# REPORT

## Acoustic Assessment- Technical Study Report

DURHAM YORK
RESIDUAL WASTE EA STUDY

**REPORT NO. 1009497**

# EXECUTIVE SUMMARY

The Proposed Thermal Treatment Facility (the Facility) is being designed to thermally process solid waste that remains after Durham's and York's waste diversion efforts. The Facility will be located approximately 2 (kilometres) south of Highway 401, between Courtice Road and Osborne Road in the Municipality of Clarington.

This Report outlines the results of Jacques Whitford Stantec Limited's (JWSL's) acoustic assessment completed for use in the Durham York Environmental Assessment Study, as well as for other regulatory requirements. Evaluations were completed for two (2) design capacity scenarios for the Facility. These are the initial design capacity of 140,000 tonnes per year (tpy) and a maximum design capacity of 400,000 tpy. The Report includes consideration of:

- existing ambient acoustical environment;
- sound from the Facility construction;
- sound from the Facility operations;
- potential impacts of sound on wildlife in addition to human receptors; and,
- mitigation measures to limit and manage potential effects.

The assessment was undertaken and the Report was prepared in accordance with the Ontario Ministry of the Environment (MOE) and Health Canada (HC) noise guidelines in support of an Individual Environmental Assessment conducted under the Ontario *Environmental Assessment Act* (EAA). The assessment follows the requirements of MOE publications and guidelines. An Acoustic Assessment Report Checklist is included in **Appendix A**.

Source sound power levels were estimated for the significant noise sources in the Facility based on:

- measured data from similar equipment;
- manufacturer's information; and,
- published resources.

Based on ambient noise measurements conducted in the Acoustic Study Area (ASA) near the critical receptors, the existing minimum background 1-hour sound exposure levels generally occurred at night (i.e., 23:00 h to 07:00 h) and ranged from 47 dBA (A-weighted decibels) near Courtice Road, and 38 dBA near the Baseline Road. As a result, the measured ambient noise levels were applied for most receptors. The Facility was also assessed against Health Canada's proposed noise criteria.

Acoustical modelling of significant sources was conducted using a computerized noise model, CADNA/A, using the algorithms from ISO 9613. The results were assessed for compliance at the nearest Points of Reception (PORs) based on the relevant noise criteria.

The predicted noise levels at all nearby PORs are less than the applicable criteria for both the 140,000 tpy and 400,000 tpy operational scenarios assessed for the Facility.

Current standards for building Facility equipment and process units incorporate efficiencies and design enhancements that reduce sound emissions. Where necessary, mitigation measures can be included to ensure applicable noise criteria are met at PORs as predicted. Such mitigation measures may include the use of equipment control options such as:

- enclosures;
- local or property-line barriers;
- mufflers and silencers; and,
- acoustic baffles or insulation.

For both the 140,000 tpy and 400,000 tpy scenarios, selection and design of specific mitigation measures would be subject to the detailed design of the proposed equipment.

For both the 140,000 tpy and 400,000 tpy scenarios, noise from the Facility has some potential to create effects on wildlife within 300 to 500 m of construction activities and 250 to 300 m of operational process units. However, it is expected that wildlife would either naturally avoid these areas due to the human presence and activity, or would adjust to the noise. In all areas, occasional short-term loud sounds, particularly associated with construction activities, may produce retreat or startle responses in some wildlife.

For both the 140,000 tpy and 400,000 tpy scenarios, some potential exists for noise and vibration impacts during the construction phase of the Facility. Generally, vibration impact is confined to a couple of hundred metres, but noise is not. There are two construction activities that are likely to create elevated sound levels that are difficult to mitigate. These are:

- Pile driving activities associated with the construction at the facility (if required); and,
- Increased short-term (i.e., 1-hour) offsite vehicle traffic associated with the construction of the Facility.

These activities would only be a concern during worst-case conditions. They are temporary and of short duration relative to the Facility construction, and would cease upon completion construction activities. Pile driving effects could be reduced through alternative technologies, controls, and scheduling. Construction vehicle traffic is predicted to be acceptable against applicable criteria, but short-term (i.e., 1-hour) effects during peak demand are possible. These peaking issues can be reduced through scheduling and planning of vehicle trips.

A monitoring program and contingency plan is recommended to address any issues that may arise during the construction and post-closure periods of the Facility. Post-closure noise effects would be assessed against the applicable criteria at the time of closure.

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# GLOSSARY AND ABBREVIATIONS

** An asterisk (*) beside a defined term indicates that the term is defined in the Environmental Assessment Act.*

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| Acoustic Energy: | Commonly referred to as the mean-square sound-pressure ratio, sound energy, or just plain energy, acoustic energy is the square of the ratio of the mean-square sound pressure (often referred to as frequency weighted), and the reference mean-square sound pressure of 20 µPa, the threshold of human hearing. It is arithmetically equivalent to 10 to the power of (SPL/10), where SPL is the sound pressure level, expressed in decibels. |
| Acoustic Study Area: | Study area for the purposes of the Acoustics Assessment Technical Study Report. Generally within 1,000 m of the Facility property boundaries, with receptors considered in each cardinal direction. |
| Airborne Sound: | Sound that reaches the point of interest by propagation through air. |
| Ambient Sound Level or Ambient Noise: | All-encompassing sound that is associated with a given environment, usually a composite of sounds from many sources near and far. Includes noise from all sources other than the sound of interest (i.e., sound other than that being measured), such as sound from other industrial noise, transportation sources, animals and nature. |
| Application Case: | The status of the parameter(s) with the Facility in place over and above the Baseline. This is considered and assessed using the maximum environmental effects of the Facility, including the maximum footprint for the Facility (for planning purposes, even though the Facility may not be built to that level). |
| Approved Terms of Reference: | Terms of Reference for the Environmental Assessment approved by Ontario's Minister of the Environment on June 27, 2007. |
| Attenuation: | The reduction of sound intensity by various means (e.g., air, humidity and porous materials). |
| Audibility: | The ability of a sound to be perceived by human beings and animals. Audibility is affected by the hearing ability of the human being or animal, other simultaneous interfering sounds or stimuli, and by the frequency content and amplitude of the sound. |

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| A-Weighting: | The weighting network used to account for changes in level sensitivity as a function of frequency. The A-weighting network de-emphasizes the high (i.e., 6.3 kHz and above) and low (i.e., below 1 kHz) frequencies, and emphasizes the frequencies between 1 kHz and 6.3 kHz, in an effort to simulate the relative response of the human ear. See also frequency weighting. |
| Background Sound Level or Background Noise: | Same as the ambient sound level. |
| Barrier: | In an acoustical sense, an obstacle composed of a berm, wall or fence that is free of gaps and of sufficient mass to prevent significant transmission of sound through it, and which attenuates sound as measured by an insertion loss. |
| Baseline: | The existing environment potentially affected or baseline conditions (also known as existing conditions). |
| Calibration: | Procedure used to adjust a sound level meter using a reference source of a known sound pressure level and frequency. Calibration must take place before and after the sound level measurements. |
| Calibrator (acoustical): | Device that produces a known sound pressure on the microphone of a sound level measurement system and is used to adjust the system to standard specifications. |
| Crest Factor: | In vibration, the ratio of peak particle velocity amplitude to root-mean-square velocity amplitude. |
| Cumulative Effect: | Change to the environment caused by an action combined with other identified past, present and planned (i.e., known) future actions. |
| Day-Night Average Sound Level: | A 24-hour time-averaged Leq, adjusted by a 10 decibel penalty for sounds occurring during the night period (i.e., 23:00h and 07:00h local time). |
| Daytime: | Defined as the hours from 07:00h to 19:00h. |
| Daytime Adjustment: | An adjustment that allows a 10 decibel increase because daytime sound levels are generally about 10 decibels higher than nighttime values. |

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| Decibel: | A logarithmic measure of any measured physical quantity and commonly used in the measurement of sound. The decibel (dB) provides the possibility of representing a large span of signal levels in a simple manner. The difference between the sound pressure for silence versus a loud sound is a factor of 1,000,000:1 or more, therefore it is less cumbersome to use a small range of equivalent values: 0 to 130 dB. A tenfold increase in sound power is equal to +10 dB; a tenfold increase in sound amplitude is equal to +20 dB. |
| Decibel, A-weighted: | A-weighted decibels (dBA). Most common units for expressing sound levels since the A weighting function is designed to approximate the response of the human ear. |
| Decibel, Linear: | Unweighted decibels (dBL). Logarithmic units associated with a sound pressure level, where the sound pressure signal is unfiltered and represents the full spectrum of incoming noise. |
| Diffracted Wave: | A sound wave whose front has been changed in direction by an obstacle in the propagation medium, where the medium is air for the purposes of this assessment. |
| Divergence: | The spreading of sound waves from a source in a free field environment. In the case of highway traffic noise, two types of divergence are common, spherical and cylindrical. Spherical divergence is that which would occur for sound emanating from a point source (e.g., a single vehicle pass-by). Cylindrical divergence is that which would occur for sound emanating from a line source, or many point sources sufficiently close to behave as a line source (e.g., a continuous stream of roadway traffic). |
| Energy Equivalent Sound Level: | An energy-average sound level (Leq) over a specified period that would have the same sound energy as the actual (i.e., unsteady) sound over the same period. It represents the average sound pressure encountered for the period. The period is often added as a suffix to the label (i.e., Leq(24) for the 24-hour equivalent sound level). An Leq value expressed in dBA is a good single-value descriptor of the annoyance of noise. |
| Environmental Assessment: | A systematic process to assess the effects of a proposed undertaking (such as the Facility) on the environment. The EA is being conducted to meet provincial requirements under the EAA. |

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| Environmental Effect: | The effect that a proposed undertaking or its alternatives has or could potentially have on the environment, positive or negative, direct or indirect, short-or long-term. |
| Environmental Management System: | A quality management system that documents issues associated with the environmental performance of a facility. |
| Evening: | Defined as the hours from 19:00h to 23:00h. In the calculation of Ldn the evening period is part of the daytime. |
| Existing Ambient: | All sounds in a given area (i.e., includes all natural sounds as well as all mechanical, electrical and other human-caused sounds). |
| Far-Field: | That portion of a source's sound field in which the sound pressure level (i.e., due to this sound source) decreases as if from a point, by 6 decibels (dB) per doubling of distance from the source (i.e., spherical divergence). For a line source, the far-field is the portion of the sound field in which the sound pressure level decreases by 3 dB per doubling of distance. |
| Free-Field: | A sound-field whose boundaries exert a negligible influence on the sound waves. In a free-field environment, sound spreads spherically from a source and decreases in level at a rate of 6 dB per doubling of distance from a point source, and at a rate of 3 dB per doubling of distance from a line source. |
| Frequency: | The number of times per second that the sine wave of sound repeats itself. It can be expressed in cycles per second, or Hertz (Hz). Frequency equals Speed of Sound / Wavelength. |
| Frequency Weighting: | A method used to account for changes in sensitivity as a function of frequency. Three standard weighting networks, A, B, and C, are used to account for different responses to sound pressure levels. Note: The absence of frequency weighting is referred to as "flat" response. See also A-weighting. |

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| Ground Effect: | The change in sound level, either positive or negative, due to intervening ground between source and receiver. Ground effect is a relatively complex acoustic phenomenon, which is a function of ground characteristics, source-to-receiver geometry, and the spectral characteristics of the source. A commonly used rule-of-thumb for propagation over soft ground (e.g., grass) is that ground effects will account for about 1.5 dB per doubling of distance. This relationship is empirical and tends to break down for distances greater than about 30 to 61 metres. |
| Ground Impedance: | A complex function of frequency relating the sound transmission characteristics of a ground surface type. |
| Hard Ground: | Any highly reflective surface in which the phase of the sound energy is essentially preserved upon reflection; examples include water, asphalt, and concrete. |
| Hearing Range (human): | An average healthy young person can hear frequencies from approximately 20 Hz to 20,000 Hz, and sound pressure levels from 0 dB to 130 dB or more (i.e., the threshold of pain). |
| Hertz (Hz): | The unit of frequency also expressed as cycles per second. |
| Insertion Loss: | The sound level at a given receiver before the construction of a barrier minus the sound level at the same receiver after the construction of the barrier. The construction of a noise barrier usually results in a partial loss of soft-ground attenuation. This is due to the barrier forcing the sound to take a higher path relative to the ground plane. Therefore, barrier IL is the net effect of barrier diffraction, combined with this partial loss of soft-ground attenuation. |
| Intensity: | The sound energy flow through a unit area in a unit time. |
| International Organisation for Standardisation: | An international body that provides scientific standards and guidelines related to various technical subjects and disciplines. |
| Line of Sight: | Refers to the direct path from the source to receiver without any intervening objects or topography. |

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| Line Source: | Multiple point sources moving in one direction (e.g., a continuous stream of roadway traffic, radiating sound cylindrically). Sound levels from a line source decrease at an ideal rate of 3 dB per doubling of distance. |
| Loudness: | The subjective judgment of intensity of a sound by humans. Loudness depends upon the sound pressure and frequency of the stimulus. Loudness was initially defined by Fletcher and Munson in 1933 as a physiological description of the magnitude of an auditory sensation. The definition of loudness was later refined as the attribute of auditory sensation corresponding most closely to the physical measurement of sound intensity. |
| Masking: | The process by which the threshold of audibility for a sound is raised by the presence of another (e.g., masking) sound. A masking sound is one that renders inaudible or unintelligible another sound that is also present. |
| Mitigation: | Measures taken to reduce, eliminate, or control impacts on the environment. |
| Monitoring and Protection Plan: | A plan that outlines the conditions necessary to maintain adequate sound or vibration levels at area receptors. Components of such a plan may include monitoring protocols, complaint responses, and mitigation alternatives. |
| Natural Ambient: | All natural sounds in a given area, excluding all non-natural sounds. “Natural ambient” is considered synonymous with the term “natural quiet,” although natural ambient is more appropriate because nature is often not quiet. |
| Near-Field: | The sound field between the source and the far-field. The near-field exists under optimal conditions at distances less than four times the largest sound source dimension. |
| Nighttime: | Defined as the hours from 23:00h to 07:00h. |
| Noise: | Any unwanted sound. "Noise" and "sound" are used interchangeably in this document. |

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| Noise Barrier: | The structure, or structure together with other material, that potentially alters the noise at a site from a 'before' condition to an 'after' condition. An effective noise barrier is one that ensures that the sound transmitted through it is insignificant as compared to the sound that refracts around the side and over the top edges. |
| Noise Floor: | The lowest amplitude measurable by sound monitoring equipment. Most commercially available sound level meters and microphones can detect sound levels down to about 15 to 20 dBA. |
| Noise level: | Same as sound level, except applied to unwanted sounds. |
| Noise Reduction Coefficient: | A single-number rating of the sound absorption properties of a material; it is the arithmetic mean of the Sabine absorption coefficients at 250, 500, 1,000, and 2,000 Hz, rounded to the nearest multiple of 0.05. |
| Normal Incidence (Sound): | Occurs when sound waves impinge at an angle perpendicular, or normal, to the microphone diaphragm. |
| Nuisance Effect: | A level of disturbance that is below the level that would cause harm, but could cause annoyance, or be unpleasant or obnoxious to individuals or groups. |
| Octave: | The interval between two frequencies having a ratio of two to one. For acoustic measurements, the octaves start a 1,000 Hz centre frequency and go up or down from that point, at the 2:1 ratio. From 1,000 Hz, the next filter's centre frequency is 2,000 Hz, the next is 4,000 Hz, or 500 Hz, 250 Hz, etc. Octave filtering is usually referred to as the class of octave filters typically 1, 3 or 12, thus creating full octaves, one-third octaves, or one-twelfth octaves. |
| Ontario Road Noise Analysis Method for Environment and Transportation: | MOE analysis method for assessing environmental noise from automobile traffic. |
| Percent Highly Annoyed: | A measure advocated by Health Canada to assess the fraction of a population that could be very annoyed with a certain sound level. |

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| Percentile Exceeded Noise Level: | The sound level exceeded X percent of a specific time period (LX). For example, from a 50-sample measurement period, the fifth highest sound level (i.e., 10% of 50 samples) is the 10-percentile exceeded sound level (L10). Other similar descriptors include L50 (i.e., the sound level exceeded 50% of a specific time period), L90 (i.e., the sound level exceeded 90% of a specific time period). |
| Point of Reception: | A noise-sensitive receptor such as a residence, campground, daycare, school, church, or hospital. |
| Point Source: | Source that radiates sound spherically (i.e., equally in all directions). Sound levels from a point source decrease at an ideal rate of 6 dB per doubling of distance. |
| Project: | Encompasses the design, construction (including construction financing) and operation of the Thermal Treatment Facility, and includes the EA Study, the supply of municipal waste, and the sale of energy. |
| Right-of-Way: | The entire strip or area of land adjacent to a highway used for highway purposes. |
| Signal-to-Noise Ratio: | The ratio between the amplitude of a signal (i.e., meaningful information) and the amplitude of background noise. Because many signals have a very wide dynamic range, signal-to-noise ratios are often expressed in terms of the logarithmic decibel scale. |
| Soft Ground: | Any highly absorptive surface in which the phase of the sound energy is changed upon reflection; examples include terrain covered with dense vegetation or freshly fallen snow. At grazing angles greater than 20 degrees, which can commonly occur at short ranges, or in the case of elevated sources soft ground becomes a good reflector and can be considered acoustically hard ground. |
| Sound: | A wave motion in air, water, or other media. It is the rapid oscillatory compression changes in a medium that propagate to distant points. It is characterized by changes in density, pressure, motion, and temperature as well as other physical properties. Not all rapid changes in the medium are due to sound (e.g., wind distortion on a microphone diaphragm). |

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| Sound Absorption Coefficient: | The ratio of the sound energy, as a function of frequency, absorbed by a surface, and the sound energy incident upon that surface. |
| Sound from Trains Environmental Analysis Method: | MOE analysis method for assessing environmental noise from trains. |
| Sound Level: | Generally, sound level refers to the weighted sound pressure level obtained by frequency weighting, usually A- or C-weighted, and expressed in decibels |
| Sound level meter: | An instrument consisting of a microphone, amplifier, output meter and frequency-weighting networks that is used to measure noise and sound levels. |
| Sound Power Level: | The total sound energy radiated by a source per unit time. The unit of measurement is the Watt. The acoustic power radiated from a given sound source as related to a reference power level (i.e., typically 1E-12 watts, or 1 picowatt) and expressed as decibels. A sound power level of 1 watt = 120 decibels relative to a reference level of 1 picowatt. |
| Sound Pressure: | The root-mean-square of the instantaneous sound pressures during a specified time interval in a stated frequency band. |
| Sound Pressure Level: | Logarithmic ratio of the root mean square sound pressure to the sound pressure at the threshold of human hearing (i.e., 20 micropascals). |
| Sound Speed: | The speed of sound in air is about 344 metres per second at 21oC and sea level. It varies depending on temperature and type of medium. |
| Sound Transmission Class: | A single-number rating used to compare the sound insulation properties of barriers. The sound transmission class (STC) is derived by fitting a reference rating curve to the sound transmission loss (TL) values measured for the 16 contiguous one-third octave frequency bands with nominal mid-band frequencies of 125 Hz to 4,000 Hz inclusive, by a standard method. The reference rating curve is fitted to the 16 measured TL values such that the sum of deficiencies (i.e., TL values less than the reference rating curve), does not exceed 32 dB, and no single deficiency is greater than 8 dB. The STC value is the numerical value of the reference contour at 500 Hz. |

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| Spectrum (Frequency Spectrum): | The amplitude of sound at various frequencies. It is given by a set of numbers that describe the amplitude at each frequency or band of frequencies. |
| STAMSON: | MOE software package for predicting transportation noise from trains and automobiles. |
| Time Response: | The response speed of the detector in a sound level meter. For Slow response, the response speed is 1 second. Slow time response is frequently used in environmental sound measurements. Fast response time is 1/8 second. For most environmental noise applications, both Fast and Slow time response measurements compared over long measurement periods (i.e., over several days) result in very little difference in results (i.e., differences are often less than the accuracy of the meter). |
| Transition Zone: | The area between the facility main process units and nearby receptors. |
| Transmission Loss: | The loss in sound energy, expressed in decibels, as sound passes through a barrier or a wall. Measurements to determine a barrier's transmission loss should be made in accordance with ASTM E90 and ASTM Recommended Practice E413. |
| Urban Hum: | The near-constant background sound in an urban environment created by ongoing traffic and machine noise. |
| Wave: | A particular type of disturbance that travels through a medium by virtue of the elastic properties of that medium. |
| Wavelength: | The perpendicular distance between two wave fronts in which the displacements have a difference in phase of one complete period. |
| Weighting: | Adjustment of sound level data to achieve a desired measurement. A-weighting is used to account for changes in human hearing sensitivity as a function of frequency. The A-weighting network de-emphasizes the high (i.e., 6,300 Hz and above) and low (i.e., below 1,000 Hz) frequencies, and emphasizes the frequencies between 1,000 Hz and 6,300 Hz, in an effort to simulate the relative response of human hearing. C-Weighting is linear over the mid frequency range from 200 Hz to 1,600 Hz, and de-emphasizes the low (i.e., below 200 Hz) and high (i.e., above 1,600 Hz) frequencies. |

Windscreen: A porous device used to cover the microphone of a sound level measurement system. Windscreens are designed to minimize the effects of wind disturbance on the sound levels being measured while minimizing the attenuation (i.e., less than 0.5 dB) of the signal.

World Health Organization: An internationally-recognized body that provides guidelines, standards, and recommendations to protect the health of human populations.

**List of Abbreviations**

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| ASA | Acoustics Study Area |
| C of A | Certificate of Approval |
| CEAA | Canadian Environmental Assessment Act |
| CN | Canadian National Railway Company |
| DNL | Day-night Sound Level |
| EA | Environmental assessment |
| EAA | Environmental Assessment Act |
| EPA | Environmental Protection Act |
| HC | Health Canada |
| HHV | Higher Heating Value |
| ID Fan | Induced Draft Fan |
| ISO | International Organization for Standardization |
| Max | Maximum |
| Min | Minimum |
| MOE | Ontario Ministry of the Environment |
| NPC | Noise Pollution Control |
| OPG | Ontario Power Generation |
| ORNAMENT | Ontario Road Noise Analysis Method for Environment and Transportation |
| POR | Points of Reception |
| PPV | Peak Particle Velocity |
| PWL | Sound Power Level |

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| RMS | Root-mean-square |
| STEAM | Sound from Trains Environmental Analysis Method |
| US EPA | United States Environmental Protection Agency |
| US-EPA AP-42 | United States Environmental Protection Agency AP-42 |
| WHO | World Health Organization |

## UNITS OF MEASUREMENT

### Area

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| $m^2$ | square metre | |

### Power

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|---|---|---|
| W | watt | |
| kW | kilowatt | 1 x $10^3$ W |
| MW | megawatt | 1 x $10^6$ W |

### Time

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| s | second |
| min | minute |
| hr | hour |
| wk | week |
| y | year |

### Miscellaneous

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|---|---|
| °C | temperature in degrees Celsius |
| dB | Decibel |
| dBA | Decibel, A-weighted |
| dBL | Decibel, Linear (unweighted) |
| N/A | not available |
| % | percent |
| cfm | cubic feet per minute |

# REPORT

## 1.0 INTRODUCTION

Durham and York Regions (the Regions) have partnered to undertake a joint Residual Waste Planning Environmental Assessment (EA) Study. Both municipalities are in need of a solution to manage the residual solid waste that remains after diversion. The Regions are working together to address the social, economic, and environmental concerns through an EA Study process to examine potential long-term residual waste management alternatives.

### 1.1 The Environmental Assessment Process

The purpose of the undertaking (i.e., what the outcome of this EA Study is intended to do) as described in the Approved EA Terms of Reference is:

> *"To process - physically, biologically and/or thermally - the waste that remains after the application of both Regions' at-source waste diversion programs in order to recover resources - both material and energy - and to minimize the amount of material requiring landfill disposal. In proceeding with this undertaking only those approaches that will meet or exceed all regulatory requirements will be considered."*

The EA Study follows a planning approach where environmental constraints or opportunities are considered in the context of the broadly defined environment under the *Environmental Assessment Act* (EAA) (i.e., the natural environment as well as the social, economic and heritage and other "environments" relevant to the undertaking) and potential effects are understood and addressed before development occurs. In accordance with the Approved EA Terms of Reference and EAA, the EA process evaluates: alternatives considering potential effects on the environment; the availability of mitigation measures that address, in whole or in part, the potential effects; and, the comparison of the advantages and disadvantages of the remaining or "net" effects. The result of this process provides the planning rationale and support for a preferred approach and method to implement the undertaking.

The EA Study document has been prepared and conducted in accordance with the EAA, and in accordance with the Terms of Reference approved by Ontario's Minister of the Environment on March 31, 2006. There are currently no federal environmental assessment process triggers identified and, therefore, this Project does not require approval under the *Canadian Environmental Assessment Act* (CEAA).

It is understood and contemplated that environmental management measures recommended as part of the EA process and this Technical Study Report will in many cases be refined, updated, modified and/or superceded as a result of subsequent approval processes.

This EA process essentially consists of three parts taking place in stages including:

- the Development and Approval of an EA Terms of Reference,

- the evaluation of “Alternatives to” the undertaking, and;
- the evaluation of “Alternative methods” of implementing the undertaking.

Refer to the EA for a detailed description of the EA process undertaken as part of the EA Study.

## 1.2 Purpose of the Report

This Report entitled *Acoustic Assessment – Technical Study Report* has been prepared to confirm the potential noise and vibration-related effects associated with the Proposed Thermal Treatment Facility (the Facility) at the Preferred Site (the Site), together with the identification of mitigation measures, and resulting net effects. This Report will form part of the supporting documentation and materials for the “Description of the Undertaking” completed as part of the EA.

## 1.3 Overview of Report Contents

This Report describes the existing acoustic conditions related to the Site, followed by an effects analysis including net effects of the Facility on the subject aspect(s) of the environment and summary of the monitoring requirements. The key components of this Report are as follows:

- acoustic assessment methodology, including facility overview, acoustics study area, modelling scenarios, and general modelling approach;
- description of noise sources;
- assessment of the existing ambient acoustical environment;
- discussion of the relevant assessment criteria;
- presentation of the predicted sound levels;
- review of proposed mitigation options and monitoring actions; and,
- conclusions and recommendations.

The information contained in this Report has been used to complete the EA.

# 2.0 STUDY METHODOLOGY

The evaluations, documented in this Technical Study Report, were completed for two (2) design capacity scenarios for the Facility. These are: an initial design capacity of 140,000 tonnes per year (tpy); and a maximum design capacity of 400,000 tpy for the Facility.

This acoustic assessment has been conducted as part of the EA Study, and is designed to assess the potential effects of the Facility relative to applicable regulatory requirements. The assessment focuses on the Ministry of the Environment (MOE) noise guidelines, published in its Noise Pollution Control (NPC) series of documents (NPC-205/232/233, 1995a, 1005b and 1195c), but it also provides data and analysis for applicable federal legislation and approvals. Guidelines from federal (e.g., Health Canada) and other jurisdictions (e.g., Municipality of Clarington) are included where appropriate.

The acoustic assessment was developed based on the following objectives:

- Define existing acoustic environment (i.e., Baseline).
- Assess proposed construction activities (i.e., Construction Case).
- Assess the Facility operations (i.e., Operation Case).
- Evaluation of potential acoustic effects on wildlife in addition to human receptors.

## 2.1 Ontario Acoustic Assessment Process

Acoustic assessments conducted in Ontario are primarily based on the MOE NPC guidelines, and supporting documents and standards. MOE procedures provide minimum setback distance to noise-sensitive Points of Reception (PORs) that are required to meet the noise criteria for certain source types. PORs include the following existing lands and lands zoned for future use:

- permanent, seasonal, or rental residences;
- hotels and motels;
- hospitals, retirement homes, and long-term care facilities;
- schools and daycares;
- churches and places of worship; and,
- other noise-sensitive land uses such as campgrounds.

In accordance with MOE noise screening guidelines, facilities with incineration and co-generation capabilities must meet a minimum setback distance of 1,000 metres (m) from the nearest POR. In terms of the Proposed Thermal Treatment Facility (the Facility), some noise-sensitive receptors are located within 1,000 m of the Proposed Thermal Treatment Facility Site (the Site). The MOE requires detailed acoustic assessments for significant facilities to determine if they meet the screening criteria. Therefore, a detailed acoustic assessment of the Facility has been conducted.

This Report presents the results of the Acoustic Assessment that was conducted for the Facility's predicted noise emissions to demonstrate compliance with applicable MOE noise criteria at nearby PORs for daytime (i.e., 07:00-19:00 h [hours]), evening (i.e., 19:00-23:00 h), and nighttime (i.e., 23:00-07:00 h) periods in accordance with MOE NPC guidelines.

According to MOE NPC guidelines, sound level limits are based on the classification of each POR as Class 1 (i.e., urban), Class 2 (i.e., suburban), or Class 3 (i.e., rural) depending on the local land-use and existing ambient sound environment. Class 3 sound level limits are more restrictive than Class 1 limits. These limits may be modified in the presence of high background sound levels, allowing a facility to contribute as much to the overall environmental noise as the existing background (i.e., beyond minimum exclusionary levels). Compliance with the applicable MOE limits is evaluated based on the sound contribution from the facility sources only. Cumulative effects (i.e., background plus facility) are not considered explicitly, although the guidelines account for background sound levels in setting the applicable limit.

This Report is intended to meet the requirements described in current MOE noise procedures and guidelines and the following documents:

- NPC-233, Information to be submitted for Approval of Stationary Sources of Sound (MOE 1995c).
- Supporting Information to be submitted for an Acoustic Assessment Report or Vibration Assessment Report Required by a Basic Comprehensive C of A (MOE, 2004a).

A completed Acoustic Assessment Checklist is included in **Appendix A**. Additional supporting information required by the MOE for Acoustic Assessment is included in the appendices to this Report.

Since this is a proposed Facility, information on noise sources and sound emission octave band data were based on a number of sources, including:

- published field measurements data on similar equipment;
- manufacturer's specifications, and;
- acoustic predictions using data from similar industrial operations.

Conservative assumptions were used throughout the analysis to ensure a robust and representative worst-case assessment (i.e., maximum environmental effects). The acoustic assessment of the Facility is based on detailed modelling such that mitigation measures can be specified where necessary to ensure compliance with applicable MOE noise guidelines.

The Facility operations do not involve sources of significant vibration emissions, such as stamping presses, forging hammers, or shaker tables. As such, a detailed vibration assessment has not been completed for the Facility operations. However, ground-borne vibration emissions may be significant for certain Facility construction activities, such as the pile-driving activity (if required). Therefore, an assessment of vibration impacts has been conducted for Facility construction activities of concern.

## 2.2 Overview of the Facility

This section of the Report provides a summary description of the Facility as it pertains to this Acoustic Assessment. The initial design capacity of the Facility is 140,000 tonnes per year (tpy) (140,000 tpy scenario) to a maximum design capacity of 400,000 tpy (400,000 tpy scenario) of waste during the planned 35-year operating period. For the purposes of this Technical Study Report, the potential effects of noise emissions from the Facility have been assessed for both the 140,000 tpy scenario and the 400,000 tpy scenario.

For the initial 140,000 tpy scenario, there would be two completely independent waste processing trains. Each train would consist of a feed chute, stoker, integrated furnace/boiler, acid gas scrubber, a fabric filter bag house and associated ash and residue collection systems. Steam produced in each boiler would drive a turbine-generator to produce electricity for delivery to the grid, for in-plant use and potentially to provide district heating to the neighbouring Courtice Water Pollution Control Plant and Clarington Energy Business Park. The expansion to the 400,000 tpy scenario would include the addition of 3-4 more identical waste processing trains.

The Acoustic Assessment considers every significant noise source within each train identified in the available design information for the Facility. Figure 2-1 illustrates the Site (Clarington 01)

A more detailed Facility layout is included in **Appendix B**.

The area surrounding the Site is characterized by a variety of land uses, but primarily industrial. Other land uses include agricultural, rural, and urban residential, as well as natural areas. The Ontario Power Generation (OPG) Darlington Station is located to the east, Highway 401 to the north and Lake Ontario to the south of the Site. There are salvage car lots immediately to the north and east.

### 2.2.1 Operating Schedule

The Facility is expected to operate continuously, 24-hours per day, 7-days per week, except during planned maintenance periods and unplanned outages.

YORK REGION AND DURHAM REGION
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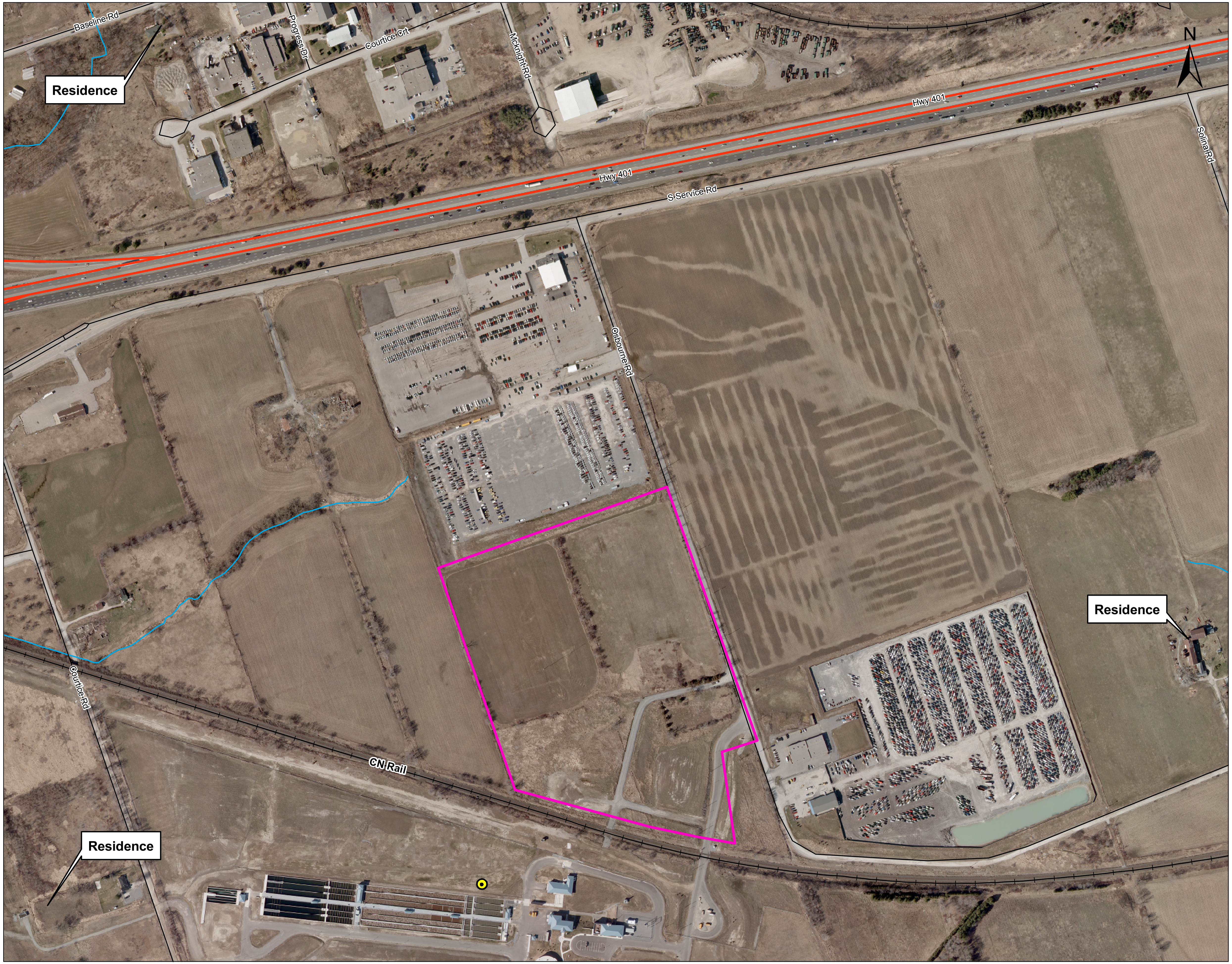
## Proposed Facility Site (Clarington 01)

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- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site

0 50 100 150

Metres - 1:5,000

1009497-054


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FIGURE NO.

**2-1**

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## 2.3 Study Area

Since noise decays with distance, impacts are largely confined to areas surrounding the noise sources. For the Acoustic Assessment, the study area has been defined to address the sphere of influence of noise around the Facility in an Acoustics Study Area (ASA). Within the ASA, only critical acoustical receptors in each main compass direction are assessed in detail since receptors that are further removed from the noise sources would likely experience less effect. This approach is consistent with the intent of the MOE screening process for noise (MOE 2004b) and MOE noise procedures (MOE 1995a, b, c). The ASA is shown in Figure 2-2.

The ASA includes the Site, as well as traffic corridors including Highway 401, Osborne Road and South Service Road. The ASA also includes adjacent lands within 1,000 m of the Facility property boundaries in accordance with the MOE screening process. In some cases, residences that fall outside the 1,000 m separation distance are included to capture locations in each main compass direction from the Site, regardless of setback distance to ensure all important effects are addressed. Particular attention is given to residential or other sensitive receptors as defined in MOE publications NPC-205/232. Zoning maps and land-use photos of the area are included in **Appendix B**.

The following sections discuss the area land-use and background features within the ASA that are of interest to define the acoustical environment of the Facility.

### 2.3.1 Local Industrial Sites

Manheim Oshawa Auctions and Copart Auto Auction operate existing car salvage and auction facilities adjacent to the Facility (i.e., within 300 m) to the north and east (see Figure 2-2). The Regional Municipality of Durham Courtice Water Pollution Control Plant is located to the southwest. The OPG Darlington Nuclear Generating Station is located further to the east from the Site.

### 2.3.2 Transportation Corridors

Several major transportation corridors are located in the ASA. The Site is bounded by Highway 401 and South Service Road to the north, Courtice Road to the west, and Osborne Road to the east. Road traffic from these sources plays a role in influencing the local ambient sound environment. A Canadian National Railway Company (CN) rail line runs northwest to southeast along the southern boundary of the Site.

### 2.3.3 Topography

The surrounding topography within the ASA is essentially flat, with generally decreasing elevation towards the Lake Ontario. There are no significant land formations in the area that would significantly affect noise propagation.


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# Acoustic Study Area

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- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site
- Acoustic Study Area
- Waterbody

0 100 200 300

Metres - 1:10,000

1009497-051

MB QC ON USA Area of Interest

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FIGURE NO.

2-2

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## 2.4 Analysis Approach

The methodology used throughout this Report is based on the MOE's guidelines and protocols for acoustic assessment. The preceding sections detail the background information necessary to assess the potential acoustical impact from the Facility.

In accordance with MOE guidelines, acoustical criteria are established based on a combination of the measurement of background sound levels and prescribed limits that are based on the avoidance of annoyance at noise-sensitive PORs.

The predicted Facility sound emissions were assessed using modelling techniques to determine if the acoustical criteria were met at critical PORs. The assessment was conducted for all phases of the Facility, including construction, operation and decommissioning.

Where appropriate, conceptual mitigation measures were applied to meet acoustical criteria. Final mitigation measures would be subject to the detailed design of the Facility and may change from the options presented in this Report.

## 2.5 Acoustic Impact Scenarios

In addition to the existing acoustical environment (i.e., Baseline), the analysis evaluates the activities of the Facility construction and operational periods.

Within the construction and operational periods, different acoustical scenarios were considered. Although all scenarios were identified and evaluated, only those scenarios that would create a significant noise impact relative to other scenarios (i.e., worst-case environmental effects) were assessed quantitatively through acoustical modelling. Other less significant scenarios were evaluated qualitatively.

The modelling scenarios considered in the acoustical assessment are:

- Baseline (i.e., existing acoustic environment);
- Construction Case (site preparation, assembly, post-closure, and future expansion); and,
- Operations Case (both the 140,000 tpy and 400,000 tpy scenarios).

### 2.5.1 Baseline

The Baseline conditions detail the existing acoustical environment (i.e., industrial, transportation, and natural sounds) based on observations, local land-use, and ambient noise monitoring.

The development of the applicable noise criteria was based on these baseline conditions in accordance with applicable MOE noise guidelines. Ambient monitoring data was used to evaluate potential effects that may result from the construction and operational period activities.

### 2.5.2 Construction Case

Construction activities at the Site would include land preparation, structural assembly, and commissioning. The acoustic analyses evaluate the main phases of the Site development, including:

- Site preparation and grading;
- Structural and process buildings assembly; and,
- Commissioning activities.

It is expected that the Site preparation and structural phases would be approximately 30 months, which thereby classifies them as long duration construction operations according to HC guidelines. However, individual parts of the work would be shorter in duration. For example, the Site preparation may be about two months, pile driving for the building foundation would likely be less than a month (if required), and paving about a week, so the noise level would not be at the maximum for an extended period of time.

Detailed noise modelling was conducted for the construction phase, while the commissioning phase associated with the Facility construction was dealt with qualitatively. The construction phase was predicted to appropriately quantify the effects of ongoing, daily construction activities at the Facility (i.e., site preparation) and the effects associated with more significant, short-term noise sources (i.e., structural). Noise associated with the commissioning activities would be of shorter duration, and would be quieter on an ongoing basis. Hence, the commissioning activities would have less effect on overall noise levels as compared to the site preparation and structural activities. Some loud short-term (e.g., less than 15-minute) events are possible during the commissioning activities, but their short duration could make them less significant over the longer-term periods used to assess noise (e.g., 1 hour or 24-hour periods). The potential effects from these events could be addressed through construction monitoring and abatement programs (See Section 7).

The construction activities during the 400,000 tpy scenario would include similar process but in significantly smaller scale. Therefore, the construction of the Facility for the 140,000 tpy scenario with all administrative and supporting buildings was considered as the worst case, and no modelling was performed for 400,000 tpy scenario. However, it was assessed qualitatively.

### 2.5.3 Operations Case

The Operations Case presents the results of the acoustic assessment that was conducted for the Facility's operational noise emissions, both the 140,000 tpy and 400,000 tpy scenarios, to assess compliance with corresponding noise regulations and guidelines at nearby noise-sensitive Points of Reception. The potential effects due to operations are evaluated for the entire Facility. Cumulative effects of the Facility are addressed qualitatively as part of the Operations Case.

## 2.6 Acoustic Modelling

With the exception of offsite traffic, all acoustical modelling of the Facility was based on the sound propagation algorithms described by the International Organization for Standardization (ISO) in their standard ISO 9613 (ISO 1993a,b). The acoustical calculations were performed using the software, CADNA/A by Datakustik Gmbh, that uses the ISO 9613 algorithms.

Acoustical modelling of offsite traffic impacts during the construction phase was performed using the MOE's STAMSON computer model (see Section 2.6.2).

### 2.6.1 Facility Modelling

The CADNA/A acoustical model considers the effects of:

- source sound power spectra;
- source directivity and orientation;
- distance attenuation;
- building and obstacle screening;
- ground attenuation;
- atmospheric attenuation; and,
- meteorological effects.

Several of these parameters are discussed further in the following sections. Source specific information (e.g., power spectra, directivity, and screening) is provided in Section 3.0.

#### *Topography*

Topography is not expected to have a significant effect on the assessment because the ASA is relatively flat with no significant land formations.

#### *Ground Type*

The ISO 9613 algorithms consider the effects of ground attenuation by consideration of the sound absorptive qualities of the ground over which the sound of interest travels. These effects are described by a parameter ranging from 0.0 (i.e., perfectly reflective) to 1.0 (i.e., perfectly absorptive). Foliage such as grass tends to have more absorptive characteristics (i.e., closer to 1.0) than acoustically hard surfaces such as water or concrete.

For the purposes of this assessment, the offsite ground was considered to have a mostly absorptive character (0.8) on average. Ground types within the Facility were modelled as semi-reflective (0.5).

#### *Meteorology*

Meteorological parameters can influence the effects of sound propagation in the atmosphere. For example, winds can produce a wide variation in the sound levels at a receptor compared to calm wind conditions. Receptors downwind of a noise source tend to experience elevated contributions from the source relative to calm conditions, while those upwind tend to experience less contribution. Crosswinds result in propagation conditions that are essentially the same as calm conditions.

Typical Ontario meteorological values were used to initialize several parameters in the model. These included a temperature of 10°C and a relative humidity of 70%. These parameters are representative of typical spring, summer and fall conditions when most outdoor activity may occur at receptors.

### 2.6.2 Traffic Modelling

Increases in offsite traffic volumes due to the Facility could influence local noise levels and sound emissions. These potential effects were assessed based on the construction period of the Facility when vehicle traffic, particularly trucks, to and from the Site would be at a peak. Changes to offsite traffic volumes during Facility operations are expected to be less significant due to the reduced number of trucks and workers. Traffic noise levels were estimated using the MOE STAMSON model, which is a computerised implementation of the MOE's *Ontario Road Noise Analysis Method for Environment and Transportation* (ORNAMENT) and *Sound from Trains Environmental Analysis Method* (STEAM) methodologies (MOE 1988, 1990).

STAMSON estimates traffic noise levels for roads that are within 500 m of receptors accounting for:

- traffic volumes;
- truck percentages;
- vehicle speed;
- road type;
- road-receptor geometry; and,
- topographical features.

Barriers and other mitigating factors (e.g., rows of houses or ground type) can also be considered by the model.

It is assumed that the baseline traffic impact is included in the ambient noise monitoring conducted in the ASA, which would account for traffic noise impact from surrounding roads, including Highway 401.

Construction traffic associated with the Facility was estimated based on the Facility design. This scenario included:

- Estimated 200 offsite workers (the worst-case scenario) attending the Site on a daily basis via two roads:
  - South Service Road; and,
  - Osborne Road.
- Approximately 40 trucks per day (the worst-case scenario), attending the Site via the main entrance at Osborne Road;
- Osborne Road is used as the main route for construction truck traffic.

The level of offsite traffic considered in this scenario is expected to be at or near the functional capacity of the area road networks; hence it represents a reasonable worst-case scenario for acoustical purposes since major changes to area roads are not anticipated. Various traffic mitigation strategies could be considered to allow the road network to accommodate the required level of offsite traffic.

STAMSON requires minimum vehicle volumes of 40 vehicles per hour and road to receptor distances of less than 500 m. In this case, volumes or distances were adjusted where these limits were reached to ensure all appropriate road contributions were included.

Critical receptors along affected area roads surrounding the Facility were evaluated for the change between a future no-build scenario (i.e., without construction traffic) and a future build scenario (i.e., with construction traffic). The results of the modelling are discussed in Section 6.1.5.

### 2.6.3 Points of Reception

Critical PORs within the ASA in each main compass direction were evaluated for inclusion in the modelling. The PORs were identified from Site plans, zoning maps, and aerial photos to form a receptor list which was confirmed during Site visits to the area.

A total of 53 different land users are located in the ASA, but only residential and farm houses are considered as critical receptors for detail modelling purpose. Among all, three receptors are considered representative. They are listed in Table 2-1 and shown on Figure 2-3.

**Table 2-1 Modelled Receptors**

| Receptor ID | Receptor Description | Facility Receptor | Traffic Receptor |
|---|---|---|---|
| POR01 | Courtice Road | X | X |
| POR02 | 255 Osborne Road | X | X |
| POR03 | 1797 Baseline Road | X | X |

Referring to Figure 2-3, two residential receptors are located to the west (i.e., POR1) and east (i.e., POR2) of the Site, which encompass the limiting receptors for potential noise impacts. The other residential receptor is located to the north of the Site and Highway 401 (i.e., POR3). Predicted sound levels at other receptors can be assessed based on the noise contour plots provided in the analysis.

No receptors of interest are located to the south of the Site since these areas are all designated industrial lands.

## 2.7 Environmental Noise Descriptors

Environmental noise deals with the propagation of sound in the outdoor environment, and thus it is subject to the effects of atmospheric conditions as well as the varying character and level of sounds that occur in nature. Environmental noise encompasses the impact of sound on the environment and the impact of the environment on sound.

The energy equivalent sound level ($L_{eq}$) is the parameter most often used to represent the time-varying aspects of environmental noise. It has been shown to be a good, single number descriptor of the annoyance of noise. The $L_{eq}$ is the energy-averaged sound level for a specified time period. It is defined as the equivalent steady, continuous level that has the same acoustical energy as the actual time-varying sound levels for a specified period of time. The $L_{eq}$ is expressed in A-weighted decibels (dBA) which represents the response of the human ear to different frequencies of sound. A 1-hour $L_{eq}$ would be denoted as $L_{eq}(1)$ and would be expressed in dBA.

A statistical parameter known as the $L_X$ is also used to assess the influence of noise, where X is a percentile. The $L_X$ is defined as the root-mean-square sound level that is exceeded X% of the time in a particular interval. The $L_{90}$ commonly represents the background sound level in a measurement. The $L_1$ and $L_{10}$ represent the effects of more spurious noise events (e.g., barking dogs or vehicle pass-bys). A $L_{eq}$ for ambient sounds commonly tracks between the $L_{50}$ and the $L_{10}$.

In Ontario, most noise criteria are defined on a one-hour time period. The MOE provides for daytime (i.e., 07:00h to 19:00h), evening (i.e., 19:00h to 23:00h), and nighttime (i.e., 23:00h to 07:00h) periods for assessment purposes.

At the federal level, Health Canada guidelines are based on a 24-hour $L_{eq}$ or variant known as the day-night sound level (DNL or $L_{dn}$). The DNL is defined by $L_d$, or the $L_{eq}$ during the 16 daytime hours from 07:00h to 23:00h, and by $L_n$, or the $L_{eq}$ during the eight nighttime hours of 23:00h to 07:00h. Since noise is more disturbing to residents at night, a +10 dB penalty is applied to the $L_n$ nighttime level. The two values are then combined as a weighted logarithmic average to give the DNL.

YORK REGION AND DURHAM REGION
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# Points of Reception Surrounding the Site




- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site

0 50 100 150

Metres - 1:5,000

1009497-052


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FIGURE NO.

2-3

Last Modified: May 6, 2009 By: S.Allen

# 3.0 NOISE SOURCE SUMMARY

The main noise sources related to the Facility were identified by JWSL personnel through a review of the Facility layouts, and equipment inventories provided by the Regions for the Facility. The sound data is based on normal equipment operating conditions. A summary of the noise source inventory used in this acoustic analysis, description of the various operations and processes that may generate significant noise levels, applicable sound quality adjustments, and data uncertainty are all included in this section.

## 3.1 Source Overview

The construction activities and operations for the Facility are expected to produce noise and vibration emissions typical for this type of operation. Large earth moving machines, digging, and limited pile driving activities are anticipated for the main construction works, and large industrial grade pumps, fans, compressors, turbine, furnaces, material transport, and a flue stack (among other source types) are anticipated for the operations at the Facility. The following inventory and discussion focuses on quantifying the significant sources of interest, and qualitatively describing the insignificant sources of noise, in accordance with applicable MOE noise guidelines.

## 3.2 Sound Power Levels

Source sound power level spectra (i.e., by octave band) used in the modelling were derived from the following data sources in this preferential order:

- Historical data from previous studies for similar equipment;
- Manufacturer's specifications;
- Analytical tools to predict source levels; and,
- Published data sources.

A summary of the significant noise sources used in modelling and their relevant characteristics is included in Table 3-1. Detailed source parameters are provided in **Appendix C**. The PWLs presented are estimated levels for each piece of equipment. The table also presents the noise source descriptions, total PWLs, locations within the Facility, and sound characteristics. All sources are assumed to be installed or radiating the sound outdoors, a conservative assumption.

**Table 3-1 Operational Noise Source Summary (Typical Noise Sources)**

| Source ID | Source Description | Overall Sound Power Level (dBA)[1] | Source Location[2] | Sound Characteristic[3] |
|---|---|---|---|---|
| BPG | Back-up Power Generator | 126[4] | O | T |
| FP | Fire Pump | 121[4] | I | T |
| EF | Miscellaneous Fans | 115 | I | S |
| SSB | Steam Soot Blower | 115 | I | S |
| AGSF | Acid Gas Scrubbing Fan | 112 | I | S |
| TG | Turbine/Generator | 110 | I | T |
| ACom | Air Compressor | 103 | O | S |
| TRon | Truck traffic onsite | 93 | O | S |
| ID | ID Fan | 92 | I | S |
| TRAN | Transformer | 92 | O | B |
| AC | Office Comfort Equipment | 85 | O | S |
| ACC | Air Cooled Condenser | 78 | O | S |
| BFP | Boiler Feed Pump | 75 | I | S |
| CP | Condensate Pump | 75 | I | S |
| CWP | Circulating Water Pump | 75 | I | B |
| ACWP | Auxiliary Cooling Water Pump | 75 | I | S |
| OP | Other Pumps | 75 | I | S |

**Notes:**

1. Estimated sound power level of source in dBA, including sound characteristic adjustments per NPC-104.
2. All sources are assumed to be outside. Specific noise control measures have not been adopted at this stage in the design. See discussion for operational unit and facility details.
3. Sound characteristic, per MOE NPC-104:

   S = Steady T = Tonal B = Buzzing C = Cyclical Q = Quasi-steady Impulsive I = Impulsive
4. Sources sound level before noise mitigation measures (supplier-published data). Modelling accounted for 20 dB reduction for each source (assumed that standard muffler will be supplied with each unit).
5. Typical noise sources are presented, but multiple sources and different arrangements are modelled for each of the 140,000 tpy and 400,000 tpy scenario Facility.

## 3.3 Sound Quality Adjustments

Some noise sources may exhibit characteristics that are typically more annoying or intrusive for receptors.

Where appropriate, adjustments were made in the modelling of these source levels to reflect such effects, including intermittency and sound character (e.g., tonality, buzzing, or screeching).

The above adjustments were made in accordance with the requirements of MOE publication *NPC-104 – Sound Level Adjustments* (MOE 1978c). For instance, a 5 dB penalty was applied to sources that are tonal (i.e., have a distinct frequency). Based on similar equipment and published references, penalties were applied to:

- compressors (tonal);
- large pumps (tonal);
- turbine intakes (tonal); and,
- transformers (buzzing).

## 3.4 Uncertainties in Source Levels

The actual equipment and process sound power emissions may be subject to site-specific installations and unique acoustical effects. These conditions present a level of uncertainty for the fully commissioned operations. This acoustical assessment uses conservative estimates for the uncertainties detailed in the subsections below.

### 3.4.1 Mitigation

According to the initial design scenario there will be one emergency diesel generator and one diesel fire pump engine for the 140,000 tpy scenario. Similarly, there will be two emergency diesel generators and two diesel fire pump engines for 400,000 tpy scenario. For the purpose of this assessment, it was assumed that they will be equipped with the acoustical muffler providing at least 20 dB noise reduction. Additional unique noise source mitigation other than the recommendations presented in Section 8.2 has not been included in the acoustic modelling.

### 3.4.2 Shielding

The Facility includes various buildings and support structures. These surfaces provide a varying degree of acoustical shielding, where the line-of-sight between the sound source(s) and various points of reception may be blocked. These features have been included in the acoustical modelling.

### 3.4.3 Directivity

Many stacks and fan discharges are expected to be pointing directly upward (i.e., approximately 90-degrees relative to the points of reception), which may provide a potentially beneficial acoustical effect by directing the sound energy away from a receptor. Furthermore, actual equipment orientation may result in 'noisy' or dominant surfaces being pointed away from the critical points of reception. As specific equipment layout and orientation details were not available for this assessment, ideal spherical or omni-directional sound spreading was assumed for all noise point sources.

### 3.4.4 Duty Cycle

Continuous operation was assumed for the equipment and processes within the acoustic models. Therefore, the acoustic duty cycle used in the analysis is 100%. As a percentage of a typical hour, some noise sources may be less than this full duty cycle for particular construction equipment. If the duty cycle is significantly less than 100%, this may result in a reduction in the hourly $L_{eq}$ noise emissions. For example:

- 50% duty cycle (i.e., 30 minute operation) = 3 dB reduction;
- 25% duty cycle (i.e., 15 minute operation) = 6 dB reduction;
- 8% duty cycle (i.e., 5 minute operation) = 11 dB reduction; and,
- 2% duty cycle (i.e., 1 minute operation) = 18 dB reduction.

## 3.5 Construction

The Construction Case acoustic modelling considers three phases of work; site preparation, structural assembly, and commissioning. Commissioning activities are addressed qualitatively. Each of the modelled phases may contain unique noise source emissions. Table 3-2 summarises the sources that were used in modelling each of the construction scenarios. The PWLs presented are estimated levels for each piece of equipment and do not reflect performance specifications. All construction equipment is expected to meet the source sound emission requirements of NPC-115 (MOE 1978d). All noise sources are assumed to be steady, with the exception of the pile driving which is considered an impulsive noise (if required at this Site). Also, two other potentially significant sources of noise during construction are blowing of steam lines and venting at high pressure. They are short in duration and their occurrence could be controlled trough impact mitigation plan.

**Table 3-2 Construction Noise Source Summary**

| Construction Phase | Number of Sources | Source Description | Overall Sound Power Level (dBA) | Typical Source Height (m) |
|---|---|---|---|---|
| Site Preparation | 1 | Heavy Truck (e.g., Caterpillar model-777) | 111 | 4 |
| | 2 | Medium truck | 108 | 3 |
| | 2 | Front End Loader | 112 | 2 |
| | 1 | Backhoe | 106 | 3 |
| | 1 | Bulldozer (e.g., Caterpillar D7) | 110 | 3 |
| | 1 | Excavator | 113 | 4 |
| | 2 | Land Grader | 115 | 3 |
| | 1 | Pneumatic Pile Driver | 134 | 3 |
| Structural Assembly | 1 | Heavy Truck (e.g., Caterpillar model-777) | 111 | 4 |
| | 1 | Front End Loader | 112 | 2 |
| | 1 | Back Hoe | 106 | 3 |
| | 1 | Excavator | 113 | 4 |
| | 1 | Land Grader | 115 | 3 |
| | 1 | Concrete Ready Mix Truck, high idling | 111 | 2.5 |
| | 1 | Concrete Vibrator | 108 | 2 |
| | 1 | Air Compressor | 111 | 1 |
| | 1 | Asphalt Paver | 109 | 2.5 |
| | 1 | Welding Compressor | 110 | 1 |

### *Earthmovers*

Large earthmovers are expected throughout the Site during the initial site preparation work. Large earthmoving machines were assumed in the modelling at representative locations dispersed throughout the Site.

### *Bulldozers*

It is expected that a standard bulldozer would be used in the preparation of the Site. This machine would support the larger earthmover in land preparation activities. One bulldozer was assumed in the modelling at a representative location.

### *Dump Trucks*

Various dump trucks are expected to be present at the Site for the haulage of materials within the Site and for transport offsite. Heavy trucks (e.g., for highway transport) are also expected to be present at the Site during the construction phase. These sources were dispersed throughout the Site at representative locations for modelling purposes.

*Pile Driving (if required)*

Pile driving requirements would be determined by contractor, but was assumed that this activity would occur in this Report. One pile driving source is included in the modelling at representative location on the Site. In the modelling, the pile driving source is located in the centre of the proposed building structures.

## 3.6 Operations

The Facility would include several significant noise emission sources. Noise emissions have been characterized using the source data presented in Table 3-1 for the equipment outlined in the preliminary design documents for the Facility. Facility operations would include a variety of pumps, compressors, turbine, boilers, condenser, a back-up power generator, and ID and process fans. The following sections highlight noise emissions and effects for sources of interest and related activities considered in the acoustic modelling. For a detailed inventory (i.e., type and quantity of noise sources) for each unit and area considered in the modelling, please refer to **Appendix C**.

The proposed flue stack is expected to generate significant noise emissions since most of the emissions from boilers, scrubbers, and ID fans are associated with the stack. The source levels used to model stack emissions are conservatively based on a worst-case condition where all fans operate at the same time and exhaust through the stack simultaneously. In order to support the 400,000 tpy scenario, there will be the second flue stack associated with additional buildings and processes, as well as some additional emissions to the existing stack.

The noise contribution of the proposed emergency back-up generator and fire pump engine were evaluated during testing periods, which are assumed to be during the daytime. According to the MOE noise guidelines, the emergency equipment does not need to be evaluated for its emergency operation, but is generally assessed for compliance during testing and maintenance periods.

Truck garbage collection shipping activity is expected to be scheduled from Monday to Friday, but some refuse may be shipped in on occasion on Saturday. Ash removal trucks and employee's vehicles would operate over the weekend as well. It was estimated that there would be about 25 collection trucks, 9 additional trucks ash removal, chemical supply, ferrous and non-ferrous trucks, and 33 employee vehicles per day. The collection trucks would discharge indoors, without excessive noise, including backup beepers.

The boiler and air pollution control buildings are designed to be under negative pressure, so the noise levels from the building openings would be at a minimum. However, the proposed significant noise sources inside the building were evaluated and their contribution to the outside environment was included.

Truck movements and idling activity have been included in the modelling. These truck emissions were presented as a line source stretching out from the main shipping gate area adjacent to the Osborne Road to the tipping building, and back.

### 3.7 Minor Sources

The objective of the acoustical modelling is to capture the major acoustically-significant sources. As found in all large industrial operations, there are numerous minor noise sources related to the Facility such as small trucks, forklifts, standby equipment, and small fans or pumps. These sources are typically excluded from the analysis where their number and size are sufficiently small to render them acoustically insignificant.

At this stage in the design process, the number and nature of these smaller noise sources are not known. In any case, the contribution of these smaller sources is expected to be insignificant due to the setback distances involved between the process areas and the closest receptors.

## 4.0 DESCRIPTION OF EXISTING CONDITIONS

The existing acoustical environment surrounding the Facility is outlined in the following sections. An ambient monitoring program was conducted throughout the ASA near the critical PORs to assess the existing sound levels related to the Facility. The results of this program were used to define the applicable noise criteria (see Section 5.0) pursuant to applicable MOE guidelines (MOE 1995a, MOE 1995b).

### 4.1 Ambient Monitoring Program

The ambient sound monitoring program was designed to gauge the ambient sound levels in the vicinity of the Facility.

Ambient monitoring was conducted at two locations near the Facility. Monitoring locations were chosen to be representative of the sensitive receptors, with consideration for Site access, sound meter security, and proximity to spurious sources (e.g., barking dogs). The location selection is discussed further below (see Section 4.3).

Monitoring at each location ranged from eight to twelve days and captured a minimum of one weekend period. Sound levels and statistics were logged continuously on an hourly basis, 24 hours per day. The collected data was post-processed to omit periods of rainfall, excursions outside instrument specifications for wind (i.e., more than 25 km/h for 40 dBA and under per the instrument specifications in **Appendix D**) or humidity (more than 95%), and spurious noise events (e.g., trains or thunder) in accordance with MOE procedures (MOE 1978a; MOE 1978b). Graphs of the measurement data for each location are included in **Appendix E**. Figure 4-1 shows an example graph for running $L_{eq}$(1).

### 4.2 Instrumentation

The measurements were conducted using three Larson Davis model 820 combination Type 1 precision integrating sound level meters and statistical data loggers. All of the meters were outfitted with environmental noise protection (see Figure 4-2) that includes bird spikes and wind screens to prevent bias due to wind currents and to give protection to the microphones.

The model 820 is capable of logging the time history of a variety of parameters and statistics over user-defined intervals. Additional details on this instrument can be found in **Appendix D**. All equipment meets MOE requirements (MOE 1978a). The specific units used are outlined below:

- LD 820 #1 (serial no. 1282) with model PRM828 pre-amp, ½-inch ANSI Type 1 microphone (serial no. 3397), and CAL200 acoustical calibrator (serial no. 4094); and,
- LD 820 #2 (serial no. 1445) with model PRM828 pre-amp, ½-inch ANSI Type 1 microphone (serial no. 2313), and CAL200 acoustical calibrator (serial no. 5044).

**Figure 4-1 Example of Ambient Monitoring Results**

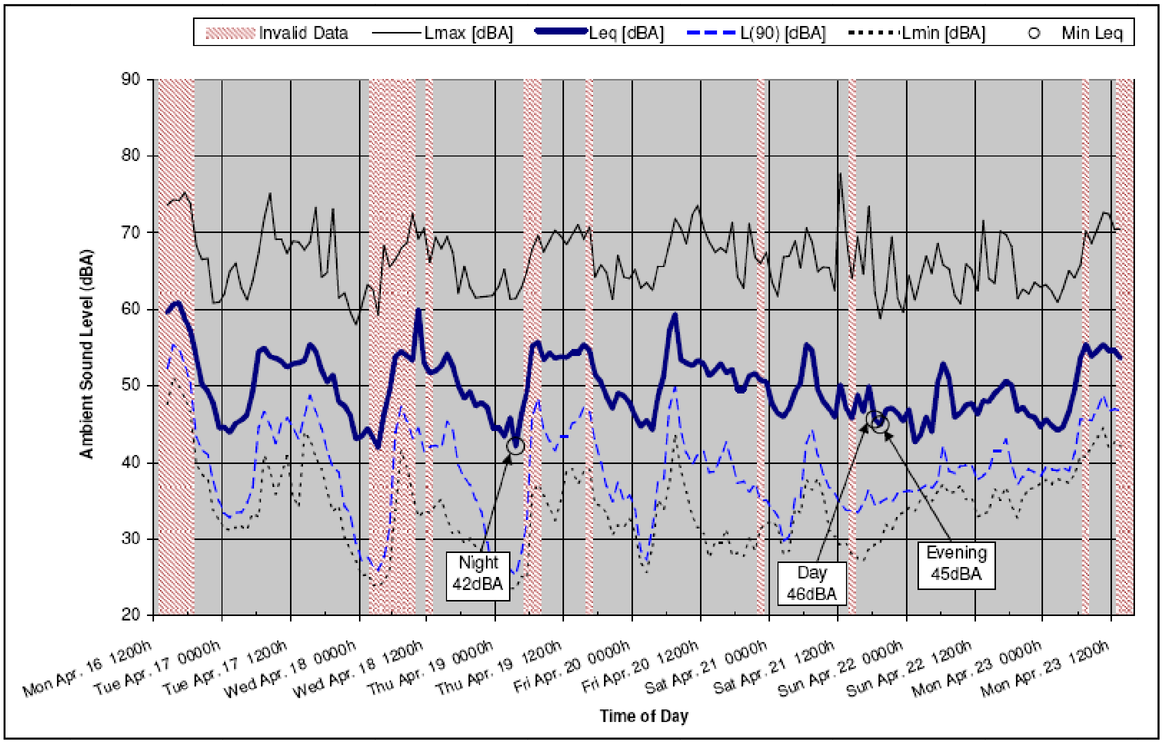


**Figure 4-2 Ambient Sound Level Meter Set-Up**

Measurement procedures required by the MOE were followed in all cases (MOE 1978b). The meters were laboratory-calibrated within two years of use and field-calibrated before and after each deployment using a Larson Davis CAL200 acoustical calibrator. No calibration drift of concern was observed for any of the measurement periods. The typical sound level meter set-up is shown in Figure 4-2. The microphone was mounted on a tripod to provide consistency in the height of measurement throughout this assessment.

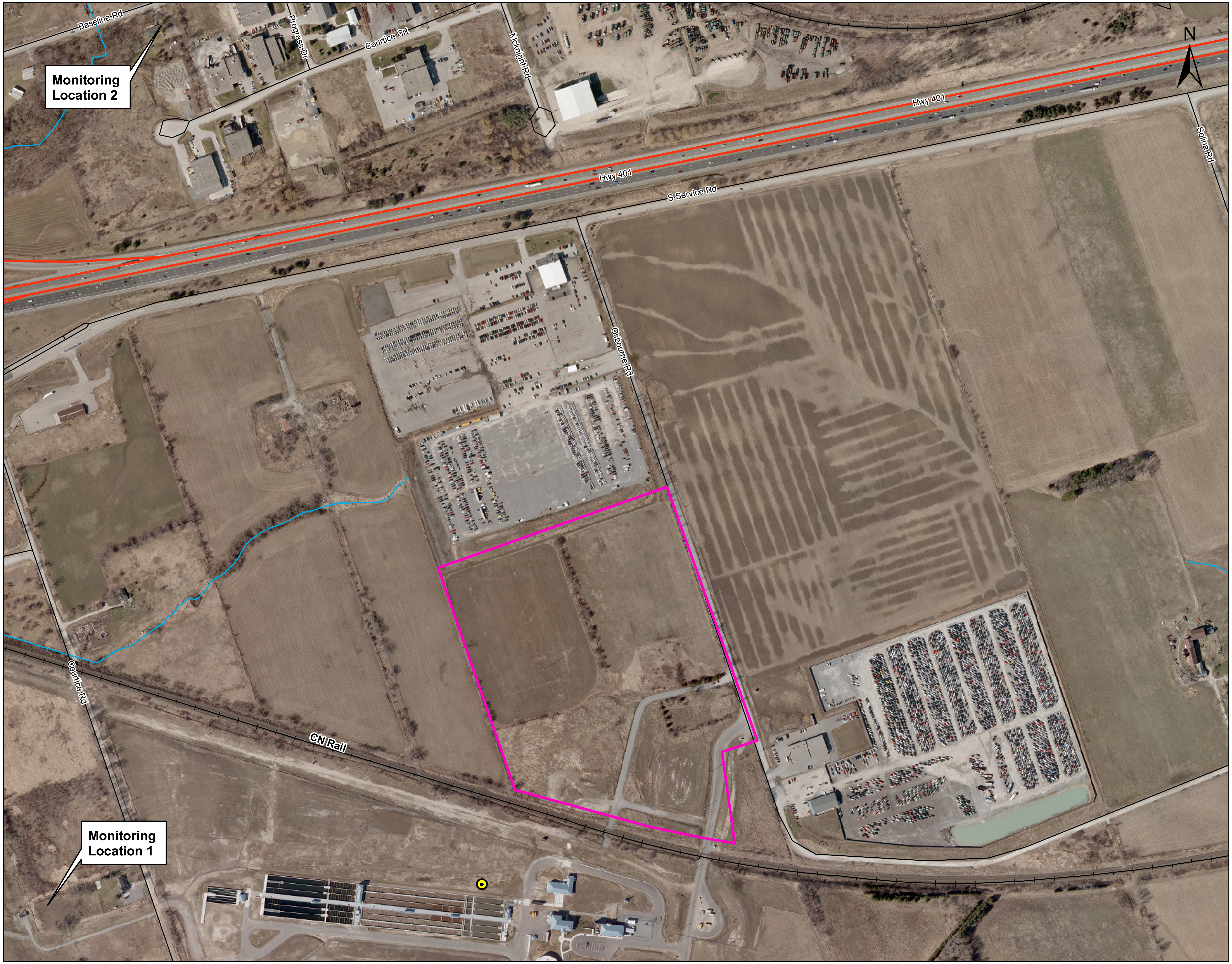
## 4.3 Monitoring Locations

The following sections describe the measurement locations used in the ambient monitoring program and the rationale for their selection. Monitoring locations were chosen to be representative of noise-sensitive receptors, with consideration for site access, sound meter security, and proximity to spurious sources (e.g., barking dogs).

Two monitoring locations were chosen to assess the ambient sound levels around the Site. These locations are shown on Figure 4-3. The monitoring results are included in Section 4.4.

Location 1 was chosen to assess the ambient noise experienced by those receptors west of the Site along the Courtice Road. Location 1 would capture sound from Courtice Road in addition to road traffic from Highway 401.

Location 2, which is located further north of Highway 401 along Baseline Road, is representative of residences north and south of Highway 401. This monitor was positioned back from the Highway 401 to approximate the setbacks of residences in the area.




YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Project Ambient Monitoring Locations

*Produced by Jacques Whitford under Licence with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2004-2008*

- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site

0 50 100 150

Metres - 1:5,000

1009497-053


Jacques Whitford

FIGURE NO.

4-3

Last Modified: May 6, 2009 By: S.Allen

## 4.4 Results

Observations at the monitoring locations indicated that the ambient sound environment is dominated by:

- Traffic noise (e.g., Highway 401, Courtice Road);
- The sounds of nature (e.g., birds, insects, rustling trees and grasses); and,
- Local industry.

In particular, Location 1 was dominated by vehicle traffic noise on area roadways; however the sounds of nature were also prominent. Noise from nearby industries and Highway 401 contributed to the ambient noise levels at Locations 2.

The minimum one-hour $L_{eq}$(1) and $L_{90}$ results for each location are displayed in Table 4-1 for various time periods. Graphs of the measured ambient sound levels are contained in **Appendix E**.

**Table 4-1 Ambient Monitoring Results**

| Loc. | Description | Measurement Period | Minimum Sound Level Measured On | 1-Hour Minimum Measured Ambient Sound Level | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Day (07:00h-19:00h) | | Evening (19:00h-23:00h) | | Night (23:00h-07:00h) | |
| | | | | Leq(1) [dBA] | L90 [dBA] | Leq(1) [dBA] | L90 [dBA] | Leq(1) [dBA] | L90 [dBA] |
| 1 | Courtice Road | Mon. Oct. 20 - Tue. Oct. 28 | Fri. Oct. 24, 4:00 a.m. | 48 | 45 | 52 | 46 | 47 | 44 |
| 2 | Baseline Road | Fri. Nov. 28 – Tue. Oct. 28 | Mon. Nov. 30, 3:00 a.m. | 51 | 46 | 45 | 40 | 38 | 31 |

# 5.0 ACOUSTIC ASSESSMENT CRITERIA

As outlined in Section 2.0, the Acoustical Assessment of the Facility was conducted in accordance with Ontario MOE guidelines and noise criteria. Federal and municipal guidelines were also considered where applicable.

## 5.1 Ontario MOE

As outlined in Section 2.1, the MOE's Acoustic Assessment procedures and guidelines were used to assess the potential acoustical effects from the Facility. The MOE's NPC series of documents formed the basis of the criteria development (MOE 1978a, 1978b, 1978c, 1978d, 1995a, 1995b).

The ambient sound level measurements conducted as part of the assessment (Section 4.0) were used with the MOE guidelines to determine the applicable noise limits (Section 5.1.4).

### 5.1.1 Receptor Classification

The MOE identifies three classes of receptors based on the existing ambient sound environment:

- Class 1 (i.e., urban): Sound environment typical of a major population centre (e.g., downtown Toronto) that is dominated by the urban hum;
- Class 2 (i.e., suburban): Sound environment with qualities of both Class 1 and 3 areas where the urban hum is often absent in the evening (i.e., 19:00h to 23:00h) and low ambient sound levels can occur as early as 19:00h; and,
- Class 3 (i.e., rural): Sound environment characteristic of a rural or wilderness area with little to no road traffic and a small population.

In addition to ambient measurements, features such as existing traffic levels, human activity, local land-use, and setback distances are used to categorise receptors according to the MOE classes. The receptors were categorized according to MOE NPC-205/232 guidelines (MOE 1995a, MOE 1995b).

Receptors around the Facility were all assessed as Class 2 based on the surrounding land-use, level of activity and traffic during the daytime, and the decrease in activity and traffic during the evening hours. Most receptors are residential homes or apartments typical of family dwellings. Ambient measurements at selected receptors in the area confirmed that sound levels were typical of Class 2 areas (see Section 4.0).

### 5.1.2 Class 1 & 2 Guideline Limits

The MOE Class 1 & 2 guidelines outlined in document NPC-205 require that the one-hour $L_{eq}(1)$ from proposed stationary noise sources should not exceed the lowest background sound levels at a noise-sensitive location, where the background is caused by sources other than those under assessment (e.g., road traffic, other noise compliant industries, and the sounds of nature). This requirement is based on the premise that source-generated noise is generally noticeable and considered annoying when it exceeds the “background” or ambient noise levels at a particular location.

NPC-205 also includes minimum exclusionary noise criteria for stationary sources, which are the lowest levels that stationary noise sources must achieve to meet the guideline. The applicable Class 2 noise limits are:

- The higher of the existing ambient or 50 dBA in any hour during the daytime period (i.e., 07:00h to 19:00h);
- The higher of the existing ambient or 45 dBA in any hour during the evening period (i.e., 19:00h to 23:00h); and,
- The higher of the existing ambient or 45 dBA in any hour during the nighttime period (i.e., 23:00h to 07:00h).

### 5.1.3 Applicable Sound Level Criteria

The applicable criteria for the Acoustic Assessment were determined based on measured ambient data as well as the application of the MOE exclusionary limits (see Sections 5.1.2 and 5.1.3). Table 5-1 illustrates the classification of each noise monitoring station and the resulting applicable sound level criteria.

**Table 5-1 Applicable Sound Level Criteria**

| Location | MOE NPC-205 Class (1) | Applicable Receptors (PORs) | 1-Hour Minimum Measured Ambient Sound Level (2,3) | | MOE Exclusionary Limits (3,4) | | Applicable 1-Hour Noise Limit (3,5) | |
|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening/ Night | Day | Evening/ Night | Day | Evening/ Night |
| | | | $L_{eq}(1)$ [dBA] | $L_{eq}(1)$ [dBA] | $L_{eq}(1)$ [dBA] | $L_{eq}(1)$ [dBA] | $L_{eq}(1)$ [dBA] | $L_{90}+10$ [dBA] |
| 1 | 2 | POR1 | 48 | 47 | 50 | 45 | 50 | 47 |
| 2 | 2 | POR2 | 48 | 47 | 50 | 45 | 50 | 47 |
| 3 | 2 | POR3 | 51 | 38 | 50 | 45 | 51 | 45 |

**Notes:**

- Receptors were considered Class 2 areas since their ambient sound environment was dominated by the influence of Highway 401 vehicle traffic, and nearby industry.
- All Leq are expressed as 1-hour equivalent sound exposure levels in dBA (i.e., Leq(1)). Similarly, all L90 values are the 1-hour averaged sound level exceeded 90% of the time.
- Daytime hours are defined as 07:00h to 19:00h, and evening / night hours are defined as 19:00h to 07:00h, per MOE guidelines.
- The MOE exclusionary criteria for Class 2 (i.e., suburban) areas are 50 dBA during the day and 45 dBA during the evening/night per MOE NPC-205 guidelines.
- For Class 2, the applicable criteria are the higher of the existing minimum ambient levels, or the exclusionary criteria. For Class 2 areas, the ambient levels are expressed as 1-hour equivalent sound levels (Leq(1)).

## 5.2 Ontario Ministry of Transportation

The Ontario Ministry of Transportation (MTO) Environmental Guide for Noise (MTO 2006) outlines the applicable procedures and criteria for assessing the influence of noise due to roadway traffic. It notes that mitigation investigation is not necessary where roadway modifications (e.g., expansions or improvements) result in sound levels at PORs that:

- change less than 5 dB from the ambient; and,
- are less than an absolute level of 65 dBA.

Where predicted roadway noise levels are equal to or greater than these criteria, right-of-way noise controls should be considered. Such controls could include right-of-way barriers, road re-alignment, or changes to the road surface.

These MTO criteria are used to evaluate the changes to offsite traffic volumes on local roads due to the Facility that have the potential to affect nearby PORs.

## 5.3 Health Canada

The federal noise guideline criteria for this type of Facility are outlined by HC (Health Canada 2005). These draft guidelines are largely based on methods employed by the U.S. Environmental Protection Agency and address overall absolute limits as well as the potential change in the fraction of people that would be highly annoyed (i.e., percent highly annoyed). The guidelines consider both construction and operational development. In this case, the evaluation of construction noise was based on an assumed duration of two years or more.

The HC guidelines suggests that all baseline noise assessments and project-related noise emissions be evaluated in terms of the $L_{dn}$ and the $L_{eq}(24)$ descriptors (see Section 2.7 for details). Since the MOE criteria are based on shorter durations and tend to be more stringent, the federal guidelines are expected to be achieved whenever the MOE criteria are achieved.

The federal criteria are as follows:

- Maximum Allowed Increase in % Highly Annoyed (between build / no-build case; for both the Construction and Operations Cases) = 6.5%; and,
- Maximum Overall Level (with character adjustments) = 75 dBA.

In accordance with ISO 1996 (ISO 2003a, 2007), the sound character adjustments address both unwanted impulsive and tonal effects. These adjustments correspond to a 12 dB and 6 dB level change (i.e., sound quality penalty) for highly impulsive and prominent tonal noises, respectively.

## 5.4 Municipal Noise By-Laws

Many municipalities employ noise by-laws to deal with industrial, residential, or construction noise. The Facility is located in Municipality of Clarington area and its noise by-law is applicable. It was reviewed for this Acoustical Assessment to provide context and guidance.

According to the Municipality of Clarington Noise By-Law (2007-071), "No person shall ring any bell blow or sound any horn or cause the same to be rung blown or sounded or shout or create cause or permit any unusual or excessive noises likely to disturb any other inhabitant of the Municipality of Clarington" (Section 1.1). The Noise By-law outlines specific areas that are hereby deemed to be noises likely to disturb the inhabitants, including:

> "The blowing of any steam or air whistle attached to or used in connection with any stationary boiler or other machine or mechanism, except for the purpose of giving notice to workmen of the time to commence or cease work or as a warning of danger" (Section 1.2(d)); and,
>
> "The noise made by the discharge into the open air of the exhaust of any steam engine, stationary internal combustion engine, motor vehicle or motorcycle except through a muffler or other device which effectively prevents loud or explosive noise" (Section 1.2(f)).

Further, "A noise curfew shall apply to any noise from any excavation or construction work whatsoever, including the erection, demolition, alteration or repair of any building: …arising between the hours of

11:00 pm until 7:00 am the following day, Monday through Saturday, 11:00 pm Saturday night until 10:00 am Sunday, and 5:00 pm Sunday until 7:00 am Monday morning" (Section 3.3(a)).

Also, "During the time when construction excavation or demolition work is permitted on Sunday as outlined in Section 3.3 above such work shall not include the operation of any mechanically powered excavation or earth moving equipment" (Section 3.4).

## 5.5 Human Perception of Loudness

Humans do not respond to a change in loudness in accordance with the loss of acoustical energy; typically a steady state 3 dB change is noticeable, but it may not be in highly variable acoustic environment. The human perception of a change in loudness is presented in Table 5-3 (U.S. EPA 1974). These values should not be considered criteria, but instead can be used to assess the significance of a change or difference beyond a criterion.

**Table 5-2 Human Perception of a Change in Loudness**

| Sound Level Change (dB) | Human Perception of Relative Loudness |
|---|---|
| 1 to 3 | Insignificant due to imperceptibility |
| 4 to 5 | Just noticeable |
| 6 to 9 | Marginally significant |
| 10 or more | Significant, perceived as a doubling (or halving) of sound exposure |

# 6.0 RESULTS OF ANALYSIS

In order to verify whether the Facility construction and operations satisfy the applicable MOE noise criteria, acoustical calculations were made for each of the Facility cases listed in Section 2.5. In order to predict the environmental noise impact at the PORs, noise propagation models were created based on the ISO 9613 standard (ISO 1993a,b). The ISO standard is based on a slight downwind/inversion condition and it has provisions for atmospheric absorption, directivity, barrier shielding, and ground effects. Vibration emissions are evaluated against ISO criteria and published research on the mechanisms of outdoor propagation and human perception levels. This section also includes an evaluation of the effects on wildlife, which experience a different response to noise from humans, including a discussion on some related background literature.

## 6.1 Potential Construction Effects

The estimated construction source levels meet the requirements of NPC-115 (MOE 1978d), which is expected since most modern construction equipment is appropriately designed and fitted with noise controls to limit noise emissions. As such, all Facility construction sources are expected to meet the noise emission limits set out in NPC-115 (MOE 1978d). Further, the majority of construction operations are expected to be carried out during daytime hours (i.e., 07:00 h to 19:00 h).

The MOE does not have receptor-specific noise criteria for construction activities. These activities are largely regulated at the municipal level, or can be assessed against federal guidelines. The MOE Class 1 criteria provide a useful basis of comparison for potential effects, particularly considering temporary nature and duration (i.e., one year of the construction period). The applicable Class 1 noise limits is the higher of the existing ambient or 50 dBA in any hour during the daytime period (i.e., 07:00h to 19:00h).

### 6.1.1 Site Preparation

This construction scenario considers the effects of noise from heavy equipment used to prepare the Site for construction. These operations would include activities such as clearing topsoil, re-distributing soil, and spreading aggregate. Earthmovers, bulldozers, excavators, and dump trucks would be expected to represent the majority of the noise sources during this construction phase. The sources were distributed in an arbitrary pattern throughout the Site for the purposes of assessing the overall offsite noise impact.

This scenario includes construction of the 140,000 tpy scenario Facility including supporting buildings and infrastructure, and it was considered as a worst-case scenario. Any other case and phase of the Site preparation would have fewer activities, and it was assumed that meeting a worst-case scenario would consequently meet other scenarios as well.

Noise contours developed for this construction scenario are included in **Appendix F**. Detailed modelling results are included in **Appendix G**.

#### *MOE Guidelines*

Table 6-1 shows the predicted sound levels from the Site preparation phase of construction. The predicted noise level at this receptor meets the target criterion. As such, it would not likely generate annoyance. An outline of the construction mitigation options, monitoring, and contingency plans is included in Section 7.0.

**Table 6-1 Comparison to MOE Guidelines (Facility for 140,000 tpy Scenario Site Preparation Phase)**

| Point of Reception ID | Point of Reception Description | Sound Level at Point of Reception [1] $L_{eq}(1)$ (dBA) | Verified by Acoustic Audit (Yes/No) | Daytime Target for Construction $L_{eq}(1)$ (dBA) | Meets Construction Target (Yes/No) |
|---|---|---|---|---|---|
| POR01 | Courtice Road | 50 | No | 50 | Yes |
| POR02 | 255 Osborne Road | 47 | No | 50 | Yes |
| POR03 | 1797 Baseline Road | 45 | No | 51 | Yes |

Notes: 1. Daytime operation of sources only; receptor height of 4.5 m.

### *Federal Guidelines*

The federal guideline criteria are outlined in Section 5.3. Table 6-2 summarizes the predicted noise levels for the Site preparation phase of construction. The analysis assumes that the Facility would not include nighttime construction activities. Daytime noise emissions represent a worst-case modelling scenario where all of the significant construction noise sources are in operation during the evaluation time period. Unless otherwise indicated, the $L_{eq}(24)$ is equivalent to the one-hour levels (i.e., $L_{eq}(1)$), as plotted on the noise contours in **Appendix F**.

No potential effects are predicted for this phase of construction at any time based on the federal guidelines.

**Table 6-2 Comparison to Federal Guidelines (Facility for 140,000 tpy Scenario Site Preparation)**

| POR ID | Baseline Case | | Baseline + Construction Case | | % Highly Annoyed | | | Meets Criterion# 1? | Meets Criterion #2? |
|---|---|---|---|---|---|---|---|---|---|
| | $L_{eq}(1)$ (dBA) | $L_{dn}$ (dBA) | $L_{eq}(1)$ (dBA) | $L_{dn}$ (dBA) | Baseline | Baseline + Construct. | Change | | |
| POR01 | 48 | 46 | 52 | 50 | 1.3 | 1.7 | 0.4 | Yes | Yes |
| POR02 | 48 | 46 | 51 | 49 | 1.3 | 1.9 | 0.6 | Yes | Yes |
| POR03 | 51 | 49 | 52 | 50 | 1.9 | 1.7 | - | Yes | Yes |

**Notes:**
- $L_{eq}(1)$ = equivalent 12-hour noise level (dB)
- $L_{eq}$ = $L_d$ daytime (i.e., 7:00h to 19:00h) noise level (dB) = $L_{dn}$
- Baseline case noise levels derived from the minimum hourly $L_{eq}$ sound level measured as part of the noise monitoring program (i.e. conservative representation of $L_{eq}(24)$ and $L_n$).
- Criterion # 1: Baseline + Construction Case ($L_{dn}$) should be less than 75 dBA.
- Criterion # 2: Increase in % Highly Annoyed should be less than 6.5%.

### 6.1.2 Structural and Assembly

The structural and assembly phase of the construction at the Facility involves more significant noise sources. Noise contours developed for this construction scenario are included in **Appendix F**. Detailed modelling results are included in **Appendix G**.

Similar to the Site preparation phase, this scenario includes construction of the 140,000 tpy scenario Facility including supporting buildings and infrastructure, and it was considered as a worst-case scenario too. Any other case and phase of the construction would have fewer activities, and it was assumed that meeting a worst-case scenario would consequently meet other scenarios as well.

*MOE Guidelines*

Table 6-3 shows the predicted sound levels from the structural phase of construction. A review of the noise contours for this construction scenario (see **Appendix F**) indicates that the higher sound levels result from pile driving activities. This result highlights the potential issues associated with pile driving and the need for careful consideration when this activity is undertaken near noise-sensitive receptors (i.e., within 600 m).

All the receptors are predicted to meet the MOE's Class 1 & 2 $L_{eq}(1)$ criterion of 50 dBA for daytime periods during common construction activities. However, during the pile driving operation they are predicted to be above this target. As such, where feasible pile driving activity should be restricted to specific periods and mitigation measures applied, particularly when necessary to reduce offsite noise. An outline of the construction mitigation options, monitoring, and contingency plans is included in Section 7.0.

**Table 6-3 Comparison to MOE Guidelines (Facility for 140,000 tpy Scenario Structural Phase)**

| POR ID | Point of Reception Description | Sound Level at Point of Reception [1] $L_{eq}(1)$ (dBA) | Verified by Acoustic Audit (Yes/No) | Daytime Target for Construction $L_{eq}(1)$ (dBA) | Meets Construction Target (Yes/No) |
|---|---|---|---|---|---|
| POR01 | Courtice Road | 49 (58[2]) | No | 50 | Yes (No[2]) |
| POR02 | 255 Osborne Road | 46 (54[2]) | No | 50 | Yes (No[2]) |
| POR03 | 1797 Baseline Road | 44 (53[2]) | No | 51 | Yes (No[2]) |

**Notes:**
1. Daytime operations only; receptor height of 4.5 m.
2. Sound level predicted during pile driving operation; 30 minutes per hour; other sources operates full 60 minutes

*Federal Guidelines*

Table 6-4 summarizes the predicted construction noise levels for the structural phase. As a worst-case estimate, the pile driving activity includes a penalty for highly impulsive sound characteristics in accordance with ISO 1996 (ISO 2003a, 2007) and assumes continuous operation of 30 minutes per hour. The analysis assessed structural phase activities during daytime only (7:00 to 19:00).

The modelled pile driving activities (i.e., one pile driver operating within the Site) for the structural phase were found to be the dominant noise contribution at all PORs.

**Table 6-4 Comparison to Federal Guidelines (Facility for 140,000 tpy Scenario Structural Phase with Daytime Pile Driving)**

| POR ID | Baseline Case | | Baseline + Construction Case | | % Highly Annoyed | | | Meets Criterion #1? | Meets Criterion #2? |
|---|---|---|---|---|---|---|---|---|---|
| | $L_{eq}(1)$ (dBA) | $L_{dn}$ (dBA) | $L_{eq}(1)$ (dBA) | $L_{dn}$ (dBA) | Baseline | Baseline + Construct. | Change | | |
| POR01 | 48 | 46 | 70 | 68 | 1.3 | 19.4 | 18.1 | Yes | No |
| POR02 | 48 | 46 | 67 | 65 | 1.3 | 15.6 | 14.3 | Yes | No |
| POR03 | 51 | 49 | 67 | 65 | 1.9 | 15.6 | 13.7 | Yes | No |

**Notes:**
- $L_{eq}(1)$ = equivalent 12-hour noise level (dB); includes a 12 dB penalty for impulse noise
- $L_n$ = daytime (i.e., 07:00h to 19:00h) noise level (dB)= $L_d$ = $L_{dn}$
- Baseline case noise levels derived from the minimum hourly $L_{eq}$ sound level measured as part of the noise monitoring program (i.e., conservative representation of $L_{eq}(24)$ and $L_n$).
- Criterion #1: Baseline + Construction Case ($L_{dn}$) should be less than 75 dBA.
- Criterion #2: Increase in % Highly Annoyed should be less than 6.5%.

Structural construction activities, excluding a pile driving daytime operation (if required), are expected to meet the applicable criteria at all receptors. Noise mitigation and construction planning measures could be used to further reduce overall noise contributions from the structural construction activities. If pile driving is required, close supervision and monitoring may be required, and vibratory, rather than impulse driving may be used to mitigate impacts.

### 6.1.3 Construction Traffic

The results of the construction traffic modelling are summarised in Table 6-5 for the receptors of concern along the local roads compared against the MTO change criteria. The traffic counts for the 400,000 tpy scenario were used and were considered to be a worst-case scenario. The predicted traffic noise impact associated with the construction phase is 37 dBA at POR1, 32 dBA at POR2 and 35 dBA at POR 3. Generally, the sound sources with difference in noise levels of 10 dBA or less do not have significant impact to overall noise level. Therefore, there would be no change in sound levels caused by increased traffic during construction periods.

**Table 6-5 Assessment of Construction Traffic for Facility for 140,000 tpy Scenario (MTO Criteria)**

| POR ID | Location | Modelled $L_{eq}$(1) Results[1] (dBA) | | Change from No-Build to Build (dBA) | Meets MTO Requirements? |
|---|---|---|---|---|---|
| | | Future No-Build[2] | Future Build | | |
| POR01 | Courtice Road | 50 | 50 | 0 | Yes |
| POR02 | 255 Osborne Road | 50 | 50 | 0 | Yes |
| POR03 | 1797 Baseline Road | 51 | 51 | 0 | Yes |

**Notes:**
1. 1-hour $L_{eq}$ results from STAMSON modelling. Some inputs were adjusted to accommodate limitations of STAMSON (i.e., minimum 40 vehicles per hour and less 500 m distance).
2. Measured ambient sound level was assumed to include worst case traffic impact.
3. MTO requirements are: less than 5 dB increase over no-build, and less than 65 dBA overall.

Table 6-6 summarizes the construction traffic results against the HC criteria. In each case, the predicted results achieve the applicable criteria. Hence, the increased traffic during the construction phase is predicted to produce acceptable noise levels at area receptors.

**Table 6-6 Assessment of Construction Traffic for Facility for 140,000 tpy Scenario (Health Canada Criteria)**

| POR ID | Location | Modeled Future Build $L_{dn}$ Results[1] (dBA) | Meets <75 dBA Criteria?[2] | % Highly Annoyed | | | Meets <6.5% Criteria?[3] |
|---|---|---|---|---|---|---|---|
| | | | | Future No-Build | Future Build | Change | |
| POR01 | Courtice Road | 48 | Yes | 1.7 | 1.7 | 0.0 | Yes |
| POR02 | 255 Osborne Road | 48 | Yes | 1.7 | 1.7 | 0.0 | Yes |
| POR03 | 1797 Baseline Road | 49 | Yes | 1.9 | 1.9 | 0.0 | Yes |

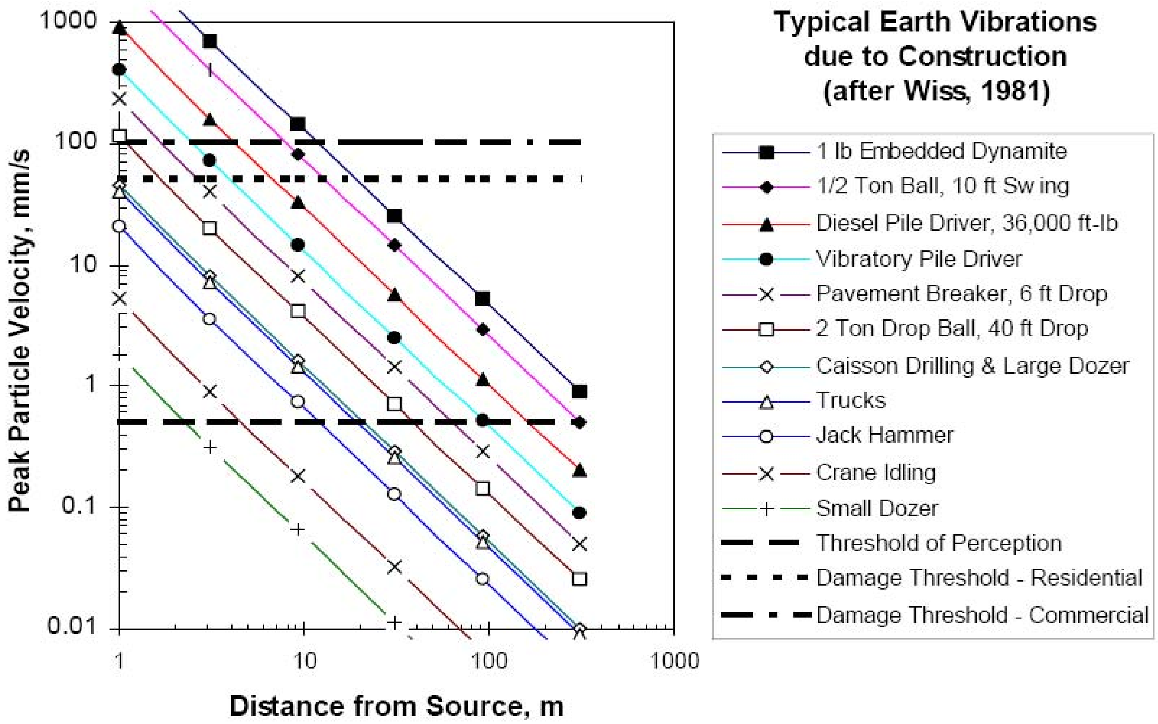
**Notes:**
1. 24-hour $L_{eq}$ results from STAMSON modelling. In some cases inputs were adjusted to accommodate limitations of STAMSON (i.e., minimum 40 vehicles per hour and less 500 m distance).
2. Health Canada criterion that future build $L_{dn}$ is less than 75 dBA overall.
3. Health Canada criterion that the change in percent highly annoyed is less than 6.5% between future build and future no-build scenarios.

### 6.1.4 Vibration

Potential vibration impacts associated with the construction period of the Facility are possible, particularly around pile driving and heavy equipment operations. Pile driving activities at the Facility are expected to be limited to the main process building areas.

Research on various soil types has resulted in the generalization of geometric attenuation and material attenuation. The most common generic model of construction vibrations as a function of separation distance was the study completed by Wiss (1981). Figure 6-1 provides a family of curves (i.e., log-log plot) based on the vibration parameter of peak particle velocity (PPV). PPV is the maximum amplitude of vibration, usually determined by the vector sum of the three directional components of vibration (i.e., vertical or Z-direction, and lateral or X- & Y-directions).

**Figure 6-1 Typical Construction Equipment Vibration Levels**




All critical receptors surrounding the Facility are greater than 200 m from construction sources (i.e., likely approximately 600 to 1,000 m), including pile driving activities within the Facility (i.e., main process buildings). Therefore, vibration emissions from these activities should not be perceptible and should remain well below any damage threshold for buildings based on the data of Figure 6-1.

Although PPV is appropriate for evaluating the potential for building damage due to vibrations, it is not ideal for evaluating human response since the human body tends to respond to average (e.g., root-mean-square or RMS) vibration amplitude in the range 8 to 80 Hz (Hertz). Table 6-7 presents vibration criteria based on the human response as developed by the International Standards Organization in ISO 2631 (ISO 2003b).

**Table 6-7 ISO 2631 Vibration Criteria**

| Receptor Type | Vibration Velocity Level (VdB) | Vibration Velocity Amplitude (RMS, mm/s) |
|---|---|---|
| Commercial / Workshop | 90 | 0.80 |
| Office | 84 | 0.40 |
| Residence | 78 (daytime) / 75 (nighttime) | 0.20 |
| Hospital | 72 | 0.10 |

The relationship of PPV to RMS velocity is expressed in terms of the crest factor, defined as the ratio of the PPV amplitude to the RMS amplitude. Peak particle velocity is typically a factor of 1.7 to 6 times greater than RMS vibration velocity. A common crest factor used for construction equipment is 4, representing a PPV-RMS difference of 12 VdB (Hanson et al. 2006). Although numerous publications provide RMS vibration estimates for construction equipment, there is considerable variation in the reported levels.

Using the typical propagation levels provided in Figure 6-1, pile driving is expected to yield a value of approximately 68 VdB at 200 m from a residential receptor which is less than the expected separation distances anticipated for this activity. This value is well within the ISO limits described in Table 6-7 and begins to approximate the threshold of perception for humans of about 65 VdB.

Overall, the propagation of vibrations and related perception at a receptor is highly site specific. Vibration impacts are dependent on actual source performance, path of vibration propagation, soil condition, and the structural conditions at the receptor.

## 6.2 Potential Operations Effects

The predicted noise effects of the Facility in operation for both the 140,000 tpy and 400,000 tpy scenarios are presented in the following sections.

Table 6-8 shows predicted noise levels at nearby receptors when the 140,000 tpy scenario Facility is operational. The results include worst-case scenarios, such as all sources operating at the same time. Similarly, Table 6-9 shows predicted noise levels at nearby receptors when the 400,000 tpy scenario Facility is operational.

**Table 6-8 Point of Reception Summary – 140,000 tpy Scenario Facility**

| Source | POR1 Commercial Farm (Courtice Road) | | POR2 Residential Receptor (255 Courtice Road) | | POR3 Residential Receptor (1797 Baseline Road) | |
|---|---|---|---|---|---|---|
| | Distance to Receptor (m) | Sound Level at Receptor (dBA) | Distance to Receptor (m) | Sound Level at Receptor (dBA) | Distance to Receptor (m) | Sound Level at Receptor (dBA) |
| Back-up Power Generator | 601 | 36 | 916 | 6 | 925 | 25 |
| Fire Pump Engine Exhaust | 714 | 28 | 800 | 27 | 1064 | <20 |
| Truck Traffic | 550 | 25 | 690 | 20 | 890 | <20 |
| Main Flue Stack | 670 | 24 | 853 | 22 | 1024 | 20 |
| Internal Noise Sources West | 638 | 23 | 876 | 0 | 981 | <20 |
| Truck Traffic | 550 | 21 | 690 | 23 | 890 | <20 |
| Steam Turbine | 672 | <20 | 843 | 40 | 982 | 23 |
| Transformer | 729 | <20 | 789 | 24 | 1003 | <20 |
| Internal Noise Sources East | 671 | <20 | 842 | 20 | 1009 | <20 |
| Office AC unit 2 | 668 | <20 | 857 | <20 | 935 | <20 |
| Office AC unit 1 | 657 | <20 | 867 | <20 | 931 | <20 |
| Office AC unit 4 | 671 | <20 | 851 | <20 | 950 | <20 |
| Office AC unit 3 | 660 | <20 | 860 | <20 | 946 | <20 |
| Air Cooled Condenser | 691 | <20 | 827 | <20 | 977 | <20 |
| **Total Sound Level at Receptor [dBA]** | **37** | | **40** | | **29** | |

**Table 6-9 Point of Reception Summary – 400,000 tpy Scenario Facility**

| Source | POR1 Commercial Farm (Courtice Road) | | POR2 Residential Receptor (255 Courtice Road) | | POR3 Residential Receptor (1797 Baseline Road) | |
|---|---|---|---|---|---|---|
| | Distance to Receptor (m) | Sound Level at Receptor (dBA) | Distance to Receptor (m) | Sound Level at Receptor (dBA) | Distance to Receptor (m) | Sound Level at Receptor (dBA) |
| Steam Turbine 3 | 550 | 44 | 980 | <20 | 936 | <20 |
| Main Flue Stack 1 | 689 | 26 | 869 | 24 | 1032 | 22 |
| Truck Traffic | 550 | 25 | 690 | 21 | 890 | <20 |
| Internal Noise Sources 3 | 574 | 24 | 960 | <20 | 965 | <20 |
| Main Flue Stack 2 | 614 | 22 | 948 | <20 | 1013 | <20 |
| Steam Tubine 2 | 697 | <20 | 832 | 40 | 1009 | <20 |
| Steam Turbine 1 | 679 | <20 | 853 | 40 | 978 | 26 |
| Back-up Power Generator 2 | 608 | <20 | 923 | <20 | 925 | 25 |
| Back-up Power Generator 1 | 609 | <20 | 921 | <20 | 930 | 25 |
| Air Cooled Condenser 3 | 561 | <20 | 969 | <20 | 964 | <20 |
| Fire Pump Engine Exhaust 2 | 721 | <20 | 807 | 27 | 1064 | <20 |
| Internal Noise Sources 2 | 636 | <20 | 897 | <20 | 991 | <20 |
| Internal Noise Sources 3 | 590 | <20 | 943 | <20 | 970 | <20 |
| Fire Pump Engine Exhaust 1 | 720 | <20 | 809 | 27 | 1061 | <20 |
| Transformer 1 | 734 | <20 | 798 | 23 | 1005 | <20 |
| Transformer 2 | 738 | <20 | 792 | 24 | 1017 | <20 |
| Internal Noise Sources 1 | 682 | <20 | 850 | 20 | 1014 | <20 |
| Office AC unit 2 | 675 | <20 | 864 | <20 | 941 | <20 |
| Office AC unit 1 | 665 | <20 | 873 | <20 | 937 | <20 |
| Office AC unit 4 | 679 | <20 | 857 | <20 | 955 | <20 |
| Office AC unit 3 | 668 | <20 | 867 | <20 | 951 | <20 |
| Air Cooled Condenser 1 | 699 | <20 | 836 | <20 | 980 | <20 |
| Air Cooled Condenser 2 | 714 | <20 | 817 | <20 | 1010 | <20 |
| **Total Sound Level at Receptor [dBA]** | **45** | | **43** | | **39** | |

*MOE Guidelines*

Table 6-10 and Table 6-11 show the modelling results of noise sources for each Facility operation scenario. Predicted sound levels meet the guideline criteria at all nearby receptors for both the 140,000 tpy and 400,000 tpy scenarios.

**Table 6-10 Acoustic Assessment Summary – 140,000 tpy Scenario Facility**

| Point of Reception ID | Point of Reception Description | Predicted Sound Level at Point of Reception [1] (dBA) | Verified by Acoustic Audit (Yes/No) | Performance Limit (dBA) | Compliance with Performance Limit (Yes/No) |
|---|---|---|---|---|---|
| POR1 | Courtice Road | 37 | No | 47 | Yes |
| POR2 | 255 Osborne Road | 40 | No | 47 | Yes |
| POR3 | 1797 Baseline Road | 29 | No | 45 | Yes |

**Notes:** 1. 24-hour operation of facility. Receptor height of 4.5 m.

**Table 6-11 Acoustic Assessment Summary – 400,000 tpy Scenario Facility**

| Point of Reception ID | Point of Reception Description | Predicted Sound Level at Point of Reception [1] (dBA) | Verified by Acoustic Audit (Yes/No) | Performance Limit (dBA) | Compliance with Performance Limit (Yes/No) |
|---|---|---|---|---|---|
| POR1 | Courtice Road | 45 | No | 47 | Yes |
| POR2 | 255 Osborne Road | 43 | No | 47 | Yes |
| POR3 | 1797 Baseline Road | 39 | No | 45 | Yes |

**Notes:** 1. 24-hour operation of Facility. Receptor height of 4.5 m.

*Federal Guidelines*

Since the noise levels at each POR surrounding the Facility are forecast to be 45 dBA or less, we predict the Health Canada criteria would be met at all PORs for both the 140,000 tpy and 400,000 tpy scenarios.

## 6.3 Description of Net Effects

From an acoustical perspective, there are two main activities that may create elevated sound levels that cannot be mitigated, or may have some net effect after mitigation measures are in place:

- pile driving activities associated with the construction phase of the Facility (if required); and,
- increased short-term offsite vehicle traffic associated with the construction phase of the Facility.

The construction activities are a concern during worst-case conditions, but are temporary and of short duration relative to the Facility day-to-day operations. The pile driving activity is associated with the construction period and would cease upon completion of construction of the Facility. Its effects can be reduced through alternative technologies (e.g., vibratory pile driving), controls, and scheduling. Construction vehicle traffic effects can be reduced through scheduling and planning of vehicle trips.

## 6.4 Potential Future Effects

Potential future long-term noise effects are based on present and planned projects within the ASA. Overall ambient sound levels in the ASA could increase with the addition of noise from future projects. Increased ambient sound levels could mask noise emissions from the Facility and potentially increase the noise criteria.

MOE noise guidelines generally limit the sound from a facility to the existing ambient conditions, or a specified minimum. As such, they inherently limit the cumulative effects of a project to a doubling of the combined acoustical energy, or a 3 dB change, compared to the ambient level (i.e., if a facility and ambient conditions have an equal contribution, the overall level would increase by 3 dB). This approach acknowledges the presence of high noise environments (e.g., near 400-series highways) that are beyond the control of industry and the masking effect they have on industrial noise.

The Facility is located in a predominantly industrial area and no significant changes are anticipated that would alter the sound environment. As such, long-term noise effects are not expected to differ greatly from the current situation.

The results of an ambient noise monitoring suggest that future no-build ambient sound levels may be about 50 dBA due to existing industries and traffic volumes. These ambient levels are on the order of 5 to 10 decibels greater than the predicted operational sound levels from the 140,000 tpy and 400,000 tpy scenario Facility, respectively. The Facility contribution to overall sound levels in either case would be insignificant (i.e., 50 dBA + 40 dBA is approximately 50 dBA, and 50 dBA + 45 dBA is approximately 51 dBA).

Further, since the region around the Facility has room for future development, it is expected that traffic noise levels would also continue to increase, creating a further masking effect of noise from the Facility. For many existing receptors in the area, this traffic noise is expected to have a more significant effect than noise levels from the Facility.

In consideration of the above factors, the cumulative effect of noise from the Facility in combination with minimal net effects in the ASA would likely not be significant.

## 6.5 Potential Effects on Wildlife

The following provides a review of some of the pertinent background literature related to wildlife and noise exposure, and a discussion on the acoustical issues that are specific to the construction and operation of the Facility. Although there are no formal guidelines for noise impacts on wildlife, the literature provides a means to evaluate potential wildlife effects.

### 6.5.1 Wildlife in Study Area

The *Natural Environment Assessment – Technical Study Report* (Jacques Whitford Stantec Limited, 2009) completed as part of this EA has evaluated the existing mammals and birds in its applicable study area. The report identified mammal species and bird species which are outlined in Table 6-10.

**Table 6-12 Selected Mammal and Bird Species Identified in Area**

| Mammals | Birds | |
|---|---|---|
| ▪ White-tailed Deer | ▪ Common Grackle | ▪ Red-winged Blackbird |
| ▪ Raccoon | ▪ Ring-billed Gull | ▪ House Sparrow |
| ▪ Eastern Cottontail | ▪ Song Sparrow | ▪ Eastern Kingbird |
| ▪ Striped Skunk | ▪ Savannah Sparrow | |
| ▪ Woodchuck | ▪ European Starling | |
| ▪ Red Fox | ▪ Brown Thrasher | |
| ▪ Coyote | ▪ Willow Flycatcher | |

### 6.5.2 Background Review

Noise and vibration impacts on wildlife is a relatively new area of study, with relatively little scientific research applied to mammals and amphibians (Warren et al. 2006; Sun and Narins 2004; U.S. Department of Transportation 2004). The available research is primarily focussed on noise emissions from aircraft fly-overs (i.e., transient noise) and road traffic (i.e., steady background noise). The field studies have identified both primary effects and secondary effects due to noise emissions.

The two main primary effects include auditory changes (e.g., hearing loss or threshold shift), and the masking of key auditory signals, such as mating calls and prey sounds. Secondary effects are non-auditory in nature, including increased stress levels and changes in mating and feeding patterns (Manci et al. 1988). Generally, there is very little information pertaining to the relationship between the dose of noise (i.e., specific sound levels) and the response of mammals and birds. As a result, the literature provides a qualitative evaluation of noise impacts.

Industrial noise impacts on humans may be affected by various non-acoustical factors, such as occupation, aesthetics, and odour. Similarly, there are a number of non-acoustical related wildlife factors that may influence the resulting noise effects, including:

- Visual disturbance;
- Air pollution;
- Microclimatic effects;
- Road kill (i.e., near traffic corridors); and,
- Increased attraction of predators.

For mammals in particular, impulsive sounds over 90 dB are considered to be adverse, and may result in retreat or strong startle reactions. Many mammals are physiologically constrained to produce low-frequency signals, which may be impacted by masking noises (Warren et al. 2006; Rabin et al. 2006). Studies of mammals such as deer indicate a correlation between noise level and heart rate.

The most common concern related to noise and wildlife is the masking effect. Masking becomes significant when the noise levels are able to mask acoustic signals on which an animal relies for survival, such as defending territory, attracting mates, or delivering distress calls (Warren et al. 2006).

Wildlife response to noise appears to vary by habitat (Pepper et al. 2003). For example, wildlife in an open area may engage in more predator-avoidance behaviour, such as long duration fleeing, whereas wildlife in a forested area may be more protected and would not expend as much energy.

Unlike wildlife, livestock do not display any significant effects to high intensity noises, such as aircraft (Pepper et al., 2003). This could partly be explained by the fact that livestock become accustomed to loud farming equipment, and therefore do not show signs of distress.

Studies on birds have produced a good understanding of their vocalization, consisting mainly of a dominant frequency and a range of harmonics (Kroodsma 1982). Although some birds have been found to produce sounds into the ultrasonic region (i.e., greater than 20,000 Hz), behavioural studies and brainstem measurements have shown that they have no response above 8,000 Hz (Narins et al. 2004).

With regards to masking of bird signals, field studies have revealed that birds adjust their vocalization to reduce the influence of background noise levels (Patricelli and Blickley 2006). For example, Song Sparrows have been found to shift the fundamental frequency of their songs from the lower frequency range (i.e., commonly found with urban noise), into the higher frequencies (i.e., above 4,000 Hz) (Wood and Yezerinac 2006). It has been found that higher-pitched frequencies in bird songs may make species less susceptible to noise effects from roads implying masking as a causative mechanism (Rheindt 2003). Birds in noisier urban environments also increased amplitude of songs when background noise increased (Brumm 2004). Another technique used by birds within noisy habitats is to increase the signal-to-noise ratio (i.e., sing louder), and increase the duration and timing of the songs (Patricelli and Blickley 2006). Field measurements have shown that the Least Bell's Vireo song may be masked when background noise exceeds 60 dBA (Ogden 1993).

Transportation related studies have revealed that not all bird species appear sensitive to noise. For example, a study in Spain estimated that approximately 15% of breeding bird species were sensitive, although total density did not differ at different levels of traffic (Peris and Pescador 2004). Some species have been found to become more common near roads (Michael et al. 1976). Some species breed well even in noisy environments (Awbrey et al. 1995).

### 6.5.3 Impact Assessment

The noise criteria discussed in this Report are applicable to humans only. No standards have been developed for wildlife. The authors that have evaluated road noise or similar sources suggest that sound levels significantly above the local ambient can impact species abundance and diversity.

For areas in close proximity to the construction equipment and the operational units (i.e., within approximately 10 to 15 m), the steady-state sound levels are expected to be in the 70 to 100 dBA range, with potentially high levels in the low frequency range. According to the literature, these levels and sound spectra are likely to cause an adverse effect on mammals, in particular with respect to masking of communications. Some bird species may adjust both the frequency content and sound level of their songs in such areas. The expected Facility noise sources typically do not produce significant sound energy above 4,000 Hz, which may have a mitigating effect for some species that can communicate in higher frequencies.

Although difficult to quantify, the breeding behaviour and success of some species of birds and amphibians whose mating system is driven by auditory cues may be affected by noise levels immediately adjacent to construction activities and operational units. However, the human presence and industrial environment is expected to deter wildlife from interacting within close proximity of these areas where high sound levels may create masking effects of concern for some species. Occasional impulsive sounds above 70 dBA in these areas could be expected, causing the potential to startle some species.

At separation distances of approximately 300 to 500 m from construction activities, and 250 to 300 m from the main process units during operations, impulsive noise is expected to drop below 90 dBA and steady-state noise below 60 dBA. Based on the reviewed literature, sound levels above these values are typically necessary to create wildlife effects (e.g., communication masking, perception of predators, or breeding success). The Darlington Provincial Park to the west of the main process areas, where most wildlife would typically find refuge, lie beyond these separation distances (i.e., approximately 1400 m from the nearest process unit). It is anticipated that most wildlife that is not deterred from coming within these distances due to non-acoustical factors (i.e., human presence), would do so because they have adjusted to the increased noise levels. In all areas, occasional short-term loud sounds, particularly associated with construction activities, could produce retreat or startle responses in some wildlife.

### 6.5.4 Summary of Potential Noise Effects

Sound levels from the operation of the Facility during both 140,000 and 400,000 tpy scenarios are expected to be localized, and not large enough to impact wildlife in adjacent non-operational areas. As such, most wildlife would be expected to continue their patterns outside the main site areas unimpeded.

In addition, wildlife that frequents the ASA is currently subjected to intermittent sounds, such as traffic, and industrial and farming activities. Thus, they are expected to be more accustomed to the presence of noise in their environment. It is anticipated that wildlife that is less tolerant of noise would relocate to other neighbouring habitat that is more acceptable.

As well, industry noise could be characterized as being a relatively constant sound. This type of sound emission is considered to be less disruptive than intermittent or impulsive sound sources. Based on the literature, the parameters and limits used to evaluate human reaction to these disruptive sounds tend to follow the magnitude of those for animals. The acoustical modelling is considered conservative, since all noise sources are assumed to be in operation during a worst-case hour of operation and in a downwind position relative to the receptor. As a result, achieving the applicable guideline criteria for humans (i.e., 40 to 45 dBA) would be expected to provide an acceptable level of protection for most wildlife.

# 7.0 IMPACT MANAGEMENT

For any existing or new industrial operation, noise emissions can be reduced by limiting operations (e.g., time of day or limited duty cycle), physical noise controls (e.g., silencers, enclosures, or barriers), or the use of quiet equipment (e.g., specify the maximum allowed PWL). Due to the continuous operation of the Facility, it is expected that mitigation would focus on the last two options. Evaluations can be made at the detailed engineering stage to correctly size any required mitigation measure, to meet acoustic performance target, and to avoid unacceptable effects (i.e., unwanted aero-acoustic system effects). The following sections provide an overview of the potential mitigation measures that could be implemented to meet applicable noise criteria at the PORs. Furthermore, a field monitoring plan is described in this section to assist in meeting noise and vibration criteria, in particular for construction and post-closure activities.

## 7.1 Construction and Post-Closure

Construction and post-closure activities associated with the Facility are expected to be highly variable and unpredictable at a detailed level. Construction equipment could be operating over a wide-ranging area and specific controls may be necessary when the construction activities are in close proximity to receptors. Hence, it is recommended that the Regions develop a Monitoring and Protection Plan (Plan) to be followed by its contractors to address potential noise and vibration impacts associated with the Facility during both the construction and post-closure periods. This plan could incorporate a complaint resolution process for noise issues. The Regions would maintain the ability to impose a Plan upon its contractors.

*Monitoring and Protection Plan*

The main components of a Plan would typically address the parameters outlined in Table 7-1.

**Table 7-1 Potential Monitoring Plan Features**

| Control Category | Control | Description |
|---|---|---|
| Source | Scheduling | Perform noisy work during less sensitive time periods, where feasible |
| | Equipment Restrictions | Limit the type and/or quantity of the noisy equipment |
| | Equipment Maintenance | Adopt appropriate maintenance schedules (i.e., for lubrication, balancing, etc.) |
| | Equipment Noise Limits | Specify maximum sound power emissions for certain equipment |
| | Method Substitution | Apply quieter methods for specific activities |
| | Noise Controls | Apply mufflers, barriers, enclosures, lagging, equipment orientation or other methods |
| | Monitoring | Apply equipment noise monitoring programs |
| Path | Barriers | Property-line noise barriers (i.e., temporary or permanent) |
| | Distance | Increase the separation between certain noisy equipment and critical receptors |
| Receptor | Window Treatments | Increase a receptor's structural sound isolation |
| | Temporary Relocation | For extreme, cases that cannot be mitigated (i.e., not likely for this Project) |
| Consultation | Dialogue | Promote open dialogue with the surrounding communities |
| | Complaint Process | Formally log, respond, and follow-up on noise complaints |
| | Public Meetings | Conduct public meetings to inform the residents and related stakeholders the planned processes and schedules |

Other key components in the Plan could include: maximum allowed PWLs, preferred travel paths for mobile equipment, preferred quiet zones (e.g., areas with little if any construction equipment allowed), time of day limits, and hourly dosage limits where applicable. The development of a Plan could include oversight during the construction and post-closure activities by a qualified acoustical consultant and the use of companies that can demonstrate compliance with equipment noise specifications stated in the Plan. Contractor training could also be used to help work be conducted in a manner that minimizes the noise effects in the area.

Mitigation of construction equipment, including the use of quiet back-up alarms, could be considered where monitoring or planning suggests that controls would be warranted. These measures would be dependent on detailed construction or post-closure planning.

Generally, the large setback distances between the process unit areas and receptors (i.e., over 600 m) at the Project would be sufficient to mitigate much of the associated construction and post-closure noise. The majority of construction and post-closure activities are expected to occur during the daytime when receptors are less sensitive to noise.

The construction activities may require monitoring or abatement to prevent noise and vibration impacts; particularly if heavy equipment (e.g., pile drivers or excavators) would be required and located near potential receptors. Quiet construction technology could be used near receptors where monitoring suggests the potential for unacceptable noise impacts. In these cases, alternative technologies could be considered, such as drilled piles instead of hammered piles. Secondary temporary controls (e.g., pile driver shrouds or temporary barriers) can also be used to mitigate effects where alternative methods are not feasible.

## 7.2 Operations

Outside of emergency back-up generators and fire pump engines, no mitigation measures are predicted to be necessary at the Facility during regular operation for both the 140,000 tpy and 400,000 tpy scenarios since the Facility meets the MOE noise criteria.

Potential mitigation measures or design modifications can be included in the Facility design to ensure that noise criteria at all offsite receptors are met. The noise reductions may be achieved with equipment-specific controls, setback limitations or property-line barriers. The need for these controls could be confirmed as the design of the Facility progresses.

# 8.0 SUMMARY AND CONCLUSION

An Acoustic Assessment has been completed for both the 140,000 tpy and 400,000 tpy scenarios. The analysis includes various acoustical scenarios during the construction, operational, and post closure periods. As summarized in this section, with appropriate mitigation and abatement measures in place, the Project is expected to meet applicable local and provincial guidelines for noise and vibration.

## 8.1 Summary of Compliance

During construction periods, with a few exceptions that are described in the Report, the Project is predicted to meet applicable provincial and federal noise criteria. Attention to a few specific activities (e.g., pile driving) could help to ensure that unacceptable noise levels do not occur.

During regular operation, the Facility is predicted to meet applicable provincial and federal noise criteria at nearby receptors under all operating scenarios. The transition zones (i.e., setback distances), equipment sound specifications, and mitigation controls designed into the Facility help to ensure noise criteria are met at offsite receptors.

## 8.2 Noise Mitigation Commitments

The Facility would include noise mitigation measures as part of its design to help ensure the applicable noise criteria are met at all offsite receptors for both the 140,000 tpy and 400,000 tpy scenarios. Such controls could include the use of enclosures, silencers or mufflers, acoustic baffles or insulation, and property-line berms/barriers. Specific mitigation measures could be considered as options as the detailed design progresses and less conservative source data becomes available.

## 8.3 Monitoring Program

An ongoing sound and vibration monitoring program is recommended during the construction and post-closure periods at the Project. An acoustic audit of the Facility should be conducted once it is operational to ensure the applicable noise criteria are met at offsite receptors.

## 9.0 CLOSURE

This Report has been prepared by Jacques Whitford Stantec Limited. The assessment represents the conditions at the subject property only at the time of the assessment, and is based on the information referenced and contained in the Report. The conclusions presented herein respecting current conditions, and potential future conditions at the subject property resulting from the Project, represent the best judgment of the assessor based on current environmental standards. Jacques Whitford Stantec Limited attests that to the best of our knowledge, the information presented in this Report is accurate. The use of this Report for other projects without written permission of Durham Region, York Region and Jacques Whitford Stantec Limited is solely at the user's own risk.

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# APPENDIX A

Supporting Information

## THE CORPORATION OF THE MUNICIPALITY OF CLARINGTON

## BY-LAW 2007 - 071

*Being a By-law to prohibit noises likely to disturb the inhabitants of the Municipality of Clarington and to repeal By-law 89-184 and its amendments*

**WHEREAS** Section 129 of *the Municipal Act, 2001,* S.O. 2001, Chapter 25 states that a local municipality may prohibit and regulate noise matters;

**AND WHEREAS** The Council of the Corporation of the Municipality of Clarington deems it appropriate to enact a by-law to regulate and control noise levels within the Municipality of Clarington;

**NOW THEREFORE** the Council of the Corporation of the Municipality of Clarington enacts as follows:

### 1. GENERAL PROVISIONS

1.1 No person shall ring any bell, blow or sound any horn or cause the same to be rung, blown or sounded, or shout or create, cause or permit any unusual or excessive noises likely to disturb any other inhabitant of the Municipality of Clarington.

1.2 Without limiting the generality of section 1.1 the following are deemed to be noises likely to disturb the inhabitants of the Municipality of Clarington:

(a) the ringing of bells, blowing of horns or sounding of sirens on any motor vehicle except to the extent that such ringing, blowing or sounding is required by law or by the requirements of safety;

(b) the sound or noise from or created by a radio or phonograph, or any musical or sound-producing instrument of whatsoever kind when such radio or phonograph or instrument is played or operated in such manner or with such volume as to annoy or disturb the peace, quiet, comfort or repose of any individual in any dwelling house, apartment house, hotel or other type of residence outside the premises where the instrument is being played;

(c) the grating, grinding or rattling noise or sound caused by a condition of disrepair or maladjustment of any motor vehicle, motorcycle, or other vehicle whatsoever or part or accessory thereof;

(d) the blowing of any steam or air whistle attached to or used in connection with any stationary boiler or other machine or mechanism, except for the purpose of giving notice to workmen of the time to commence or cease work or as a warning of danger;

e) the noise made by power lawnmowers, outboard motors or similar power motors;

(f) the noise made by the discharge into the open air of the exhaust of any steam engine, stationary internal combustion engine, motor vehicle or motorcycle except through a muffler or other device which effectively prevents loud or explosive noise;

(g) any noise which may be heard beyond the lot upon which it is made at sufficient volume to disturb persons beyond such lot;

(h) the persistent barking, calling or whining, or other similar persistent noise made by any domestic pet, or any other animal kept, or used for any purpose other than agriculture.

## 2. EXEMPTIONS

2.1 Notwithstanding the other provisions of this By-law, the restrictions listed in sections 1.1 and 1.2 shall not apply to prevent:

(a) the use, in a reasonable manner, of any apparatus or mechanism for the amplification of the human voice or music in a public place within the limits of the Municipality;

(b) any military or other band or any parade operating with written permission having been first obtained from the Municipality;

(c) any police, fire, public or emergency service vehicle or ambulance in the lawful discharge of its assigned duties;

(d) any sound arising from the operation of any railway which operates under the Railway Act of Canada or from any plant or work in connection with any such railway;

(e) the sound of church bells or carillons; and

(f) the making by any person upon his or her own property, noise which is reasonable and necessary taking into account the volume and time of day, for his or her enjoyment and use of such property provided that such noise does not interfere with the lawful enjoyment of any adjoining property owner or occupant.

2.2 Notwithstanding the other provisions of this By-law, the restrictions listed in sections 1.1 and 1.2 shall not apply to a person who permits or causes the emission of sound in connection with any traditional, festive, or religious activities, and to such activities listed hereunder;

(a) the Bowmanville Foundry Co. Ltd., manufacturing;

(b) Goodyear Canada Inc., manufacturing;

(c) Oshawa Ski Club, recreational snowmaking;

(d) Mosport Park, automobile and motorcycle racing;

(e) Blue Circle Canada Inc., its licensed pit and quarry operations and all accessory uses related thereto.

**3. CURFEWS**

3.1 A noise curfew shall apply to the following operations and/or businesses within the Municipality of Clarington:

(a) the Orono Fish and Hunt Club, shooting range;

(b) the Union Rod and Gun Club, shooting range; and

(c) the Marksman Club of Oshawa, shooting range.

This curfew shall commence at 11:00 p.m. and continue until 7:00 a.m. the following morning, Sunday night through Saturday morning, then commence again at 11:00 p.m. Saturday night and continue until 10:00 a.m. Sunday morning.

3.2 With respect to a licensed canine kennel there shall be a noise curfew imposed, to wit:

(a) evenings - Sunday to Friday inclusive, there shall be a curfew commencing at 11:00 p.m. and continuing until 7:00 a.m. of the following day; Saturday, the curfew shall commence at 11:00 p.m. and shall continue until 8:00 a.m. Sunday morning;

(b) during the periods identified as the curfew hours, any kennel noise, more particularly the barking of dogs, which carries beyond the boundary of the property upon which the licensed kennel is situated shall be deemed to be a contravention; and

(c) that during non-curfew hours, that is from 7:00 a.m. to 11:00 p.m., Monday to Saturday inclusive, and from 8:00 a.m. to 11:00 p.m. Sunday, continuous barking for a period in excess of 1 hour at any time shall be deemed to be a contravention.

3.3 A noise curfew shall apply to any noise from any excavation or construction work whatsoever, including the erection, demolition, alteration or repair of any building;

(a) arising between the hours of 11:00 p.m. until 7:00 a.m. the following day, Monday through Saturday, 11:00 p.m. Saturday night until 10:00 a.m. Sunday and 5:00p.m. Sunday until 7:00 a.m. Monday morning.

(b) except in the case of urgent necessity and then only under prior authorization from the Municipality.

3.4 During the time when construction, excavation or demolition work is permitted on Sunday as outlined in Section 3.3 above, such work shall not include the operation of any mechanically powered excavation or earth moving equipment.

3.5 A noise curfew shall apply to the use of propane guns and other such similar devices used to protect agricultural produce from predation by any animal, reptile or bird. This curfew shall be commence at 11:00 p.m. and continue until 7:00 a.m. seven days per week.

3.6 Time restrictions as set out above in this by-law for Sundays shall apply in the same manner for all statutory holidays.

3.7 No person shall cause, create or permit any noise in contravention of the curfew times as outlined throughout Section 3.

## 4. ENFORCEMENT

4.1 This By-law shall apply to all property within the limits of the Municipality and shall be enforced on a complaint basis only by the Durham Regional Police Service and the Clarington Municipal Law Enforcement Officers and, where applicable, the Clarington Animal Services Officers.

4.2 The complaint shall include the name, address and telephone number or other contact information of the complainant. Failure to provide the required complainant information shall render the complaint incomplete and it will not be investigated.

4.3 Anonymous complaints or third party complaints which attempt to obscure the identity of the complainant will not be investigated.

4.4 Where an officer has determined that a complaint has been filed for a malicious or vexatious reason or as part of an ongoing pattern of harassment, the officer may, after conferring and confirming with the Manager of Municipal Law Enforcement, cease the investigation and close the file with no further action taken. The officer shall then advise the complainant of this in writing.

4.5 Where the subject matter of an investigation is the same or the circumstances are substantially similar to that for which charges or other court actions have already been initiated, no additional court action pursuant to this By-law will be initiated by the Municipality.

4.6 Nothing in this By-law prevents any individual from privately initiating a charge for an alleged offence.

## 5. PENALTY

5.1 Every person who contravenes any provision of this by-law is guilty of an offence and upon conviction liable to a fine as set out in the *Provincial Offences Act.*

5.2 Should any section, clause, or provision of this By-law be declared by a court of competent jurisdiction to be invalid, the same shall not affect the validity of this By-law as a whole or any part thereof, other than the part so declared to be invalid.

5.3 The provisions of this by-law shall come into full force and effect immediately upon its final passing by Council.

5.4 By-law 89-184 and its amendments are hereby repealed.

Read a first time this 2nd day of April, 2007

Read a second time this 2nd day of April, 2007

Read a third time and finally passed this 2nd day of April, 2007

Jim Abernethy
Mayor

Patti L. Barrie
Municipal Clerk

## BACKGROUND ON ENVIRONMENTAL ACOUSTICS

### How is an Audible Sound Generated?

Any vibrating surface has the potential to oscillate the surrounding air. These movements create pressure fluctuations that disperse from the surface in the form of a pressure wave, analogous to an object falling into a calm water surface, with the intensity of the wave decreasing with distance. An ear, acting like a microphone, responds to the air pressure fluctuations allowing the brain to process the fluctuations as an audible sound. The average human ear's response to sound is in the range of 20 Hz to 20,000 Hz, with the upper frequency range decreasing with age and over exposure to noise.

### Sound Pressure Levels – why do we apply Decibels?

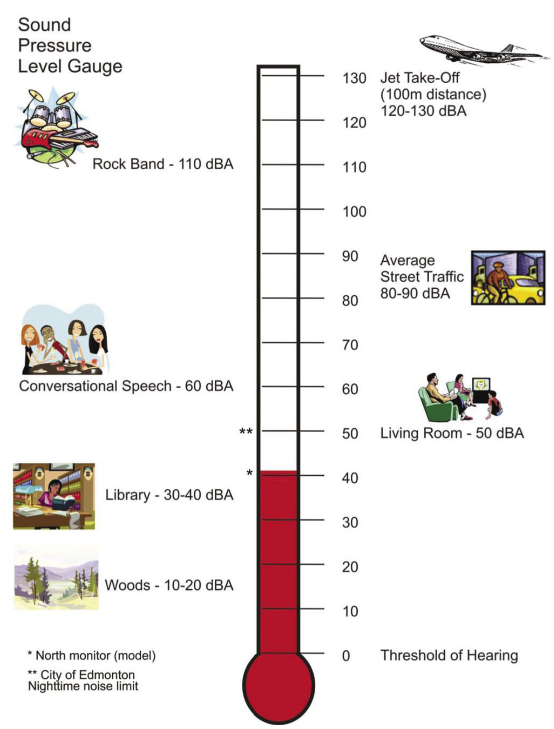
As noted above, the human ear has a wide frequency range of response, and the ability to hear an enormous range of sound intensities within those frequencies. For example, a jet engine take-off may produce one million times more sound intensity than sounds of nature in a typical forest. We apply the decibel or logarithmic scale

Since decibels are based upon a logarithmic scale, it is important to have an understanding of how a change in the sound level will be perceived. In dealing with environmental noise levels, differences of 1 or 2 dB are considered to be insignificant and typically not detectable by the human ear; a change of 3 to 5 dB is considered to be detectable but generally not sufficient to cause an adverse reaction to the sound; a difference of 5 to 10 dB is considered to be significant and may cause and adverse reaction and mitigation is recommended.

### What is Noise?

When sounds interfere with human activity, it is considered noise. The degree of annoyance from a noise exposure is highly subjective, as it depends on the person, the environment, and many non-acoustical factors such as: temperature, lighting, and occupant activity and occupation. A recent study by Health Canada [Health Canada,2002] found that while less than 10% of the people surveyed were either very bothered or extremely bothered by noise exposure, there appeared to be significant variance amongst population densities (5% very bothered in urban areas versus 1% very bothered in rural areas) and amongst geographical regions (e.g. 5% very bothered in Ontario versus 2.4% very bothered in Alberta). One may conclude that if a noise annoyance study were conducted in an industrial, rural town, they may receive significantly different results if the same study was conducted in a non-industrial, urban area.

Sound Level Equivalencies



## How is Sound Measured?

Sound is measured using a Sound Level Meter (SLM). A modern SLM consists of a polarized condenser microphone, digital memory, and a variety of acoustic filters allowing for various narrow band sound measurements in addition to averaged overall levels. SLM response times are also key considerations in sound measurement, including ‘slow’ response for sounds that vary slowly with time, ‘fast’ response for sounds that vary quickly with time, and ‘impulse’ for short-duration impact type sounds.

## How is Sound Energy Reduced in the Environment?

The most significant mechanism for sound reduction within the environment is geometric spreading or divergence loss. For a point source, this results in a 6 dB reduction in sound level for every doubling of distance. In practical terms, this is limited in its application, as very few sources are found to be greater than 500 to 1,000 m from significant noise receptors (e.g. residences, hospitals, schools, etc.) in most cities and towns. Air absorption is another way energy is extracted from a propagating sound wave. And, a ground interaction also influences the sound energy reduction, as sound waves interact with the ground (often with variable acoustic impedance), causing destructive interference between the direct sound from a source and the indirect sound from the ground-reflected sound.

## Noise Emission versus Noise Immission

The sounds generated by equipment produce noise emissions that are typically organized within noise source inventory for a particular facility or process. The incoming sounds from all noise sources ($L_{pi}$) are called noise immissions, and are based on the cumulative, logarithmic summation of the sound pressure levels ($L_{pT}$), as follows:

$$L_{p_T} = 10 \log \left( \sum_{i=1}^{N} 10^{\frac{L_{p_i}}{10}} \right)$$

## ISO 9613 – Basics of Outdoor Sound Propagation

Outdoor sound propagation, as detailed in the international standard ISO 9613, Parts 1 and 2, and industry best practices, mainly consider five (5) main acoustical mechanisms, including:

- Source geometry and type (point, line, coherent incoherent);
- Meteorological conditions (wind and temperature variants, atmospheric turbulence);
- Atmospheric absorption of sound;
- Terrain – type and contours (ground absorption and reflection); and,
- Obstructions (buildings, barriers, vegetation, etc.).

## Hemispherical sound spreading

For a point source, in a loss-less medium with no reflections, the sound levels decay by 6 dB per doubling of distance. If the source is directional, an additional term (Directivity Index, DI) is needed to account for the uneven distribution of sound as a function of direction. The DI is the difference between the actual sound pressure and the sound pressure from a non-directional source with the same acoustic power. It can be validated experimentally, or calculated analytically such as a moving piston at the end of a long tube (Beranek, 1954).

## Atmospheric Absorption

Sound energy is dissipated in the air by two main mechanisms:

- Viscous losses due to the friction between air molecules; and,
- A relaxation process, where molecules vibrate and rotate in the atmosphere causing interference with the incoming sound.

The atmospheric absorption of sound has been found to be a function of frequency, temperature, and molar concentration of water vapour. At distances of less than 500 m, the atmospheric absorption is generally insignificant (i.e. < 1 dB). At larger separation distances, this phenomena may be significant, in particular within the high frequencies (i.e. > 1 KHz). The most common atmospheric settings used in acoustical prediction is 10 deg. Celsius and 70% relative humidity (ISO 9613-2).

## Meteorological Effects

Over open ground areas, vertical wind velocity gradients may exist due to friction between the moving air and ground. Wind speed profiles are strongly dependent on the time of day, weather conditions, and the nature of the surface (roughness). The wind speed, in the absence of turbulence, will vary logarithmically up to a height of 100 m, with negligible changes at higher altitudes. The velocity gradient creates a sound speed profile (i.e. changing speed of sound versus height), influencing the propagation where the sound wave propagating in the direction of wind will be bent downward, and sound wave propagation against the wind will be bent upward. This process is called refraction, where the sound waves are 'curved' in the direction of the lower sound speed.

Analogous to wind direction, refraction may occur due to vertical temperature gradients. The speed of sound in air is proportional to the square root of the temperature. In the presence of a temperature gradient, the effect is to refract sound waves in the direction of lower sound speed, or lower temperature. Typically, this may result in sound waves refracting upward during a sunny afternoon period (negative temperature gradient), and sound waves refracting downward during a calm evening period (positive temperature gradient).

Refraction effects can cause both increases and decreases in sound levels compared to a uniform atmosphere. One common approach is to calculate the sound levels assuming no refraction, assuming this represents a reasonable prediction of the equivalent or time averaged sound level that would be observed.

## Ground Interactions

The surface over which sound propagates is often somewhere between highly reflective and highly absorptive. The prediction of the ground interaction with the sound propagation requires knowledge of the reflective and absorptive properties, known as the acoustic impedance, of the intervening ground surface(s). The main factors in determining the ground effect include the distance between the source and receiver (i.e. direct path), distance of any ground reflected paths, angle of incidence of the reflected paths, and the flow resistivity of the surface that is used to derive ground impedance. Experiments have been used to derive flow resistivity for various ground surfaces, including snow covered ground (very low resistivity), grass (moderate resistivity), and asphalt areas (very high resistivity). Vegetation and foliage may provide a minor amount of sound attenuation when significantly dense and only significant at large separation distances (i.e. greater than 200 m).

## Noise Barriers

When the line of sight between a noise source and a receiver is obstructed by a non-porous wall, building, or berm, the sound waves must diffract around the object in order to be heard at the receiver. This effect is limited by the sound reduction of the obstruction itself. Typically, the sound propagating through the obstruction or barrier must be 10 dB less than the sound waves diffracting around it. The barrier material's acoustic effectiveness is typically described as the Transmission Loss (TL, dB). The measure of the line of sight blockage that a barrier provides is called the Fresnel number, and is inversely proportionally to the wavelength of sound. Therefore, a barrier's effectiveness increases with increasing frequency.

Ministry of the Environment
Ministère de l'Environnement

Ontario

# ACOUSTIC ASSESSMENT REPORT CHECK-LIST

Company Name: ______________________________

Company Address: ______________________________

______________________________

Location of Facility: ______________________________

______________________________

The attached Acoustic Assessment Report was prepared in accordance with the guidance in the ministry document "Information to be Submitted for Approval of Stationary Sources of Sound" (NPC 233) dated October 1995 and the minimum required information identified in the check-list on the reverse of this sheet has been submitted.

Company Contact: ______________________________

Name: ______________________________

Title: ______________________________

Phone Number: ______________________________

Signature: ____________________

Date: ____________________

Technical Contact: ______________________________

Name: ______________________________

Representing: ______________________________

Phone Number: ______________________________

Signature: ____________________

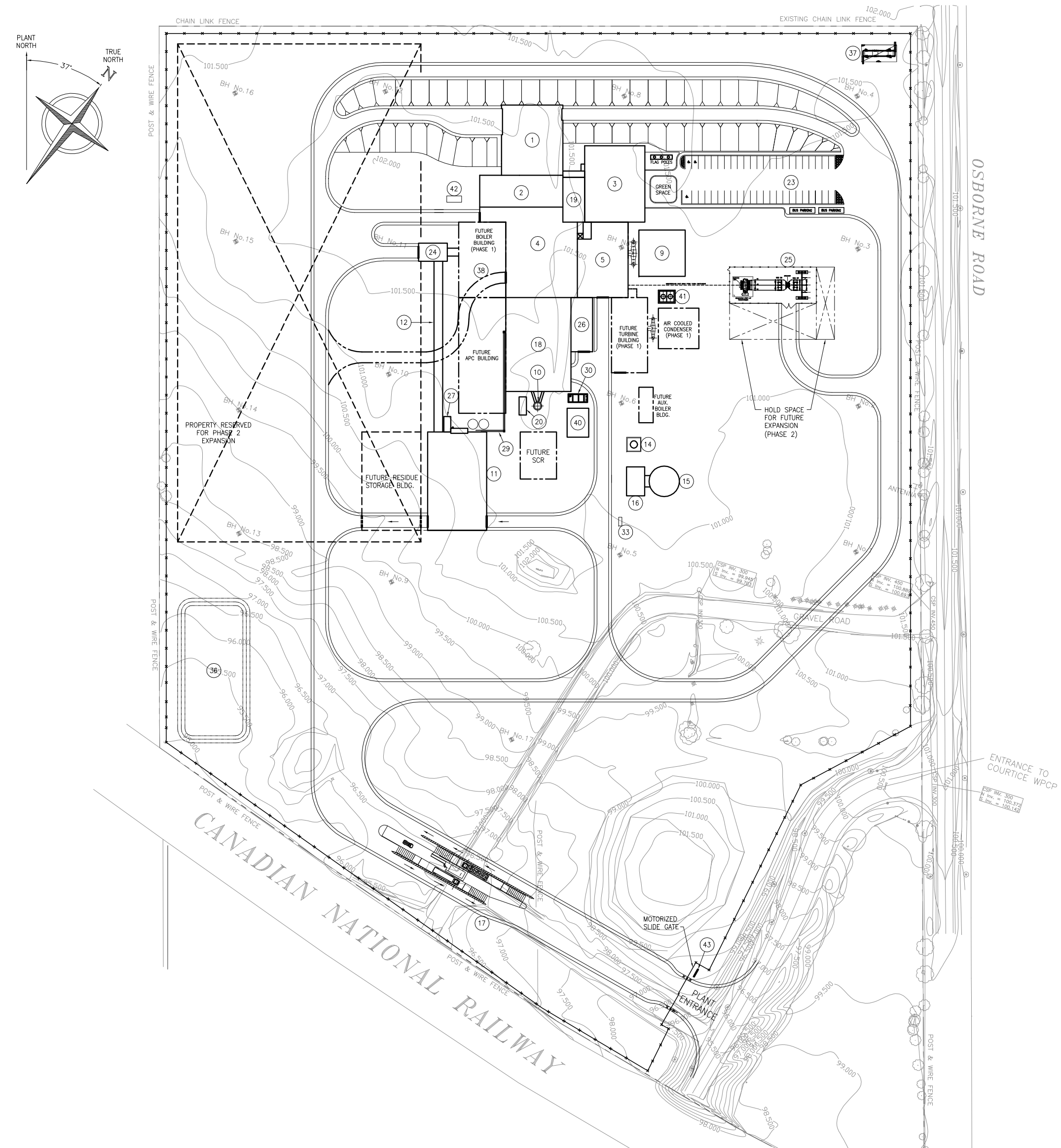
Date: ____________________

## ACOUSTIC ASSESSMENT REPORT CHECKLIST

| | Required Information | | |
|---|---|---|---|
| | | Submitted | Explanation/Reference |
| **1.0** | **Introduction** (Project Background and Overview) | ☐ Yes | |
| | | | |
| **2.0** | **Facility Description** | | |
| | 2.1 Operating hours of facility and significant Noise Sources | ☐ Yes | |
| | 2.2 Site Plan identifying all significant Noise Sources | ☐ Yes | |
| | | | |
| **3.0** | **Noise Source Summary** | | |
| | 3.1 ***Noise Source Summary Table*** | ☐ Yes | |
| | 3.2 Source noise emissions specifications | ☐ Yes | |
| | 3.3 Source power/capacity ratings | ☐ Yes | |
| | 3.4 Noise control equipment description and acoustical specifications | ☐ Yes | |
| | | | |
| **4.0** | **Point of Reception Noise Impact Calculations** | | |
| | 4.1 ***Point of Reception Noise Impact Table*** | ☐ Yes | |
| | 4.2 Point(s) of Reception (POR) list and description | ☐ Yes | |
| | 4.3 Land-use Zoning Plan | ☐ Yes | |
| | 4.4 Scaled Area Location Plan | ☐ Yes | |
| | 4.5 Procedure used to assess noise impacts at each POR | ☐ Yes | |
| | 4.6 List of parameters/assumptions used in calculations | ☐ Yes | |
| | | | |
| **5.0** | **Acoustic Assessment Summary** | | |
| | 5.1 ***Acoustic Assessment Summary Table*** | ☐ Yes | |
| | 5.2 Rationale for selecting applicable noise guideline limits | ☐ Yes | |
| | 5.3 Predictable Worst Case Impacts Operating Scenario | ☐ Yes | |
| | | | |
| **6.0** | **Conclusions** | | |
| | 6.1 Statement of compliance with the selected noise performance limits | ☐ Yes | |
| | | | |
| **7.0** | **Appendices** (Provide details such as) | ☐ Yes | |
| | Listing of Insignificant Noise Sources | ☐ Yes | |
| | Manufacture's Noise Specifications | ☐ Yes | |
| | Calculations | ☐ Yes | |
| | Instrumentation | ☐ Yes | |
| | Meteorology during Sound Level Measurements | ☐ Yes | |
| | Raw Data from Measurements | ☐ Yes | |
| | Drawings (Facility / Equipment) | ☐ Yes | |

# APPENDIX B

Zoning, Area, and Site Plan




## LEGEND

1. TIPPING FLOOR
2. REFUSE BUILDING
3. ADMINISTRATION BUILDING
4. BOILER BUILDING
5. TURBINE BLDG.
6. NOT USED
7. NOT USED
8. NOT USED
9. AIR COOLED CONDENSER
10. STACK
11. RESIDUE STORAGE BUILDING
12. INCLINED BELT CONVEYOR GALLERY ENCLOSURE
13. NOT USED
14. AMMONIA STORAGE TANK & CONTAINMENT
15. FIRE WATER STORAGE TANK
16. FIRE WATER PUMP HOUSE
17. TRUCK SCALE AREA
18. FDG/APC BUILDING/BAGHOUSE BLDG.
19. CONTROL/ELECTRICAL ROOMS
20. CEMS BUILDING
21. NOT USED
22. NOT USED
23. PARKING LOT
24. GRIZZLY BUILDING
25. SWITCHYARD
26. MAINTENANCE AND STORAGE BUILDING
27. RESIDUE PROCESSING ELECTRICAL BUILDING
28. NOT USED
29. FLY ASH TRANSPORT CONVEYORS
30. SETTLING BASIN
31. NOT USED
32. NOT USED
33. MAINT. TRUCK DIESEL OIL STORAGE TANK
34. NOT USED
35. NOT USED
36. RETENTION POND
37. GAS METERING STATION
38. GRAVEL ACCESS ROAD
39. NOT USED
40. ID FAN VFD BUILDING
41. CLOSED COOLING WATER HEAT EXCHANGER
42. EMERGENCY DIESEL GENERATOR ENCLOSURE
43. PLANT ENTRANCE SIGN

GRAPHIC SCALE

10m 30m 50m
0m 20m 40m 60m
METERS

GRAPHIC SCALE

0' 40' 80' 150'
20' 60' 100' 200'
1"=80'-0"

# PRELIMINARY

CONTRACTOR SHALL VERIFY ALL CONDITIONS ON JOB SITE & NOTIFY PROJECT ENGINEER OF ANY VARIATIONS FROM DIMENSIONS SHOWN ON THESE DRAWINGS BEFORE PROCEEDING WITH ANY CONSTRUCTION.

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| REV | DATE | BY | CHK | APPR | ISSUED FOR | REVISION DESCRIPTION |
|---|---|---|---|---|---|---|
| E | 01-23-09 | GM | RAM | PFP | REVIEW & COMMENT | GENERAL REVISION, INCORPORATED CLIENTS COMMENTS |
| D | 01-09-09 | GM | RAM | PFP | REVIEW & COMMENT | GENERAL REVISION, INCORPORATED CLIENTS COMMENTS |
| C | 12-22-08 | GM | RAM | PFP | REVIEW & COMMENT | GENERAL REVISION, INCORPORATED CLIENTS COMMENTS |
| G | 02-13-09 | KPL | RAM | PFP | REVIEW & COMMENT | INCORPORATED CLIENT COMMENTS |
| F | 01-30-09 | GM | RAM | PFP | REVIEW & COMMENT | GENERAL REVISION, INCORPORATED CLIENTS COMMENTS |

| | |
|---|---|
| PROJECT ENGINEER | R. MARTINSEN |
| ENGINEER | G. KOSIBA |
| DATE | 11/25/08 |
| RATIO | 1:960 |
| DRAWN | G. MOREAU |
| CHECKED | G. KOSIBA |
| APPROVED | R. MARTINSEN |
| APPROVED | T. SWEENEY |

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PE SEAL

COVANTA ENERGY INC.
COVANTA ENERGY INC.
40 LANE ROAD
FAIRFIELD, NEW JERSEY 07007-2615

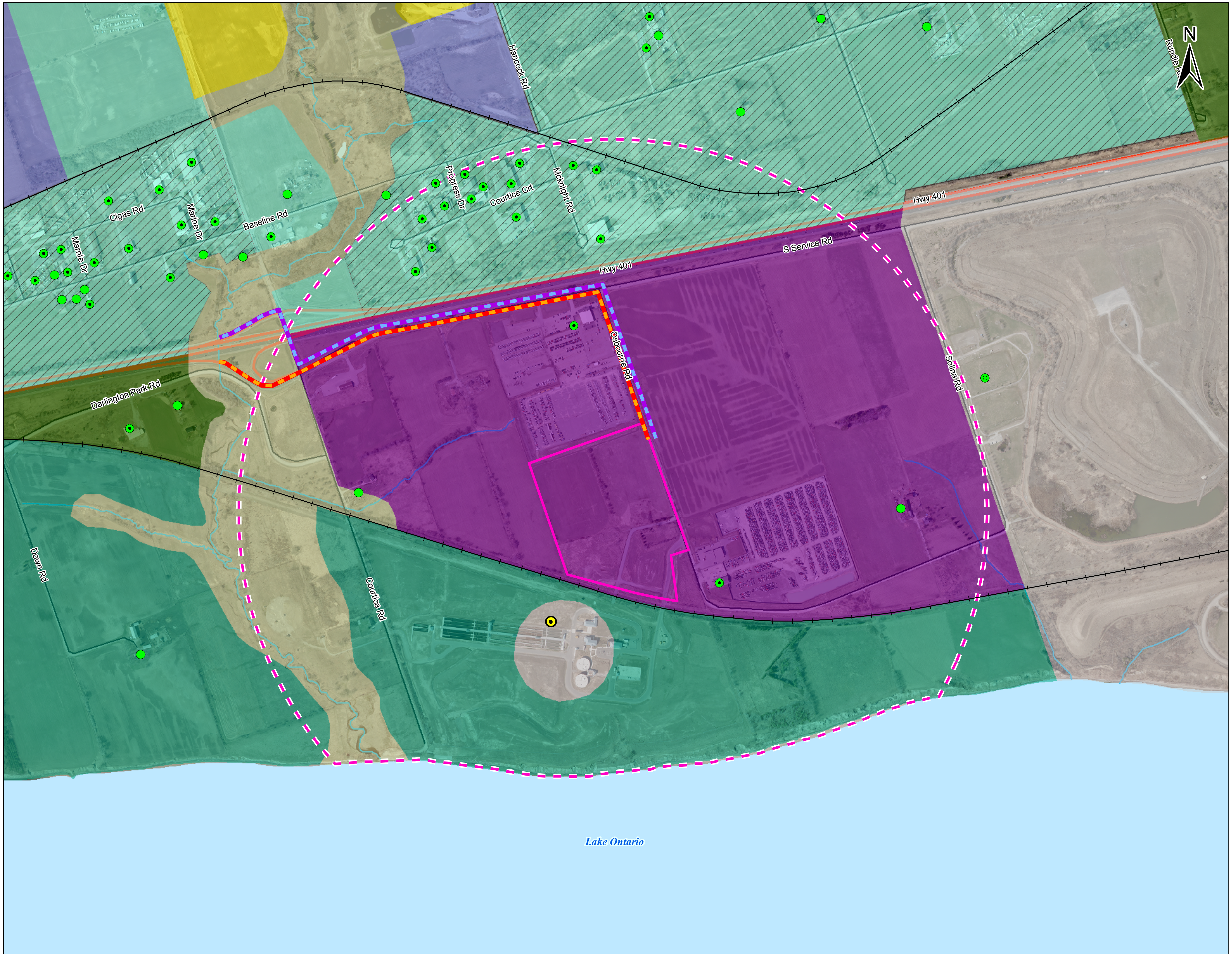
**DURHAM YORK ENERGY FROM WASTE FACILITY**
**BASE CASE FACILITY**

BASE CASE SITE PLAN

ORIGINAL SIZE: 24"x36"
WORK ORDER: 57708
COVANTA PN: ______
Document ID: M-2000
SHEET 1 OF 1
Rev. G

R:\COVANTA\DURHAM YORK EFW\MECHANICAL\SITE PLAN, GA's\M-2000 SERIES BASE CASE SP & GAs\M-2000_G.dwg
Feb 13, 2009 - 11:42am

N
COURTICE ROAD
HANCOCK ROAD
SOLINA ROAD
BASELINE ROAD
RUNDLE ROAD
CIGAS ROAD
Tooley Creek
401 HIGHWAY
401 HIGHWAY
CLARINGTON
SOUTH SERVICE ROAD
SOLINA ROAD
DOWN ROAD
Clarington 01
OSBOURNE ROAD
Tooley Creek
Lake Ontario
0 100 200 300
Metres
1009497-015




YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Clarington Official Plan Landuse



- Business
- Residential
- Recreational Facility
- Courtice Water Pollution Plant
- Inbound Haul Route
- Outbound Haul Route
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site
- 1 km Radius from Site
- Waterbody

**Clarington Official Plan Landuse**

- General Agricultural
- Light Industrial
- General Industrial
- Prestige Employment
- Business Park
- Environmental Protection
- Waterfront Greenway
- Green Space
- Utility

0 100 200 300

Metres - 1:10,000

1009497-056

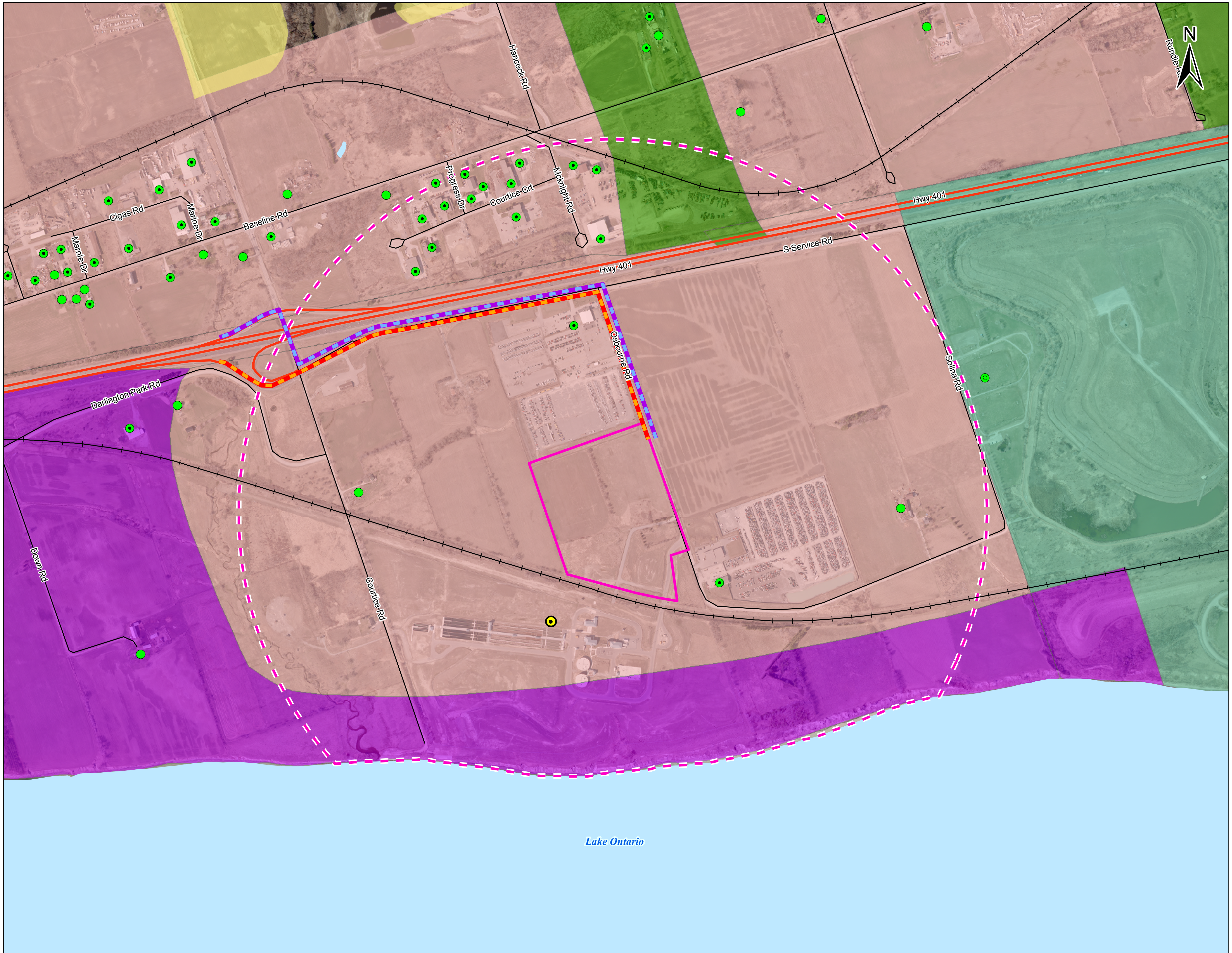

Jacques Whitford

FIGURE NO.

Last Modified: May 6, 2009 By: S.Allen

YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Durham Official Plan Landuse




- Business
- Residential
- Recreational Facility
- Courtice Water Pollution Plant
- Inbound Haul Route
- Outbound Haul Route
- Collector
- Expressway / Highway
- Railway
- Clarington 01 Site
- 1 km Radius from Site
- Waterfront
- Darlington Nuclear Generating Station
- Employment Area
- General Agriculture
- Major Open Space
- Waterbody

0 100 200 300

Metres - 1:10,000



1009497-055


Jacques Whitford

FIGURE NO.

Last Modified: May 6, 2009 By: S.Allen

# APPENDIX C

Source Sound Power Level

| Phase | Description | Source ID | Qty | Octave Sound Power Levels [dB] 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Overall dBA | Notes | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operation | Back-up Power Generator | BPG | 1 | 107 | 119 | 108 | 111 | 116 | 121 | 120 | 114 | **126** | 3,5 | RFP-604-2008-D8 (200-300 kW)300 kW Cummins Data online |
| | Fire Pump | FP | 2 | 85 | 95 | 102 | 105 | 111 | 116 | 116 | 110 | **121** | 3,5 | RFP-604-2008-C21 (185 kW)/200 kW Cummins Data online |
| | Miscellaneous Fans | EF | >2 | 119 | 119 | 120 | 113 | 108 | 102 | 98 | 93 | **115** | 1 | RFP-604-2008-B7/ASHRAE 1991, ch 42, table 4 |
| | Steam Soot Blower | SSB | 2 | 119 | 119 | 120 | 113 | 108 | 102 | 98 | 93 | **115** | 1 | RFP-604-2008-B11/ASHRAE 1991, ch 42, table 4 |
| | Acid Gas Scrubbing Fan | AGSF | 2 | 116 | 116 | 117 | 110 | 105 | 99 | 95 | 90 | **112** | 1 | RFP-604-2008-B13/ASHRAE 1991, ch 42, table 4 |
| | Turbine/Generator | TG | 1 | 103 | 104 | 101 | 100 | 100 | 98 | 97 | 93 | **105** | 1,3 | RFP-604-2008-C14/Bies & Hansen, Page 548, 11.84 |
| | Air Compressor | ACom | 2 | 87 | 87 | 86 | 89 | 92 | 92 | 90 | 87 | **98** | 1 | RFP-604-2008-C22/Bies & Hansen, Page 515, Tables 11.4 |
| | Truck traffic on-site | TRon | 97 | 93 | 88 | 83 | 90 | 87 | 88 | 82 | 71 | **93** | 4 | Lw from previous study, number of vehicles estimated by JWSL |
| | Truck traffic off-site | TRoff | 7 | 93 | 88 | 83 | 90 | 87 | 88 | 82 | 71 | **93** | 4 | Lw from previous study, number of vehicles estimated by JWSL |
| | ID Fan | ID | 2 | 102 | 102 | 92 | 87 | 85 | 80 | 75 | 70 | **92** | 1 | RFP-604-2008-B1 (18 m/s, D=1.7, SP=1 in$H_2O$)/ASHRAE 1991, ch 42, table 4 |
| | Transformer | TRAN | 1 | 83 | 88 | 87 | 87 | 81 | 76 | 71 | 64 | **87** | 1,3 | RFP-604-2008-D2/Bies & Hansen, Page 554, 11.95 |
| | Office Comfort Equipment | AC | 4 | 57 | 71 | 72 | 79 | 82 | 78 | 76 | 63 | **85** | 2 | Assumed to be 4 units, and date obtained from previous studies/measurements |
| | Air Cooled Condenser (4 fans, 2 centrifugal pups) | ACC | 1 | 69 | 70 | 72 | 72 | 75 | 72 | 68 | 62 | **78** | 1 | RFP-604-2008-C15/Bies & Hansen, Page 513, 11.2 |
| | Boiler Feed Pump | BFP | 3 | 66 | 67 | 69 | 69 | 72 | 69 | 65 | 59 | **75** | 1 | RFP-604-2008-C17/Bies & Hansen, Page 523/524, Tables 11.10&11.11 |
| | Condensate Pump | CP | 1 | 66 | 67 | 69 | 69 | 72 | 69 | 65 | 59 | **75** | 1 | RFP-604-2008-C18/Bies & Hansen, Page 523/524, Tables 11.10&11.11 |
| | Circulating Water Pump | CWP | 1 | 66 | 67 | 69 | 69 | 72 | 69 | 65 | 59 | **75** | 1 | RFP-604-2008-C19/Bies & Hansen, Page 523/524, Tables 11.10&11.11 |
| | Auxiliary Cooling Water Pump | ACWP | 2 | 66 | 67 | 69 | 69 | 72 | 69 | 65 | 59 | **75** | 1 | RFP-604-2008-C20/Bies & Hansen, Page 523/524, Tables 11.10&11.11 |
| | Other Pumps | OP | 2 | 66 | 67 | 69 | 69 | 72 | 69 | 65 | 59 | **75** | 1 | RFP-604-2008-C21/Bies & Hansen, Page 523/524, Tables 11.10&11.11 |
| Construction - Site Prep | Heavy Truck (i.e. Cat 777) | HT | 1 | 107 | 108 | 109 | 108 | 107 | 105 | 100 | 96 | **111** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Medium Sized Truck | MT | 2 | 97 | 103 | 105 | 104 | 104 | 103 | 96 | 91 | **108** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Front End Loader | FEL | 2 | 116 | 111 | 107 | 105 | 108 | 106 | 102 | 101 | **112** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Back Hoe | BH | 1 | 123 | 115 | 105 | 102 | 98 | 99 | 95 | 90 | **106** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Bulldozer (i.e. CAT D7) | BZ | 1 | 102 | 108 | 109 | 108 | 105 | 102 | 96 | 92 | **110** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Excavator | EX | 1 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | **113** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Land Grader | LG | 2 | 119 | 114 | 110 | 108 | 111 | 109 | 105 | 104 | **115** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Pneumatic Pile Driver | PD | 1 | 127 | 127 | 127 | 127 | 127 | 127 | 127 | 127 | **133** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| Construction - Assembly | Concrete Ready Mix Truck, high idling | CRM | 1 | 105 | 113 | 113 | 110 | 105 | 102 | 98 | 71 | **111** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Concrete Vibrator | CV | 1 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | **108** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Heavy Truck (i.e. Cat 777) | HT | 1 | 107 | 108 | 109 | 108 | 107 | 105 | 100 | 96 | **111** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Front End Loader | FEL | 1 | 121 | 116 | 112 | 110 | 113 | 111 | 107 | 106 | **117** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Back Hoe | BH | 1 | 123 | 115 | 105 | 102 | 98 | 99 | 95 | 90 | **106** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Excavator | EX | 1 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | 107 | **113** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Land Grader | LG | 1 | 119 | 114 | 110 | 108 | 111 | 109 | 105 | 104 | **115** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Air Compressor | AC | 1 | 100 | 100 | 99 | 102 | 105 | 105 | 103 | 100 | **111** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Asphalt Paver (Large) | AP | 1 | 103 | 103 | 103 | 103 | 103 | 103 | 103 | 103 | **109** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |
| | Welding Compressor | WC | 1 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | **110** | 6 | U.S. Department of Transportation, Construction Equipment Noise Levels |

Reference Notes:
1 Sound Data predicted from specs data provided in the Detailed Facility and Equipment Data (Base Case),[RFP-604-2008]
2 Sound Data obtained from Jacques Whitford's internal noise source database.
3 Noise Source Identified as Tonal; Tonal Penalty as per MOE's NPC-104 is required.
4 Based on a 1m section (line source) as per MTO data.
5 Manufacturer specs for a unit of similar rating
6 Sound Levels based on actual measurements or empirical prediction

# APPENDIX D

Instrumentation

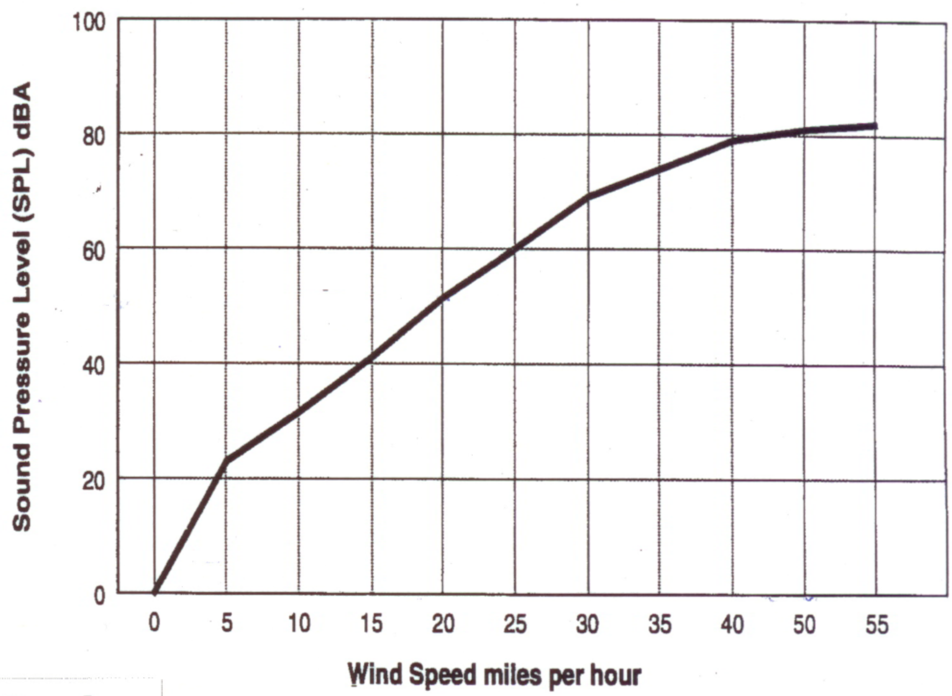
Design of the steel RMS tower (with earth ground) with internal cable runs contributes to the excellent RMS performance in the presence of EMI and RFI influences.

## 8.7 Wind Noise

The microphone is mounted such that winds up to 20 m.p.h. do not cause vibration levels at the microphone resulting in microphone outputs above 60 dBA.

Using the capability of the Larson•Davis RMS to interface directly to windspeed sensors, a complete Model 2100K microphone system with rainhat, windscreen, and bird spikes was tested in actual variable wind conditions out-of-doors. Data were logged simultaneously for windspeed and A-weighted sound pressure level; resulting data are plotted in Figure 16.

**FIGURE 16.** Wind Screen Noise for the Model 2100K Outdoor Microphone System




In the above figure, A-weighed sound pressure levels are correlated over a 0-55 mile per hour (0-88 km/hr) range. The 50 dBA limit is reached at 20 miles per hour or 8.9 m/s.

The microphone assembly, tilt-down tower have been designed to withstand wind velocities of 100 m.p.h. without permanent damage.

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A PCB GROUP CO.

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# Models 812 / 820 Sound Level Meters

There exists a need to select an instrument that will do just what you need it to do. The 812 and 820 were designed with this in mind. For example, a consultant that works heavily in the industrial hygiene sector will greatly benefit from having the Model 812, a hand held data logging integrating sound level meter and a personal noise dosimeter. The Model 820 is the perfect environmental noise analyzer, maintaining all of the features of the 812 but with added memory, modem capability, daily and exceedance histories.

- Sound Level Measurements
- Community Noise Assessment
- Environmental Noise Monitoring
- Statistical Analysis
- Transportation Noise/Passby Measurement
- Sonic boom/artillery fire measurements
- Production Line Testing
- Remote Outdoor Noise Monitoring (Model 820)

The ½" condenser microphones used with our Models 812 and 820 allow for a wider dynamic range and greater level of accuracy. The Models 812 and 820 meet the IEC and ANSI requirements for Type 1, Precision Integrating Sound Level Meters.

Fundamental to each of these instruments is an integrating sound level meter. Each features true RMS and dual Peak detectors that operate simultaneously. Each has Slow, Fast, and Impulse detector rates. Each has A and C frequency weighting filters.

**FEATURES**

- ANSI/IEC Type 1 integrating SLM
- 110 dB dynamic range
- Long Term logging capabilities: Interval and Time histories (812 only); Interval, Time, Daily and Event histories (820 only)
- Statistics - user selectable Ln values: 4 in the 812, 6 in the 820
- Slow, Fast and Impulse Detectors
- True RMS with two separate Peak detectors
- A & C weighting
- ½" condenser microphone - extension cables up to 20 feet available
- 64K bytes of memory (812) / 256 K bytes of memory (820)
- AC/DC Output
- RS-232 Interface
- Remote communications via modem (820 only)

### Communications & AC/DC Outputs

Also common to this family of meters is a serial digital interface for communication with a computer or direct connection to a printer. Each meter also features AC and DC outputs for transferring data to DAT or chart recorder during data acquisition. The analog output can be weighted (A or C) or unweighted, independent of how the data is acquired and stored within the instrument.

### Dynamic Range

Each of these instruments has a unique 110dB dynamic range without the need for range switching thus removing the problems of missed critical data.

### Measurements

Measurements include instantaneous Sound Pressure Level, Lmin (rms), Lmax (rms), Lpeak and Unweighted Peak Levels, Ln (statistics), Leq, SEL, Time Weighted Average (TWA), and Taktmaximal 3 & 5. All of these parameters are measured simultaneously making this family very flexible in an extremely wide variety of applications.

### Modem Capability (820)

The 820 can be connected to a modem for remote data acquisition from portable or permanent monitors. The modem control mode enables the 820 to automatically dial out upon a high level event or a low memory condition.

## SPECIFICATIONS

| | |
|---|---|
| **Linearity range** | > 107 dB |
| **Max peak level** | 142 dB (based on normal sensitivity free field microphone) |
| **RMS noise floor** | 17.5 dBA (based on high sensitivity random incidence microphone) |
| **Time weighting** | Slow, fast, and impulse |
| **Frequency weighting** | A and C |
| **Microphone** | ½" air condenser |
| **Microphone polarization** | 0, 28, & 200 volts DC |
| **Memory** | 64KB |

| | |
|---|---|
| **DC output** | 0 - 3 volts @ 600 ohms |
| **AC output** | |
| **A - weight range** | 38.4 dBuV to 128.4 dBuV |
| **C - weight range** | 36.3 dBuV to 126.3 dBuV |
| **Linear range** | 36.1 dBuV to 126.1 dBuV |
| **Output impedance** | 600 ohms |
| **Gain** | 0 or 20 dB (user selectable) |
| **Quartz clock/calendar** | 24 hour format (hh:mm:ss), 1 second resolution, 100 yr. calendar (mo/day/yr) |
| **Power Supply** | |
| **Internal** | 9 Volt battery, 24 hr operation |
| **External** | 7 to 16 Vdc, 30 ma current draw |
| **Dimensions** | 13.2" L x 3.3" W x 1.1" D (with preamp connected) |
| **Standards Met** | |
| | ANSI S1.4 – 1983 |
| | ANSI S1.25 – 1991 |
| | IEC 651 |
| | IEC 804 |
| | Directive 86/188/EEC |
| | IEC/TC - 29 |

| | |
|---|---|
| **CCS009** | Cordura nylon pouch |
| **WS001** | 3 ½" windscreen |
| **SWW_SLM_UTIL** | Windows software for instrument setup, data download, and data export 9V alkaline battery |
| | Operator's manual |
| | Acoustic calibrators<br>Outdoor environmental cases<br>Tripods<br>Software<br>Printer, computer and modem cable<br>Outdoor preamp (Model 820 only) |

MODEL 831

# Sound Level Meter for Environmental Noise

- Exceedance Based Logging
- Audio and Voice Recording with Replay
- Multiple Communication Options, Including GPRS
- 2 GB Data Storage Including Audio Files
- Small, Lightweight, Ergonomic Design
- Real Time 1/1 and 1/3 Octave

...and a whole lot more

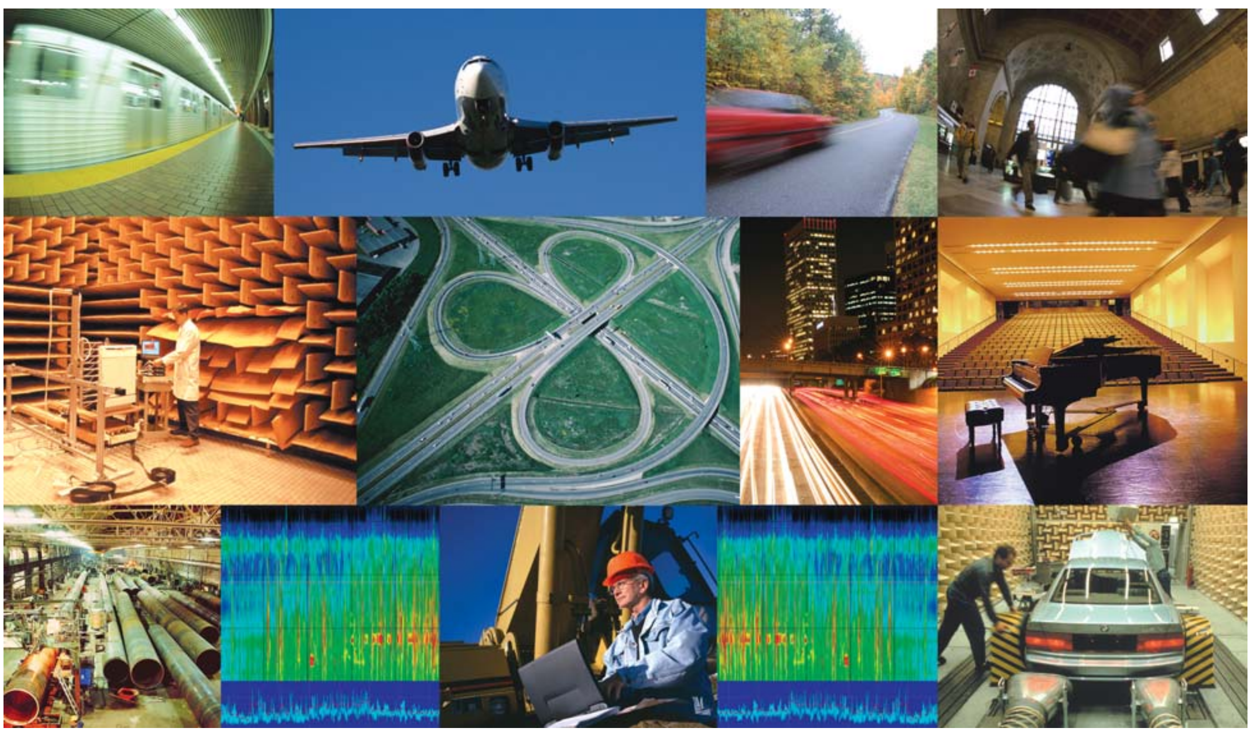

Model 831 is the newest Sound Level Meter from Larson Davis – with capabilities not found in other meters: USB powered, ANY LEVEL™ data representation, huge data storage, and remote access technologies that fit your "real life" needs and expectations. The rugged, ergonomic design is ideal for one-handed operation, right or left.

The 831 can be used with a complete range of microphones and preamplifiers including weather-resistant units for unattended and semi-permanent monitoring applications.

As with all Larson Davis equipment, this product is complemented with toll free applications assistance, 24-hour customer service, and is backed by a no-risk policy that guarantees satisfaction or your money refunded.

Larson Davis
A PCB Group Co.
**Acoustic Test Products Group**

- ✓ Precision integrating sound level meter, ANSI S1.4 type 1, IEC 61672 class 1
- ✓ Single measurement range from 20 to 140 dB SPL
- ✓ 120 MB standard data memory, expands up to 2GB
- ✓ 160 x 240 graphic LCD display with backlight and icon driven user interface
- ✓ Elastomeric illuminated keypad with "Quiet Touch" tactile action
- ✓ Detectors: linear, slow, fast, impulse, peak
- ✓ Frequency weighting: A, C, Z
- ✓ Peak frequency weighting: A, C, Z
- ✓ $L_n$ statistics (L0.01 through L99.99 available) and Histogram tables
- ✓ Measurement or Interval History stores statistics with every run or by time interval
- ✓ Exceedance History with programmable length and triggers
- ✓ Jack for AC/DC output or Headset microphone and speaker
- ✓ Voice annotation recording with playback, from headset or measurement microphone
- ✓ Digital audio recording of events and interval start
- ✓ Detachable preamplifier with up to 30m (100 feet) microphone extension cable (full scale to 20 kHz)
- ✓ 4 – AA batteries provides up to 16 hours of battery life
- ✓ Dust tight (IP53), durable plastic case with tripod mount and lanyard
- ✓ USB 2.0 peripheral full-speed port
- ✓ AUX control connector for USB Mass Storage, Cellular & Dialup Modems and future devices
- ✓ AC and DC signal output connector, 2.5 mm phone jack
- ✓ Utility software included for setup, control and high speed data download, application software available
- ✓ Field-upgradeable firmware



***Total Customer Satisfaction Guaranteed***

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Email: sales@LarsonDavis.com www.LarsonDavis.com
ISO 9001:2000 CERTIFIED

Larson Davis
A PCB Group Co.



**Larson Davis** provides a complete line of acoustic and vibration measurement tools including dosimeters, sound level meters, real time analyzers, pre-amplifiers, calibrators, and microphones.

# APPENDIX E

Ambinet Sound Level Data

**Weather Data for Monitoring Period - Baseline Road**

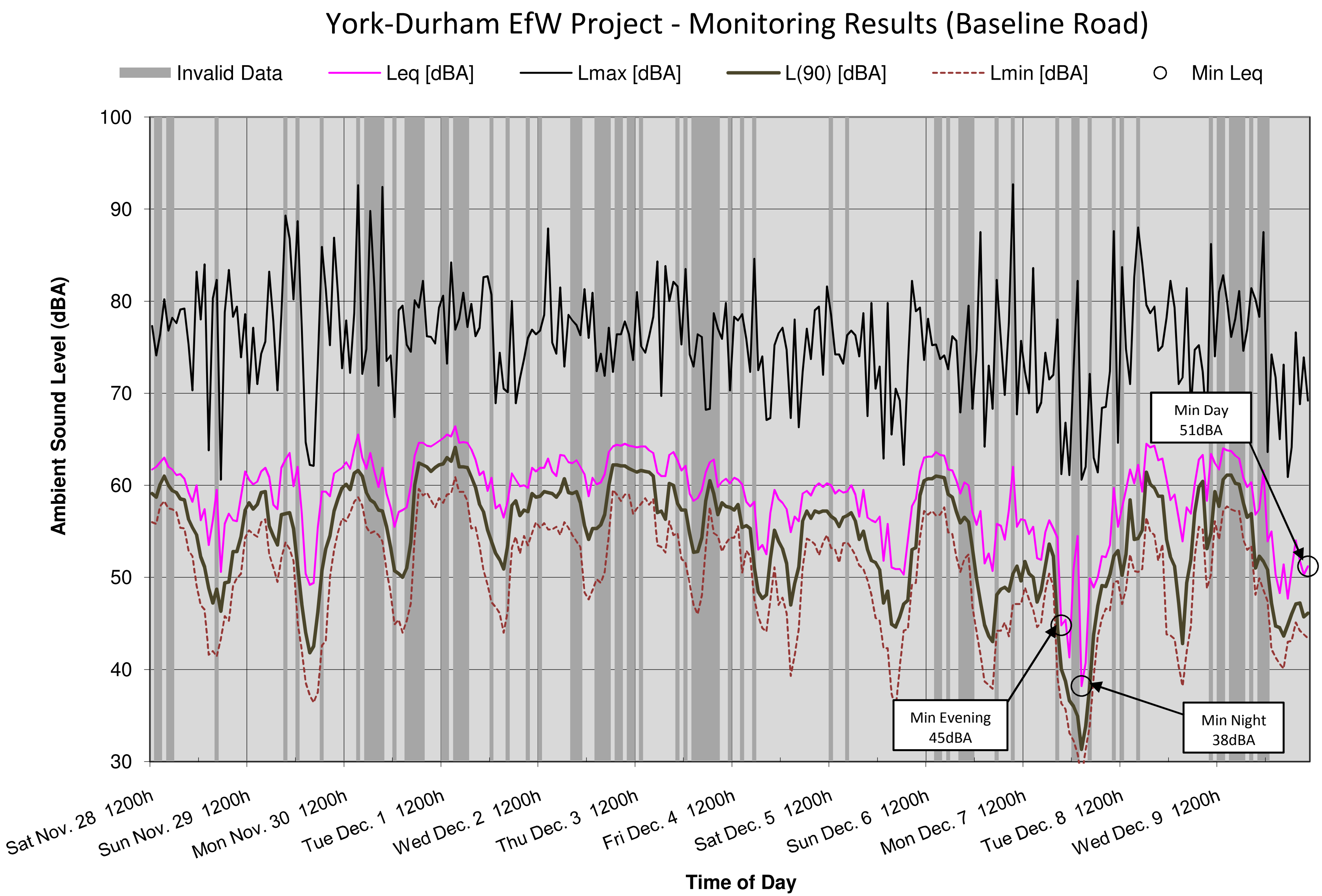
| Station | TORONTO CIT | Lat | 43.63 | Long | -79.4 | Alt | 76.5 | Height | 10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Temp (degC) | DewPoint (degC) | Rel Hum (%) | Wind Dir (deg) | Wind Speed (km/hr) | visibility (km) | stn Press (kPa) | Hmdx | Wind Chill | Weather |
| 2008-Nov-28 00:00 | 28-Nov-08 | 0:00 | 2.6 | -2.4 | 70 | 21 | 13 | 12.9 | 99.58 | | | Rain |
| 2008-Nov-28 01:00 | 28-Nov-08 | 1:00 | 2.5 | -1.4 | 75 | 20 | 11 | 8 | 99.46 | | | Rain |
| 2008-Nov-28 02:00 | 28-Nov-08 | 2:00 | 2.1 | -1.4 | 78 | | 0 | 6.4 | 99.4 | | | Rain |
| 2008-Nov-28 03:00 | 28-Nov-08 | 3:00 | 2.3 | -1 | 79 | 23 | 4 | 8 | 99.35 | | | Rain |
| 2008-Nov-28 04:00 | 28-Nov-08 | 4:00 | 2.4 | -1.1 | 78 | 24 | 17 | 8 | 99.37 | | | |
| 2008-Nov-28 05:00 | 28-Nov-08 | 5:00 | 2.6 | -1.1 | 77 | 23 | 24 | 6.4 | 99.38 | | | |
| 2008-Nov-28 06:00 | 28-Nov-08 | 6:00 | 3.1 | -0.9 | 75 | 24 | 30 | 8 | 99.44 | | | Rain |
| 2008-Nov-28 07:00 | 28-Nov-08 | 7:00 | 3.2 | -0.9 | 74 | 23 | 33 | 8 | 99.49 | | | Rain |
| 2008-Nov-28 08:00 | 28-Nov-08 | 8:00 | 2.5 | -1.1 | 77 | 24 | 33 | 9.7 | 99.56 | | | Rain |
| 2008-Nov-28 09:00 | 28-Nov-08 | 9:00 | 3.3 | -0.7 | 75 | 24 | 33 | 15 | 99.58 | | | Rain |
| 2008-Nov-28 10:00 | 28-Nov-08 | 10:00 | 3.7 | -1 | 71 | 24 | 41 | 15 | 99.6 | | | |
| 2008-Nov-28 11:00 | 28-Nov-08 | 11:00 | 4.3 | -1.2 | 67 | 25 | 37 | 15 | 99.65 | | | |
| 2008-Nov-28 12:00 | 28-Nov-08 | 12:00 | 4.4 | -2.1 | 63 | 25 | 41 | 15 | 99.62 | | | Rain |
| 2008-Nov-28 13:00 | 28-Nov-08 | 13:00 | 4.4 | -2.2 | 62 | 25 | 37 | 15 | 99.61 | | | Rain |
| 2008-Nov-28 14:00 | 28-Nov-08 | 14:00 | 4.3 | -2.2 | 63 | 25 | 37 | 15 | 99.59 | | | |
| 2008-Nov-28 15:00 | 28-Nov-08 | 15:00 | 3.9 | -2.4 | 63 | 25 | 39 | 15 | 99.61 | | | |
| 2008-Nov-28 16:00 | 28-Nov-08 | 16:00 | 3.3 | -3.1 | 63 | 30 | 30 | 15 | 99.69 | | | Rain |
| 2008-Nov-28 17:00 | 28-Nov-08 | 17:00 | 2.6 | -4.5 | 59 | 28 | 22 | 15 | 99.78 | | | |
| 2008-Nov-28 18:00 | 28-Nov-08 | 18:00 | 2.3 | -4.3 | 62 | 27 | 24 | 15 | 99.88 | | | |
| 2008-Nov-28 19:00 | 28-Nov-08 | 19:00 | 1.7 | -3.8 | 67 | 27 | 22 | 15 | 99.96 | | | |
| 2008-Nov-28 20:00 | 28-Nov-08 | 20:00 | 2.2 | -3.2 | 67 | 25 | 22 | 15 | 100.02 | | | |
| 2008-Nov-28 21:00 | 28-Nov-08 | 21:00 | 2.1 | -2.6 | 71 | 26 | 24 | 15 | 100.08 | | | |
| 2008-Nov-28 22:00 | 28-Nov-08 | 22:00 | 2 | -2.4 | 73 | 24 | 26 | 15 | 100.1 | | | |
| 2008-Nov-28 23:00 | 28-Nov-08 | 23:00 | 1.9 | -2.2 | 74 | 25 | 24 | 15 | 100.12 | | | |
| 2008-Nov-29 00:00 | 29-Nov-08 | 0:00 | 1.9 | -2.4 | 73 | 25 | 22 | 15 | 100.16 | | | |
| 2008-Nov-29 01:00 | 29-Nov-08 | 1:00 | 2 | -2.3 | 73 | 24 | 20 | 15 | 100.17 | | | |
| 2008-Nov-29 02:00 | 29-Nov-08 | 2:00 | 2 | -2.8 | 70 | 27 | 20 | 15 | 100.19 | | | Snow |
| 2008-Nov-29 03:00 | 29-Nov-08 | 3:00 | 2.3 | -3.6 | 65 | 27 | 19 | 15 | 100.22 | | | |
| 2008-Nov-29 04:00 | 29-Nov-08 | 4:00 | 2 | -3.9 | 65 | 27 | 22 | 15 | 100.21 | | | |
| 2008-Nov-29 05:00 | 29-Nov-08 | 5:00 | 1.8 | -3.5 | 68 | 27 | 17 | 15 | 100.23 | | | |
| 2008-Nov-29 06:00 | 29-Nov-08 | 6:00 | 1.5 | -3.9 | 67 | 28 | 13 | 15 | 100.26 | | | |
| 2008-Nov-29 07:00 | 29-Nov-08 | 7:00 | 1.2 | -4.2 | 67 | 27 | 9 | 15 | 100.3 | | | |
| 2008-Nov-29 08:00 | 29-Nov-08 | 8:00 | 1.5 | -3.5 | 69 | 24 | 11 | 15 | 100.32 | | | |
| 2008-Nov-29 09:00 | 29-Nov-08 | 9:00 | 2.1 | -2.8 | 70 | 25 | 15 | 15 | 100.34 | | | |
| 2008-Nov-29 10:00 | 29-Nov-08 | 10:00 | 2.6 | -2.7 | 68 | 24 | 19 | 15 | 100.39 | | | |
| 2008-Nov-29 11:00 | 29-Nov-08 | 11:00 | 3.4 | -2.6 | 65 | 23 | 17 | 15 | 100.38 | | | |
| 2008-Nov-29 12:00 | 29-Nov-08 | 12:00 | 3.7 | -2.6 | 63 | 23 | 13 | 15 | 100.33 | | | |
| 2008-Nov-29 13:00 | 29-Nov-08 | 13:00 | 4.4 | -1.5 | 65 | 20 | 15 | 15 | 100.29 | | | |
| 2008-Nov-29 14:00 | 29-Nov-08 | 14:00 | 4.5 | -3.5 | 56 | 21 | 24 | 15 | 100.23 | | | |
| 2008-Nov-29 15:00 | 29-Nov-08 | 15:00 | 5.6 | -4.2 | 49 | 23 | 22 | 15 | 100.24 | | | |
| 2008-Nov-29 16:00 | 29-Nov-08 | 16:00 | 4.3 | -5 | 51 | 24 | 28 | 15 | 100.27 | | | |
| 2008-Nov-29 17:00 | 29-Nov-08 | 17:00 | 2.7 | -6.4 | 51 | 28 | 15 | 15 | 100.29 | | | |
| 2008-Nov-29 18:00 | 29-Nov-08 | 18:00 | 2.4 | -6.7 | 51 | 30 | 6 | 15 | 100.24 | | | |
| 2008-Nov-29 19:00 | 29-Nov-08 | 19:00 | -0.1 | -5.9 | 65 | | 0 | 15 | 100.23 | | | |
| 2008-Nov-29 20:00 | 29-Nov-08 | 20:00 | -0.7 | -6.6 | 64 | | 0 | 15 | 100.23 | | | |
| 2008-Nov-29 21:00 | 29-Nov-08 | 21:00 | -0.2 | -5.3 | 68 | 21 | 4 | 15 | 100.23 | | | |
| 2008-Nov-29 22:00 | 29-Nov-08 | 22:00 | 1.9 | -3.6 | 67 | 26 | 7 | 15 | 100.24 | | | |
| 2008-Nov-29 23:00 | 29-Nov-08 | 23:00 | 1.7 | -4.7 | 62 | 31 | 6 | 15 | 100.22 | | | |
| 2008-Nov-30 00:00 | 30-Nov-08 | 0:00 | -0.1 | -4.8 | 71 | 35 | 4 | 15 | 100.19 | | | |
| 2008-Nov-30 01:00 | 30-Nov-08 | 1:00 | 0.6 | -4.1 | 71 | 6 | 9 | 15 | 100.14 | | | |
| 2008-Nov-30 02:00 | 30-Nov-08 | 2:00 | 1 | -3.1 | 74 | 7 | 11 | 15 | 100.11 | | | |
| 2008-Nov-30 03:00 | 30-Nov-08 | 3:00 | 1.4 | -2.8 | 74 | 6 | 15 | 15 | 100.05 | | | |
| 2008-Nov-30 04:00 | 30-Nov-08 | 4:00 | 0.7 | -3.5 | 73 | 7 | 15 | 15 | 99.93 | | | |
| 2008-Nov-30 05:00 | 30-Nov-08 | 5:00 | 1.4 | -2.9 | 73 | 6 | 11 | 15 | 99.96 | | | |
| 2008-Nov-30 06:00 | 30-Nov-08 | 6:00 | 1.6 | -2.9 | 72 | 7 | 17 | 15 | 99.87 | | | |
| 2008-Nov-30 07:00 | 30-Nov-08 | 7:00 | 2.4 | -2.8 | 68 | 9 | 20 | 15 | 99.82 | | | |
| 2008-Nov-30 08:00 | 30-Nov-08 | 8:00 | 2 | -4.1 | 64 | 9 | 19 | 15 | 99.82 | | | |
| 2008-Nov-30 09:00 | 30-Nov-08 | 9:00 | 2.5 | -3.8 | 63 | 9 | 26 | 15 | 99.73 | | | |
| 2008-Nov-30 10:00 | 30-Nov-08 | 10:00 | 2.6 | -3.8 | 63 | 9 | 28 | 15 | 99.68 | | | |
| 2008-Nov-30 11:00 | 30-Nov-08 | 11:00 | 3.3 | -3.8 | 60 | 10 | 26 | 15 | 99.6 | | | |
| 2008-Nov-30 12:00 | 30-Nov-08 | 12:00 | 2.9 | -3.8 | 61 | 9 | 30 | 15 | 99.48 | | | |
| 2008-Nov-30 13:00 | 30-Nov-08 | 13:00 | 2.8 | -2.8 | 67 | 9 | 26 | 15 | 99.35 | | | |
| 2008-Nov-30 14:00 | 30-Nov-08 | 14:00 | 2.9 | -2.6 | 67 | 9 | 33 | 15 | 99.19 | | | |
| 2008-Nov-30 15:00 | 30-Nov-08 | 15:00 | 3 | -2.1 | 69 | 9 | 30 | 15 | 99.18 | | | |
| 2008-Nov-30 16:00 | 30-Nov-08 | 16:00 | 2.5 | -1.6 | 74 | 9 | 37 | 8 | 99.08 | | | Rain |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008-Nov-30 17:00 | 30-Nov-08 | 17:00 | 2.4 | -0.7 | 80 | 9 | 43 | 9.7 | 98.97 | | | Rain |
| 2008-Nov-30 18:00 | 30-Nov-08 | 18:00 | 2.8 | -0.1 | 81 | 8 | 43 | 8 | 98.88 | | | Rain |
| 2008-Nov-30 19:00 | 30-Nov-08 | 19:00 | 2.9 | -0.1 | 81 | 8 | 46 | 8 | 98.7 | | | Rain |
| 2008-Nov-30 20:00 | 30-Nov-08 | 20:00 | 2.8 | 0.1 | 82 | 9 | 44 | 12.9 | 98.56 | | | Moderate Rain |
| 2008-Nov-30 21:00 | 30-Nov-08 | 21:00 | 2.9 | 0.3 | 83 | 8 | 41 | 8 | 98.43 | | | Moderate Rain |
| 2008-Nov-30 22:00 | 30-Nov-08 | 22:00 | 2.9 | 0.3 | 83 | 8 | 43 | 6.4 | 98.32 | | | Moderate Rain |
| 2008-Nov-30 23:00 | 30-Nov-08 | 23:00 | 2.9 | 0.4 | 84 | 9 | 39 | 5.6 | 98.21 | | | Rain |
| 2008-Dec-1 00:00 | 1-Dec-08 | 0:00 | 3.1 | 0.7 | 84 | 9 | 33 | 6.4 | 98.15 | | | Moderate Rain |
| 2008-Dec-1 01:00 | 1-Dec-08 | 1:00 | 3.4 | 0.9 | 84 | 11 | 22 | 5.6 | 98.01 | | | |
| 2008-Dec-1 02:00 | 1-Dec-08 | 2:00 | 3.2 | 0.8 | 84 | 12 | 20 | 15 | 97.97 | | | Rain |
| 2008-Dec-1 03:00 | 1-Dec-08 | 3:00 | 3.3 | 1 | 85 | 13 | 17 | 15 | 97.92 | | | Rain |
| 2008-Dec-1 04:00 | 1-Dec-08 | 4:00 | 3.4 | 1.2 | 85 | 15 | 11 | 12.9 | 97.86 | | | Rain |
| 2008-Dec-1 05:00 | 1-Dec-08 | 5:00 | 4 | 1.7 | 85 | 19 | 15 | 6.4 | 97.84 | | | Rain |
| 2008-Dec-1 06:00 | 1-Dec-08 | 6:00 | 4.1 | 1.9 | 86 | 23 | 22 | 15 | 97.93 | | | Rain |
| 2008-Dec-1 07:00 | 1-Dec-08 | 7:00 | 4 | 1 | 81 | 24 | 37 | 15 | 98.01 | | | |
| 2008-Dec-1 08:00 | 1-Dec-08 | 8:00 | 3.7 | 0.2 | 78 | 23 | 28 | 15 | 98.06 | | | |
| 2008-Dec-1 09:00 | 1-Dec-08 | 9:00 | 3.5 | -0.7 | 74 | 22 | 37 | 15 | 98.13 | | | |
| 2008-Dec-1 10:00 | 1-Dec-08 | 10:00 | 3.7 | -0.1 | 76 | 21 | 28 | 15 | 98.18 | | | |
| 2008-Dec-1 11:00 | 1-Dec-08 | 11:00 | 4.2 | -1.2 | 68 | 23 | 35 | 15 | 98.2 | | | Rain |
| 2008-Dec-1 12:00 | 1-Dec-08 | 12:00 | 4.1 | -1.4 | 67 | 22 | 33 | 15 | 98.22 | | | Rain |
| 2008-Dec-1 13:00 | 1-Dec-08 | 13:00 | 3.4 | -0.9 | 73 | 22 | 32 | 15 | 98.28 | | | Rain |
| 2008-Dec-1 14:00 | 1-Dec-08 | 14:00 | 3.2 | -0.5 | 77 | 22 | 39 | 15 | 98.33 | | | Rain |
| 2008-Dec-1 15:00 | 1-Dec-08 | 15:00 | 3.2 | -0.1 | 79 | 24 | 32 | 15 | 98.39 | | | Rain |
| 2008-Dec-1 16:00 | 1-Dec-08 | 16:00 | 2.4 | -0.5 | 81 | 23 | 39 | 9.7 | 98.48 | | | Rain |
| 2008-Dec-1 17:00 | 1-Dec-08 | 17:00 | 2.9 | -0.3 | 79 | 21 | 43 | 15 | 98.56 | | | |
| 2008-Dec-1 18:00 | 1-Dec-08 | 18:00 | 3 | -0.7 | 77 | 23 | 35 | 15 | 98.61 | | | |
| 2008-Dec-1 19:00 | 1-Dec-08 | 19:00 | 2.8 | -0.8 | 77 | 22 | 35 | 15 | 98.7 | | | |
| 2008-Dec-1 20:00 | 1-Dec-08 | 20:00 | 2.8 | -0.9 | 77 | 24 | 35 | 15 | 98.81 | | | |
| 2008-Dec-1 21:00 | 1-Dec-08 | 21:00 | 2.5 | -1.2 | 77 | 26 | 28 | 15 | 98.95 | | | Snow |
| 2008-Dec-1 22:00 | 1-Dec-08 | 22:00 | 2 | -3 | 69 | 27 | 35 | 15 | 99.06 | | | |
| 2008-Dec-1 23:00 | 1-Dec-08 | 23:00 | 1.3 | -5.4 | 61 | 25 | 41 | 15 | 99.18 | | | |
| 2008-Dec-2 00:00 | 2-Dec-08 | 0:00 | 0.8 | -5.8 | 61 | 24 | 35 | 15 | 99.33 | | | |
| 2008-Dec-2 01:00 | 2-Dec-08 | 1:00 | 0.7 | -5.2 | 65 | 24 | 35 | 15 | 99.43 | | | |
| 2008-Dec-2 02:00 | 2-Dec-08 | 2:00 | 0.7 | -5.4 | 64 | 25 | 37 | 15 | 99.57 | | | |
| 2008-Dec-2 03:00 | 2-Dec-08 | 3:00 | 0.7 | -5 | 66 | 26 | 39 | 15 | 99.69 | | | |
| 2008-Dec-2 04:00 | 2-Dec-08 | 4:00 | 0.4 | -4.3 | 71 | 26 | 33 | 15 | 99.8 | | | Snow |
| 2008-Dec-2 05:00 | 2-Dec-08 | 5:00 | 0.9 | -4.6 | 67 | 26 | 32 | 15 | 99.93 | | | |
| 2008-Dec-2 06:00 | 2-Dec-08 | 6:00 | 1.1 | -5 | 64 | 25 | 28 | 15 | 100.07 | | | |
| 2008-Dec-2 07:00 | 2-Dec-08 | 7:00 | 1.1 | -4.6 | 66 | 25 | 32 | 15 | 100.24 | | | |
| 2008-Dec-2 08:00 | 2-Dec-08 | 8:00 | 1 | -5.1 | 64 | 25 | 33 | 15 | 100.37 | | | Rain |
| 2008-Dec-2 09:00 | 2-Dec-08 | 9:00 | 0.9 | -4.8 | 66 | 25 | 28 | 15 | 100.49 | | | Snow |
| 2008-Dec-2 10:00 | 2-Dec-08 | 10:00 | 0.6 | -4.7 | 68 | 24 | 35 | 15 | 100.59 | | | Snow |
| 2008-Dec-2 11:00 | 2-Dec-08 | 11:00 | 1.1 | -5.3 | 62 | 24 | 32 | 15 | 100.67 | | | Rain |
| 2008-Dec-2 12:00 | 2-Dec-08 | 12:00 | 1.2 | -5.3 | 62 | 24 | 35 | 15 | 100.67 | | | |
| 2008-Dec-2 13:00 | 2-Dec-08 | 13:00 | 1.3 | -6.7 | 55 | 25 | 32 | 15 | 100.68 | | | |
| 2008-Dec-2 14:00 | 2-Dec-08 | 14:00 | 1.9 | -7.7 | 49 | 25 | 30 | 15 | 100.69 | | | |
| 2008-Dec-2 15:00 | 2-Dec-08 | 15:00 | 1.6 | -7.7 | 50 | 25 | 32 | 15 | 100.73 | | | |
| 2008-Dec-2 16:00 | 2-Dec-08 | 16:00 | 1.4 | -8.3 | 48 | 25 | 30 | 15 | 100.8 | | | |
| 2008-Dec-2 17:00 | 2-Dec-08 | 17:00 | 1.3 | -7.5 | 52 | 22 | 35 | 15 | 100.82 | | | |
| 2008-Dec-2 18:00 | 2-Dec-08 | 18:00 | 0.6 | -6.2 | 60 | 22 | 37 | 15 | 100.9 | | | |
| 2008-Dec-2 19:00 | 2-Dec-08 | 19:00 | -0.1 | -6.5 | 62 | 24 | 39 | 15 | 100.95 | | -7 | Rain |
| 2008-Dec-2 20:00 | 2-Dec-08 | 20:00 | 0.4 | -6.2 | 61 | 24 | 41 | 15 | 100.96 | | | Rain |
| 2008-Dec-2 21:00 | 2-Dec-08 | 21:00 | 0.4 | -6.2 | 61 | 23 | 41 | 15 | 100.92 | | | |
| 2008-Dec-2 22:00 | 2-Dec-08 | 22:00 | -0.1 | -6.2 | 63 | 26 | 26 | 15 | 100.93 | | -6 | |
| 2008-Dec-2 23:00 | 2-Dec-08 | 23:00 | -0.2 | -6.4 | 63 | 25 | 32 | 15 | 100.93 | | -7 | |
| 2008-Dec-3 00:00 | 3-Dec-08 | 0:00 | 0.1 | -6.1 | 63 | 24 | 32 | 15 | 100.95 | | | |
| 2008-Dec-3 01:00 | 3-Dec-08 | 1:00 | 1.1 | -5.7 | 60 | 23 | 39 | 15 | 100.93 | | | |
| 2008-Dec-3 02:00 | 3-Dec-08 | 2:00 | 0.9 | -5.5 | 62 | 21 | 44 | 15 | 100.96 | | | |
| 2008-Dec-3 03:00 | 3-Dec-08 | 3:00 | 0.8 | -5.5 | 63 | 22 | 48 | 15 | 101 | | | |
| 2008-Dec-3 04:00 | 3-Dec-08 | 4:00 | 0.7 | -5.6 | 63 | 21 | 39 | 15 | 100.97 | | | |
| 2008-Dec-3 05:00 | 3-Dec-08 | 5:00 | 1.1 | -5 | 64 | 21 | 37 | 15 | 100.94 | | | |
| 2008-Dec-3 06:00 | 3-Dec-08 | 6:00 | 1.3 | -4.5 | 65 | 22 | 41 | 15 | 100.9 | | | |
| 2008-Dec-3 07:00 | 3-Dec-08 | 7:00 | 1.7 | -4 | 66 | 21 | 39 | 15 | 100.88 | | | |
| 2008-Dec-3 08:00 | 3-Dec-08 | 8:00 | 2.3 | -3.5 | 65 | 22 | 37 | 15 | 100.83 | | | |
| 2008-Dec-3 09:00 | 3-Dec-08 | 9:00 | 2.6 | -3.1 | 66 | 22 | 39 | 15 | 100.82 | | | |
| 2008-Dec-3 10:00 | 3-Dec-08 | 10:00 | 3.2 | -3.1 | 63 | 22 | 43 | 15 | 100.8 | | | |
| 2008-Dec-3 11:00 | 3-Dec-08 | 11:00 | 4.4 | -2.4 | 61 | 22 | 35 | 15 | 100.72 | | | |
| 2008-Dec-3 12:00 | 3-Dec-08 | 12:00 | 4.3 | -2.6 | 61 | 22 | 41 | 15 | 100.62 | | | |
| 2008-Dec-3 13:00 | 3-Dec-08 | 13:00 | 4.9 | -2.2 | 60 | 22 | 30 | 15 | 100.55 | | | |
| 2008-Dec-3 14:00 | 3-Dec-08 | 14:00 | 4.8 | -2.2 | 60 | 21 | 28 | 15 | 100.47 | | | |
| 2008-Dec-3 15:00 | 3-Dec-08 | 15:00 | 5.1 | -2.1 | 60 | 21 | 28 | 15 | 100.45 | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008-Dec-3 16:00 | 3-Dec-08 | 16:00 | 4.8 | -2.2 | 60 | 21 | 26 | 15 | 100.44 | | | |
| 2008-Dec-3 17:00 | 3-Dec-08 | 17:00 | 4.4 | -1.2 | 67 | 23 | 15 | 15 | 100.4 | | | |
| 2008-Dec-3 18:00 | 3-Dec-08 | 18:00 | 4.4 | -0.4 | 71 | 25 | 4 | 15 | 100.35 | | | |
| 2008-Dec-3 19:00 | 3-Dec-08 | 19:00 | 5 | -0.8 | 66 | 16 | 7 | 15 | 100.26 | | | |
| 2008-Dec-3 20:00 | 3-Dec-08 | 20:00 | 5.4 | -0.9 | 64 | 17 | 9 | 15 | 100.22 | | | |
| 2008-Dec-3 21:00 | 3-Dec-08 | 21:00 | 6.2 | -0.8 | 61 | 22 | 39 | 15 | 100.14 | | | Rain |
| 2008-Dec-3 22:00 | 3-Dec-08 | 22:00 | 5.4 | 0.2 | 69 | 23 | 33 | 15 | 100.11 | | | |
| 2008-Dec-3 23:00 | 3-Dec-08 | 23:00 | 5.7 | 0.6 | 70 | 22 | 33 | 15 | 100.09 | | | Rain |
| 2008-Dec-4 00:00 | 4-Dec-08 | 0:00 | 5.4 | 1.2 | 74 | 22 | 26 | 15 | 100.02 | | | Drizzle |
| 2008-Dec-4 01:00 | 4-Dec-08 | 1:00 | 5.1 | 1.5 | 78 | 22 | 22 | 6.4 | 99.99 | | | Rain |
| 2008-Dec-4 02:00 | 4-Dec-08 | 2:00 | 4.8 | 1.7 | 80 | 22 | 17 | 3.7 | 99.99 | | | Rain |
| 2008-Dec-4 03:00 | 4-Dec-08 | 3:00 | 4.8 | 1.5 | 79 | 24 | 28 | 15 | 100.02 | | | Rain |
| 2008-Dec-4 04:00 | 4-Dec-08 | 4:00 | 4.4 | 0.9 | 78 | 24 | 20 | 15 | 100.04 | | | Rain |
| 2008-Dec-4 05:00 | 4-Dec-08 | 5:00 | 4.2 | 0.1 | 75 | 25 | 20 | 15 | 100.04 | | | Rain |
| 2008-Dec-4 06:00 | 4-Dec-08 | 6:00 | 4.1 | -0.4 | 72 | 25 | 26 | 15 | 100.1 | | | Rain |
| 2008-Dec-4 07:00 | 4-Dec-08 | 7:00 | 3.8 | -0.9 | 71 | 26 | 28 | 15 | 100.23 | | | Rain |
| 2008-Dec-4 08:00 | 4-Dec-08 | 8:00 | 2.7 | -3.9 | 62 | 28 | 30 | 15 | 100.39 | | | |
| 2008-Dec-4 09:00 | 4-Dec-08 | 9:00 | 2.1 | -5.1 | 59 | 27 | 32 | 15 | 100.58 | | | |
| 2008-Dec-4 10:00 | 4-Dec-08 | 10:00 | 1.6 | -6.6 | 54 | 27 | 46 | 15 | 100.73 | | | |
| 2008-Dec-4 11:00 | 4-Dec-08 | 11:00 | 1.9 | -7.2 | 51 | 27 | 30 | 15 | 100.85 | | | |
| 2008-Dec-4 12:00 | 4-Dec-08 | 12:00 | 2.3 | -7.4 | 49 | 27 | 33 | 15 | 100.88 | | | |
| 2008-Dec-4 13:00 | 4-Dec-08 | 13:00 | 1 | -8.8 | 48 | 28 | 35 | 15 | 100.93 | | | Rain |
| 2008-Dec-4 14:00 | 4-Dec-08 | 14:00 | 0.7 | -8.6 | 50 | 27 | 33 | 15 | 100.99 | | | |
| 2008-Dec-4 15:00 | 4-Dec-08 | 15:00 | 0.6 | -8.8 | 49 | 28 | 33 | 15 | 101.01 | | | |
| 2008-Dec-4 16:00 | 4-Dec-08 | 16:00 | 0.3 | -7.7 | 55 | 26 | 32 | 15 | 101.09 | | | |
| 2008-Dec-4 17:00 | 4-Dec-08 | 17:00 | -0.2 | -7.8 | 56 | 27 | 24 | 15 | 101.16 | | -6 | Snow |
| 2008-Dec-4 18:00 | 4-Dec-08 | 18:00 | -0.2 | -8.5 | 54 | 26 | 30 | 15 | 101.23 | | -7 | |
| 2008-Dec-4 19:00 | 4-Dec-08 | 19:00 | -0.7 | -8.4 | 56 | 27 | 30 | 15 | 101.28 | | -7 | Snow |
| 2008-Dec-4 20:00 | 4-Dec-08 | 20:00 | -1 | -9.2 | 54 | 26 | 24 | 15 | 101.32 | | -7 | |
| 2008-Dec-4 21:00 | 4-Dec-08 | 21:00 | -1.5 | -9 | 57 | 27 | 26 | 15 | 101.35 | | -8 | |
| 2008-Dec-4 22:00 | 4-Dec-08 | 22:00 | -1.5 | -9.4 | 55 | 26 | 30 | 15 | 101.36 | | -8 | |
| 2008-Dec-4 23:00 | 4-Dec-08 | 23:00 | -1.9 | -9.4 | 56 | 26 | 26 | 15 | 101.4 | | -8 | |
| 2008-Dec-5 00:00 | 5-Dec-08 | 0:00 | -2.6 | -9.6 | 59 | 26 | 26 | 15 | 101.39 | | -9 | |
| 2008-Dec-5 01:00 | 5-Dec-08 | 1:00 | -2.8 | -9.6 | 59 | 27 | 26 | 15 | 101.38 | | -10 | |
| 2008-Dec-5 02:00 | 5-Dec-08 | 2:00 | -3.5 | -10.1 | 60 | 28 | 20 | 15 | 101.37 | | -10 | |
| 2008-Dec-5 03:00 | 5-Dec-08 | 3:00 | -3.5 | -10.6 | 58 | 27 | 22 | 15 | 101.4 | | -10 | |
| 2008-Dec-5 04:00 | 5-Dec-08 | 4:00 | -3.9 | -10.7 | 59 | 27 | 32 | 15 | 101.38 | | -12 | |
| 2008-Dec-5 05:00 | 5-Dec-08 | 5:00 | -4.2 | -11 | 59 | 28 | 28 | 15 | 101.36 | | -12 | |
| 2008-Dec-5 06:00 | 5-Dec-08 | 6:00 | -4.6 | -11.2 | 60 | 28 | 30 | 15 | 101.38 | | -12 | |
| 2008-Dec-5 07:00 | 5-Dec-08 | 7:00 | -4.7 | -11.3 | 60 | 27 | 30 | 15 | 101.4 | | -13 | |
| 2008-Dec-5 08:00 | 5-Dec-08 | 8:00 | -4.6 | -11.6 | 58 | 27 | 32 | 15 | 101.42 | | -13 | |
| 2008-Dec-5 09:00 | 5-Dec-08 | 9:00 | -4.2 | -11.1 | 59 | 26 | 30 | 15 | 101.44 | | -12 | |
| 2008-Dec-5 10:00 | 5-Dec-08 | 10:00 | -2.9 | -11.6 | 51 | 26 | 35 | 15 | 101.46 | | -11 | |
| 2008-Dec-5 11:00 | 5-Dec-08 | 11:00 | -2.4 | -12 | 48 | 25 | 39 | 15 | 101.42 | | -11 | |
| 2008-Dec-5 12:00 | 5-Dec-08 | 12:00 | -2 | -12.5 | 44 | 26 | 32 | 15 | 101.34 | | -9 | |
| 2008-Dec-5 13:00 | 5-Dec-08 | 13:00 | -2.2 | -13.8 | 41 | 27 | 32 | 15 | 101.28 | | -10 | |
| 2008-Dec-5 14:00 | 5-Dec-08 | 14:00 | -2.4 | -13.6 | 42 | 28 | 33 | 15 | 101.26 | | -10 | |
| 2008-Dec-5 15:00 | 5-Dec-08 | 15:00 | -3.4 | -13.3 | 46 | 26 | 41 | 15 | 101.23 | | -12 | |
| 2008-Dec-5 16:00 | 5-Dec-08 | 16:00 | -4 | -14.6 | 43 | 26 | 33 | 15 | 101.23 | | -12 | |
| 2008-Dec-5 17:00 | 5-Dec-08 | 17:00 | -4.8 | -13.9 | 49 | 28 | 24 | 15 | 101.28 | | -12 | |
| 2008-Dec-5 18:00 | 5-Dec-08 | 18:00 | -4.9 | -13.7 | 50 | 26 | 22 | 15 | 101.26 | | -12 | |
| 2008-Dec-5 19:00 | 5-Dec-08 | 19:00 | -5.3 | -13.6 | 52 | 27 | 15 | 15 | 101.22 | | -11 | |
| 2008-Dec-5 20:00 | 5-Dec-08 | 20:00 | -4.8 | -13.2 | 52 | 24 | 19 | 15 | 101.19 | | -11 | |
| 2008-Dec-5 21:00 | 5-Dec-08 | 21:00 | -4 | -12 | 54 | 23 | 30 | 15 | 101.13 | | -12 | |
| 2008-Dec-5 22:00 | 5-Dec-08 | 22:00 | -3.9 | -11.4 | 56 | 25 | 28 | 15 | 101.07 | | -11 | |
| 2008-Dec-5 23:00 | 5-Dec-08 | 23:00 | -4 | -11.8 | 55 | 24 | 30 | 15 | 101.02 | | -12 | |
| 2008-Dec-6 00:00 | 6-Dec-08 | 0:00 | -4 | -11.1 | 58 | 25 | 32 | 15 | 100.94 | | -12 | Snow |
| 2008-Dec-6 01:00 | 6-Dec-08 | 1:00 | -4 | -11.9 | 54 | 26 | 30 | 15 | 100.89 | | -12 | |
| 2008-Dec-6 02:00 | 6-Dec-08 | 2:00 | -4.7 | -12 | 57 | 26 | 30 | 15 | 100.86 | | -13 | |
| 2008-Dec-6 03:00 | 6-Dec-08 | 3:00 | -4.8 | -12.2 | 56 | 25 | 24 | 15 | 100.85 | | -12 | Snow |
| 2008-Dec-6 04:00 | 6-Dec-08 | 4:00 | -4.7 | -11.3 | 60 | 25 | 19 | 15 | 100.77 | | -11 | Snow |
| 2008-Dec-6 05:00 | 6-Dec-08 | 5:00 | -4.7 | -10.7 | 63 | 25 | 26 | 12.9 | 100.7 | | -12 | Snow |
| 2008-Dec-6 06:00 | 6-Dec-08 | 6:00 | -4.5 | -10.4 | 63 | 25 | 22 | 9.7 | 100.64 | | -11 | Snow |
| 2008-Dec-6 07:00 | 6-Dec-08 | 7:00 | -4.8 | -10.1 | 66 | 25 | 19 | 9.7 | 100.61 | | -11 | Snow |
| 2008-Dec-6 08:00 | 6-Dec-08 | 8:00 | -4.7 | -10.3 | 65 | 24 | 22 | 15 | 100.54 | | -12 | Snow |
| 2008-Dec-6 09:00 | 6-Dec-08 | 9:00 | -4.1 | -9.8 | 64 | 24 | 24 | 9.7 | 100.47 | | -11 | Snow |
| 2008-Dec-6 10:00 | 6-Dec-08 | 10:00 | -3.2 | -8.5 | 67 | 21 | 28 | 15 | 100.39 | | -10 | Snow |
| 2008-Dec-6 11:00 | 6-Dec-08 | 11:00 | -2 | -9.4 | 57 | 20 | 35 | 15 | 100.29 | | -10 | |
| 2008-Dec-6 12:00 | 6-Dec-08 | 12:00 | -2 | -9.7 | 56 | 21 | 33 | 15 | 100.17 | | -9 | |
| 2008-Dec-6 13:00 | 6-Dec-08 | 13:00 | -2 | -8.9 | 59 | 20 | 41 | 11.3 | 100.05 | | -10 | Rain |
| 2008-Dec-6 14:00 | 6-Dec-08 | 14:00 | -1.9 | -8.3 | 62 | 19 | 35 | 11.3 | 99.94 | | -9 | Rain |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008-Dec-6 15:00 | 6-Dec-08 | 15:00 | -0.9 | -8.6 | 56 | 18 | 33 | 15 | 99.84 | | -8 | |
| 2008-Dec-6 16:00 | 6-Dec-08 | 16:00 | -1 | -7.3 | 62 | 19 | 41 | 3.5 | 99.79 | | -9 | Snow |
| 2008-Dec-6 17:00 | 6-Dec-08 | 17:00 | -0.9 | -5.3 | 72 | 19 | 35 | 2.4 | 99.73 | | -8 | Snow |
| 2008-Dec-6 18:00 | 6-Dec-08 | 18:00 | -0.6 | -4.9 | 73 | 21 | 37 | 2.6 | 99.68 | | -8 | Snow |
| 2008-Dec-6 19:00 | 6-Dec-08 | 19:00 | -0.1 | -5.7 | 66 | 21 | 46 | 15 | 99.59 | | -8 | Snow |
| 2008-Dec-6 20:00 | 6-Dec-08 | 20:00 | -0.6 | -5 | 72 | 20 | 39 | 4.8 | 99.5 | | -8 | Snow |
| 2008-Dec-6 21:00 | 6-Dec-08 | 21:00 | 0.2 | -5.2 | 67 | 21 | 50 | 15 | 99.43 | | | Snow |
| 2008-Dec-6 22:00 | 6-Dec-08 | 22:00 | -0.3 | -3.9 | 77 | 21 | 43 | 2.7 | 99.35 | | -8 | Snow |
| 2008-Dec-6 23:00 | 6-Dec-08 | 23:00 | -0.4 | -4.8 | 72 | 23 | 37 | 15 | 99.29 | | -8 | Snow |
| 2008-Dec-7 00:00 | 7-Dec-08 | 0:00 | -0.4 | -5.4 | 69 | 25 | 35 | 15 | 99.24 | | -7 | |
| 2008-Dec-7 01:00 | 7-Dec-08 | 1:00 | -0.7 | -6.2 | 66 | 25 | 30 | 15 | 99.25 | | -7 | |
| 2008-Dec-7 02:00 | 7-Dec-08 | 2:00 | -1.1 | -7.6 | 61 | 26 | 26 | 15 | 99.27 | | -7 | |
| 2008-Dec-7 03:00 | 7-Dec-08 | 3:00 | -1.7 | -8.1 | 62 | 28 | 30 | 15 | 99.29 | | -9 | |
| 2008-Dec-7 04:00 | 7-Dec-08 | 4:00 | -1.8 | -7.8 | 64 | 28 | 28 | 15 | 99.36 | | -9 | |
| 2008-Dec-7 05:00 | 7-Dec-08 | 5:00 | -3.3 | -10.7 | 57 | 29 | 39 | 15 | 99.5 | | -12 | |
| 2008-Dec-7 06:00 | 7-Dec-08 | 6:00 | -5 | -12.7 | 55 | 30 | 43 | 15 | 99.65 | | -14 | |
| 2008-Dec-7 07:00 | 7-Dec-08 | 7:00 | -6.2 | -13.8 | 55 | 30 | 44 | 15 | 99.84 | | -16 | |
| 2008-Dec-7 08:00 | 7-Dec-08 | 8:00 | -7.2 | -14.6 | 55 | 30 | 43 | 15 | 100.02 | | -17 | |
| 2008-Dec-7 09:00 | 7-Dec-08 | 9:00 | -7.8 | -15.1 | 56 | 30 | 44 | 15 | 100.15 | | -18 | |
| 2008-Dec-7 10:00 | 7-Dec-08 | 10:00 | -7.7 | -13.8 | 62 | 31 | 41 | 8 | 100.34 | | -18 | Snow |
| 2008-Dec-7 11:00 | 7-Dec-08 | 11:00 | -8.1 | -16.4 | 51 | 31 | 43 | 15 | 100.53 | | -19 | Snow |
| 2008-Dec-7 12:00 | 7-Dec-08 | 12:00 | -8.5 | -17 | 50 | 33 | 37 | 15 | 100.65 | | -18 | |
| 2008-Dec-7 13:00 | 7-Dec-08 | 13:00 | -8.6 | -17.1 | 50 | 32 | 30 | 15 | 100.79 | | -18 | |
| 2008-Dec-7 14:00 | 7-Dec-08 | 14:00 | -8.5 | -16.8 | 51 | 30 | 39 | 15 | 100.91 | | -19 | |
| 2008-Dec-7 15:00 | 7-Dec-08 | 15:00 | -8.8 | -16.8 | 52 | 30 | 39 | 15 | 101.01 | | -19 | |
| 2008-Dec-7 16:00 | 7-Dec-08 | 16:00 | -8.8 | -16.7 | 53 | 31 | 28 | 15 | 101.14 | | -18 | |
| 2008-Dec-7 17:00 | 7-Dec-08 | 17:00 | -8.9 | -16.3 | 55 | 29 | 30 | 15 | 101.24 | | -18 | |
| 2008-Dec-7 18:00 | 7-Dec-08 | 18:00 | -9.4 | -16.7 | 55 | 27 | 30 | 15 | 101.33 | | -19 | |
| 2008-Dec-7 19:00 | 7-Dec-08 | 19:00 | -10.3 | -17.3 | 56 | 28 | 22 | 15 | 101.44 | | -19 | |
| 2008-Dec-7 20:00 | 7-Dec-08 | 20:00 | -10.3 | -18.6 | 51 | 28 | 17 | 15 | 101.48 | | -18 | |
| 2008-Dec-7 21:00 | 7-Dec-08 | 21:00 | -10.6 | -18.4 | 53 | 28 | 19 | 15 | 101.48 | | -18 | |
| 2008-Dec-7 22:00 | 7-Dec-08 | 22:00 | -10.8 | -18.2 | 54 | 30 | 11 | 15 | 101.52 | | -17 | |
| 2008-Dec-7 23:00 | 7-Dec-08 | 23:00 | -10.5 | -18.1 | 54 | 30 | 11 | 15 | 101.59 | | -16 | |
| 2008-Dec-8 00:00 | 8-Dec-08 | 0:00 | -10 | -17.7 | 53 | 34 | 11 | 15 | 101.57 | | -16 | |
| 2008-Dec-8 01:00 | 8-Dec-08 | 1:00 | -9.7 | -18.1 | 50 | 28 | 11 | 15 | 101.63 | | -15 | |
| 2008-Dec-8 02:00 | 8-Dec-08 | 2:00 | -9.7 | -18.1 | 50 | 36 | 6 | 15 | 101.66 | | | |
| 2008-Dec-8 03:00 | 8-Dec-08 | 3:00 | -8.9 | -16.4 | 55 | 7 | 13 | 15 | 101.69 | | -15 | |
| 2008-Dec-8 04:00 | 8-Dec-08 | 4:00 | -9.1 | -14.9 | 63 | 7 | 15 | 15 | 101.69 | | -16 | |
| 2008-Dec-8 05:00 | 8-Dec-08 | 5:00 | -9.5 | -14 | 70 | 6 | 17 | 5.6 | 101.68 | | -17 | Snow |
| 2008-Dec-8 06:00 | 8-Dec-08 | 6:00 | -9.4 | -13.8 | 70 | 6 | 19 | 5.6 | 101.68 | | -17 | Snow |
| 2008-Dec-8 07:00 | 8-Dec-08 | 7:00 | -8.5 | -12.7 | 72 | 5 | 13 | 5.6 | 101.69 | | -14 | Snow |
| 2008-Dec-8 08:00 | 8-Dec-08 | 8:00 | -7.8 | -12 | 72 | 7 | 17 | 1.4 | 101.72 | | -14 | Snow |
| 2008-Dec-8 09:00 | 8-Dec-08 | 9:00 | -7.3 | -11.3 | 73 | 6 | 19 | 1.9 | 101.73 | | -14 | Snow |
| 2008-Dec-8 10:00 | 8-Dec-08 | 10:00 | -5.9 | -10.2 | 72 | 8 | 11 | 1.8 | 101.75 | | -11 | Snow |
| 2008-Dec-8 11:00 | 8-Dec-08 | 11:00 | -5.2 | -10.3 | 67 | 14 | 17 | 4.8 | 101.75 | | -11 | Snow |
| 2008-Dec-8 12:00 | 8-Dec-08 | 12:00 | -4.7 | -11 | 61 | 16 | 17 | 15 | 101.69 | | -11 | |
| 2008-Dec-8 13:00 | 8-Dec-08 | 13:00 | -4.2 | -11.6 | 56 | 15 | 13 | 15 | 101.63 | | -9 | |
| 2008-Dec-8 14:00 | 8-Dec-08 | 14:00 | -3.9 | -10.8 | 59 | 14 | 15 | 9.7 | 101.61 | | -9 | Snow |
| 2008-Dec-8 15:00 | 8-Dec-08 | 15:00 | -3.5 | -10.9 | 56 | 14 | 20 | 15 | 101.56 | | -10 | Rain |
| 2008-Dec-8 16:00 | 8-Dec-08 | 16:00 | -2.9 | -11.1 | 53 | 12 | 15 | 15 | 101.51 | | -8 | |
| 2008-Dec-8 17:00 | 8-Dec-08 | 17:00 | -2.8 | -11.7 | 50 | 12 | 13 | 15 | 101.51 | | -7 | |
| 2008-Dec-8 18:00 | 8-Dec-08 | 18:00 | -2.6 | -11.9 | 49 | 13 | 19 | 15 | 101.48 | | -8 | |
| 2008-Dec-8 19:00 | 8-Dec-08 | 19:00 | -2.4 | -11.2 | 51 | 12 | 17 | 15 | 101.44 | | -8 | |
| 2008-Dec-8 20:00 | 8-Dec-08 | 20:00 | -2 | -11.3 | 49 | 13 | 19 | 15 | 101.42 | | -8 | |
| 2008-Dec-8 21:00 | 8-Dec-08 | 21:00 | -2 | -11.3 | 49 | 13 | 19 | 15 | 101.34 | | -8 | |
| 2008-Dec-8 22:00 | 8-Dec-08 | 22:00 | -2 | -10.9 | 51 | 12 | 13 | 15 | 101.28 | | -6 | |
| 2008-Dec-8 23:00 | 8-Dec-08 | 23:00 | -1.8 | -10 | 53 | 14 | 13 | 9.7 | 101.27 | | -6 | Snow |
| 2008-Dec-9 00:00 | 9-Dec-08 | 0:00 | -2.1 | -8.1 | 63 | 13 | 15 | 3.9 | 101.18 | | -7 | Snow |
| 2008-Dec-9 01:00 | 9-Dec-08 | 1:00 | -2.1 | -6.7 | 71 | 13 | 15 | 2.7 | 101.11 | | -7 | Snow |
| 2008-Dec-9 02:00 | 9-Dec-08 | 2:00 | -2 | -5.9 | 75 | 12 | 15 | 1.1 | 101.07 | | -7 | Snow |
| 2008-Dec-9 03:00 | 9-Dec-08 | 3:00 | -1.6 | -5.3 | 76 | 11 | 19 | 0.6 | 100.99 | | -7 | Snow |
| 2008-Dec-9 04:00 | 9-Dec-08 | 4:00 | -0.7 | -4.1 | 78 | 13 | 17 | 1.4 | 100.89 | | -6 | Snow |
| 2008-Dec-9 05:00 | 9-Dec-08 | 5:00 | -0.1 | -3.4 | 78 | 14 | 13 | 11.3 | 100.75 | | -4 | Snow |
| 2008-Dec-9 06:00 | 9-Dec-08 | 6:00 | 0.6 | -3.3 | 75 | 11 | 17 | 15 | 100.61 | | | |
| 2008-Dec-9 07:00 | 9-Dec-08 | 7:00 | 0.9 | -3.5 | 72 | 10 | 20 | 15 | 100.53 | | | |
| 2008-Dec-9 08:00 | 9-Dec-08 | 8:00 | 1.3 | -3.4 | 71 | 10 | 9 | 15 | 100.51 | | | |
| 2008-Dec-9 09:00 | 9-Dec-08 | 9:00 | 1.3 | -3.1 | 72 | 7 | 7 | 14.5 | 100.49 | | | Rain |
| 2008-Dec-9 10:00 | 9-Dec-08 | 10:00 | 1.7 | -2.5 | 74 | 7 | 4 | 12.9 | 100.47 | | | Moderate Rain |
| 2008-Dec-9 11:00 | 9-Dec-08 | 11:00 | 1.8 | -1.8 | 77 | | 0 | 8 | 100.43 | | | Rain |
| 2008-Dec-9 12:00 | 9-Dec-08 | 12:00 | 2.9 | -0.8 | 77 | 22 | 11 | 12.9 | 100.37 | | | Rain |
| 2008-Dec-9 13:00 | 9-Dec-08 | 13:00 | 3.7 | 0.1 | 77 | 20 | 17 | 15 | 100.25 | | | Freezing Rain |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008-Dec-9 14:00 | 9-Dec-08 | 14:00 | 3.6 | 0.1 | 78 | 19 | 13 | 11.3 | 100.17 | | | Rain |
| 2008-Dec-9 15:00 | 9-Dec-08 | 15:00 | 3.7 | 0.5 | 80 | 20 | 17 | 8 | 100.14 | | | Rain |
| 2008-Dec-9 16:00 | 9-Dec-08 | 16:00 | 3.5 | 0.5 | 81 | 19 | 6 | 5.6 | 100.12 | | | Rain |
| 2008-Dec-9 17:00 | 9-Dec-08 | 17:00 | 3.5 | 0.7 | 82 | 16 | 7 | 4 | 100.08 | | | Rain |
| 2008-Dec-9 18:00 | 9-Dec-08 | 18:00 | 3.6 | 0.9 | 82 | 11 | 4 | 1 | 100.07 | | | |
| 2008-Dec-9 19:00 | 9-Dec-08 | 19:00 | 3.4 | 0.7 | 82 | 10 | 4 | 0.5 | 100.04 | | | Rain |
| 2008-Dec-9 20:00 | 9-Dec-08 | 20:00 | 3.4 | 0.9 | 84 | 11 | 4 | 0.5 | 100 | | | |
| 2008-Dec-9 21:00 | 9-Dec-08 | 21:00 | 3.9 | 1 | 81 | | 0 | 0.3 | 99.98 | | | |
| 2008-Dec-9 22:00 | 9-Dec-08 | 22:00 | 4.1 | 1.5 | 83 | | 0 | 0.3 | 99.96 | | | Rain |
| 2008-Dec-9 23:00 | 9-Dec-08 | 23:00 | 3.1 | 1 | 86 | 29 | 6 | 0.3 | 99.96 | | | Rain |
| 2008-Dec-10 00:00 | 10-Dec-08 | 0:00 | 3.4 | 1 | 84 | 30 | 7 | 4.8 | 99.94 | | | Rain |
| 2008-Dec-10 01:00 | 10-Dec-08 | 1:00 | 3.7 | 1.3 | 84 | 32 | 9 | 4.8 | 99.91 | | | Rain |
| 2008-Dec-10 02:00 | 10-Dec-08 | 2:00 | 3.6 | 0.8 | 82 | 32 | 9 | 5.6 | 99.93 | | | Rain |
| 2008-Dec-10 03:00 | 10-Dec-08 | 3:00 | 2.3 | -1 | 79 | 32 | 19 | 8 | 100.04 | | | Moderate Rain |
| 2008-Dec-10 04:00 | 10-Dec-08 | 4:00 | 0.9 | -3 | 75 | 33 | 22 | 3.5 | 100.13 | | | Moderate Snow |
| 2008-Dec-10 05:00 | 10-Dec-08 | 5:00 | -0.8 | -5.5 | 70 | 32 | 26 | 15 | 100.29 | | -7 | Snow |
| 2008-Dec-10 06:00 | 10-Dec-08 | 6:00 | -2 | -7 | 69 | 32 | 22 | 15 | 100.43 | | -8 | Snow |
| 2008-Dec-10 07:00 | 10-Dec-08 | 7:00 | -3 | -8.1 | 68 | 32 | 24 | 9.7 | 100.61 | | -10 | Snow |
| 2008-Dec-10 08:00 | 10-Dec-08 | 8:00 | -3.5 | -8.8 | 67 | 33 | 30 | 15 | 100.74 | | -11 | Rain |
| 2008-Dec-10 09:00 | 10-Dec-08 | 9:00 | -3.5 | -8.9 | 66 | 34 | 26 | 15 | 100.92 | | -11 | |
| 2008-Dec-10 10:00 | 10-Dec-08 | 10:00 | -3.3 | -8.8 | 66 | 33 | 20 | 15 | 100.98 | | -9 | |
| 2008-Dec-10 11:00 | 10-Dec-08 | 11:00 | -3.2 | -9.1 | 64 | 34 | 26 | 15 | 101.09 | | -10 | |
| 2008-Dec-10 12:00 | 10-Dec-08 | 12:00 | -2.1 | -9.2 | 58 | 34 | 15 | 15 | 101.07 | | -7 | |
| 2008-Dec-10 13:00 | 10-Dec-08 | 13:00 | -1.8 | -8.6 | 60 | 32 | 17 | 15 | 101.07 | | -7 | |
| 2008-Dec-10 14:00 | 10-Dec-08 | 14:00 | -1.9 | -8.7 | 60 | 36 | 9 | 15 | 101.1 | | | |
| 2008-Dec-10 15:00 | 10-Dec-08 | 15:00 | -2.6 | -9.8 | 58 | 31 | 19 | 15 | 101.19 | | -8 | |
| 2008-Dec-10 16:00 | 10-Dec-08 | 16:00 | -3.5 | -10.3 | 59 | 31 | 17 | 15 | 101.28 | | -9 | |
| 2008-Dec-10 17:00 | 10-Dec-08 | 17:00 | -3.9 | -10.4 | 61 | 33 | 13 | 15 | 101.38 | | -9 | |
| 2008-Dec-10 18:00 | 10-Dec-08 | 18:00 | -4.7 | -11.1 | 61 | 34 | 15 | 15 | 101.45 | | -10 | |
| 2008-Dec-10 19:00 | 10-Dec-08 | 19:00 | -5 | -11.7 | 59 | 32 | 11 | 15 | 101.46 | | -10 | |
| 2008-Dec-10 20:00 | 10-Dec-08 | 20:00 | -5.4 | -11.5 | 62 | 32 | 15 | 15 | 101.42 | | -11 | |
| 2008-Dec-10 21:00 | 10-Dec-08 | 21:00 | -5.6 | -11.7 | 62 | 33 | 15 | 15 | 101.39 | | -11 | |
| 2008-Dec-10 22:00 | 10-Dec-08 | 22:00 | -5.6 | -12.2 | 60 | 36 | 20 | 15 | 101.41 | | -12 | |
| 2008-Dec-10 23:00 | 10-Dec-08 | 23:00 | -5.8 | -12.4 | 60 | 3 | 13 | 15 | 101.39 | | -11 | |



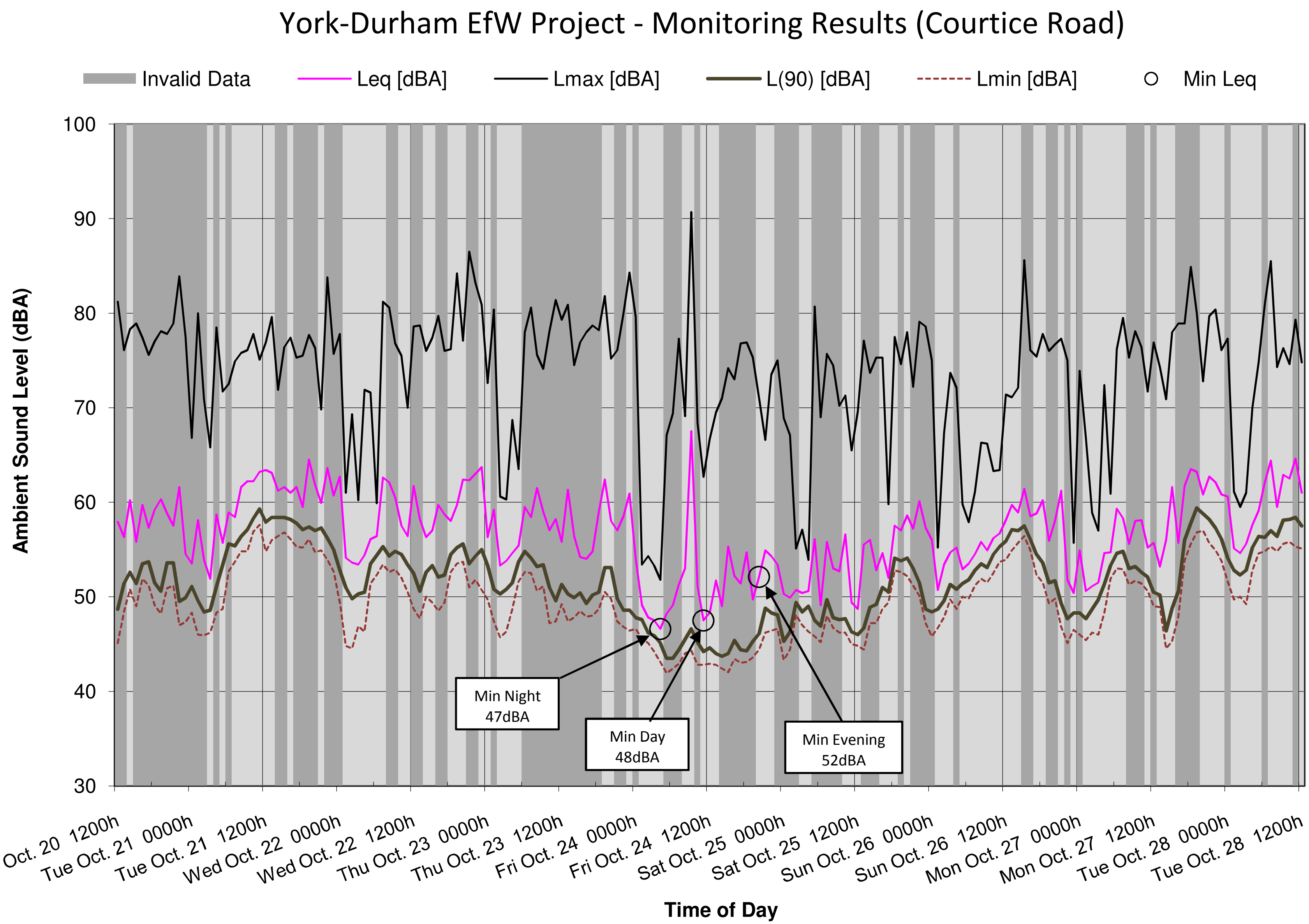
York-Durham EfW Project - Monitoring Results (Baseline Road)
Invalid Data
Leq [dBA]
Lmax [dBA]
L(90) [dBA]
Lmin [dBA]
Min Leq
Ambient Sound Level (dBA)
100
90
80
70
60
50
40
30
Min Day
51dBA
Min Evening
45dBA
Min Night
38dBA
Sat Nov. 28 1200h
Sun Nov. 29 1200h
Mon Nov. 30 1200h
Tue Dec. 1 1200h
Wed Dec. 2 1200h
Thu Dec. 3 1200h
Fri Dec. 4 1200h
Sat Dec. 5 1200h
Sun Dec. 6 1200h
Mon Dec. 7 1200h
Tue Dec. 8 1200h
Wed Dec. 9 1200h
Time of Day

## Weather Data for Monitoring Period - Courtice Road

| Station | TORONTO CITY CENTRE | Lat | 43.63 | Long | -79.4 | Alt | 76.5 | Height | 10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Time | Temp (degC) | DewPoint (degC) | Rel Hum (%) | Wind Dir (deg) | Wind Speed (km/hr) | visibility (km) | stn Press (kPa) | Hmdx | Wind Chill | Weather |
| 2008-Oct-20 00:00 | 20-Oct-08 | 0:00 | 9.3 | 2.8 | 64 | 27 | 9 | 15 | 101.6 | | | |
| 2008-Oct-20 01:00 | 20-Oct-08 | 1:00 | 8.6 | 1.5 | 61 | 30 | 6 | 15 | 101.61 | | | |
| 2008-Oct-20 02:00 | 20-Oct-08 | 2:00 | 7.9 | 0.8 | 61 | 30 | 6 | 15 | 101.55 | | | |
| 2008-Oct-20 03:00 | 20-Oct-08 | 3:00 | 8.4 | 0.4 | 57 | 29 | 6 | 15 | 101.47 | | | |
| 2008-Oct-20 04:00 | 20-Oct-08 | 4:00 | 7.8 | 1.1 | 63 | 31 | 6 | 15 | 101.49 | | | |
| 2008-Oct-20 05:00 | 20-Oct-08 | 5:00 | 8.5 | 0.8 | 58 | 32 | 6 | 15 | 101.47 | | | |
| 2008-Oct-20 06:00 | 20-Oct-08 | 6:00 | 8.8 | 1.6 | 61 | 28 | 6 | 15 | 101.42 | | | |
| 2008-Oct-20 07:00 | 20-Oct-08 | 7:00 | 8.7 | 2.5 | 65 | 28 | 6 | 15 | 101.35 | | | |
| 2008-Oct-20 08:00 | 20-Oct-08 | 8:00 | 9.7 | 3 | 63 | 26 | 9 | 15 | 101.34 | | | |
| 2008-Oct-20 09:00 | 20-Oct-08 | 9:00 | 10.9 | 4.9 | 66 | 24 | 11 | 15 | 101.28 | | | |
| 2008-Oct-20 10:00 | 20-Oct-08 | 10:00 | 12.7 | 4.6 | 58 | 23 | 13 | 15 | 101.21 | | | |
| 2008-Oct-20 11:00 | 20-Oct-08 | 11:00 | 12.9 | 5.2 | 59 | 23 | 19 | | 101.18 | | | |
| 2008-Oct-20 12:00 | 20-Oct-08 | 12:00 | 13.2 | 4.7 | 56 | 23 | 9 | | 101.07 | | | Rain |
| 2008-Oct-20 13:00 | 20-Oct-08 | 13:00 | 12.9 | 4.6 | 57 | 26 | 9 | | 100.98 | | | |
| 2008-Oct-20 14:00 | 20-Oct-08 | 14:00 | 13.9 | 3.9 | 51 | 29 | 6 | | 100.89 | | | Rain |
| 2008-Oct-20 15:00 | 20-Oct-08 | 15:00 | 13.9 | 3.7 | 50 | 21 | 4 | | 100.87 | | | |
| 2008-Oct-20 16:00 | 20-Oct-08 | 16:00 | 13.3 | 5.3 | 58 | 8 | 6 | | 100.81 | | | |
| 2008-Oct-20 17:00 | 20-Oct-08 | 17:00 | 12.6 | 5.6 | 62 | 9 | 6 | | 100.77 | | | |
| 2008-Oct-20 18:00 | 20-Oct-08 | 18:00 | 13.9 | 8.2 | 68 | 23 | 17 | | 100.74 | | | |
| 2008-Oct-20 19:00 | 20-Oct-08 | 19:00 | 13.2 | 8 | 71 | 24 | 19 | | 100.71 | | | Rain |
| 2008-Oct-20 20:00 | 20-Oct-08 | 20:00 | 12.3 | 7.8 | 74 | 26 | 15 | | 100.68 | | | Rain |
| 2008-Oct-20 21:00 | 20-Oct-08 | 21:00 | 11.8 | 7.8 | 76 | 24 | 13 | | 100.65 | | | Rain |
| 2008-Oct-20 22:00 | 20-Oct-08 | 22:00 | 11.8 | 7.9 | 77 | 23 | 24 | | 100.57 | | | Rain |
| 2008-Oct-20 23:00 | 20-Oct-08 | 23:00 | 11.2 | 7.9 | 80 | 26 | 15 | | 100.5 | | | Rain |
| 2008-Oct-21 00:00 | 21-Oct-08 | 0:00 | 11 | 8 | 82 | 24 | 13 | | 100.41 | | | Rain |
| 2008-Oct-21 01:00 | 21-Oct-08 | 1:00 | 11.4 | 8.3 | 81 | 27 | 15 | | 100.37 | | | Rain |
| 2008-Oct-21 02:00 | 21-Oct-08 | 2:00 | 10.9 | 7.9 | 82 | 27 | 17 | | 100.33 | | | |
| 2008-Oct-21 03:00 | 21-Oct-08 | 3:00 | 10.4 | 6.5 | 77 | 28 | 24 | | 100.27 | | | |
| 2008-Oct-21 04:00 | 21-Oct-08 | 4:00 | 9.7 | 5.5 | 75 | 27 | 24 | | 100.28 | | | |
| 2008-Oct-21 05:00 | 21-Oct-08 | 5:00 | 8 | 3.7 | 74 | 30 | 32 | | 100.36 | | | Drizzle |
| 2008-Oct-21 06:00 | 21-Oct-08 | 6:00 | 6.4 | 1.2 | 69 | 30 | 30 | | 100.41 | | | |
| 2008-Oct-21 07:00 | 21-Oct-08 | 7:00 | 4.8 | 0.2 | 72 | 31 | 26 | | 100.51 | | | |
| 2008-Oct-21 08:00 | 21-Oct-08 | 8:00 | 4.5 | -0.8 | 68 | 32 | 33 | | 100.57 | | | |
| 2008-Oct-21 09:00 | 21-Oct-08 | 9:00 | 4.8 | -2.2 | 60 | 32 | 32 | | 100.67 | | | |
| 2008-Oct-21 10:00 | 21-Oct-08 | 10:00 | 5.1 | -2.7 | 57 | 32 | 35 | | 100.75 | | | |
| 2008-Oct-21 11:00 | 21-Oct-08 | 11:00 | 5.8 | -2.5 | 55 | 32 | 37 | | 100.83 | | | |
| 2008-Oct-21 12:00 | 21-Oct-08 | 12:00 | 4.9 | -3.2 | 56 | 32 | 33 | | 100.94 | | | |
| 2008-Oct-21 13:00 | 21-Oct-08 | 13:00 | 4.7 | -3.6 | 55 | 31 | 39 | | 101.02 | | | |
| 2008-Oct-21 14:00 | 21-Oct-08 | 14:00 | 4.1 | -3.4 | 58 | 32 | 41 | | 101.09 | | | |
| 2008-Oct-21 15:00 | 21-Oct-08 | 15:00 | 3.7 | -3.4 | 60 | 32 | 33 | | 101.2 | | | |
| 2008-Oct-21 16:00 | 21-Oct-08 | 16:00 | 2.5 | -3.3 | 66 | 33 | 33 | | 101.29 | | | Snow |
| 2008-Oct-21 17:00 | 21-Oct-08 | 17:00 | 2.5 | -2.6 | 69 | 32 | 22 | | 101.39 | | | Snow |
| 2008-Oct-21 18:00 | 21-Oct-08 | 18:00 | 2.5 | -2.7 | 69 | 33 | 26 | | 101.46 | | | Snow |
| 2008-Oct-21 19:00 | 21-Oct-08 | 19:00 | 2.8 | -3.5 | 63 | 35 | 26 | | 101.5 | | | |
| 2008-Oct-21 20:00 | 21-Oct-08 | 20:00 | 2.4 | -3.8 | 64 | 33 | 22 | | 101.55 | | | |
| 2008-Oct-21 21:00 | 21-Oct-08 | 21:00 | 2.2 | -3.8 | 64 | 34 | 19 | | 101.67 | | | |
| 2008-Oct-21 22:00 | 21-Oct-08 | 22:00 | 2 | -3.7 | 66 | 34 | 15 | | 101.7 | | | |
| 2008-Oct-21 23:00 | 21-Oct-08 | 23:00 | 1.7 | -4 | 66 | 34 | 26 | | 101.69 | | | |
| 2008-Oct-22 00:00 | 22-Oct-08 | 0:00 | 1.9 | -4.2 | 64 | 35 | 24 | | 101.67 | | | |
| 2008-Oct-22 01:00 | 22-Oct-08 | 1:00 | 1.9 | -4.6 | 62 | 34 | 20 | | 101.71 | | | |
| 2008-Oct-22 02:00 | 22-Oct-08 | 2:00 | 1.9 | -4.7 | 62 | 33 | 13 | | 101.79 | | | |
| 2008-Oct-22 03:00 | 22-Oct-08 | 3:00 | 1.7 | -4.8 | 62 | 34 | 11 | | 101.85 | | | |
| 2008-Oct-22 04:00 | 22-Oct-08 | 4:00 | 2 | -4.9 | 60 | 35 | 20 | | 101.93 | | | |
| 2008-Oct-22 05:00 | 22-Oct-08 | 5:00 | 1.7 | -5.1 | 61 | 3 | 13 | | 102.01 | | | |
| 2008-Oct-22 06:00 | 22-Oct-08 | 6:00 | 1.2 | -5.3 | 62 | 33 | 19 | | 102.07 | | | |
| 2008-Oct-22 07:00 | 22-Oct-08 | 7:00 | 1.1 | -5.6 | 61 | 35 | 20 | | 102.15 | | | |
| 2008-Oct-22 08:00 | 22-Oct-08 | 8:00 | 1.5 | -5.3 | 61 | 36 | 13 | | 102.24 | | | |
| 2008-Oct-22 09:00 | 22-Oct-08 | 9:00 | 2.8 | -4.4 | 59 | 34 | 17 | | 102.31 | | | |
| 2008-Oct-22 10:00 | 22-Oct-08 | 10:00 | 3.1 | -4.7 | 57 | 34 | 15 | | 102.34 | | | |
| 2008-Oct-22 11:00 | 22-Oct-08 | 11:00 | 4.4 | -4.2 | 54 | 35 | 15 | | 102.41 | | | |
| 2008-Oct-22 12:00 | 22-Oct-08 | 12:00 | 4.9 | -4.3 | 51 | 3 | 6 | 15 | 102.43 | | | |
| 2008-Oct-22 13:00 | 22-Oct-08 | 13:00 | 6.1 | -3.5 | 50 | 17 | 6 | 15 | 102.4 | | | |
| 2008-Oct-22 14:00 | 22-Oct-08 | 14:00 | 5.2 | -2.9 | 56 | 16 | 13 | 15 | 102.43 | | | |
| 2008-Oct-22 15:00 | 22-Oct-08 | 15:00 | 6.1 | -2.2 | 55 | 18 | 13 | 15 | 102.46 | | | |
| 2008-Oct-22 16:00 | 22-Oct-08 | 16:00 | 6.3 | -4.1 | 47 | 3 | 15 | 15 | 102.44 | | | |
| 2008-Oct-22 17:00 | 22-Oct-08 | 17:00 | 5.3 | -3.4 | 53 | 6 | 19 | 15 | 102.51 | | | |
| 2008-Oct-22 18:00 | 22-Oct-08 | 18:00 | 5.5 | -2 | 58 | 5 | 9 | 15 | 102.59 | | | |
| 2008-Oct-22 19:00 | 22-Oct-08 | 19:00 | 5.5 | -3.2 | 53 | 4 | 11 | 15 | 102.62 | | | |
| 2008-Oct-22 20:00 | 22-Oct-08 | 20:00 | 5.5 | -2.4 | 57 | 3 | 13 | 15 | 102.65 | | | |
| 2008-Oct-22 21:00 | 22-Oct-08 | 21:00 | 5.7 | -2 | 58 | 4 | 13 | 15 | 102.7 | | | |
| 2008-Oct-22 22:00 | 22-Oct-08 | 22:00 | 5.6 | -1.9 | 58 | 3 | 13 | 15 | 102.71 | | | |
| 2008-Oct-22 23:00 | 22-Oct-08 | 23:00 | 6 | -2.2 | 56 | 9 | 17 | 15 | 102.75 | | | |
| 2008-Oct-23 00:00 | 23-Oct-08 | 0:00 | 6 | -1.3 | 59 | 5 | 13 | 15 | 102.75 | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008-Oct-23 01:00 | 23-Oct-08 | 1:00 | 5.8 | -1.5 | 59 | 5 | 19 | 15 | 102.8 | | | |
| 2008-Oct-23 02:00 | 23-Oct-08 | 2:00 | 5.5 | -1.7 | 60 | 4 | 17 | 15 | 102.77 | | | |
| 2008-Oct-23 03:00 | 23-Oct-08 | 3:00 | 5.5 | -1.5 | 61 | 3 | 20 | 15 | 102.76 | | | |
| 2008-Oct-23 04:00 | 23-Oct-08 | 4:00 | 5.5 | -1.8 | 59 | 5 | 19 | 15 | 102.76 | | | |
| 2008-Oct-23 05:00 | 23-Oct-08 | 5:00 | 5.9 | -0.7 | 63 | 6 | 19 | 15 | 102.79 | | | |
| 2008-Oct-23 06:00 | 23-Oct-08 | 6:00 | 6 | -0.2 | 64 | 5 | 19 | 15 | 102.78 | | | |
| 2008-Oct-23 07:00 | 23-Oct-08 | 7:00 | 6.8 | 1.4 | 68 | 6 | 28 | 15 | 102.82 | | | |
| 2008-Oct-23 08:00 | 23-Oct-08 | 8:00 | 7.6 | 0.4 | 60 | 13 | 17 | 15 | 102.84 | | | |
| 2008-Oct-23 09:00 | 23-Oct-08 | 9:00 | 7.6 | 1.2 | 64 | 13 | 13 | 15 | 102.89 | | | |
| 2008-Oct-23 10:00 | 23-Oct-08 | 10:00 | 8.4 | 2.2 | 65 | 10 | 15 | 15 | 102.88 | | | |
| 2008-Oct-23 11:00 | 23-Oct-08 | 11:00 | 8.4 | 2.2 | 65 | 8 | 19 | 15 | 102.86 | | | |
| 2008-Oct-23 12:00 | 23-Oct-08 | 12:00 | 8.7 | 2.9 | 67 | 9 | 22 | 15 | 102.78 | | | |
| 2008-Oct-23 13:00 | 23-Oct-08 | 13:00 | 8.6 | 2.4 | 65 | 7 | 30 | 15 | 102.72 | | | |
| 2008-Oct-23 14:00 | 23-Oct-08 | 14:00 | 8.6 | 2.7 | 66 | 8 | 22 | 15 | 102.65 | | | |
| 2008-Oct-23 15:00 | 23-Oct-08 | 15:00 | 8.4 | 2.9 | 68 | 9 | 22 | 15 | 102.61 | | | |
| 2008-Oct-23 16:00 | 23-Oct-08 | 16:00 | 8.3 | 2.9 | 69 | 8 | 26 | 15 | 102.53 | | | |
| 2008-Oct-23 17:00 | 23-Oct-08 | 17:00 | 8.1 | 3.3 | 72 | 8 | 28 | 15 | 102.46 | | | |
| 2008-Oct-23 18:00 | 23-Oct-08 | 18:00 | 8.2 | 3.8 | 74 | 6 | 20 | 15 | 102.52 | | | |
| 2008-Oct-23 19:00 | 23-Oct-08 | 19:00 | 8.3 | 4.3 | 76 | 7 | 33 | 15 | 102.44 | | | |
| 2008-Oct-23 20:00 | 23-Oct-08 | 20:00 | 8.5 | 4.3 | 75 | 8 | 30 | 15 | 102.39 | | | |
| 2008-Oct-23 21:00 | 23-Oct-08 | 21:00 | 8.9 | 4.6 | 74 | 10 | 19 | 15 | 102.36 | | | |
| 2008-Oct-23 22:00 | 23-Oct-08 | 22:00 | 9.3 | 5.4 | 77 | 10 | 13 | 15 | 102.29 | | | |
| 2008-Oct-23 23:00 | 23-Oct-08 | 23:00 | 9.1 | 3.8 | 69 | 10 | 17 | 15 | 102.2 | | | |
| 2008-Oct-24 00:00 | 24-Oct-08 | 0:00 | 8.9 | 4.4 | 73 | 15 | 13 | 15 | 102.12 | | | |
| 2008-Oct-24 01:00 | 24-Oct-08 | 1:00 | 9.1 | 4.3 | 72 | 16 | 13 | 15 | 102.06 | | | |
| 2008-Oct-24 02:00 | 24-Oct-08 | 2:00 | 10.1 | 3.7 | 64 | 18 | 22 | 15 | 102 | | | |
| 2008-Oct-24 03:00 | 24-Oct-08 | 3:00 | 9.6 | 3.5 | 66 | 18 | 19 | 15 | 101.93 | | | |
| 2008-Oct-24 04:00 | 24-Oct-08 | 4:00 | 9.6 | 3.2 | 64 | 17 | 19 | 15 | 101.87 | | | |
| 2008-Oct-24 05:00 | 24-Oct-08 | 5:00 | 8.9 | 3 | 66 | 17 | 15 | 15 | 101.85 | | | |
| 2008-Oct-24 06:00 | 24-Oct-08 | 6:00 | 8.2 | 2.9 | 69 | 14 | 13 | 15 | 101.78 | | | |
| 2008-Oct-24 07:00 | 24-Oct-08 | 7:00 | 8.4 | 3 | 69 | 13 | 11 | 15 | 101.76 | | | |
| 2008-Oct-24 08:00 | 24-Oct-08 | 8:00 | 8.8 | 3.2 | 68 | 14 | 11 | 15 | 101.78 | | | |
| 2008-Oct-24 09:00 | 24-Oct-08 | 9:00 | 9.4 | 3.6 | 67 | 13 | 9 | 15 | 101.7 | | | |
| 2008-Oct-24 10:00 | 24-Oct-08 | 10:00 | 9.4 | 3.8 | 68 | 13 | 13 | 15 | 101.63 | | | |
| 2008-Oct-24 11:00 | 24-Oct-08 | 11:00 | 9.6 | 4 | 68 | 12 | 13 | 15 | 101.56 | | | |
| 2008-Oct-24 12:00 | 24-Oct-08 | 12:00 | 9.7 | 4.2 | 69 | 12 | 9 | 15 | 101.46 | | | |
| 2008-Oct-24 13:00 | 24-Oct-08 | 13:00 | 9.9 | 4.1 | 67 | 12 | 13 | 15 | 101.33 | | | |
| 2008-Oct-24 14:00 | 24-Oct-08 | 14:00 | 10.5 | 4.4 | 66 | 10 | 13 | 15 | 101.24 | | | |
| 2008-Oct-24 15:00 | 24-Oct-08 | 15:00 | 10.4 | 4.6 | 67 | 10 | 9 | 15 | 101.2 | | | |
| 2008-Oct-24 16:00 | 24-Oct-08 | 16:00 | 10.9 | 4.6 | 65 | 11 | 15 | 15 | 101.18 | | | |
| 2008-Oct-24 17:00 | 24-Oct-08 | 17:00 | 11.3 | 5 | 65 | 11 | 11 | 15 | 101.15 | | | |
| 2008-Oct-24 18:00 | 24-Oct-08 | 18:00 | 11.8 | 3.2 | 56 | 14 | 13 | 15 | 101.13 | | | |
| 2008-Oct-24 19:00 | 24-Oct-08 | 19:00 | 11.7 | 4.2 | 60 | 14 | 15 | 15 | 101.04 | | | |
| 2008-Oct-24 20:00 | 24-Oct-08 | 20:00 | 12 | 4.3 | 59 | 14 | 19 | 15 | 100.97 | | | |
| 2008-Oct-24 21:00 | 24-Oct-08 | 21:00 | 12.2 | 3.8 | 56 | 14 | 22 | 15 | 100.89 | | | |
| 2008-Oct-24 22:00 | 24-Oct-08 | 22:00 | 10.9 | 5.5 | 69 | 15 | 17 | 15 | 100.89 | | | Rain |
| 2008-Oct-24 23:00 | 24-Oct-08 | 23:00 | 11.3 | 7.3 | 76 | 18 | 17 | 11.3 | 100.89 | | | Rain |
| 2008-Oct-25 00:00 | 25-Oct-08 | 0:00 | 10.9 | 7.7 | 81 | 19 | 22 | 9.7 | 100.82 | | | Rain |
| 2008-Oct-25 01:00 | 25-Oct-08 | 1:00 | 11.4 | 7.9 | 79 | 18 | 22 | 15 | 100.72 | | | Rain |
| 2008-Oct-25 02:00 | 25-Oct-08 | 2:00 | 11.4 | 7.9 | 79 | 18 | 19 | 15 | 100.68 | | | |
| 2008-Oct-25 03:00 | 25-Oct-08 | 3:00 | 11.4 | 8 | 80 | 17 | 15 | 15 | 100.52 | | | |
| 2008-Oct-25 04:00 | 25-Oct-08 | 4:00 | 11.3 | 7.7 | 78 | 14 | 11 | 9.7 | 100.44 | | | Rain |
| 2008-Oct-25 05:00 | 25-Oct-08 | 5:00 | 11.3 | 7.9 | 80 | 13 | 7 | 15 | 100.34 | | | Rain |
| 2008-Oct-25 06:00 | 25-Oct-08 | 6:00 | 11.1 | 8.1 | 82 | 13 | 9 | 6.4 | 100.26 | | | Rain |
| 2008-Oct-25 07:00 | 25-Oct-08 | 7:00 | 11.1 | 8.4 | 83 | 14 | 11 | 8 | 100.19 | | | Rain |
| 2008-Oct-25 08:00 | 25-Oct-08 | 8:00 | 11.3 | 8.7 | 84 | 15 | 11 | 8 | 100.14 | | | Rain |
| 2008-Oct-25 09:00 | 25-Oct-08 | 9:00 | 11.6 | 9.2 | 85 | 16 | 13 | 15 | 100.05 | | | |
| 2008-Oct-25 10:00 | 25-Oct-08 | 10:00 | 12.2 | 9.7 | 85 | 18 | 15 | 15 | 100.01 | | | |
| 2008-Oct-25 11:00 | 25-Oct-08 | 11:00 | 11.8 | 9.1 | 84 | 24 | 15 | 15 | 99.95 | | | |
| 2008-Oct-25 12:00 | 25-Oct-08 | 12:00 | 12.8 | 8.9 | 77 | 21 | 11 | 15 | 99.9 | | | |
| 2008-Oct-25 13:00 | 25-Oct-08 | 13:00 | 11.6 | 7.8 | 77 | 21 | 22 | 15 | 99.83 | | | Rain |
| 2008-Oct-25 14:00 | 25-Oct-08 | 14:00 | 12.3 | 7.7 | 73 | 20 | 17 | 15 | 99.77 | | | |
| 2008-Oct-25 15:00 | 25-Oct-08 | 15:00 | 11.9 | 7.9 | 76 | 22 | 26 | 15 | 99.73 | | | |
| 2008-Oct-25 16:00 | 25-Oct-08 | 16:00 | 12.7 | 5 | 59 | 24 | 33 | 15 | 99.71 | | | |
| 2008-Oct-25 17:00 | 25-Oct-08 | 17:00 | 11.4 | 4.5 | 62 | 23 | 35 | 15 | 99.76 | | | |
| 2008-Oct-25 18:00 | 25-Oct-08 | 18:00 | 11.2 | 3.7 | 60 | 24 | 37 | 15 | 99.8 | | | |
| 2008-Oct-25 19:00 | 25-Oct-08 | 19:00 | 10.2 | 2.9 | 60 | 24 | 33 | 15 | 99.85 | | | |
| 2008-Oct-25 20:00 | 25-Oct-08 | 20:00 | 10 | 3.3 | 63 | 24 | 33 | 15 | 99.86 | | | |
| 2008-Oct-25 21:00 | 25-Oct-08 | 21:00 | 9.5 | 3.2 | 65 | 24 | 22 | 15 | 99.87 | | | |
| 2008-Oct-25 22:00 | 25-Oct-08 | 22:00 | 9.3 | 3 | 65 | 24 | 20 | 15 | 99.88 | | | |
| 2008-Oct-25 23:00 | 25-Oct-08 | 23:00 | 9.6 | 3.7 | 67 | 23 | 28 | 15 | 99.89 | | | |
| 2008-Oct-26 00:00 | 26-Oct-08 | 0:00 | 8.8 | 2.9 | 66 | 25 | 30 | 15 | 99.89 | | | |
| 2008-Oct-26 01:00 | 26-Oct-08 | 1:00 | 8.7 | 2.5 | 65 | 23 | 30 | 15 | 99.86 | | | |
| 2008-Oct-26 02:00 | 26-Oct-08 | 2:00 | 8.6 | 2.7 | 66 | 22 | 30 | 15 | 99.84 | | | |
| 2008-Oct-26 03:00 | 26-Oct-08 | 3:00 | 9.5 | 2.9 | 63 | 24 | 33 | 15 | 99.78 | | | |
| 2008-Oct-26 04:00 | 26-Oct-08 | 4:00 | 10 | 4.5 | 69 | 21 | 32 | 15 | 99.72 | | | |
| 2008-Oct-26 05:00 | 26-Oct-08 | 5:00 | 10.8 | 5.1 | 68 | 20 | 30 | 15 | 99.65 | | | |
| 2008-Oct-26 06:00 | 26-Oct-08 | 6:00 | 10.9 | 5.8 | 71 | 20 | 32 | 15 | 99.61 | | | |
| 2008-Oct-26 07:00 | 26-Oct-08 | 7:00 | 10.7 | 5.8 | 72 | 20 | 35 | 15 | 99.58 | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008-Oct-26 08:00 | 26-Oct-08 | 8:00 | 11.1 | 5.8 | 70 | 20 | 33 | 15 | 99.57 | | | |
| 2008-Oct-26 09:00 | 26-Oct-08 | 9:00 | 11.8 | 6.4 | 69 | 20 | 33 | 15 | 99.49 | | | |
| 2008-Oct-26 10:00 | 26-Oct-08 | 10:00 | 11.4 | 6 | 69 | 20 | 35 | 15 | 99.44 | | | |
| 2008-Oct-26 11:00 | 26-Oct-08 | 11:00 | 11.6 | 6.4 | 70 | 20 | 33 | 15 | 99.39 | | | |
| 2008-Oct-26 12:00 | 26-Oct-08 | 12:00 | 11.7 | 6.8 | 72 | 21 | 32 | 15 | 99.33 | | | |
| 2008-Oct-26 13:00 | 26-Oct-08 | 13:00 | 12.3 | 7 | 70 | 20 | 37 | 15 | 99.28 | | | |
| 2008-Oct-26 14:00 | 26-Oct-08 | 14:00 | 13.2 | 7.6 | 69 | 21 | 41 | 15 | 99.25 | | | Rain |
| 2008-Oct-26 15:00 | 26-Oct-08 | 15:00 | 11.4 | 7.6 | 77 | 23 | 43 | 4.8 | 99.26 | | | Moderate Rain |
| 2008-Oct-26 16:00 | 26-Oct-08 | 16:00 | 12.1 | 5.1 | 62 | 24 | 28 | 15 | 99.31 | | | |
| 2008-Oct-26 17:00 | 26-Oct-08 | 17:00 | 11.9 | 6.2 | 68 | 24 | 22 | 15 | 99.37 | | | |
| 2008-Oct-26 18:00 | 26-Oct-08 | 18:00 | 9.6 | 1.7 | 58 | 30 | 15 | 15 | 99.51 | | | Rain |
| 2008-Oct-26 19:00 | 26-Oct-08 | 19:00 | 6.9 | 1.3 | 67 | 18 | 4 | 15 | 99.54 | | | |
| 2008-Oct-26 20:00 | 26-Oct-08 | 20:00 | 8.4 | 1.4 | 61 | 28 | 15 | 15 | 99.61 | | | |
| 2008-Oct-26 21:00 | 26-Oct-08 | 21:00 | 8.4 | 2 | 64 | 25 | 17 | 15 | 99.69 | | | |
| 2008-Oct-26 22:00 | 26-Oct-08 | 22:00 | 9 | 2.2 | 62 | 24 | 24 | 15 | 99.69 | | | |
| 2008-Oct-26 23:00 | 26-Oct-08 | 23:00 | 9.2 | 2.6 | 63 | 23 | 28 | 15 | 99.7 | | | |
| 2008-Oct-27 00:00 | 27-Oct-08 | 0:00 | 9 | 2.9 | 66 | 22 | 32 | 15 | 99.75 | | | |
| 2008-Oct-27 01:00 | 27-Oct-08 | 1:00 | 8.3 | 2.3 | 66 | 23 | 30 | 15 | 99.8 | | | |
| 2008-Oct-27 02:00 | 27-Oct-08 | 2:00 | 7.9 | 1.4 | 63 | 24 | 30 | 15 | 99.82 | | | |
| 2008-Oct-27 03:00 | 27-Oct-08 | 3:00 | 6.9 | 0.7 | 65 | 25 | 24 | 15 | 99.88 | | | |
| 2008-Oct-27 04:00 | 27-Oct-08 | 4:00 | 6.8 | 0.4 | 64 | 24 | 28 | 15 | 99.93 | | | |
| 2008-Oct-27 05:00 | 27-Oct-08 | 5:00 | 6.7 | -0.1 | 62 | 23 | 35 | 15 | 99.99 | | | |
| 2008-Oct-27 06:00 | 27-Oct-08 | 6:00 | 6.2 | 0.1 | 65 | 23 | 30 | 15 | 100.04 | | | |
| 2008-Oct-27 07:00 | 27-Oct-08 | 7:00 | 5.9 | 0.4 | 68 | 24 | 37 | 15 | 100.11 | | | Rain |
| 2008-Oct-27 08:00 | 27-Oct-08 | 8:00 | 5.4 | 0.8 | 72 | 24 | 22 | 15 | 100.22 | | | Rain |
| 2008-Oct-27 09:00 | 27-Oct-08 | 9:00 | 5.9 | 1 | 71 | 24 | 26 | 15 | 100.29 | | | Rain |
| 2008-Oct-27 10:00 | 27-Oct-08 | 10:00 | 6.8 | 1.7 | 70 | 23 | 22 | 15 | 100.34 | | | |
| 2008-Oct-27 11:00 | 27-Oct-08 | 11:00 | 7.6 | 2.3 | 69 | 23 | 28 | 15 | 100.34 | | | Rain |
| 2008-Oct-27 12:00 | 27-Oct-08 | 12:00 | 8.8 | 3.4 | 69 | 24 | 17 | 15 | 100.33 | | | |
| 2008-Oct-27 13:00 | 27-Oct-08 | 13:00 | 9.6 | 2.6 | 62 | 25 | 15 | 15 | 100.37 | | | |
| 2008-Oct-27 14:00 | 27-Oct-08 | 14:00 | 10.1 | 2.4 | 59 | 24 | 7 | 15 | 100.42 | | | |
| 2008-Oct-27 15:00 | 27-Oct-08 | 15:00 | 8.3 | 3.2 | 70 | 33 | 4 | 14.5 | 100.48 | | | Rain |
| 2008-Oct-27 16:00 | 27-Oct-08 | 16:00 | 8.8 | 3 | 67 | 26 | 20 | 15 | 100.51 | | | |
| 2008-Oct-27 17:00 | 27-Oct-08 | 17:00 | 7.4 | 1.9 | 68 | 33 | 22 | 15 | 100.61 | | | Drizzle |
| 2008-Oct-27 18:00 | 27-Oct-08 | 18:00 | 7.6 | 2.2 | 69 | 34 | 9 | 15 | 100.67 | | | |
| 2008-Oct-27 19:00 | 27-Oct-08 | 19:00 | 7.1 | 2.2 | 71 | 31 | 13 | 15 | 100.69 | | | |
| 2008-Oct-27 20:00 | 27-Oct-08 | 20:00 | 6.4 | 1.5 | 71 | 32 | 13 | 15 | 100.71 | | | |
| 2008-Oct-27 21:00 | 27-Oct-08 | 21:00 | 5.9 | 1.1 | 71 | 33 | 7 | 15 | 100.77 | | | |
| 2008-Oct-27 22:00 | 27-Oct-08 | 22:00 | 5.5 | 0.9 | 72 | 32 | 6 | 15 | 100.77 | | | |
| 2008-Oct-27 23:00 | 27-Oct-08 | 23:00 | 5.3 | 0.7 | 72 | 33 | 17 | 15 | 100.72 | | | |



York-Durham EfW Project - Monitoring Results (Courtice Road)
Invalid Data
Leq [dBA]
Lmax [dBA]
L(90) [dBA]
Lmin [dBA]
Min Leq
Ambient Sound Level (dBA)
100
90
80
70
60
50
40
30
Min Night
47dBA
Min Day
48dBA
Min Evening
52dBA
Mon Oct. 20 1200h
Tue Oct. 21 0000h
Tue Oct. 21 1200h
Wed Oct. 22 0000h
Wed Oct. 22 1200h
Thu Oct. 23 0000h
Thu Oct. 23 1200h
Fri Oct. 24 0000h
Fri Oct. 24 1200h
Sat Oct. 25 0000h
Sat Oct. 25 1200h
Sun Oct. 26 0000h
Sun Oct. 26 1200h
Mon Oct. 27 0000h
Mon Oct. 27 1200h
Tue Oct. 28 0000h
Tue Oct. 28 1200h
Time of Day

# APPENDIX F

Noise Contour Plots (CADNA/A)


YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Predicted Noise Contours - Facility Operation (400 kt/a)



- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site
- Acoustic Study Area
- Waterbody

Facility Operation Noise Contours (dB)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65

0 100 200 300

Metres - 1:10,000

1009497-072


Jacques Whitford

FIGURE NO.

F-4

Last Modified: June 10, 2009 By: S.Allen


YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Predicted Noise Contours - Facility Operation (140 kt/a)

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- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site
- Acoustic Study Area
- Waterbody

**Facility Operation Noise Contours (dB)**

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65

0 100 200 300

Metres - 1:10,000

1009497-051


Jacques Whitford

FIGURE NO.

F-3

Last Modified: June 10, 2009 By: S.Allen


YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Predicted Noise Contours - Construction (Building Assembly)



Courtice Water Pollution Plant
Collector
Expressway / Highway
Railway
Watercourse
Clarington 01 Site
Acoustic Study Area
Waterbody

**Construction Noise Contours (dB)**
**(Building Assembly)**

30
35
40
45
50
55
60
65
70
75

0 100 200 300
Metres - 1:10,000

1009497-060


Jacques Whitford

FIGURE NO.
F-2

Last Modified: May 6, 2009 By: S.Allen


YORK REGION AND DURHAM REGION
RESIDUAL WASTE STUDY

# Predicted Noise Contours - Construction (Site Preparation)



- Courtice Water Pollution Plant
- Collector
- Expressway / Highway
- Railway
- Watercourse
- Clarington 01 Site
- Acoustic Study Area
- Waterbody

**Construction Noise Contours (dB)**

**(Site Preparation)**

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80
- 85

0 100 200 300

Metres - 1:10,000

1009497-059


Jacques Whitford

FIGURE NO.

F-1

Last Modified: May 6, 2009 By: S.Allen

# APPENDIX G

Detailed Model Inputs and Results (CADNA/A)

**York/Durham EfW Facility - Sample Protocol Report for Operation Phase 400 ktpy**

| | |
|---|---|
| **ID:** | **POR1** |
| X: | 679867.8 |
| Y: | 4860445 |
| Z: | 94.5 |
| Ground: | 90 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -34.4 | | 32 | | -3.06 | 0 | 0.02 | -97 |
| | | | | | 82 | | 63 | | -3.06 | 0 | 0.07 | 19 |
| | | | | | 93.1 | | 125 | | 1.8 | 0 | 0.22 | 25 |
| | | | | | 97.6 | | 250 | | 0.28 | 0 | 0.56 | 31 |
| Steam Tubine 3 | ST3 | 680405.4 | 4860409 | 113.1 | 102 | 539.21 | 500 | 65.64 | -0.76 | 0 | 1.04 | 36 |
| | | | | | 105.2 | | 1000 | | -0.77 | 0 | 1.97 | 38 |
| | | | | | 104.4 | | 2000 | | -0.77 | 0 | 5.21 | 34 |
| | | | | | 103.2 | | 4000 | | -0.77 | 0 | 17.67 | 21 |
| | | | | | 97.1 | | 8000 | | -0.77 | 0 | 63.02 | -31 |
| | | | | | -34.4 | | 32 | | -3.64 | 13.97 | 0.02 | -112 |
| | | | | | 82 | | 63 | | -3.64 | 17.25 | 0.08 | 1 |
| | | | | | 93.1 | | 125 | | 1.77 | 19.57 | 0.28 | 4 |
| | | | | | 97.6 | | 250 | | 0.13 | 22.04 | 0.7 | 7 |
| Steam Tubine 1 | ST1 | 680538.4 | 4860448 | 113.1 | 102 | 670.94 | 500 | 67.53 | -0.91 | 23.32 | 1.29 | 11 |
| | | | | | 105.2 | | 1000 | | -0.91 | 24.08 | 2.45 | 12 |
| | | | | | 104.4 | | 2000 | | -0.91 | 24.51 | 6.48 | 7 |
| | | | | | 103.2 | | 4000 | | -0.91 | 24.75 | 21.99 | -10 |
| | | | | | 97.1 | | 8000 | | -0.91 | 24.87 | 78.42 | -73 |
| | | | | | -34.4 | | 32 | | -3.7 | 11.64 | 0.02 | -110 |
| | | | | | 82 | | 63 | | -3.7 | 14.9 | 0.08 | 3 |
| | | | | | 93.1 | | 125 | | 1.77 | 16.92 | 0.28 | 6 |
| | | | | | 97.6 | | 250 | | 0.12 | 20.89 | 0.72 | 8 |
| Steam Tubine 2 | ST2 | 680556.2 | 4860424 | 113.1 | 102 | 689 | 500 | 67.76 | -0.92 | 22.94 | 1.33 | 11 |
| | | | | | 105.2 | | 1000 | | -0.93 | 23.85 | 2.52 | 12 |
| | | | | | 104.4 | | 2000 | | -0.93 | 24.38 | 6.66 | 7 |
| | | | | | 103.2 | | 4000 | | -0.93 | 24.68 | 22.58 | -11 |
| | | | | | 97.1 | | 8000 | | -0.93 | 24.84 | 80.53 | -75 |
| | | | | | -59.4 | | 32 | | -5.02 | 6.07 | 0.02 | -127 |
| | | | | | 60.8 | | 63 | | -5.02 | 8.56 | 0.07 | -9 |
| | | | | | 82.9 | | 125 | | 4.02 | 9.24 | 0.25 | 3 |
| | | | | | 79.4 | | 250 | | 4.29 | 12.71 | 0.63 | -5 |
| Back-up Power Generator 2 | BPG2 | 680467.5 | 4860461 | 102 | 87.8 | 599.97 | 500 | 66.56 | 0.41 | 18.15 | 1.16 | 2 |
| | | | | | 96 | | 1000 | | -1.15 | 21.28 | 2.19 | 7 |
| | | | | | 102.2 | | 2000 | | -1.26 | 22.75 | 5.8 | 8 |
| | | | | | 101 | | 4000 | | -1.26 | 23.72 | 19.66 | -8 |
| | | | | | 92.9 | | 8000 | | -1.26 | 24.31 | 70.13 | -67 |
| | | | | | -59.4 | | 32 | | -5.03 | 6.52 | 0.02 | -128 |
| | | | | | 60.8 | | 63 | | -5.03 | 9.08 | 0.07 | -10 |
| | | | | | 82.9 | | 125 | | 4.03 | 9.6 | 0.25 | 2 |
| | | | | | 79.4 | | 250 | | 4.29 | 13.14 | 0.63 | -5 |
| Back-up Power Generator 1 | BPG1 | 680469 | 4860456 | 102 | 87.8 | 601.34 | 500 | 66.58 | 0.41 | 18.96 | 1.16 | 1 |
| | | | | | 96 | | 1000 | | -1.15 | 22.13 | 2.2 | 6 |
| | | | | | 102.2 | | 2000 | | -1.26 | 23.33 | 5.81 | 8 |
| | | | | | 101 | | 4000 | | -1.26 | 24.08 | 19.71 | -8 |
| | | | | | 92.9 | | 8000 | | -1.26 | 24.52 | 70.29 | -67 |
| | | | | | -59.4 | | 32 | | -4.04 | 7.42 | 0.02 | -131 |
| | | | | | 38.8 | | 63 | | -4.04 | 10.26 | 0.09 | -36 |
| | | | | | 58.9 | | 125 | | 1.73 | 11.69 | 0.29 | -23 |
| | | | | | 73.4 | | 250 | | 0.03 | 16.11 | 0.74 | -12 |
| Fire Pump Engine Exhaust 1 | FP1 | 680575.8 | 4860372 | 111 | 81.8 | 711.95 | 500 | 68.05 | -1.01 | 19.07 | 1.37 | -6 |
| | | | | | 91 | | 1000 | | -1.01 | 22.03 | 2.6 | -1 |
| | | | | | 97.2 | | 2000 | | -1.01 | 24.47 | 6.88 | -1 |
| | | | | | 97 | | 4000 | | -1.01 | 24.73 | 23.33 | -18 |
| | | | | | 88.9 | | 8000 | | -1.01 | 24.86 | 83.21 | -86 |
| | | | | | -59.4 | | 32 | | -4.04 | 5.01 | 0.02 | -128 |
| | | | | | 38.8 | | 63 | | -4.04 | 5.88 | 0.09 | -31 |
| | | | | | 58.9 | | 125 | | 1.73 | 5.92 | 0.29 | -17 |
| | | | | | 73.4 | | 250 | | 0.03 | 10.31 | 0.74 | -6 |
| Fire Pump Engine Exhaust 2 | FP2 | 680577 | 4860369 | 111 | 81.8 | 713.51 | 500 | 68.07 | -1.01 | 13.31 | 1.38 | 0 |
| | | | | | 91 | | 1000 | | -1.01 | 16.22 | 2.61 | 5 |
| | | | | | 97.2 | | 2000 | | -1.01 | 19.14 | 6.9 | 4 |
| | | | | | 97 | | 4000 | | -1.01 | 22.09 | 23.38 | -16 |
| | | | | | 88.9 | | 8000 | | -1.01 | 24.85 | 83.4 | -86 |
| | | | | | -34.4 | | 32 | | -3 | 4.77 | 0.02 | -104 |
| | | | | | 81.2 | | 63 | | -3 | 4.77 | 0.08 | 12 |
| | | | | | 91.3 | | 125 | | 1.92 | 2.85 | 0.28 | 19 |
| | | | | | 88.8 | | 250 | | 0.29 | 4.48 | 0.7 | 16 |
| Main Flue Stack 1 | MFS1 | 680529.2 | 4860387 | 187.7 | 89.2 | 670.55 | 500 | 67.53 | -0.75 | 4.78 | 1.29 | 16 |
| | | | | | 90.4 | | 1000 | | -0.75 | 4.78 | 2.45 | 16 |
| | | | | | 86.6 | | 2000 | | -0.75 | 4.79 | 6.48 | 9 |
| | | | | | 81.4 | | 4000 | | -0.75 | 4.81 | 21.97 | -12 |
| | | | | | 74.3 | | 8000 | | -0.75 | 4.86 | 78.37 | -76 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -3 | 4.77 | 0.02 | -108 |
| | | | | | 76.2 | | 63 | | -3 | 4.77 | 0.07 | 8 |
| | | | | | 86.3 | | 125 | | 1.86 | 2.92 | 0.24 | 15 |
| | | | | | 83.8 | | 250 | | 0.29 | 4.49 | 0.62 | 12 |
| Main Flue Stack 2 | MFS2 | 680446.5 | 4860356 | 187.7 | 84.2 | 593.05 | 500 | 66.46 | -0.75 | 4.79 | 1.14 | 13 |
| | | | | | 85.4 | | 1000 | | -0.75 | 4.82 | 2.17 | 13 |
| | | | | | 81.6 | | 2000 | | -0.75 | 4.86 | 5.73 | 5 |
| | | | | | 76.4 | | 4000 | | -0.75 | 4.95 | 19.43 | -14 |
| | | | | | 69.3 | | 8000 | | -0.75 | 5.13 | 69.32 | -71 |
| | | | | | -34.4 | | 32 | | -5.13 | 9.89 | 0.02 | -107 |
| | | | | | 61.6 | | 63 | | -5.13 | 13.37 | 0.09 | -15 |
| | | | | | 76.7 | | 125 | | 4.38 | 14.22 | 0.3 | -10 |
| | | | | | 83.2 | | 250 | | 3.43 | 18.19 | 0.76 | -7 |
| Transformer 1 | TRAN1 | 680594.9 | 4860459 | 102.5 | 88.6 | 727.31 | 500 | 68.23 | -0.69 | 22.3 | 1.4 | -3 |
| | | | | | 85.8 | | 1000 | | -1.27 | 23.44 | 2.66 | -7 |
| | | | | | 82 | | 2000 | | -1.28 | 24.15 | 7.03 | -16 |
| | | | | | 76.8 | | 4000 | | -1.28 | 24.55 | 23.83 | -39 |
| | | | | | 67.7 | | 8000 | | -1.28 | 24.77 | 85.01 | -109 |
| | | | | | -34.4 | | 32 | | -5.14 | 11.23 | 0.02 | -109 |
| | | | | | 61.6 | | 63 | | -5.14 | 14.46 | 0.09 | -16 |
| | | | | | 76.7 | | 125 | | 4.39 | 14.94 | 0.3 | -11 |
| | | | | | 83.2 | | 250 | | 3.43 | 18.6 | 0.76 | -8 |
| Transformer 2 | TRAN2 | 680598.7 | 4860447 | 102.5 | 88.6 | 731.02 | 500 | 68.28 | -0.69 | 22.51 | 1.41 | -3 |
| | | | | | 85.8 | | 1000 | | -1.27 | 23.58 | 2.67 | -7 |
| | | | | | 82 | | 2000 | | -1.28 | 24.23 | 7.06 | -16 |
| | | | | | 76.8 | | 4000 | | -1.28 | 24.6 | 23.96 | -39 |
| | | | | | 67.7 | | 8000 | | -1.28 | 24.79 | 85.44 | -110 |
| | | | | | -39.4 | | 32 | | -3 | 0 | 0.02 | -102 |
| | | | | | 66.8 | | 63 | | -3 | 0 | 0.07 | 4 |
| | | | | | 76.9 | | 125 | | 1.84 | 0 | 0.23 | 9 |
| | | | | | 84.4 | | 250 | | 0.29 | 0 | 0.59 | 18 |
| Internal Noise Sources 3 | INS3 | 680426 | 4860389 | 125 | 83.8 | 561.95 | 500 | 65.99 | -0.75 | 0 | 1.08 | 17 |
| | | | | | 82 | | 1000 | | -0.75 | 0 | 2.06 | 15 |
| | | | | | 77.2 | | 2000 | | -0.75 | 0 | 5.43 | 7 |
| | | | | | 73 | | 4000 | | -0.75 | 0 | 18.42 | -11 |
| | | | | | 67.9 | | 8000 | | -0.75 | 0 | 65.68 | -63 |
| | | | | | -39.4 | | 32 | | -3 | 7.3 | 0.02 | -110 |
| | | | | | 66.8 | | 63 | | -3 | 9.32 | 0.07 | -6 |
| | | | | | 76.9 | | 125 | | 1.85 | 10.74 | 0.24 | -2 |
| | | | | | 84.4 | | 250 | | 0.29 | 16.24 | 0.6 | 1 |
| Internal Noise Sources 3 | INS3 | 680443.2 | 4860394 | 125 | 83.8 | 578.55 | 500 | 66.25 | -0.75 | 20.06 | 1.12 | -3 |
| | | | | | 82 | | 1000 | | -0.75 | 23.21 | 2.12 | -9 |
| | | | | | 77.2 | | 2000 | | -0.75 | 25 | 5.59 | -19 |
| | | | | | 73 | | 4000 | | -0.75 | 25 | 18.96 | -36 |
| | | | | | 67.9 | | 8000 | | -0.75 | 25 | 67.62 | -90 |
| | | | | | -39.4 | | 32 | | -3 | 6.15 | 0.02 | -109 |
| | | | | | 66.8 | | 63 | | -3 | 8.34 | 0.08 | -6 |
| | | | | | 76.9 | | 125 | | 1.89 | 9.99 | 0.26 | -2 |
| | | | | | 84.4 | | 250 | | 0.29 | 15.01 | 0.65 | 2 |
| Internal Noise Sources 2 | INS2 | 680490.5 | 4860400 | 125 | 83.8 | 625.16 | 500 | 66.92 | -0.75 | 18.58 | 1.21 | -2 |
| | | | | | 82 | | 1000 | | -0.75 | 21.68 | 2.29 | -8 |
| | | | | | 77.2 | | 2000 | | -0.75 | 23.91 | 6.04 | -19 |
| | | | | | 73 | | 4000 | | -0.75 | 24.42 | 20.49 | -38 |
| | | | | | 67.9 | | 8000 | | -0.75 | 24.7 | 73.07 | -96 |
| | | | | | -39.4 | | 32 | | -3 | 11.7 | 0.02 | -116 |
| | | | | | 66.8 | | 63 | | -3 | 14.98 | 0.08 | -13 |
| | | | | | 76.9 | | 125 | | 1.93 | 16.7 | 0.28 | -10 |
| | | | | | 84.4 | | 250 | | 0.29 | 20.83 | 0.7 | -5 |
| Internal Noise Sources 1 | INS1 | 680538.1 | 4860405 | 125 | 83.8 | 672.25 | 500 | 67.55 | -0.75 | 23.33 | 1.3 | -8 |
| | | | | | 82 | | 1000 | | -0.75 | 24.08 | 2.46 | -11 |
| | | | | | 77.2 | | 2000 | | -0.75 | 24.52 | 6.5 | -21 |
| | | | | | 73 | | 4000 | | -0.75 | 24.75 | 22.03 | -41 |
| | | | | | 67.9 | | 8000 | | -0.75 | 24.87 | 78.57 | -102 |
| | | | | | -53.1 | | 32 | | -4.87 | 0 | 0.02 | -114 |
| | | | | | 53.1 | | 63 | | -4.87 | 0 | 0.06 | -7 |
| | | | | | 58.2 | | 125 | | 3.68 | 0 | 0.21 | -11 |
| | | | | | 60.7 | | 250 | | 4.32 | 0 | 0.54 | -9 |
| Truck Traffic | TR | 680386.8 | 4860461 | 102 | 73.1 | 519.34 | 500 | 65.31 | 0.45 | 0 | 1 | 6 |
| | | | | | 73.3 | | 1000 | | -1.12 | 0 | 1.9 | 7 |
| | | | | | 75.5 | | 2000 | | -1.22 | 0 | 5.02 | 6 |
| | | | | | 69.3 | | 4000 | | -1.22 | 0 | 17.02 | -12 |
| | | | | | 56.2 | | 8000 | | -1.22 | 0 | 60.7 | -69 |
| | | | | | -39.4 | | 32 | | -4.33 | 7.34 | 0.02 | -110 |
| | | | | | 30.5 | | 63 | | -4.33 | 10.18 | 0.08 | -43 |
| | | | | | 55 | | 125 | | 2.54 | 12.01 | 0.27 | -27 |
| | | | | | 63.9 | | 250 | | -0.01 | 17.13 | 0.69 | -21 |
| Office AC unit 1 | AC1 | 680523.2 | 4860489 | 107.7 | 76.1 | 656.97 | 500 | 67.35 | -1.08 | 20.28 | 1.27 | -12 |
| | | | | | 82.4 | | 1000 | | -1.08 | 22.66 | 2.4 | -9 |
| | | | | | 79.4 | | 2000 | | -1.08 | 23.67 | 6.35 | -17 |
| | | | | | 76.7 | | 4000 | | -1.08 | 24.28 | 21.53 | -35 |
| | | | | | 61.7 | | 8000 | | -1.08 | 24.63 | 76.79 | -106 |

| Source Description | Source ID | Location Within Acoustic Model (m) X | Y | Z | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | -39.4 | | 32 | | -4.34 | 12.63 | 0.02 | -115 |
| | | | | | 30.5 | | 63 | | -4.34 | 15.57 | 0.08 | -48 |
| | | | | | 55 | | 125 | | 2.54 | 17.61 | 0.27 | -33 |
| | | | | | 63.9 | | 250 | | -0.01 | 21.33 | 0.69 | -26 |
| Office AC unit 3 | AC3 | 680527.5 | 4860474 | 107.7 | 76.1 | 660.5 | 500 | 67.4 | -1.08 | 22.78 | 1.27 | -14 |
| | | | | | 82.4 | | 1000 | | -1.08 | 23.74 | 2.42 | -10 |
| | | | | | 79.4 | | 2000 | | -1.08 | 24.33 | 6.38 | -18 |
| | | | | | 76.7 | | 4000 | | -1.08 | 24.65 | 21.64 | -36 |
| | | | | | 61.7 | | 8000 | | -1.08 | 24.82 | 77.2 | -107 |
| | | | | | -47 | | 32 | | -5.2 | 0 | 0.02 | -110 |
| | | | | | 59.2 | | 63 | | -5.2 | 0 | 0.09 | -4 |
| | | | | | 64.3 | | 125 | | 4.51 | 0 | 0.3 | -9 |
| | | | | | 66.8 | | 250 | | 4.24 | 0 | 0.77 | -7 |
| Truck Traffic | TR | 680578 | 4860253 | 101.01 | 79.2 | 735.82 | 500 | 68.34 | 0.37 | 0 | 1.42 | 9 |
| | | | | | 79.4 | | 1000 | | -1.2 | 0 | 2.69 | 10 |
| | | | | | 81.6 | | 2000 | | -1.3 | 0 | 7.11 | 7 |
| | | | | | 75.4 | | 4000 | | -1.3 | 0 | 24.11 | -16 |
| | | | | | 62.3 | | 8000 | | -1.3 | 0 | 86 | -91 |
| | | | | | -39.4 | | 32 | | -4.36 | 5.63 | 0.02 | -108 |
| | | | | | 30.5 | | 63 | | -4.36 | 7.98 | 0.08 | -41 |
| | | | | | 55 | | 125 | | 2.54 | 9.45 | 0.27 | -25 |
| | | | | | 63.9 | | 250 | | -0.02 | 14.49 | 0.7 | -19 |
| Office AC unit 2 | AC2 | 680533.7 | 4860492 | 107.7 | 76.1 | 667.68 | 500 | 67.49 | -1.09 | 17.59 | 1.29 | -9 |
| | | | | | 82.4 | | 1000 | | -1.09 | 20.61 | 2.44 | -7 |
| | | | | | 79.4 | | 2000 | | -1.09 | 22.86 | 6.45 | -16 |
| | | | | | 76.7 | | 4000 | | -1.09 | 23.8 | 21.88 | -35 |
| | | | | | 61.7 | | 8000 | | -1.09 | 24.36 | 78.04 | -107 |
| | | | | | -39.4 | | 32 | | -4.36 | 11.19 | 0.02 | -114 |
| | | | | | 30.5 | | 63 | | -4.36 | 14.06 | 0.08 | -47 |
| | | | | | 55 | | 125 | | 2.54 | 16.04 | 0.28 | -31 |
| | | | | | 63.9 | | 250 | | -0.02 | 20.4 | 0.7 | -25 |
| Office AC unit 4 | AC4 | 680538 | 4860477 | 107.7 | 76.1 | 671.15 | 500 | 67.54 | -1.09 | 22.1 | 1.29 | -14 |
| | | | | | 82.4 | | 1000 | | -1.09 | 23.31 | 2.45 | -10 |
| | | | | | 79.4 | | 2000 | | -1.09 | 24.07 | 6.49 | -18 |
| | | | | | 76.7 | | 4000 | | -1.09 | 24.51 | 21.99 | -36 |
| | | | | | 61.7 | | 8000 | | -1.09 | 24.75 | 78.45 | -108 |
| | | | | | 45.4 | | 63 | | -5.09 | 4.77 | 0.08 | -22 |
| | | | | | 50.5 | | 125 | | 4.18 | 4.73 | 0.26 | -26 |
| | | | | | 53 | | 250 | | 4.27 | 5.3 | 0.67 | -24 |
| Truck Traffic | TR | 680505.2 | 4860506 | 102.01 | 65.4 | 640.35 | 500 | 67.13 | 0.4 | 6.11 | 1.23 | -9 |
| | | | | | 65.6 | | 1000 | | -1.17 | 7.17 | 2.34 | -10 |
| | | | | | 67.8 | | 2000 | | -1.27 | 8.7 | 6.19 | -13 |
| | | | | | 61.6 | | 4000 | | -1.27 | 10.69 | 20.98 | -36 |
| | | | | | 48.5 | | 8000 | | -1.27 | 13.01 | 74.85 | -105 |
| | | | | | -39.4 | | 32 | | -3.12 | 0 | 0.02 | -102 |
| | | | | | 42.5 | | 63 | | -3.12 | 0 | 0.07 | -20 |
| | | | | | 53.5 | | 125 | | 1.8 | 0 | 0.23 | -14 |
| | | | | | 62.9 | | 250 | | 0.26 | 0 | 0.57 | -4 |
| Air Cooled Condenser 3 | ACC3 | 680414.8 | 4860382 | 113.1 | 68.3 | 551.05 | 500 | 65.82 | -0.78 | 0 | 1.06 | 2 |
| | | | | | 74.5 | | 1000 | | -0.78 | 0 | 2.02 | 7 |
| | | | | | 72.7 | | 2000 | | -0.78 | 0 | 5.33 | 2 |
| | | | | | 68.5 | | 4000 | | -0.78 | 0 | 18.06 | -15 |
| | | | | | 60.4 | | 8000 | | -0.78 | 0 | 64.41 | -69 |
| | | | | | -56.1 | | 32 | | -5 | 0 | 0.02 | -117 |
| | | | | | 50.1 | | 63 | | -5 | 0 | 0.07 | -11 |
| | | | | | 55.2 | | 125 | | 3.96 | 0 | 0.24 | -15 |
| | | | | | 57.7 | | 250 | | 4.29 | 0 | 0.61 | -14 |
| Truck Traffic | TR | 680423.7 | 4860267 | 99.03 | 70.1 | 584.01 | 500 | 66.33 | 0.42 | 0 | 1.13 | 2 |
| | | | | | 70.3 | | 1000 | | -1.15 | 0 | 2.14 | 3 |
| | | | | | 72.5 | | 2000 | | -1.25 | 0 | 5.64 | 2 |
| | | | | | 66.3 | | 4000 | | -1.25 | 0 | 19.14 | -18 |
| | | | | | 53.2 | | 8000 | | -1.25 | 0 | 68.26 | -80 |
| | | | | | -39.4 | | 32 | | -3.71 | 10.08 | 0.02 | -114 |
| | | | | | 42.5 | | 63 | | -3.71 | 13.46 | 0.08 | -35 |
| | | | | | 53.5 | | 125 | | 1.77 | 16.11 | 0.28 | -32 |
| | | | | | 62.9 | | 250 | | 0.12 | 20.43 | 0.72 | -26 |
| Air Cooled Condenser 1 | ACC1 | 680557.9 | 4860462 | 113.1 | 68.3 | 690.59 | 500 | 67.78 | -0.93 | 22.54 | 1.33 | -22 |
| | | | | | 74.5 | | 1000 | | -0.93 | 23.59 | 2.53 | -18 |
| | | | | | 72.7 | | 2000 | | -0.93 | 24.24 | 6.67 | -25 |
| | | | | | 68.5 | | 4000 | | -0.93 | 24.6 | 22.63 | -46 |
| | | | | | 60.4 | | 8000 | | -0.93 | 24.8 | 80.72 | -112 |
| | | | | | -39.4 | | 32 | | -3.76 | 11.21 | 0.02 | -115 |
| | | | | | 42.5 | | 63 | | -3.76 | 14.51 | 0.09 | -36 |
| | | | | | 53.5 | | 125 | | 1.77 | 16.59 | 0.29 | -33 |
| | | | | | 62.9 | | 250 | | 0.1 | 20.54 | 0.74 | -26 |
| Air Cooled Condenser 2 | ACC2 | 680573.6 | 4860435 | 113.1 | 68.3 | 706.12 | 500 | 67.98 | -0.94 | 22.74 | 1.36 | -23 |
| | | | | | 74.5 | | 1000 | | -0.94 | 23.72 | 2.58 | -19 |
| | | | | | 72.7 | | 2000 | | -0.94 | 24.31 | 6.82 | -25 |
| | | | | | 68.5 | | 4000 | | -0.94 | 24.64 | 23.14 | -46 |
| | | | | | 60.4 | | 8000 | | -0.94 | 24.82 | 82.53 | -114 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -58.4 | | 32 | | -4.82 | 0 | 0.02 | -118 |
| | | | | | 47.8 | | 63 | | -4.82 | 0 | 0.06 | -12 |
| | | | | | 52.9 | | 125 | | 3.57 | 0 | 0.2 | -16 |
| | | | | | 55.4 | | 250 | | 4.34 | 0 | 0.52 | -14 |
| Truck Traffic | TR | 680362.6 | 4860447 | 102 | 67.8 | 494.9 | 500 | 64.89 | 0.46 | 0 | 0.95 | 2 |
| | | | | | 68 | | 1000 | | -1.1 | 0 | 1.81 | 2 |
| | | | | | 70.2 | | 2000 | | -1.2 | 0 | 4.78 | 2 |
| | | | | | 64 | | 4000 | | -1.2 | 0 | 16.22 | -16 |
| | | | | | 50.9 | | 8000 | | -1.2 | 0 | 57.84 | -71 |
| **Nighttime Level, dBA:** | | | | | | | | | | | | **42** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

| | |
|---|---|
| **ID:** | **POR2** |
| X: | 681376.6 |
| Y: | 4860335 |
| Z: | 104.5 |
| Ground: | 100 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -34.4 | | 32 | | -4.08 | 0 | 0.03 | -100 |
| | | | | | 82 | | 63 | | -4.08 | 0 | 0.1 | 17 |
| | | | | | 93.1 | | 125 | | 1.75 | 0 | 0.34 | 22 |
| | | | | | 97.6 | | 250 | | 0.02 | 0 | 0.86 | 27 |
| Steam Tubine 2 | ST2 | 680556.2 | 4860424 | 113.1 | 102 | 825.28 | 500 | 69.33 | -1.02 | 0 | 1.59 | 32 |
| | | | | | 105.2 | | 1000 | | -1.02 | 0 | 3.02 | 34 |
| | | | | | 104.4 | | 2000 | | -1.02 | 0 | 7.98 | 28 |
| | | | | | 103.2 | | 4000 | | -1.02 | 0 | 27.04 | 8 |
| | | | | | 97.1 | | 8000 | | -1.02 | 0 | 96.46 | -68 |
| | | | | | -34.4 | | 32 | | -4.13 | 0 | 0.03 | -100 |
| | | | | | 82 | | 63 | | -4.13 | 0 | 0.1 | 16 |
| | | | | | 93.1 | | 125 | | 1.75 | 0 | 0.35 | 21 |
| | | | | | 97.6 | | 250 | | 0.01 | 0 | 0.88 | 27 |
| Steam Tubine 1 | ST1 | 680538.4 | 4860448 | 113.1 | 102 | 845.88 | 500 | 69.55 | -1.03 | 0 | 1.63 | 32 |
| | | | | | 105.2 | | 1000 | | -1.03 | 0 | 3.09 | 34 |
| | | | | | 104.4 | | 2000 | | -1.03 | 0 | 8.17 | 28 |
| | | | | | 103.2 | | 4000 | | -1.03 | 0 | 27.72 | 7 |
| | | | | | 97.1 | | 8000 | | -1.03 | 0 | 98.87 | -70 |
| | | | | | -34.4 | | 32 | | -4.37 | 11.97 | 0.03 | -113 |
| | | | | | 82 | | 63 | | -4.37 | 15.36 | 0.12 | 0 |
| | | | | | 93.1 | | 125 | | 1.73 | 18.13 | 0.4 | 2 |
| | | | | | 97.6 | | 250 | | -0.05 | 21.81 | 1.02 | 4 |
| Steam Tubine 3 | ST3 | 680405.4 | 4860409 | 113.1 | 102 | 974.07 | 500 | 70.77 | -1.09 | 23.11 | 1.88 | 7 |
| | | | | | 105.2 | | 1000 | | -1.09 | 23.95 | 3.56 | 8 |
| | | | | | 104.4 | | 2000 | | -1.09 | 24.44 | 9.41 | 1 |
| | | | | | 103.2 | | 4000 | | -1.09 | 24.71 | 31.92 | -23 |
| | | | | | 97.1 | | 8000 | | -1.09 | 24.85 | 113.85 | -111 |
| | | | | | -59.4 | | 32 | | -5.36 | 13.62 | 0.03 | -138 |
| | | | | | 60.8 | | 63 | | -5.36 | 17.18 | 0.11 | -21 |
| | | | | | 82.9 | | 125 | | 4.93 | 18.04 | 0.38 | -11 |
| | | | | | 79.4 | | 250 | | 4.2 | 19.48 | 0.96 | -15 |
| Back-up Power Generator 1 | BPG1 | 680469 | 4860456 | 102 | 87.8 | 915.72 | 500 | 70.24 | 0.33 | 23.11 | 1.77 | -8 |
| | | | | | 96 | | 1000 | | -1.24 | 24.09 | 3.35 | 0 |
| | | | | | 102.2 | | 2000 | | -1.34 | 24.52 | 8.85 | 0 |
| | | | | | 101 | | 4000 | | -1.34 | 24.75 | 30.01 | -23 |
| | | | | | 92.9 | | 8000 | | -1.34 | 24.87 | 107.03 | -108 |
| | | | | | -59.4 | | 32 | | -5.36 | 13.35 | 0.03 | -138 |
| | | | | | 60.8 | | 63 | | -5.36 | 16.91 | 0.11 | -21 |
| | | | | | 82.9 | | 125 | | 4.93 | 17.93 | 0.38 | -11 |
| | | | | | 79.4 | | 250 | | 4.2 | 19.41 | 0.96 | -15 |
| Back-up Power Generator 2 | BPG2 | 680467.5 | 4860461 | 102 | 87.8 | 917.9 | 500 | 70.26 | 0.33 | 23.03 | 1.77 | -8 |
| | | | | | 96 | | 1000 | | -1.24 | 24.04 | 3.36 | 0 |
| | | | | | 102.2 | | 2000 | | -1.34 | 24.49 | 8.87 | 0 |
| | | | | | 101 | | 4000 | | -1.34 | 24.74 | 30.08 | -23 |
| | | | | | 92.9 | | 8000 | | -1.34 | 24.87 | 107.29 | -108 |
| | | | | | -59.4 | | 32 | | -4.26 | 0 | 0.03 | -124 |
| | | | | | 38.8 | | 63 | | -4.26 | 0 | 0.1 | -26 |
| | | | | | 58.9 | | 125 | | 1.73 | 0 | 0.33 | -12 |
| | | | | | 73.4 | | 250 | | -0.02 | 0 | 0.84 | 4 |
| Fire Pump Engine Exhaust 2 | FP2 | 680577 | 4860369 | 111 | 81.8 | 800.4 | 500 | 69.07 | -1.06 | 0 | 1.54 | 12 |
| | | | | | 91 | | 1000 | | -1.06 | 0 | 2.93 | 20 |
| | | | | | 97.2 | | 2000 | | -1.06 | 0 | 7.73 | 21 |
| | | | | | 97 | | 4000 | | -1.06 | 0 | 26.23 | 3 |
| | | | | | 88.9 | | 8000 | | -1.06 | 0 | 93.55 | -73 |
| | | | | | -59.4 | | 32 | | -4.26 | 0 | 0.03 | -124 |
| | | | | | 38.8 | | 63 | | -4.26 | 0 | 0.1 | -26 |
| | | | | | 58.9 | | 125 | | 1.73 | 0 | 0.33 | -12 |
| | | | | | 73.4 | | 250 | | -0.02 | 0 | 0.84 | 4 |
| Fire Pump Engine Exhaust 1 | FP1 | 680575.8 | 4860372 | 111 | 81.8 | 801.75 | 500 | 69.08 | -1.06 | 0 | 1.55 | 12 |
| | | | | | 91 | | 1000 | | -1.07 | 0 | 2.93 | 20 |
| | | | | | 97.2 | | 2000 | | -1.07 | 0 | 7.75 | 21 |
| | | | | | 97 | | 4000 | | -1.07 | 0 | 26.27 | 3 |
| | | | | | 88.9 | | 8000 | | -1.07 | 0 | 93.71 | -73 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -34.4 | | 32 | | -3 | 4.77 | 0.03 | -106 |
| | | | | | 81.2 | | 63 | | -3 | 4.77 | 0.1 | 10 |
| | | | | | 91.3 | | 125 | | 2.03 | 2.74 | 0.35 | 17 |
| | | | | | 88.8 | | 250 | | 0.29 | 4.48 | 0.89 | 14 |
| Main Flue Stack 1 | MFS1 | 680529.2 | 4860387 | 187.7 | 89.2 | 853.06 | 500 | 69.62 | -0.75 | 4.77 | 1.64 | 14 |
| | | | | | 90.4 | | 1000 | | -0.75 | 4.77 | 3.12 | 14 |
| | | | | | 86.6 | | 2000 | | -0.75 | 4.77 | 8.24 | 5 |
| | | | | | 81.4 | | 4000 | | -0.75 | 4.77 | 27.95 | -20 |
| | | | | | 74.3 | | 8000 | | -0.75 | 4.77 | 99.71 | -99 |
| | | | | | -34.4 | | 32 | | -5.2 | 0 | 0.03 | -98 |
| | | | | | 61.6 | | 63 | | -5.2 | 0 | 0.1 | -2 |
| | | | | | 76.7 | | 125 | | 4.52 | 0 | 0.32 | 3 |
| | | | | | 83.2 | | 250 | | 3.42 | 0 | 0.82 | 10 |
| Transformer 2 | TRAN2 | 680598.7 | 4860447 | 102.5 | 88.6 | 785.88 | 500 | 68.91 | -0.71 | 0 | 1.52 | 19 |
| | | | | | 85.8 | | 1000 | | -1.29 | 0 | 2.87 | 15 |
| | | | | | 82 | | 2000 | | -1.3 | 0 | 7.59 | 7 |
| | | | | | 76.8 | | 4000 | | -1.3 | 0 | 25.75 | -17 |
| | | | | | 67.7 | | 8000 | | -1.3 | 0 | 91.85 | -92 |
| | | | | | -34.4 | | 32 | | -5.2 | 0 | 0.03 | -98 |
| | | | | | 61.6 | | 63 | | -5.2 | 0 | 0.1 | -2 |
| | | | | | 76.7 | | 125 | | 4.53 | 0 | 0.33 | 3 |
| | | | | | 83.2 | | 250 | | 3.42 | 0 | 0.83 | 10 |
| Transformer 1 | TRAN1 | 680594.9 | 4860459 | 102.5 | 88.6 | 791.48 | 500 | 68.97 | -0.71 | 0 | 1.53 | 19 |
| | | | | | 85.8 | | 1000 | | -1.29 | 0 | 2.89 | 15 |
| | | | | | 82 | | 2000 | | -1.3 | 0 | 7.65 | 7 |
| | | | | | 76.8 | | 4000 | | -1.3 | 0 | 25.94 | -17 |
| | | | | | 67.7 | | 8000 | | -1.3 | 0 | 92.51 | -92 |
| | | | | | -39.4 | | 32 | | -3 | 4.77 | 0.03 | -112 |
| | | | | | 76.2 | | 63 | | -3 | 4.77 | 0.11 | 4 |
| | | | | | 86.3 | | 125 | | 2.06 | 2.71 | 0.38 | 11 |
| | | | | | 83.8 | | 250 | | 0.29 | 4.48 | 0.97 | 8 |
| Main Flue Stack 2 | MFS2 | 680446.5 | 4860356 | 187.7 | 84.2 | 934.04 | 500 | 70.41 | -0.75 | 4.77 | 1.8 | 8 |
| | | | | | 85.4 | | 1000 | | -0.75 | 4.77 | 3.42 | 8 |
| | | | | | 81.6 | | 2000 | | -0.75 | 4.77 | 9.03 | -2 |
| | | | | | 76.4 | | 4000 | | -0.75 | 4.77 | 30.61 | -29 |
| | | | | | 69.3 | | 8000 | | -0.75 | 4.77 | 109.17 | -114 |
| | | | | | -39.4 | | 32 | | -3 | 0 | 0.03 | -106 |
| | | | | | 66.8 | | 63 | | -3 | 0 | 0.1 | 0 |
| | | | | | 76.9 | | 125 | | 2.03 | 0 | 0.35 | 5 |
| | | | | | 84.4 | | 250 | | 0.29 | 0 | 0.88 | 14 |
| Internal Noise Sources 1 | INS1 | 680538.1 | 4860405 | 125 | 83.8 | 841.7 | 500 | 69.5 | -0.75 | 0 | 1.62 | 13 |
| | | | | | 82 | | 1000 | | -0.75 | 0 | 3.08 | 10 |
| | | | | | 77.2 | | 2000 | | -0.75 | 0 | 8.13 | 0 |
| | | | | | 73 | | 4000 | | -0.75 | 0 | 27.58 | -23 |
| | | | | | 67.9 | | 8000 | | -0.75 | 0 | 98.38 | -99 |
| | | | | | -39.4 | | 32 | | -3.01 | 8.76 | 0.03 | -115 |
| | | | | | 66.8 | | 63 | | -3.01 | 12.15 | 0.11 | -12 |
| | | | | | 76.9 | | 125 | | 2.05 | 14.19 | 0.37 | -10 |
| | | | | | 84.4 | | 250 | | 0.29 | 18.62 | 0.93 | -5 |
| Internal Noise Sources 2 | INS2 | 680490.5 | 4860400 | 125 | 83.8 | 888.72 | 500 | 69.98 | -0.75 | 21.85 | 1.71 | -9 |
| | | | | | 82 | | 1000 | | -0.75 | 23.53 | 3.25 | -14 |
| | | | | | 77.2 | | 2000 | | -0.75 | 24.2 | 8.59 | -25 |
| | | | | | 73 | | 4000 | | -0.75 | 24.58 | 29.12 | -50 |
| | | | | | 67.9 | | 8000 | | -0.75 | 24.79 | 103.88 | -130 |
| | | | | | -45.7 | | 32 | | -5.29 | 0 | 0.03 | -110 |
| | | | | | 60.5 | | 63 | | -5.29 | 0 | 0.1 | -4 |
| | | | | | 65.6 | | 125 | | 4.75 | 0 | 0.34 | -9 |
| | | | | | 68.1 | | 250 | | 4.22 | 0 | 0.86 | -6 |
| Truck Traffic | TR | 680551.9 | 4860298 | 100.53 | 80.5 | 825.49 | 500 | 69.33 | 0.35 | 0 | 1.59 | 9 |
| | | | | | 80.7 | | 1000 | | -1.22 | 0 | 3.02 | 10 |
| | | | | | 82.9 | | 2000 | | -1.32 | 0 | 7.98 | 7 |
| | | | | | 76.7 | | 4000 | | -1.32 | 0 | 27.05 | -18 |
| | | | | | 63.6 | | 8000 | | -1.32 | 0 | 96.48 | -101 |
| | | | | | -39.4 | | 32 | | -3.16 | 6.39 | 0.03 | -113 |
| | | | | | 66.8 | | 63 | | -3.16 | 8.22 | 0.11 | -9 |
| | | | | | 76.9 | | 125 | | 2.02 | 10.14 | 0.38 | -6 |
| | | | | | 84.4 | | 250 | | 0.25 | 12.94 | 0.98 | 0 |
| Internal Noise Sources 3 | INS3 | 680443.2 | 4860394 | 125 | 83.8 | 935.5 | 500 | 70.42 | -0.79 | 15.61 | 1.8 | -3 |
| | | | | | 82 | | 1000 | | -0.79 | 18.03 | 3.42 | -9 |
| | | | | | 77.2 | | 2000 | | -0.79 | 20.19 | 9.04 | -22 |
| | | | | | 73 | | 4000 | | -0.79 | 21.94 | 30.66 | -49 |
| | | | | | 67.9 | | 8000 | | -0.79 | 23.2 | 109.34 | -134 |
| | | | | | -39.4 | | 32 | | -3.21 | 8.07 | 0.03 | -115 |
| | | | | | 66.8 | | 63 | | -3.21 | 10.8 | 0.12 | -11 |
| | | | | | 76.9 | | 125 | | 2.02 | 11.6 | 0.39 | -8 |
| | | | | | 84.4 | | 250 | | 0.24 | 16.23 | 0.99 | -4 |
| Internal Noise Sources 3 | INS3 | 680426 | 4860389 | 125 | 83.8 | 952.33 | 500 | 70.58 | -0.8 | 19.37 | 1.84 | -7 |
| | | | | | 82 | | 1000 | | -0.8 | 22.32 | 3.48 | -14 |
| | | | | | 77.2 | | 2000 | | -0.8 | 25 | 9.2 | -27 |
| | | | | | 73 | | 4000 | | -0.8 | 25 | 31.21 | -53 |
| | | | | | 67.9 | | 8000 | | -0.8 | 25 | 111.31 | -138 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| Truck Traffic | TR | 680664.9 | 4860436 | 102 | -47.3 | 718.81 | 32 | 68.13 | -5.19 | 0 | 0.02 | -110 |
| | | | | | 58.9 | | 63 | | -5.19 | 0 | 0.09 | -4 |
| | | | | | 64 | | 125 | | 4.46 | 0 | 0.3 | -9 |
| | | | | | 66.5 | | 250 | | 4.25 | 0 | 0.75 | -7 |
| | | | | | 78.9 | | 500 | | 0.37 | 0 | 1.39 | 9 |
| | | | | | 79.1 | | 1000 | | -1.19 | 0 | 2.63 | 10 |
| | | | | | 81.3 | | 2000 | | -1.3 | 0 | 6.95 | 8 |
| | | | | | 75.1 | | 4000 | | -1.3 | 0 | 23.56 | -15 |
| | | | | | 62 | | 8000 | | -1.3 | 0 | 84.02 | -89 |
| Office AC unit 4 | AC4 | 680538 | 4860477 | 107.7 | -39.4 | 850.57 | 32 | 69.59 | -4.71 | 1.59 | 0.03 | -106 |
| | | | | | 30.5 | | 63 | | -4.71 | 1.78 | 0.1 | -36 |
| | | | | | 55 | | 125 | | 2.56 | 0.57 | 0.35 | -18 |
| | | | | | 63.9 | | 250 | | -0.1 | 2.28 | 0.89 | -9 |
| | | | | | 76.1 | | 500 | | -1.18 | 2.86 | 1.64 | 3 |
| | | | | | 82.4 | | 1000 | | -1.18 | 3.94 | 3.11 | 7 |
| | | | | | 79.4 | | 2000 | | -1.18 | 5.46 | 8.22 | -3 |
| | | | | | 76.7 | | 4000 | | -1.18 | 7.17 | 27.87 | -27 |
| | | | | | 61.7 | | 8000 | | -1.18 | 9.19 | 99.42 | -115 |
| Office AC unit 2 | AC2 | 680533.7 | 4860492 | 107.7 | -39.4 | 857.48 | 32 | 69.66 | -4.72 | 0 | 0.03 | -104 |
| | | | | | 30.5 | | 63 | | -4.72 | 0 | 0.1 | -35 |
| | | | | | 55 | | 125 | | 2.56 | 0 | 0.35 | -18 |
| | | | | | 63.9 | | 250 | | -0.11 | 0 | 0.89 | -7 |
| | | | | | 76.1 | | 500 | | -1.18 | 0 | 1.65 | 6 |
| | | | | | 82.4 | | 1000 | | -1.18 | 0 | 3.14 | 11 |
| | | | | | 79.4 | | 2000 | | -1.18 | 0 | 8.29 | 3 |
| | | | | | 76.7 | | 4000 | | -1.18 | 0 | 28.1 | -20 |
| | | | | | 61.7 | | 8000 | | -1.18 | 0 | 100.22 | -107 |
| Office AC unit 3 | AC3 | 680527.5 | 4860474 | 107.7 | -39.4 | 860.37 | 32 | 69.69 | -4.72 | 2.35 | 0.03 | -107 |
| | | | | | 30.5 | | 63 | | -4.72 | 2.81 | 0.1 | -37 |
| | | | | | 55 | | 125 | | 2.56 | 1.7 | 0.35 | -19 |
| | | | | | 63.9 | | 250 | | -0.11 | 4.79 | 0.9 | -11 |
| | | | | | 76.1 | | 500 | | -1.18 | 6.58 | 1.66 | -1 |
| | | | | | 82.4 | | 1000 | | -1.18 | 8.76 | 3.15 | 2 |
| | | | | | 79.4 | | 2000 | | -1.18 | 11.23 | 8.31 | -9 |
| | | | | | 76.7 | | 4000 | | -1.18 | 13.92 | 28.19 | -34 |
| | | | | | 61.7 | | 8000 | | -1.18 | 16.76 | 100.56 | -124 |
| Office AC unit 1 | AC1 | 680523.2 | 4860489 | 107.7 | -39.4 | 867.22 | 32 | 69.76 | -4.73 | 0 | 0.03 | -104 |
| | | | | | 30.5 | | 63 | | -4.73 | 0 | 0.11 | -35 |
| | | | | | 55 | | 125 | | 2.56 | 0 | 0.36 | -18 |
| | | | | | 63.9 | | 250 | | -0.11 | 0 | 0.9 | -7 |
| | | | | | 76.1 | | 500 | | -1.18 | 0 | 1.67 | 6 |
| | | | | | 82.4 | | 1000 | | -1.18 | 0 | 3.17 | 11 |
| | | | | | 79.4 | | 2000 | | -1.18 | 0 | 8.38 | 2 |
| | | | | | 76.7 | | 4000 | | -1.18 | 0 | 28.42 | -20 |
| | | | | | 61.7 | | 8000 | | -1.18 | 0 | 101.36 | -108 |
| Truck Traffic | TR | 680687.4 | 4860349 | 102 | -51.4 | 689.4 | 32 | 67.77 | -5.15 | 0 | 0.02 | -114 |
| | | | | | 54.8 | | 63 | | -5.15 | 0 | 0.08 | -8 |
| | | | | | 59.9 | | 125 | | 4.36 | 0 | 0.28 | -12 |
| | | | | | 62.4 | | 250 | | 4.25 | 0 | 0.72 | -10 |
| | | | | | 74.8 | | 500 | | 0.38 | 0 | 1.33 | 5 |
| | | | | | 75 | | 1000 | | -1.19 | 0 | 2.52 | 6 |
| | | | | | 77.2 | | 2000 | | -1.29 | 0 | 6.66 | 4 |
| | | | | | 71 | | 4000 | | -1.29 | 0 | 22.59 | -18 |
| | | | | | 57.9 | | 8000 | | -1.29 | 0 | 80.58 | -89 |
| Air Cooled Condenser 2 | ACC2 | 680573.6 | 4860435 | 113.1 | -39.4 | 809.35 | 32 | 69.16 | -4.04 | 0 | 0.03 | -105 |
| | | | | | 42.5 | | 63 | | -4.04 | 0 | 0.1 | -23 |
| | | | | | 53.5 | | 125 | | 1.75 | 0 | 0.33 | -18 |
| | | | | | 62.9 | | 250 | | 0.03 | 0 | 0.84 | -7 |
| | | | | | 68.3 | | 500 | | -1.01 | 0 | 1.56 | -1 |
| | | | | | 74.5 | | 1000 | | -1.01 | 0 | 2.96 | 3 |
| | | | | | 72.7 | | 2000 | | -1.01 | 0 | 7.82 | -3 |
| | | | | | 68.5 | | 4000 | | -1.01 | 0 | 26.52 | -26 |
| | | | | | 60.4 | | 8000 | | -1.01 | 0 | 94.6 | -102 |
| Truck Traffic | TR | 680490.1 | 4860222 | 99.25 | -53.8 | 893.64 | 32 | 70.02 | -5.35 | 0 | 0.03 | -118 |
| | | | | | 52.4 | | 63 | | -5.35 | 0 | 0.11 | -12 |
| | | | | | 57.5 | | 125 | | 4.89 | 0 | 0.37 | -18 |
| | | | | | 60 | | 250 | | 4.21 | 0 | 0.93 | -15 |
| | | | | | 72.4 | | 500 | | 0.33 | 0 | 1.72 | 0 |
| | | | | | 72.6 | | 1000 | | -1.23 | 0 | 3.27 | 1 |
| | | | | | 74.8 | | 2000 | | -1.34 | 0 | 8.64 | -3 |
| | | | | | 68.6 | | 4000 | | -1.34 | 0 | 29.28 | -29 |
| | | | | | 55.5 | | 8000 | | -1.34 | 0 | 104.45 | -118 |
| Air Cooled Condenser 1 | ACC1 | 680557.9 | 4860462 | 113.1 | -39.4 | 828.5 | 32 | 69.37 | -4.09 | 0 | 0.03 | -105 |
| | | | | | 42.5 | | 63 | | -4.09 | 0 | 0.1 | -23 |
| | | | | | 53.5 | | 125 | | 1.75 | 0 | 0.34 | -18 |
| | | | | | 62.9 | | 250 | | 0.02 | 0 | 0.86 | -7 |
| | | | | | 68.3 | | 500 | | -1.02 | 0 | 1.6 | -2 |
| | | | | | 74.5 | | 1000 | | -1.02 | 0 | 3.03 | 3 |
| | | | | | 72.7 | | 2000 | | -1.02 | 0 | 8.01 | -4 |
| | | | | | 68.5 | | 4000 | | -1.02 | 0 | 27.15 | -27 |
| | | | | | 60.4 | | 8000 | | -1.02 | 0 | 96.84 | -105 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -55.2 | | 32 | | -5.32 | 0 | 0.03 | -120 |
| | | | | | 51 | | 63 | | -5.32 | 0 | 0.11 | -14 |
| | | | | | 56.1 | | 125 | | 4.84 | 0 | 0.36 | -19 |
| | | | | | 58.6 | | 250 | | 4.21 | 0 | 0.9 | -16 |
| Truck Traffic | TR | 680524 | 4860194 | 98.81 | 71 | 864.14 | 500 | 69.73 | 0.34 | 0 | 1.67 | -1 |
| | | | | | 71.2 | | 1000 | | -1.23 | 0 | 3.16 | -1 |
| | | | | | 73.4 | | 2000 | | -1.33 | 0 | 8.35 | -3 |
| | | | | | 67.2 | | 4000 | | -1.33 | 0 | 28.32 | -30 |
| | | | | | 54.1 | | 8000 | | -1.33 | 0 | 101 | -115 |
| | | | | | -39.4 | | 32 | | -4.36 | 7.87 | 0.03 | -114 |
| | | | | | 42.5 | | 63 | | -4.36 | 10.59 | 0.12 | -35 |
| | | | | | 53.5 | | 125 | | 1.74 | 12.9 | 0.4 | -32 |
| | | | | | 62.9 | | 250 | | -0.05 | 17.75 | 1 | -26 |
| Air Cooled Condenser 3 | ACC3 | 680414.8 | 4860382 | 113.1 | 68.3 | 963.01 | 500 | 70.67 | -1.09 | 21.08 | 1.86 | -24 |
| | | | | | 74.5 | | 1000 | | -1.09 | 22.95 | 3.52 | -22 |
| | | | | | 72.7 | | 2000 | | -1.09 | 23.85 | 9.31 | -30 |
| | | | | | 68.5 | | 4000 | | -1.09 | 24.39 | 31.56 | -57 |
| | | | | | 60.4 | | 8000 | | -1.09 | 24.68 | 112.56 | -146 |
| | | | | | -57.4 | | 32 | | -5.22 | 0 | 0.02 | -121 |
| | | | | | 48.8 | | 63 | | -5.22 | 0 | 0.09 | -15 |
| | | | | | 53.9 | | 125 | | 4.57 | 0 | 0.31 | -20 |
| | | | | | 56.4 | | 250 | | 4.24 | 0 | 0.79 | -17 |
| Truck Traffic | TR | 680642 | 4860503 | 102.06 | 68.8 | 753.59 | 500 | 68.54 | 0.36 | 0 | 1.45 | -2 |
| | | | | | 69 | | 1000 | | -1.2 | 0 | 2.76 | -1 |
| | | | | | 71.2 | | 2000 | | -1.31 | 0 | 7.28 | -3 |
| | | | | | 65 | | 4000 | | -1.31 | 0 | 24.7 | -27 |
| | | | | | 51.9 | | 8000 | | -1.31 | 0 | 88.08 | -103 |
| **Nighttime Level, dBA:** | | | | | | | | | | | | **41** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** **POR3**
X: 679935.6
Y: 4861211
Z: 105.38
Ground: 100.88

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -34.4 | | 32 | | -4.3 | 0 | 0.03 | -101 |
| | | | | | 82 | | 63 | | -4.3 | 0 | 0.11 | 16 |
| | | | | | 93.1 | | 125 | | 1.74 | 0 | 0.38 | 21 |
| | | | | | 97.6 | | 250 | | -0.03 | 0 | 0.97 | 26 |
| Steam Tubine 3 | ST3 | 680405.4 | 4860409 | 113.1 | 102 | 929.89 | 500 | 70.37 | -1.07 | 0 | 1.79 | 31 |
| | | | | | 105.2 | | 1000 | | -1.07 | 0 | 3.4 | 33 |
| | | | | | 104.4 | | 2000 | | -1.07 | 0 | 8.99 | 26 |
| | | | | | 103.2 | | 4000 | | -1.07 | 0 | 30.47 | 3 |
| | | | | | 97.1 | | 8000 | | -1.07 | 0 | 108.69 | -81 |
| | | | | | -34.4 | | 32 | | -4.37 | 4.7 | 0.03 | -106 |
| | | | | | 82 | | 63 | | -4.37 | 5.82 | 0.12 | 10 |
| | | | | | 93.1 | | 125 | | 1.73 | 7.12 | 0.4 | 13 |
| | | | | | 97.6 | | 250 | | -0.05 | 9.11 | 1.01 | 17 |
| Steam Tubine 1 | ST1 | 680538.4 | 4860448 | 113.1 | 102 | 972.41 | 500 | 70.76 | -1.09 | 11.26 | 1.87 | 19 |
| | | | | | 105.2 | | 1000 | | -1.09 | 13.64 | 3.56 | 18 |
| | | | | | 104.4 | | 2000 | | -1.09 | 16.11 | 9.4 | 9 |
| | | | | | 103.2 | | 4000 | | -1.09 | 18.48 | 31.87 | -17 |
| | | | | | 97.1 | | 8000 | | -1.09 | 20.57 | 113.66 | -107 |
| | | | | | -34.4 | | 32 | | -4.42 | 9.01 | 0.03 | -110 |
| | | | | | 82 | | 63 | | -4.42 | 11.71 | 0.12 | 4 |
| | | | | | 93.1 | | 125 | | 1.73 | 13.81 | 0.41 | 6 |
| | | | | | 97.6 | | 250 | | -0.06 | 19.65 | 1.05 | 6 |
| Steam Tubine 2 | ST2 | 680556.2 | 4860424 | 113.1 | 102 | 1002.85 | 500 | 71.02 | -1.1 | 23.2 | 1.93 | 7 |
| | | | | | 105.2 | | 1000 | | -1.11 | 25 | 3.67 | 7 |
| | | | | | 104.4 | | 2000 | | -1.11 | 25 | 9.69 | 0 |
| | | | | | 103.2 | | 4000 | | -1.11 | 25 | 32.86 | -25 |
| | | | | | 97.1 | | 8000 | | -1.11 | 25 | 117.22 | -115 |
| | | | | | -59.4 | | 32 | | -5.36 | 4.77 | 0.03 | -129 |
| | | | | | 60.8 | | 63 | | -5.36 | 4.77 | 0.11 | -9 |
| | | | | | 82.9 | | 125 | | 4.94 | 0 | 0.38 | 7 |
| | | | | | 79.4 | | 250 | | 4.2 | 0.57 | 0.96 | 3 |
| Back-up Power Generator 2 | BPG2 | 680467.5 | 4860461 | 102 | 87.8 | 919.48 | 500 | 70.27 | 0.33 | 4.44 | 1.77 | 11 |
| | | | | | 96 | | 1000 | | -1.24 | 4.77 | 3.36 | 19 |
| | | | | | 102.2 | | 2000 | | -1.34 | 4.77 | 8.89 | 20 |
| | | | | | 101 | | 4000 | | -1.34 | 4.77 | 30.13 | -3 |
| | | | | | 92.9 | | 8000 | | -1.34 | 4.77 | 107.47 | -88 |
| | | | | 102 | -59.4 | | 32 | | -5.37 | 4.77 | 0.03 | -129 |
| | | | | 102 | 60.8 | | 63 | | -5.37 | 4.77 | 0.11 | -9 |
| | | | | 102 | 82.9 | | 125 | | 4.94 | 0 | 0.38 | 7 |
| | | | | 102 | 79.4 | | 250 | | 4.2 | 0.57 | 0.96 | 3 |
| Back-up Power Generator 1 | BPG1 | 680469 | 4860456 | 102 | 87.8 | 924.59 | 500 | 70.32 | 0.33 | 4.44 | 1.78 | 11 |
| | | | | 102 | 96 | | 1000 | | -1.24 | 4.77 | 3.38 | 19 |
| | | | | 102 | 102.2 | | 2000 | | -1.34 | 4.77 | 8.94 | 20 |
| | | | | 102 | 101 | | 4000 | | -1.34 | 4.77 | 30.3 | -3 |
| | | | | 102 | 92.9 | | 8000 | | -1.34 | 4.77 | 108.07 | -89 |
| | | | | | -59.4 | | 32 | | -4.68 | 8.07 | 0.03 | -134 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | 38.8 | | 63 | | -4.68 | 10.99 | 0.13 | -39 |
| | | | | | 58.9 | | 125 | | 1.7 | 12.88 | 0.43 | -28 |
| | | | | | 73.4 | | 250 | | -0.13 | 17.94 | 1.1 | -17 |
| Fire Pump Engine Exhaust 1 | FP1 | 680575.8 | 4860372 | 111 | 81.8 | 1055.22 | 500 | 71.47 | -1.17 | 21.03 | 2.03 | -12 |
| | | | | | 91 | | 1000 | | -1.17 | 24.04 | 3.86 | -7 |
| | | | | | 97.2 | | 2000 | | -1.17 | 25 | 10.2 | -8 |
| | | | | | 97 | | 4000 | | -1.17 | 25 | 34.58 | -33 |
| | | | | | 88.9 | | 8000 | | -1.17 | 25 | 123.34 | -130 |
| | | | | | -59.4 | | 32 | | -4.68 | 7.83 | 0.03 | -134 |
| | | | | | 38.8 | | 63 | | -4.68 | 10.65 | 0.13 | -39 |
| | | | | | 58.9 | | 125 | | 1.7 | 12.48 | 0.44 | -27 |
| | | | | | 73.4 | | 250 | | -0.13 | 17.51 | 1.1 | -17 |
| Fire Pump Engine Exhaust 2 | FP2 | 680577 | 4860369 | 111 | 81.8 | 1058.78 | 500 | 71.5 | -1.17 | 20.59 | 2.04 | -11 |
| | | | | | 91 | | 1000 | | -1.17 | 23.59 | 3.87 | -7 |
| | | | | | 97.2 | | 2000 | | -1.17 | 25 | 10.23 | -8 |
| | | | | | 97 | | 4000 | | -1.17 | 25 | 34.7 | -33 |
| | | | | | 88.9 | | 8000 | | -1.17 | 25 | 123.75 | -130 |
| | | | | | -34.4 | | 32 | | -3 | 4.77 | 0.03 | -107 |
| | | | | | 81.2 | | 63 | | -3 | 4.77 | 0.12 | 8 |
| | | | | | 91.3 | | 125 | | 2.09 | 2.69 | 0.42 | 15 |
| | | | | | 88.8 | | 250 | | 0.29 | 4.48 | 1.06 | 12 |
| Main Flue Stack 1 | MFS1 | 680529.2 | 4860387 | 187.7 | 89.2 | 1019.06 | 500 | 71.16 | -0.75 | 4.77 | 1.96 | 12 |
| | | | | | 90.4 | | 1000 | | -0.75 | 4.77 | 3.73 | 11 |
| | | | | | 86.6 | | 2000 | | -0.75 | 4.77 | 9.85 | 2 |
| | | | | | 81.4 | | 4000 | | -0.75 | 4.77 | 33.39 | -27 |
| | | | | | 74.3 | | 8000 | | -0.75 | 4.77 | 119.11 | -120 |
| | | | | | -34.4 | | 32 | | -5.37 | 4.77 | 0.03 | -105 |
| | | | | | 61.6 | | 63 | | -5.37 | 4.77 | 0.12 | -9 |
| | | | | | 76.7 | | 125 | | 4.84 | 0 | 0.41 | 0 |
| | | | | | 83.2 | | 250 | | 3.37 | 1.4 | 1.04 | 6 |
| Transformer 1 | TRAN1 | 680594.9 | 4860459 | 102.5 | 88.6 | 1000.48 | 500 | 71 | -0.75 | 4.77 | 1.93 | 12 |
| | | | | | 85.8 | | 1000 | | -1.33 | 4.77 | 3.66 | 8 |
| | | | | | 82 | | 2000 | | -1.34 | 4.77 | 9.67 | -2 |
| | | | | | 76.8 | | 4000 | | -1.34 | 4.77 | 32.79 | -30 |
| | | | | | 67.7 | | 8000 | | -1.34 | 4.77 | 116.94 | -124 |
| | | | | | -34.4 | | 32 | | -5.38 | 4.77 | 0.03 | -105 |
| | | | | | 61.6 | | 63 | | -5.38 | 4.77 | 0.12 | -9 |
| | | | | | 76.7 | | 125 | | 4.85 | 0 | 0.42 | 0 |
| | | | | | 83.2 | | 250 | | 3.37 | 1.4 | 1.06 | 6 |
| Transformer 2 | TRAN2 | 680598.7 | 4860447 | 102.5 | 88.6 | 1012.15 | 500 | 71.1 | -0.75 | 4.77 | 1.95 | 12 |
| | | | | | 85.8 | | 1000 | | -1.33 | 4.77 | 3.7 | 8 |
| | | | | | 82 | | 2000 | | -1.34 | 4.77 | 9.78 | -2 |
| | | | | | 76.8 | | 4000 | | -1.34 | 4.77 | 33.17 | -31 |
| | | | | | 67.7 | | 8000 | | -1.34 | 4.77 | 118.3 | -125 |
| | | | | | -39.4 | | 32 | | -3 | 4.77 | 0.03 | -112 |
| | | | | | 76.2 | | 63 | | -3 | 4.77 | 0.12 | 3 |
| | | | | | 86.3 | | 125 | | 2.08 | 2.69 | 0.41 | 10 |
| | | | | | 83.8 | | 250 | | 0.29 | 4.48 | 1.04 | 7 |
| Main Flue Stack 2 | MFS2 | 680446.5 | 4860356 | 187.7 | 84.2 | 999.96 | 500 | 71 | -0.75 | 4.77 | 1.93 | 7 |
| | | | | | 85.4 | | 1000 | | -0.75 | 4.77 | 3.66 | 7 |
| | | | | | 81.6 | | 2000 | | -0.75 | 4.77 | 9.66 | -3 |
| | | | | | 76.4 | | 4000 | | -0.75 | 4.77 | 32.77 | -31 |
| | | | | | 69.3 | | 8000 | | -0.75 | 4.77 | 116.88 | -123 |
| | | | | | -39.4 | | 32 | | -3.23 | 3.69 | 0.03 | -111 |
| | | | | | 66.8 | | 63 | | -3.23 | 4.14 | 0.12 | -5 |
| | | | | | 76.9 | | 125 | | 2.01 | 4.26 | 0.39 | 0 |
| | | | | | 84.4 | | 250 | | 0.24 | 4.68 | 1 | 8 |
| Internal Noise Sources 3 | INS3 | 680426 | 4860389 | 125 | 83.8 | 957.53 | 500 | 70.62 | -0.81 | 4.91 | 1.85 | 7 |
| | | | | | 82 | | 1000 | | -0.81 | 5.18 | 3.5 | 4 |
| | | | | | 77.2 | | 2000 | | -0.81 | 5.59 | 9.25 | -7 |
| | | | | | 73 | | 4000 | | -0.81 | 6.31 | 31.38 | -35 |
| | | | | | 67.9 | | 8000 | | -0.81 | 7.47 | 111.92 | -121 |
| | | | | | -39.4 | | 32 | | -3.24 | 7.07 | 0.03 | -114 |
| | | | | | 66.8 | | 63 | | -3.24 | 9.85 | 0.12 | -11 |
| | | | | | 76.9 | | 125 | | 2.01 | 12.22 | 0.4 | -8 |
| | | | | | 84.4 | | 250 | | 0.23 | 15.69 | 1 | -3 |
| Internal Noise Sources 3 | INS3 | 680443.2 | 4860394 | 125 | 83.8 | 962.25 | 500 | 70.67 | -0.81 | 18.54 | 1.86 | -6 |
| | | | | | 82 | | 1000 | | -0.81 | 20.62 | 3.52 | -12 |
| | | | | | 77.2 | | 2000 | | -0.81 | 22.26 | 9.3 | -24 |
| | | | | | 73 | | 4000 | | -0.81 | 23.42 | 31.53 | -52 |
| | | | | | 67.9 | | 8000 | | -0.81 | 24.13 | 112.47 | -139 |
| | | | | | -39.4 | | 32 | | -3.3 | 0 | 0.03 | -107 |
| | | | | | 66.8 | | 63 | | -3.3 | 0 | 0.12 | -1 |
| | | | | | 76.9 | | 125 | | 2 | 0 | 0.4 | 4 |
| | | | | | 84.4 | | 250 | | 0.22 | 0 | 1.03 | 12 |
| Internal Noise Sources 2 | INS2 | 680490.5 | 4860400 | 125 | 83.8 | 983.45 | 500 | 70.86 | -0.82 | 0 | 1.9 | 12 |
| | | | | | 82 | | 1000 | | -0.82 | 0 | 3.6 | 8 |
| | | | | | 77.2 | | 2000 | | -0.82 | 0 | 9.5 | -2 |
| | | | | | 73 | | 4000 | | -0.82 | 0 | 32.23 | -29 |
| | | | | | 67.9 | | 8000 | | -0.82 | 0 | 114.95 | -117 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -3.36 | 11.45 | 0.03 | -119 |
| | | | | | 66.8 | | 63 | | -3.36 | 15.24 | 0.12 | -16 |
| | | | | | 76.9 | | 125 | | 1.99 | 16.69 | 0.41 | -13 |
| | | | | | 84.4 | | 250 | | 0.2 | 21.63 | 1.05 | -10 |
| Internal Noise Sources 1 | INS1 | 680538.1 | 4860405 | 125 | 83.8 | 1006.67 | 500 | 71.06 | -0.84 | 24.86 | 1.94 | -13 |
| | | | | | 82 | | 1000 | | -0.84 | 25 | 3.68 | -17 |
| | | | | | 77.2 | | 2000 | | -0.84 | 25 | 9.73 | -28 |
| | | | | | 73 | | 4000 | | -0.84 | 25 | 32.99 | -55 |
| | | | | | 67.9 | | 8000 | | -0.84 | 25 | 117.66 | -145 |
| | | | | | -47.2 | | 32 | | -5.39 | 0 | 0.03 | -113 |
| | | | | | 59 | | 63 | | -5.39 | 0 | 0.12 | -6 |
| | | | | | 64.1 | | 125 | | 5 | 0 | 0.4 | -12 |
| | | | | | 66.6 | | 250 | | 4.19 | 0 | 1.01 | -9 |
| Truck Traffic | TR | 680386.9 | 4860357 | 100.5 | 79 | 966.57 | 500 | 70.7 | 0.32 | 0 | 1.86 | 6 |
| | | | | | 79.2 | | 1000 | | -1.25 | 0 | 3.54 | 6 |
| | | | | | 81.4 | | 2000 | | -1.35 | 0 | 9.34 | 3 |
| | | | | | 75.2 | | 4000 | | -1.35 | 0 | 31.67 | -26 |
| | | | | | 62.1 | | 8000 | | -1.35 | 0 | 112.97 | -120 |
| | | | | | -39.4 | | 32 | | -4.82 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.82 | 0 | 0.11 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.38 | -18 |
| | | | | | 63.9 | | 250 | | -0.13 | 0 | 0.97 | -7 |
| Office AC unit 1 | AC1 | 680523.2 | 4860489 | 107.7 | 76.1 | 931.29 | 500 | 70.38 | -1.2 | 0 | 1.8 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.41 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 30.52 | -23 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 108.85 | -116 |
| | | | | | -39.4 | | 32 | | -4.83 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.83 | 0 | 0.11 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.38 | -18 |
| | | | | | 63.9 | | 250 | | -0.13 | 0 | 0.98 | -7 |
| Office AC unit 2 | AC2 | 680533.7 | 4860492 | 107.7 | 76.1 | 935.43 | 500 | 70.42 | -1.21 | 0 | 1.8 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.42 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9.04 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 30.65 | -23 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 109.33 | -117 |
| | | | | | -39.4 | | 32 | | -4.84 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.84 | 0 | 0.12 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.39 | -18 |
| | | | | | 63.9 | | 250 | | -0.14 | 0 | 0.99 | -7 |
| Office AC unit 3 | AC3 | 680527.5 | 4860474 | 107.7 | 76.1 | 945.8 | 500 | 70.52 | -1.21 | 0 | 1.82 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.46 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9.14 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 30.99 | -24 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 110.55 | -118 |
| | | | | | -39.4 | | 32 | | -4.84 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.84 | 0 | 0.12 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.39 | -19 |
| | | | | | 63.9 | | 250 | | -0.14 | 0 | 0.99 | -8 |
| Office AC unit 4 | AC4 | 680538 | 4860477 | 107.7 | 76.1 | 949.74 | 500 | 70.55 | -1.21 | 0 | 1.83 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.47 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9.18 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 31.12 | -24 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 111.01 | -119 |
| | | | | | -54.4 | | 32 | | -5.33 | 0 | 0.03 | -119 |
| | | | | | 51.8 | | 63 | | -5.33 | 0 | 0.11 | -13 |
| | | | | | 56.9 | | 125 | | 4.86 | 0 | 0.36 | -18 |
| | | | | | 59.4 | | 250 | | 4.21 | 0 | 0.91 | -16 |
| Truck Traffic | TR | 680381.1 | 4860459 | 102 | 71.8 | 874.42 | 500 | 69.83 | 0.34 | 0 | 1.69 | 0 |
| | | | | | 72 | | 1000 | | -1.23 | 0 | 3.2 | 0 |
| | | | | | 74.2 | | 2000 | | -1.33 | 0 | 8.45 | -3 |
| | | | | | 68 | | 4000 | | -1.33 | 0 | 28.65 | -29 |
| | | | | | 54.9 | | 8000 | | -1.33 | 0 | 102.2 | -116 |
| | | | | | -39.4 | | 32 | | -4.35 | 0 | 0.03 | -106 |
| | | | | | 42.5 | | 63 | | -4.35 | 0 | 0.12 | -24 |
| | | | | | 53.5 | | 125 | | 1.74 | 0 | 0.39 | -19 |
| | | | | | 62.9 | | 250 | | -0.04 | 0 | 1 | -9 |
| Air Cooled Condenser 3 | ACC3 | 680414.8 | 4860382 | 113.1 | 68.3 | 958.22 | 500 | 70.63 | -1.09 | 0 | 1.85 | -3 |
| | | | | | 74.5 | | 1000 | | -1.09 | 0 | 3.5 | 1 |
| | | | | | 72.7 | | 2000 | | -1.09 | 0 | 9.26 | -6 |
| | | | | | 68.5 | | 4000 | | -1.09 | 0 | 31.4 | -32 |
| | | | | | 60.4 | | 8000 | | -1.09 | 0 | 112 | -121 |
| | | | | | -39.4 | | 32 | | -4.37 | 0 | 0.03 | -106 |
| | | | | | 42.5 | | 63 | | -4.37 | 0 | 0.12 | -24 |
| | | | | | 53.5 | | 125 | | 1.73 | 0 | 0.4 | -19 |
| | | | | | 62.9 | | 250 | | -0.05 | 0 | 1.02 | -9 |
| Air Cooled Condenser 1 | ACC1 | 680557.9 | 4860462 | 113.1 | 68.3 | 974.39 | 500 | 70.77 | -1.09 | 0 | 1.88 | -3 |
| | | | | | 74.5 | | 1000 | | -1.09 | 0 | 3.56 | 1 |
| | | | | | 72.7 | | 2000 | | -1.09 | 0 | 9.42 | -6 |
| | | | | | 68.5 | | 4000 | | -1.09 | 0 | 31.93 | -33 |
| | | | | | 60.4 | | 8000 | | -1.09 | 0 | 113.89 | -123 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| Air Cooled Condenser 2 | ACC2 | 680573.6 | 4860435 | 113.1 | -39.4 | 1004.68 | 32 | 71.04 | -4.42 | 0 | 0.03 | -106 |
| | | | | | 42.5 | | 63 | | -4.42 | 0 | 0.12 | -24 |
| | | | | | 53.5 | | 125 | | 1.73 | 0 | 0.41 | -20 |
| | | | | | 62.9 | | 250 | | -0.06 | 0 | 1.05 | -9 |
| | | | | | 68.3 | | 500 | | -1.1 | 0 | 1.94 | -4 |
| | | | | | 74.5 | | 1000 | | -1.11 | 0 | 3.67 | 1 |
| | | | | | 72.7 | | 2000 | | -1.11 | 0 | 9.71 | -7 |
| | | | | | 68.5 | | 4000 | | -1.11 | 0 | 32.92 | -34 |
| | | | | | 60.4 | | 8000 | | -1.11 | 0 | 117.43 | -127 |
| Truck Traffic | TR | 680362.6 | 4860447 | 102 | -58.4 | 875.52 | 32 | 69.85 | -5.33 | 0 | 0.03 | -123 |
| | | | | | 47.8 | | 63 | | -5.33 | 0 | 0.11 | -17 |
| | | | | | 52.9 | | 125 | | 4.86 | 0 | 0.36 | -22 |
| | | | | | 55.4 | | 250 | | 4.21 | 0 | 0.91 | -20 |
| | | | | | 67.8 | | 500 | | 0.34 | 0 | 1.69 | -4 |
| | | | | | 68 | | 1000 | | -1.23 | 0 | 3.2 | -4 |
| | | | | | 70.2 | | 2000 | | -1.33 | 0 | 8.46 | -7 |
| | | | | | 64 | | 4000 | | -1.33 | 0 | 28.69 | -33 |
| | | | | | 50.9 | | 8000 | | -1.33 | 0 | 102.33 | -120 |
| **Nighttime Level, dBA:** | | | | | | | | | | | | **37** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**York/Durham EfW Facility - Sample Protocol Report for Operation Phase 140 tpy**

**ID:** **POR1**
X: 679867.8
Y: 4860445
Z: 94.5
Ground: 90

| Source Description | Source ID | Location Within Acoustic Model (m) X | Y | Z | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | -34.4 | | 32 | | -3.64 | 12.93 | 0.02 | -111 |
| | | | | | 82 | | 63 | | -3.64 | 16.47 | 0.08 | 2 |
| | | | | | 93.1 | | 125 | | 1.77 | 19.23 | 0.28 | 4 |
| | | | | | 97.6 | | 250 | | 0.13 | 22.15 | 0.7 | 7 |
| Steam Tubine | ST | 680539.5 | 4860437 | 113.1 | 102 | 672.09 | 500 | 67.55 | -0.91 | 23.39 | 1.3 | 11 |
| | | | | | 105.2 | | 1000 | | -0.91 | 24.12 | 2.46 | 12 |
| | | | | | 104.4 | | 2000 | | -0.91 | 24.54 | 6.5 | 7 |
| | | | | | 103.2 | | 4000 | | -0.91 | 24.76 | 22.02 | -10 |
| | | | | | 97.1 | | 8000 | | -0.91 | 24.88 | 78.56 | -73 |
| | | | | | -59.4 | | 32 | | -5.03 | 0 | 0.02 | -121 |
| | | | | | 60.8 | | 63 | | -5.03 | 0 | 0.07 | -1 |
| | | | | | 82.9 | | 125 | | 4.03 | 0 | 0.25 | 12 |
| | | | | | 79.4 | | 250 | | 4.29 | 0 | 0.63 | 8 |
| Back-up Power Generator | BPG | 680469 | 4860456 | 102 | 87.8 | 601.34 | 500 | 66.58 | 0.41 | 0 | 1.16 | 20 |
| | | | | | 96 | | 1000 | | -1.15 | 0 | 2.2 | 28 |
| | | | | | 102.2 | | 2000 | | -1.26 | 0 | 5.81 | 31 |
| | | | | | 101 | | 4000 | | -1.26 | 0 | 19.71 | 16 |
| | | | | | 92.9 | | 8000 | | -1.26 | 0 | 70.29 | -43 |
| | | | | | -59.4 | | 32 | | -4.05 | 0 | 0.02 | -123 |
| | | | | | 38.8 | | 63 | | -4.05 | 0 | 0.09 | -25 |
| | | | | | 58.9 | | 125 | | 1.73 | 0 | 0.29 | -11 |
| | | | | | 73.4 | | 250 | | 0.03 | 0 | 0.75 | 5 |
| Fire Pump Engine Exhaust | FP | 680577.3 | 4860362 | 111 | 81.8 | 714.56 | 500 | 68.08 | -1.01 | 0 | 1.38 | 13 |
| | | | | | 91 | | 1000 | | -1.01 | 0 | 2.61 | 21 |
| | | | | | 97.2 | | 2000 | | -1.01 | 0 | 6.91 | 23 |
| | | | | | 97 | | 4000 | | -1.01 | 0 | 23.42 | 7 |
| | | | | | 88.9 | | 8000 | | -1.01 | 0 | 83.52 | -62 |
| | | | | | -36.4 | | 32 | | -3 | 4.77 | 0.02 | -106 |
| | | | | | 79.2 | | 63 | | -3 | 4.77 | 0.08 | 10 |
| | | | | | 89.3 | | 125 | | 1.92 | 2.85 | 0.28 | 17 |
| | | | | | 86.8 | | 250 | | 0.29 | 4.48 | 0.7 | 14 |
| Main Flue Stack | MFS | 680529 | 4860381 | 187.7 | 87.2 | 670.92 | 500 | 67.53 | -0.75 | 4.77 | 1.29 | 14 |
| | | | | | 88.4 | | 1000 | | -0.75 | 4.77 | 2.45 | 14 |
| | | | | | 84.6 | | 2000 | | -0.75 | 4.78 | 6.48 | 7 |
| | | | | | 79.4 | | 4000 | | -0.75 | 4.79 | 21.99 | -14 |
| | | | | | 72.3 | | 8000 | | -0.75 | 4.8 | 78.42 | -78 |
| | | | | | -34.4 | | 32 | | -5.14 | 9.78 | 0.02 | -107 |
| | | | | | 61.6 | | 63 | | -5.14 | 13.27 | 0.09 | -15 |
| | | | | | 76.7 | | 125 | | 4.38 | 14.1 | 0.3 | -10 |
| | | | | | 83.2 | | 250 | | 3.43 | 18.05 | 0.76 | -7 |
| Transformer | TRAN | 680596.8 | 4860457 | 102.5 | 88.6 | 729.19 | 500 | 68.26 | -0.69 | 22.23 | 1.41 | -3 |
| | | | | | 85.8 | | 1000 | | -1.27 | 23.4 | 2.67 | -7 |
| | | | | | 82 | | 2000 | | -1.28 | 24.12 | 7.05 | -16 |
| | | | | | 76.8 | | 4000 | | -1.28 | 24.54 | 23.9 | -39 |
| | | | | | 67.7 | | 8000 | | -1.28 | 24.76 | 85.23 | -109 |
| | | | | | -43.6 | | 32 | | -4.99 | 0 | 0.02 | -105 |
| | | | | | 62.6 | | 63 | | -4.99 | 0 | 0.07 | 1 |
| | | | | | 67.7 | | 125 | | 3.94 | 0 | 0.24 | -3 |
| | | | | | 70.2 | | 250 | | 4.29 | 0 | 0.6 | -1 |
| Trusk Traffic | TR | 680440.4 | 4860360 | 100.93 | 82.6 | 579.1 | 500 | 66.26 | 0.42 | 0 | 1.12 | 15 |
| | | | | | 82.8 | | 1000 | | -1.14 | 0 | 2.12 | 16 |
| | | | | | 85 | | 2000 | | -1.25 | 0 | 5.6 | 14 |
| | | | | | 78.8 | | 4000 | | -1.25 | 0 | 18.98 | -5 |
| | | | | | 65.7 | | 8000 | | -1.25 | 0 | 67.69 | -67 |
| | | | | | -39.4 | | 32 | | -3 | 0 | 0.02 | -104 |
| | | | | | 66.8 | | 63 | | -3 | 0 | 0.08 | 3 |
| | | | | | 76.9 | | 125 | | 1.9 | 0 | 0.26 | 8 |
| | | | | | 84.4 | | 250 | | 0.29 | 0 | 0.67 | 16 |
| Internal Noise Sources | INS | 680504.8 | 4860413 | 125 | 83.8 | 638.6 | 500 | 67.1 | -0.75 | 0 | 1.23 | 16 |
| | | | | | 82 | | 1000 | | -0.75 | 0 | 2.34 | 13 |
| | | | | | 77.2 | | 2000 | | -0.75 | 0 | 6.17 | 5 |
| | | | | | 73 | | 4000 | | -0.75 | 0 | 20.93 | -14 |
| | | | | | 67.9 | | 8000 | | -0.75 | 0 | 74.64 | -73 |
| | | | | | -39.4 | | 32 | | -3 | 9.37 | 0.02 | -113 |
| | | | | | 66.8 | | 63 | | -3 | 12.68 | 0.08 | -11 |
| | | | | | 76.9 | | 125 | | 1.93 | 15.06 | 0.28 | -8 |
| | | | | | 84.4 | | 250 | | 0.29 | 19.74 | 0.7 | -4 |
| Internal Noise Sources | INS | 680537.5 | 4860402 | 125 | 83.8 | 671.83 | 500 | 67.55 | -0.75 | 22.94 | 1.3 | -7 |
| | | | | | 82 | | 1000 | | -0.75 | 23.85 | 2.46 | -11 |
| | | | | | 77.2 | | 2000 | | -0.75 | 24.39 | 6.49 | -20 |
| | | | | | 73 | | 4000 | | -0.75 | 24.68 | 22.02 | -40 |
| | | | | | 67.9 | | 8000 | | -0.75 | 24.84 | 78.53 | -102 |
| | | | | | -44.4 | | 32 | | -5.25 | 0 | 0.02 | -108 |
| | | | | | 61.8 | | 63 | | -5.25 | 0 | 0.09 | -2 |
| | | | | | 66.9 | | 125 | | 4.64 | 0 | 0.32 | -7 |
| | | | | | 69.4 | | 250 | | 4.23 | 0 | 0.81 | -5 |
| Trusk Traffic | TR | 680597.5 | 4860171 | 99.08 | 81.8 | 779.73 | 500 | 68.84 | 0.36 | 0 | 1.5 | 11 |
| | | | | | 82 | | 1000 | | -1.21 | 0 | 2.85 | 11 |
| | | | | | 84.2 | | 2000 | | -1.31 | 0 | 7.54 | 9 |
| | | | | | 78 | | 4000 | | -1.31 | 0 | 25.55 | -15 |
| | | | | | 64.9 | | 8000 | | -1.31 | 0 | 91.14 | -94 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -4.33 | 7.4 | 0.02 | -110 |
| | | | | | 30.5 | | 63 | | -4.33 | 10.26 | 0.08 | -43 |
| | | | | | 55 | | 125 | | 2.54 | 12.05 | 0.27 | -27 |
| | | | | | 63.9 | | 250 | | -0.01 | 17.26 | 0.69 | -21 |
| Office AC unit 1 | AC1 | 680523.2 | 4860489 | 107.7 | 76.1 | 656.97 | 500 | 67.35 | -1.08 | 20.42 | 1.27 | -12 |
| | | | | | 82.4 | | 1000 | | -1.08 | 22.84 | 2.4 | -9 |
| | | | | | 79.4 | | 2000 | | -1.08 | 23.79 | 6.35 | -17 |
| | | | | | 76.7 | | 4000 | | -1.08 | 24.35 | 21.53 | -35 |
| | | | | | 61.7 | | 8000 | | -1.08 | 24.66 | 76.79 | -106 |
| | | | | | -39.4 | | 32 | | -4.34 | 12.57 | 0.02 | -115 |
| | | | | | 30.5 | | 63 | | -4.34 | 15.51 | 0.08 | -48 |
| | | | | | 55 | | 125 | | 2.54 | 17.52 | 0.27 | -33 |
| | | | | | 63.9 | | 250 | | -0.01 | 21.32 | 0.69 | -26 |
| Office AC unit 3 | AC3 | 680527.5 | 4860474 | 107.7 | 76.1 | 660.5 | 500 | 67.4 | -1.08 | 22.77 | 1.27 | -14 |
| | | | | | 82.4 | | 1000 | | -1.08 | 23.74 | 2.42 | -10 |
| | | | | | 79.4 | | 2000 | | -1.08 | 24.33 | 6.38 | -18 |
| | | | | | 76.7 | | 4000 | | -1.08 | 24.65 | 21.64 | -36 |
| | | | | | 61.7 | | 8000 | | -1.08 | 24.82 | 77.2 | -107 |
| | | | | | -39.4 | | 32 | | -4.36 | 5.75 | 0.02 | -108 |
| | | | | | 30.5 | | 63 | | -4.36 | 8.12 | 0.08 | -41 |
| | | | | | 55 | | 125 | | 2.54 | 9.54 | 0.27 | -25 |
| | | | | | 63.9 | | 250 | | -0.02 | 14.69 | 0.7 | -19 |
| Office AC unit 2 | AC2 | 680533.7 | 4860492 | 107.7 | 76.1 | 667.68 | 500 | 67.49 | -1.09 | 17.8 | 1.29 | -9 |
| | | | | | 82.4 | | 1000 | | -1.09 | 20.81 | 2.44 | -7 |
| | | | | | 79.4 | | 2000 | | -1.09 | 23.09 | 6.45 | -17 |
| | | | | | 76.7 | | 4000 | | -1.09 | 23.94 | 21.88 | -36 |
| | | | | | 61.7 | | 8000 | | -1.09 | 24.43 | 78.04 | -107 |
| | | | | | -39.4 | | 32 | | -4.36 | 11.17 | 0.02 | -114 |
| | | | | | 30.5 | | 63 | | -4.36 | 14.05 | 0.08 | -47 |
| | | | | | 55 | | 125 | | 2.54 | 16 | 0.28 | -31 |
| | | | | | 63.9 | | 250 | | -0.02 | 20.45 | 0.7 | -25 |
| Office AC unit 4 | AC4 | 680538 | 4860477 | 107.7 | 76.1 | 671.15 | 500 | 67.54 | -1.09 | 22.14 | 1.29 | -14 |
| | | | | | 82.4 | | 1000 | | -1.09 | 23.34 | 2.45 | -10 |
| | | | | | 79.4 | | 2000 | | -1.09 | 24.09 | 6.49 | -18 |
| | | | | | 76.7 | | 4000 | | -1.09 | 24.52 | 21.99 | -36 |
| | | | | | 61.7 | | 8000 | | -1.09 | 24.75 | 78.45 | -108 |
| | | | | | -56.4 | | 32 | | -4.92 | 0 | 0.02 | -117 |
| | | | | | 49.8 | | 63 | | -4.92 | 0 | 0.07 | -11 |
| | | | | | 54.9 | | 125 | | 3.78 | 0 | 0.22 | -15 |
| | | | | | 57.4 | | 250 | | 4.31 | 0 | 0.57 | -13 |
| Trusk Traffic | TR | 680410.8 | 4860464 | 102 | 69.8 | 543.37 | 500 | 65.7 | 0.44 | 0 | 1.05 | 3 |
| | | | | | 70 | | 1000 | | -1.13 | 0 | 1.99 | 3 |
| | | | | | 72.2 | | 2000 | | -1.23 | 0 | 5.25 | 2 |
| | | | | | 66 | | 4000 | | -1.23 | 0 | 17.81 | -16 |
| | | | | | 52.9 | | 8000 | | -1.23 | 0 | 63.51 | -75 |
| | | | | | -39.4 | | 32 | | -3.71 | 10.2 | 0.02 | -114 |
| | | | | | 42.5 | | 63 | | -3.71 | 13.66 | 0.08 | -35 |
| | | | | | 53.5 | | 125 | | 1.77 | 16.28 | 0.28 | -33 |
| | | | | | 62.9 | | 250 | | 0.12 | 20.57 | 0.72 | -26 |
| Air Cooled Condenser | ACC | 680558.6 | 4860459 | 113.1 | 68.3 | 691.25 | 500 | 67.79 | -0.93 | 22.66 | 1.33 | -23 |
| | | | | | 74.5 | | 1000 | | -0.93 | 23.67 | 2.53 | -19 |
| | | | | | 72.7 | | 2000 | | -0.93 | 24.28 | 6.68 | -25 |
| | | | | | 68.5 | | 4000 | | -0.93 | 24.63 | 22.65 | -46 |
| | | | | | 60.4 | | 8000 | | -0.93 | 24.81 | 80.8 | -112 |
| | | | | | -57.4 | | 32 | | -4.93 | 0 | 0.02 | -118 |
| | | | | | 48.8 | | 63 | | -4.93 | 0 | 0.07 | -12 |
| | | | | | 53.9 | | 125 | | 3.8 | 0 | 0.23 | -16 |
| | | | | | 56.4 | | 250 | | 4.31 | 0 | 0.57 | -14 |
| Trusk Traffic | TR | 680414.8 | 4860472 | 102 | 68.8 | 547.75 | 500 | 65.77 | 0.44 | 0 | 1.06 | 2 |
| | | | | | 69 | | 1000 | | -1.13 | 0 | 2 | 2 |
| | | | | | 71.2 | | 2000 | | -1.23 | 0 | 5.29 | 1 |
| | | | | | 65 | | 4000 | | -1.23 | 0 | 17.95 | -17 |
| | | | | | 51.9 | | 8000 | | -1.23 | 0 | 64.02 | -77 |
| **Nighttime Level, dBA:** | | | | | | | | | | | | **37** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** **POR2**
X: 681376.6
Y: 4860335
Z: 104.5
Ground: 100

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -34.4 | | 32 | | -4.12 | 0 | 0.03 | -100 |
| | | | | | 82 | | 63 | | -4.12 | 0 | 0.1 | 17 |
| | | | | | 93.1 | | 125 | | 1.75 | 0 | 0.35 | 21 |
| | | | | | 97.6 | | 250 | | 0.01 | 0 | 0.88 | 27 |
| Steam Tubine | ST | 680539.5 | 4860437 | 113.1 | 102 | 843.38 | 500 | 69.52 | -1.03 | 0 | 1.63 | 32 |
| | | | | | 105.2 | | 1000 | | -1.03 | 0 | 3.08 | 34 |
| | | | | | 104.4 | | 2000 | | -1.03 | 0 | 8.15 | 28 |
| | | | | | 103.2 | | 4000 | | -1.03 | 0 | 27.64 | 7 |
| | | | | | 97.1 | | 8000 | | -1.03 | 0 | 98.58 | -70 |
| | | | | | -59.4 | | 32 | | -5.36 | 13.63 | 0.03 | -138 |
| | | | | | 60.8 | | 63 | | -5.36 | 17.16 | 0.11 | -21 |
| | | | | | 82.9 | | 125 | | 4.93 | 17.95 | 0.38 | -11 |
| | | | | | 79.4 | | 250 | | 4.2 | 19.42 | 0.96 | -15 |
| Back-up Power Generator | BPG | 680469 | 4860456 | 102 | 87.8 | 915.72 | 500 | 70.24 | 0.33 | 23.04 | 1.77 | -8 |
| | | | | | 96 | | 1000 | | -1.24 | 24.04 | 3.35 | 0 |
| | | | | | 102.2 | | 2000 | | -1.34 | 24.5 | 8.85 | 0 |
| | | | | | 101 | | 4000 | | -1.34 | 24.74 | 30.01 | -23 |
| | | | | | 92.9 | | 8000 | | -1.34 | 24.87 | 107.03 | -108 |

| Source Description | Source ID | Location Within Acoustic Model (m) X | Y | Z | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | -59.4 | | 32 | | -4.26 | 0 | 0.03 | -124 |
| | | | | | 38.8 | | 63 | | -4.26 | 0 | 0.1 | -26 |
| | | | | | 58.9 | | 125 | | 1.73 | 0 | 0.33 | -12 |
| | | | | | 73.4 | | 250 | | -0.02 | 0 | 0.83 | 4 |
| Fire Pump Engine Exhaust | FP | 680577.3 | 4860362 | 111 | 81.8 | 799.85 | 500 | 69.06 | -1.06 | 0 | 1.54 | 12 |
| | | | | | 91 | | 1000 | | -1.06 | 0 | 2.93 | 20 |
| | | | | | 97.2 | | 2000 | | -1.06 | 0 | 7.73 | 21 |
| | | | | | 97 | | 4000 | | -1.06 | 0 | 26.21 | 3 |
| | | | | | 88.9 | | 8000 | | -1.06 | 0 | 93.49 | -73 |
| | | | | | -36.4 | | 32 | | -3 | 4.77 | 0.03 | -108 |
| | | | | | 79.2 | | 63 | | -3 | 4.77 | 0.1 | 8 |
| | | | | | 89.3 | | 125 | | 2.03 | 2.74 | 0.35 | 15 |
| | | | | | 86.8 | | 250 | | 0.29 | 4.48 | 0.89 | 12 |
| Main Flue Stack | MFS | 680529 | 4860381 | 187.7 | 87.2 | 852.92 | 500 | 69.62 | -0.75 | 4.77 | 1.64 | 12 |
| | | | | | 88.4 | | 1000 | | -0.75 | 4.77 | 3.12 | 12 |
| | | | | | 84.6 | | 2000 | | -0.75 | 4.77 | 8.24 | 3 |
| | | | | | 79.4 | | 4000 | | -0.75 | 4.77 | 27.95 | -22 |
| | | | | | 72.3 | | 8000 | | -0.75 | 4.77 | 99.69 | -101 |
| | | | | | -34.4 | | 32 | | -5.2 | 0 | 0.03 | -98 |
| | | | | | 61.6 | | 63 | | -5.2 | 0 | 0.1 | -2 |
| | | | | | 76.7 | | 125 | | 4.53 | 0 | 0.32 | 3 |
| | | | | | 83.2 | | 250 | | 3.42 | 0 | 0.82 | 10 |
| Transformer | TRAN | 680596.8 | 4860457 | 102.5 | 88.6 | 789.27 | 500 | 68.94 | -0.71 | 0 | 1.52 | 19 |
| | | | | | 85.8 | | 1000 | | -1.29 | 0 | 2.89 | 15 |
| | | | | | 82 | | 2000 | | -1.3 | 0 | 7.63 | 7 |
| | | | | | 76.8 | | 4000 | | -1.3 | 0 | 25.86 | -17 |
| | | | | | 67.7 | | 8000 | | -1.3 | 0 | 92.25 | -92 |
| | | | | | -44.4 | | 32 | | -5.27 | 0 | 0.03 | -108 |
| | | | | | 61.8 | | 63 | | -5.27 | 0 | 0.1 | -2 |
| | | | | | 66.9 | | 125 | | 4.68 | 0 | 0.33 | -7 |
| | | | | | 69.4 | | 250 | | 4.23 | 0 | 0.83 | -5 |
| Trusk Traffic | TR | 680597.5 | 4860171 | 99.08 | 81.8 | 796.19 | 500 | 69.02 | 0.35 | 0 | 1.53 | 11 |
| | | | | | 82 | | 1000 | | -1.21 | 0 | 2.91 | 11 |
| | | | | | 84.2 | | 2000 | | -1.32 | 0 | 7.69 | 9 |
| | | | | | 78 | | 4000 | | -1.32 | 0 | 26.09 | -16 |
| | | | | | 64.9 | | 8000 | | -1.32 | 0 | 93.06 | -96 |
| | | | | | -39.4 | | 32 | | -3 | 0 | 0.03 | -106 |
| | | | | | 66.8 | | 63 | | -3 | 0 | 0.1 | 0 |
| | | | | | 76.9 | | 125 | | 2.03 | 0 | 0.35 | 5 |
| | | | | | 84.4 | | 250 | | 0.29 | 0 | 0.88 | 14 |
| Internal Noise Sources | INS | 680537.5 | 4860402 | 125 | 83.8 | 842.05 | 500 | 69.51 | -0.75 | 0 | 1.62 | 13 |
| | | | | | 82 | | 1000 | | -0.75 | 0 | 3.08 | 10 |
| | | | | | 77.2 | | 2000 | | -0.75 | 0 | 8.14 | 0 |
| | | | | | 73 | | 4000 | | -0.75 | 0 | 27.59 | -23 |
| | | | | | 67.9 | | 8000 | | -0.75 | 0 | 98.42 | -99 |
| | | | | | -39.4 | | 32 | | -3 | 9.28 | 0.03 | -116 |
| | | | | | 66.8 | | 63 | | -3 | 12.57 | 0.11 | -13 |
| | | | | | 76.9 | | 125 | | 2.04 | 14.8 | 0.36 | -10 |
| | | | | | 84.4 | | 250 | | 0.29 | 19.7 | 0.91 | -6 |
| Internal Noise Sources | INS | 680504.8 | 4860413 | 125 | 83.8 | 875.55 | 500 | 69.85 | -0.75 | 23.07 | 1.69 | -10 |
| | | | | | 82 | | 1000 | | -0.75 | 24.02 | 3.2 | -14 |
| | | | | | 77.2 | | 2000 | | -0.75 | 24.48 | 8.46 | -25 |
| | | | | | 73 | | 4000 | | -0.75 | 24.73 | 28.69 | -50 |
| | | | | | 67.9 | | 8000 | | -0.75 | 24.86 | 102.34 | -128 |
| | | | | | -49.2 | | 32 | | -5.36 | 0 | 0.03 | -114 |
| | | | | | 57 | | 63 | | -5.36 | 0 | 0.11 | -8 |
| | | | | | 62.1 | | 125 | | 4.93 | 0 | 0.38 | -13 |
| | | | | | 64.6 | | 250 | | 4.2 | 0 | 0.96 | -11 |
| Trusk Traffic | TR | 680462.4 | 4860288 | 100.16 | 77 | 915.41 | 500 | 70.23 | 0.33 | 0 | 1.76 | 5 |
| | | | | | 77.2 | | 1000 | | -1.24 | 0 | 3.35 | 5 |
| | | | | | 79.4 | | 2000 | | -1.34 | 0 | 8.85 | 2 |
| | | | | | 73.2 | | 4000 | | -1.34 | 0 | 30 | -26 |
| | | | | | 60.1 | | 8000 | | -1.34 | 0 | 107 | -116 |
| | | | | | -39.4 | | 32 | | -4.71 | 0 | 0.03 | -104 |
| | | | | | 30.5 | | 63 | | -4.71 | 0 | 0.1 | -34 |
| | | | | | 55 | | 125 | | 2.56 | 0 | 0.35 | -18 |
| | | | | | 63.9 | | 250 | | -0.1 | 0 | 0.89 | -6 |
| Office AC unit 4 | AC4 | 680538 | 4860477 | 107.7 | 76.1 | 850.57 | 500 | 69.59 | -1.18 | 0 | 1.64 | 6 |
| | | | | | 82.4 | | 1000 | | -1.18 | 0 | 3.11 | 11 |
| | | | | | 79.4 | | 2000 | | -1.18 | 0 | 8.22 | 3 |
| | | | | | 76.7 | | 4000 | | -1.18 | 0 | 27.87 | -20 |
| | | | | | 61.7 | | 8000 | | -1.18 | 0 | 99.42 | -106 |
| | | | | | -39.4 | | 32 | | -4.72 | 0 | 0.03 | -104 |
| | | | | | 30.5 | | 63 | | -4.72 | 0 | 0.1 | -35 |
| | | | | | 55 | | 125 | | 2.56 | 0 | 0.35 | -18 |
| | | | | | 63.9 | | 250 | | -0.11 | 0 | 0.89 | -7 |
| Office AC unit 2 | AC2 | 680533.7 | 4860492 | 107.7 | 76.1 | 857.48 | 500 | 69.66 | -1.18 | 0 | 1.65 | 6 |
| | | | | | 82.4 | | 1000 | | -1.18 | 0 | 3.14 | 11 |
| | | | | | 79.4 | | 2000 | | -1.18 | 0 | 8.29 | 3 |
| | | | | | 76.7 | | 4000 | | -1.18 | 0 | 28.1 | -20 |
| | | | | | 61.7 | | 8000 | | -1.18 | 0 | 100.22 | -107 |
| | | | | | -39.4 | | 32 | | -4.72 | 2.02 | 0.03 | -106 |
| | | | | | 30.5 | | 63 | | -4.72 | 2.26 | 0.1 | -37 |
| | | | | | 55 | | 125 | | 2.56 | 1.01 | 0.35 | -19 |
| | | | | | 63.9 | | 250 | | -0.11 | 3.41 | 0.9 | -10 |
| Office AC unit 3 | AC3 | 680527.5 | 4860474 | 107.7 | 76.1 | 860.37 | 500 | 69.69 | -1.18 | 4.7 | 1.66 | 1 |
| | | | | | 82.4 | | 1000 | | -1.18 | 6.49 | 3.15 | 4 |
| | | | | | 79.4 | | 2000 | | -1.18 | 8.67 | 8.31 | -6 |
| | | | | | 76.7 | | 4000 | | -1.18 | 11.15 | 28.19 | -31 |
| | | | | | 61.7 | | 8000 | | -1.18 | 13.86 | 100.56 | -121 |

| Source Description | Source ID | Location Within Acoustic Model (m) X | Y | Z | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | -39.4 | | 32 | | -4.73 | 0 | 0.03 | -104 |
| | | | | | 30.5 | | 63 | | -4.73 | 0 | 0.11 | -35 |
| | | | | | 55 | | 125 | | 2.56 | 0 | 0.36 | -18 |
| | | | | | 63.9 | | 250 | | -0.11 | 0 | 0.9 | -7 |
| Office AC unit 1 | AC1 | 680523.2 | 4860489 | 107.7 | 76.1 | 867.22 | 500 | 69.76 | -1.18 | 0 | 1.67 | 6 |
| | | | | | 82.4 | | 1000 | | -1.18 | 0 | 3.17 | 11 |
| | | | | | 79.4 | | 2000 | | -1.18 | 0 | 8.38 | 2 |
| | | | | | 76.7 | | 4000 | | -1.18 | 0 | 28.42 | -20 |
| | | | | | 61.7 | | 8000 | | -1.18 | 0 | 101.36 | -108 |
| | | | | | -53 | | 32 | | -5.34 | 0 | 0.03 | -118 |
| | | | | | 53.2 | | 63 | | -5.34 | 0 | 0.11 | -12 |
| | | | | | 58.3 | | 125 | | 4.87 | 0 | 0.36 | -17 |
| | | | | | 60.8 | | 250 | | 4.21 | 0 | 0.92 | -14 |
| Trusk Traffic | TR | 680504.5 | 4860196 | 98.65 | 73.2 | 883.12 | 500 | 69.92 | 0.33 | 0 | 1.7 | 1 |
| | | | | | 73.4 | | 1000 | | -1.23 | 0 | 3.23 | 1 |
| | | | | | 75.6 | | 2000 | | -1.33 | 0 | 8.53 | -2 |
| | | | | | 69.4 | | 4000 | | -1.33 | 0 | 28.94 | -28 |
| | | | | | 56.3 | | 8000 | | -1.33 | 0 | 103.22 | -116 |
| | | | | | -39.4 | | 32 | | -4.09 | 0 | 0.03 | -105 |
| | | | | | 42.5 | | 63 | | -4.09 | 0 | 0.1 | -23 |
| | | | | | 53.5 | | 125 | | 1.75 | 0 | 0.34 | -18 |
| | | | | | 62.9 | | 250 | | 0.02 | 0 | 0.86 | -7 |
| Air Cooled Condenser | ACC | 680558.6 | 4860459 | 113.1 | 68.3 | 827.43 | 500 | 69.35 | -1.02 | 0 | 1.6 | -2 |
| | | | | | 74.5 | | 1000 | | -1.02 | 0 | 3.03 | 3 |
| | | | | | 72.7 | | 2000 | | -1.02 | 0 | 8 | -4 |
| | | | | | 68.5 | | 4000 | | -1.02 | 0 | 27.11 | -27 |
| | | | | | 60.4 | | 8000 | | -1.02 | 0 | 96.71 | -105 |
| | | | | | -60.3 | | 32 | | -5.39 | 8.87 | 0.03 | -134 |
| | | | | | 45.9 | | 63 | | -5.39 | 12.19 | 0.12 | -32 |
| | | | | | 51 | | 125 | | 5 | 12.72 | 0.39 | -38 |
| | | | | | 53.5 | | 250 | | 4.19 | 16.61 | 1 | -39 |
| Trusk Traffic | TR | 680427.7 | 4860480 | 102 | 65.9 | 960 | 500 | 70.65 | 0.32 | 21.34 | 1.85 | -28 |
| | | | | | 66.1 | | 1000 | | -1.25 | 22.89 | 3.51 | -30 |
| | | | | | 68.3 | | 2000 | | -1.35 | 23.82 | 9.28 | -34 |
| | | | | | 62.1 | | 4000 | | -1.35 | 24.37 | 31.46 | -63 |
| | | | | | 49 | | 8000 | | -1.35 | 24.67 | 112.21 | -157 |
| **Nighttime Level, dBA:** | | | | | | | | | | | | **38** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** **POR3**
X: 679935.6
Y: 4861211
Z: 105.38
Ground: 100.88

| Source Description | Source ID | Location Within Acoustic Model (m) X | Y | Z | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | -34.4 | | 32 | | -4.39 | 5.62 | 0.03 | -107 |
| | | | | | 82 | | 63 | | -4.39 | 7.51 | 0.12 | 8 |
| | | | | | 93.1 | | 125 | | 1.73 | 9.55 | 0.4 | 11 |
| | | | | | 97.6 | | 250 | | -0.05 | 12.47 | 1.02 | 13 |
| Steam Tubine | ST | 680539.5 | 4860437 | 113.1 | 102 | 981.64 | 500 | 70.84 | -1.1 | 15.1 | 1.89 | 15 |
| | | | | | 105.2 | | 1000 | | -1.1 | 17.54 | 3.59 | 14 |
| | | | | | 104.4 | | 2000 | | -1.1 | 19.77 | 9.49 | 5 |
| | | | | | 103.2 | | 4000 | | -1.1 | 21.61 | 32.17 | -20 |
| | | | | | 97.1 | | 8000 | | -1.1 | 22.97 | 114.74 | -110 |
| | | | | | -59.4 | | 32 | | -5.37 | 4.77 | 0.03 | -129 |
| | | | | | 60.8 | | 63 | | -5.37 | 4.77 | 0.11 | -9 |
| | | | | | 82.9 | | 125 | | 4.94 | 0 | 0.38 | 7 |
| | | | | | 79.4 | | 250 | | 4.2 | 0.57 | 0.96 | 3 |
| Back-up Power Generator | BPG | 680469 | 4860456 | 102 | 87.8 | 924.59 | 500 | 70.32 | 0.33 | 4.44 | 1.78 | 11 |
| | | | | | 96 | | 1000 | | -1.24 | 4.77 | 3.38 | 19 |
| | | | | | 102.2 | | 2000 | | -1.34 | 4.77 | 8.94 | 20 |
| | | | | | 101 | | 4000 | | -1.34 | 4.77 | 30.3 | -3 |
| | | | | | 92.9 | | 8000 | | -1.34 | 4.77 | 108.07 | -89 |
| | | | | | -59.4 | | 32 | | -4.69 | 7.76 | 0.03 | -134 |
| | | | | | 38.8 | | 63 | | -4.69 | 10.57 | 0.13 | -39 |
| | | | | | 58.9 | | 125 | | 1.7 | 12.32 | 0.44 | -27 |
| | | | | | 73.4 | | 250 | | -0.13 | 17.27 | 1.11 | -16 |
| Fire Pump Engine Exhaust | FP | 680577.3 | 4860362 | 111 | 81.8 | 1064.29 | 500 | 71.54 | -1.17 | 20.32 | 2.05 | -11 |
| | | | | | 91 | | 1000 | | -1.17 | 23.31 | 3.89 | -7 |
| | | | | | 97.2 | | 2000 | | -1.17 | 25 | 10.29 | -8 |
| | | | | | 97 | | 4000 | | -1.17 | 25 | 34.88 | -33 |
| | | | | | 88.9 | | 8000 | | -1.17 | 25 | 124.4 | -131 |
| | | | | | -36.4 | | 32 | | -3 | 4.77 | 0.03 | -109 |
| | | | | | 79.2 | | 63 | | -3 | 4.77 | 0.12 | 6 |
| | | | | | 89.3 | | 125 | | 2.09 | 2.68 | 0.42 | 13 |
| | | | | | 86.8 | | 250 | | 0.29 | 4.48 | 1.07 | 10 |
| Main Flue Stack | MFS | 680529 | 4860381 | 187.7 | 87.2 | 1024.26 | 500 | 71.21 | -0.75 | 4.77 | 1.97 | 10 |
| | | | | | 88.4 | | 1000 | | -0.75 | 4.77 | 3.75 | 9 |
| | | | | | 84.6 | | 2000 | | -0.75 | 4.77 | 9.9 | -1 |
| | | | | | 79.4 | | 4000 | | -0.75 | 4.77 | 33.57 | -29 |
| | | | | | 72.3 | | 8000 | | -0.75 | 4.77 | 119.72 | -123 |
| | | | | | -34.4 | | 32 | | -5.37 | 4.77 | 0.03 | -105 |
| | | | | | 61.6 | | 63 | | -5.37 | 4.77 | 0.12 | -9 |
| | | | | | 76.7 | | 125 | | 4.84 | 0 | 0.41 | 0 |
| | | | | | 83.2 | | 250 | | 3.37 | 1.4 | 1.05 | 6 |
| Transformer | TRAN | 680596.8 | 4860457 | 102.5 | 88.6 | 1003.3 | 500 | 71.03 | -0.75 | 4.77 | 1.93 | 12 |
| | | | | | 85.8 | | 1000 | | -1.33 | 4.77 | 3.67 | 8 |
| | | | | | 82 | | 2000 | | -1.34 | 4.77 | 9.7 | -2 |
| | | | | | 76.8 | | 4000 | | -1.34 | 4.77 | 32.88 | -31 |
| | | | | | 67.7 | | 8000 | | -1.34 | 4.77 | 117.27 | -124 |

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -43.6 | | 32 | | -5.41 | 0 | 0.03 | -109 |
| | | | | | 62.6 | | 63 | | -5.41 | 0 | 0.12 | -3 |
| | | | | | 67.7 | | 125 | | 5.03 | 0 | 0.41 | -9 |
| | | | | | 70.2 | | 250 | | 4.19 | 0 | 1.03 | -6 |
| Trusk Traffic | TR | 680440.4 | 4860360 | 100.93 | 82.6 | 990.09 | 500 | 70.91 | 0.32 | 0 | 1.91 | 9 |
| | | | | | 82.8 | | 1000 | | -1.25 | 0 | 3.62 | 10 |
| | | | | | 85 | | 2000 | | -1.35 | 0 | 9.57 | 6 |
| | | | | | 78.8 | | 4000 | | -1.35 | 0 | 32.45 | -23 |
| | | | | | 65.7 | | 8000 | | -1.35 | 0 | 115.72 | -120 |
| | | | | | -39.4 | | 32 | | -3.29 | 0 | 0.03 | -107 |
| | | | | | 66.8 | | 63 | | -3.29 | 0 | 0.12 | -1 |
| | | | | | 76.9 | | 125 | | 2 | 0 | 0.4 | 4 |
| | | | | | 84.4 | | 250 | | 0.22 | 0 | 1.02 | 12 |
| Internal Noise Sources | INS | 680504.8 | 4860413 | 125 | 83.8 | 980.53 | 500 | 70.83 | -0.82 | 0 | 1.89 | 12 |
| | | | | | 82 | | 1000 | | -0.82 | 0 | 3.59 | 8 |
| | | | | | 77.2 | | 2000 | | -0.82 | 0 | 9.48 | -2 |
| | | | | | 73 | | 4000 | | -0.82 | 0 | 32.13 | -29 |
| | | | | | 67.9 | | 8000 | | -0.82 | 0 | 114.61 | -117 |
| | | | | | -39.4 | | 32 | | -3.37 | 12.62 | 0.03 | -120 |
| | | | | | 66.8 | | 63 | | -3.37 | 16.53 | 0.12 | -18 |
| | | | | | 76.9 | | 125 | | 1.99 | 18 | 0.41 | -15 |
| | | | | | 84.4 | | 250 | | 0.2 | 22.94 | 1.05 | -11 |
| Internal Noise Sources | INS | 680537.5 | 4860402 | 125 | 83.8 | 1009.03 | 500 | 71.08 | -0.84 | 25 | 1.95 | -13 |
| | | | | | 82 | | 1000 | | -0.84 | 25 | 3.69 | -17 |
| | | | | | 77.2 | | 2000 | | -0.84 | 25 | 9.75 | -28 |
| | | | | | 73 | | 4000 | | -0.84 | 25 | 33.07 | -55 |
| | | | | | 67.9 | | 8000 | | -0.84 | 25 | 117.94 | -145 |
| | | | | | -47.7 | | 32 | | -5.51 | 4.77 | 0.04 | -120 |
| | | | | | 58.5 | | 63 | | -5.51 | 4.77 | 0.15 | -14 |
| | | | | | 63.6 | | 125 | | 5.18 | 0 | 0.49 | -15 |
| | | | | | 66.1 | | 250 | | 4.16 | 0.61 | 1.25 | -13 |
| Trusk Traffic | TR | 680552.9 | 4860181 | 98.78 | 78.5 | 1201.52 | 500 | 72.59 | 0.29 | 4.48 | 2.32 | -1 |
| | | | | | 78.7 | | 1000 | | -1.28 | 4.77 | 4.39 | -2 |
| | | | | | 80.9 | | 2000 | | -1.38 | 4.77 | 11.61 | -7 |
| | | | | | 74.7 | | 4000 | | -1.38 | 4.77 | 39.37 | -41 |
| | | | | | 61.6 | | 8000 | | -1.38 | 4.77 | 140.44 | -155 |
| | | | | | -39.4 | | 32 | | -4.82 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.82 | 0 | 0.11 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.38 | -18 |
| | | | | | 63.9 | | 250 | | -0.13 | 0 | 0.97 | -7 |
| Office AC unit 1 | AC1 | 680523.2 | 4860489 | 107.7 | 76.1 | 931.29 | 500 | 70.38 | -1.2 | 0 | 1.8 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.41 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 30.52 | -23 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 108.85 | -116 |
| | | | | | -39.4 | | 32 | | -4.83 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.83 | 0 | 0.11 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.38 | -18 |
| | | | | | 63.9 | | 250 | | -0.13 | 0 | 0.98 | -7 |
| Office AC unit 2 | AC2 | 680533.7 | 4860492 | 107.7 | 76.1 | 935.43 | 500 | 70.42 | -1.21 | 0 | 1.8 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.42 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9.04 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 30.65 | -23 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 109.33 | -117 |
| | | | | | -39.4 | | 32 | | -4.84 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.84 | 0 | 0.12 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.39 | -18 |
| | | | | | 63.9 | | 250 | | -0.14 | 0 | 0.99 | -7 |
| Office AC unit 3 | AC3 | 680527.5 | 4860474 | 107.7 | 76.1 | 945.8 | 500 | 70.52 | -1.21 | 0 | 1.82 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.46 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9.14 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 30.99 | -24 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 110.55 | -118 |
| | | | | | -39.4 | | 32 | | -4.84 | 0 | 0.03 | -105 |
| | | | | | 30.5 | | 63 | | -4.84 | 0 | 0.12 | -35 |
| | | | | | 55 | | 125 | | 2.57 | 0 | 0.39 | -19 |
| | | | | | 63.9 | | 250 | | -0.14 | 0 | 0.99 | -8 |
| Office AC unit 4 | AC4 | 680538 | 4860477 | 107.7 | 76.1 | 949.74 | 500 | 70.55 | -1.21 | 0 | 1.83 | 5 |
| | | | | | 82.4 | | 1000 | | -1.21 | 0 | 3.47 | 10 |
| | | | | | 79.4 | | 2000 | | -1.21 | 0 | 9.18 | 1 |
| | | | | | 76.7 | | 4000 | | -1.21 | 0 | 31.12 | -24 |
| | | | | | 61.7 | | 8000 | | -1.21 | 0 | 111.01 | -119 |
| | | | | | -52.5 | | 32 | | -5.34 | 1.88 | 0.03 | -119 |
| | | | | | 53.7 | | 63 | | -5.34 | 1.98 | 0.11 | -13 |
| | | | | | 58.8 | | 125 | | 4.88 | 0 | 0.36 | -16 |
| | | | | | 61.3 | | 250 | | 4.21 | 0 | 0.92 | -14 |
| Trusk Traffic | TR | 680442.4 | 4860485 | 102 | 73.7 | 885.69 | 500 | 69.95 | 0.33 | 2.7 | 1.71 | -1 |
| | | | | | 73.9 | | 1000 | | -1.23 | 3.43 | 3.24 | -2 |
| | | | | | 76.1 | | 2000 | | -1.33 | 3.9 | 8.56 | -5 |
| | | | | | 69.9 | | 4000 | | -1.33 | 4.26 | 29.02 | -32 |
| | | | | | 56.8 | | 8000 | | -1.33 | 4.49 | 103.52 | -120 |
| | | | | | -39.4 | | 32 | | -4.38 | 0 | 0.03 | -106 |
| | | | | | 42.5 | | 63 | | -4.38 | 0 | 0.12 | -24 |
| | | | | | 53.5 | | 125 | | 1.73 | 0 | 0.4 | -19 |
| | | | | | 62.9 | | 250 | | -0.05 | 0 | 1.02 | -9 |
| Air Cooled Condenser | ACC | 680558.6 | 4860459 | 113.1 | 68.3 | 976.69 | 500 | 70.8 | -1.09 | 0 | 1.88 | -3 |
| | | | | | 74.5 | | 1000 | | -1.09 | 0 | 3.57 | 1 |
| | | | | | 72.7 | | 2000 | | -1.09 | 0 | 9.44 | -6 |
| | | | | | 68.5 | | 4000 | | -1.09 | 0 | 32.01 | -33 |
| | | | | | 60.4 | | 8000 | | -1.09 | 0 | 114.16 | -123 |
| | | | | | -62.9 | | 32 | | -5.34 | 0 | 0.03 | -127 |
| | | | | | 43.3 | | 63 | | -5.34 | 0 | 0.11 | -21 |
| | | | | | 48.4 | | 125 | | 4.87 | 0 | 0.36 | -27 |
| | | | | | 50.9 | | 250 | | 4.21 | 0 | 0.92 | -24 |
| Trusk Traffic | TR | 680419.2 | 4860475 | 102 | 63.3 | 880.53 | 500 | 69.89 | 0.33 | 0 | 1.7 | -9 |
| | | | | | 63.5 | | 1000 | | -1.23 | 0 | 3.22 | -8 |
| | | | | | 65.7 | | 2000 | | -1.33 | 0 | 8.51 | -11 |
| | | | | | 59.5 | | 4000 | | -1.33 | 0 | 28.85 | -38 |
| | | | | | 46.4 | | 8000 | | -1.33 | 0 | 102.92 | -125 |
| **Nighttime Level, dBA:** | | | | | | | | | | | | **27** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**York/Durham EfW Facility - Sample Protocol Report for Construction Assembly**

**ID:** **POR1**
X: 679867.75
Y: 4860445.44
Z: 94.5
Ground: 90

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| Land Grader | LG | 680459.67 | 4860415.34 | 103 | -39.4 | 592.75 | 32 | 66.46 | -4.86 | 0 | 0.02 | -101.02 |
| | | | | | 92.3 | | 63 | | -4.86 | 0 | 0.07 | 30.63 |
| | | | | | 97.4 | | 125 | | 6.93 | 0 | 0.24 | 23.77 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.62 | 28.61 |
| | | | | | 104.3 | | 500 | | 0.22 | 0 | 1.14 | 36.48 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 2.17 | 41.87 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 5.73 | 37.51 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 19.42 | 19.62 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 69.28 | -33.34 |
| Excavator | EX | 680508.58 | 4860317.26 | 104 | -39.4 | 653.59 | 32 | 67.31 | -4.83 | 0 | 0.02 | -101.9 |
| | | | | | 80.3 | | 63 | | -4.83 | 0 | 0.08 | 17.74 |
| | | | | | 90.4 | | 125 | | 7.16 | 0 | 0.27 | 15.67 |
| | | | | | 97.9 | | 250 | | 3.43 | 0 | 0.68 | 26.48 |
| | | | | | 103.3 | | 500 | | 0.01 | 0 | 1.26 | 34.72 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 2.39 | 36.8 |
| | | | | | 107.7 | | 2000 | | 0 | 0 | 6.32 | 34.08 |
| | | | | | 107.5 | | 4000 | | 0 | 0 | 21.42 | 18.78 |
| | | | | | 105.4 | | 8000 | | 0 | 0 | 76.39 | -38.3 |
| Concrete Ready Mix Truck, high | CRM | 680468.49 | 4860365.72 | 102.5 | -39.4 | 606.06 | 32 | 66.65 | -4.96 | 0 | 0.02 | -101.11 |
| | | | | | 78.3 | | 63 | | -4.96 | 0 | 0.07 | 16.54 |
| | | | | | 96.4 | | 125 | | 7.01 | 0 | 0.25 | 22.49 |
| | | | | | 103.9 | | 250 | | 6.29 | 0 | 0.63 | 30.33 |
| | | | | | 106.3 | | 500 | | 0.79 | 0 | 1.17 | 37.69 |
| | | | | | 104.5 | | 1000 | | 0.02 | 0 | 2.22 | 35.61 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 5.86 | 30.19 |
| | | | | | 98.5 | | 4000 | | 0 | 0 | 19.86 | 11.99 |
| | | | | | 69.4 | | 8000 | | 0 | 0 | 70.84 | -68.09 |
| Front End Loader | FEL | 680543.57 | 4860285.71 | 101.66 | -39.4 | 694.48 | 32 | 67.83 | -5.16 | 0 | 0.02 | -102.1 |
| | | | | | 89.3 | | 63 | | -5.16 | 0 | 0.08 | 26.54 |
| | | | | | 94.4 | | 125 | | 7.56 | 0 | 0.29 | 18.72 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 0.72 | 21.95 |
| | | | | | 101.3 | | 500 | | 2.22 | 0 | 1.34 | 29.9 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 2.54 | 36.99 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 6.71 | 32.16 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 22.76 | 11.91 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 81.17 | -49.6 |
| Air Compressor | CV | 680517.72 | 4860412.81 | 101 | -39.4 | 650.82 | 32 | 67.27 | -5.24 | 4.77 | 0.02 | -106.22 |
| | | | | | 73.8 | | 63 | | -5.24 | 4.77 | 0.08 | 6.92 |
| | | | | | 83.9 | | 125 | | 7.61 | 0 | 0.27 | 8.75 |
| | | | | | 90.4 | | 250 | | 9.25 | 0 | 0.68 | 13.2 |
| | | | | | 98.8 | | 500 | | 8.84 | 0 | 1.25 | 21.44 |
| | | | | | 105 | | 1000 | | 2.03 | 2.74 | 2.38 | 30.58 |
| | | | | | 106.2 | | 2000 | | 0 | 4.77 | 6.29 | 27.87 |
| | | | | | 104 | | 4000 | | 0 | 4.77 | 21.33 | 10.63 |
| | | | | | 98.9 | | 8000 | | 0 | 4.77 | 76.07 | -49.21 |
| Heavy Trucks | HT | 680596.14 | 4860316.56 | 104 | -39.4 | 739.77 | 32 | 68.38 | -4.97 | 0 | 0.02 | -102.84 |
| | | | | | 80.3 | | 63 | | -4.97 | 0 | 0.09 | 16.79 |
| | | | | | 91.4 | | 125 | | 7.35 | 0 | 0.3 | 15.36 |
| | | | | | 99.9 | | 250 | | 3.43 | 0 | 0.77 | 27.32 |
| | | | | | 104.3 | | 500 | | 0.01 | 0 | 1.43 | 34.48 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 2.71 | 35.41 |
| | | | | | 105.7 | | 2000 | | 0 | 0 | 7.15 | 30.17 |
| | | | | | 100.5 | | 4000 | | 0 | 0 | 24.24 | 7.88 |
| | | | | | 94.4 | | 8000 | | 0 | 0 | 86.47 | -60.45 |
| Concrete Vibrator | CV | 680449.23 | 4860464.18 | 102 | -39.4 | 581.83 | 32 | 66.3 | -4.99 | 0 | 0.02 | -100.72 |
| | | | | | 75.3 | | 63 | | -4.99 | 0 | 0.07 | 13.93 |
| | | | | | 85.4 | | 125 | | 6.93 | 0 | 0.24 | 11.94 |
| | | | | | 92.9 | | 250 | | 7.39 | 0 | 0.61 | 18.61 |
| | | | | | 98.3 | | 500 | | 2.22 | 0 | 1.12 | 28.66 |
| | | | | | 101.5 | | 1000 | | 0.14 | 0 | 2.13 | 32.94 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 5.62 | 30.78 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 19.07 | 17.14 |
| | | | | | 100.4 | | 8000 | | 0 | 0 | 68.01 | -33.9 |
| Asphalt Paver (Large) | AP | 680530.56 | 4860477.02 | 102.5 | -39.4 | 663.61 | 32 | 67.44 | -5.05 | 4.77 | 0.02 | -106.58 |
| | | | | | 76.3 | | 63 | | -5.05 | 4.77 | 0.08 | 9.06 |
| | | | | | 86.4 | | 125 | | 7.28 | 0 | 0.27 | 11.41 |
| | | | | | 93.9 | | 250 | | 6.29 | 0 | 0.69 | 19.48 |
| | | | | | 99.3 | | 500 | | 0.79 | 3.98 | 1.28 | 25.81 |
| | | | | | 102.5 | | 1000 | | 0.02 | 4.75 | 2.43 | 27.86 |
| | | | | | 103.7 | | 2000 | | 0 | 4.77 | 6.41 | 25.08 |
| | | | | | 103.5 | | 4000 | | 0 | 4.77 | 21.75 | 9.54 |
| | | | | | 101.4 | | 8000 | | 0 | 4.77 | 77.56 | -48.37 |
| Welding Compressor | WC | 680607.61 | 4860361.44 | 101 | -39.4 | 744.64 | 32 | 68.44 | -5.34 | 4.77 | 0.02 | -107.3 |
| | | | | | 77.3 | | 63 | | -5.34 | 4.77 | 0.09 | 9.33 |
| | | | | | 87.4 | | 125 | | 8.18 | 0 | 0.31 | 10.47 |
| | | | | | 94.9 | | 250 | | 9.25 | 0 | 0.78 | 16.43 |
| | | | | | 100.3 | | 500 | | 8.84 | 0 | 1.44 | 21.59 |
| | | | | | 103.5 | | 1000 | | 2.03 | 2.74 | 2.72 | 27.57 |
| | | | | | 104.7 | | 2000 | | 0 | 4.77 | 7.2 | 24.29 |
| | | | | | 104.5 | | 4000 | | 0 | 4.77 | 24.4 | 6.89 |
| | | | | | 102.4 | | 8000 | | 0 | 4.77 | 87.04 | -57.85 |
| Backhoe | BH | 680594.73 | 4860397.15 | 103 | -39.4 | 728.63 | 32 | 68.25 | -5.07 | 0 | 0.02 | -102.6 |
| | | | | | 96.3 | | 63 | | -5.07 | 0 | 0.09 | 33.03 |
| | | | | | 98.4 | | 125 | | 7.44 | 0 | 0.3 | 22.41 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.76 | 21.67 |
| | | | | | 98.3 | | 500 | | 0.22 | 0 | 1.4 | 28.42 |
| | | | | | 97.5 | | 1000 | | 0 | 0 | 2.67 | 26.58 |
| | | | | | 99.7 | | 2000 | | 0 | 0 | 7.04 | 24.41 |
| | | | | | 95.5 | | 4000 | | 0 | 0 | 23.88 | 3.37 |
| | | | | | 88.4 | | 8000 | | 0 | 0 | 85.16 | -65.01 |
| Trucks | TR | 680455.65 | 4860350.74 | 98.59 | -47.1 | 595.49 | 32 | 66.5 | -5.32 | 4.81 | 0.02 | -113.09 |
| | | | | | 59.1 | | 63 | | -5.32 | 4.89 | 0.07 | -7.02 |
| | | | | | 64.2 | | 125 | | 7.23 | 0 | 0.24 | -9.75 |
| | | | | | 66.7 | | 250 | | 9.99 | 0 | 0.62 | -10.39 |
| | | | | | 79.1 | | 500 | | 14 | 0 | 1.15 | -2.53 |
| | | | | | 79.3 | | 1000 | | 5 | 2.22 | 2.18 | 3.42 |
| | | | | | 81.5 | | 2000 | | 0 | 8.79 | 5.75 | 0.48 |
| | | | | | 75.3 | | 4000 | | 0 | 10.84 | 19.51 | -21.54 |
| | | | | | 62.2 | | 8000 | | 0 | 13.28 | 69.6 | -87.16 |
| **Daytime Level, dBA:** | | | | | | | | | | | | **49** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** POR2
X: 681376.6
Y: 4860334.79
Z: 104.5
Ground: 100

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -5.27 | 0 | 0.03 | -104 |
| | | | | | 92.3 | | 63 | | -5.27 | 0 | 0.11 | 27 |
| | | | | | 97.4 | | 125 | | 7.9 | 0 | 0.38 | 19 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.96 | 24 |
| Land Grader | LG | 680459.67 | 4860415.34 | 103 | 104.3 | 920.46 | 500 | 70.28 | 0.22 | 0 | 1.77 | 32 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 3.37 | 37 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 8.9 | 31 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 30.16 | 5 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 107.59 | -75 |
| | | | | | -39.4 | | 32 | | -5.12 | 0 | 0.03 | -104 |
| | | | | | 80.3 | | 63 | | -5.12 | 0 | 0.11 | 16 |
| | | | | | 90.4 | | 125 | | 7.57 | 0 | 0.36 | 13 |
| | | | | | 97.9 | | 250 | | 3.43 | 0 | 0.91 | 24 |
| Excavator | EX | 680508.58 | 4860317.26 | 104 | 103.3 | 868.2 | 500 | 69.77 | 0.01 | 0 | 1.67 | 32 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 3.18 | 34 |
| | | | | | 107.7 | | 2000 | | 0 | 0 | 8.39 | 30 |
| | | | | | 107.5 | | 4000 | | 0 | 0 | 28.45 | 9 |
| | | | | | 105.4 | | 8000 | | 0 | 0 | 101.48 | -66 |
| | | | | | -39.4 | | 32 | | -5.02 | 0 | 0.02 | -103 |
| | | | | | 80.3 | | 63 | | -5.02 | 0 | 0.1 | 16 |
| | | | | | 91.4 | | 125 | | 7.43 | 0 | 0.32 | 15 |
| | | | | | 99.9 | | 250 | | 3.43 | 0 | 0.81 | 27 |
| Heavy Trucks | HT | 680596.14 | 4860316.56 | 104 | 104.3 | 780.67 | 500 | 68.85 | 0.01 | 0 | 1.51 | 34 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 2.86 | 35 |
| | | | | | 105.7 | | 2000 | | 0 | 0 | 7.54 | 29 |
| | | | | | 100.5 | | 4000 | | 0 | 0 | 25.58 | 6 |
| | | | | | 94.4 | | 8000 | | 0 | 0 | 91.25 | -66 |
| | | | | | -39.4 | | 32 | | -5.3 | 0 | 0.03 | -104 |
| | | | | | 89.3 | | 63 | | -5.3 | 0 | 0.1 | 25 |
| | | | | | 94.4 | | 125 | | 8.13 | 0 | 0.34 | 17 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 0.87 | 20 |
| Front End Loader | FEL | 680543.57 | 4860285.71 | 101.66 | 101.3 | 834.48 | 500 | 69.43 | 2.22 | 0 | 1.61 | 28 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 3.05 | 35 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 8.06 | 29 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 27.35 | 6 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 97.54 | -68 |
| | | | | | -39.4 | | 32 | | -5.36 | 0 | 0.02 | -103 |
| | | | | | 77.3 | | 63 | | -5.36 | 0 | 0.09 | 14 |
| | | | | | 87.4 | | 125 | | 8.31 | 0 | 0.32 | 10 |
| | | | | | 94.9 | | 250 | | 9.25 | 0 | 0.8 | 16 |
| Welding Compressor | WC | 680607.61 | 4860361.44 | 101 | 100.3 | 769.46 | 500 | 68.72 | 8.84 | 0 | 1.48 | 21 |
| | | | | | 103.5 | | 1000 | | 2.03 | 0 | 2.81 | 30 |
| | | | | | 104.7 | | 2000 | | 0 | 0 | 7.44 | 29 |
| | | | | | 104.5 | | 4000 | | 0 | 0 | 25.22 | 11 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 89.94 | -56 |
| | | | | | -39.4 | | 32 | | -5.43 | 0 | 0.03 | -104 |
| | | | | | 73.8 | | 63 | | -5.43 | 0 | 0.1 | 9 |
| | | | | | 83.9 | | 125 | | 8.72 | 0 | 0.35 | 5 |
| | | | | | 90.4 | | 250 | | 9.25 | 0 | 0.9 | 11 |
| Air Compressor | CV | 680517.72 | 4860412.81 | 101 | 98.8 | 862.42 | 500 | 69.71 | 8.84 | 0 | 1.66 | 19 |
| | | | | | 105 | | 1000 | | 2.03 | 0 | 3.15 | 30 |
| | | | | | 106.2 | | 2000 | | 0 | 0 | 8.33 | 28 |
| | | | | | 104 | | 4000 | | 0 | 0 | 28.26 | 6 |
| | | | | | 98.9 | | 8000 | | 0 | 0 | 100.8 | -72 |
| | | | | | -39.4 | | 32 | | -5.31 | 0 | 0.03 | -104 |
| | | | | | 78.3 | | 63 | | -5.31 | 0 | 0.11 | 13 |
| | | | | | 96.4 | | 125 | | 8.08 | 0 | 0.37 | 18 |
| | | | | | 103.9 | | 250 | | 6.29 | 0 | 0.95 | 26 |
| Concrete Ready Mix Truck, high | CRM | 680468.49 | 4860365.72 | 102.5 | 106.3 | 908.64 | 500 | 70.17 | 0.79 | 0 | 1.75 | 34 |
| | | | | | 104.5 | | 1000 | | 0.02 | 0 | 3.32 | 31 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 8.78 | 24 |
| | | | | | 98.5 | | 4000 | | 0 | 0 | 29.78 | -1 |
| | | | | | 69.4 | | 8000 | | 0 | 0 | 106.2 | -107 |
| | | | | | -39.4 | | 32 | | -5.27 | 0 | 0.03 | -104 |
| | | | | | 76.3 | | 63 | | -5.27 | 0 | 0.1 | 12 |
| | | | | | 86.4 | | 125 | | 7.97 | 0 | 0.35 | 8 |
| | | | | | 93.9 | | 250 | | 6.29 | 0 | 0.9 | 17 |
| Asphalt Paver (Large) | AP | 680530.56 | 4860477.02 | 102.5 | 99.3 | 857.91 | 500 | 69.67 | 0.79 | 0 | 1.65 | 27 |
| | | | | | 102.5 | | 1000 | | 0.02 | 0 | 3.14 | 30 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 8.29 | 26 |
| | | | | | 103.5 | | 4000 | | 0 | 0 | 28.11 | 6 |
| | | | | | 101.4 | | 8000 | | 0 | 0 | 100.27 | -69 |
| | | | | | -39.4 | | 32 | | -5.38 | 0 | 0.03 | -104 |
| | | | | | 75.3 | | 63 | | -5.38 | 0 | 0.11 | 10 |
| | | | | | 85.4 | | 125 | | 8.41 | 0 | 0.38 | 6 |
| | | | | | 92.9 | | 250 | | 7.39 | 0 | 0.98 | 14 |
| Concrete Vibrator | CV | 680449.23 | 4860464.18 | 102 | 98.3 | 936.36 | 500 | 70.43 | 2.22 | 0 | 1.81 | 24 |
| | | | | | 101.5 | | 1000 | | 0.14 | 0 | 3.42 | 28 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 9.05 | 23 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 30.68 | 1 |
| | | | | | 100.4 | | 8000 | | 0 | 0 | 109.44 | -79 |
| | | | | | -39.4 | | 32 | | -5.14 | 0 | 0.03 | -103 |
| | | | | | 96.3 | | 63 | | -5.14 | 0 | 0.1 | 32 |
| | | | | | 98.4 | | 125 | | 7.61 | 0 | 0.32 | 22 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.82 | 21 |
| Backhoe | BH | 680594.73 | 4860397.15 | 103 | 98.3 | 784.35 | 500 | 68.89 | 0.22 | 0 | 1.51 | 28 |
| | | | | | 97.5 | | 1000 | | 0 | 0 | 2.87 | 26 |
| | | | | | 99.7 | | 2000 | | 0 | 0 | 7.58 | 23 |
| | | | | | 95.5 | | 4000 | | 0 | 0 | 25.7 | 1 |
| | | | | | 88.4 | | 8000 | | 0 | 0 | 91.68 | -72 |
| | | | | | -53.7 | | 32 | | -5.39 | 0 | 0.02 | -116 |
| | | | | | 52.5 | | 63 | | -5.39 | 0 | 0.08 | -10 |
| | | | | | 57.6 | | 125 | | 7.74 | 0 | 0.27 | -18 |
| | | | | | 60.1 | | 250 | | 9.99 | 0 | 0.69 | -18 |
| Trucks | TR | 680717.84 | 4860275.82 | 100 | 72.5 | 661.41 | 500 | 67.41 | 14 | 0 | 1.28 | -10 |
| | | | | | 72.7 | | 1000 | | 5 | 0 | 2.42 | -2 |
| | | | | | 74.9 | | 2000 | | 0 | 0 | 6.39 | 1 |
| | | | | | 68.7 | | 4000 | | 0 | 0 | 21.67 | -20 |
| | | | | | 55.6 | | 8000 | | 0 | 0 | 77.31 | -89 |
| **Daytime Level, dBA:** | | | | | | | | | | | | **46** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** **POR3**
X: 679935.56
Y: 4861211.27
Z: 105.38
Ground: 100.88

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -5.29 | 0 | 0.03 | -104.72 |
| | | | | | 92.3 | | 63 | | -5.29 | 0 | 0.12 | 26.89 |
| | | | | | 97.4 | | 125 | | 7.95 | 0 | 0.39 | 18.47 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.99 | 24.11 |
| Land Grader | LG | 680459.67 | 4860415.34 | 103 | 104.3 | 953 | 500 | 70.58 | 0.22 | 0 | 1.84 | 31.66 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 3.49 | 36.43 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 9.21 | 29.91 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 31.23 | 3.69 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 111.39 | -79.57 |
| | | | | | -39.4 | | 32 | | -5.28 | 0 | 0.03 | -105.68 |
| | | | | | 80.3 | | 63 | | -5.28 | 0 | 0.13 | 13.93 |
| | | | | | 90.4 | | 125 | | 7.75 | 0 | 0.44 | 10.69 |
| | | | | | 97.9 | | 250 | | 3.43 | 0 | 1.11 | 21.84 |
| Excavator | EX | 680508.58 | 4860317.26 | 104 | 103.3 | 1061.89 | 500 | 71.52 | 0.01 | 0 | 2.05 | 29.72 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 3.88 | 31.09 |
| | | | | | 107.7 | | 2000 | | 0 | 0 | 10.26 | 25.92 |
| | | | | | 107.5 | | 4000 | | 0 | 0 | 34.8 | 1.18 |
| | | | | | 105.4 | | 8000 | | 0 | 0 | 124.12 | -90.24 |
| | | | | | -39.4 | | 32 | | -5.37 | 0 | 0.03 | -105.06 |
| | | | | | 78.3 | | 63 | | -5.37 | 0 | 0.12 | 12.55 |
| | | | | | 96.4 | | 125 | | 8.24 | 0 | 0.41 | 16.75 |
| | | | | | 103.9 | | 250 | | 6.29 | 0 | 1.04 | 25.57 |
| Concrete Ready Mix Truck, high | CRM | 680468.49 | 4860365.72 | 102.5 | 106.3 | 999.49 | 500 | 71 | 0.79 | 0 | 1.93 | 32.59 |
| | | | | | 104.5 | | 1000 | | 0.02 | 0 | 3.66 | 29.83 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 9.66 | 22.05 |
| | | | | | 98.5 | | 4000 | | 0 | 0 | 32.75 | -5.25 |
| | | | | | 69.4 | | 8000 | | 0 | 0 | 116.82 | -118.42 |
| | | | | | -39.4 | | 32 | | -5.47 | 0 | 0.04 | -105.85 |
| | | | | | 89.3 | | 63 | | -5.47 | 0 | 0.13 | 22.75 |
| | | | | | 94.4 | | 125 | | 8.67 | 0 | 0.46 | 13.39 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 1.16 | 17.47 |
| Front End Loader | FEL | 680543.57 | 4860285.71 | 101.66 | 101.3 | 1107.41 | 500 | 71.89 | 2.22 | 0 | 2.13 | 25.05 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 4.05 | 31.43 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 10.7 | 24.11 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 36.29 | -5.68 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 129.44 | -101.92 |
| | | | | | -39.4 | | 32 | | -5.5 | 0 | 0.03 | -104.83 |
| | | | | | 73.8 | | 63 | | -5.5 | 0 | 0.12 | 8.28 |
| | | | | | 83.9 | | 125 | | 9.08 | 0 | 0.41 | 3.51 |
| | | | | | 90.4 | | 250 | | 9.25 | 0 | 1.03 | 9.22 |
| Air Compressor | CV | 680517.72 | 4860412.81 | 101 | 98.8 | 988.16 | 500 | 70.9 | 8.84 | 0 | 1.91 | 17.16 |
| | | | | | 105 | | 1000 | | 2.03 | 0 | 3.61 | 28.46 |
| | | | | | 106.2 | | 2000 | | 0 | 0 | 9.55 | 25.75 |
| | | | | | 104 | | 4000 | | 0 | 0 | 32.38 | 0.72 |
| | | | | | 98.9 | | 8000 | | 0 | 0 | 115.5 | -87.5 |
| | | | | | -39.4 | | 32 | | -5.31 | 0 | 0.04 | -106.05 |
| | | | | | 80.3 | | 63 | | -5.31 | 0 | 0.14 | 13.55 |
| | | | | | 91.4 | | 125 | | 7.77 | 0 | 0.46 | 11.25 |
| | | | | | 99.9 | | 250 | | 3.43 | 0 | 1.16 | 23.39 |
| Heavy Trucks | HT | 680596.14 | 4860316.56 | 104 | 104.3 | 1112.15 | 500 | 71.92 | 0.01 | 0 | 2.14 | 30.22 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 4.07 | 30.51 |
| | | | | | 105.7 | | 2000 | | 0 | 0 | 10.75 | 23.03 |
| | | | | | 100.5 | | 4000 | | 0 | 0 | 36.45 | -7.87 |
| | | | | | 94.4 | | 8000 | | 0 | 0 | 129.99 | -107.51 |
| | | | | | -39.4 | | 32 | | -5.33 | 0 | 0.03 | -104.61 |
| | | | | | 76.3 | | 63 | | -5.33 | 0 | 0.12 | 11.01 |
| | | | | | 86.4 | | 125 | | 8.16 | 0 | 0.39 | 7.35 |
| | | | | | 93.9 | | 250 | | 6.29 | 0 | 0.99 | 16.11 |
| Asphalt Paver (Large) | AP | 680530.56 | 4860477.02 | 102.5 | 99.3 | 945.07 | 500 | 70.51 | 0.79 | 0 | 1.82 | 26.18 |
| | | | | | 102.5 | | 1000 | | 0.02 | 0 | 3.46 | 28.52 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 9.13 | 24.06 |
| | | | | | 103.5 | | 4000 | | 0 | 0 | 30.97 | 2.02 |
| | | | | | 101.4 | | 8000 | | 0 | 0 | 110.46 | -79.57 |
| | | | | | -39.4 | | 32 | | -5.54 | 0 | 0.03 | -105.59 |
| | | | | | 77.3 | | 63 | | -5.54 | 0 | 0.13 | 11.02 |
| | | | | | 87.4 | | 125 | | 9.25 | 0 | 0.45 | 6.01 |
| | | | | | 94.9 | | 250 | | 9.25 | 0 | 1.13 | 12.82 |
| Welding Compressor | WC | 680607.61 | 4860361.44 | 101 | 100.3 | 1083.46 | 500 | 71.7 | 8.84 | 0 | 2.09 | 17.68 |
| | | | | | 103.5 | | 1000 | | 2.03 | 0 | 3.96 | 25.81 |
| | | | | | 104.7 | | 2000 | | 0 | 0 | 10.47 | 22.53 |
| | | | | | 104.5 | | 4000 | | 0 | 0 | 35.51 | -2.7 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 126.64 | -95.93 |
| | | | | | -39.4 | | 32 | | -5.35 | 0 | 0.03 | -104.22 |
| | | | | | 75.3 | | 63 | | -5.35 | 0 | 0.11 | 10.4 |
| | | | | | 85.4 | | 125 | | 8.34 | 0 | 0.37 | 6.54 |
| | | | | | 92.9 | | 250 | | 7.39 | 0 | 0.95 | 14.42 |
| Concrete Vibrator | CV | 680449.23 | 4860464.18 | 102 | 98.3 | 906.65 | 500 | 70.15 | 2.22 | 0 | 1.75 | 24.18 |
| | | | | | 101.5 | | 1000 | | 0.14 | 0 | 3.32 | 27.9 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 8.76 | 23.79 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 29.71 | 2.64 |
| | | | | | 100.4 | | 8000 | | 0 | 0 | 105.97 | -75.72 |
| | | | | | -39.4 | | 32 | | -5.36 | 0 | 0.03 | -105.48 |
| | | | | | 96.3 | | 63 | | -5.36 | 0 | 0.13 | 30.12 |
| | | | | | 98.4 | | 125 | | 8.06 | 0 | 0.43 | 18.5 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 1.09 | 18.19 |
| Backhoe | BH | 680594.73 | 4860397.15 | 103 | 98.3 | 1047.52 | 500 | 71.4 | 0.22 | 0 | 2.02 | 24.65 |
| | | | | | 97.5 | | 1000 | | 0 | 0 | 3.83 | 22.26 |
| | | | | | 99.7 | | 2000 | | 0 | 0 | 10.12 | 18.17 |
| | | | | | 95.5 | | 4000 | | 0 | 0 | 34.33 | -10.23 |
| | | | | | 88.4 | | 8000 | | 0 | 0 | 122.44 | -105.44 |
| | | | | | -49.2 | | 32 | | -5.55 | 0 | 0.03 | -113.84 |
| | | | | | 57 | | 63 | | -5.55 | 0 | 0.11 | -7.72 |
| | | | | | 62.1 | | 125 | | 9.02 | 0 | 0.37 | -17.46 |
| | | | | | 64.6 | | 250 | | 9.99 | 0 | 0.95 | -16.5 |
| Trucks | TR | 680501.66 | 4860501.63 | 100.1 | 77 | 907.79 | 500 | 70.16 | 14 | 0 | 1.75 | -8.91 |
| | | | | | 77.2 | | 1000 | | 5 | 0 | 3.32 | -1.28 |
| | | | | | 79.4 | | 2000 | | 0 | 0 | 8.77 | 0.46 |
| | | | | | 73.2 | | 4000 | | 0 | 0 | 29.75 | -26.71 |
| | | | | | 60.1 | | 8000 | | 0 | 0 | 106.1 | -116.17 |
| **Daytime Level, dBA:** | | | | | | | | | | | | **44** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**York/Durham EfW Facility - Sample Protocol Report for Site Preparation Phase**

**ID:** **POR1**
X: 679867.75
Y: 4860445.44
Z: 94.5
Ground: 90

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -4.86 | 0 | 0.02 | -101 |
| | | | | | 92.3 | | 63 | | -4.86 | 0 | 0.07 | 31 |
| | | | | | 97.4 | | 125 | | 6.93 | 0 | 0.24 | 24 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.62 | 29 |
| Land Grader | LG | 680459.67 | 4860415.34 | 103 | 104.3 | 592.75 | 500 | 66.46 | 0.22 | 0 | 1.14 | 36 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 2.17 | 42 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 5.73 | 38 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 19.42 | 20 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 69.28 | -33 |
| | | | | | -39.4 | | 32 | | -5.08 | 0 | 0.02 | -103 |
| | | | | | 92.3 | | 63 | | -5.08 | 0 | 0.09 | 29 |
| | | | | | 97.4 | | 125 | | 7.45 | 0 | 0.3 | 21 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.76 | 27 |
| Land Grader | LG | 680592.35 | 4860348.86 | 103 | 104.3 | 731.06 | 500 | 68.28 | 0.22 | 0 | 1.41 | 34 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 2.67 | 40 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 7.06 | 34 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 23.96 | 13 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 85.45 | -51 |
| | | | | | -39.4 | | 32 | | -4.83 | 0 | 0.02 | -102 |
| | | | | | 80.3 | | 63 | | -4.83 | 0 | 0.08 | 18 |
| | | | | | 90.4 | | 125 | | 7.16 | 0 | 0.27 | 16 |
| | | | | | 97.9 | | 250 | | 3.43 | 0 | 0.68 | 26 |
| Excavator | EX | 680508.58 | 4860317.26 | 104 | 103.3 | 653.59 | 500 | 67.31 | 0.01 | 0 | 1.26 | 35 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 2.39 | 37 |
| | | | | | 107.7 | | 2000 | | 0 | 0 | 6.32 | 34 |
| | | | | | 107.5 | | 4000 | | 0 | 0 | 21.42 | 19 |
| | | | | | 105.4 | | 8000 | | 0 | 0 | 76.39 | -38 |
| | | | | | -39.4 | | 32 | | -5.07 | 0 | 0.02 | -101 |
| | | | | | 89.3 | | 63 | | -5.07 | 0 | 0.08 | 27 |
| | | | | | 94.4 | | 125 | | 7.2 | 0 | 0.26 | 20 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 0.66 | 23 |
| Front End Loader | FEL | 680494.36 | 4860404.36 | 102 | 101.3 | 628 | 500 | 66.96 | 2.22 | 0 | 1.21 | 31 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 2.3 | 38 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 6.07 | 34 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 20.58 | 15 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 73.4 | -41 |
| | | | | | -39.4 | | 32 | | -5.16 | 0 | 0.02 | -102 |
| | | | | | 89.3 | | 63 | | -5.16 | 0 | 0.08 | 27 |
| | | | | | 94.4 | | 125 | | 7.56 | 0 | 0.29 | 19 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 0.72 | 22 |
| Front End Loader | FEL | 680543.57 | 4860285.71 | 101.66 | 101.3 | 694.48 | 500 | 67.83 | 2.22 | 0 | 1.34 | 30 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 2.54 | 37 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 6.71 | 32 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 22.76 | 12 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 81.17 | -50 |
| | | | | | -39.4 | | 32 | | -4.97 | 0 | 0.02 | -103 |
| | | | | | 80.3 | | 63 | | -4.97 | 0 | 0.09 | 17 |
| | | | | | 91.4 | | 125 | | 7.35 | 0 | 0.3 | 15 |
| | | | | | 99.9 | | 250 | | 3.43 | 0 | 0.77 | 27 |
| Heavy Trucks | HT | 680596.14 | 4860316.56 | 104 | 104.3 | 739.77 | 500 | 68.38 | 0.01 | 0 | 1.43 | 34 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 2.71 | 35 |
| | | | | | 105.7 | | 2000 | | 0 | 0 | 7.15 | 30 |
| | | | | | 100.5 | | 4000 | | 0 | 0 | 24.24 | 8 |
| | | | | | 94.4 | | 8000 | | 0 | 0 | 86.47 | -60 |
| | | | | | -39.4 | | 32 | | -5.05 | 0 | 0.02 | -102 |
| | | | | | 75.3 | | 63 | | -5.05 | 0 | 0.09 | 12 |
| | | | | | 91.4 | | 125 | | 7.38 | 0 | 0.29 | 16 |
| | | | | | 99.9 | | 250 | | 5.22 | 0 | 0.74 | 26 |
| Bulldozer | BZ | 680538.85 | 4860213.57 | 100.45 | 104.3 | 710.05 | 500 | 68.03 | 0.22 | 0 | 1.37 | 35 |
| | | | | | 104.5 | | 1000 | | 0 | 0 | 2.6 | 34 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 6.86 | 28 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 23.27 | 5 |
| | | | | | 90.4 | | 8000 | | 0 | 0 | 82.99 | -61 |
| | | | | | -39.4 | | 32 | | -4.91 | 0 | 0.02 | -101 |
| | | | | | 70.3 | | 63 | | -4.91 | 0 | 0.08 | 8 |
| | | | | | 86.4 | | 125 | | 7.05 | 0 | 0.25 | 12 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.65 | 23 |
| Medium Trucks | MT | 680485.39 | 4860502.14 | 103 | 100.3 | 620.3 | 500 | 66.85 | 0.22 | 0 | 1.2 | 32 |
| | | | | | 103.5 | | 1000 | | 0 | 0 | 2.27 | 34 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 5.99 | 31 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 20.33 | 9 |
| | | | | | 89.4 | | 8000 | | 0 | 0 | 72.5 | -50 |
| | | | | | -39.4 | | 32 | | -5.08 | 4.77 | 0.02 | -107 |
| | | | | | 70.3 | | 63 | | -5.08 | 4.77 | 0.09 | 2 |
| | | | | | 86.4 | | 125 | | 7.47 | 0 | 0.3 | 10 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.77 | 22 |
| Medium Trucks | MT | 680600.28 | 4860526.12 | 103.36 | 100.3 | 737.01 | 500 | 68.35 | 0.22 | 4.55 | 1.42 | 26 |
| | | | | | 103.5 | | 1000 | | 0 | 4.77 | 2.7 | 28 |
| | | | | | 103.7 | | 2000 | | 0 | 4.77 | 7.12 | 23 |
| | | | | | 96.5 | | 4000 | | 0 | 4.77 | 24.15 | -1 |
| | | | | | 89.4 | | 8000 | | 0 | 4.77 | 86.14 | -70 |
| | | | | | -39.4 | | 32 | | -5.07 | 0 | 0.02 | -103 |
| | | | | | 96.3 | | 63 | | -5.07 | 0 | 0.09 | 33 |
| | | | | | 98.4 | | 125 | | 7.44 | 0 | 0.3 | 22 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.76 | 22 |
| Backhoe | BH | 680594.73 | 4860397.15 | 103 | 98.3 | 728.63 | 500 | 68.25 | 0.22 | 0 | 1.4 | 28 |
| | | | | | 97.5 | | 1000 | | 0 | 0 | 2.67 | 27 |
| | | | | | 99.7 | | 2000 | | 0 | 0 | 7.04 | 24 |
| | | | | | 95.5 | | 4000 | | 0 | 0 | 23.88 | 3 |
| | | | | | 88.4 | | 8000 | | 0 | 0 | 85.16 | -65 |
| | | | | | -50.1 | | 32 | | -4.99 | 0 | 0.02 | -111 |
| | | | | | 56.1 | | 63 | | -4.99 | 0 | 0.07 | -5 |
| | | | | | 61.2 | | 125 | | 6.91 | 0 | 0.24 | -12 |
| | | | | | 63.7 | | 250 | | 7.39 | 0 | 0.6 | -11 |
| Trucks | TR | 680445.44 | 4860419.85 | 102 | 76.1 | 578.31 | 500 | 66.24 | 2.22 | 0 | 1.11 | 7 |
| | | | | | 76.3 | | 1000 | | 0.14 | 0 | 2.12 | 8 |
| | | | | | 78.5 | | 2000 | | 0 | 0 | 5.59 | 7 |
| | | | | | 72.3 | | 4000 | | 0 | 0 | 18.95 | -13 |
| | | | | | 59.2 | | 8000 | | 0 | 0 | 67.59 | -75 |
| **Daytime Level, dBA:** | | | | | | | | | | | | **50** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** **POR2**
X: 681376.6
Y: 4860334.79
Z: 104.5
Ground: 100

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar (dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -5.14 | 0 | 0.03 | -103 |
| | | | | | 92.3 | | 63 | | -5.14 | 0 | 0.1 | 28 |
| | | | | | 97.4 | | 125 | | 7.61 | 0 | 0.32 | 21 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.82 | 26 |
| Land Grader | LG | 680592.35 | 4860348.86 | 103 | 104.3 | 784.38 | 500 | 68.89 | 0.22 | 0 | 1.51 | 34 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 2.87 | 39 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 7.58 | 33 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 25.7 | 11 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 91.68 | -58 |
| | | | | | -39.4 | | 32 | | -5.27 | 0 | 0.03 | -104 |
| | | | | | 92.3 | | 63 | | -5.27 | 0 | 0.11 | 27 |
| | | | | | 97.4 | | 125 | | 7.9 | 0 | 0.38 | 19 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.96 | 24 |
| Land Grader | LG | 680459.67 | 4860415.34 | 103 | 104.3 | 920.46 | 500 | 70.28 | 0.22 | 0 | 1.77 | 32 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 3.37 | 37 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 8.9 | 31 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 30.16 | 5 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 107.59 | -75 |
| | | | | | -39.4 | | 32 | | -5.12 | 0 | 0.03 | -104 |
| | | | | | 80.3 | | 63 | | -5.12 | 0 | 0.11 | 16 |
| | | | | | 90.4 | | 125 | | 7.57 | 0 | 0.36 | 13 |
| | | | | | 97.9 | | 250 | | 3.43 | 0 | 0.91 | 24 |
| Excavator | EX | 680508.58 | 4860317.26 | 104 | 103.3 | 868.2 | 500 | 69.77 | 0.01 | 0 | 1.67 | 32 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 3.18 | 34 |
| | | | | | 107.7 | | 2000 | | 0 | 0 | 8.39 | 30 |
| | | | | | 107.5 | | 4000 | | 0 | 0 | 28.45 | 9 |
| | | | | | 105.4 | | 8000 | | 0 | 0 | 101.48 | -66 |
| | | | | | -39.4 | | 32 | | -5.02 | 0 | 0.02 | -103 |
| | | | | | 80.3 | | 63 | | -5.02 | 0 | 0.1 | 16 |
| | | | | | 91.4 | | 125 | | 7.43 | 0 | 0.32 | 15 |
| | | | | | 99.9 | | 250 | | 3.43 | 0 | 0.81 | 27 |
| Heavy Trucks | HT | 680596.14 | 4860316.56 | 104 | 104.3 | 780.67 | 500 | 68.85 | 0.01 | 0 | 1.51 | 34 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 2.86 | 35 |
| | | | | | 105.7 | | 2000 | | 0 | 0 | 7.54 | 29 |
| | | | | | 100.5 | | 4000 | | 0 | 0 | 25.58 | 6 |
| | | | | | 94.4 | | 8000 | | 0 | 0 | 91.25 | -66 |
| | | | | | -39.4 | | 32 | | -5.3 | 0 | 0.03 | -104 |
| | | | | | 89.3 | | 63 | | -5.3 | 0 | 0.1 | 25 |
| | | | | | 94.4 | | 125 | | 8.13 | 0 | 0.34 | 17 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 0.87 | 20 |
| Front End Loader | FEL | 680543.57 | 4860285.71 | 101.66 | 101.3 | 834.48 | 500 | 69.43 | 2.22 | 0 | 1.61 | 28 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 3.05 | 35 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 8.06 | 29 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 27.35 | 6 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 97.54 | -68 |
| | | | | | -39.4 | | 32 | | -5.34 | 0 | 0.03 | -104 |
| | | | | | 89.3 | | 63 | | -5.34 | 0 | 0.11 | 25 |
| | | | | | 94.4 | | 125 | | 8.28 | 0 | 0.36 | 16 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 0.92 | 20 |
| Front End Loader | FEL | 680494.36 | 4860404.36 | 102 | 101.3 | 884.99 | 500 | 69.94 | 2.22 | 0 | 1.71 | 27 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 3.24 | 34 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 8.55 | 28 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 29 | 4 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 103.44 | -74 |
| | | | | | -39.4 | | 32 | | -5.2 | 0 | 0.03 | -104 |
| | | | | | 75.3 | | 63 | | -5.2 | 0 | 0.1 | 11 |
| | | | | | 91.4 | | 125 | | 7.76 | 0 | 0.35 | 14 |
| | | | | | 99.9 | | 250 | | 5.22 | 0 | 0.88 | 24 |
| Bulldozer | BZ | 680538.85 | 4860213.57 | 100.45 | 104.3 | 846.48 | 500 | 69.55 | 0.22 | 0 | 1.63 | 33 |
| | | | | | 104.5 | | 1000 | | 0 | 0 | 3.1 | 32 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 8.18 | 25 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 27.74 | -1 |
| | | | | | 90.4 | | 8000 | | 0 | 0 | 98.94 | -78 |
| | | | | | -39.4 | | 32 | | -5.16 | 0 | 0.03 | -103 |
| | | | | | 70.3 | | 63 | | -5.16 | 0 | 0.1 | 6 |
| | | | | | 86.4 | | 125 | | 7.65 | 0 | 0.33 | 9 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.83 | 21 |
| Medium Trucks | MT | 680600.28 | 4860526.12 | 103.36 | 100.3 | 799.55 | 500 | 69.06 | 0.22 | 0 | 1.54 | 29 |
| | | | | | 103.5 | | 1000 | | 0 | 0 | 2.92 | 32 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 7.73 | 27 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 26.2 | 1 |
| | | | | | 89.4 | | 8000 | | 0 | 0 | 93.45 | -73 |
| | | | | | -39.4 | | 32 | | -5.26 | 0 | 0.03 | -104 |
| | | | | | 70.3 | | 63 | | -5.26 | 0 | 0.11 | 5 |
| | | | | | 86.4 | | 125 | | 7.88 | 0 | 0.37 | 8 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.95 | 20 |
| Medium Trucks | MT | 680485.39 | 4860502.14 | 103 | 100.3 | 906.79 | 500 | 70.15 | 0.22 | 0 | 1.75 | 28 |
| | | | | | 103.5 | | 1000 | | 0 | 0 | 3.32 | 30 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 8.76 | 25 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 29.72 | -3 |
| | | | | | 89.4 | | 8000 | | 0 | 0 | 105.99 | -87 |
| | | | | | -39.4 | | 32 | | -5.14 | 0 | 0.03 | -103 |
| | | | | | 96.3 | | 63 | | -5.14 | 0 | 0.1 | 32 |
| | | | | | 98.4 | | 125 | | 7.61 | 0 | 0.32 | 22 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.82 | 21 |
| Backhoe | BH | 680594.73 | 4860397.15 | 103 | 98.3 | 784.35 | 500 | 68.89 | 0.22 | 0 | 1.51 | 28 |
| | | | | | 97.5 | | 1000 | | 0 | 0 | 2.87 | 26 |
| | | | | | 99.7 | | 2000 | | 0 | 0 | 7.58 | 23 |
| | | | | | 95.5 | | 4000 | | 0 | 0 | 25.7 | 1 |
| | | | | | 88.4 | | 8000 | | 0 | 0 | 91.68 | -72 |
| | | | | | -55.5 | | 32 | | -5.11 | 0 | 0.02 | -118 |
| | | | | | 50.7 | | 63 | | -5.11 | 0 | 0.08 | -12 |
| | | | | | 55.8 | | 125 | | 7.39 | 0 | 0.27 | -19 |
| | | | | | 58.3 | | 250 | | 7.39 | 0 | 0.69 | -17 |
| Trucks | TR | 680718.35 | 4860275.38 | 102 | 70.7 | 660.93 | 500 | 67.4 | 2.22 | 0 | 1.27 | 0 |
| | | | | | 70.9 | | 1000 | | 0.14 | 0 | 2.42 | 1 |
| | | | | | 73.1 | | 2000 | | 0 | 0 | 6.39 | -1 |
| | | | | | 66.9 | | 4000 | | 0 | 0 | 21.66 | -22 |
| | | | | | 53.8 | | 8000 | | 0 | 0 | 77.25 | -91 |
| **Daytime Level, dBA:** | | | | | | | | | | | | **47** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

**ID:** **POR3**
X: 679935.56
Y: 4861211.27
Z: 105.38
Ground: 100.88

| Source Description | Source ID | Location Within Acoustic Model (m) | | | Source Sound Power Level [dBA] | Dist. (m) | Freq (Hz) | Adiv (dB) | Agr (dB) | Abar(dB) | Aatm (dB) | Sound Pressure Level at Receptor (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | Y | Z | | | | | | | | |
| | | | | | -39.4 | | 32 | | -5.29 | 0 | 0.03 | -105 |
| | | | | | 92.3 | | 63 | | -5.29 | 0 | 0.12 | 27 |
| | | | | | 97.4 | | 125 | | 7.95 | 0 | 0.39 | 18 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 0.99 | 24 |
| Land Grader | LG | 680459.67 | 4860415.34 | 103 | 104.3 | 953 | 500 | 70.58 | 0.22 | 0 | 1.84 | 32 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 3.49 | 36 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 9.21 | 30 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 31.23 | 4 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 111.39 | -80 |
| | | | | | -39.4 | | 32 | | -5.38 | 0 | 0.03 | -106 |
| | | | | | 92.3 | | 63 | | -5.38 | 0 | 0.13 | 26 |
| | | | | | 97.4 | | 125 | | 8.1 | 0 | 0.45 | 17 |
| | | | | | 100.9 | | 250 | | 5.22 | 0 | 1.13 | 23 |
| Land Grader | LG | 680592.35 | 4860348.86 | 103 | 104.3 | 1084.04 | 500 | 71.7 | 0.22 | 0 | 2.09 | 30 |
| | | | | | 110.5 | | 1000 | | 0 | 0 | 3.97 | 35 |
| | | | | | 109.7 | | 2000 | | 0 | 0 | 10.48 | 28 |
| | | | | | 105.5 | | 4000 | | 0 | 0 | 35.52 | -2 |
| | | | | | 102.4 | | 8000 | | 0 | 0 | 126.7 | -96 |
| | | | | | -39.4 | | 32 | | -5.28 | 0 | 0.03 | -106 |
| | | | | | 80.3 | | 63 | | -5.28 | 0 | 0.13 | 14 |
| | | | | | 90.4 | | 125 | | 7.75 | 0 | 0.44 | 11 |
| | | | | | 97.9 | | 250 | | 3.43 | 0 | 1.11 | 22 |
| Excavator | EX | 680508.58 | 4860317.26 | 104 | 103.3 | 1061.89 | 500 | 71.52 | 0.01 | 0 | 2.05 | 30 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 3.88 | 31 |
| | | | | | 107.7 | | 2000 | | 0 | 0 | 10.26 | 26 |
| | | | | | 107.5 | | 4000 | | 0 | 0 | 34.8 | 1 |
| | | | | | 105.4 | | 8000 | | 0 | 0 | 124.12 | -90 |
| | | | | | -39.4 | | 32 | | -5.4 | 0 | 0.03 | -105 |
| | | | | | 89.3 | | 63 | | -5.4 | 0 | 0.12 | 24 |
| | | | | | 94.4 | | 125 | | 8.5 | 0 | 0.4 | 15 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 1.02 | 19 |
| Front End Loader | FEL | 680494.36 | 4860404.36 | 102 | 101.3 | 981.51 | 500 | 70.84 | 2.22 | 0 | 1.89 | 26 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 3.59 | 33 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 9.49 | 26 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 32.16 | -1 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 114.72 | -86 |
| | | | | | -39.4 | | 32 | | -5.47 | 0 | 0.04 | -106 |
| | | | | | 89.3 | | 63 | | -5.47 | 0 | 0.13 | 23 |
| | | | | | 94.4 | | 125 | | 8.67 | 0 | 0.46 | 13 |
| | | | | | 97.9 | | 250 | | 7.39 | 0 | 1.16 | 17 |
| Front End Loader | FEL | 680543.57 | 4860285.71 | 101.66 | 101.3 | 1107.41 | 500 | 71.89 | 2.22 | 0 | 2.13 | 25 |
| | | | | | 107.5 | | 1000 | | 0.14 | 0 | 4.05 | 31 |
| | | | | | 106.7 | | 2000 | | 0 | 0 | 10.7 | 24 |
| | | | | | 102.5 | | 4000 | | 0 | 0 | 36.29 | -6 |
| | | | | | 99.4 | | 8000 | | 0 | 0 | 129.44 | -102 |
| | | | | | -39.4 | | 32 | | -5.31 | 0 | 0.04 | -106 |
| | | | | | 80.3 | | 63 | | -5.31 | 0 | 0.14 | 14 |
| | | | | | 91.4 | | 125 | | 7.77 | 0 | 0.46 | 11 |
| | | | | | 99.9 | | 250 | | 3.43 | 0 | 1.16 | 23 |
| Heavy Trucks | HT | 680596.14 | 4860316.56 | 104 | 104.3 | 1112.15 | 500 | 71.92 | 0.01 | 0 | 2.14 | 30 |
| | | | | | 106.5 | | 1000 | | 0 | 0 | 4.07 | 31 |
| | | | | | 105.7 | | 2000 | | 0 | 0 | 10.75 | 23 |
| | | | | | 100.5 | | 4000 | | 0 | 0 | 36.45 | -8 |
| | | | | | 94.4 | | 8000 | | 0 | 0 | 129.99 | -108 |
| | | | | | -39.4 | | 32 | | -5.25 | 0 | 0.03 | -104 |
| | | | | | 70.3 | | 63 | | -5.25 | 0 | 0.11 | 5 |
| | | | | | 86.4 | | 125 | | 7.86 | 0 | 0.37 | 8 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 0.94 | 20 |
| Medium Trucks | MT | 680485.39 | 4860502.14 | 103 | 100.3 | 897.32 | 500 | 70.06 | 0.22 | 0 | 1.73 | 28 |
| | | | | | 103.5 | | 1000 | | 0 | 0 | 3.28 | 30 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 8.67 | 25 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 29.41 | -3 |
| | | | | | 89.4 | | 8000 | | 0 | 0 | 104.88 | -86 |
| | | | | | -39.4 | | 32 | | -5.29 | 0 | 0.03 | -105 |
| | | | | | 70.3 | | 63 | | -5.29 | 0 | 0.12 | 5 |
| | | | | | 86.4 | | 125 | | 7.96 | 0 | 0.39 | 7 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 1 | 19 |
| Medium Trucks | MT | 680600.28 | 4860526.12 | 103.36 | 100.3 | 954.61 | 500 | 70.6 | 0.22 | 0 | 1.84 | 28 |
| | | | | | 103.5 | | 1000 | | 0 | 0 | 3.49 | 29 |
| | | | | | 103.7 | | 2000 | | 0 | 0 | 9.23 | 24 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 31.28 | -5 |
| | | | | | 89.4 | | 8000 | | 0 | 0 | 111.58 | -93 |
| | | | | | -39.4 | | 32 | | -5.42 | 0 | 0.04 | -106 |
| | | | | | 75.3 | | 63 | | -5.42 | 0 | 0.14 | 8 |
| | | | | | 91.4 | | 125 | | 8.15 | 0 | 0.48 | 10 |
| | | | | | 99.9 | | 250 | | 5.22 | 0 | 1.22 | 21 |
| Bulldozer | BZ | 680538.85 | 4860213.57 | 100.45 | 104.3 | 1165.93 | 500 | 72.33 | 0.22 | 0 | 2.25 | 29 |
| | | | | | 104.5 | | 1000 | | 0 | 0 | 4.26 | 28 |
| | | | | | 102.7 | | 2000 | | 0 | 0 | 11.27 | 19 |
| | | | | | 96.5 | | 4000 | | 0 | 0 | 38.21 | -14 |
| | | | | | 90.4 | | 8000 | | 0 | 0 | 136.28 | -118 |
| | | | | | -39.4 | | 32 | | -5.36 | 0 | 0.03 | -105 |
| | | | | | 96.3 | | 63 | | -5.36 | 0 | 0.13 | 30 |
| | | | | | 98.4 | | 125 | | 8.06 | 0 | 0.43 | 19 |
| | | | | | 95.9 | | 250 | | 5.22 | 0 | 1.09 | 18 |
| Backhoe | BH | 680594.73 | 4860397.15 | 103 | 98.3 | 1047.52 | 500 | 71.4 | 0.22 | 0 | 2.02 | 25 |
| | | | | | 97.5 | | 1000 | | 0 | 0 | 3.83 | 22 |
| | | | | | 99.7 | | 2000 | | 0 | 0 | 10.12 | 18 |
| | | | | | 95.5 | | 4000 | | 0 | 0 | 34.33 | -10 |
| | | | | | 88.4 | | 8000 | | 0 | 0 | 122.44 | -105 |
| | | | | | -49.5 | | 32 | | -5.36 | 0 | 0.03 | -114 |
| | | | | | 56.7 | | 63 | | -5.36 | 0 | 0.11 | -8 |
| | | | | | 61.8 | | 125 | | 8.36 | 0 | 0.38 | -17 |
| | | | | | 64.3 | | 250 | | 7.39 | 0 | 0.96 | -14 |
| Trucks | TR | 680507.52 | 4860495.84 | 102.04 | 76.7 | 915.96 | 500 | 70.24 | 2.22 | 0 | 1.77 | 2 |
| | | | | | 76.9 | | 1000 | | 0.14 | 0 | 3.35 | 3 |
| | | | | | 79.1 | | 2000 | | 0 | 0 | 8.85 | 0 |
| | | | | | 72.9 | | 4000 | | 0 | 0 | 30.02 | -27 |
| | | | | | 59.8 | | 8000 | | 0 | 0 | 107.06 | -117 |
| **Daytime Level, dBA:** | | | | | | | | | | | | **45** |

Note: Trucking activity spectrum presented in the table is at the closest point on the path between source and receiver

# APPENDIX H

Traffic Modelling Results (STAMSON)

STAMSON 5.0 NORMAL REPORT Date: 22-04-2009 15:54:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: 1 hour
Description:

Road data, segment # 1: S Service Rd

Car traffic volume : 33 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: S Service Rd

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: S Service Rd

Source height = 2.05 m

ROAD (0.00 + 35.14 + 0.00) = 35.14 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.55 | 60.07 | 0.00 | -23.66 | -1.27 | 0.00 | 0.00 | 0.00 | 35.14 |

Segment Leq : 35.14 dBA

Total Leq All Segments: 35.14 dBA

TOTAL Leq FROM ALL SOURCES: 35.14

STAMSON 5.0 NORMAL REPORT Date: 22-04-2009 15:41:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: 1 hour
Description:

Road data, segment # 1: Osbourne

Car traffic volume : 33 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Osbourne

Angle1 Angle2 : -20.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Osbourne

Source height = 2.05 m

ROAD (0.00 + 31.80 + 0.00) = 31.80 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -20 | 45 | 0.55 | 60.07 | 0.00 | -23.66 | -4.62 | 0.00 | 0.00 | 0.00 | 31.80 |

Segment Leq : 31.80 dBA

Total Leq All Segments: 31.80 dBA

TOTAL Leq FROM ALL SOURCES: 31.80

STAMSON 5.0 NORMAL REPORT Date: 22-04-2009 14:00:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: 1 hour
Description:

Road data, segment # 1: S Service Rd

Car traffic volume : 33 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: S Service Rd

Angle1 Angle2 : 0.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 330.00 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Osbourne Rd

Car traffic volume : 33 veh/TimePeriod
Medium truck volume : 0 veh/TimePeriod
Heavy truck volume : 7 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Osbourne Rd

Angle1 Angle2 : -60.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 500.00 m
Receiver height : 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: S Service Rd

Source height = 2.05 m

ROAD (0.00 + 32.94 + 0.00) = 32.94 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 45 | 0.55 | 60.07 | 0.00 | -20.86 | -6.28 | 0.00 | 0.00 | 0.00 | 32.94 |

Segment Leq : 32.94 dBA

Results segment # 2: Osbourne Rd

Source height = 2.05 m

ROAD (0.00 + 33.94 + 0.00) = 33.94 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -60 | 30 | 0.55 | 60.96 | 0.00 | -23.66 | -3.36 | 0.00 | 0.00 | 0.00 | 33.94 |

Segment Leq : 33.94 dBA

Total Leq All Segments: 36.48 dBA

TOTAL Leq FROM ALL SOURCES: 36.48