impacts meet and do not exceed the levels that were conservatively estimated in this report. An updated environmental noise analysis and summary report is required should any of the Site construction, operations, activities or conceptual layout as detailed in this report and/or summarized in the following Technical Recommendations be modified.

1. **Construction of perimeter berms/staged operations** – berms shall be constructed along the license boundary/limit of extraction as outlined in the site plans prepared by Harrington McAvan Ltd.

2. **Berms 1 and 3 Construction** – constructed to the required height and prior to the start of Site extraction operations and shall remain until the end of operations.
3. **Berm 2 Construction** –constructed to the required height and prior to start of extraction operations in Area 3 and shall remain until the end of Site operations.
4. **Time of Operations** – daily extraction activities commence at 7:00 a.m. and must cease not later than 7:00 p.m.
5. **Process equipment** – any changes to the equipment used on the site which might increase noise generation will be reviewed and approved by a competent professional prior to operation.



78370-00(003)GN-WA001 JAN 14, 2016



**LEGEND**

|  |                          |  |      |                                 |
|--|--------------------------|--|------|---------------------------------|
|  | PROPERTY BOUNDARY        |  | POR1 | POINT-OF-RECEPTION LOCATION     |
|  | ROAD ALLOWANCE           |  | L1   | NOISE MEASUREMENT LOCATION      |
|  | EASEMENT                 |  |      | BERM (4.0m ABOVE GRADE)         |
|  | FENCE                    |  | T2   | TRUCK OR FRONT END LOADER ROUTE |
|  | WATER BODY               |  | S1   | NOISE SOURCE LOCATION           |
|  | AGRICULTURAL DITCH/SWALE |  |      | BOUNDARY OF LICENSED AREA       |
|  | VEGETATION               |  |      | BERM (5m ABOVE GRADE)           |

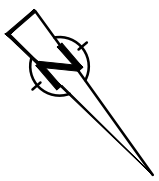
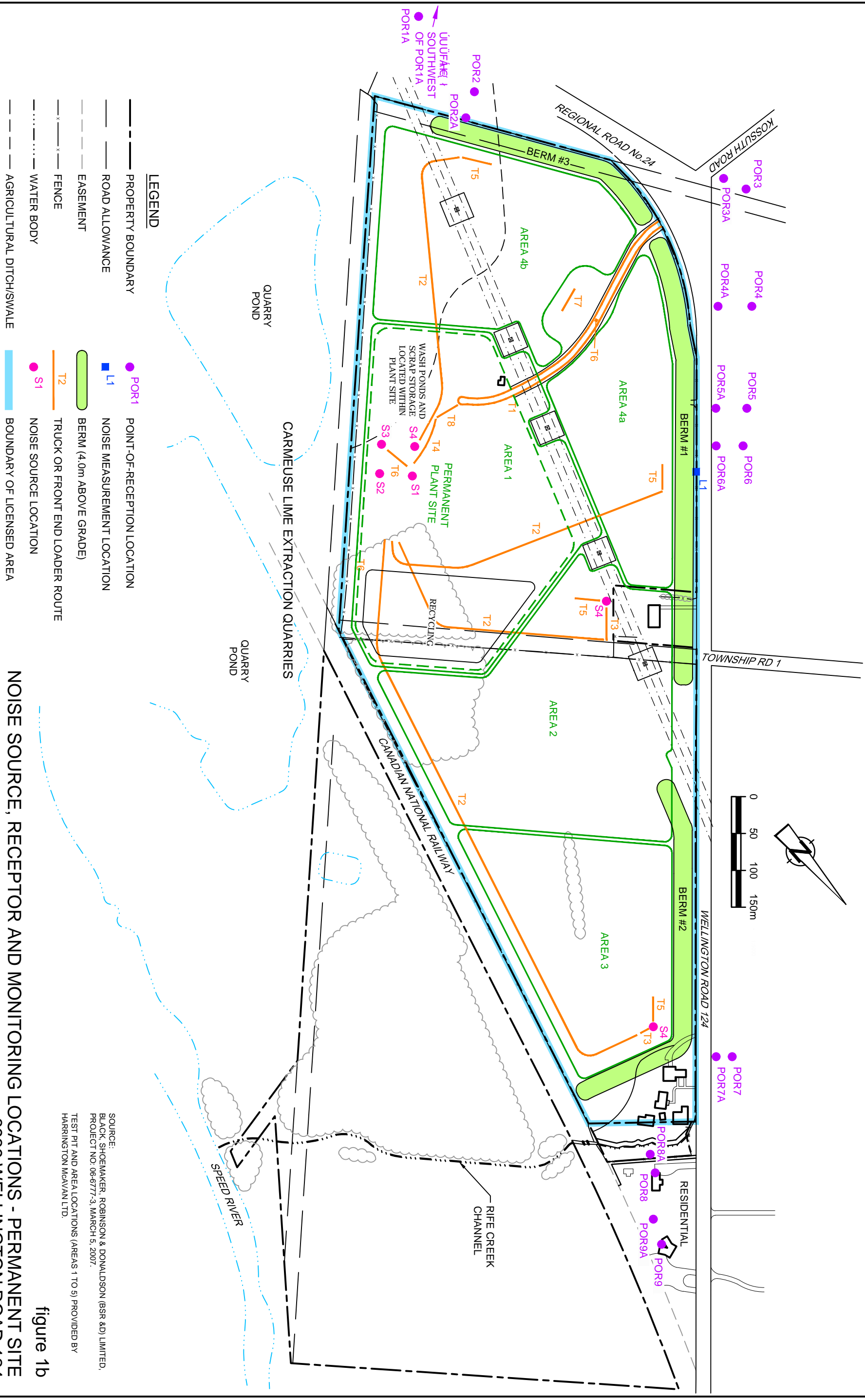
**NOISE SOURCE, RECEPTOR AND MONITORING LOCATIONS - TEMPORARY SITE**  
 6939 WELLINGTON ROAD 124  
 Guelph Township, County of Wellington

SOURCE:  
 BLACK, SHOEMAKER, ROBINSON & DONALDSON (BSR &D) LIMITED,  
 PROJECT NO.: 06-6777-3, MARCH 5, 2007.  
 TEST PIT AND AREA LOCATIONS (AREAS 1 TO 5) PROVIDED BY  
 HARRINGTON McAVAN LTD.

figure 1a



78370-00(003)GN-WA003 JAN 14, 2016



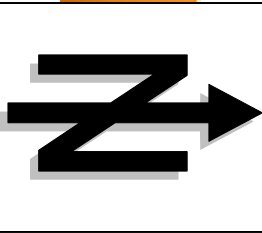
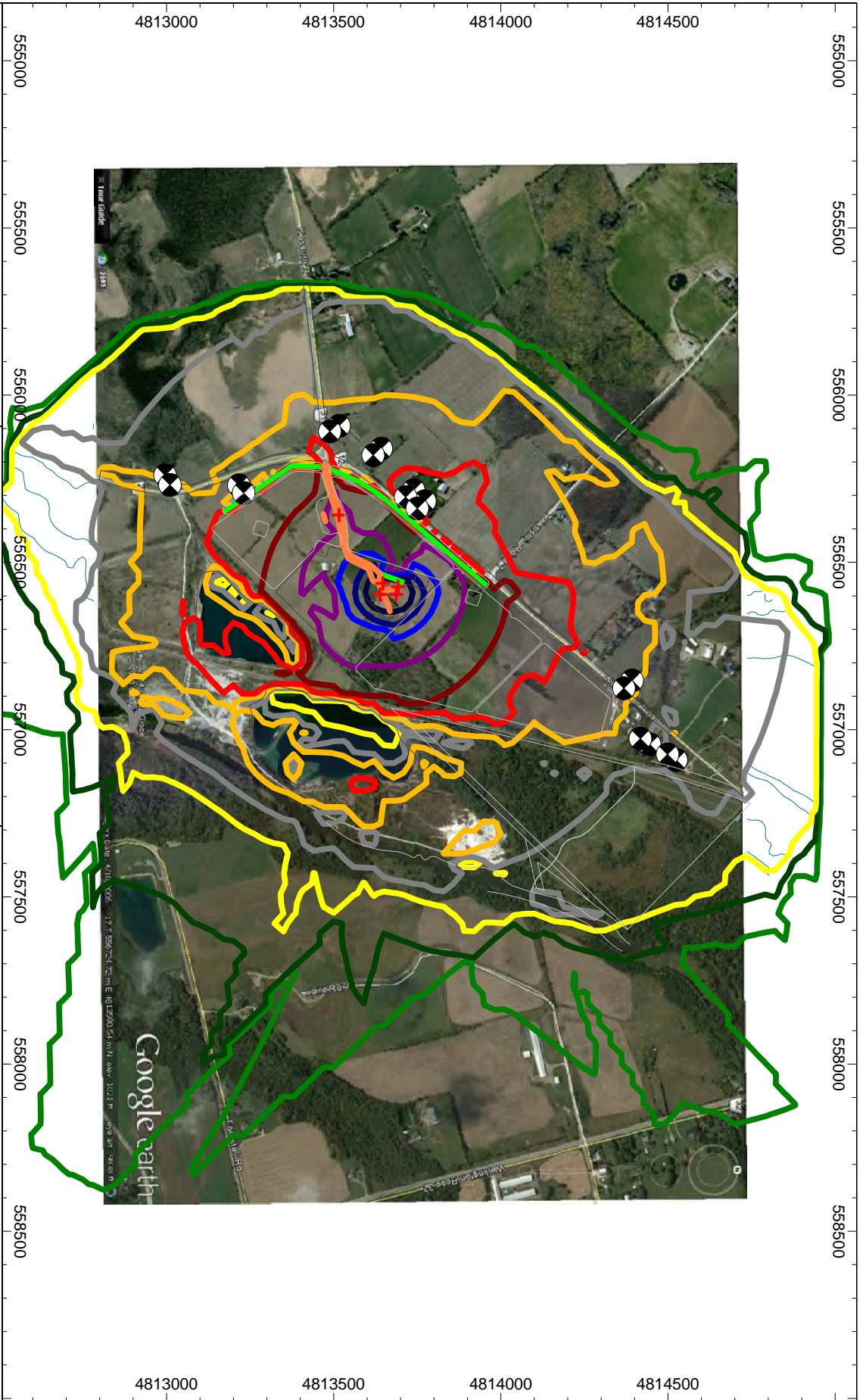
**LEGEND**

- PROPERTY BOUNDARY
- ROAD ALLOWANCE
- EASEMENT
- FENCE
- WATER BODY
- AGRICULTURAL DITCH/SWALE
- VEGETATION
- POR1 POINT-OF-RECEPTION LOCATION
- L1 NOISE MEASUREMENT LOCATION
- BERM (4.0m ABOVE GRADE)
- T2 TRUCK OR FRONT END LOADER ROUTE
- S1 NOISE SOURCE LOCATION
- BOUNDARY OF LICENSED AREA

**NOISE SOURCE, RECEPTOR AND MONITORING LOCATIONS - PERMANENT SITE**  
 6939 WELLINGTON ROAD 124  
 Guelph Township, County of Wellington

figure 1b

SOURCE:  
 BLACK, SHOEMAKER, ROBINSON & DONALDSON (BSR &D) LIMITED,  
 PROJECT NO.: 06-6777-3, MARCH 5, 2007.  
 TEST PIT AND AREA LOCATIONS (AREAS 1 TO 5) PROVIDED BY  
 HARRINGTON McAVAN LTD.

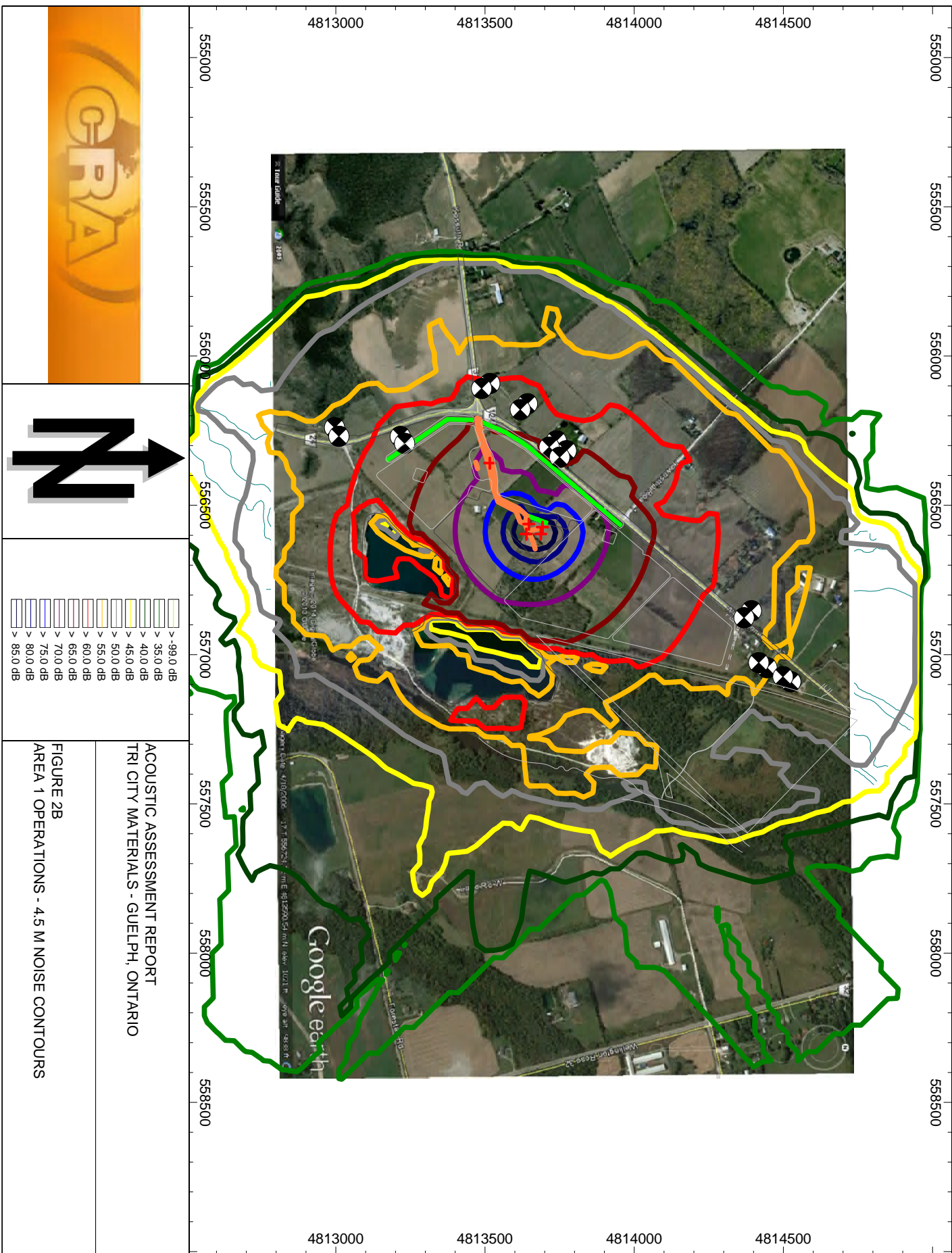


|  |            |
|--|------------|
|  | > -99.0 dB |
|  | > 35.0 dB  |
|  | > 40.0 dB  |
|  | > 45.0 dB  |
|  | > 50.0 dB  |
|  | > 55.0 dB  |
|  | > 60.0 dB  |
|  | > 65.0 dB  |
|  | > 70.0 dB  |
|  | > 75.0 dB  |
|  | > 80.0 dB  |
|  | > 85.0 dB  |

ACQUSTIC ASSESSMENT REPORT  
 TRI CITY MATERIALS - GUELPH, ONTARIO

FIGURE 2A  
 AREA 1 OPERATIONS - 1.5 M NOISE CONTOURS

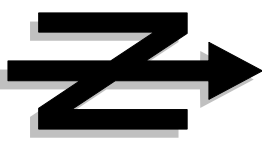




ACOUSTIC ASSESSMENT REPORT  
 TRI CITY MATERIALS - GUELPH, ONTARIO

FIGURE 2B  
 AREA 1 OPERATIONS - 4.5 M NOISE CONTOURS

|                     |            |
|---------------------|------------|
| [Green line]        | > -99.0 dB |
| [Light Green line]  | > 35.0 dB  |
| [Yellow-Green line] | > 40.0 dB  |
| [Yellow line]       | > 45.0 dB  |
| [Orange line]       | > 50.0 dB  |
| [Red-Orange line]   | > 55.0 dB  |
| [Red line]          | > 60.0 dB  |
| [Dark Red line]     | > 65.0 dB  |
| [Purple line]       | > 70.0 dB  |
| [Blue line]         | > 75.0 dB  |
| [Dark Blue line]    | > 80.0 dB  |
| [Black line]        | > 85.0 dB  |



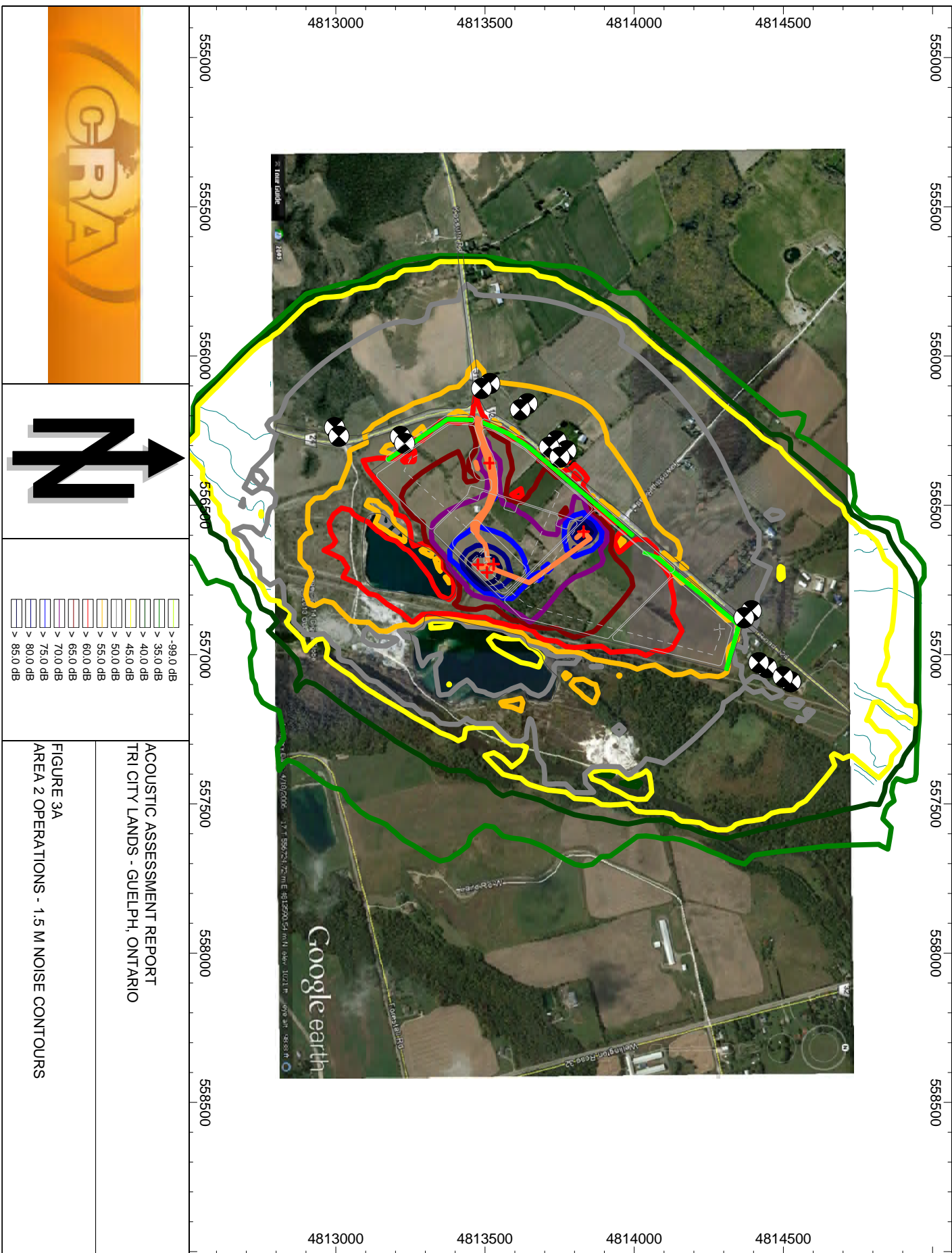
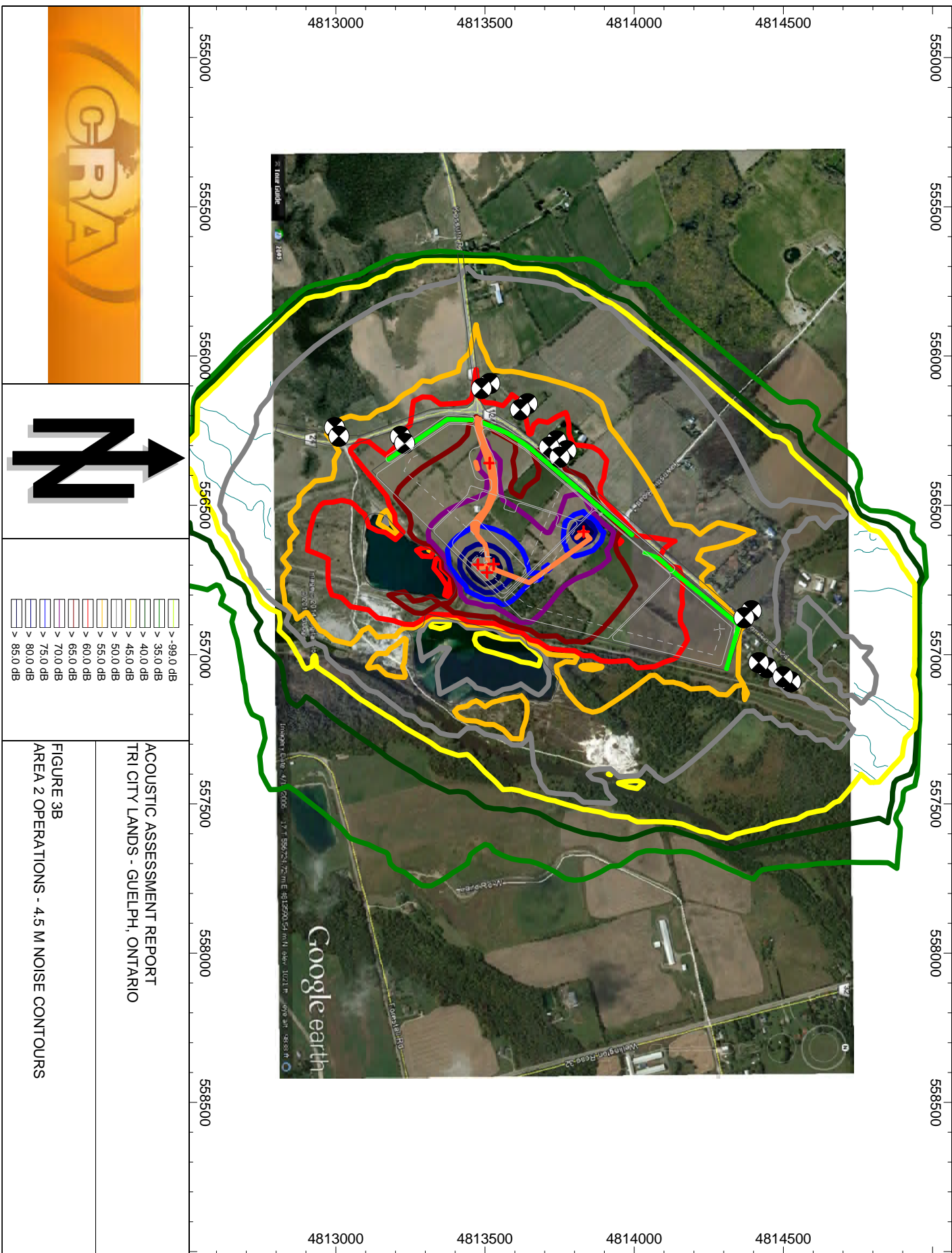
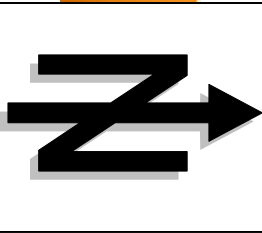
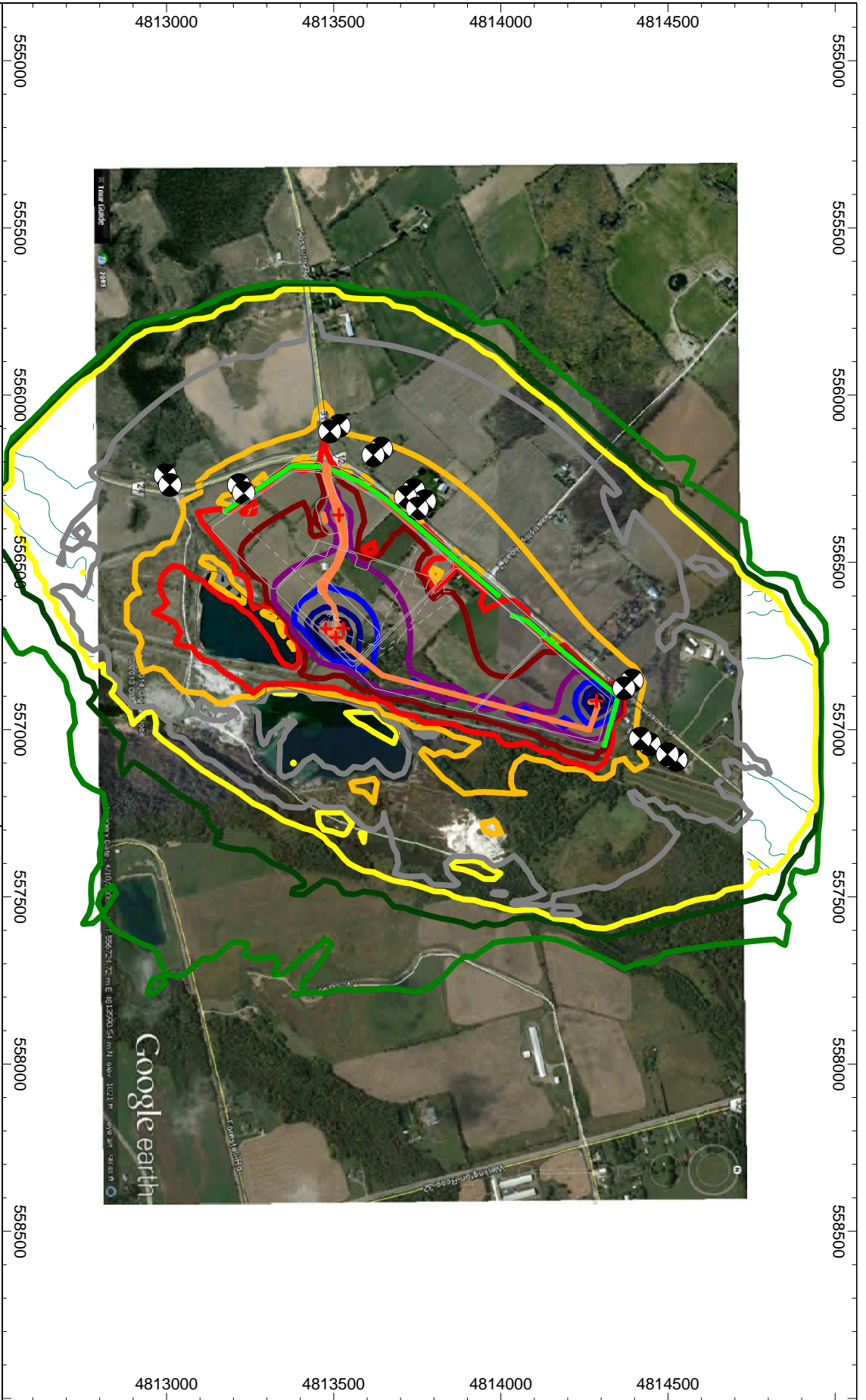


FIGURE 3A  
 ACQUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO  
 AREA 2 OPERATIONS - 1.5 M NOISE CONTOURS

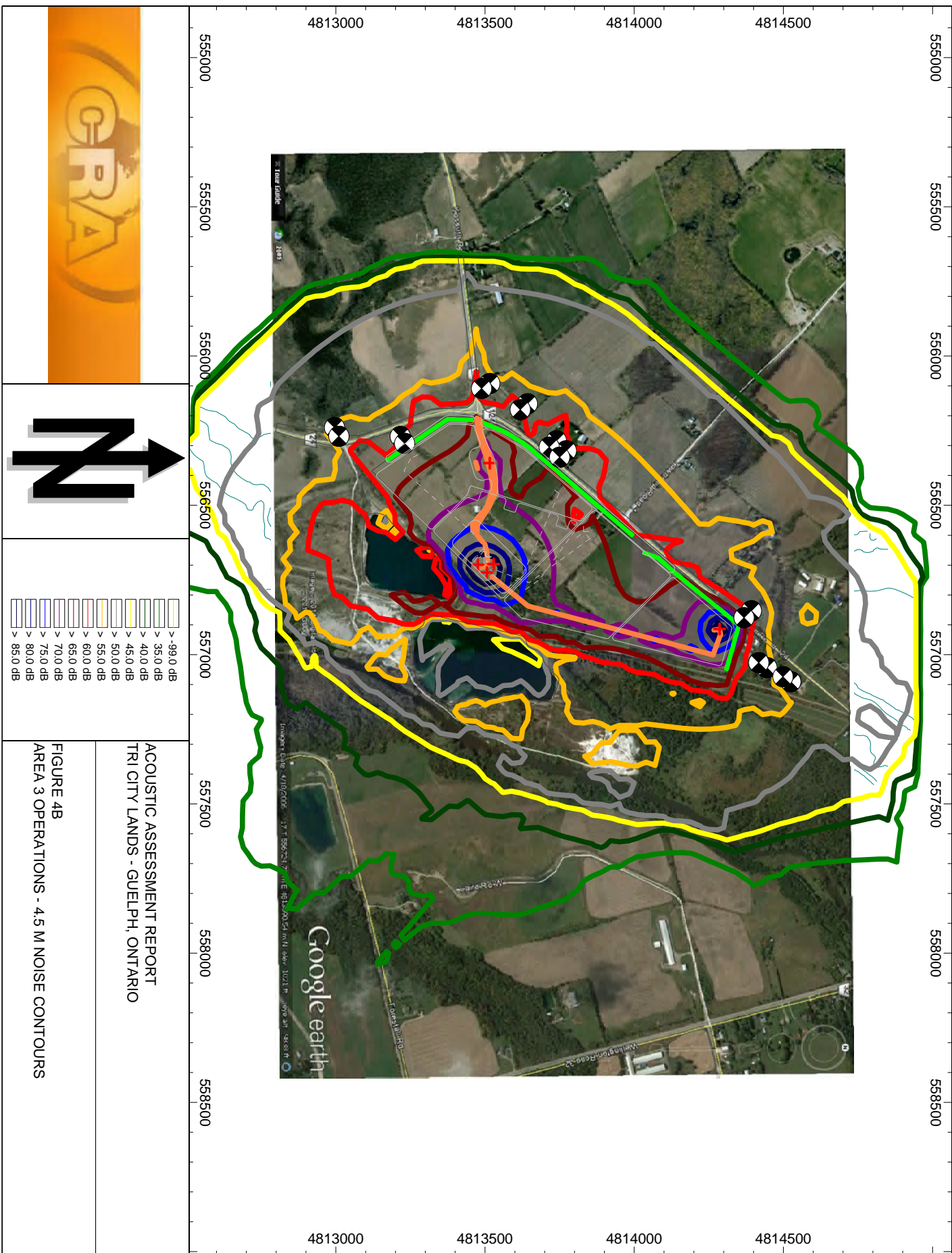




|  |            |
|--|------------|
|  | > -99.0 dB |
|  | > 35.0 dB  |
|  | > 40.0 dB  |
|  | > 45.0 dB  |
|  | > 50.0 dB  |
|  | > 55.0 dB  |
|  | > 60.0 dB  |
|  | > 65.0 dB  |
|  | > 70.0 dB  |
|  | > 75.0 dB  |
|  | > 80.0 dB  |
|  | > 85.0 dB  |

ACQUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

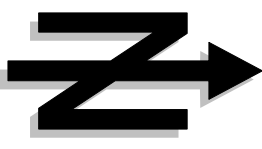
FIGURE 4A  
 AREA 3 OPERATIONS - 1.5 M NOISE CONTOURS

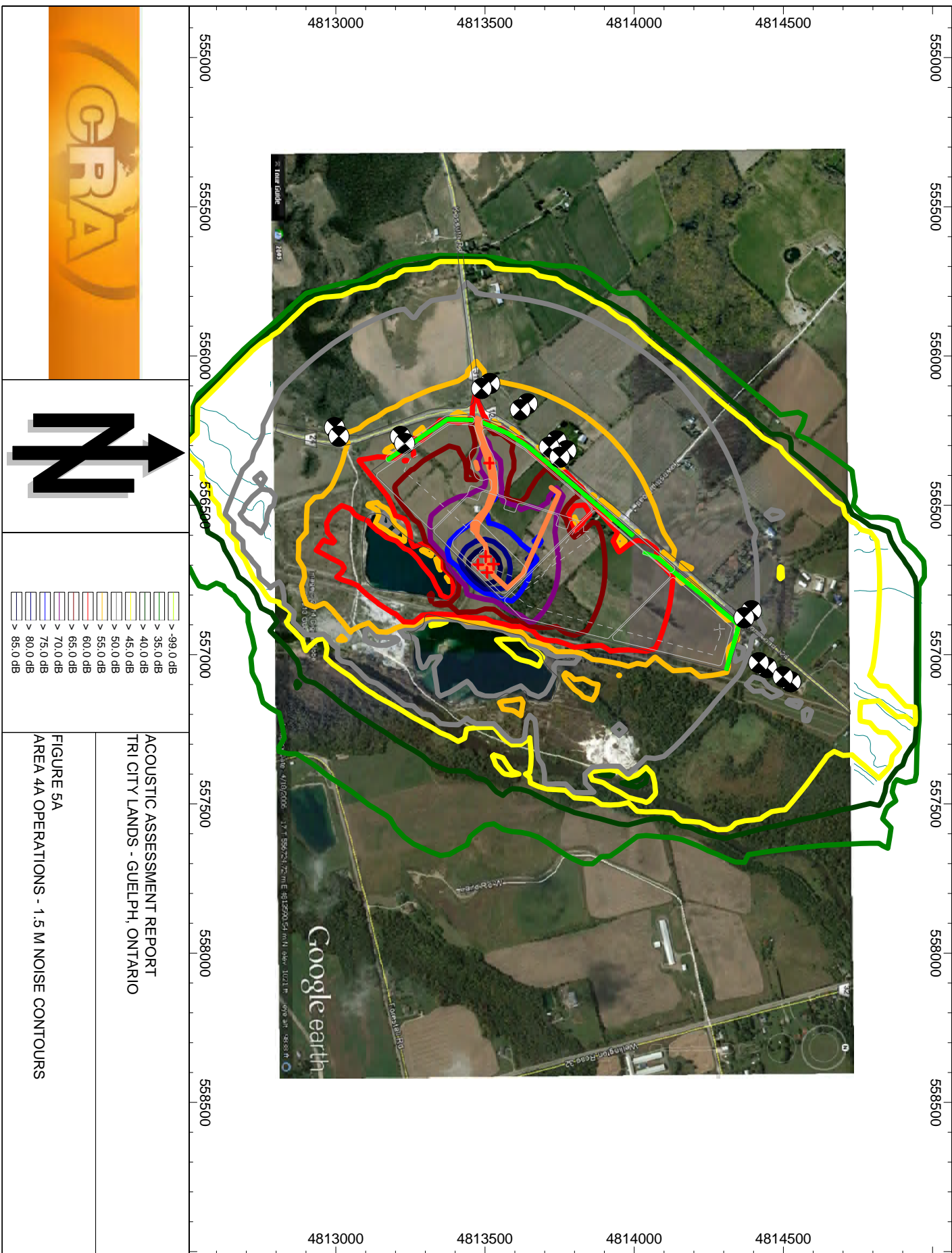


- > -99.0 dB
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

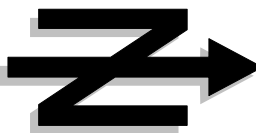
ACQUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

FIGURE 4B  
 AREA 3 OPERATIONS - 4.5 M NOISE CONTOURS



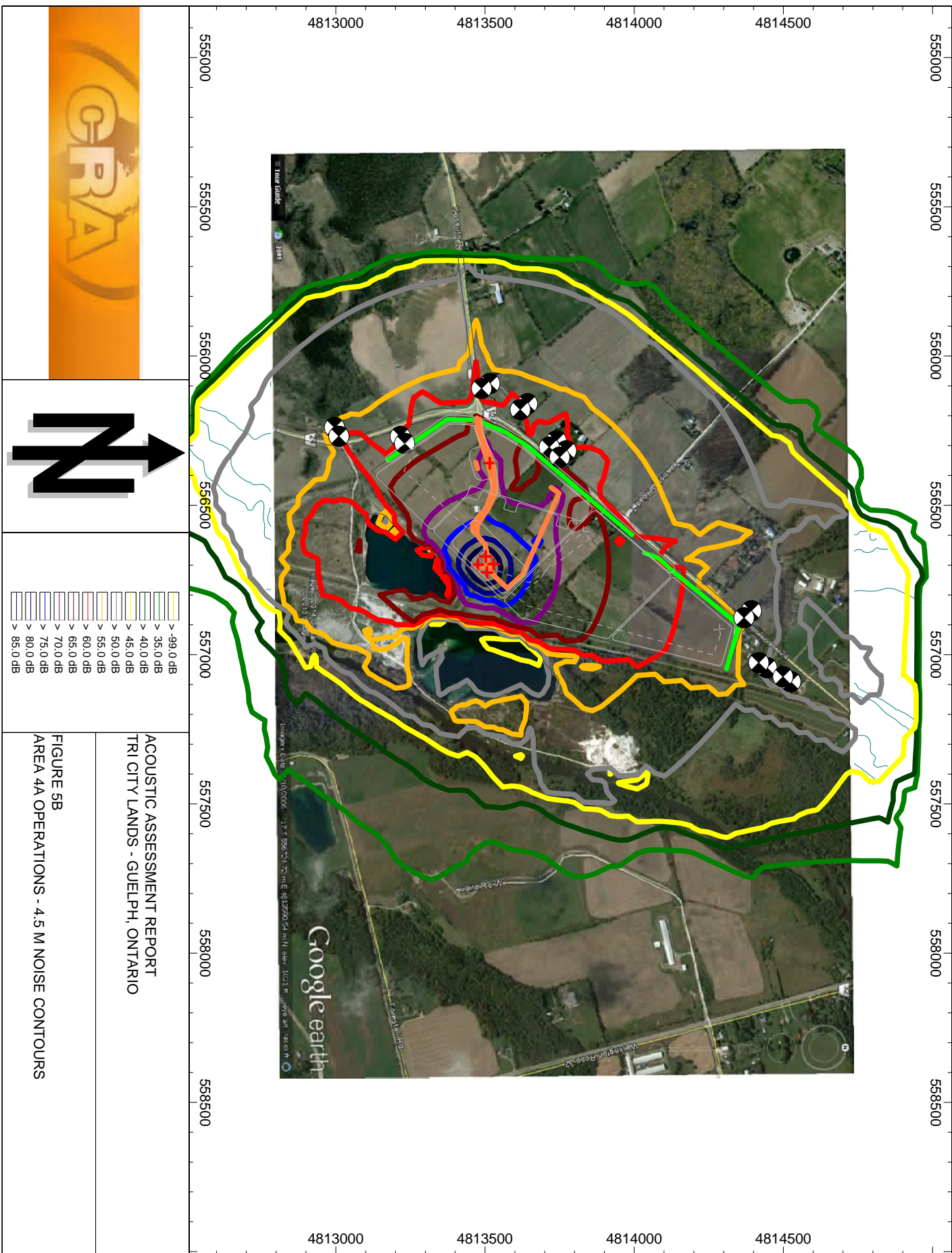


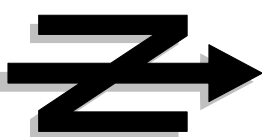
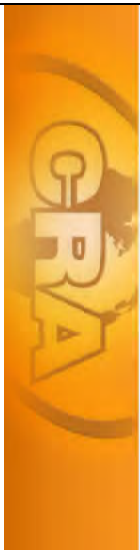
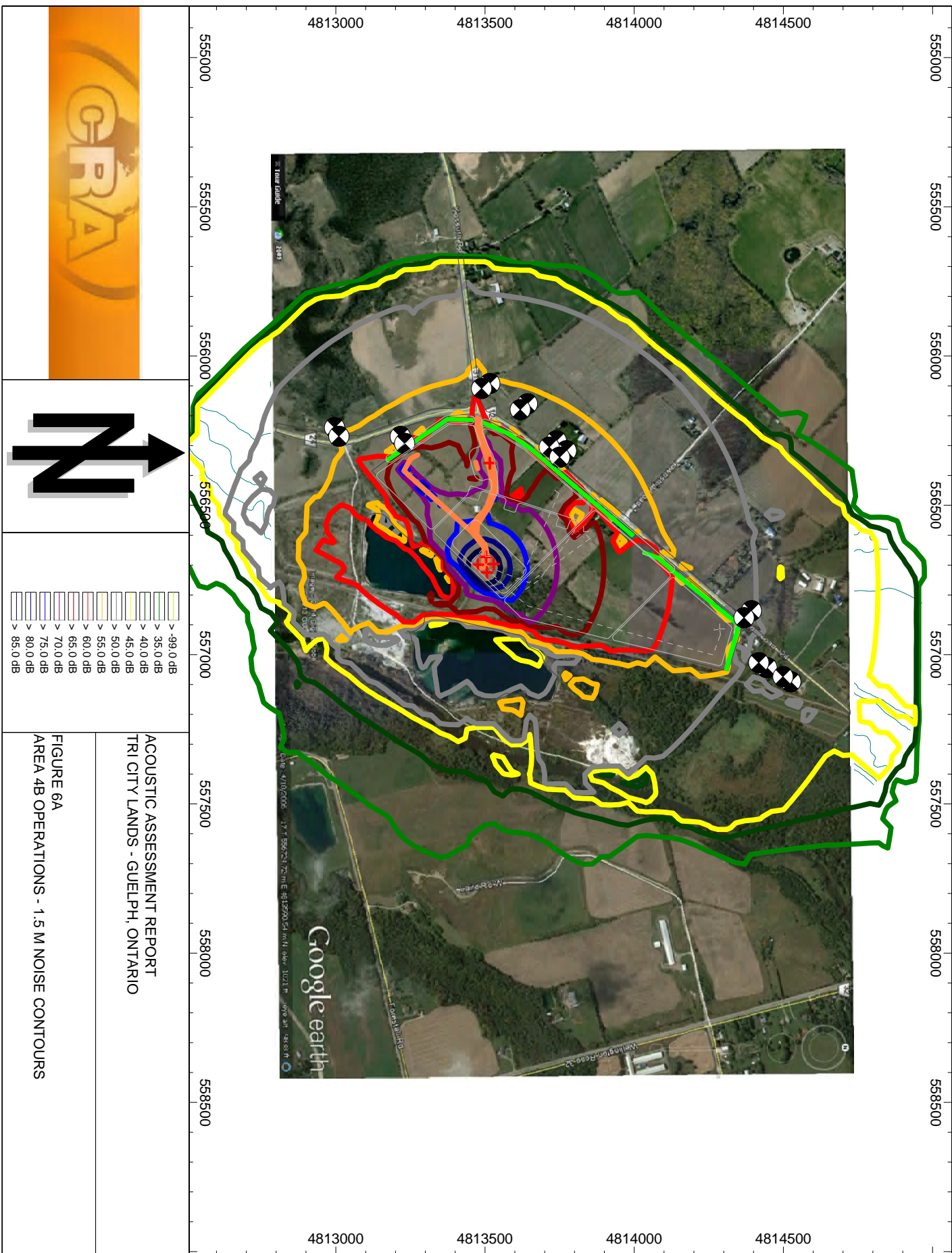
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB



ACOUSTIC ASSESSMENT REPORT  
TRI CITY LANDS - GUELPH, ONTARIO

FIGURE 5A  
AREA 4A OPERATIONS - 1.5 M NOISE CONTOURS



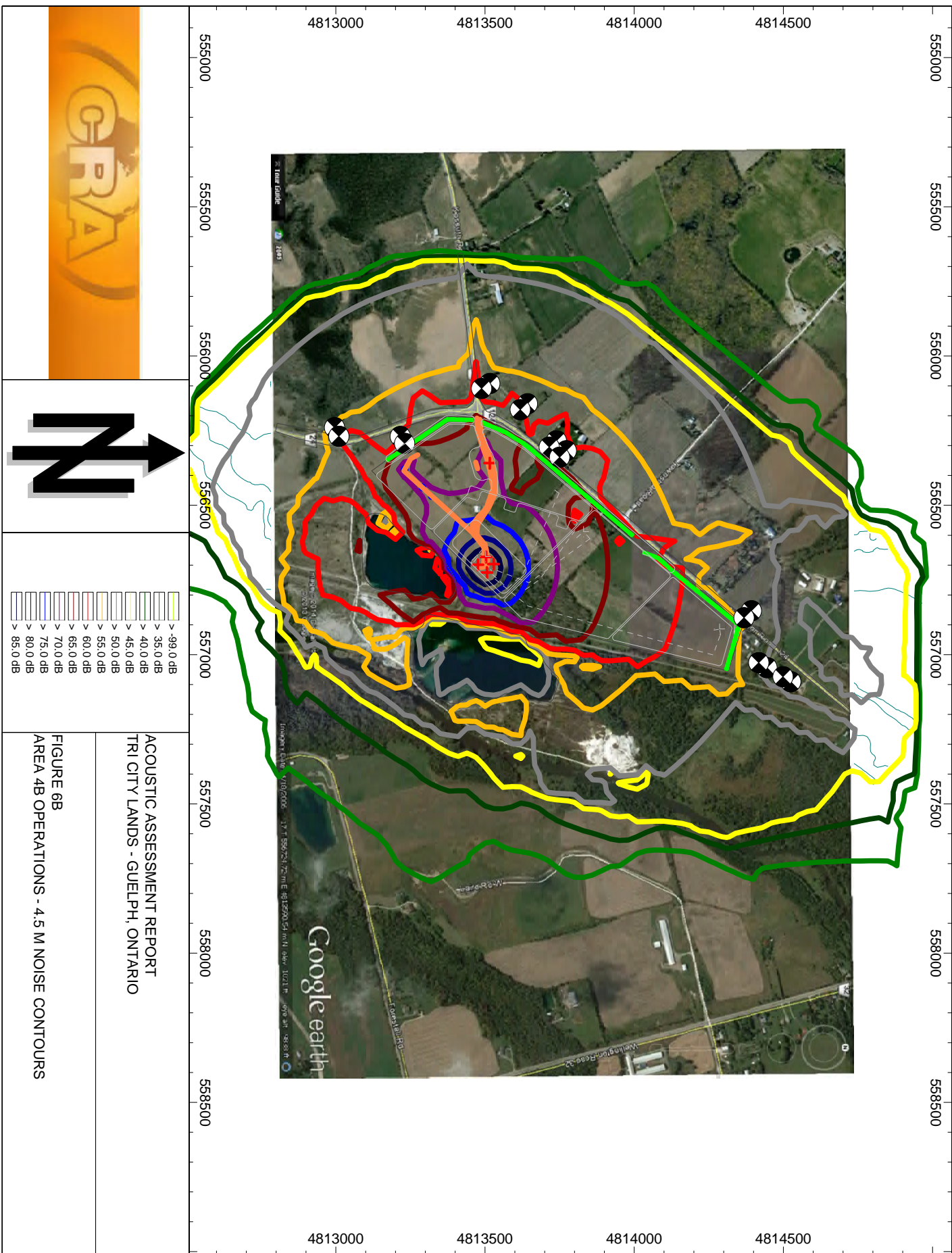


|  |           |
|--|-----------|
|  | > 99.0 dB |
|  | > 45.0 dB |
|  | > 50.0 dB |
|  | > 55.0 dB |
|  | > 60.0 dB |
|  | > 65.0 dB |
|  | > 70.0 dB |
|  | > 75.0 dB |
|  | > 80.0 dB |
|  | > 85.0 dB |

ACQUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

FIGURE 6A  
 AREA 4B OPERATIONS - 1.5 M NOISE CONTOURS

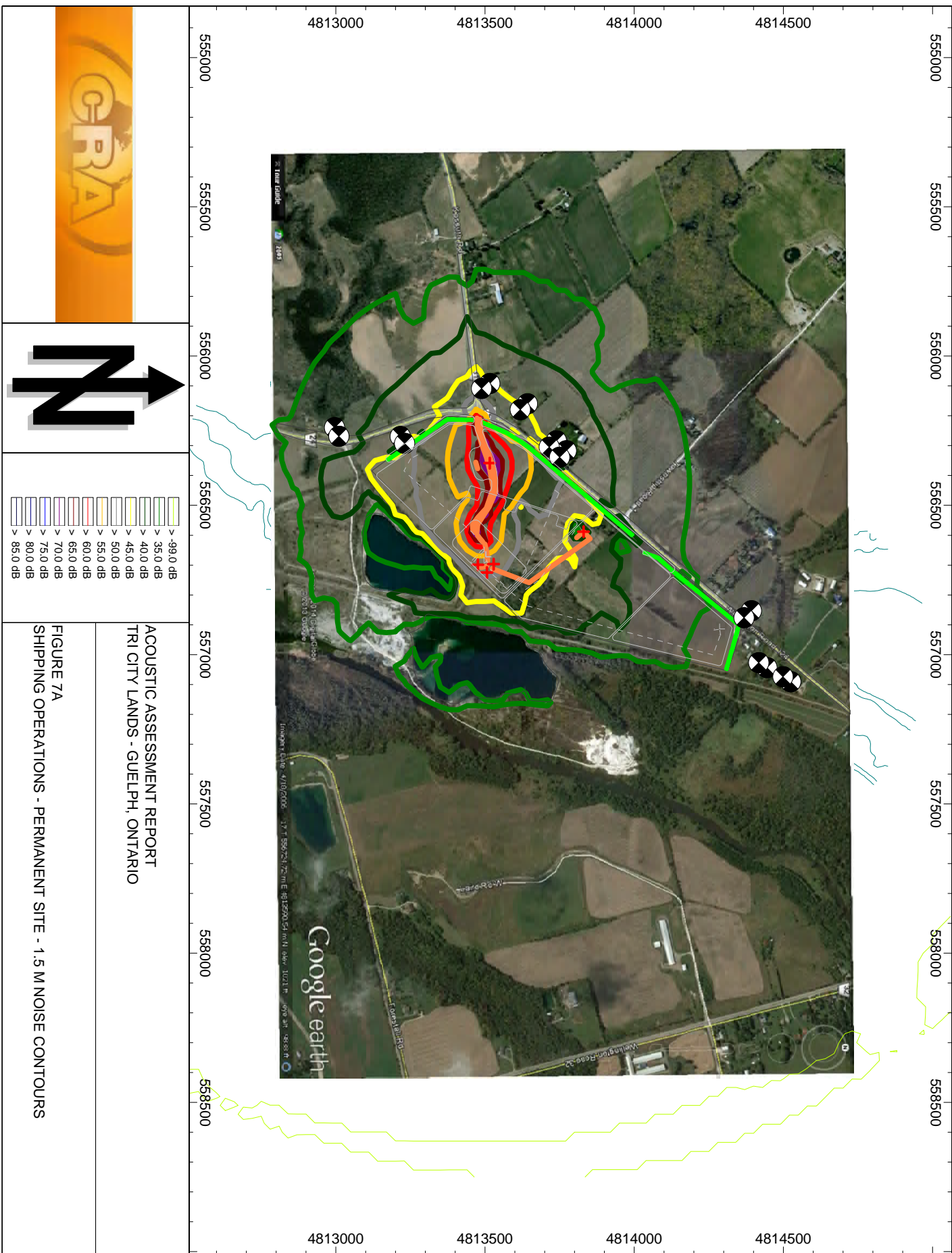


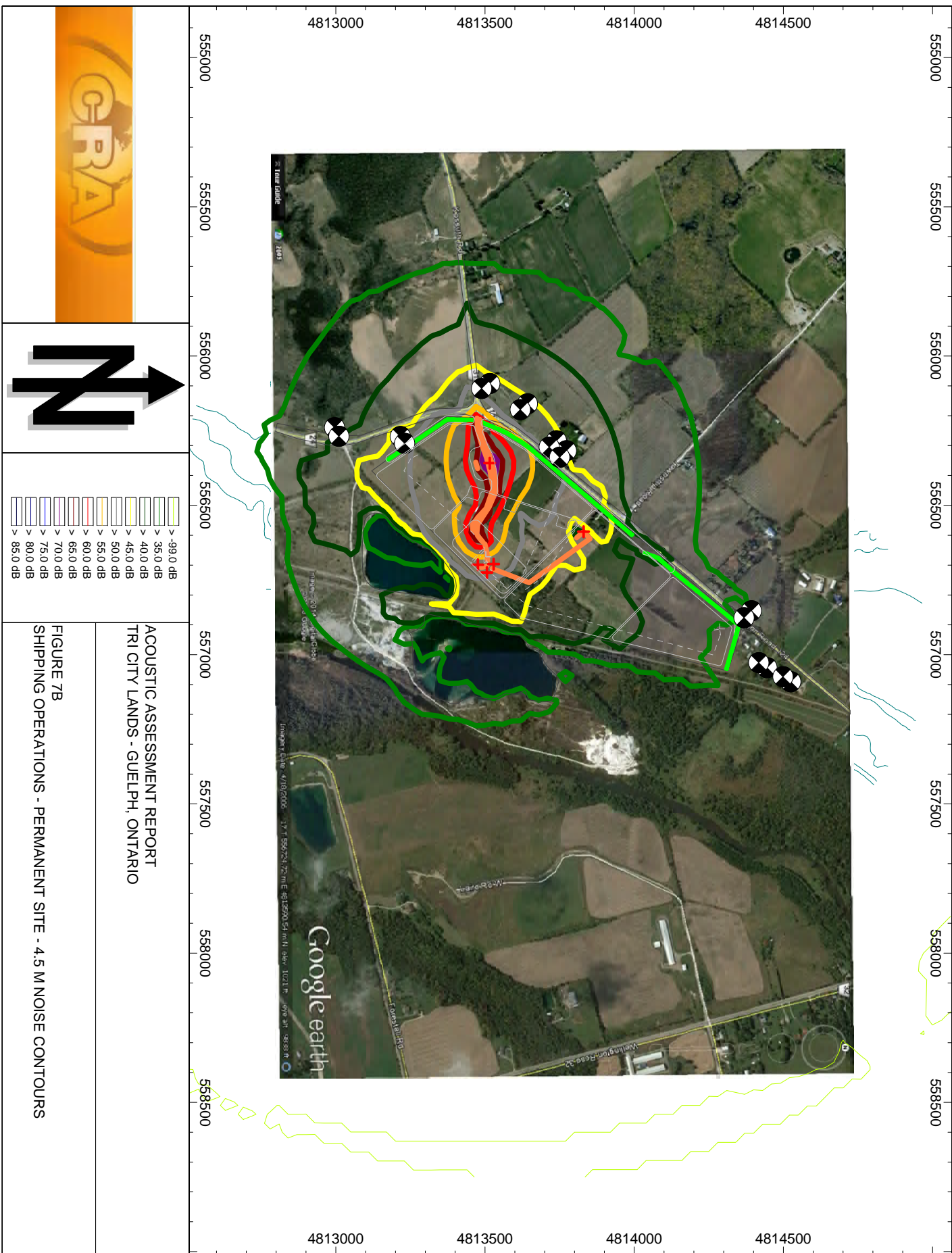


|  |           |
|--|-----------|
|  | > 99.0 dB |
|  | > 35.0 dB |
|  | > 40.0 dB |
|  | > 45.0 dB |
|  | > 50.0 dB |
|  | > 55.0 dB |
|  | > 60.0 dB |
|  | > 65.0 dB |
|  | > 70.0 dB |
|  | > 75.0 dB |
|  | > 80.0 dB |
|  | > 85.0 dB |

ACOUSTIC ASSESSMENT REPORT  
 TRI CITY LANDS - GUELPH, ONTARIO

FIGURE 6B  
 AREA 4B OPERATIONS - 4.5 M NOISE CONTOURS





**TABLE 1**  
**NOISE SOURCE SUMMARY**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

| <i>Each A<br/>ID</i> | <i>Source Description</i>         | <i>Source Type</i>  | <i>Sound Power<br/>Level (1)<br/>(dBA)</i> | <i>Source<br/>Location (2)</i> | <i>Sound<br/>Characteristics (3)</i> | <i>Noise Control<br/>Measures (4)</i> |
|----------------------|-----------------------------------|---------------------|--|--------------------------------|--------------------------------------|---------------------------------------|
| S1                   | Wash Plant                        | Point               | 117.4                                      | O                              | S,T                                  | B                                     |
| S2                   | Impact Crusher                    | Point               | 125.9                                      | O                              | S,T                                  | B                                     |
| S3                   | Cone Crusher                      | Point               | 124.0                                      | O                              | S,T                                  | B                                     |
| S4                   | Screener                          | Point               | 121.6                                      | O                              | S,T                                  | B                                     |
| T1                   | Truck Route                       | Moving Point - Line | 109.9                                      | O                              | S                                    | B                                     |
| T2                   | Material Truck Route              | Moving Point - Line | 113.6                                      | O                              | S                                    | B                                     |
| T3                   | Front End Loader Route 1          | Moving Point - Line | 112.5                                      | O                              | S                                    | B                                     |
| T4                   | Material Truck Route              | Moving Point - Line | 113.6                                      | O                              | S                                    | B                                     |
| T5                   | Front End Loader Route 2          | Moving Point - Line | 113.6                                      | O                              | S                                    | B                                     |
| T6                   | Plant Site Front End Loader Route | Moving Point - Line | 113.6                                      | O                              | S                                    | B                                     |
| T6b                  | Scale                             | Point               | 109.9                                      | O                              | S                                    | B                                     |
| T7                   | Direct Sales Front End Loader     | Moving Point - Line | 113.6                                      | O                              | S                                    | B                                     |
| T8                   | Front End Loader Route 3          | Moving Point - Line | 113.6                                      | O                              | S                                    | B                                     |
| T9                   | Scale                             | Point               | 109.9                                      | O                              | S                                    | B                                     |

## Notes:

- (1) Sound Power Level (PWL) in dBA calculated from sound pressure level and reference distance and includes + 5 dBA tonal penalty if applicable.  
Resulting PWL based on dimensions of vertical area source or travel path and equipment movements for moving point line/area sources.
- (2) Source Location:  
O - located/installed outside of building  
I - located/installed inside of building
- (3) Sound Characteristics:  
S - Steady  
Q - Quasi Steady Impulsive  
I - Impulsive  
B - Buzzing  
T - Tonal  
C - Cyclic
- (4) Noise Control Measures:  
S - silencer, acoustic louvre, muffler  
A - acoustic lining, plenum  
B - barrier, berm, screening  
L - lagging  
E - acoustic enclosure  
O - other  
U - uncontrolled  
AC - administrative control



TABLE 2B  
POINT-OF-RECEPTION NOISE IMPACT - AREA 2 OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

| Cada A ID                                | Source Description            | Residence on Hespeler Road - POR1 |                               | Residence on Hespeler Road - POR2 |                               | Residence on Kosuth Road - POR3 |                               | Residence on Hespeler Road - POR4 |                               | Residence on Hespeler Road - POR5 |                               | Residence on Hespeler Road - POR6 |                               | Residence on Hespeler Road - POR7 |                               | Residence on Hespeler Road - POR8 |                               | Residence on Hespeler Road - POR9 |                               |                          |                               |
|--|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|---------------------------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|-----------------------------------|-------------------------------|--------------------------|-------------------------------|
|  |                               | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)        | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m)          | Daytime Sound Level (L) (Leq) | Distance to Receptor (m) | Daytime Sound Level (L) (Leq) |
| S1                                       | Wash Plant                    | 697                               | 39.1 dBA                      | 508                               | 48.1 dBA                      | 606                             | 40.9 dBA                      | 538                               | 42.7 dBA                      | 487                               | 49.6 dBA                      | 479                               | 44.5 dBA                      | 911                               | 36.3 dBA                      | 1007                              | 34.7 dBA                      | 1077                              | 33.4 dBA                      | 1087                     | 33.9 dBA                      |
| S2                                       | Impact Crusher                | 701                               | 49.8 dBA                      | 519                               | 58.6 dBA                      | 636                             | 51.0 dBA                      | 592                               | 52.9 dBA                      | 523                               | 59.4 dBA                      | 479                               | 54.1 dBA                      | 929                               | 46.9 dBA                      | 929                               | 46.9 dBA                      | 1020                              | 44.5 dBA                      | 1099                     | 44.3 dBA                      |
| S3                                       | Cone Crusher                  | 661                               | 49.3 dBA                      | 481                               | 53.4 dBA                      | 613                             | 50.4 dBA                      | 578                               | 52.0 dBA                      | 520                               | 58.3 dBA                      | 515                               | 52.9 dBA                      | 962                               | 45.4 dBA                      | 1056                              | 44.1 dBA                      | 1056                              | 44.1 dBA                      | 1136                     | 43.4 dBA                      |
| S4                                       | Screener                      | 671                               | 36.9 dBA                      | 888                               | 46.7 dBA                      | 564                             | 45.2 dBA                      | 444                               | 46.7 dBA                      | 301                               | 54.2 dBA                      | 266                               | 54.8 dBA                      | 653                               | 40.8 dBA                      | 788                               | 40.7 dBA                      | 859                               | 41.2 dBA                      | 869                      | 41.0 dBA                      |
| T1                                       | Truck Route                   | 515                               | 34.5 dBA                      | 297                               | 44.6 dBA                      | 322                             | 42.4 dBA                      | 312                               | 42.4 dBA                      | 317                               | 42.2 dBA                      | 336                               | 42.2 dBA                      | 336                               | 28.1 dBA                      | 1160                              | 26.1 dBA                      | 1242                              | 25.3 dBA                      | 1242                     | 25.3 dBA                      |
| T2                                       | Material Truck Route          | 807                               | 34.5 dBA                      | 603                               | 40.0 dBA                      | 612                             | 36.1 dBA                      | 530                               | 36.1 dBA                      | 423                               | 44.1 dBA                      | 403                               | 40.8 dBA                      | 769                               | 35.1 dBA                      | 873                               | 33.4 dBA                      | 954                               | 32.1 dBA                      | 954                      | 32.1 dBA                      |
| T3                                       | Front End Loader Route 1      | 917                               | 17.0 dBA                      | 700                               | 23.6 dBA                      | 621                             | 23.6 dBA                      | 595                               | 24.3 dBA                      | 474                               | 37.7 dBA                      | 291                               | 31.3 dBA                      | 624                               | 20.3 dBA                      | 757                               | 19.2 dBA                      | 838                               | 19.4 dBA                      | 838                      | 19.4 dBA                      |
| T4                                       | Material Truck Route          | 650                               | 28.7 dBA                      | 459                               | 26.4 dBA                      | 565                             | 26.4 dBA                      | 526                               | 27.4 dBA                      | 467                               | 31.3 dBA                      | 463                               | 28.8 dBA                      | 943                               | 21.0 dBA                      | 1045                              | 19.6 dBA                      | 1126                              | 18.5 dBA                      | 1126                     | 18.5 dBA                      |
| T5                                       | Front End Loader Route 2      | 621                               | 22.4 dBA                      | 427                               | 22.4 dBA                      | 536                             | 20.9 dBA                      | 501                               | 20.9 dBA                      | 501                               | 27.6 dBA                      | 449                               | 31.7 dBA                      | 961                               | 22.8 dBA                      | 1067                              | 21.9 dBA                      | 1148                              | 20.5 dBA                      | 1148                     | 20.5 dBA                      |
| T6                                       | Plant Site Front End Loader   | 686                               | 25.7 dBA                      | 501                               | 22.4 dBA                      | 614                             | 22.9 dBA                      | 571                               | 22.9 dBA                      | 306                               | 32.3 dBA                      | 332                               | 32.1 dBA                      | 571                               | 17.4 dBA                      | 1026                              | 17.2 dBA                      | 1026                              | 17.2 dBA                      | 1026                     | 17.2 dBA                      |
| T7                                       | Plant Site Front End Loader   | 479                               | 25.4 dBA                      | 261                               | 36.8 dBA                      | 298                             | 31.1 dBA                      | 306                               | 31.1 dBA                      | 306                               | 32.3 dBA                      | 332                               | 32.1 dBA                      | 571                               | 17.4 dBA                      | 1026                              | 17.2 dBA                      | 1026                              | 17.2 dBA                      | 1026                     | 17.2 dBA                      |
| T8                                       | Direct Sales Front End Loader | 621                               | 24.3 dBA                      | 427                               | 29.0 dBA                      | 536                             | 26.0 dBA                      | 501                               | 26.0 dBA                      | 306                               | 27.8 dBA                      | 332                               | 27.8 dBA                      | 571                               | 19.6 dBA                      | 1067                              | 18.2 dBA                      | 1067                              | 18.2 dBA                      | 1067                     | 18.2 dBA                      |
| T9                                       | Scale                         | 512                               | 34.4 dBA                      | 294                               | 45.3 dBA                      | 270                             | 40.2 dBA                      | 265                               | 40.2 dBA                      | 265                               | 42.9 dBA                      | 288                               | 43.1 dBA                      | 1037                              | 27.5 dBA                      | 1177                              | 25.9 dBA                      | 1258                              | 24.9 dBA                      | 1258                     | 24.9 dBA                      |
| Total Facility Sound Level (1-hour Leq): |                               |                                   | 53.1 dBA                      |                                   | 60.3 dBA                      |                                 | 55.2 dBA                      |                                   | 57.1 dBA                      |                                   | 62.9 dBA                      |                                   | 49.1 dBA                      |                                   | 50.2 dBA                      |                                   | 51.1 dBA                      |                                   | 50.2 dBA                      |                          | 48.1 dBA                      |
| Residence on Hespeler Road - OLA         |                               |                                   |                               |                                   |                               |                                 |                               |                                   |                               |                                   |                               |                                   |                               |                                   |                               |                                   |                               |                                   |                               |                          |                               |
|  |                               | POR1A                             |                               | POR2A                             |                               | POR3A                           |                               | POR4A                             |                               | POR5A                             |                               | POR6A                             |                               | POR7A                             |                               | POR8A                             |                               | POR9A                             |                               |                          |                               |
| S1                                       | Wash Plant                    | 674                               | 40.7 dBA                      | 479                               | 39.4 dBA                      | 596                             | 42.0 dBA                      | 532                               | 42.7 dBA                      | 457                               | 45.3 dBA                      | 449                               | 45.7 dBA                      | 898                               | 37.5 dBA                      | 978                               | 35.2 dBA                      | 1057                              | 33.9 dBA                      | 1057                     | 33.9 dBA                      |
| S2                                       | Impact Crusher                | 674                               | 51.4 dBA                      | 489                               | 53.6 dBA                      | 624                             | 50.0 dBA                      | 565                               | 52.6 dBA                      | 459                               | 54.9 dBA                      | 485                               | 55.3 dBA                      | 916                               | 48.1 dBA                      | 991                               | 46.0 dBA                      | 1070                              | 44.7 dBA                      | 1070                     | 44.7 dBA                      |
| S3                                       | Cone Crusher                  | 634                               | 50.9 dBA                      | 452                               | 49.7 dBA                      | 601                             | 46.2 dBA                      | 551                               | 49.5 dBA                      | 489                               | 53.8 dBA                      | 485                               | 53.9 dBA                      | 950                               | 46.0 dBA                      | 1028                              | 44.6 dBA                      | 1106                              | 43.4 dBA                      | 1106                     | 43.4 dBA                      |
| S4                                       | Screener                      | 866                               | 38.8 dBA                      | 644                               | 33.7 dBA                      | 568                             | 33.7 dBA                      | 431                               | 42.3 dBA                      | 282                               | 54.3 dBA                      | 244                               | 56.0 dBA                      | 647                               | 42.0 dBA                      | 759                               | 40.1 dBA                      | 839                               | 41.5 dBA                      | 839                      | 41.5 dBA                      |
| T1                                       | Truck Route                   | 495                               | 35.9 dBA                      | 271                               | 38.7 dBA                      | 309                             | 35.4 dBA                      | 282                               | 38.2 dBA                      | 289                               | 42.3 dBA                      | 311                               | 41.1 dBA                      | 1021                              | 29.2 dBA                      | 1131                              | 26.4 dBA                      | 1212                              | 25.6 dBA                      | 1212                     | 25.6 dBA                      |
| T2                                       | Material Truck Route          | 895                               | 34.6 dBA                      | 573                               | 33.2 dBA                      | 608                             | 30.4 dBA                      | 508                               | 36.4 dBA                      | 395                               | 38.2 dBA                      | 310                               | 40.1 dBA                      | 757                               | 35.3 dBA                      | 844                               | 33.9 dBA                      | 924                               | 32.5 dBA                      | 924                      | 32.5 dBA                      |
| T3                                       | Front End Loader Route 1      | 782                               | 16.7 dBA                      | 623                               | 14.5 dBA                      | 599                             | 13.2 dBA                      | 461                               | 14.1 dBA                      | 401                               | 28.9 dBA                      | 271                               | 31.3 dBA                      | 618                               | 20.7 dBA                      | 728                               | 18.9 dBA                      | 808                               | 18.9 dBA                      | 808                      | 18.9 dBA                      |
| T4                                       | Material Truck Route          | 623                               | 17.6 dBA                      | 429                               | 15.5 dBA                      | 554                             | 13.2 dBA                      | 499                               | 12.7 dBA                      | 457                               | 27.8 dBA                      | 433                               | 28.2 dBA                      | 932                               | 22.0 dBA                      | 1017                              | 20.0 dBA                      | 1096                              | 19.6 dBA                      | 1096                     | 19.6 dBA                      |
| T5                                       | Front End Loader Route 2      | 595                               | 26.0 dBA                      | 398                               | 22.8 dBA                      | 623                             | 20.3 dBA                      | 544                               | 20.3 dBA                      | 420                               | 30.3 dBA                      | 419                               | 32.8 dBA                      | 950                               | 24.4 dBA                      | 1059                              | 22.4 dBA                      | 1118                              | 21.0 dBA                      | 1118                     | 21.0 dBA                      |
| T6                                       | Plant Site Front End Loader   | 659                               | 23.3 dBA                      | 472                               | 22.8 dBA                      | 603                             | 20.3 dBA                      | 544                               | 24.2 dBA                      | 472                               | 30.3 dBA                      | 467                               | 26.6 dBA                      | 950                               | 19.8 dBA                      | 1059                              | 17.6 dBA                      | 1106                              | 16.5 dBA                      | 1106                     | 16.5 dBA                      |
| T7                                       | Plant Site Front End Loader   | 460                               | 21.3 dBA                      | 236                               | 30.1 dBA                      | 282                             | 26.1 dBA                      | 306                               | 32.0 dBA                      | 306                               | 32.0 dBA                      | 333                               | 31.7 dBA                      | 571                               | 18.8 dBA                      | 1059                              | 18.2 dBA                      | 1059                              | 18.2 dBA                      | 1059                     | 18.2 dBA                      |
| T8                                       | Direct Sales Front End Loader | 398                               | 26.1 dBA                      | 271                               | 28.8 dBA                      | 297                             | 26.5 dBA                      | 235                               | 27.5 dBA                      | 269                               | 28.5 dBA                      | 269                               | 28.5 dBA                      | 503                               | 21.0 dBA                      | 1059                              | 18.2 dBA                      | 1059                              | 18.2 dBA                      | 1059                     | 18.2 dBA                      |
| T9                                       | Scale                         | 495                               | 35.9 dBA                      | 271                               | 45.3 dBA                      | 257                             | 40.3 dBA                      | 235                               | 42.4 dBA                      | 269                               | 49.1 dBA                      | 291                               | 49.1 dBA                      | 1033                              | 28.4 dBA                      | 1148                              | 26.2 dBA                      | 1228                              | 25.2 dBA                      | 1228                     | 25.2 dBA                      |
| Total Facility Sound Level (1-hour Leq): |                               |                                   | 54.7 dBA                      |                                   | 53.3 dBA                      |                                 | 56.8 dBA                      |                                   | 56.8 dBA                      |                                   | 59.5 dBA                      |                                   | 56.8 dBA                      |                                   | 51.4 dBA                      |                                   | 51.4 dBA                      |                                   | 51.4 dBA                      |                          | 49.3 dBA                      |

NOTES:  
(1) Sound level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2C  
POINT-OF-RECEPTION NOISE IMPACT - AREA 3 OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

| Cadmia A ID                              | Source Description                | Residence on Hespeler Road - OL1 |   | Residence on Hespeler Road - OL2 |   | Residence on Kossuth Road - OL3 |   | Residence on Hespeler Road - OL4 |   | Residence on Hespeler Road - OL5 |   | Residence on Hespeler Road - OL6 |   | Residence on Hespeler Road - OL7 |   | Residence on Hespeler Road - OL8 |   | Residence on Hespeler Road - OL9 |   |                          |   |
|--|-----------------------------------|----------------------------------|---|----------------------------------|---|---------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|--------------------------|---|
|  |                                   | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)        | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m) | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) |
| S1                                       | Wash Plant                        | 697                              | 39.1 dBA                                      | 508                              | 48.1 dBA                                      | 606                             | 40.9 dBA                                      | 558                              | 42.7 dBA                                      | 487                              | 49.6 dBA                                      | 479                              | 44.5 dBA                                      | 911                              | 34.7 dBA                                      | 1007                             | 34.7 dBA                                      | 1087                             | 33.4 dBA                                      | 1087                     | 33.4 dBA                                      |
| S2                                       | Impact Crusher                    | 701                              | 58.6 dBA                                      | 519                              | 51.0 dBA                                      | 636                             | 51.0 dBA                                      | 592                              | 52.9 dBA                                      | 523                              | 59.4 dBA                                      | 515                              | 54.1 dBA                                      | 929                              | 45.4 dBA                                      | 1020                             | 45.4 dBA                                      | 1099                             | 44.3 dBA                                      | 1099                     | 44.3 dBA                                      |
| S3                                       | Cone Crusher                      | 661                              | 49.3 dBA                                      | 481                              | 53.4 dBA                                      | 613                             | 50.4 dBA                                      | 578                              | 52.0 dBA                                      | 520                              | 58.3 dBA                                      | 515                              | 52.9 dBA                                      | 962                              | 46.4 dBA                                      | 1056                             | 44.1 dBA                                      | 1136                             | 43.0 dBA                                      | 1136                     | 43.0 dBA                                      |
| S4                                       | Screener                          | 1442                             | 35.2 dBA                                      | 1228                             | 43.5 dBA                                      | 1095                            | 38.4 dBA                                      | 954                              | 40.8 dBA                                      | 794                              | 43.2 dBA                                      | 750                              | 43.1 dBA                                      | 151                              | 55.5 dBA                                      | 227                              | 52.0 dBA                                      | 309                              | 50.1 dBA                                      | 309                      | 50.1 dBA                                      |
| T1                                       | Truck Route                       | 515                              | 34.5 dBA                                      | 297                              | 44.6 dBA                                      | 322                             | 43.3 dBA                                      | 312                              | 42.2 dBA                                      | 317                              | 42.2 dBA                                      | 336                              | 40.1 dBA                                      | 1027                             | 26.1 dBA                                      | 1160                             | 26.1 dBA                                      | 1242                             | 25.3 dBA                                      | 1242                     | 25.3 dBA                                      |
| T2                                       | Material Truck Route              | 1124                             | 34.1 dBA                                      | 919                              | 42.0 dBA                                      | 869                             | 36.2 dBA                                      | 752                              | 40.2 dBA                                      | 604                              | 44.5 dBA                                      | 566                              | 40.3 dBA                                      | 493                              | 44.4 dBA                                      | 566                              | 43.4 dBA                                      | 646                              | 41.7 dBA                                      | 295                      | 25.8 dBA                                      |
| T3                                       | Front End Loader Route            | 1455                             | 12.1 dBA                                      | 1242                             | 19.8 dBA                                      | 1113                            | 14.9 dBA                                      | 973                              | 17.4 dBA                                      | 813                              | 19.4 dBA                                      | 768                              | 19.1 dBA                                      | 157                              | 19.1 dBA                                      | 213                              | 28.2 dBA                                      | 295                              | 25.8 dBA                                      | 295                      | 25.8 dBA                                      |
| T4                                       | Material Truck Route              | 650                              | 24.6 dBA                                      | 459                              | 28.7 dBA                                      | 565                             | 26.4 dBA                                      | 526                              | 27.8 dBA                                      | 467                              | 29.8 dBA                                      | 463                              | 28.8 dBA                                      | 943                              | 32.0 dBA                                      | 1045                             | 28.2 dBA                                      | 1126                             | 25.8 dBA                                      | 1126                     | 25.8 dBA                                      |
| T5                                       | Front End Loader Route            | 621                              | 11.8 dBA                                      | 427                              | 19.5 dBA                                      | 536                             | 14.7 dBA                                      | 501                              | 17.2 dBA                                      | 451                              | 19.2 dBA                                      | 449                              | 19.0 dBA                                      | 961                              | 31.1 dBA                                      | 1067                             | 19.6 dBA                                      | 1148                             | 18.5 dBA                                      | 1148                     | 18.5 dBA                                      |
| T6                                       | Plant Site Front End Loader Route | 686                              | 21.7 dBA                                      | 501                              | 22.9 dBA                                      | 614                             | 22.9 dBA                                      | 571                              | 24.6 dBA                                      | 505                              | 30.7 dBA                                      | 498                              | 25.5 dBA                                      | 931                              | 17.2 dBA                                      | 1026                             | 17.2 dBA                                      | 1106                             | 16.1 dBA                                      | 1106                     | 16.1 dBA                                      |
| T7                                       | Direct Sales Front End Loader     | 479                              | 25.4 dBA                                      | 261                              | 36.8 dBA                                      | 298                             | 31.1 dBA                                      | 288                              | 32.3 dBA                                      | 306                              | 32.1 dBA                                      | 332                              | 29.9 dBA                                      | 1064                             | 17.4 dBA                                      | 1199                             | 15.9 dBA                                      | 1281                             | 14.9 dBA                                      | 1281                     | 14.9 dBA                                      |
| T8                                       | Front End Loader Route            | 621                              | 24.3 dBA                                      | 427                              | 29.0 dBA                                      | 536                             | 27.8 dBA                                      | 501                              | 27.8 dBA                                      | 451                              | 29.4 dBA                                      | 449                              | 26.9 dBA                                      | 961                              | 19.6 dBA                                      | 1067                             | 18.2 dBA                                      | 1148                             | 17.2 dBA                                      | 1148                     | 17.2 dBA                                      |
| T9                                       | Scale                             | 512                              | 34.4 dBA                                      | 294                              | 45.3 dBA                                      | 270                             | 40.2 dBA                                      | 265                              | 42.9 dBA                                      | 288                              | 43.1 dBA                                      | 313                              | 40.5 dBA                                      | 1037                             | 27.5 dBA                                      | 1177                             | 25.9 dBA                                      | 1258                             | 24.9 dBA                                      | 1258                     | 24.9 dBA                                      |
| Total Facility Sound Level (1-hour Leq): |                                   |                                  | 53.0 dBA                                      |                                  | 60.5 dBA                                      |                                 | 54.7 dBA                                      |                                  | 56.4 dBA                                      |                                  | 62.4 dBA                                      |                                  | 57.3 dBA                                      |                                  | 56.8 dBA                                      |                                  | 53.9 dBA                                      |                                  | 52.2 dBA                                      |                          | 52.2 dBA                                      |

| Cadmia A ID                              | Source Description                | Residence on Hespeler Road - OL1 |   | Residence on Hespeler Road - OL2 |   | Residence on Kossuth Road - OL3 |   | Residence on Hespeler Road - OL4 |   | Residence on Hespeler Road - OL5 |   | Residence on Hespeler Road - OL6 |   | Residence on Hespeler Road - OL7 |   | Residence on Hespeler Road - OL8 |   | Residence on Hespeler Road - OL9 |   |                          |   |
|--|-----------------------------------|----------------------------------|---|----------------------------------|---|---------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|--------------------------|---|
|  |                                   | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)        | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) | Distance to Receiver (m) | Daytime 7 a.m. - 7 p.m. Sound Level (L) (Leq) |
| S1                                       | Wash Plant                        | 671                              | 40.7 dBA                                      | 479                              | 39.4 dBA                                      | 596                             | 42.0 dBA                                      | 532                              | 42.7 dBA                                      | 457                              | 45.3 dBA                                      | 449                              | 45.7 dBA                                      | 898                              | 37.5 dBA                                      | 978                              | 35.2 dBA                                      | 1057                             | 33.9 dBA                                      | 1057                     | 33.9 dBA                                      |
| S2                                       | Impact Crusher                    | 674                              | 51.4 dBA                                      | 489                              | 50.0 dBA                                      | 624                             | 53.6 dBA                                      | 565                              | 52.6 dBA                                      | 493                              | 54.9 dBA                                      | 485                              | 55.3 dBA                                      | 916                              | 48.1 dBA                                      | 991                              | 46.0 dBA                                      | 1070                             | 44.7 dBA                                      | 1070                     | 44.7 dBA                                      |
| S3                                       | Cone Crusher                      | 634                              | 50.9 dBA                                      | 452                              | 49.7 dBA                                      | 601                             | 50.7 dBA                                      | 551                              | 51.6 dBA                                      | 489                              | 53.8 dBA                                      | 485                              | 53.9 dBA                                      | 950                              | 46.6 dBA                                      | 1028                             | 44.6 dBA                                      | 1106                             | 43.4 dBA                                      | 1106                     | 43.4 dBA                                      |
| S4                                       | Screener                          | 1419                             | 37.0 dBA                                      | 1200                             | 37.9 dBA                                      | 1105                            | 38.5 dBA                                      | 950                              | 40.1 dBA                                      | 790                              | 42.8 dBA                                      | 744                              | 43.4 dBA                                      | 128                              | 58.5 dBA                                      | 198                              | 52.9 dBA                                      | 278                              | 50.8 dBA                                      | 278                      | 50.8 dBA                                      |
| T1                                       | Truck Route                       | 495                              | 35.9 dBA                                      | 271                              | 38.7 dBA                                      | 309                             | 43.4 dBA                                      | 282                              | 42.3 dBA                                      | 289                              | 41.7 dBA                                      | 311                              | 40.8 dBA                                      | 1021                             | 29.2 dBA                                      | 1131                             | 26.4 dBA                                      | 1212                             | 25.6 dBA                                      | 1212                     | 25.6 dBA                                      |
| T2                                       | Material Truck Route              | 1100                             | 35.3 dBA                                      | 890                              | 35.6 dBA                                      | 871                             | 36.5 dBA                                      | 738                              | 37.8 dBA                                      | 588                              | 40.5 dBA                                      | 548                              | 41.2 dBA                                      | 476                              | 45.3 dBA                                      | 538                              | 44.0 dBA                                      | 616                              | 42.3 dBA                                      | 616                      | 42.3 dBA                                      |
| T3                                       | Front End Loader Route            | 1432                             | 13.8 dBA                                      | 1214                             | 15.0 dBA                                      | 1123                            | 15.0 dBA                                      | 968                              | 16.4 dBA                                      | 808                              | 18.6 dBA                                      | 762                              | 19.3 dBA                                      | 932                              | 29.3 dBA                                      | 1017                             | 20.5 dBA                                      | 265                              | 26.6 dBA                                      | 265                      | 26.6 dBA                                      |
| T4                                       | Material Truck Route              | 623                              | 26.0 dBA                                      | 429                              | 25.5 dBA                                      | 554                             | 28.7 dBA                                      | 499                              | 27.8 dBA                                      | 437                              | 28.2 dBA                                      | 433                              | 29.3 dBA                                      | 932                              | 22.0 dBA                                      | 1017                             | 20.0 dBA                                      | 1096                             | 18.9 dBA                                      | 1096                     | 18.9 dBA                                      |
| T5                                       | Front End Loader Route            | 595                              | 13.6 dBA                                      | 398                              | 14.7 dBA                                      | 523                             | 14.8 dBA                                      | 474                              | 16.2 dBA                                      | 420                              | 18.4 dBA                                      | 419                              | 19.2 dBA                                      | 950                              | 33.6 dBA                                      | 1039                             | 28.7 dBA                                      | 1118                             | 26.3 dBA                                      | 1118                     | 26.3 dBA                                      |
| T6                                       | Plant Site Front End Loader Route | 659                              | 23.3 dBA                                      | 472                              | 22.8 dBA                                      | 603                             | 26.1 dBA                                      | 544                              | 24.2 dBA                                      | 475                              | 26.6 dBA                                      | 467                              | 26.8 dBA                                      | 919                              | 19.8 dBA                                      | 997                              | 17.6 dBA                                      | 1076                             | 16.5 dBA                                      | 1076                     | 16.5 dBA                                      |
| T7                                       | Direct Sales Front End Loader     | 460                              | 27.3 dBA                                      | 236                              | 32.3 dBA                                      | 282                             | 32.3 dBA                                      | 277                              | 32.0 dBA                                      | 306                              | 32.0 dBA                                      | 333                              | 31.7 dBA                                      | 1059                             | 18.8 dBA                                      | 1171                             | 16.2 dBA                                      | 1251                             | 15.2 dBA                                      | 1251                     | 15.2 dBA                                      |
| T8                                       | Front End Loader Route            | 595                              | 26.1 dBA                                      | 398                              | 25.8 dBA                                      | 523                             | 26.5 dBA                                      | 474                              | 27.5 dBA                                      | 420                              | 26.5 dBA                                      | 419                              | 26.7 dBA                                      | 950                              | 21.0 dBA                                      | 1039                             | 18.6 dBA                                      | 1118                             | 17.5 dBA                                      | 1118                     | 17.5 dBA                                      |
| T9                                       | Scale                             | 495                              | 35.9 dBA                                      | 271                              | 38.6 dBA                                      | 257                             | 40.9 dBA                                      | 235                              | 42.4 dBA                                      | 263                              | 42.1 dBA                                      | 291                              | 41.4 dBA                                      | 1033                             | 28.4 dBA                                      | 1148                             | 26.2 dBA                                      | 1228                             | 25.2 dBA                                      | 1228                     | 25.2 dBA                                      |
| Total Facility Sound Level (1-hour Leq): |                                   |                                  | 54.6 dBA                                      |                                  | 53.6 dBA                                      |                                 | 56.3 dBA                                      |                                  | 56.0 dBA                                      |                                  | 58.1 dBA                                      |                                  | 58.4 dBA                                      |                                  | 59.4 dBA                                      |                                  | 54.7 dBA                                      |                                  | 52.9 dBA                                      |                          | 52.9 dBA                                      |

Notes:  
(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2D  
POINT-OF-RECEPTION NOISE IMPACT - AREA 4A OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

| Cadna A ID                               | Source Description                | Residence on Hespeler Road - POR1        |   | Residence on Hespeler Road - POR2        |   | Residence on Kossuth Road - POR3        |   | Residence on Hespeler Road - POR4        |   | Residence on Hespeler Road - POR5        |   | Residence on Hespeler Road - POR6        |   | Residence on Hespeler Road - POR7        |   | Residence on Hespeler Road - POR8A       |   | Residence on Hespeler Road - POR9A       |   |                          |   |
|--|-----------------------------------|--|---|--|---|---|---|--|---|--|---|--|---|--|---|--|---|--|---|--------------------------|---|
|  |                                   | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m) | Daytime 7 a.m. - 7 p.m. Sound Level (L) |
|  |                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                     | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                      | (Leq)                                   |
| S1                                       | Wash Plant                        | 697                                      | 39.1 dBA                                | 508                                      | 48.1 dBA                                | 606                                     | 40.9 dBA                                | 558                                      | 42.7 dBA                                | 487                                      | 49.6 dBA                                | 479                                      | 44.5 dBA                                | 911                                      | 34.7 dBA                                | 1007                                     | 34.7 dBA                                | 1087                                     | 33.4 dBA                                | 1087                     | 33.4 dBA                                |
| S2                                       | Impact Crusher                    | 701                                      | 58.6 dBA                                | 519                                      | 51.0 dBA                                | 636                                     | 51.0 dBA                                | 592                                      | 52.9 dBA                                | 523                                      | 59.4 dBA                                | 515                                      | 54.1 dBA                                | 929                                      | 45.9 dBA                                | 1020                                     | 45.5 dBA                                | 1099                                     | 44.3 dBA                                | 1099                     | 44.3 dBA                                |
| S3                                       | Cone Crusher                      | 661                                      | 49.3 dBA                                | 481                                      | 53.4 dBA                                | 613                                     | 50.4 dBA                                | 578                                      | 52.0 dBA                                | 520                                      | 58.3 dBA                                | 515                                      | 52.9 dBA                                | 962                                      | 46.4 dBA                                | 1056                                     | 44.1 dBA                                | 1136                                     | 43.0 dBA                                | 1136                     | 43.0 dBA                                |
| S4                                       | Screener                          | 660                                      | 45.4 dBA                                | 472                                      | 54.6 dBA                                | 582                                     | 47.1 dBA                                | 543                                      | 48.8 dBA                                | 482                                      | 55.4 dBA                                | 477                                      | 50.1 dBA                                | 942                                      | 41.5 dBA                                | 1041                                     | 40.1 dBA                                | 1122                                     | 38.8 dBA                                | 1122                     | 38.8 dBA                                |
| T1                                       | Truck Route                       | 515                                      | 34.5 dBA                                | 297                                      | 34.5 dBA                                | 322                                     | 43.3 dBA                                | 312                                      | 42.4 dBA                                | 317                                      | 40.1 dBA                                | 336                                      | 40.1 dBA                                | 1027                                     | 28.1 dBA                                | 1160                                     | 26.1 dBA                                | 1242                                     | 25.3 dBA                                | 1242                     | 25.3 dBA                                |
| T2                                       | Material Truck Route              | 745                                      | 41.3 dBA                                | 541                                      | 41.3 dBA                                | 568                                     | 38.1 dBA                                | 497                                      | 40.6 dBA                                | 391                                      | 45.4 dBA                                | 391                                      | 43.6 dBA                                | 825                                      | 34.6 dBA                                | 933                                      | 33.0 dBA                                | 1014                                     | 31.8 dBA                                | 1014                     | 31.8 dBA                                |
| T3                                       | Front End Loader Route            | 669                                      | 25.3 dBA                                | 482                                      | 29.4 dBA                                | 594                                     | 26.7 dBA                                | 553                                      | 28.5 dBA                                | 490                                      | 34.7 dBA                                | 484                                      | 29.6 dBA                                | 937                                      | 22.5 dBA                                | 1035                                     | 21.2 dBA                                | 1115                                     | 20.1 dBA                                | 1115                     | 20.1 dBA                                |
| T4                                       | Material Truck Route              | 650                                      | 24.6 dBA                                | 459                                      | 28.7 dBA                                | 565                                     | 26.4 dBA                                | 526                                      | 27.8 dBA                                | 467                                      | 29.8 dBA                                | 463                                      | 28.8 dBA                                | 943                                      | 22.0 dBA                                | 1045                                     | 19.6 dBA                                | 1126                                     | 18.5 dBA                                | 1126                     | 18.5 dBA                                |
| T5                                       | Front End Loader Route            | 764                                      | 22.3 dBA                                | 545                                      | 31.7 dBA                                | 411                                     | 28.3 dBA                                | 299                                      | 31.6 dBA                                | 176                                      | 34.4 dBA                                | 158                                      | 34.4 dBA                                | 785                                      | 21.3 dBA                                | 930                                      | 19.6 dBA                                | 1011                                     | 19.1 dBA                                | 1011                     | 19.1 dBA                                |
| T6                                       | Plant Site Front End Loader Route | 686                                      | 21.7 dBA                                | 501                                      | 25.7 dBA                                | 614                                     | 22.9 dBA                                | 571                                      | 24.6 dBA                                | 505                                      | 30.7 dBA                                | 498                                      | 25.5 dBA                                | 931                                      | 17.2 dBA                                | 1026                                     | 17.2 dBA                                | 1106                                     | 16.1 dBA                                | 1106                     | 16.1 dBA                                |
| T7                                       | Direct Sales Front End Loader     | 479                                      | 25.4 dBA                                | 261                                      | 36.8 dBA                                | 298                                     | 31.1 dBA                                | 306                                      | 32.3 dBA                                | 306                                      | 32.3 dBA                                | 332                                      | 29.9 dBA                                | 1064                                     | 17.4 dBA                                | 1199                                     | 15.9 dBA                                | 1281                                     | 14.9 dBA                                | 1281                     | 14.9 dBA                                |
| T8                                       | Front End Loader Route            | 621                                      | 24.3 dBA                                | 427                                      | 29.0 dBA                                | 536                                     | 26.0 dBA                                | 501                                      | 27.8 dBA                                | 449                                      | 26.9 dBA                                | 449                                      | 26.9 dBA                                | 961                                      | 19.6 dBA                                | 1067                                     | 18.2 dBA                                | 1148                                     | 17.2 dBA                                | 1148                     | 17.2 dBA                                |
| T9                                       | Scale                             | 512                                      | 34.4 dBA                                | 294                                      | 45.3 dBA                                | 270                                     | 40.2 dBA                                | 265                                      | 42.9 dBA                                | 288                                      | 29.4 dBA                                | 313                                      | 40.5 dBA                                | 1037                                     | 26.9 dBA                                | 1177                                     | 25.9 dBA                                | 1258                                     | 24.9 dBA                                | 1258                     | 24.9 dBA                                |
| Total Facility Sound Level (1-hour Leq): |                                   |  | 53.7 dBA                                |  | 61.4 dBA                                |   | 55.3 dBA                                |  | 57.0 dBA                                |  | 63.2 dBA                                |  | 58.0 dBA                                |  | 50.3 dBA                                |  | 48.9 dBA                                |  | 47.7 dBA                                |                          | 47.7 dBA                                |
|  |                                   | Residence on Hespeler Road - OLA - POR1A |   | Residence on Hespeler Road - OLA - POR2A |   | Residence on Kossuth Road - OLA - POR3A |   | Residence on Hespeler Road - OLA - POR4A |   | Residence on Hespeler Road - OLA - POR5A |   | Residence on Hespeler Road - OLA - POR6A |   | Residence on Hespeler Road - OLA - POR7A |   | Residence on Hespeler Road - OLA - POR8A |   | Residence on Hespeler Road - OLA - POR9A |   |                          |   |
| S1                                       | Wash Plant                        | 671                                      | 40.7 dBA                                | 479                                      | 39.4 dBA                                | 596                                     | 42.0 dBA                                | 532                                      | 42.7 dBA                                | 457                                      | 45.3 dBA                                | 449                                      | 45.7 dBA                                | 898                                      | 37.5 dBA                                | 978                                      | 35.2 dBA                                | 1057                                     | 33.9 dBA                                | 1057                     | 33.9 dBA                                |
| S2                                       | Impact Crusher                    | 674                                      | 51.4 dBA                                | 489                                      | 53.6 dBA                                | 624                                     | 53.6 dBA                                | 565                                      | 52.6 dBA                                | 493                                      | 54.9 dBA                                | 485                                      | 55.3 dBA                                | 916                                      | 46.1 dBA                                | 991                                      | 46.0 dBA                                | 1070                                     | 44.7 dBA                                | 1070                     | 44.7 dBA                                |
| S3                                       | Cone Crusher                      | 634                                      | 50.9 dBA                                | 452                                      | 49.7 dBA                                | 601                                     | 50.7 dBA                                | 551                                      | 51.6 dBA                                | 489                                      | 53.8 dBA                                | 485                                      | 53.9 dBA                                | 950                                      | 46.6 dBA                                | 1028                                     | 44.6 dBA                                | 1106                                     | 43.4 dBA                                | 1106                     | 43.4 dBA                                |
| S4                                       | Screener                          | 633                                      | 47.1 dBA                                | 442                                      | 45.7 dBA                                | 571                                     | 49.9 dBA                                | 515                                      | 48.6 dBA                                | 451                                      | 49.5 dBA                                | 446                                      | 51.1 dBA                                | 930                                      | 42.8 dBA                                | 1012                                     | 40.5 dBA                                | 1092                                     | 39.2 dBA                                | 1092                     | 39.2 dBA                                |
| T1                                       | Truck Route                       | 495                                      | 35.9 dBA                                | 271                                      | 38.7 dBA                                | 309                                     | 45.4 dBA                                | 282                                      | 42.3 dBA                                | 289                                      | 41.7 dBA                                | 311                                      | 40.8 dBA                                | 1021                                     | 29.2 dBA                                | 1131                                     | 26.4 dBA                                | 1212                                     | 23.6 dBA                                | 1212                     | 23.6 dBA                                |
| T2                                       | Material Truck Route              | 720                                      | 35.9 dBA                                | 512                                      | 34.7 dBA                                | 582                                     | 38.4 dBA                                | 473                                      | 40.5 dBA                                | 376                                      | 44.5 dBA                                | 360                                      | 40.8 dBA                                | 814                                      | 33.4 dBA                                | 904                                      | 33.4 dBA                                | 984                                      | 32.2 dBA                                | 984                      | 32.2 dBA                                |
| T3                                       | Front End Loader Route            | 643                                      | 26.9 dBA                                | 453                                      | 26.5 dBA                                | 554                                     | 28.0 dBA                                | 459                                      | 28.0 dBA                                | 433                                      | 30.9 dBA                                | 453                                      | 30.9 dBA                                | 925                                      | 22.8 dBA                                | 1006                                     | 21.6 dBA                                | 1085                                     | 20.4 dBA                                | 1085                     | 20.4 dBA                                |
| T4                                       | Material Truck Route              | 623                                      | 26.0 dBA                                | 429                                      | 25.5 dBA                                | 554                                     | 27.8 dBA                                | 499                                      | 27.8 dBA                                | 437                                      | 29.3 dBA                                | 433                                      | 29.3 dBA                                | 932                                      | 22.0 dBA                                | 1017                                     | 20.0 dBA                                | 1096                                     | 18.9 dBA                                | 1096                     | 18.9 dBA                                |
| T5                                       | Front End Loader Route            | 745                                      | 24.1 dBA                                | 521                                      | 25.9 dBA                                | 415                                     | 28.6 dBA                                | 283                                      | 30.6 dBA                                | 150                                      | 35.4 dBA                                | 128                                      | 36.4 dBA                                | 782                                      | 23.7 dBA                                | 902                                      | 19.4 dBA                                | 981                                      | 19.4 dBA                                | 981                      | 19.4 dBA                                |
| T6                                       | Plant Site Front End Loader Route | 659                                      | 23.3 dBA                                | 472                                      | 22.8 dBA                                | 603                                     | 26.1 dBA                                | 544                                      | 24.2 dBA                                | 475                                      | 26.6 dBA                                | 467                                      | 26.8 dBA                                | 919                                      | 19.8 dBA                                | 997                                      | 17.6 dBA                                | 1076                                     | 16.3 dBA                                | 1076                     | 16.3 dBA                                |
| T7                                       | Direct Sales Front End Loader     | 460                                      | 27.3 dBA                                | 236                                      | 32.3 dBA                                | 282                                     | 32.3 dBA                                | 277                                      | 32.3 dBA                                | 306                                      | 31.7 dBA                                | 333                                      | 31.1 dBA                                | 1059                                     | 16.2 dBA                                | 1171                                     | 16.2 dBA                                | 1251                                     | 15.2 dBA                                | 1251                     | 15.2 dBA                                |
| T8                                       | Front End Loader Route            | 595                                      | 26.1 dBA                                | 398                                      | 25.8 dBA                                | 523                                     | 26.5 dBA                                | 474                                      | 27.5 dBA                                | 420                                      | 26.5 dBA                                | 419                                      | 26.7 dBA                                | 950                                      | 21.0 dBA                                | 1039                                     | 18.6 dBA                                | 1118                                     | 17.5 dBA                                | 1118                     | 17.5 dBA                                |
| T9                                       | Scale                             | 495                                      | 35.9 dBA                                | 271                                      | 38.6 dBA                                | 257                                     | 40.9 dBA                                | 235                                      | 42.4 dBA                                | 263                                      | 42.1 dBA                                | 291                                      | 41.4 dBA                                | 1033                                     | 28.4 dBA                                | 1148                                     | 26.2 dBA                                | 1228                                     | 25.2 dBA                                | 1228                     | 25.2 dBA                                |
| Total Facility Sound Level (1-hour Leq): |                                   |  | 55.3 dBA                                |  | 54.1 dBA                                |   | 57.1 dBA                                |  | 56.7 dBA                                |  | 58.7 dBA                                |  | 59.1 dBA                                |  | 51.5 dBA                                |  | 49.4 dBA                                |  | 48.1 dBA                                |                          | 48.1 dBA                                |

Notes:

(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.



TABLE 2E  
POINT-OF-RECEPTION NOISE IMPACT - AREA 4B OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

| Cadna A ID                               | Source Description                | Residence on Hespeler Road - POR1        |   | Residence on Hespeler Road - POR2        |   | Residence on Kossuth Road - POR3        |   | Residence on Hespeler Road - POR4        |   | Residence on Hespeler Road - POR5        |   | Residence on Hespeler Road - POR6        |   | Residence on Hespeler Road - POR7        |   | Residence on Hespeler Road - POR8A       |   | Residence on Hespeler Road - POR9A       |   |                          |   |
|--|-----------------------------------|--|---|--|---|---|---|--|---|--|---|--|---|--|---|--|---|--|---|--------------------------|---|
|  |                                   | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m)                 | Daytime 7 a.m. - 7 p.m. Sound Level (L) | Distance to Receptor (m) | Daytime 7 a.m. - 7 p.m. Sound Level (L) |
|  |                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                     | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                                      | (Leq)                                   | (m)                      | (Leq)                                   |
| S1                                       | Wash Plant                        | 697                                      | 39.1 dBA                                | 508                                      | 48.1 dBA                                | 606                                     | 40.9 dBA                                | 558                                      | 42.7 dBA                                | 487                                      | 49.6 dBA                                | 479                                      | 44.5 dBA                                | 911                                      | 34.7 dBA                                | 1007                                     | 34.7 dBA                                | 1087                                     | 33.4 dBA                                | 1087                     | 33.4 dBA                                |
| S2                                       | Impact Crusher                    | 701                                      | 58.6 dBA                                | 519                                      | 51.0 dBA                                | 636                                     | 51.0 dBA                                | 592                                      | 52.9 dBA                                | 523                                      | 54.1 dBA                                | 929                                      | 54.1 dBA                                | 929                                      | 45.9 dBA                                | 1099                                     | 45.5 dBA                                | 1099                                     | 44.3 dBA                                | 1099                     | 44.3 dBA                                |
| S3                                       | Cone Crusher                      | 661                                      | 49.3 dBA                                | 481                                      | 53.4 dBA                                | 613                                     | 50.4 dBA                                | 578                                      | 52.0 dBA                                | 520                                      | 58.3 dBA                                | 515                                      | 52.9 dBA                                | 962                                      | 46.4 dBA                                | 1056                                     | 44.1 dBA                                | 1136                                     | 43.0 dBA                                | 1136                     | 43.0 dBA                                |
| S4                                       | Screener                          | 660                                      | 45.4 dBA                                | 472                                      | 54.5 dBA                                | 582                                     | 47.0 dBA                                | 543                                      | 48.8 dBA                                | 482                                      | 55.4 dBA                                | 477                                      | 50.1 dBA                                | 942                                      | 41.6 dBA                                | 1041                                     | 40.1 dBA                                | 1122                                     | 38.9 dBA                                | 1122                     | 38.9 dBA                                |
| T1                                       | Truck Route                       | 515                                      | 34.5 dBA                                | 297                                      | 44.6 dBA                                | 322                                     | 43.3 dBA                                | 312                                      | 42.4 dBA                                | 317                                      | 42.4 dBA                                | 336                                      | 40.1 dBA                                | 2017                                     | 28.1 dBA                                | 1160                                     | 26.1 dBA                                | 1242                                     | 25.3 dBA                                | 1242                     | 25.3 dBA                                |
| T2                                       | Material Truck Route              | 1358                                     | 41.4 dBA                                | 1545                                     | 49.4 dBA                                | 1669                                    | 42.4 dBA                                | 1820                                     | 41.0 dBA                                | 1973                                     | 42.1 dBA                                | 2017                                     | 40.1 dBA                                | 2817                                     | 31.3 dBA                                | 2969                                     | 30.0 dBA                                | 3050                                     | 29.0 dBA                                | 3050                     | 29.0 dBA                                |
| T3                                       | Front End Loader Route            | 671                                      | 19.9 dBA                                | 487                                      | 24.0 dBA                                | 606                                     | 21.3 dBA                                | 566                                      | 23.1 dBA                                | 504                                      | 29.2 dBA                                | 498                                      | 24.0 dBA                                | 944                                      | 16.6 dBA                                | 1040                                     | 15.3 dBA                                | 1120                                     | 14.3 dBA                                | 1120                     | 14.3 dBA                                |
| T4                                       | Material Truck Route              | 650                                      | 28.7 dBA                                | 459                                      | 28.7 dBA                                | 565                                     | 26.4 dBA                                | 526                                      | 27.8 dBA                                | 467                                      | 29.8 dBA                                | 463                                      | 28.8 dBA                                | 943                                      | 21.0 dBA                                | 1045                                     | 18.5 dBA                                | 1126                                     | 18.5 dBA                                | 1126                     | 18.5 dBA                                |
| T5                                       | Front End Loader Route            | 276                                      | 30.0 dBA                                | 76                                       | 42.9 dBA                                | 63                                      | 29.2 dBA                                | 374                                      | 28.2 dBA                                | 453                                      | 27.1 dBA                                | 523                                      | 25.4 dBA                                | 1265                                     | 15.4 dBA                                | 1394                                     | 14.2 dBA                                | 1476                                     | 13.3 dBA                                | 1476                     | 13.3 dBA                                |
| T6                                       | Plant Site Front End Loader Route | 686                                      | 21.7 dBA                                | 501                                      | 25.7 dBA                                | 614                                     | 22.9 dBA                                | 571                                      | 24.6 dBA                                | 505                                      | 30.7 dBA                                | 498                                      | 25.5 dBA                                | 931                                      | 17.2 dBA                                | 1026                                     | 16.1 dBA                                | 1106                                     | 16.1 dBA                                | 1106                     | 16.1 dBA                                |
| T7                                       | Direct Sales Front End Loader     | 479                                      | 25.4 dBA                                | 261                                      | 36.8 dBA                                | 298                                     | 31.1 dBA                                | 306                                      | 32.3 dBA                                | 306                                      | 32.3 dBA                                | 356                                      | 29.9 dBA                                | 1064                                     | 17.4 dBA                                | 1199                                     | 15.9 dBA                                | 1281                                     | 14.9 dBA                                | 1281                     | 14.9 dBA                                |
| T8                                       | Front End Loader Route            | 621                                      | 24.3 dBA                                | 427                                      | 29.0 dBA                                | 536                                     | 26.0 dBA                                | 501                                      | 27.8 dBA                                | 451                                      | 29.4 dBA                                | 449                                      | 26.9 dBA                                | 961                                      | 19.6 dBA                                | 1067                                     | 18.2 dBA                                | 1148                                     | 17.2 dBA                                | 1148                     | 17.2 dBA                                |
| T9                                       | Scale                             | 512                                      | 34.4 dBA                                | 294                                      | 45.3 dBA                                | 270                                     | 40.2 dBA                                | 265                                      | 42.9 dBA                                | 288                                      | 43.1 dBA                                | 313                                      | 40.5 dBA                                | 1037                                     | 27.5 dBA                                | 1177                                     | 25.9 dBA                                | 1258                                     | 24.9 dBA                                | 1258                     | 24.9 dBA                                |
| Total Facility Sound Level (1-hour Leq): |                                   |  | 53.9 dBA                                |  | 61.7 dBA                                |   | 55.4 dBA                                |  | 57.0 dBA                                |  | 63.1 dBA                                |  | 57.9 dBA                                |  | 50.2 dBA                                |  | 48.8 dBA                                |  | 47.7 dBA                                |                          | 47.7 dBA                                |
|  |                                   | Residence on Hespeler Road - OLA - POR1A |   | Residence on Hespeler Road - OLA - POR2A |   | Residence on Kossuth Road - OLA - POR3A |   | Residence on Hespeler Road - OLA - POR4A |   | Residence on Hespeler Road - OLA - POR5A |   | Residence on Hespeler Road - OLA - POR6A |   | Residence on Hespeler Road - OLA - POR7A |   | Residence on Hespeler Road - OLA - POR8A |   | Residence on Hespeler Road - OLA - POR9A |   |                          |   |
| S1                                       | Wash Plant                        | 671                                      | 40.7 dBA                                | 479                                      | 39.4 dBA                                | 596                                     | 42.0 dBA                                | 532                                      | 42.7 dBA                                | 457                                      | 45.3 dBA                                | 449                                      | 45.7 dBA                                | 898                                      | 37.5 dBA                                | 978                                      | 35.2 dBA                                | 1057                                     | 33.9 dBA                                | 1057                     | 33.9 dBA                                |
| S2                                       | Impact Crusher                    | 674                                      | 51.4 dBA                                | 489                                      | 53.6 dBA                                | 604                                     | 53.6 dBA                                | 565                                      | 52.6 dBA                                | 493                                      | 54.9 dBA                                | 485                                      | 55.3 dBA                                | 916                                      | 46.1 dBA                                | 991                                      | 46.0 dBA                                | 1070                                     | 44.7 dBA                                | 1070                     | 44.7 dBA                                |
| S3                                       | Cone Crusher                      | 634                                      | 50.9 dBA                                | 452                                      | 50.7 dBA                                | 621                                     | 50.7 dBA                                | 551                                      | 51.6 dBA                                | 489                                      | 53.8 dBA                                | 485                                      | 53.9 dBA                                | 950                                      | 46.6 dBA                                | 1028                                     | 44.6 dBA                                | 1106                                     | 43.4 dBA                                | 1106                     | 43.4 dBA                                |
| S4                                       | Screener                          | 633                                      | 47.1 dBA                                | 442                                      | 45.7 dBA                                | 571                                     | 49.7 dBA                                | 515                                      | 48.6 dBA                                | 451                                      | 51.0 dBA                                | 446                                      | 51.1 dBA                                | 930                                      | 42.8 dBA                                | 1012                                     | 40.5 dBA                                | 1092                                     | 39.3 dBA                                | 1092                     | 39.3 dBA                                |
| T1                                       | Truck Route                       | 495                                      | 35.9 dBA                                | 271                                      | 38.7 dBA                                | 309                                     | 45.4 dBA                                | 282                                      | 42.3 dBA                                | 289                                      | 41.7 dBA                                | 311                                      | 40.8 dBA                                | 1021                                     | 29.2 dBA                                | 1131                                     | 26.4 dBA                                | 1212                                     | 23.6 dBA                                | 1212                     | 23.6 dBA                                |
| T2                                       | Material Truck Route              | 1386                                     | 43.1 dBA                                | 1574                                     | 45.4 dBA                                | 1654                                    | 43.7 dBA                                | 1815                                     | 41.1 dBA                                | 1969                                     | 41.3 dBA                                | 2015                                     | 41.1 dBA                                | 2816                                     | 32.3 dBA                                | 2941                                     | 30.3 dBA                                | 3020                                     | 29.3 dBA                                | 3020                     | 29.3 dBA                                |
| T3                                       | Front End Loader Route            | 623                                      | 21.5 dBA                                | 429                                      | 21.2 dBA                                | 594                                     | 24.0 dBA                                | 539                                      | 22.6 dBA                                | 473                                      | 25.1 dBA                                | 468                                      | 25.2 dBA                                | 932                                      | 15.7 dBA                                | 1011                                     | 15.7 dBA                                | 1090                                     | 14.6 dBA                                | 1090                     | 14.6 dBA                                |
| T4                                       | Material Truck Route              | 644                                      | 26.0 dBA                                | 429                                      | 25.5 dBA                                | 554                                     | 27.8 dBA                                | 499                                      | 27.8 dBA                                | 433                                      | 28.2 dBA                                | 433                                      | 29.3 dBA                                | 932                                      | 20.0 dBA                                | 1017                                     | 18.0 dBA                                | 1096                                     | 18.9 dBA                                | 1096                     | 18.9 dBA                                |
| T5                                       | Front End Loader Route            | 255                                      | 33.1 dBA                                | 34                                       | 40.5 dBA                                | 349                                     | 30.8 dBA                                | 427                                      | 28.3 dBA                                | 501                                      | 27.3 dBA                                | 532                                      | 26.8 dBA                                | 1259                                     | 16.8 dBA                                | 1366                                     | 14.5 dBA                                | 1446                                     | 13.6 dBA                                | 1446                     | 13.6 dBA                                |
| T6                                       | Plant Site Front End Loader Route | 659                                      | 23.3 dBA                                | 472                                      | 22.8 dBA                                | 603                                     | 26.1 dBA                                | 544                                      | 24.2 dBA                                | 475                                      | 26.6 dBA                                | 467                                      | 26.8 dBA                                | 919                                      | 19.8 dBA                                | 997                                      | 17.6 dBA                                | 1076                                     | 16.3 dBA                                | 1076                     | 16.3 dBA                                |
| T7                                       | Direct Sales Front End Loader     | 460                                      | 27.3 dBA                                | 236                                      | 30.1 dBA                                | 282                                     | 32.3 dBA                                | 277                                      | 31.7 dBA                                | 306                                      | 31.7 dBA                                | 333                                      | 31.1 dBA                                | 1059                                     | 18.8 dBA                                | 1171                                     | 16.2 dBA                                | 1251                                     | 15.2 dBA                                | 1251                     | 15.2 dBA                                |
| T8                                       | Front End Loader Route            | 595                                      | 26.1 dBA                                | 398                                      | 25.8 dBA                                | 523                                     | 26.5 dBA                                | 474                                      | 27.5 dBA                                | 420                                      | 26.5 dBA                                | 419                                      | 26.7 dBA                                | 950                                      | 18.4 dBA                                | 1039                                     | 16.2 dBA                                | 1118                                     | 14.5 dBA                                | 1118                     | 14.5 dBA                                |
| T9                                       | Scale                             | 495                                      | 35.9 dBA                                | 271                                      | 38.6 dBA                                | 257                                     | 40.9 dBA                                | 235                                      | 42.4 dBA                                | 263                                      | 42.1 dBA                                | 291                                      | 41.4 dBA                                | 1033                                     | 28.4 dBA                                | 1148                                     | 26.2 dBA                                | 1228                                     | 25.2 dBA                                | 1228                     | 25.2 dBA                                |
| Total Facility Sound Level (1-hour Leq): |                                   |  | 55.5 dBA                                |  | 54.8 dBA                                |   | 57.3 dBA                                |  | 56.7 dBA                                |  | 58.8 dBA                                |  | 59.0 dBA                                |  | 51.4 dBA                                |  | 49.3 dBA                                |  | 48.1 dBA                                |                          | 48.1 dBA                                |

Notes:  
(1) Sound Level at the Receptor was calculated using Cadna A Acoustical Modelling Software.

TABLE 2F  
POINT-OF-RECEPTION NOISE IMPACT - SHIPPING OPERATIONS  
SPENCER PIT  
GUELPH, ONTARIO

| Codina A ID | Source Description                              | Residence on Hespeler Road       |   | Residence on Hespeler Road |   | Residence on Kossuth Road |   | Residence on Hespeler Road |   | Residence on Hespeler Road |   | Residence on Hespeler Road |   | Residence on Hespeler Road |   |
|-------------|---|----------------------------------|---|----------------------------|---|---------------------------|---|----------------------------|---|----------------------------|---|----------------------------|---|----------------------------|---|
|             |   | POH1                             | POH2                                      | POH3                       | POH4                                      | POH5                      | POH6                                      | POH7                       | POH8A                                     | POH9A                      |   |                            |   |                            |   |
|             |   | Distance to Receiver (m)         | Nighttime 6 a.m. - 7 a.m. Sound Level (L) | Distance to Receiver (m)   | Nighttime 6 a.m. - 7 a.m. Sound Level (L) | Distance to Receiver (m)  | Nighttime 6 a.m. - 7 a.m. Sound Level (L) | Distance to Receiver (m)   | Nighttime 6 a.m. - 7 a.m. Sound Level (L) | Distance to Receiver (m)   | Nighttime 6 a.m. - 7 a.m. Sound Level (L) | Distance to Receiver (m)   | Nighttime 6 a.m. - 7 a.m. Sound Level (L) | Distance to Receiver (m)   | Nighttime 6 a.m. - 7 a.m. Sound Level (L) |
| T1          | Truck Route                                     | 515                              | 34.5 dBA                                  | 297                        | 44.6 dBA                                  | 322                       | 43.3 dBA                                  | 312                        | 42.4 dBA                                  | 317                        | 42.2 dBA                                  | 336                        | 40.1 dBA                                  | 1027                       | 28.1 dBA                                  |
| T8          | Front End Loader Route                          | 621                              | 24.3 dBA                                  | 427                        | 29.0 dBA                                  | 536                       | 27.8 dBA                                  | 501                        | 27.8 dBA                                  | 451                        | 29.4 dBA                                  | 449                        | 26.9 dBA                                  | 961                        | 19.6 dBA                                  |
| T9          | Scale   | 512                              | 34.4 dBA                                  | 294                        | 45.3 dBA                                  | 270                       | 40.2 dBA                                  | 265                        | 42.9 dBA                                  | 288                        | 43.9 dBA                                  | 313                        | 40.5 dBA                                  | 1037                       | 27.5 dBA                                  |
|             | <b>Total Facility Sound Level (1-hour Leq):</b> |                                  | <b>37.7 dBA</b>                           |                            | <b>48.0 dBA</b>                           |                           | <b>45.1 dBA</b>                           |                            | <b>45.7 dBA</b>                           |                            | <b>45.8 dBA</b>                           |                            | <b>43.4 dBA</b>                           |                            | <b>31.1 dBA</b>                           |
|             |   | Residence on Hespeler Road - OLA |   |                            |   |                           |   |                            |   |                            |   |                            |   |                            |   |
|             |   | POH1                             |   | POH2                       |   | POH3                      |   | POH4                       |   | POH5                       |   | POH6                       |   | POH7                       |   |
|             |   | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)  | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   |
| T1          | Truck Route                                     | 538                              | 35.9 dBA                                  | 314                        | 38.7 dBA                                  | 312                       | 45.4 dBA                                  | 262                        | 42.3 dBA                                  | 250                        | 41.7 dBA                                  | 270                        | 40.8 dBA                                  | 980                        | 29.2 dBA                                  |
| T8          | Front End Loader Route                          | 595                              | 26.1 dBA                                  | 398                        | 25.8 dBA                                  | 523                       | 26.5 dBA                                  | 474                        | 27.5 dBA                                  | 420                        | 26.5 dBA                                  | 419                        | 26.7 dBA                                  | 950                        | 21.0 dBA                                  |
| T9          | Scale   | 495                              | 35.9 dBA                                  | 271                        | 38.6 dBA                                  | 257                       | 40.9 dBA                                  | 235                        | 42.4 dBA                                  | 263                        | 42.1 dBA                                  | 291                        | 41.4 dBA                                  | 1033                       | 28.4 dBA                                  |
|             | <b>Total Facility Sound Level (1-hour Leq):</b> |                                  | <b>39.1 dBA</b>                           |                            | <b>41.8 dBA</b>                           |                           | <b>46.8 dBA</b>                           |                            | <b>45.4 dBA</b>                           |                            | <b>45.0 dBA</b>                           |                            | <b>44.2 dBA</b>                           |                            | <b>32.2 dBA</b>                           |
|             |   | Residence on Hespeler Road - OLA |   |                            |   |                           |   |                            |   |                            |   |                            |   |                            |   |
|             |   | POH8A                            |   | POH9A                      |   | POH8A                     |   | POH9A                      |   | POH8A                      |   | POH9A                      |   | POH8A                      |   |
|             |   | Distance to Receiver (m)         | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)  | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   | Distance to Receiver (m)   | Daytime 7 a.m. - 7 p.m. Sound Level (L)   |
| T1          | Truck Route                                     | 1180                             | 26.1 dBA                                  | 1092                       | 26.4 dBA                                  | 1172                      | 26.6 dBA                                  | 1148                       | 26.2 dBA                                  | 1160                       | 26.1 dBA                                  | 1148                       | 26.3 dBA                                  | 1172                       | 25.6 dBA                                  |
| T8          | Front End Loader Route                          | 1067                             | 18.2 dBA                                  | 1039                       | 18.6 dBA                                  | 1118                      | 17.2 dBA                                  | 1118                       | 17.2 dBA                                  | 1067                       | 18.2 dBA                                  | 1148                       | 17.2 dBA                                  | 1118                       | 17.2 dBA                                  |
| T9          | Scale   | 1177                             | 25.9 dBA                                  | 1148                       | 26.2 dBA                                  | 1228                      | 24.9 dBA                                  | 1228                       | 24.9 dBA                                  | 1177                       | 25.9 dBA                                  | 1228                       | 24.9 dBA                                  | 1228                       | 24.9 dBA                                  |
|             | <b>Total Facility Sound Level (1-hour Leq):</b> |                                  | <b>29.7 dBA</b>                           |                            | <b>29.7 dBA</b>                           |                           | <b>28.3 dBA</b>                           |                            | <b>28.3 dBA</b>                           |                            | <b>28.3 dBA</b>                           |                            | <b>28.3 dBA</b>                           |                            | <b>28.3 dBA</b>                           |

Notes:  
(1) Sound Level at the Receiver was calculated using Cadna A Acoustical Modelling Software.

**TABLE 3**  
**ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

| <i>Point-of-Reception ID</i>                      | <i>Point-of-Reception Description</i> | <i>Sound Level at Point-of-Reception Predicted (Leq)</i> | <i>Verified by Acoustic Audit (Yes/No)</i> | <i>Performance Limit (1) (Leq)</i> | <i>Compliance with Performance Limit (Yes/No)</i> |
|---|---------------------------------------|--|--|------------------------------------|---|
| <b>Area 1 Operations - 7:00 a.m. - 11:00 p.m.</b> |                                       |  |  |                                    |   |
| POR1  | Residence on Hespeler Road            | 52.7 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR1A   | Residence on Hespeler Road - OLA      | 58.5 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR2  | Residence on Hespeler Road            | 61.5 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR2A   | Residence on Hespeler Road - OLA      | 53.0 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR3  | Residence on Kossuth Road             | 56.5 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR3A   | Residence on Kossuth Road - OLA       | 56.9 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4  | Residence on Hespeler Road            | 62.1 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4A   | Residence on Hespeler Road - OLA      | 58.8 (dBA)   | No   | 65 (dBA)                           | Yes   |
| POR5  | Residence on Hespeler Road            | 62.6 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR5A   | Residence on Hespeler Road - OLA      | 61.1 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR6  | Residence on Hespeler Road            | 62.7 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR6A   | Residence on Hespeler Road - OLA      | 61.1 (dBA)   | No   | 68 (dBA)                           | Yes   |
| POR7  | Residence on Hespeler Road            | 55.7 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR7A   | Residence on Hespeler Road - OLA      | 57.9 (dBA)   | No   | 75 (dBA)                           | Yes   |
| POR8A   | Residence on Hespeler Road            | 49.7 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR8A   | Residence on Hespeler Road - OLA      | 50.2 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR9A   | Residence on Hespeler Road            | 52.3 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR9A   | Residence on Hespeler Road - OLA      | 52.7 (dBA)   | No   | 68 (dBA)                           | Yes   |
| <b>Area 2 Operations - 7:00 a.m. - 11:00 p.m.</b> |                                       |  |  |                                    |   |
| POR1  | Residence on Hespeler Road            | 53.1 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR1A   | Residence on Hespeler Road - OLA      | 54.7 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR2  | Residence on Hespeler Road            | 60.5 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR2A   | Residence on Hespeler Road - OLA      | 53.5 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR3  | Residence on Kossuth Road             | 55.2 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR3A   | Residence on Kossuth Road - OLA       | 56.6 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4  | Residence on Hespeler Road            | 57.1 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4A   | Residence on Hespeler Road - OLA      | 56.8 (dBA)   | No   | 65 (dBA)                           | Yes   |
| POR5  | Residence on Hespeler Road            | 62.9 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR5A   | Residence on Hespeler Road - OLA      | 59.5 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR6  | Residence on Hespeler Road            | 59.1 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR6A   | Residence on Hespeler Road - OLA      | 60.3 (dBA)   | No   | 68 (dBA)                           | Yes   |
| POR7  | Residence on Hespeler Road            | 50.2 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR7A   | Residence on Hespeler Road - OLA      | 51.4 (dBA)   | No   | 75 (dBA)                           | Yes   |
| POR8A   | Residence on Hespeler Road            | 49.0 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR8A   | Residence on Hespeler Road - OLA      | 49.3 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR9A   | Residence on Hespeler Road            | 48.1 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR9A   | Residence on Hespeler Road - OLA      | 48.5 (dBA)   | No   | 68 (dBA)                           | Yes   |

TABLE 3

**ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS  
SPENCER PIT  
GUELPH, ONTARIO**

| <i>Point-of-Reception ID</i>                       | <i>Point-of-Reception Description</i> | <i>Sound Level at Point-of-Reception Predicted (Leq)</i> | <i>Verified by Acoustic Audit (Yes/No)</i> | <i>Performance Limit (1) (Leq)</i> | <i>Compliance with Performance Limit (Yes/No)</i> |
|--|---------------------------------------|--|--|------------------------------------|---|
| <b>Area 3 Operations - 7:00 a.m. - 11:00 p.m.</b>  |                                       |  |  |                                    |   |
| POR1   | Residence on Hespeler Road            | 53.0 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR1A  | Residence on Hespeler Road - OLA      | 54.6 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR2   | Residence on Hespeler Road            | 60.5 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR2A  | Residence on Hespeler Road - OLA      | 53.6 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR3   | Residence on Kossuth Road             | 54.7 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR3A  | Residence on Kossuth Road - OLA       | 56.3 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4   | Residence on Hespeler Road            | 56.4 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4A  | Residence on Hespeler Road - OLA      | 56.0 (dBA)   | No   | 65 (dBA)                           | Yes   |
| POR5   | Residence on Hespeler Road            | 62.4 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR5A  | Residence on Hespeler Road - OLA      | 58.1 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR6   | Residence on Hespeler Road            | 57.3 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR6A  | Residence on Hespeler Road - OLA      | 58.4 (dBA)   | No   | 68 (dBA)                           | Yes   |
| POR7   | Residence on Hespeler Road            | 56.8 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR7A  | Residence on Hespeler Road - OLA      | 59.4 (dBA)   | No   | 75 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road            | 53.9 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road - OLA      | 54.7 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road            | 52.2 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road - OLA      | 52.9 (dBA)   | No   | 68 (dBA)                           | Yes   |
| <b>Area 4A Operations - 7:00 a.m. - 11:00 p.m.</b> |                                       |  |  |                                    |   |
| POR1   | Residence on Hespeler Road            | 53.7 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR1A  | Residence on Hespeler Road - OLA      | 55.3 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR2   | Residence on Hespeler Road            | 61.4 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR2A  | Residence on Hespeler Road - OLA      | 54.1 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR3   | Residence on Kossuth Road             | 55.3 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR3A  | Residence on Kossuth Road - OLA       | 57.1 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4   | Residence on Hespeler Road            | 57.0 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4A  | Residence on Hespeler Road - OLA      | 56.7 (dBA)   | No   | 65 (dBA)                           | Yes   |
| POR5   | Residence on Hespeler Road            | 63.2 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR5A  | Residence on Hespeler Road - OLA      | 58.7 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR6   | Residence on Hespeler Road            | 58.0 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR6A  | Residence on Hespeler Road - OLA      | 59.1 (dBA)   | No   | 68 (dBA)                           | Yes   |
| POR7   | Residence on Hespeler Road            | 50.3 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR7A  | Residence on Hespeler Road - OLA      | 51.5 (dBA)   | No   | 75 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road            | 48.9 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road - OLA      | 49.4 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road            | 47.7 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road - OLA      | 48.1 (dBA)   | No   | 68 (dBA)                           | Yes   |

**TABLE 3**  
**ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS**  
**SPENCER PIT**  
**GUELPH, ONTARIO**

| <i>Point-of-Reception ID</i>                       | <i>Point-of-Reception Description</i> | <i>Sound Level at Point-of-Reception Predicted (Leq)</i> | <i>Verified by Acoustic Audit (Yes/No)</i> | <i>Performance Limit (1) (Leq)</i> | <i>Compliance with Performance Limit (Yes/No)</i> |
|--|---------------------------------------|--|--|------------------------------------|---|
| <b>Area 4B Operations - 7:00 a.m. - 11:00 p.m.</b> |                                       |  |  |                                    |   |
| POR1   | Residence on Hespeler Road            | 53.9 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR1A  | Residence on Hespeler Road - OLA      | 55.5 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR2   | Residence on Hespeler Road            | 61.7 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR2A  | Residence on Hespeler Road - OLA      | 54.8 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR3   | Residence on Kossuth Road             | 55.4 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR3A  | Residence on Kossuth Road - OLA       | 57.3 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4   | Residence on Hespeler Road            | 57.0 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR4A  | Residence on Hespeler Road - OLA      | 56.7 (dBA)   | No   | 65 (dBA)                           | Yes   |
| POR5   | Residence on Hespeler Road            | 63.1 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR5A  | Residence on Hespeler Road - OLA      | 58.8 (dBA)   | No   | 67 (dBA)                           | Yes   |
| POR6   | Residence on Hespeler Road            | 57.9 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR6A  | Residence on Hespeler Road - OLA      | 59.0 (dBA)   | No   | 68 (dBA)                           | Yes   |
| POR7   | Residence on Hespeler Road            | 50.2 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR7A  | Residence on Hespeler Road - OLA      | 51.4 (dBA)   | No   | 75 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road            | 48.8 (dBA)   | No   | 63 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road - OLA      | 49.3 (dBA)   | No   | 66 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road            | 47.7 (dBA)   | No   | 64 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road - OLA      | 48.1 (dBA)   | No   | 68 (dBA)                           | Yes   |
| <b>Shipping Operations - 6:00 a.m. - 7:00 a.m.</b> |                                       |  |  |                                    |   |
| POR1   | Residence on Hespeler Road            | 34.5 (dBA)   | No   | 58 (dBA)                           | Yes   |
| POR1A  | Residence on Hespeler Road - OLA      | 35.9 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR2   | Residence on Hespeler Road            | 44.6 (dBA)   | No   | 58 (dBA)                           | Yes   |
| POR2A  | Residence on Hespeler Road - OLA      | 38.7 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR3   | Residence on Kossuth Road             | 43.3 (dBA)   | No   | 55 (dBA)                           | Yes   |
| POR3A  | Residence on Kossuth Road - OLA       | 45.4 (dBA)   | No   | 57 (dBA)                           | Yes   |
| POR4   | Residence on Hespeler Road            | 42.4 (dBA)   | No   | 57 (dBA)                           | Yes   |
| POR4A  | Residence on Hespeler Road - OLA      | 42.3 (dBA)   | No   | 59 (dBA)                           | Yes   |
| POR5   | Residence on Hespeler Road            | 42.2 (dBA)   | No   | 58 (dBA)                           | Yes   |
| POR5A  | Residence on Hespeler Road - OLA      | 41.7 (dBA)   | No   | 61 (dBA)                           | Yes   |
| POR6   | Residence on Hespeler Road            | 40.1 (dBA)   | No   | 58 (dBA)                           | Yes   |
| POR6A  | Residence on Hespeler Road - OLA      | 40.8 (dBA)   | No   | 62 (dBA)                           | Yes   |
| POR7   | Residence on Hespeler Road            | 28.1 (dBA)   | No   | 57 (dBA)                           | Yes   |
| POR7A  | Residence on Hespeler Road - OLA      | 29.2 (dBA)   | No   | 60 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road            | 26.1 (dBA)   | No   | 60 (dBA)                           | Yes   |
| POR8A  | Residence on Hespeler Road - OLA      | 26.4 (dBA)   | No   | 69 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road            | 25.3 (dBA)   | No   | 57 (dBA)                           | Yes   |
| POR9A  | Residence on Hespeler Road - OLA      | 25.6 (dBA)   | No   | 60 (dBA)                           | Yes   |

**Note:**

- (1) Site-Specific noise limits determined by background sound level assessment.

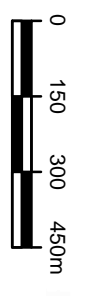
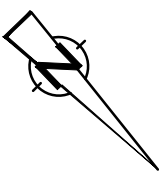
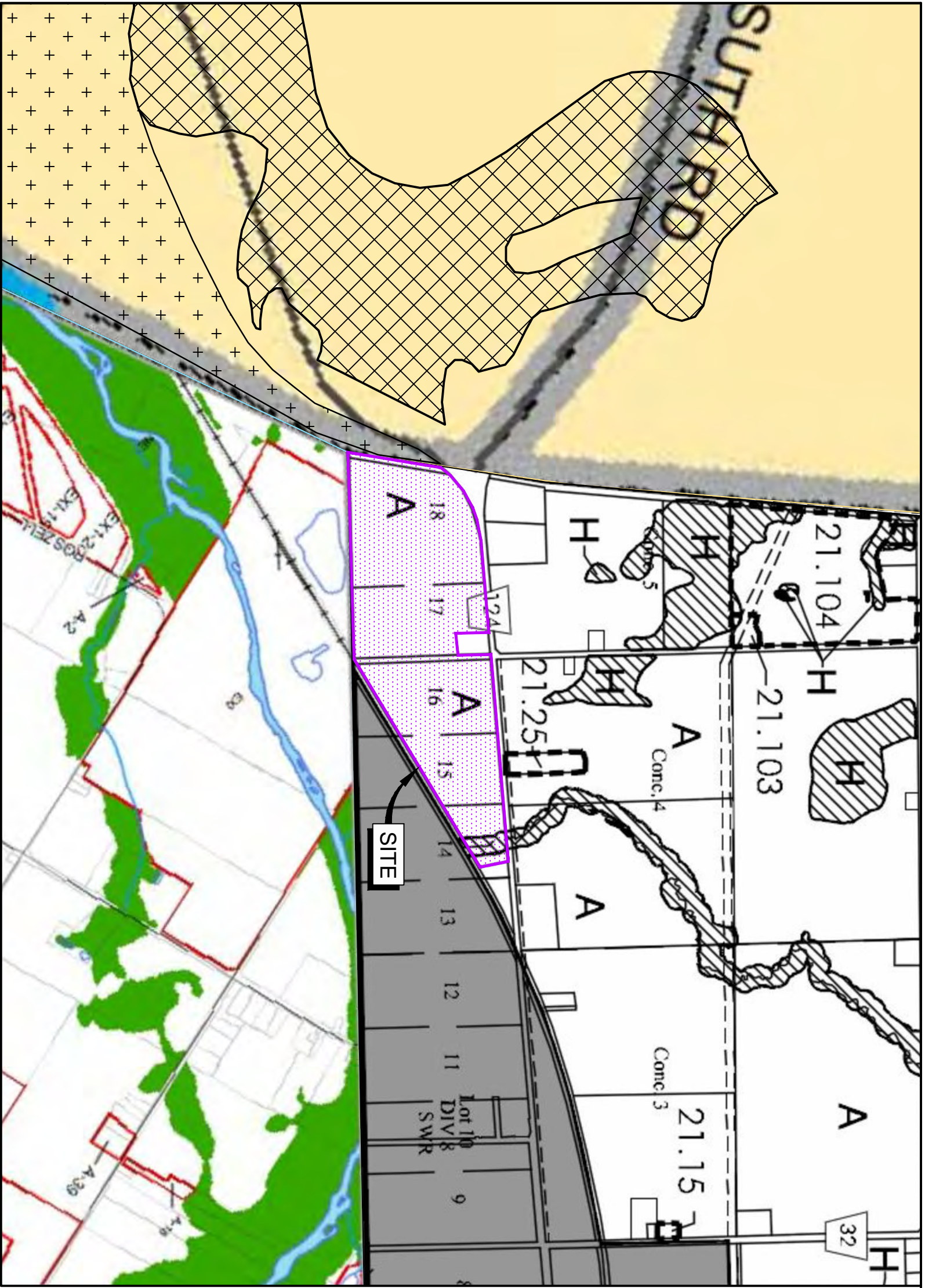


# Appendix A

## Land Use Zoning Designation Plan







- REGION OF WATERLOO**
- PRIME AGRICULTURAL AREA
  - MINERAL AGGREGATE RESOURCE AREAS
  - AGGREGATE BEDROCK DEPOSITS
- TOWNSHIP OF GUELPH/ERAMOSA**
- A AGRICULTURE
  - HAZARD
- TOWNSHIP OF PUSLINCH**
- A AGRICULTURAL ZONE
  - NATURAL ENVIRONMENT ZONE
  - EXI EXTRACTIVE INDUSTRIAL ZONE

SOURCES:

1. TOWNSHIP OF GUELPH/ERAMOSA ZONING BY-LAW, SCHEDULE "A" TO BY-LAW NUMBER 57/1999, MAP 1.
2. REGION OF WATERLOO, REGIONAL OFFICIAL PLAN, MAP 7, THE COUNTRYSIDE
3. REGION OF WATERLOO, REGIONAL OFFICIAL PLAN, MAP 8, MINERAL AGGREGATE RESOURCE AREAS AND AGGREGATE BEDROCK DEPOSITS
4. TOWNSHIP OF PUSLINCH, ZONING BY-LAW No. 19/85, SCHEDULE "A"



figure A.1  
**LAND USE ZONING MAP**  
 6939 WELLINGTON ROAD 124  
 Guelph Township, County of Wellington



## **Appendix B**

### **Site-Specific Ambient Background Noise Measurements**



TABLE B.1  
 ENVIRONMENTAL SOUND LEVEL MEASUREMENTS, LEQ - VALIDATED BACKGROUND MEASUREMENTS  
 SPENCER PIT  
 GUELPH, ONTARIO

| Date                          | Time     | Leq (dBA) | Wind Speed (kph) (1) | Weather (1) | Comments                      |
|-------------------------------|----------|-----------|----------------------|-------------|-------------------------------|
| Wednesday, September 11, 2013 | 14:13:41 | 77.4      | 11                   | -           | Not used, partial measurement |
| Wednesday, September 11, 2013 | 15:00:00 | 78        | 13                   | -           |                               |
| Wednesday, September 11, 2013 | 16:00:00 | 78.3      | 7                    | -           |                               |
| Wednesday, September 11, 2013 | 17:00:00 | 77.6      | 6                    | -           |                               |
| Wednesday, September 11, 2013 | 18:00:00 | 77.4      | 6                    | -           |                               |
| Wednesday, September 11, 2013 | 19:00:00 | 76.1      | 2                    | -           |                               |
| Wednesday, September 11, 2013 | 20:00:00 | 75.5      | 6                    | -           |                               |
| Wednesday, September 11, 2013 | 21:00:00 | 75.4      | 13                   | -           |                               |
| Wednesday, September 11, 2013 | 22:00:00 | 74.4      | 11                   | -           |                               |
| Wednesday, September 11, 2013 | 23:00:00 | 73.7      | 2                    | -           |                               |
| Thursday, September 12, 2013  | 0:00:00  | 71.7      | 6                    | -           |                               |
| Thursday, September 12, 2013  | 1:00:00  | 71.6      | 7                    | -           |                               |
| Thursday, September 12, 2013  | 2:00:00  | 69.8      | 7                    | -           |                               |
| Thursday, September 12, 2013  | 3:00:00  | 71.4      | 6                    | -           |                               |
| Thursday, September 12, 2013  | 4:00:00  | 72.1      | 9                    | -           |                               |
| Thursday, September 12, 2013  | 5:00:00  | 75.5      | 7                    | -           |                               |
| Thursday, September 12, 2013  | 6:00:00  | 77.5      | 6                    | -           |                               |
| Thursday, September 12, 2013  | 7:00:00  | 78        | 7                    | -           |                               |
| Thursday, September 12, 2013  | 8:00:00  | 78.1      | 11                   | -           |                               |
| Thursday, September 12, 2013  | 9:00:00  | 77.7      | 11                   | -           |                               |
| Thursday, September 12, 2013  | 10:00:00 | 77.7      | 13                   | -           |                               |
| Thursday, September 12, 2013  | 11:00:00 | 77.6      | 9                    | -           |                               |
| Thursday, September 12, 2013  | 12:00:00 | 77.6      | 17                   | -           |                               |
| Thursday, September 12, 2013  | 13:00:00 | 77.6      | 17                   | -           |                               |
| Thursday, September 12, 2013  | 14:00:00 | 77.8      | 20                   | -           |                               |
| Thursday, September 12, 2013  | 15:00:00 | 78.1      | 19                   | -           |                               |
| Thursday, September 12, 2013  | 16:00:00 | 78.4      | 20                   | -           |                               |
| Thursday, September 12, 2013  | 17:00:00 | 77.8      | 20                   | -           |                               |
| Thursday, September 12, 2013  | 18:00:00 | 78        | 17                   | -           |                               |
| Thursday, September 12, 2013  | 19:00:00 | 76.9      | 9                    | -           |                               |
| Thursday, September 12, 2013  | 20:00:00 | 75.7      | 9                    | -           |                               |
| Thursday, September 12, 2013  | 21:00:00 | 75.6      | 7                    | -           |                               |
| Thursday, September 12, 2013  | 22:00:00 | 74.7      | 9                    | -           |                               |
| Thursday, September 12, 2013  | 23:00:00 | 74.5      | 11                   | -           |                               |
| Friday, September 13, 2013    | 0:00:00  | 72        | 7                    | -           |                               |
| Friday, September 13, 2013    | 1:00:00  | 70.2      | 11                   | -           |                               |
| Friday, September 13, 2013    | 2:00:00  | 69.7      | 7                    | -           |                               |
| Friday, September 13, 2013    | 3:00:00  | 71.4      | 13                   | -           |                               |
| Friday, September 13, 2013    | 4:00:00  | 71.6      | 15                   | -           |                               |
| Friday, September 13, 2013    | 5:00:00  | 75.3      | 13                   | -           |                               |
| Friday, September 13, 2013    | 6:00:00  | 77.4      | 9                    | -           |                               |
| Friday, September 13, 2013    | 7:00:00  | 78.4      | 17                   | -           |                               |
| Friday, September 13, 2013    | 8:00:00  | 78.8      | 15                   | -           |                               |
| Friday, September 13, 2013    | 9:00:00  | 78.5      | 17                   | -           |                               |
| Friday, September 13, 2013    | 10:00:00 | 78.6      | 19                   | -           |                               |
| Friday, September 13, 2013    | 11:00:00 | 78.3      | 17                   | -           |                               |
| Friday, September 13, 2013    | 12:00:00 | 78.2      | 17                   | -           |                               |
| Friday, September 13, 2013    | 13:00:00 | 78.4      | 15                   | -           |                               |
| Friday, September 13, 2013    | 14:00:00 | 78.6      | 17                   | -           |                               |
| Friday, September 13, 2013    | 15:00:00 | 78.8      | 15                   | -           |                               |
| Friday, September 13, 2013    | 16:00:00 | 77.4      | 19                   | -           |                               |
| Friday, September 13, 2013    | 17:00:00 | 77.4      | 11                   | -           |                               |
| Friday, September 13, 2013    | 18:00:00 | 78.5      | 13                   | -           |                               |
| Friday, September 13, 2013    | 19:00:00 | 77.8      | 11                   | -           |                               |
| Friday, September 13, 2013    | 20:00:00 | 76.7      | 9                    | -           |                               |
| Friday, September 13, 2013    | 21:00:00 | 75.9      | 7                    | -           |                               |
| Friday, September 13, 2013    | 22:00:00 | 75.1      | 6                    | -           |                               |
| Friday, September 13, 2013    | 23:00:00 | 74.5      | 6                    | -           |                               |
| Saturday, September 14, 2013  | 0:00:00  | 72.8      | 0                    | -           |                               |
| Saturday, September 14, 2013  | 1:00:00  | 71.4      | 0                    | -           |                               |
| Saturday, September 14, 2013  | 2:00:00  | 69.5      | 0                    | -           |                               |
| Saturday, September 14, 2013  | 3:00:00  | 69.7      | 0                    | -           |                               |
| Saturday, September 14, 2013  | 4:00:00  | 69.2      | 2                    | -           |                               |
| Saturday, September 14, 2013  | 5:00:00  | 71.8      | 2                    | -           |                               |
| Saturday, September 14, 2013  | 6:00:00  | 74.6      | 4                    | -           |                               |
| Saturday, September 14, 2013  | 7:00:00  | 75.6      | 2                    | -           |                               |
| Saturday, September 14, 2013  | 8:00:00  | 76.5      | 6                    | -           |                               |
| Saturday, September 14, 2013  | 9:00:00  | 76.9      | 9                    | -           |                               |
| Saturday, September 14, 2013  | 10:00:00 | 77.1      | 11                   | -           |                               |
| Saturday, September 14, 2013  | 11:00:00 | 77.6      | 11                   | -           |                               |
| Saturday, September 14, 2013  | 12:00:00 | 77.4      | 7                    | -           |                               |
| Saturday, September 14, 2013  | 13:00:00 | 77.4      | 9                    | -           |                               |
| Saturday, September 14, 2013  | 14:00:00 | 77.1      | 7                    | -           |                               |
| Saturday, September 14, 2013  | 15:00:00 | 77.4      | 9                    | -           |                               |
| Saturday, September 14, 2013  | 16:00:00 | 77.3      | 11                   | -           |                               |
| Saturday, September 14, 2013  | 17:00:00 | 76.9      | 9                    | -           |                               |
| Saturday, September 14, 2013  | 18:00:00 | 76.3      | 11                   | -           |                               |

TABLE B.1  
 ENVIRONMENTAL SOUND LEVEL MEASUREMENTS, LEQ - VALIDATED BACKGROUND MEASUREMENTS  
 SPENCER PIT  
 GUELPH, ONTARIO

| Date                          | Time     | Leq<br>(dBA) | Wind Speed<br>(kph) (1) | Weather (1) | Comments |
|-------------------------------|----------|--------------|-------------------------|-------------|----------|
| Saturday, September 14, 2013  | 19:00:00 | 75.2         | 9                       | -           |          |
| Saturday, September 14, 2013  | 20:00:00 | 74.8         | 6                       | -           |          |
| Saturday, September 14, 2013  | 21:00:00 | 74.5         | 2                       | -           |          |
| Saturday, September 14, 2013  | 22:00:00 | 73.4         | 6                       | -           |          |
| Saturday, September 14, 2013  | 23:00:00 | 73           | 4                       | -           |          |
| Sunday, September 15, 2013    | 0:00:00  | 71.5         | 4                       | -           |          |
| Sunday, September 15, 2013    | 1:00:00  | 69.9         | 2                       | -           |          |
| Sunday, September 15, 2013    | 2:00:00  | 68.8         | 2                       | -           |          |
| Sunday, September 15, 2013    | 3:00:00  | 66.7         | 4                       | -           |          |
| Sunday, September 15, 2013    | 4:00:00  | 65.6         | 2                       | -           |          |
| Sunday, September 15, 2013    | 5:00:00  | 66.5         | 0                       | -           |          |
| Sunday, September 15, 2013    | 6:00:00  | 71.7         | 0                       | -           |          |
| Sunday, September 15, 2013    | 7:00:00  | 71.6         | 0                       | -           |          |
| Sunday, September 15, 2013    | 8:00:00  | 73.1         | 2                       | -           |          |
| Sunday, September 15, 2013    | 9:00:00  | 75.2         | 7                       | -           |          |
| Sunday, September 15, 2013    | 10:00:00 | 76           | 7                       | -           |          |
| Sunday, September 15, 2013    | 11:00:00 | 76.5         | 9                       | -           |          |
| Sunday, September 15, 2013    | 12:00:00 | 76.8         | 9                       | -           |          |
| Sunday, September 15, 2013    | 13:00:00 | 76.7         | 11                      | -           |          |
| Sunday, September 15, 2013    | 14:00:00 | 76.7         | 9                       | -           |          |
| Sunday, September 15, 2013    | 15:00:00 | 76.8         | 9                       | -           |          |
| Sunday, September 15, 2013    | 16:00:00 | 76.6         | 7                       | -           |          |
| Sunday, September 15, 2013    | 17:00:00 | 76.6         | 9                       | -           |          |
| Sunday, September 15, 2013    | 18:00:00 | 76.3         | 9                       | -           |          |
| Sunday, September 15, 2013    | 19:00:00 | 75.5         | 7                       | -           |          |
| Sunday, September 15, 2013    | 20:00:00 | 75.2         | 17                      | -           |          |
| Sunday, September 15, 2013    | 21:00:00 | 73.8         | 6                       | -           |          |
| Sunday, September 15, 2013    | 22:00:00 | 73.3         | 6                       | -           |          |
| Sunday, September 15, 2013    | 23:00:00 | 72.1         | 4                       | -           |          |
| Monday, September 16, 2013    | 0:00:00  | 69.4         | 4                       | -           |          |
| Monday, September 16, 2013    | 1:00:00  | 68.5         | 6                       | -           |          |
| Monday, September 16, 2013    | 2:00:00  | 68.6         | 6                       | -           |          |
| Monday, September 16, 2013    | 3:00:00  | 67.4         | 0                       | -           |          |
| Monday, September 16, 2013    | 4:00:00  | 71.2         | 2                       | -           |          |
| Monday, September 16, 2013    | 5:00:00  | 75.8         | 4                       | -           |          |
| Monday, September 16, 2013    | 6:00:00  | 77.9         | 11                      | -           |          |
| Monday, September 16, 2013    | 7:00:00  | 78.5         | 13                      | -           |          |
| Monday, September 16, 2013    | 8:00:00  | 78.7         | 15                      | -           |          |
| Monday, September 16, 2013    | 9:00:00  | 78.4         | 15                      | -           |          |
| Monday, September 16, 2013    | 10:00:00 | 77.4         | 15                      | -           |          |
| Monday, September 16, 2013    | 11:00:00 | 77.8         | 13                      | -           |          |
| Monday, September 16, 2013    | 12:00:00 | 78.2         | 11                      | -           |          |
| Monday, September 16, 2013    | 13:00:00 | 77.9         | 11                      | -           |          |
| Monday, September 16, 2013    | 14:00:00 | 77.8         | 13                      | -           |          |
| Monday, September 16, 2013    | 15:00:00 | 78.5         | 9                       | -           |          |
| Monday, September 16, 2013    | 16:00:00 | 78.4         | 11                      | -           |          |
| Monday, September 16, 2013    | 17:00:00 | 78.4         | 9                       | -           |          |
| Monday, September 16, 2013    | 18:00:00 | 77.8         | 13                      | -           |          |
| Monday, September 16, 2013    | 19:00:00 | 76.7         | 7                       | -           |          |
| Monday, September 16, 2013    | 20:00:00 | 76           | 6                       | -           |          |
| Monday, September 16, 2013    | 21:00:00 | 75.7         | 4                       | -           |          |
| Monday, September 16, 2013    | 22:00:00 | 74.8         | 4                       | -           |          |
| Monday, September 16, 2013    | 23:00:00 | 73.8         | 4                       | -           |          |
| Tuesday, September 17, 2013   | 0:00:00  | 72.3         | 6                       | -           |          |
| Tuesday, September 17, 2013   | 1:00:00  | 70.4         | 0                       | -           |          |
| Tuesday, September 17, 2013   | 2:00:00  | 69.9         | 4                       | -           |          |
| Tuesday, September 17, 2013   | 3:00:00  | 72.2         | 0                       | -           |          |
| Tuesday, September 17, 2013   | 4:00:00  | 72           | 0                       | -           |          |
| Tuesday, September 17, 2013   | 5:00:00  | 76.2         | 4                       | -           |          |
| Tuesday, September 17, 2013   | 6:00:00  | 78.5         | 0                       | -           |          |
| Tuesday, September 17, 2013   | 7:00:00  | 79.1         | 2                       | -           |          |
| Tuesday, September 17, 2013   | 8:00:00  | 79           | 6                       | -           |          |
| Tuesday, September 17, 2013   | 9:00:00  | 78.8         | 11                      | -           |          |
| Tuesday, September 17, 2013   | 10:00:00 | 77.8         | 9                       | -           |          |
| Tuesday, September 17, 2013   | 11:00:00 | 77.8         | 7                       | -           |          |
| Tuesday, September 17, 2013   | 12:00:00 | 78           | 9                       | -           |          |
| Tuesday, September 17, 2013   | 13:00:00 | 77.9         | 9                       | -           |          |
| Tuesday, September 17, 2013   | 14:00:00 | 78.1         | 9                       | -           |          |
| Tuesday, September 17, 2013   | 15:00:00 | 78.3         | 9                       | -           |          |
| Tuesday, September 17, 2013   | 16:00:00 | 78.2         | 9                       | -           |          |
| Tuesday, September 17, 2013   | 17:00:00 | 78.2         | 7                       | -           |          |
| Tuesday, September 17, 2013   | 18:00:00 | 78           | 6                       | -           |          |
| Tuesday, September 17, 2013   | 19:00:00 | 76.6         | 6                       | -           |          |
| Tuesday, September 17, 2013   | 20:00:00 | 75.9         | 6                       | -           |          |
| Tuesday, September 17, 2013   | 21:00:00 | 75.6         | 6                       | -           |          |
| Tuesday, September 17, 2013   | 22:00:00 | 74.8         | 6                       | -           |          |
| Tuesday, September 17, 2013   | 23:00:00 | 74           | 2                       | -           |          |
| Wednesday, September 18, 2013 | 0:00:00  | 72.4         | 2                       | -           |          |
| Wednesday, September 18, 2013 | 1:00:00  | 71.3         | 0                       | -           |          |
| Wednesday, September 18, 2013 | 2:00:00  | 69.5         | 2                       | -           |          |
| Wednesday, September 18, 2013 | 3:00:00  | 72           | 2                       | -           |          |
| Wednesday, September 18, 2013 | 4:00:00  | 72.3         | 0                       | -           |          |
| Wednesday, September 18, 2013 | 5:00:00  | 75.6         | 0                       | -           |          |
| Wednesday, September 18, 2013 | 6:00:00  | 78           | 4                       | -           |          |

TABLE B.1  
 ENVIRONMENTAL SOUND LEVEL MEASUREMENTS, LEQ - VALIDATED BACKGROUND MEASUREMENTS  
 SPENCER PIT  
 GUELPH, ONTARIO

| Date   | Time     | Leq (dBA) | Wind Speed (kph) (1) | Weather (1) | Comments                      |
|--|----------|-----------|----------------------|-------------|-------------------------------|
| Wednesday, September 18, 2013                      | 7:00:00  | 78.8      | 4                    | -           |                               |
| Wednesday, September 18, 2013                      | 8:00:00  | 79.1      |                      | -           |                               |
| Wednesday, September 18, 2013                      | 9:00:00  | 78.5      |                      | -           |                               |
| Wednesday, September 18, 2013                      | 10:00:00 | 77.7      | 7                    | -           |                               |
| Wednesday, September 18, 2013                      | 11:00:00 | 77.8      | 7                    | -           |                               |
| Wednesday, September 18, 2013                      | 12:00:00 | 77.9      | 7                    | -           |                               |
| Wednesday, September 18, 2013                      | 13:00:00 | 77.5      | 7                    | -           |                               |
| Wednesday, September 18, 2013                      | 14:00:00 | 77.9      | 11                   | -           |                               |
| Wednesday, September 18, 2013                      | 15:00:00 | 78.4      | 9                    | -           |                               |
| Wednesday, September 18, 2013                      | 16:00:00 | 78.1      | 9                    | -           |                               |
| Wednesday, September 18, 2013                      | 17:00:00 | 77.9      | 9                    | -           |                               |
| Wednesday, September 18, 2013                      | 18:00:00 | 77.9      | 9                    | -           |                               |
| Wednesday, September 18, 2013                      | 19:00:00 | 76.6      | 6                    | -           |                               |
| Wednesday, September 18, 2013                      | 20:00:00 | 75.8      | 6                    | -           |                               |
| Wednesday, September 18, 2013                      | 21:00:00 | 75.7      | 2                    | -           |                               |
| Wednesday, September 18, 2013                      | 22:00:00 | 75.7      | 0                    | -           |                               |
| Wednesday, September 18, 2013                      | 23:00:00 | 74.3      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 0:00:00  | 71.4      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 1:00:00  | 70.6      | 4                    | -           |                               |
| Thursday, September 19, 2013                       | 2:00:00  | 70.9      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 3:00:00  | 71.7      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 4:00:00  | 72.3      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 5:00:00  | 75.1      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 6:00:00  | 78        | 0                    | -           |                               |
| Thursday, September 19, 2013                       | 7:00:00  | 78.2      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 8:00:00  | 78.7      | 0                    | -           |                               |
| Thursday, September 19, 2013                       | 9:00:00  | 78.3      | 2                    | -           |                               |
| Thursday, September 19, 2013                       | 10:00:00 | 77.9      | 9                    | -           |                               |
| Thursday, September 19, 2013                       | 11:00:00 | 77.8      | 11                   | -           |                               |
| Thursday, September 19, 2013                       | 12:00:00 | 78        | 9                    | -           |                               |
| Thursday, September 19, 2013                       | 13:00:00 | 78.1      | 9                    | -           |                               |
| Thursday, September 19, 2013                       | 14:00:00 | 77.8      | 11                   | -           | Not used, partial measurement |
| Lowest Daytime one-hour Leq (7 a.m. to 11 p.m.):   |          | 71.60     |                      |             |                               |
| Lowest Nighttime one-hour Leq (11 p.m. to 7 a.m.): |          | 65.60     |                      |             |                               |

## Note:

- (1) Weather data provided by Environment Canada's Guelph Turfgrass Station.  
 (2) Boxed data represents the lowest measured Leq during the respective monitoring time period.

TABLE B.2  
 BACKGROUND SOUND LEVEL EVALUATION SUMMARY  
 SPENCER PIT  
 GUELPH, ONTARIO

| Point-of-Reception | Measurement Location Number | Measurement Reference Distance (1) (m) | Source-to-Receptor Distance (2) (m) | Daytime  |                                    | Nighttime                                      |                                    |
|--------------------|-----------------------------|--|-------------------------------------|--|------------------------------------|--|------------------------------------|
|                    |                             |  |                                     | Measured Leq at Measurement Location (3) (dBA) | Estimated Background at PORs (dBA) | Measured Leq at Measurement Location (3) (dBA) | Estimated Background at PORs (dBA) |
| POR1               | L1                          | 9.0                                    | 55.0                                | 71.6   | 63.7                               | 65.6   | 57.7                               |
| POR1A              | L1                          | 9.0                                    | 25.0                                | 71.6   | 67.2                               | 65.6   | 61.2                               |
| POR2               | L1                          | 9.0                                    | 56.0                                | 71.6   | 63.7                               | 65.6   | 57.7                               |
| POR2A              | L1                          | 9.0                                    | 26.0                                | 71.6   | 67.0                               | 65.6   | 61.0                               |
| POR3               | L1                          | 9.0                                    | 102.0                               | 71.6   | 61.1                               | 65.6   | 55.1                               |
| POR3A              | L1                          | 9.0                                    | 72.0                                | 71.6   | 62.6                               | 65.6   | 56.6                               |
| POR4               | L1                          | 9.0                                    | 68.0                                | 71.6   | 62.8                               | 65.6   | 56.8                               |
| POR4A              | L1                          | 9.0                                    | 38.0                                | 71.6   | 65.3                               | 65.6   | 59.3                               |
| POR5               | L1                          | 9.0                                    | 56.0                                | 71.6   | 63.7                               | 65.6   | 57.7                               |
| POR5A              | L1                          | 9.0                                    | 26.0                                | 71.6   | 67.0                               | 65.6   | 61.0                               |
| POR6               | L1                          | 9.0                                    | 53.0                                | 71.6   | 63.9                               | 65.6   | 57.9                               |
| POR6A              | L1                          | 9.0                                    | 23.0                                | 71.6   | 67.5                               | 65.6   | 61.5                               |
| POR7               | L1                          | 9.0                                    | 34.0                                | 71.6   | 65.8                               | 65.6   | 59.8                               |
| POR7A              | L1                          | 9.0                                    | 4.0                                 | 71.6   | 75.1                               | 65.6   | 69.1                               |
| POR8               | L1                          | 9.0                                    | 61.0                                | 71.6   | 63.3                               | 65.6   | 57.3                               |
| POR8A              | L1                          | 9.0                                    | 31.0                                | 71.6   | 66.2                               | 65.6   | 60.2                               |
| POR9               | L1                          | 9.0                                    | 49.0                                | 71.6   | 64.2                               | 65.6   | 58.2                               |
| POR9A              | L1                          | 9.0                                    | 19.0                                | 71.6   | 68.4                               | 65.6   | 62.4                               |

Notes:

- (1) Reference distance based on distance from LT measurement location to the center of Wellington Road 124
- (2) Source-to-receptor distance based on distance from the center of Wellington Road 124 to the selected POR.
- (3) Lowest daytime and nighttime Leq measured at L1 during the period noted in Table B.1.



# Appendix C

## Noise Specification and Worst-Case Simultaneous Operations Summary



TABLE C.1  
 ACOUSTIC ASSESSMENT SUMMARY - STEADY STATE SOUND LEVELS  
 SPENCER PIT  
 GUELPH, ONTARIO

| Cadastral ID | Noise Source Description | Data Quality          |       |       |       |       |       |       |       |       |       |       | Total Sound Power Level (dBA) | Tonal Penalty Assessment | Absolute Height (m) | Above Roof Height (m) | Area (m <sup>2</sup> ) | Time-weighted Operation Reductions |             | Equipment Movements |                | Speed (km/h) | Reference/Comments |    |  |
|--------------|--------------------------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------------|--------------------------|---------------------|-----------------------|------------------------|------------------------------------|-------------|---------------------|----------------|--------------|--------------------|----|--|
|              |                          | 31.5                  | 63    | 125   | 250   | 500   | 1K    | 2K    | 4K    | 8K    | dB(A) | dB(A) |                               |                          |                     |                       |                        | Day (min)                          | Night (min) | Day (#/hour)        | Night (#/hour) |              |                    |    |  |
| S1           | Wash Plant               | PWL (dB)              | 114.7 | 106.3 | 101.6 | 102.0 | 101.8 | 104.6 | 106.7 | 106.2 | 104.1 | 104.1 | 117.2                         | YES                      | 5                   | 320.10                | 5.10                   | NA                                 | 60          | 0                   | NA             | NA           | NA                 | NA | CRA Measurement LM#711   |
|              |                          | A-weighted correction | -39.4 | -26.2 | -16.1 | -8.6  | -3.2  | 0.0   | 0.0   | 1.2   | 1.0   | -1.1  | 117.4                         | YES                      | 5                   | 318.00                | 3.00                   | NA                                 | 60          | 0                   | NA             | NA           | NA                 | NA | CRA Measurement LM#720   |
|              |                          | PWL (dBA)             | 75.3  | 80.1  | 85.5  | 93.4  | 98.6  | 104.6 | 107.9 | 107.2 | 103.0 | 103.0 | 124.4                         | YES                      | 5                   | 318.00                | 3.00                   | NA                                 | 60          | 0                   | NA             | NA           | NA                 | NA | CRA Measurement LM#726   |
| S2           | Impact Crusher           | PWL (dB)              | 113.4 | 116.9 | 116.0 | 112.7 | 115.2 | 115.5 | 115.7 | 111.4 | 101.2 | 124.0 | 120.9                         | YES                      | 5                   | 318.00                | 3.00                   | NA                                 | 60          | 0                   | NA             | NA           | NA                 | NA | CRA Measurement LM#726   |
|              |                          | A-weighted correction | -39.4 | -26.2 | -16.1 | -8.6  | -3.2  | 0.0   | 0.0   | 1.2   | 1.0   | -1.1  | 125.0                         | YES                      | 5                   | 318.00                | 3.00                   | NA                                 | 60          | 0                   | NA             | NA           | NA                 | NA | CRA Measurement LM#730   |
|              |                          | PWL (dBA)             | 74.0  | 90.7  | 99.9  | 104.1 | 112.0 | 115.5 | 116.9 | 112.4 | 107.9 | 100.1 | 119.0                         | 124.0                    | YES                 | 5                     | 318.00                 | 3.00                               | NA          | 60                  | 0              | NA           | NA                 | NA | CRA Measurement LM#730   |
| S3           | Cone Crusher             | PWL (dB)              | 114.1 | 121.2 | 117.1 | 114.3 | 114.5 | 114.7 | 112.4 | 111.3 | 108.9 | 103.2 | 119.0                         | YES                      | 5                   | 318.00                | 3.00                   | NA                                 | 60          | 0                   | NA             | NA           | NA                 | NA | CRA Measurement LM#730   |
|              |                          | A-weighted correction | -39.4 | -26.2 | -16.1 | -8.6  | -3.2  | 0.0   | 0.0   | 1.2   | 1.0   | -1.1  | 121.6                         | YES                      | 5                   | 317.21                | 2.00                   | NA                                 | 30          | 30                  | NA             | NA           | NA                 | NA | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | PWL (dBA)             | 70.2  | 87.2  | 94.3  | 102.1 | 106.6 | 109.8 | 112.5 | 110.0 | 102.1 | 102.1 | 119.0                         | NO                       | 0                   | 317.21                | 2.00                   | NA                                 | 30          | 30                  | NA             | NA           | NA                 | NA | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
| T1           | Truck Route              | PWL (dB)              | 31    | 117   | 112   | 105   | 107   | 104   | 103   | 100   | 91    | 119.0 | 109.9                         | NO                       | 0                   | 318.15                | 2.00                   | NA                                 | NA          | NA                  | 10             | 10           | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | A-weighted correction | -39.4 | -26.2 | -16.1 | -8.6  | -3.2  | 0.0   | 0.0   | 1.2   | 1.0   | -1.1  | 109.9                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 20             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | PWL (dBA)             | 90.8  | 90.8  | 95.9  | 96.4  | 103.8 | 104.0 | 104.2 | 101.0 | 89.9  | 109.9 | 123.9                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 20             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
| T3, T5 - T8  | Front End Loader/Routes  | PWL (dB)              | 31    | 123   | 113   | 107   | 109   | 108   | 107   | 105   | 99    | 123.9 | 113.6                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 20             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | A-weighted correction | -39.4 | -26.2 | -16.1 | -8.6  | -3.2  | 0.0   | 0.0   | 1.0   | -1.1  | 113.6 | 113.6                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 20             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | PWL (dBA)             | 96.8  | 96.8  | 96.9  | 98.4  | 105.8 | 108.0 | 108.2 | 106.0 | 97.9  | 121.2 | 121.2                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 10             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
| T2, T4       | Material Truck Routes    | PWL (dB)              | 31    | 118   | 115   | 113   | 108   | 107   | 105   | 101   | 96    | 121.2 | 112.5                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 10             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | A-weighted correction | -39.4 | -26.2 | -16.1 | -8.6  | -3.2  | 0.0   | 0.0   | 1.2   | 1.0   | -1.1  | 112.5                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 10             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |
|              |                          | PWL (dBA)             | 91.8  | 91.8  | 98.9  | 104.4 | 104.8 | 107.0 | 106.2 | 102.0 | 94.9  | 112.5 | 112.5                         | NO                       | 0                   | 317.00                | 2.00                   | NA                                 | NA          | NA                  | 10             | 0            | 15                 | 15 | Referenced from UK Department for Environment, Food and Rural Affairs (Defra) Noise Database for Construction Noise document Transport Truck Route - 26ton 235kw |

Notes:  
 Equipment specifications as provided by Tri City and/or as measured at Tri City's Petersburg site



## Appendix D

### CADNA/A Sample Calculation for POR5 – Area 2



| Configuration                       |   |
|-------------------------------------|---|
| Parameter                           | Value   |
| General                             |   |
| Country                             | (user defined)  |
| Max. Error (dB)                     | 0.00  |
| Max. Search Radius (m)              | 2000.00   |
| Min. Dist Src to Rcvr               | 0.00  |
| Partition                           |   |
| Raster Factor                       | 0.50  |
| Max. Length of Section (m)          | 1000.00   |
| Min. Length of Section (m)          | 1.00  |
| Min. Length of Section (%)          | 0.00  |
| Proj. Line Sources                  | On  |
| Proj. Area Sources                  | On  |
| Ref. Time                           |   |
| Reference Time Day (min)            | 60.00   |
| Reference Time Night (min)          | 60.00   |
| Daytime Penalty (dB)                | 0.00  |
| Recr. Time Penalty (dB)             | 6.00  |
| Night-time Penalty (dB)             | 10.00   |
| DTM                                 |   |
| Standard Height (m)                 | 0.00  |
| Model of Terrain                    | Triangulation   |
| Reflection                          |   |
| max. Order of Reflection            | 1   |
| Search Radius Src                   | 100.00  |
| Search Radius Rcvr                  | 100.00  |
| Max. Distance Source - Rcvr         | 1000.00 1000.00   |
| Min. Distance Rcvr - Reflector      | 1.00 1.00   |
| Min. Distance Source - Reflector    | 0.10  |
| Industrial (ISO 9613)               |   |
| Lateral Diffraction                 | some Obj  |
| Obst. within Area Src do not shield | On  |
| Screening                           | Excl. Ground Att. over Barrier<br>Dz with limit (20/25) |
| Barrier Coefficients C1,2,3         | 3.0 20.0 0.0  |
| Temperature (°C)                    | 10  |
| rel. Humidity (%)                   | 70  |
| Ground Absorption G                 | 1.00  |
| Wind Speed for Dir. (m/s)           | 3.0   |
| Roads (???)                         |   |
| Railways (???)                      |   |
| Aircraft (???)                      |   |
| Strictly acc. to AzB                |   |

## Receiver

Name: Residence on Hesspeler Road

ID: POR7

X: 556562.36

Y: 4813912.20

Z: 1.50

## Point Source, ISO 9613, Name: "Washbay", ID: "S1"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556620.97 | 4813710.85 | 5.10 | 0     | 0     | 117.4 | -88.0 | 0.0  | 0.0  | 57.4 | 3.2  | 1.2  | 0.0  | 0.0   | 8.2  | -0.0 | -0.0 | 47.4  | -88.0 |

## Point Source, ISO 9613, Name: "Impact Crusher", ID: "S2"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556634.14 | 4813726.24 | 3.00 | 0     | 0     | 125.9 | -88.0 | 0.0  | 0.0  | 57.0 | 1.7  | 1.5  | 0.0  | 0.0   | 7.3  | -0.0 | -0.0 | 58.4  | -88.0 |

## Point Source, ISO 9613, Name: "Cone Crusher", ID: "S3"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556645.90 | 4813718.26 | 3.00 | 0     | 0     | 124.0 | -88.0 | 0.0  | 0.0  | 57.5 | 1.4  | 2.0  | 0.0  | 0.0   | 6.1  | -0.0 | -0.0 | 56.9  | -88.0 |

## Point Source, ISO 9613, Name: "Screener", ID: "S4"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556599.71 | 4813809.99 | 3.00 | 0     | 0     | 121.6 | -88.0 | 0.0  | 0.0  | 51.7 | 1.3  | 3.0  | 0.0  | 0.0   | 8.8  | -0.0 | -0.0 | 56.7  | -88.0 |

## Line Source, ISO 9613, Name: "Truck Route", ID: "T1"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556551.00 | 4813592.59 | 2.00 | 0     | 0     | 95.1  | 95.1  | 0.0  | 0.0  | 61.1 | 1.9  | 2.6  | 0.0  | 0.0   | 6.0  | -0.0 | -0.0 | 23.5  | 23.5  |
| 2   | 556517.66 | 4813566.13 | 2.00 | 0     | 0     | 93.5  | 93.5  | 0.0  | 0.0  | 61.9 | 2.1  | 2.5  | 0.0  | 0.0   | 6.1  | -0.0 | -0.0 | 21.0  | 21.0  |
| 3   | 556401.76 | 4813573.01 | 2.00 | 0     | 0     | 92.6  | 92.6  | 0.0  | 0.0  | 62.5 | 2.2  | 2.0  | 0.0  | 0.0   | 6.8  | -0.0 | -0.0 | 19.0  | 19.0  |
| 4   | 556440.93 | 4813587.30 | 2.00 | 0     | 0     | 92.0  | 92.0  | 0.0  | 0.0  | 61.8 | 2.0  | 2.3  | 0.0  | 0.0   | 6.8  | -0.0 | -0.0 | 19.1  | 19.1  |
| 5   | 556341.43 | 4813565.07 | 2.00 | 0     | 0     | 92.8  | 92.8  | 0.0  | 0.0  | 63.3 | 2.3  | 2.2  | 0.0  | 0.0   | 6.6  | -0.0 | -0.0 | 18.4  | 18.4  |
| 6   | 556392.77 | 4813580.95 | 2.00 | 0     | 0     | 92.1  | 92.1  | 0.0  | 0.0  | 62.4 | 2.2  | 2.2  | 0.0  | 0.0   | 6.8  | -0.0 | -0.0 | 18.4  | 18.4  |
| 7   | 556619.80 | 4813591.00 | 2.00 | 0     | 0     | 91.1  | 91.1  | 0.0  | 0.0  | 61.3 | 2.0  | 2.5  | 0.0  | 0.0   | 5.1  | -0.0 | -0.0 | 20.2  | 20.2  |
| 8   | 556572.70 | 4813549.72 | 2.00 | 0     | 0     | 91.8  | 91.8  | 0.0  | 0.0  | 62.2 | 2.1  | 2.5  | 0.0  | 0.0   | 5.4  | -0.0 | -0.0 | 19.6  | 19.6  |
| 9   | 556483.26 | 4813588.88 | 2.00 | 0     | 0     | 90.7  | 90.7  | 0.0  | 0.0  | 61.4 | 2.0  | 2.4  | 0.0  | 0.0   | 6.6  | -0.0 | -0.0 | 18.3  | 18.3  |
| 10  | 556308.62 | 4813543.37 | 2.00 | 0     | 0     | 92.8  | 92.8  | 0.0  | 0.0  | 64.0 | 2.5  | 2.2  | 0.0  | 0.0   | 6.3  | -0.0 | -0.0 | 17.8  | 17.8  |
| 11  | 556646.79 | 4813571.42 | 2.00 | 0     | 0     | 90.5  | 90.5  | 0.0  | 0.0  | 61.9 | 2.1  | 2.4  | 0.0  | 0.0   | 4.6  | -0.0 | -0.0 | 19.6  | 19.6  |
| 12  | 556355.19 | 4813560.31 | 2.00 | 0     | 0     | 91.3  | 91.3  | 0.0  | 0.0  | 63.2 | 2.3  | 2.2  | 0.0  | 0.0   | 6.6  | -0.0 | -0.0 | 16.9  | 16.9  |
| 13  | 556639.91 | 4813546.02 | 2.00 | 0     | 0     | 90.7  | 90.7  | 0.0  | 0.0  | 62.5 | 2.2  | 2.4  | 0.0  | 0.0   | 4.5  | -0.0 | -0.0 | 19.1  | 19.1  |
| 14  | 556444.10 | 4813578.30 | 2.00 | 0     | 0     | 89.9  | 89.9  | 0.0  | 0.0  | 62.0 | 2.1  | 2.4  | 0.0  | 0.0   | 6.6  | -0.0 | -0.0 | 16.8  | 16.8  |
| 15  | 556609.74 | 4813538.61 | 2.00 | 0     | 0     | 90.1  | 90.1  | 0.0  | 0.0  | 62.5 | 2.2  | 2.4  | 0.0  | 0.0   | 4.9  | -0.0 | -0.0 | 18.0  | 18.0  |
| 16  | 556471.62 | 4813576.18 | 2.00 | 0     | 0     | 89.3  | 89.3  | 0.0  | 0.0  | 61.8 | 2.1  | 2.4  | 0.0  | 0.0   | 6.5  | -0.0 | -0.0 | 16.5  | 16.5  |
| 17  | 556295.39 | 4813547.08 | 2.00 | 0     | 0     | 91.2  | 91.2  | 0.0  | 0.0  | 64.1 | 2.5  | 2.2  | 0.0  | 0.0   | 6.4  | -0.0 | -0.0 | 16.1  | 16.1  |
| 18  | 556258.35 | 4813528.02 | 2.00 | 0     | 0     | 91.9  | 91.9  | 0.0  | 0.0  | 64.8 | 2.6  | 2.0  | 0.0  | 0.0   | 6.3  | -0.0 | -0.0 | 16.2  | 16.2  |
| 19  | 556226.10 | 4813537.07 | 2.00 | 0     | 0     | 90.5  | 90.5  | 0.0  | 0.0  | 65.0 | 2.7  | 2.1  | 0.0  | 0.0   | 6.0  | -0.0 | -0.0 | 14.6  | 14.6  |
| 20  | 556205.46 | 4813539.72 | 2.00 | 0     | 0     | 83.9  | 83.9  | 0.0  | 0.0  | 65.3 | 2.7  | 3.3  | 0.0  | 0.0   | 12.9 | -0.0 | -0.0 | -0.2  | -0.2  |
| 21  | 556259.94 | 4813537.02 | 2.00 | 0     | 0     | 90.5  | 90.5  | 0.0  | 0.0  | 64.7 | 2.6  | 2.2  | 0.0  | 0.0   | 6.2  | -0.0 | -0.0 | 14.9  | 14.9  |
| 22  | 556198.97 | 4813530.34 | 2.00 | 0     | 0     | 80.0  | 80.0  | 0.0  | 0.0  | 65.4 | 2.8  | 3.1  | 0.0  | 0.0   | 12.5 | -0.0 | -0.0 | -3.8  | -3.8  |
| 23  | 556218.03 | 4813526.11 | 2.00 | 0     | 0     | 90.7  | 90.7  | 0.0  | 0.0  | 65.3 | 2.7  | 2.1  | 0.0  | 0.0   | 5.9  | -0.0 | -0.0 | 14.6  | 14.6  |

## Line Source, ISO 9613, Name: "Material Truck Route", ID: "T2"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556597.94 | 4813757.52 | 2.00 | 0     | 0     | 99.8  | -10.2 | 0.0  | 0.0  | 55.0 | 1.4  | 2.3  | 0.0  | 0.0   | 7.7  | -0.0 | -0.0 | 33.4  | -76.6 |

## Line Source, ISO 9613, Name: "Front End Loader Route", ID: "T3"

| Nr. | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|-----|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
|     | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556589.46 | 4813796.73 | 2.00 | 0     | 0     | 97.4  | -15.6 | 0.0  | 0.0  | 52.5 | 0.8  | 5.1  | 0.0  | 0.0   | 5.5  | -0.0 | -0.0 | 33.5  | -79.5 |



| Line Source, ISO 9613, Name: "Material Truck Route", ID: "T4" |           |            |      |       |       |       |       |      |      |      |      |      |      |       |      |      |      |       |       |
|---|-----------|------------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|------|------|------|-------|-------|
| Nr.   | X         | Y          | Z    | Refl. | Freq. | LxT   | LxN   | K0   | Dc   | Adiv | Aatm | Agr  | Afol | Ahous | Abar | Cmet | RL   | LrT   | LrN   |
|   | (m)       | (m)        | (m)  |       | (Hz)  | dB(A) | dB(A) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB)  | (dB) | (dB) | (dB) | dB(A) | dB(A) |
| 1   | 556659.41 | 4813644.29 | 2.00 | 0     | 0     | 103.1 | -6.9  | 0.0  | 0.0  | 60.1 | 2.2  | 1.5  | 0.0  | 0.0   | 5.4  | -0.0 | -0.0 | 33.9  | -76.1 |
| 2   | 556666.22 | 4813550.60 | 2.00 | 0     | 0     | 100.2 | -9.8  | 0.0  | 0.0  | 62.5 | 2.6  | 1.4  | 0.0  | 0.0   | 4.9  | -0.0 | -0.0 | 28.8  | -81.2 |

# Appendix E

## Curricula Vitae

## **EDUCATION**

B.E.S. Honors with Distinguished Academic Achievement, Environment and Resource Studies, Ecology Focus and Geography Minor, University of Waterloo, 2002

## **Other Training**

Noise Control for Buildings, Manufacturing Plants, Equipment and Products, Hoover & Keith Inc.  
Cadna A Acoustic Modelling Advanced Seminar, Datakustic

## **EMPLOYMENT HISTORY**

2002- Associate  
Present Conestoga-Rovers & Associates, Waterloo, ON  
Named CRA Associate, 2011

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS**

Member, Canadian Acoustical Association (CAA)  
Member, Air & Waste Management Association (AWMA)  
Member, AWMA Noise Practitioners Group and Noise Best Practices Committee

## **PROFILE OF PROFESSIONAL ACTIVITIES**

### **Noise Compliance, Permitting, and Control Assessments**

- Ongoing development of Conestoga-Rovers & Associates Noise & Vibration Services Group.
- Acoustic specialist and acoustic modelling expert.
- Design of numerous Noise Abatement Action Plans for a variety of clients including the specification of noise controls such as silencers, enclosures, earthen berms/barrier walls, acoustic treatments or special buildings components, equipment replacement and administrative/operator controls.
- Noise control analysis for tonal sources including gas-fired generators, radiators, transformer units and jet turbines.
- Acoustic assessments for large development projects in accordance with Environmental Impact Statements (US - EIS) and Environmental Assessments (Canadian - EA).
- Noise Impact Assessments for wind farms including acoustic modelling and monitoring of proposed and existing wind farm projects in Barrie, Ontario and New York State in accordance with applicable State noise guidelines and town bylaws and regulations.
- Noise assessment of mobile road and rail traffic corridors using MOE Stamson software programs including Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) and Sound from Trains Environmental Analysis Method (STEAM).
- Noise Impact Studies for stationary and mobile sources in support of land use development projects to meet Ontario Ministry of the Environment (MOE), Canadian National Rail (CNR), state and/or municipal bylaw requirements.

- Land Use Compatibility Assessments for proposed commercial, industrial or residential development based on MOE Guidelines D-1 and D-6.
- Acoustic Assessments and for industrial, commercial, power generation and construction clients to meet Ontario noise publications policies and standards in support of Section 9 Approvals under C of A (Air & Noise) Applications.
- Acoustic Assessments for aggregate industry clients in support of Aggregate Resources Act license applications for proposed or expanding quarries/pit extraction sites.
- Field measurements using established acoustical engineering methods and Type 1 precision sound pressure level meters.
- Type 1 precision sound intensity measurements using established acoustical engineering methods.
- Ambient background sound level evaluations and negotiation of site-specific sound level limits.
- Noise assessments for proposed residential developments in accordance with US Housing and Urban Development (HUD) requirements.
- Acoustic Assessment for proposed US compressor stations and abatement designed to demonstrate compliance with Federal Energy Regulatory Commission (FERC) regulations.
- Peer review of noise impact assessments, acoustic assessment and audits for a variety of projects including land use development proposals, industrial/commercial compliance and wind energy projects in North America.
- Evaluation of mechanical noise generating equipment to strict scientific and laboratory standards in order to provide manufacturer noise specification documentation.

#### **Vibration Assessment**

- Vibration Impact Studies in support of C of A (Air & Noise) Applications, LU-131 land use development proposals for municipal approval.
- Vibration due to Blasting assessment in support of Aggregate License applications.
- Vibration Audits for industrial stamping facilities to demonstrate compliance with conditions of Certificate of Approvals (C of A) (Air & Noise).

#### **Other**

- Performance of various air related field activities including flow rate, odour, formaldehyde analysis and moisture sampling of industrial stacks.
- Spill prevention and contingency planning in accordance with Sections 3 and 14 of the Canadian Environmental Protection Act (EPA), the draft MOE document, "*Planning for Spill Contingencies*" (February 2000), the Canadian Standards Association (CSA) document, "*Emergency Preparedness and Response*" (October 2003), and the British Columbia Ministry of the Environment, Land and Parks document, "*Guidelines for Industry Emergency Response Contingency Plans*".
- ISO 9001 2002 Quality Systems Auditor.

#### **Project Profiles**

- Transportation Corridor Noise Impact Assessments. CRA conducts traffic noise impact modelling for road and/or rail corridors using a variety of approved acoustic models in North America. Direct measurement and noise monitoring is often conducted to support the model predictions and to evaluate the net change between the existing and future noise exposure conditions. Practical

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mitigation measures are designed to meet regulatory requirements and noise reduction targets. Sample projects include:

- Enfield Road Area Noise Study – Rail traffic noise impact assessment for the City of Burlington
- Northfield Drive Expansion Study – Road traffic noise was evaluated for a two lane expansion
- QEW Noise Study – Road traffic noise and mitigation study for two lane expansion in Burlington
- Power Generation Facilities. Acoustic Assessments and Noise Abatement Action Plans are prepared in support of Applications for Certificates of Approval (Air & Noise), EA/EIS or FERC approval for existing or proposed power generation facilities. This work requires advanced noise measurement techniques and complex acoustic modelling of stationary indoor and outdoor noise sources and mobile heavy equipment. Indoor noise propagation is evaluated through wall, roof and window construction elements based on the transmission loss and sound absorption co-efficient qualities of the construction materials. Noise abatement including discrete controls such as silencers, enclosures and barrier walls or construction materials with enhanced acoustic qualities are designed to meet the applicable standards. Sample projects include:
  - Houston Hub Gas Storage, Houston, Texas, US.
  - Index Energy Ajax Steamplant, Ajax, Ontario.
  - Hydro One Inc. Transformer Stations, Ontario.
  - Toromont Energy Limited Power Generation Plant, Waterloo Landfill, Waterloo, Ontario.
  - Petrolia Landfill Gas Utilization Facility, Petrolia Landfill, Thunder Bay, Ontario.
  - Proposed Site Global Power Generation Facility, Sluse Road, Holland Landing, Ontario.
- Renewable Energy Projects – Solar and Wind.
  - Noise Assessment completed in support of the Certificate of Approval Application and Renewable Energy Approvals for project sites that provide between 500 kW to 10.0 MW of ground mounted solar energy in Ontario.
  - Cumulative Noise Impact Study prepared for the proposed construction of a 250 wind turbine project proposed by two independent developers in New York State.
  - Cumulative Noise Impact Study prepared for the proposed construction of a 125 wind turbine project proposed by an independent developer in New York State.
  - Peer review of Environmental Noise Survey and Noise Impact Assessments and Communication and Microwave Studies for proposed wind energy projects under the State Environmental Quality Review Act (SEQR) for project Sites in the Towns of Arkwright, Allegany and Centerville, Towns of Clinton, Altona and Ellenburg, Town of Wethersfield, Town of Eagle and Towns of Chateaugay and Bellmont.
  - Site-wide acoustic modelling of proposed wind turbines and transformers to evaluate off-site noise impacts respective of site-specific imagery, geometry and terrain conditions to determine compliance with respect to bylaw, Provincial or State requirements.
  - Long-term noise monitoring to determine background environmental noise levels.
  - Post-construction noise surveys to audit wind turbine operations and noise compliance.
- Industrial Facilities. Acoustic Assessments, Audits and Noise Abatement Action Plans are prepared in support of Applications for Certificates of Approval (Air & Noise) and EA/EIS approval for significant existing or proposed industrial facilities to demonstrate compliance with the applicable noise limits. Sample projects include:
  - Foundry - Gerdeau-Ameristeel, Whitby, Ontario.
  - Renewable Energy – Liberty Energy Biomass Power Plant, Hamilton, Ontario .

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- Mining & Exploration - Touquoy Gold Project, Moose River Gold Mines, Halifax, Nova Scotia.
  - Landfill - Region of Waterloo Landfill Flare Facility, Waterloo, Ontario.
  - Waste Treatment - St. Mary's Waste Water Treatment Plant, St. Mary's, Ontario.
  - Quarry / Pit Extraction - Holcim Quarry, Milton, Ontario.
  - Concrete Products - Hanson Pressure Pipe Inc., Stouffville and Uxbrige, Ontario.
  - Automotive - Cooper Standard Automotive, Glencoe, Ontario.
  - Manufacturing - Praxair Oxygen Manufacturing/Air Separation Plant Expansion, Sault Ste. Marie, Ontario.
  - Fleet Operations & Mobile Heavy Equipment - TTC Mount Dennis Bus Garage, Toronto, Ontario.
  - Land Development - Zoning Applications or Draft Plan of Subdivision Approval. Noise impact studies are completed to support zoning applications and proposed draft plans of subdivision for land development sites. This work involves the evaluation of potential noise impacts from stationary sources such as existing industry and/or commercial development and mobile sources such as road and/or rail traffic corridors on proposed sensitive residential or institutional developments that require Regional or City government planning approval for draft subdivision development plans or zoning applications. Noise is directly measured and/or modelled using industry standard acoustic modelling software to predict off-site impacts for comparison to the LU-131 (Ontario, Canada) or HUD (US) requirements. Noise abatement measures are engineered and specified to meet the applicable limits defined for the outdoor living and amenity areas and/or sensitive indoor living or sleeping areas such as bedrooms and may include barrier walls and/or earthen berms, special building components and acoustic wall construction materials, building setbacks/land use buffers, noise warning clauses and provisions/requirements for forced air/air-conditioning. Sample projects include:
    - Claiborne Homes Proposed Subdivision Development, Jefferson Parish, Louisiana, US.
    - 6 Building Residential Development Site Approval - 745 University Avenue East, Waterloo, Ontario.
    - 38 unit Condominium Development Site Approval - 19-25 Concession Street, Cambridge, Ontario.
    - Car Wash Development Site Approval - Goderich Street, Port Elgin, Ontario.
    - Proposed City of Toronto Homeless Shelter Approval - Peter Street, Toronto, Ontario.
    - Draft Plan of Subdivision Approval - 56 Pioneer Tower Road, Kitchener, Ontario.
    - Waterloo Research and Development Park Tekpark Centre Site Zoning Application, Waterloo, Ontario.
    - Draft Plan of Subdivision Approval - Ottawa Street, Kitchener, Ontario.
    - Draft Plan of Subdivision Approval - 125 Golf Road, Brantford, Ontario.

## **PUBLICATIONS AND PRESENTATIONS**

- Wiens, T., "Managing Industrial Noise Sources" Presentation provided to the Air & Waste Management Association Conference, *Environmental Nuisances: Noise, Light, Odour and Fugitive Dust*, Vancouver, British Columbia, May 2007.
- Session Chair at the Air & Waste Management Association Conference, *Environmental Nuisances: Noise, Light, Odour and Fugitive Dust*, Vancouver, British Columbia, May 2007.

- Wiens, T., "3M Noise Compliance Seminar" Training for 3M executives and facility managers, May 2007.
- Wiens, T., "Noise Case Studies & Solutions: Managing Industrial Noise Sources" Presentation provided to the Air & Waste Management Association Conference, *Environmental Nuisances: Noise, Light, Odour and Fugitive Dust*, Toronto, Ontario, February 2008.
- Wiens, T., "I Hear That:: an informal introduction to noise work" Presentation and training seminar for CRA's Air & Noise Group, February 2008.
- Wiens, T., "An Introduction to Acoustic Modelling" Training for Cooper Standard Automotive Management, April 2008 - Ongoing.
- Wiens, T., "Noise Modelling Versus Reality Under Worst-case Meteorological Conditions", Canadian Acoustics – The Canadian Acoustical Association (CAA), Volume 38, No. 3 (2010).
- "Noise Modelling Versus Reality" Presentation at the annual Canadian Acoustical Association 2010 Conference in Victoria, British Columbia – October 2010.
- "Solutions to Environmental Noise Problems" Presentation at Kinetics Noise Control 2011 Corporate Sales Incentive Meeting in Cancun, Mexico, November 2011.
- "Noise Control Case Studies" Presentation at the Air & Waste Management Association, Ontario Section, Noise Conference, May 2012.
- Wiens, T., "Quantifying the Ambient Environment: siting within the urban din", INTER-NOISE 2012, 41<sup>st</sup> International Congress and Exposition on Noise Control Engineering, New York City, USA, August 2012.
- "Quantifying the Ambient Environment: siting within the urban din", Presentation at INTER-NOISE 2012, New York City, USA, August 2012.

## EDUCATION

B.A.Sc. Chemical Engineering, University of Waterloo, 2010

## **Other Training**

Hoover & Keith Inc. - Noise Control for Buildings, Manufacturing Plants, Equipment and Products, 2011  
Ontario Regulation 419/05 - Assessing Compliance with Air Standards

## EMPLOYMENT HISTORY

2010-Present Conestoga-Rovers & Associates, Waterloo, ON  
2008-09 Ontario Ministry of the Environment (MOE), Toronto, ON  
2008 Toyota Motor Manufacturing Canada (Toyota), Cambridge, ON  
2005-07 Agriculture and Agri-Food Canada (AAFC), Harrow, ON

## PROFESSIONAL REGISTRATIONS/AFFILIATIONS

Engineering Intern: Ontario

## PROFILE OF PROFESSIONAL ACTIVITIES

### **Air Compliance and Assessment**

- Preparation of air emissions inventories, assessments and permitting for a variety of industrial clients including Ontario Ministry of the Environment (MOE) Emissions Summary and Dispersion Modelling (ESDM) Reports, and Environmental Compliance Approvals (ECA) (Air & Noise).
- Experience with stationary air emission and dispersion modelling programs including Ontario Regulation 346, AERMOD, SCREEN3, and USEPA Compilation of Air Pollutant Emission Factors AP-42.
- Knowledge and experience with several environmental legislation in Ontario and Canada, including Environmental Compliance Approval Air [ECA (Air)], Ontario Local Air Pollution, Greenhouse Gas Emissions Reporting and Toxics Reduction Act regulations as well as federal regulations under the Canadian Environmental Protection Act (1999).
- Conducted plant inspections to identify emission sources and ventilation testing to quantify air flow and emissions rates for use in emission inventories.
- Annual Canadian National Pollutant Release Inventory and Regulation 127 Assessment and internet based reporting for a variety of industrial clients.
- Preparation of Operations and Maintenance Manuals as part of ECA conditions.
- Analysis and speciation of Ontario's Industrial Sub-sector VOC emissions for future regulatory work through Certificates of Approval and National Pollutant Release Inventory Reports. Implementation of Maximum Incremental Reactivity (MIR) values and calculations of MIR values for compound products.



- Analyzed, compiled, and prepared a Carbon Dioxide Capture and Storage report based on published IPCC work in support of MOE initiatives.
- Data compilation and calculation in support of benchmarking emissions of Primary Iron and Steel Mills for the MOE.
- Performed calculation of Upper Risk Thresholds for Hazardous Air Pollutants and conducted detailed comparisons to identify Facilities with potentials to exceed the Thresholds.

#### **Greenhouse Gas Emission Inventories**

- Verified multiple Greenhouse Gas (GHG) Inventories for a variety of industrial clients, including linear facilities, under Ontario Regulation 452/09.
- Developed Toyota's internal Greenhouse Gas (GHG) calculation tool including reporting methodology and documentation based on the work of the World Resources Institute and the World Business Council for Sustainable Development.
- Prepared the baseline GHG emissions report for the Toyota Cambridge Facility for the 2007 fiscal year.
- Assisted in the implementation of the GHG calculation tool and reporting methodology for a second Toyota plant in Ontario.

#### **Noise Assessment**

- Field measurements using Type 1 precision Sound Level Meters to conduct short and long term noise measurements and monitoring programs.
- Ambient background sound level evaluations and negotiation of site-specific sound level limits.
- Acoustic Assessments and Acoustic Audits to meet Ontario noise publications policies and standards.
- Design of Noise Abatement Plans for a variety of clients including the specification of noise controls such as silencers, enclosures, barrier walls, equipment replacement and administrative/operator controls.
- Experience using Computer Aided Noise Abatement (Cadna A) noise modeling software to determine off-site environmental noise impacts.
- Noise assessment of mobile road and rail traffic corridors using MOE Stamson software programs including Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) and Sound from Trains Environmental Analysis Method (STEAM).
- Land Use Compatibility Assessments for proposed residential development based on Municipal and MOE Guidelines.

#### **Field Activities**

- Conducted Noise and Odour field work activities (in accordance to best practices and published MOE procedures and guidance).
- Performed oversight activities in support of a large remediation project for a Specialty Chemical Manufacturer in Ontario. Took quantitative measurements of affected areas to verify predictions of an air dispersion model.
- Conducted soil depth sampling for moisture and nitrite/nitrate measurements.
- Performed soil respiration (emissions) monitoring, focus on CO<sub>2</sub> and NO<sub>2</sub>.

- Deployment and calibration of UV-DOAS and OP-FTIR optical remote sensing equipment for fugitive emissions monitoring.

## **PUBLICATIONS AND PRESENTATIONS**

### **Published Refereed Papers**

- Wiens, T., Grozev S., Zehr Z., Reusing G., "Quantifying the Ambient Environment: siting within the urban din", INTER-NOISE 2012, 41st International Congress and Exposition on Noise Control Engineering, New York City, USA, August 2012.