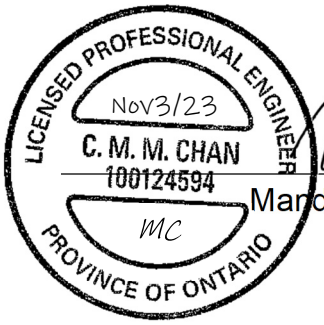
Howe Gastmeier Chapnik Limited
2000 Argentia Road, Plaza One, Suite 203
Mississauga, Ontario, Canada L5N 1P7
t: 905.826.4044

Noise Feasibility Study
Proposed Batching Plants
Scotland Drive
London, Ontario

Prepared for:

Bre-Ex Aggregates
247 Exeter Road
London, ON N6L 1A5

Prepared by:



Mandy Chan, PEng

and

Bill Gastmeier, MASc, PEng

November 3, 2023

HGC Project No: 02300061

Limitations

This document was prepared solely for the addressed party and titled project or named part thereof, and should not be relied upon or used for any other project without obtaining prior written authorization from HGC Engineering. HGC Engineering accepts no responsibility or liability for any consequence of this document being used for a purpose other than for which it was commissioned. Any person or party using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm their agreement to indemnify HGC Engineering for all loss or damage resulting therefrom. HGC Engineering accepts no responsibility or liability for this document to any person or party other than the party by whom it was commissioned.

Any conclusions and/or recommendations herein reflect the judgment of HGC Engineering based on information available at the time of preparation, and were developed in good faith on information provided by others, as noted in the report, which has been assumed to be factual and accurate. Changed conditions or information occurring or becoming known after the date of this report could affect the results and conclusions presented.

Table of Contents

1 INTRODUCTION & SUMMARY

Howe Gastmeier Chapnik Limited (HGC Engineering) was retained by Bre-Ex Aggregates to undertake a noise assessment for a proposed ready mix concrete batching plant and a proposed hot-mixed asphalt plant to be located on Scotland Drive, east of White Oak Drive in London, Ontario.

This study uses predictive analysis to assess the sound levels expected to be produced by the two plants at the closest nearby residential receptors, with respect to the guidelines of the Ministry of Environment, Conservation and Parks (MECP). This study has been requested by the City of London to support a Zoning By-Law Amendment to permit the proposed use and is based on criteria contained in MECP Guideline NPC-300, aerial photography and a site visit.

Specifics of the plants have not yet been identified, so this study considers that the proposed plants will be large in scale and operate continuously. Information for such plants was taken from observations of other facilities in the London area and taken from our files for large scale facilities consistent with the site area.

The results of the analysis indicate the proposed plants are feasible at this site and can be within the limits of the MECP guidelines, additional noise control measures are not required. The reader is referred to the main body of the report for assumptions and results of the analysis. A Professional Engineer qualified to provide acoustical engineering services in Ontario shall review the site and grading plans and the actual design and operational parameters of the facilities when available and conduct an updated the analysis to confirm that applicable MECP limits are met at all receptors.

2 SITE DESCRIPTION

The site is located on the north side of Scotland Drive, east of White Oak Drive in London, Ontario. The proposed site plan dated July 14, 2023 is attached as Figure 1.

HGC Engineering visited the site on April 27, 2023 to investigate the acoustic and topographic environment of the site. An aerial photo showing the site and surrounding land uses is attached as Figure 2. There are some residential uses, approximately 350 m to the east, along Scotland Drive and further north along Westminster Drive, close to Highway 401. Immediately to the south, on the south side of Scotland Drive, are lands owned by the City of London as well as the City of London landfill. It was observed that previous residential homes on the City-owned lands have been demolished and it is understood noise sensitive uses will not be permitted on those lands. To the north and west of the site are licensed aggregate operations and a large scale concrete batching plant similar to that being proposed for the subject lands.

3 CRITERIA

3.1 Criteria for Stationary (Industrial) Sources of Sound

MECP Guideline NPC-300 [1] is the MECP guideline for use in investigating Land Use Compatibility issues with regard to noise. An industrial or commercial facility is classified in the MECP Guideline NPC-300 as a stationary source of sound (as compared to sources such as traffic or construction, for example) for noise assessment purposes. Stationary noise sources encompass the noise from all the activities and equipment within the property boundary of a facility including regular on-site truck traffic, material handling and mechanical equipment. In terms of background sound, the residential area east of the site is located in a semi-urban (Class 2) acoustical environment which is characterized mainly by the sounds of road traffic and human activity during the daytime hours.

NPC-300 is intended for use in the planning of both residential and commercial/industrial land uses and provides the acceptability limits for sound due to commercial operations in that regard. The facade of a residence (i.e., in the plane of a window), or any associated usable outdoor area is considered a sensitive point of reception (within 30 m of a dwelling façade). NPC-300 stipulates that the exclusionary non-impulsive sound level limit for a stationary noise source in a Class 2 area is

taken to be 50 dBA during daytime and evening hours (07:00 to 19:00 and 19:00 to 23:00), and 45 dBA during nighttime hours (23:00 to 07:00) at the plane of the windows of noise sensitive spaces. For outdoor living areas (OLAs), the sound level limit is 50 dBA during the daytime hour and 45 dBA during the evening hours. If the background sound levels due to road traffic exceed the exclusionary limits, then that background sound level becomes the criterion. The background sound level is defined as the sound level that occurs when the source under consideration is not operating and may include traffic noise and natural sounds.

Commercial activities such as the occasional movement of customer/employee vehicles and garbage collection are not of themselves considered to be significant noise sources in the MECP guidelines. Accordingly, these sources have not been considered in this study.

The existing residences to the east of the site along Scotland Drive are considered to be the representative noise sensitive receptors (R1 to R3) in this study. R1 is a 1-storey house and R2 and R3 are 2-storey houses. The receptor locations are shown on Figures 3 and 4.

The sound level limits apply at any point on the residential property and outside residential windows. Consequently, the most stringent receptor locations are the upper-storey windows at the façades of dwellings. The exclusionary minimum sound level limits are used in the following sections of this report as the criteria by which the sound levels produced by the proposed facilities are assessed. Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors although there may be residual audibility during periods of low background sound.

4 NOISE SOURCES SUMMARY

Noise sources associated with the ready-mixed concrete batching plant and hot-mixed asphalt (HMA) plant are outlined below and are based on HGC Engineering's experience with these facilities. Any acoustically insignificant sources are also noted. The sound power levels of each source used in the analysis are detailed in Appendix A. The locations of each source are shown on Figure 3.

4.1 Ready-Mix Batching Plant

4.1.1 Cement Tanker Trucks

Tanker trucks delivering cementitious materials to the plant will be unloaded from the tanker trucks using truck mounted blowers. This assessment also considers sound emissions from the truck engines and exhausts. Once unloading is completed, the tanker trucks will exit the property back onto Scotland Drive. Five tanker trucks are assumed to visit the site in a predictable worst-case hour of operation with unloading occurring continuously.

4.1.2 Ready-Mix Trucks

Ready-mix trucks will enter the site and drive under the loading area. Trucks will be loaded while operating at an elevated engine idle and sound emissions from the truck engines and combustion exhausts are included in the assessment. Once loading is completed, ready-mix trucks will move to the slumping rack, located east of the plant. In this area, the trucks will operate at an elevated idle to complete raw material mixing and to adjust for product consistency as required. Up to four ready-mix trucks could be operating at an elevated engine idle at the slumping rack at any given time. Twenty (20) ready-mix trucks can enter and exit the facility during a predictable worst-case hour of operation. Each truck is assumed to idle for up to 5 minutes while loading, and for up to 10 minutes while slumping.

4.1.3 Loading Point Sources

A dust collector will be used to control particulate emissions during the loading of ready-mix trucks and is typically equipped with a secondary exhaust silencer. The loading point is also equipped with a horn, which typically operates for approximately 5 seconds at the end of each loading cycle.

4.1.4 Aggregate Trucks, Front-end Loader & Hopper

Aggregate trucks will enter the site and unload aggregate into one of the several stockpiles, assumed to be located on the north side of the plant. Up to 5 aggregate trucks are assumed to enter and exit the facility in a busy hour. A front-end loader is used to transfer aggregate materials between the stockpiles and the hopper, which is equipped with a vibrator to loosen clumped materials onto and enclosed conveyor belt (acoustically negligible) which will transport the materials to elevated storage compartments within the plant.

4.1.5 Summary of Predictable Worst-Case Hour Activities

The following table summarizes the "predictable worst-case hours" of operation at the ready mixed-batching facility considered for the purpose of this assessment.

Table 1: Summary of Predictable Worst-Case Hours of Operation for Ready-Mixed Batching Plant

Source Name	Quantity or Operating Time/Hr
Unloading Aggregate Trucks	5 min/hr
Front End Loader	60 min/hr
Arriving/Departing Aggregate Trucks	5 at 10 km/h
Arriving/Departing Tanker Trucks	5 at 10 km/h
Unloading Tanker Trucks	60 min/hr
Arriving/Departing Ready-Mix Trucks	20 at 10 km/h
Loading Ready-Mix Trucks	60 min/hr
Slumping Ready-Mix Trucks	60 min/hr
Dust Collector Secondary Fan Exhaust	60 min/hr
Loading Point Signal Horn	3 min/hr
Hopper Vibrator	60 min/hr

4.2 Hot-Mixed Asphalt (HMA) Plant

4.2.1 Aggregate/Asphalt Cement Trucks & Front-End Loader

Aggregate materials are delivered by trucks which unload materials (with negligible sound emissions) into the storage area north of the HMA plant before exiting the site. Liquid asphalt cement is delivered by trucks which travel to the storage tanks central to the plant where they unload (with negligible sound emissions), before exiting the property. A front-end loader transfers aggregate material and Recycled Asphalt (RAP) material from the stockpiles to the feed hoppers on the north side of the HMA plant. Up to 20 aggregate/RAP and 2 asphalt cement trucks are assumed the visit the site per hour, with the front-end loader operating continuously.

4.2.2 Dryer/Mixer System & Baghouse

Virgin aggregate and RAP are transferred by conveyor systems (with negligible sound emissions) to screens to remove oversized material before being introduced to the dryer/mixer. The dryer/mixer is heated by a natural gas fired burner located at the east end of the drum, which is supplied with combustion air by two blowers. The dryer/mixer drum is rotated by a motor/gear system.

The exhaust of the dryer/mixer is drawn through a baghouse by an induced-draft fan which discharges air to atmosphere through an exhaust stack on the north side of the baghouse. A dust blower is used to transfer dust collected in the baghouse to a dust silo for reintroduction to the HMA production process.

4.2.3 Bucket Elevator and Storage Silos (Continuous Mode)

Hot mix asphalt exiting the dryer/mixer is transferred to the top of storage silos by a drag conveyor driven by a topside motor/gearbox and distributed across the silos by a system of conveyors with four associated motors/gearboxes. A system of pneumatic batching gates meters the HMA into each of the silos. The finished product is then deposited from the silos by a system of pneumatic loading gates into trucks waiting below. Sound from the pneumatic gate systems is intermittent; each batching gate typically operates for 5 minutes per hour and the loading gates operate for approximately 10 seconds per truck.

4.2.4 Mixing Tower (Batch Mode)

Hot aggregate exiting the dryer/mixer is transferred to the top of the batch mix tower by a bucket elevator driven by a topside motor/gearbox and transferred to a screen deck to be sorted by size into storage bins within the batch mix tower. Aggregate materials are then mixed in a pugmill with asphalt cement to produce hot-mix asphalt (an acoustically negligible process). The finished product is then batched directly into trucks by pneumatic loading gates. The sound emission level and operating time of the batch tower loading gate pneumatics were assumed to be equivalent to those of the storage silos.

4.2.5 Hot-Mix Asphalt Trucks

Hot mix asphalt trucks will enter the property from Scotland Drive and travel beneath the mixing tower or storage silos to be loaded. During a predictable worst-case hour, up to 20 HMA trucks are assumed to enter and exit the facility.

4.2.6 Summary of Predictable Worst-Case Hour Activities

The following table summarizes the operations/activities that take place during a predictable worst-case hour of operation of the subject site.

Table 2: Summary of Predictable Worst-Case Hour of Operation (Day/Night)

Source Name	Quantity or Operating Time/Hr
Aggregate/RAP Truck Movements	20 at 10 km/hr
Asphalt Cement Truck Movements	2 at 10 km/hr
Front-End Loader	60 min/hr
HMA Truck Movements	20 at 10 km/hr
Silo Batcher Gate Pneumatics	5 mins/hr
Silo Loading Gate Pneumatics (10 sec/truck)	1.2 mins/hr
All Other Continuous Mode Sources	60 min/hr
Bucket Elevator & Screen Deck	60 min/hr
Mixing Tower Loading Gate Pneumatics	5 mins/hr

5 ASSESSMENT METHODOLOGY

Predictive noise modelling was used to assess the potential noise impact of trucking activities at the residential receptors. The software used for this purpose (*Cadna-A 2023 build: 197.5343*) is a computer implementation of ISO Standard 9613-2.2 "Acoustics - Attenuation of Sound During Propagation Outdoors." [2] The ISO method accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures such as barriers. Additional details are provided in Appendix B.

The following information and assumptions were used in the analysis:

- The facilities are assumed to operate 24 hours per day.
- The final grade of the site is approximately 278.4 to 283 mASL.

The equipment/activities outlined in Section 4 were used to predict the sound emissions of the facilities during the predictable worst-case hour. The sound power levels for noise sources measured from other large scale similar facilities were used in our analysis and are summarized in Appendix A. Since both plants will be under the same ownership and located on the same property, the assessment considers their simultaneous operation.

6 ASSESSMENT RESULTS AND RECOMMENDATIONS

6.1 Results

The predicted sound levels due to the simultaneous operation of both facilities at the closest neighbouring receptors (R1 to R3) during a worst-case busiest hour operating scenario, are summarized in the following table and shown on Figure 3.

Table 3: Predicted Sound Levels at Residential Receptors during a Worst-case Operating Scenario hour (Without Mitigation), Leq (dBA)

Receptor	Criteria		Predicted Sound Level- At Facade	Predicted Sound Level - OLA
	Day/Eve/ Night – At Facade	Day/Eve/ Night – OLA		
R1 (5361 Scotland Drive, 1 storey-residence)	50 / 50 / 45	50 / 45 / --	43	42
R2 (2-Storey residence)	50 / 50 / 45	50 / 45 / --	44	42
R3 (2-Storey residence)	50 / 50 / 45	50 / 45 / --	42	41

The results of this analysis indicate that the predicted sound levels will meet the MECP's applicable sound level limits at the residential dwellings and in their OLA's during daytime, evening and nighttime hours. Additional noise control measures not typically included in the design of the equipment for these plants are not required.

7 CONCLUSIONS AND RECOMMENDATIONS

The acoustical analysis indicates that sound levels predicted under worst case operating scenarios are expected to comply with the applicable MECP limits at the neighbouring receptors. In our opinion, the operation of large scale Ready-Mix Concrete Batching and Hot Mix Asphalt plants is feasible at this site in terms of noise emissions.

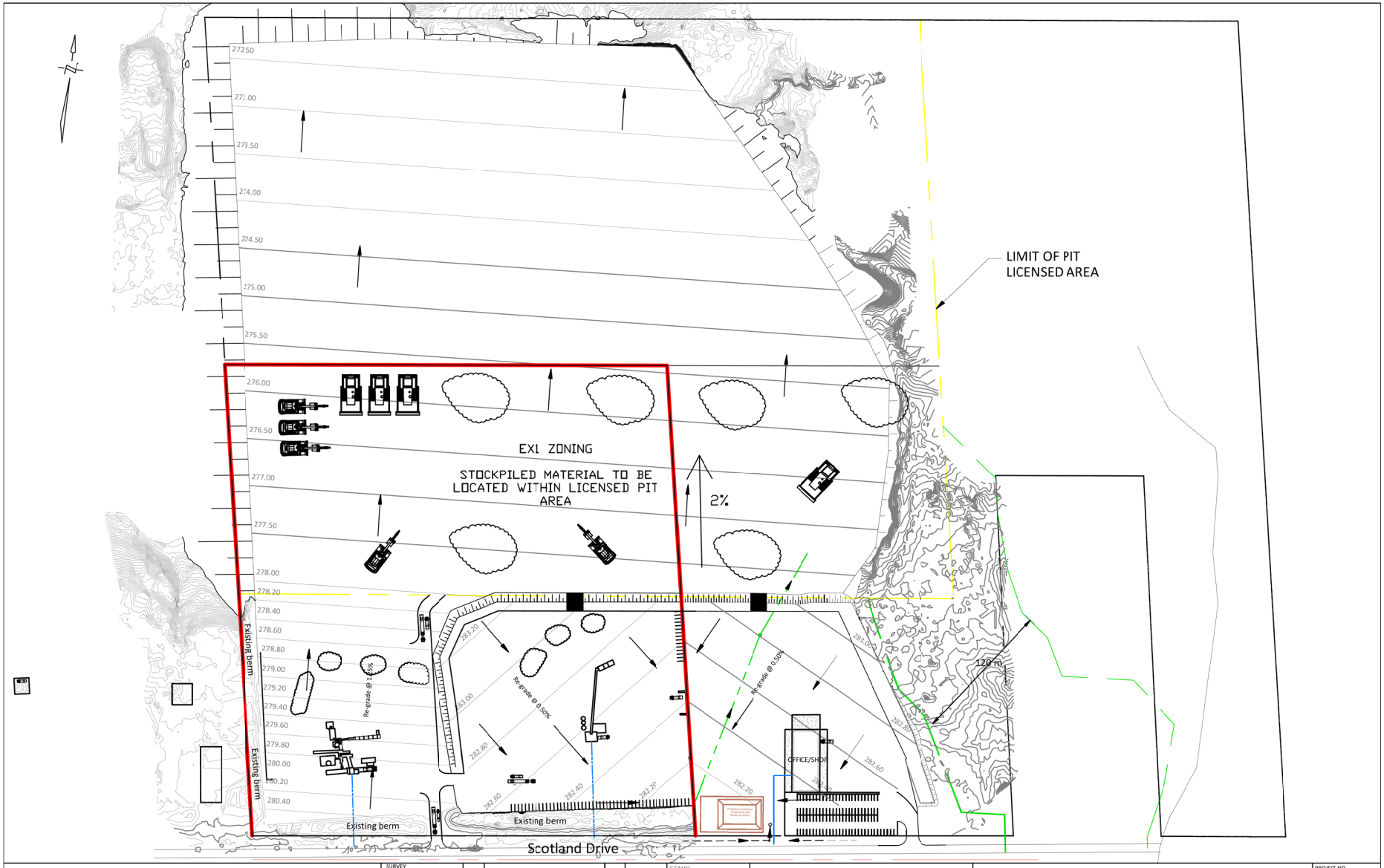
The acoustic recommendations may be subject to modification if the site plan and/or grading is changed significantly, if operating equipment and scenarios are found to be significantly different to those assumed in this assessment once equipment is selected and the plants are designed, or if there is a significant increase in background sound levels due to road traffic or other activities in the area.

7.1 Implementation

Prior to the issuance of building permits, a Professional Engineer qualified to provide acoustical engineering services in Ontario shall review the site and grading plans and the design and operational parameters of the facilities and conduct an updated the analysis to confirm that applicable MECP limits are met at off-set receptors and design any additional mitigation such as perimeter berming, if determined to be required, to the appropriate height and extent.

8 REFERENCES

1. Ontario Ministry of the Environment, Conservation and Parks, Publication NPC-300 *Stationary and Transportation Sources – Approval and Planning*, August 2013.
2. International Organization for Standardization, *Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation*, ISO-9613-2, Switzerland, 1996.
3. Google Maps and Aerial Imagery, Internet application: *maps.google.com*



SURVEY	DeKay Constriction				STAMP
DESIGN	K. GRAHAM				
DRAWN	K. GRAHAM	C	FOR APPROVAL	K.G.	JUL 14/23
DATE	JANUARY 2022	B	FOR APPROVAL	K.G.	JUN 20/23
		A	FCR REVIEW	K.G.	APR 27/23
		No.	REVISION	BY	DATE

BLACK CREEK ENGINEERING INC

1086 Modeland Road
Building 1010, Suite 266
Sarnia, On:ario
(519) 333-5893

BRE-EX CONSTRUCTION INC.
LONDON, ONTARIO

#3832 & #3696 SCOTLAND DRIVE
PROPOSED LOT GRADING

PROJECT NO. 2041.02

SHEETNO: GR

Figure 1: Site Plan

Figure 2: Aerial Photo

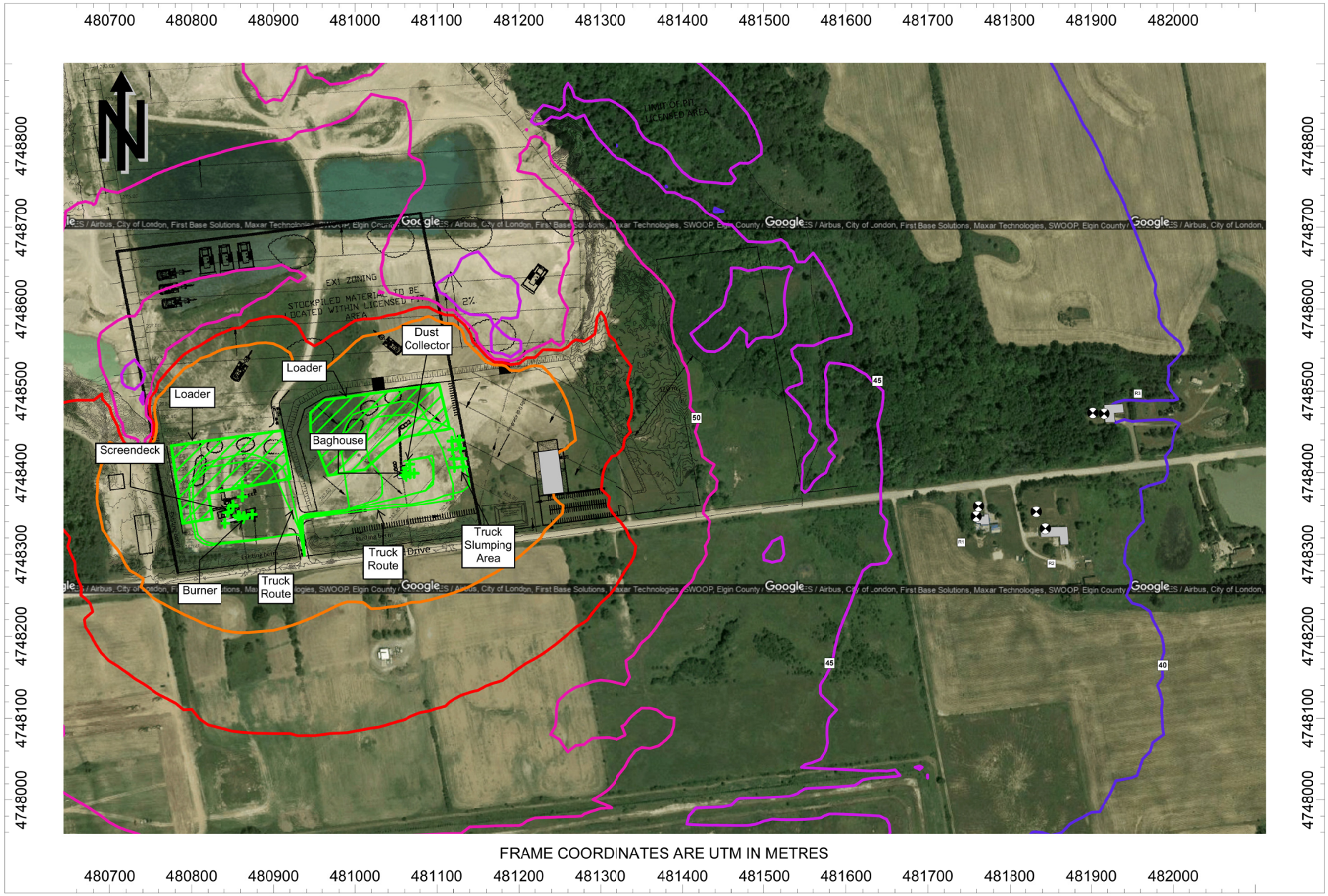


Figure 3: Predicted Sound Level Contours, Leq [dBA]

APPENDIX A

Supporting Info

Table A1: Source Sound Levels

Source Name	Source Sound Power Level, dBA
Ready-Mix Batching Plant	
Unloading Aggregate Trucks	104
Front End Loader	108
Tanker Truck Movements	97
Unloading Tanker Trucks	109
Ready-Mix Trucks Movements	102
Loading Ready-Mix Trucks	106
Slumping Ready-Mix Trucks	106
Slumping Ready-Mix Trucks, Exhaust	96
Aggregate Scale Vibration	101 (include 5 dB adjustment)
Dust Collector	98
Baghouse Outlet	104
Cement Scale Vibrator	117 (include 5 dB adjustment)
Hot-Mix Asphalt Plant	
Aggregate/RAP Truck Movements	102
Asphalt Cement Truck Movements	102
Burner	110
Casing	102
Dryer Mixer	98
Dust Blower	104 (include 5 dB adjustment)
HMA Truck Movements	101
RAP Scalper	94
Silo Batcher Gate Pneumatics	116
Bucket Elevator & Screen Deck	107
Mixing Tower Loading Gate Pneumatics	116
Tertiary Blower	105

APPENDIX B
Acoustical Modeling
Assumptions

The computational acoustical model used for this Assessment (*Cadna/A*, version 2023, build 197.5343) is based on the methods from ISO Standard 9613-2.2 “Acoustics - Attenuation of Sound During Propagation Outdoors” [2], which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures (or by topography and foliage where applicable). This modelling technique is acceptable to the MECP.

Ground attenuation was assumed to be spectral for all sources, with the ground factor (G) assumed to be 0.5 for the site (chosen to yield the best agreement between predictions and onsite measurements based on HGC Engineering experience); the ground factor was assumed to be 1.0 in all other areas, representative of grassy fields and forest areas and 0.0 for water surfaces. The temperature and relative humidity were assumed to be 10° C and 70%, respectively.

The modelling considered one order of reflection, the sufficiency of which was confirmed using an iterative convergence analysis with increasing orders of reflection.

Onsite movement of trucks were modelled as line sources with time weighting factors based 10 km/hr for trucks travelling within the site. Loader movements were modelled as area sources.