

Jade Consulting 411 Confederation Parkway Tel: (905) 660-2444
Acoustics Engineers Unit 19 Fax: (905) 660-4110
Inc. Concord, Ontario
L4K 0A8

PRELIMINARY ENVIRONMENTAL NOISE REPORT

PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE



PREPARED FOR
772 WINSTON CHURCHILL GP INC.
C/O IBI GROUP

June 25, 2021
File: 21-051

TABLE OF CONTENTS

	SUMMARY.....	1
1.0	INTRODUCTION	2
2.0	ENVIRONMENTAL NOISE AND VIBRATION GUIDELINES	3
3.0	THE EFFECT OF THE NEIGHBOURHOOD ON THE DEVELOPMENT	4
4.0	THE EFFECT OF THE DEVELOPMENT ON THE NEIGHBOURHOOD.....	5
5.0	THE EFFECT OF THE DEVELOPMENT ON ITSELF	11
6.0	CONCLUSION	12
7.0	REFERENCES	13

LIST OF TABLES

TABLE 1	SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITHOUT</u> MITIGATION MEASURES.....	14
TABLE 2	SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITHOUT</u> MITIGATION MEASURES.....	15
TABLE 3	SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITH</u> MITIGATION MEASURES – BERM AND ACOUSTIC FENCE ON BLACKWOOD LANDS (OPTION 1)	16

LIST OF TABLES - Continued

TABLE 4	SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITH</u> MITIGATION MEASURES – BERM AND ACOUSTIC FENCE ON BLACKWOOD LANDS (OPTION 1)	17
TABLE 5	SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITH</u> MITIGATION MEASURES – ACOUSTIC FENCE ON BLACKWOOD LANDS (OPTION 2)	18
TABLE 6	SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITH</u> MITIGATION MEASURES – ACOUSTIC FENCE ON BLACKWOOD LANDS (OPTION 2)	19
TABLE 7	SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITH</u> MITIGATION MEASURES – ACOUSTIC FENCE AT SUBJECT SITE (OPTION 3)	20
TABLE 8	SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS <u>WITH</u> MITIGATION MEASURES – ACOUSTIC FENCE AT SUBJECT SITE (OPTION 3)	21

LIST OF FIGURES

- | | |
|----------|--|
| FIGURE 1 | KEY PLAN |
| FIGURE 2 | SITE PLAN |
| FIGURE 3 | PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE AND PREDICTED SOUND LEVELS WITHOUT MITIGATION MEASURES |
| FIGURE 4 | PLAN SHOWING ANALYZED SOURCES OF IMPULSIVE NOISE AND PREDICTED SOUND LEVELS WITHOUT MITIGATION MEASURES |
| FIGURE 5 | PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE AND PREDICTED SOUND LEVELS WITH MITIGATION MEASURES – BERM AND ACOUSTIC FENCE ON BLACKWOOD LANDS |
| FIGURE 6 | PLAN SHOWING ANALYZED SOURCES OF IMPULSIVE NOISE AND PREDICTED SOUND LEVELS WITH MITIGATION MEASURES – BERM AND ACOUSTIC FENCE ON BLACKWOOD LANDS |
| FIGURE 7 | PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE AND PREDICTED SOUND LEVELS WITH MITIGATION MEASURES – ACOUSTIC FENCE ON BLACKWOOD LANDS |
| FIGURE 8 | PLAN SHOWING ANALYZED SOURCES OF IMPULSIVE NOISE AND PREDICTED SOUND LEVELS WITH MITIGATION MEASURES – ACOUSTIC FENCE ON BLACKWOOD LANDS |

LIST OF FIGURES - Continued

- FIGURE 9 PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE AND PREDICTED SOUND LEVELS WITH MITIGATION MEASURES – ACOUSTIC FENCE AT SUBJECT SITE
- FIGURE 10 PLAN SHOWING ANALYZED SOURCES OF IMPULSIVE NOISE AND PREDICTED SOUND LEVELS WITH MITIGATION MEASURES – ACOUSTIC FENCE AT SUBJECT SITE

LIST OF APPENDICES

APPENDIX A	ENVIRONMENTAL NOISE CRITERIA	A-1
APPENDIX B	SAMPLE CADNAA CALCULATIONS	B-1

SUMMARY

The proposed industrial development is to be located at 772 Winston Churchill Boulevard in the Town of Oakville. The proposed development will consist of two industrial buildings.

The environmental noise guidelines for transportation and stationary noise sources of the Town of Oakville, Region of Halton and Ministry of the Environment, Conservation and Parks (MOE) set out sound level limits for both the indoor (transportation sources only) and outdoor space (both transportation and stationary sources).

The noise sources associated with the proposed buildings are rooftop mechanical equipment, non-refrigerated truck pass-bys, as well as impulses associated with the loading/unloading operations and trailer coupling/uncoupling operations at the loading bays and trailer coupling/uncoupling operations at the trailer parking areas.

As the building tenants are not known at this time, detailed information regarding rooftop mechanical equipment associated with the proposed buildings was not available at the time of preparation of this report. Equipment from similar Jade Acoustics Inc. analyses were assumed to be representative of the expected equipment and used for the preliminary analysis. Once detailed information regarding the mechanical equipment becomes available, the analysis should be revisited to verify compliance with the applicable sound level limits at the nearby residential receptors.

Based on the preliminary analysis, the applicable sound level limits are predicted to be exceeded at the nearest sensitive receptor locations; therefore, noise mitigation measures are required.

Garbage collection operations should be limited to daytime hours between 7:00 a.m. and 7:00 p.m., Monday to Friday.

1.0 INTRODUCTION

Jade Acoustics Inc. was retained by 772 Winston Churchill GP Inc. (c/o IBI Group) to prepare a Preliminary Environmental Noise Report to investigate the potential impact of external noise sources including transportation and stationary sources on the proposed development, as well as to assess the noise emissions from the proposed development to the satisfaction of the Town of Oakville and Halton Region.

The proposed development is identified as:

772 Winston Churchill Boulevard
Town of Oakville

The proposed development is located southeast of Beryl Road and the CN rail corridor, and southwest of Winston Churchill Boulevard. Surrounding land uses include industrial developments to the northeast and northwest, future industrial developments and existing residential to the southeast, and existing residential developments to the southwest.

The proposed development will consist of two industrial buildings. The tenants of the buildings are not known at this time.

Figure 1 shows the Key Plan. Figure 2 shows the Site Plan of the proposed development. Figures 3 to 10 show the locations of the noise sources analyzed as well as the receiver locations.

In preparing this report, the following information has been used:

- Site plan, architectural plans and architectural elevations for the proposed development last dated April 9, 2021, prepared by Baldassarra Architects Inc., provided on April 21, 2021;
- Site grading plan dated April 9, 2021, prepared by A.M. Candaras Associates Inc., received on April 22, 2021;
- Transportation Impact Study dated April 6, 2021, prepared by IBI Group and additional information on truck movements;
- Grading plan for the proposed Blackwood development (560 Winston Churchill Boulevard) last dated February 26, 2021, prepared by A.M. Candaras Associates Inc., received June 8, 2021; and
- Site visit conducted by Jade Acoustics Inc. staff on April 19, 2021.

2.0 ENVIRONMENTAL NOISE AND VIBRATION GUIDELINES

The MOE document “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning, Publication NPC-300”, dated August, 2013, released October 21, 2013 (updated final version # 22) was used for the analysis. A brief summary of the NPC-300 guidelines is given in Appendix A. The guidelines are also summarized below.

For the purpose of this analysis, the area of the proposed development was considered to be a Class 1 Residential Area.

The MOE guidelines require that the sound level due to the stationary source not exceed the ambient sound level due to road traffic in any hour of operation, or the values of 50 dBA between 7:00 a.m. and 11:00 p.m. applicable to any location on the premises of a person including outdoor areas and the plane of any window and 45 dBA between 11:00 p.m. and 7:00 a.m. applicable to the plane of any open window but not to outdoor areas, whichever is higher. Tables C-5, C-6, C-7 and C-8 of NPC-300, included in Appendix A, provide the exclusion limit values of one-hour equivalent sound level (Leq, dBA) and impulsive sound level (LIm, dBA).

The most critical hour is usually the quietest hour of road traffic in which the stationary source is also operating. If the guidelines are exceeded, the MOE requires mitigation measures, preferably at the source. The sounds from the stationary source are measured in terms of Leq, the energy equivalent continuous sound level over a defined time period (in this case, one hour) and LIm, the logarithmic average of sound levels (impulses) measured using the impulsive settings of sound level meters.

The MOE also has vibration guidelines with respect to stationary sources, NPC-207. These guidelines require that the peak vibration velocities not exceed 0.3 mm/s at the point of reception during the day or night.

The MOE recognizes the need for back-up beepers/alarms as safety devices and, as such, does not have any guidelines or criteria to address these sources.

It should be noted that the MOE guidelines do not require that the source be inaudible but rather that specific sound level limits be achieved.

The Town of Oakville has a by-law to prohibit or regulate noise likely to disturb the inhabitants of the Town, By-law No. 2008-098 (as amended by By-laws No. 2009-081, 2011-100, 2013-028 and 2016-016). The By-law provides qualitative information with respect to sources of noise and prohibitions by time and place.

3.0 THE EFFECT OF THE NEIGHBOURHOOD ON THE DEVELOPMENT

As outlined in MOE Publication NPC-300, the industrial and office space uses proposed within the subject development are not considered to be noise sensitive spaces requiring acoustical assessment. As such, the potential impact of the surrounding transportation and stationary sources on the proposed development have not been considered further in this report.

While the proposed development does not contemplate the inclusion of noise sensitive uses, the permitted uses under the current site zoning notes that certain noise sensitive uses could be permitted within the subject site. It is our understanding that noise sensitive uses are not proposed within the development; however, should noise sensitive uses be proposed within the subject development, an analysis will need to be conducted to ensure compliance with the applicable sound level limits at the noise sensitive receptor locations.

4.0 THE EFFECT OF THE DEVELOPMENT ON THE NEIGHBOURHOOD

Noise Assessment

Noise sources associated with the proposed industrial buildings include rooftop mechanical equipment, non-refrigerated truck pass-bys, as well as impulses associated with the loading/unloading operations and trailer coupling/uncoupling operations at the loading bays and trailer coupling/uncoupling operations at the trailer parking areas.

At the time of preparation of this report, specific information regarding mechanical equipment associated with the proposed buildings is not known. Typical assumptions and mechanical equipment information from similar Jade Acoustics Inc. projects were used and included in the analysis.

The rooftop mechanical equipment is not expected to affect the feasibility of the project. However, once final mechanical equipment information is available, additional analysis should be conducted to ensure compliance with the guidelines at the noise sensitive receptors.

Based on information provided by the client, the proposed development will be comprised of industrial uses with associated office space. It is anticipated that the facility will operate on a 24-hour basis. The analysis has accounted for 36 truck round trips per hour during the worst case hour during daytime, evening and nighttime periods (18 round trips per hour, per building) and assumes the trucks do not idle while on the property.

Impulses associated with delivery loading/unloading and trailer coupling/uncoupling have also been accounted for in the analysis.

Sound power levels for the assumed rooftop mechanical equipment, non-refrigerated truck pass-bys, as well as impulses associated with the loading/unloading and coupling/uncoupling operations were based on other Jade Acoustics Inc. files prepared for similar developments.

A list of the analyzed continuous and impulsive noise sources and sound power levels in octave bands is given in Table A below.

Due to the location and orientation relative to the sensitive receptors, vibration associated with operations at the subject site is not expected to be significant at the existing sensitive receptors and was not analyzed further at this time. Once the tenants are known, the potential impact of vibration associated with the specific uses may need to be evaluated to ensure compliance at the sensitive receptors. Should sensitive receptors be proposed within the adjacent

employment lands, an analysis should be conducted to ensure the applicable vibration limits are met at the sensitive receptors.

TABLE A

SUMMARY OF NOISE SOURCE INFORMATION

Noise Source	Source ID	Sound Power Level (PWL), dB re. 10 ⁻¹² watts								
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Overall dBA/dBAI
Non-Refrigerated Truck Pass-by	TP	97.0	101.0	100.0	97.0	93.0	90.0	83.0	76.0	98.9
York Predator 5 Ton	York5	81.0	91.0	82.5	80.5	79.0	73.5	69.5	64.5	83.7
Impulses	IMP5	93.0	107.0	103.0	108.0	110.0	104.0	99.0	89.0	112.5 (dBAI)

The critical receptors are the existing residential dwellings, located on either side of Winston Churchill Boulevard, in a southeastern direction from the subject site, as well as the existing residential development to the west/southwest. Two-storey dwellings were modelled at 4.5 m above ground level; bungalow dwellings were modelled at 2.5 m above ground level. The receptors are labelled R1 to R5 on Figures 3 to 10.

The MOE noise guidelines require that the noise from the proposed development not exceed the existing ambient Leq due to road traffic in any hour of operation or the exclusion limits previously discussed in Section 3.0.

For the current analysis, the MOE Class 1 exclusion limits have been used. See Table B and Appendix A for details.

Based on information provided by IBI, the building structures have not been designed to support refrigeration equipment. Therefore, the analysis does not include any refrigeration equipment on the buildings or refrigerated trucks delivering to the site. If this is altered at a later date, the acoustic analysis should be updated.

TABLE B

SUMMARY OF SOUND LEVEL LIMITS

Receptor	Leq 1 hour (dBA/dBAI)*		
	Daytime 7:00 a.m. to 7:00 p.m.	Evening 7:00 p.m. to 11:00 p.m.	Nighttime 11:00 p.m. to 7:00 a.m.
R1 to R5	50	50	45

* MOE Class 1 Area exclusion limits.

As noted above, the analyzed noise sources associated with the proposed industrial development are:

- Non-refrigerated truck pass-by and manoeuvring;
- Impulses associated with the loading/unloading operations and trailer coupling/uncoupling operations; and
- Rooftop mechanical equipment.

For the rooftop heat/cool units, duty cycles of 100% for daytime hours, 70% for evening hours, and 40% for nighttime hours were used.

Based on information from IBI Group, 36 non-refrigerated tractor trailer round trips during the daytime, evening and nighttime periods entering the proposed site from Winston Churchill Boulevard, manoeuvring to the loading bay area of either building, and exiting the proposed site on Winston Churchill Boulevard are included in the analysis. The analysis assumes the trucks do not idle at the loading bays.

Screening from proposed buildings within the site has been included in this analysis. The proposed buildings have been modelled to the roof deck height only. The proposed parapets shown on the architectural elevations outlined in Section 1.0 are not included in the model. These parapets will provide screening of the proposed mechanical equipment; therefore, the current analysis represents a conservative scenario. Once the final mechanical information is available, the noise analysis should be updated in order to confirm compliance with the applicable sound level limits.

Table A, above, shows the sound power levels for noise sources used in the analysis. Figures 3 to 10 show the locations of the analyzed noise sources.

The sound level in terms of Leq (one hour continuous noise sources) and LIm (impulsive noise sources) were determined for the critical receptors. The CadnaA computer program (Version 2020 MR1), which uses International Standard Analytical Code ISO 9613-2 was used for the analysis.

As per the MOE guidelines, impulsive noise sources were analyzed separately. The impulsive noise associated with the loading bays of the proposed buildings and with the trailer coupling/uncoupling at the trailer parking areas have been analyzed. The modelling included all time periods for the loading/unloading and coupling/uncoupling operations. The impulsive sound level used in the analysis is representative of a typical industrial facility loading/unloading and coupling/uncoupling activities.

Tables 1 and 2 and Figures 3 and 4 show the results of the analysis without the addition of mitigation measures.

As can be seen from Tables 1 and 2 and Figures 3 and 4, the unmitigated sound levels are predicted to exceed the MOE guidelines at the critical noise sensitive receptors. Therefore, noise mitigation measures are required.

There are existing industrial developments to the northeast and northwest of the subject site. Based on information on the Town of Oakville website, there is a proposed industrial development at 560 Winston Churchill Boulevard, directly southeast of the subject site, which proposes three warehouse-type buildings. As per NPC-300, these facilities are not considered to be noise sensitive uses and were not considered further in this report.

There is a proposed industrial development (Blackwood) located immediately to the southeast of the subject site at 560 Winston Churchill Boulevard. As noted below, noise mitigation options within and external to the subject site (within the Blackwood lands) have been proposed. All analyzed scenarios consider inclusion of the proposed buildings within the Blackwood site. Should the Blackwood development not proceed, the 4.0 m high acoustic barrier outlined in Option 3 would need to be extended by 10.5 m in a southwest direction in order to achieve compliance with the applicable sound level limits. Should there be any changes to the design of the Blackwood site, the noise mitigation measures outlined below will need to be re-evaluated to ensure compliance at the noise sensitive receptor locations.

Required Noise Mitigation Measures

As shown in Tables 1 and 2 and Figures 3 and 4, the operations at the subject site are predicted to exceed the applicable sound level limits without the implementation of noise mitigation measures.

In order to achieve the applicable sound level limits for all scenarios analyzed (non-refrigerated truck activities and loading/unloading and coupling/uncoupling impulses), the following noise mitigation options, presented in order of the client's preference, have been considered. Options 1 and 2 involve physical mitigation measures on the lands of the proposed Blackwood industrial development located at 560 Winston Churchill Boulevard. Discussions with the Blackwood landowners have been initiated regarding implementing the physical mitigation measures within their lands.

Noise mitigation options:

1. A 4.7 m high acoustic barrier (berm and acoustic fence combination) located within the Blackwood lands as shown on Figures 5 and 6; or
2. A 4.7 m high acoustic fence (or retaining wall and acoustic fence combination) located within the Blackwood lands, immediately adjacent to the common property line with the existing residential property, as shown on Figures 7 and 8; or
3. A 4.0 m high acoustic fence, tapering down to a 2.9 m high acoustic fence installed along the southeast property line, at the location shown on Figures 9 and 10. As noted above, the west termination point of the 4.0 m high acoustic fence would need to be extended by 10.5 m in a southwest direction, should the Blackwood development not proceed.

The design detail considerations such as, but not limited to, grading and structural implications for each of the above options will need to be confirmed by the appropriate technical discipline prior to implementation.

Tables 3 to 8 show the predicted sound levels at the nearby noise sensitive receptors with the implementation of each of the above noted acoustic barrier options.

As noted above, should there be any changes to the design of the Blackwood site, the noise mitigation measures will need to be re-evaluated to ensure compliance at the noise sensitive receptor locations.

Generally, if a sound barrier is to be used, the sound barrier may be an acoustic fence, berm, or a berm/acoustic fence combination. The acoustic fence must be solid with no gaps along its length and have a minimum surface density of 20 kg/m² (4 lb/ft²). Appropriate treatment of the sound barrier at all discontinuities and points of termination would be required to ensure that the sound barrier is effective.

If gaps at the bottom of the acoustic fence are necessary for drainage, special design techniques to create interrupted line of sight under the acoustic fence are required. Any treatment of the drainage proposed for the subject site should be reviewed by Jade Acoustics Inc. prior to its implementation.

As noted above, once the final mechanical information for the proposed buildings is available, the analysis will need to be revisited to ensure the applicable sound level criteria are met.

5.0 THE EFFECT OF THE DEVELOPMENT ON ITSELF

As discussed in Section 3.0, no noise sensitive uses are proposed within the development. Therefore, based on NPC-300, analyses of the potential noise impact of stationary sources within the proposed development on the development itself are not needed, and, as such, they were not analyzed further.

As the site zoning permits the development of certain noise sensitive uses within the subject site, should a noise sensitive use be proposed in the future, a noise report will need to be prepared to ensure compliance with the applicable noise and vibration guidelines.

6.0 CONCLUSION

Based on the preliminary analysis, the Town/Region/MOE sound level limits are predicted to be met at the existing noise sensitive receptors with the incorporation of the mitigation measures options outlined in Section 5.0.

If at any time in the application process the details of tenants and their operations become known, the analysis and any mitigation should be updated to ensure that the noise guidelines can be achieved.


A detailed noise and vibration report will need to be prepared once all building plans and selection of mechanical equipment have been finalized.


Prior to issuance of building permits, an acoustical consultant should review the plans and mechanical equipment to ensure compliance with the MOE guidelines.

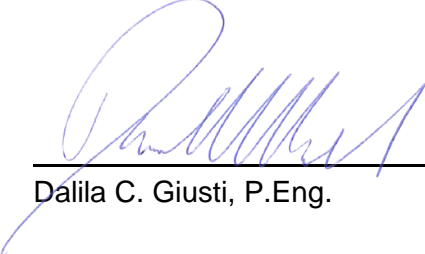
Prior to final occupancy an acoustical consultant should inspect the installed equipment and mitigation measures, if mitigation is required.


Respectfully submitted,

JADE ACOUSTICS INC.

Per: 
Michael Bechbache, P.Eng.



Per: 
Dalila C. Giusti, P.Eng.



MB/DS/DG/jg
J:\Reports\21-051 Jun 25-21 772 Winston Churchill Boulevard (PENR).doc

7.0 REFERENCES

1. "Model Municipal Noise Control By-law", Final Report, Ontario Ministry of the Environment, August, 1978.
2. ORNAMENT – "Ontario Road Noise Analysis Method for Environment and Transportation", Ontario Ministry of the Environment, October, 1989.
3. "Building Practice Note No. 56: Controlling Sound Transmission into Buildings", J.D. Quirt, Division of Building Research, National Research Council of Canada, September, 1985.
4. "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", Ontario Ministry of the Environment, Publication NPC-300, August, 2013, released October 21, 2013 (updated final version # 22).
5. "Impulse Vibration in Residential Buildings", Ontario Ministry of Environment Publication NPC-207 (Draft), November, 1983.
6. By-law No. 2008-098 (as amended by By-laws No. 2009-081, 2011-100, 2013-028 and 2016-016), Town of Oakville, July 7, 2008.

TABLE 1
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITHOUT MITIGATION MEASURES**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBA)			Evening Sound Level** Leq 1 hour (dBA)			Nighttime Sound Level*** Leq 1 hour (dBA)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	48	50	No	48	50	No	48	45	Yes
R2	44	50	No	44	50	No	44	45	No
R3	45	50	No	45	50	No	45	45	No
R4	46	50	No	46	50	No	46	45	Yes
R5	39	50	No	39	50	No	38	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 2
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITHOUT MITIGATION MEASURES**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBA)			Evening Sound Level** Leq 1 hour (dBA)			Nighttime Sound Level*** Leq 1 hour (dBA)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	50	50	No	50	50	No	50	45	Yes
R2	45	50	No	45	50	No	45	45	No
R3	47	50	No	47	50	No	47	45	Yes
R4	48	50	No	48	50	No	48	45	Yes
R5	36	50	No	36	50	No	36	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 3
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITH MITIGATION MEASURES – BERM AND ACOUSTIC FENCE ON
BLACKWOOD LANDS (OPTION 1)**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBA)			Evening Sound Level** Leq 1 hour (dBA)			Nighttime Sound Level*** Leq 1 hour (dBA)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	45	50	No	45	50	No	45	45	No
R2	41	50	No	41	50	No	41	45	No
R3	44	50	No	44	50	No	43	45	No
R4	45	50	No	45	50	No	45	45	No
R5	39	50	No	39	50	No	38	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 4
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITH MITIGATION MEASURES – BERM AND ACOUSTIC FENCE ON
BLACKWOOD LANDS (OPTION 1)**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBAI)			Evening Sound Level** Leq 1 hour (dBAI)			Nighttime Sound Level*** Leq 1 hour (dBAI)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	45	50	No	45	50	No	45	45	No
R2	41	50	No	41	50	No	41	45	No
R3	41	50	No	41	50	No	41	45	No
R4	42	50	No	42	50	No	42	45	No
R5	36	50	No	36	50	No	36	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 5
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITH MITIGATION MEASURES – ACOUSTIC FENCE ON BLACKWOOD LANDS
(OPTION 2)**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBA)			Evening Sound Level** Leq 1 hour (dBA)			Nighttime Sound Level*** Leq 1 hour (dBA)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	44	50	No	44	50	No	44	45	No
R2	41	50	No	41	50	No	41	45	No
R3	44	50	No	44	50	No	44	45	No
R4	45	50	No	45	50	No	45	45	No
R5	39	50	No	39	50	No	38	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 6
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITH MITIGATION MEASURES – ACOUSTIC FENCE ON BLACKWOOD LANDS
(OPTION 2)**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBAI)			Evening Sound Level** Leq 1 hour (dBAI)			Nighttime Sound Level*** Leq 1 hour (dBAI)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	45	50	No	45	50	No	45	45	No
R2	41	50	No	41	50	No	41	45	No
R3	42	50	No	42	50	No	42	45	No
R4	45	50	No	45	50	No	45	45	No
R5	36	50	No	36	50	No	36	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 7
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO CONTINUOUS
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITH MITIGATION MEASURES – ACOUSTIC FENCE AT SUBJECT SITE
(OPTION 3)**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBAI)			Evening Sound Level** Leq 1 hour (dBAI)			Nighttime Sound Level*** Leq 1 hour (dBAI)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	46	50	No	45	50	No	45	45	No
R2	40	50	No	40	50	No	40	45	No
R3	40	50	No	40	50	No	40	45	No
R4	42	50	No	42	50	No	41	45	No
R5	38	50	No	38	50	No	38	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.

TABLE 8
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
TOWN OF OAKVILLE

**SUMMARY OF PREDICTED SOUND LEVELS DUE TO IMPULSIVE
NOISE SOURCES AT THE CLOSEST RESIDENTIAL RECEPTOR LOCATIONS
WITH MITIGATION MEASURES – ACOUSTIC FENCE AT SUBJECT SITE
(OPTION 3)**

Receptor Location	Daytime Sound Level* Leq 1 hour (dBA)			Evening Sound Level** Leq 1 hour (dBA)			Nighttime Sound Level*** Leq 1 hour (dBA)		
	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance	Predicted	Limit	Exceedance
R1	45	50	No	45	50	No	45	45	No
R2	39	50	No	39	50	No	39	45	No
R3	41	50	No	41	50	No	41	45	No
R4	42	50	No	42	50	No	42	45	No
R5	36	50	No	36	50	No	36	45	No

* (7:00 a.m. to 7:00 p.m.)

** (7:00 p.m. to 11:00 p.m.)

*** (11:00 p.m. to 7:00 a.m.)

Note: Receiver height has been taken at 4.5 m above grade for two-storey dwellings and at 2.5 m above grade for bungalow dwellings.



N.T.S.

**Proposed Industrial Development
772 Winston Churchill Boulevard
Town of Oakville**

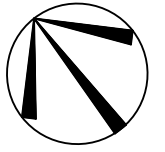
Date: June 2021

File: 21-051

**KEY PLAN
FIGURE 1**



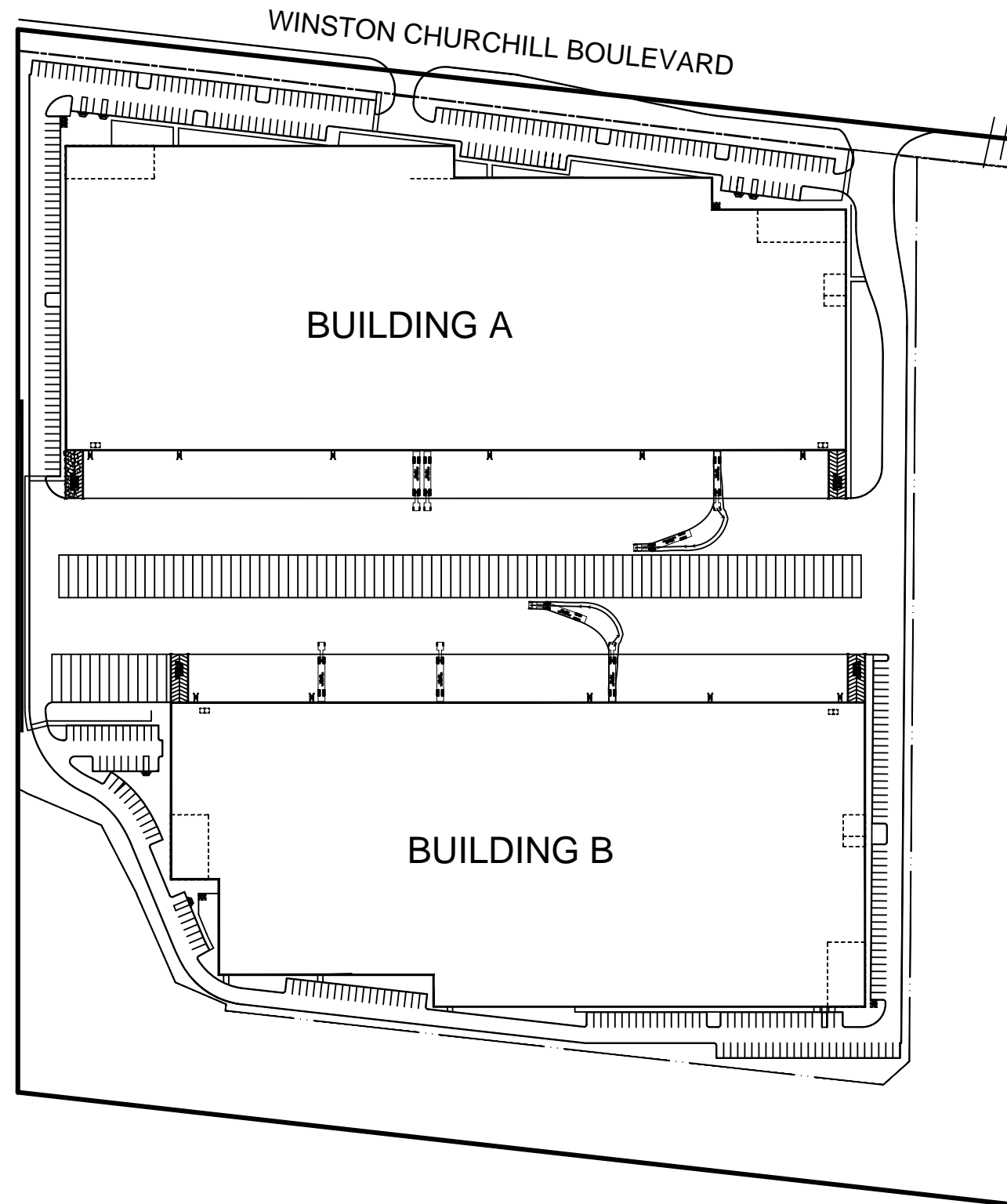
EXISTING/FUTURE INDUSTRIAL



EXISTING RESIDENTIAL

EXISTING INDUSTRIAL

CN RAIL



FUTURE INDUSTRIAL

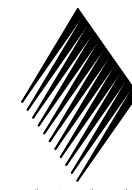
EXISTING RESIDENTIAL

N.T.S.

Proposed Industrial Development
772 Winston Churchill Boulevard
Town of Oakville

Date: June 2021

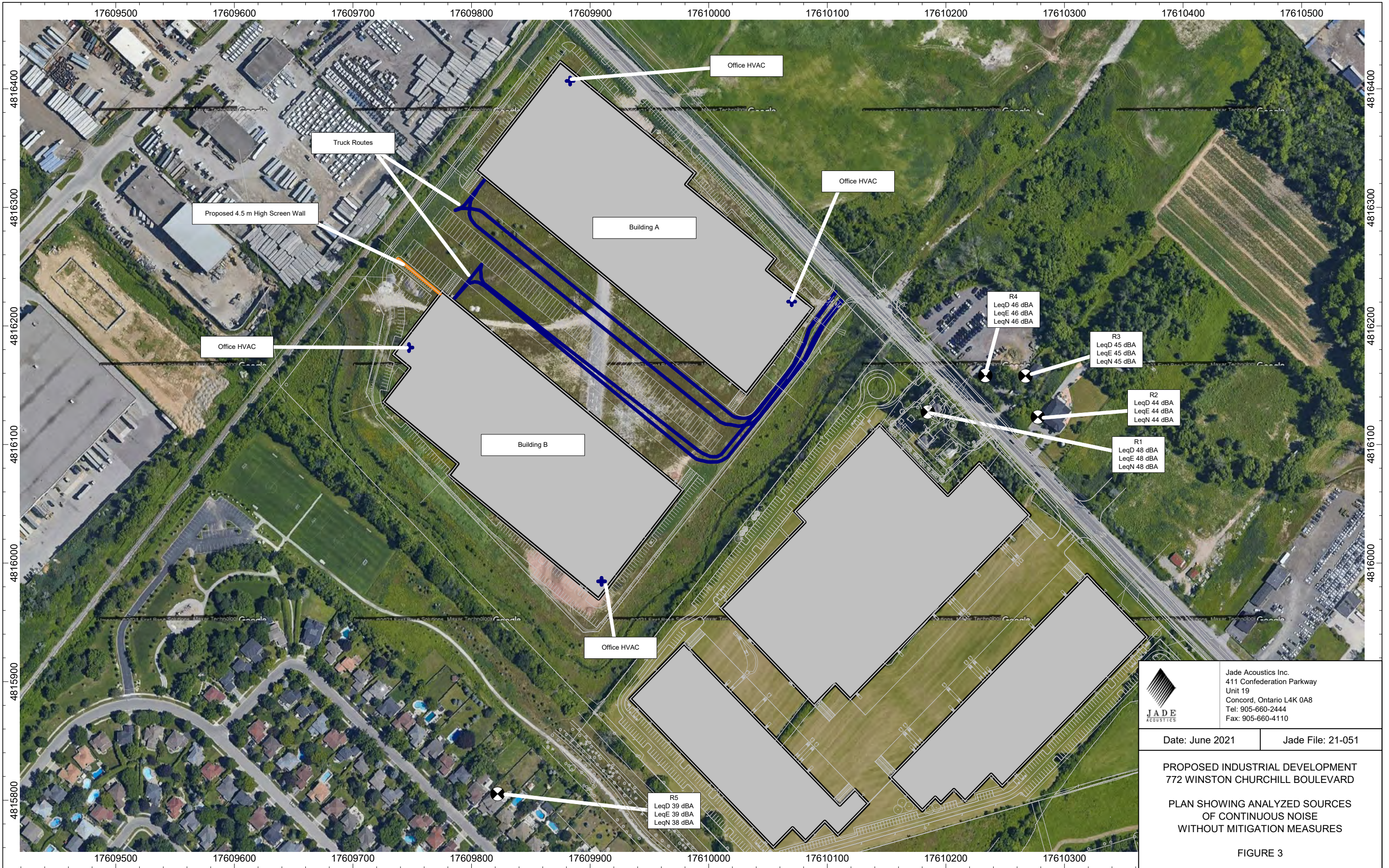
Our File: 21-051



JADE
ACOUSTICS

SITE PLAN

FIGURE 2




 Jade Acoustics Inc.
 411 Confederation Parkway
 Unit 19
 Concord, Ontario L4K 0A8
 Tel: 905-660-2444
 Fax: 905-660-4110

Date: June 2021 Jade File: 21-051

PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
PLAN SHOWING ANALYZED SOURCES
OF CONTINUOUS NOISE
WITHOUT MITIGATION MEASURES

FIGURE 3

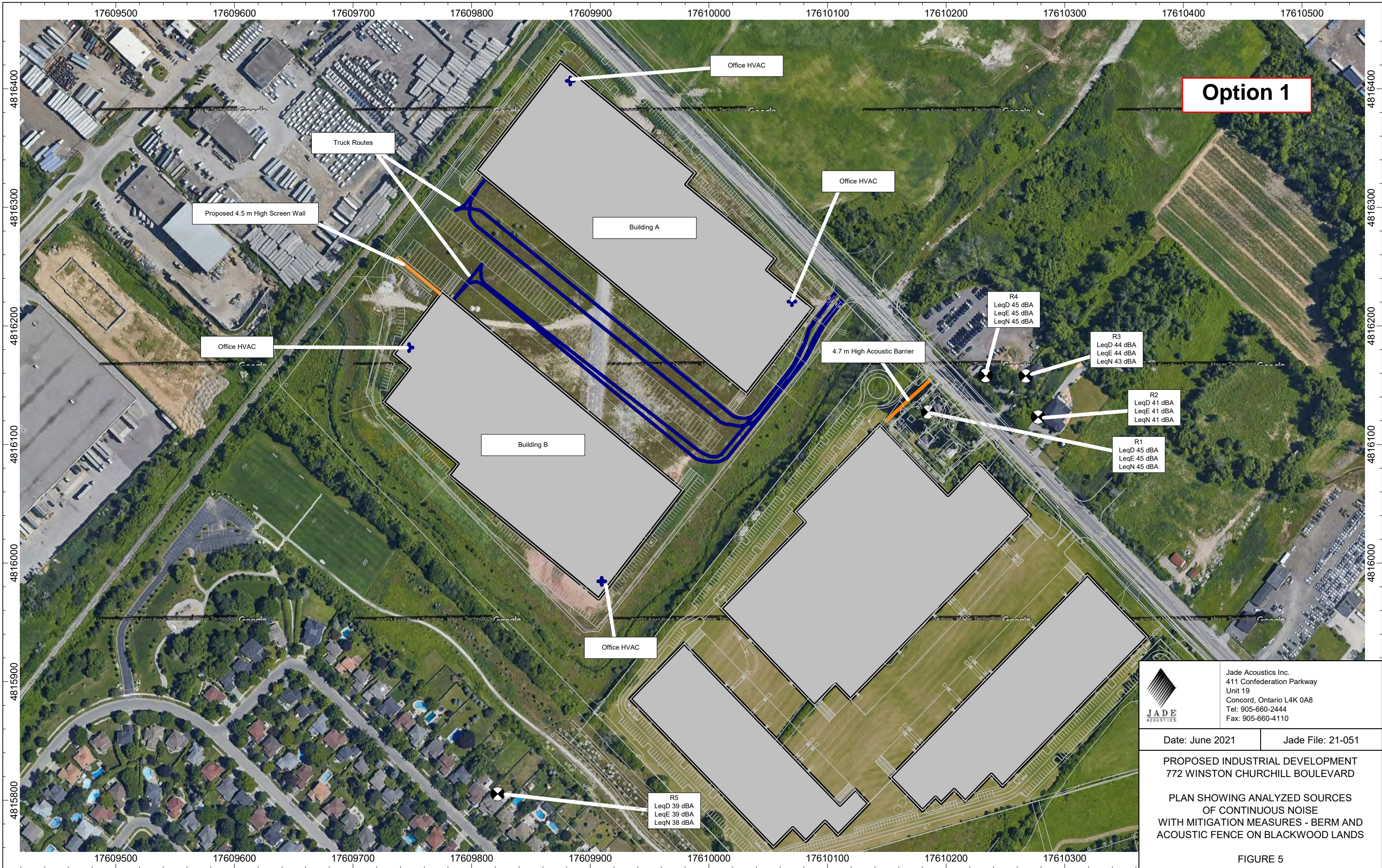




 Jade Acoustics Inc.
 411 Confederation Parkway
 Unit 19
 Concord, Ontario L4K 0A8
 Tel: 905-660-2444
 Fax: 905-660-4110

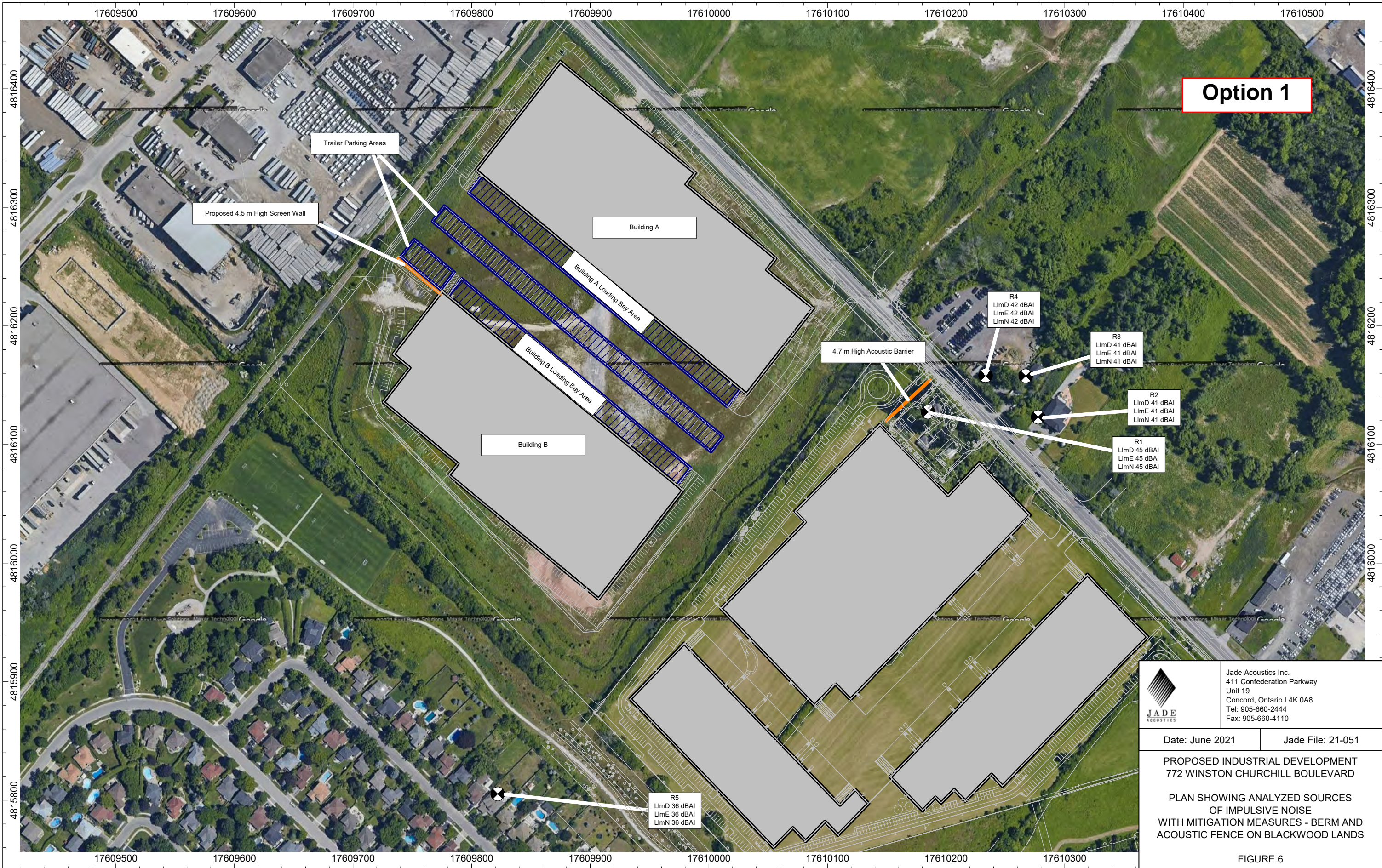
Date: June 2021 Jade File: 21-051

PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD
PLAN SHOWING ANALYZED SOURCES
OF IMPULSIVE NOISE
WITHOUT MITIGATION MEASURES

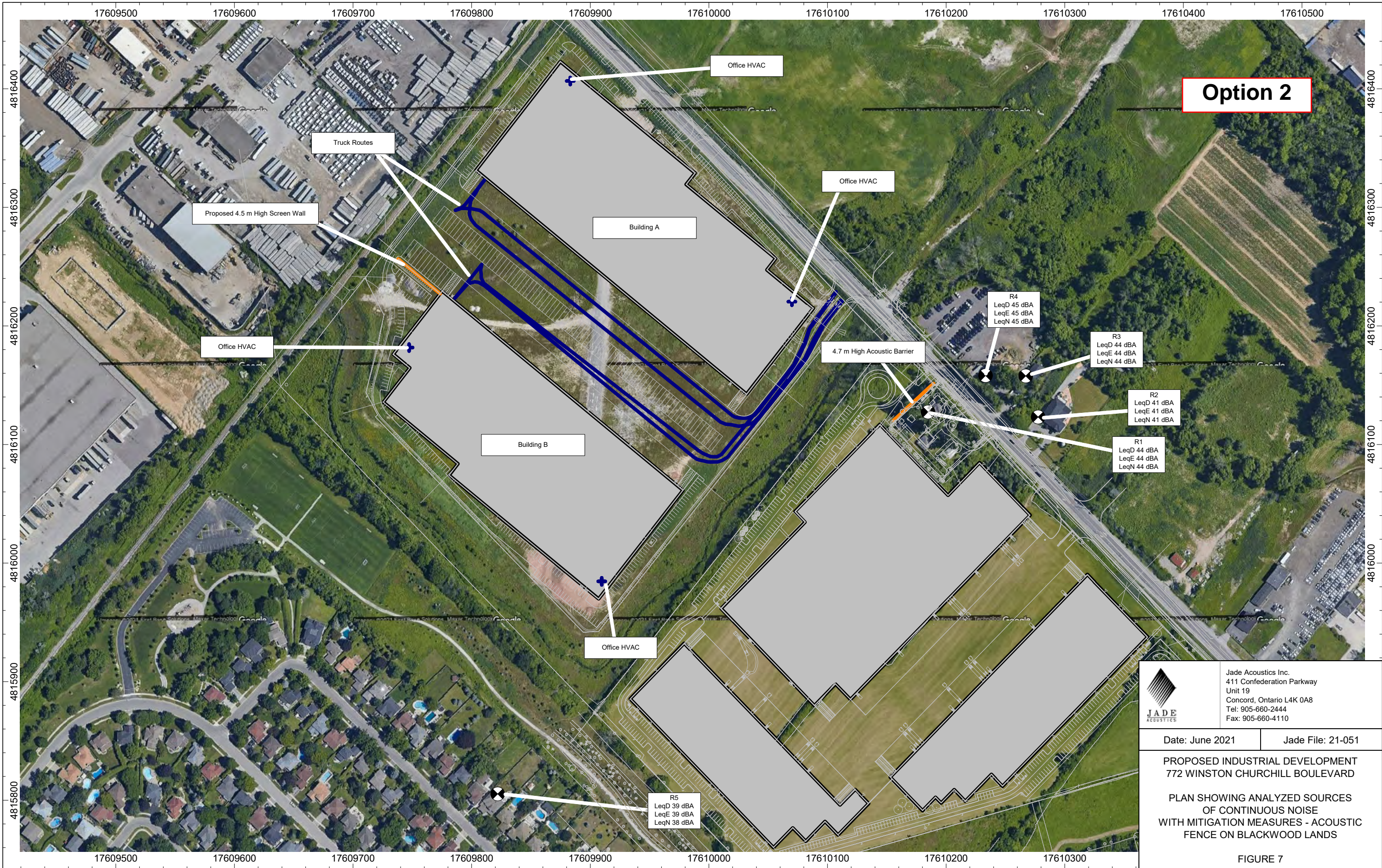
FIGURE 4



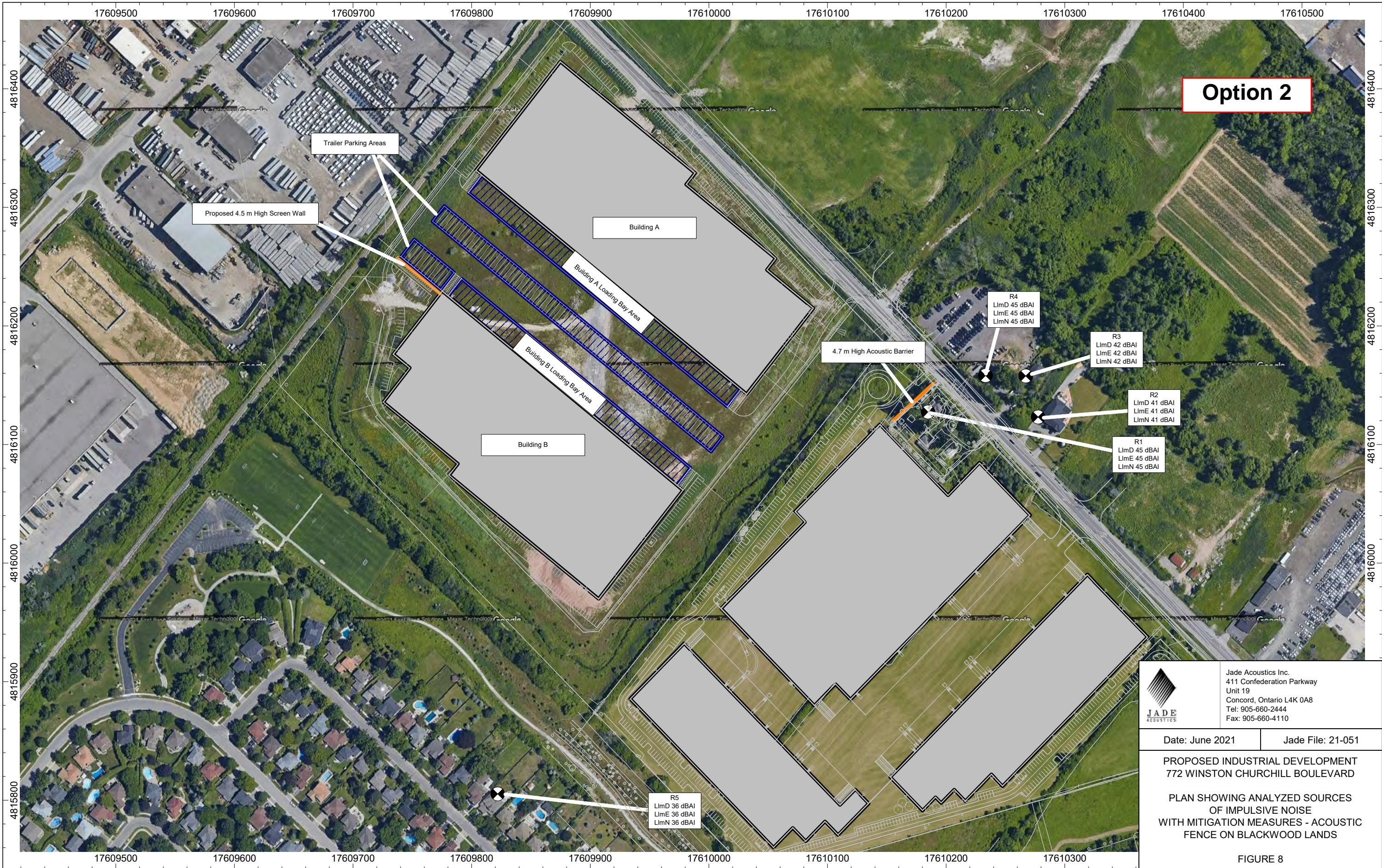
 <p>Jade Acoustics Inc. 411 Confederation Parkway Unit 19 Concord, Ontario L4K 0A8 Tel: 905-660-2444 Fax: 905-660-4110</p>	Date: June 2021	Jade File: 21-051
	<p>PROPOSED INDUSTRIAL DEVELOPMENT 772 WINSTON CHURCHILL BOULEVARD</p> <p>PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE WITH MITIGATION MEASURES - BERM AND ACOUSTIC FENCE ON BLACKWOOD LANDS</p>	
<p>FIGURE 5</p>		



 <p>Jade Acoustics Inc. 411 Confederation Parkway Unit 19 Concord, Ontario L4K 0A8 Tel: 905-660-2444 Fax: 905-660-4110</p>	Date: June 2021	Jade File: 21-051
	<p>PROPOSED INDUSTRIAL DEVELOPMENT 772 WINSTON CHURCHILL BOULEVARD</p> <p>PLAN SHOWING ANALYZED SOURCES OF IMPULSIVE NOISE WITH MITIGATION MEASURES - BERM AND ACOUSTIC FENCE ON BLACKWOOD LANDS</p>	
<p>FIGURE 6</p>		



 <p>Jade Acoustics Inc. 411 Confederation Parkway Unit 19 Concord, Ontario L4K 0A8 Tel: 905-660-2444 Fax: 905-660-4110</p>	Date: June 2021	Jade File: 21-051
	<p>PROPOSED INDUSTRIAL DEVELOPMENT 772 WINSTON CHURCHILL BOULEVARD</p> <p>PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE WITH MITIGATION MEASURES - ACOUSTIC FENCE ON BLACKWOOD LANDS</p>	
<p>FIGURE 7</p>		



Option 2

Trailer Parking Areas

Proposed 4.5 m High Screen Wall

Building A

Building A Loading Bay Area

Building B

Building B Loading Bay Area

4.7 m High Acoustic Barrier

R4
LimD 45 dBAI
LimE 45 dBAI
LimN 45 dBAI

R3
LimD 42 dBAI
LimE 42 dBAI
LimN 42 dBAI

R2
LimD 41 dBAI
LimE 41 dBAI
LimN 41 dBAI

R1
LimD 45 dBAI
LimE 45 dBAI
LimN 45 dBAI

R5
LimD 36 dBAI
LimE 36 dBAI
LimN 36 dBAI



Jade Acoustics Inc.
411 Confederation Parkway
Unit 19
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

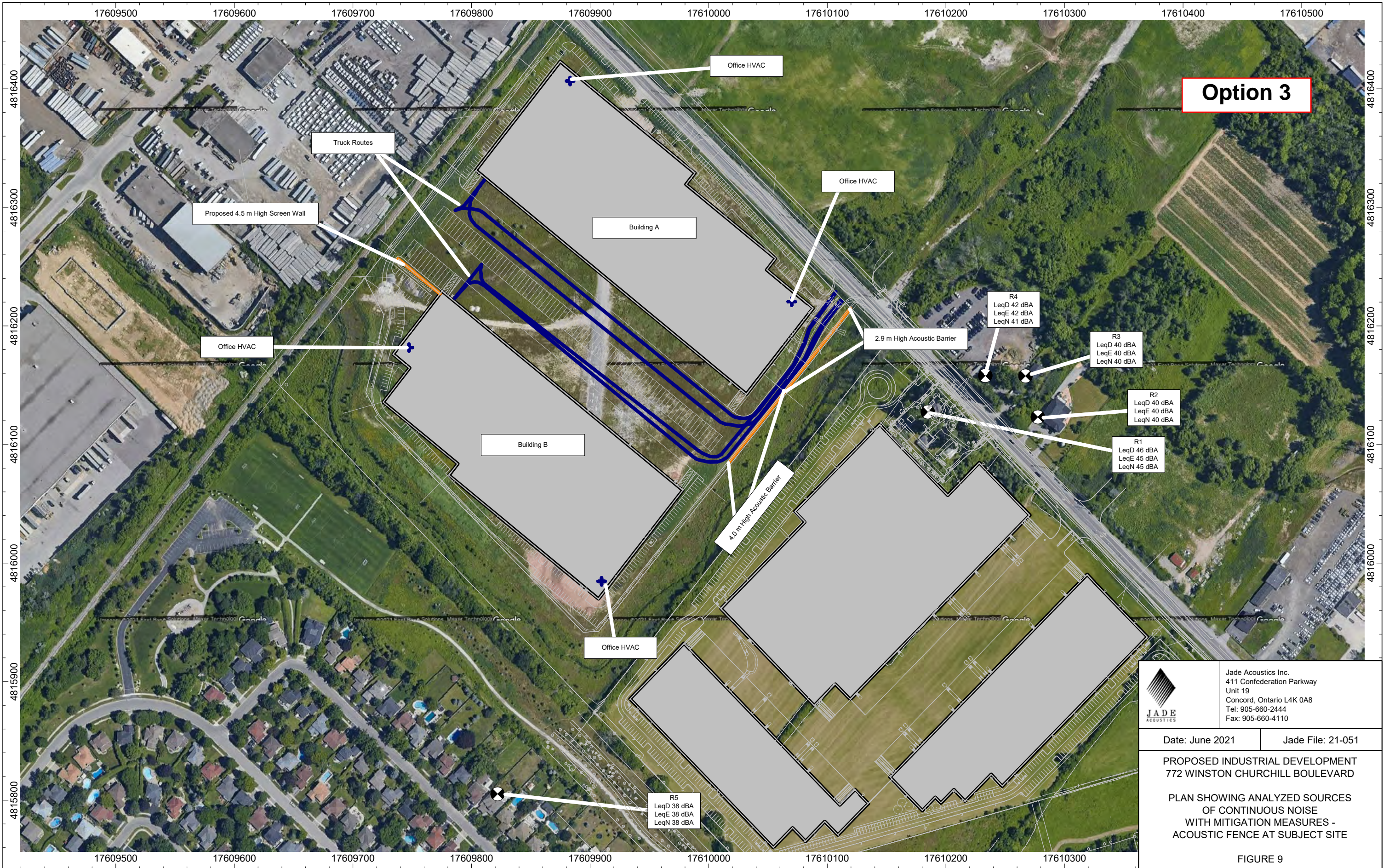
Date: June 2021

Jade File: 21-051

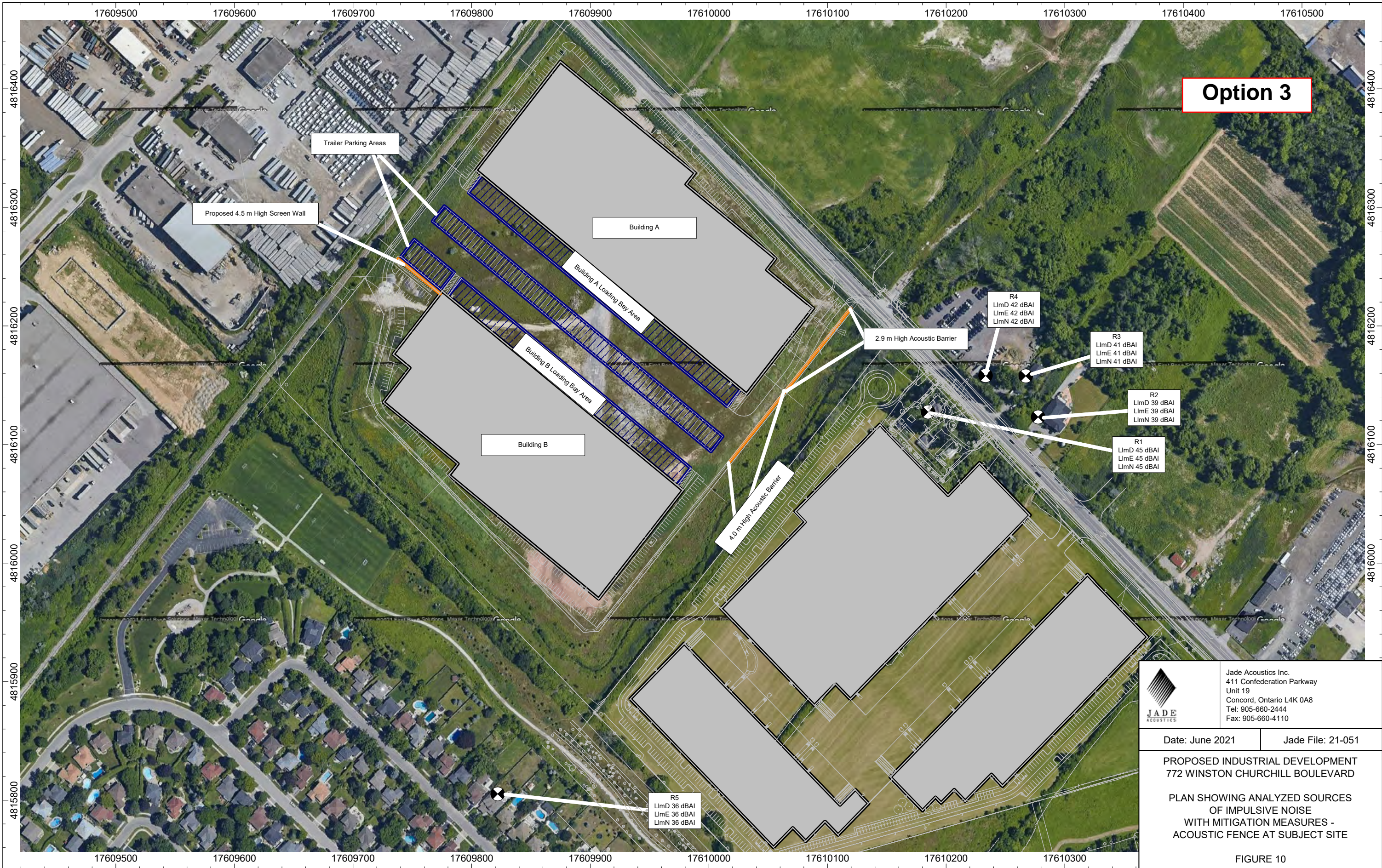
PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD

PLAN SHOWING ANALYZED SOURCES
OF IMPULSIVE NOISE
WITH MITIGATION MEASURES - ACOUSTIC
FENCE ON BLACKWOOD LANDS

FIGURE 8



 <p>Jade Acoustics Inc. 411 Confederation Parkway Unit 19 Concord, Ontario L4K 0A8 Tel: 905-660-2444 Fax: 905-660-4110</p>	Date: June 2021	Jade File: 21-051
	<p>PROPOSED INDUSTRIAL DEVELOPMENT 772 WINSTON CHURCHILL BOULEVARD</p> <p>PLAN SHOWING ANALYZED SOURCES OF CONTINUOUS NOISE WITH MITIGATION MEASURES - ACOUSTIC FENCE AT SUBJECT SITE</p>	
<p>FIGURE 9</p>		



Option 3

Trailer Parking Areas

Proposed 4.5 m High Screen Wall

Building A

Building A Loading Bay Area

Building B

Building B Loading Bay Area

2.9 m High Acoustic Barrier

4.0 m High Acoustic Barrier

R4
LimD 42 dBAI
LimE 42 dBAI
LimN 42 dBAI

R3
LimD 41 dBAI
LimE 41 dBAI
LimN 41 dBAI

R2
LimD 39 dBAI
LimE 39 dBAI
LimN 39 dBAI

R1
LimD 45 dBAI
LimE 45 dBAI
LimN 45 dBAI

R5
LimD 36 dBAI
LimE 36 dBAI
LimN 36 dBAI

JADE
REGISTREES

Jade Acoustics Inc.
411 Confederation Parkway
Unit 19
Concord, Ontario L4K 0A8
Tel: 905-660-2444
Fax: 905-660-4110

Date: June 2021 Jade File: 21-051

**PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD**

PLAN SHOWING ANALYZED SOURCES
OF IMPULSIVE NOISE
WITH MITIGATION MEASURES -
ACOUSTIC FENCE AT SUBJECT SITE

FIGURE 10

APPENDIX A

ENVIRONMENTAL NOISE CRITERIA

ONTARIO MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MOE)

Reference: "Environmental Noise Guidelines Stationary and Transportation Sources – Approval and Planning", Publication NPC-300, August, 2013, released October 21, 2013 (updated final version # 22).

SOUND LEVEL CRITERIA FOR ROAD AND RAIL NOISE

TABLE C-1

Sound Level Limit for Outdoor Living Areas

Road and Rail

Time Period	Leq (16) (dBA)
16 hr, 07:00 - 23:00	55

TABLE C-2

Indoor Sound Level Limits

Road and Rail

Type of Space	Time Period	Leq (dBA)	
		Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
	23:00 – 07:00	40	35

SOUND LEVEL CRITERIA FOR AIRCRAFT NOISE

TABLE C-3

Outdoor Aircraft Noise Limit

Time Period	NEF/NEP
24-hour	30

TABLE C-4

Indoor Aircraft Noise Limit (Applicable over 24-hour period)

Type of Space	Indoor NEF/NEP*
Living/dining/den areas of residences, hospitals, nursing/retirement homes, schools, daycare centres, etc.	5
Sleeping Quarters	0

- * The indoor NEF/NEP values in Table C-4 are used to determine acoustical insulation requirements based on the NEF/NEP contour maps.

SOUND LEVEL CRITERIA FOR STATIONARY SOURCES

TABLE C-5

**Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)
Outdoor Points of Reception**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

TABLE C-6

**Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)
Plane of Window of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

TABLE C-7

**Exclusion Limit Values for Impulsive Sound Level (L_{LM} , dBAI)
Outdoor Points of Reception**

Time of Day	Actual Number of Impulses in Period of One-Hour	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 23:00	9 or more	50	50	45	55
	7 to 8	55	55	50	60
	5 to 6	60	60	55	65
	4	65	65	60	70
	3	70	70	65	75
	2	75	75	70	80
	1	80	80	75	85

TABLE C-8

**Exclusion Limit Values of Impulsive Sound Level (L_{LM} , dBAI)
Plane of Window - Noise Sensitive Spaces (Day/Night)**

Actual Number of Impulses in Period of One-Hour	Class 1 Area (07:00-23:00)/ (23:00-07:00)	Class 2 Area (07:00-23:00)/ (23:00-07:00)	Class 3 Area (07:00-19:00)/ (19:00-07:00)	Class 4 Area (07:00-23:00)/ (23:00-07:00)
9 or more	50/45	50/45	45/40	60/55
7 to 8	55/50	55/50	50/45	65/60
5 to 6	60/55	60/55	55/50	70/65
4	65/60	65/60	60/55	75/70
3	70/65	70/65	65/60	80/75
2	75/70	75/70	70/65	85/80
1	80/75	80/75	75/70	90/85

SUPPLEMENTARY SOUND LEVEL LIMITS

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-4. Table C-9 and Table C-10 are expanded versions of Table C-2 and Table C-4, and present guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed. The sound level limits in Table C-9 and Table C-10 are presented as information, for good-practice design objectives.

TABLE C-9

**Supplementary Indoor Sound Level Limits
Road and Rail**

Type of Space	Time Period	L _{eq} (Time Period) (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

TABLE C-10

**Supplementary Indoor Aircraft Noise Limit
(Applicable over 24-hour period)**

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

* The indoor NEF/NEP values in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

APPENDIX B

SAMPLE CADNAA CALCULATIONS

Point sources

Name	M.	ID	Result: PWL			Lw / Li		Correction				Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day (dBA)	Evening (dBA)	Night (dBA)	Type	Value	norm. (dBA)	Day (dBA)	Evening (dBA)	Night (dBA)	α	Area (m ²)		Day (min)	Special (min)	Night (min)				(dB)	(Hz)	(m)	(m)	X (m)
Rooftop HVAC for Office		1000000001	83.7	83.7	83.7	Lw	York5		0	0	0				60	42	24	0		(none)	1.44	8	17609883.1	4816406.48	110.14
Rooftop HVAC for Office		1000000001	83.7	83.7	83.7	Lw	York5		0	0	0				60	42	24	0		(none)	1.44	8	17610069.9	4816220.41	110.14
Rooftop HVAC for Office		1000000001	83.7	83.7	83.7	Lw	York5		0	0	0				60	42	24	0		(none)	1.44	8	17609747.2	4816181.74	107.64
Rooftop HVAC for Office		1000000001	83.7	83.7	83.7	Lw	York5		0	0	0				60	42	24	0		(none)	1.44	8	17609909.6	4815984.53	107.64

Line sources

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Mowing Pt. 5c			
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	r	Area		Day	Special	Night				Number			Speed
			(dBa)	(dBa)	(dBa)	(dBa)	(dBa)	(dBa)				(dB(A))	(dB(A))	(dB(A))	(dB(A))	(m²)		(min)	(min)	(min)				(dB)	(Hz)	Day	Evening
Truck Route Bldg A		100000001	101.2	101.2	101.2	71.4	71.4	71.4	PWL-Pt	TP			0	0	0						0		(none)	18	18	18	10
Truck Route Bldg B		100000001	101.1	101.1	101.1	71.4	71.4	71.4	PWL-Pt	TP			0	0	0						0		(none)	18	18	18	10

Receivers

Name	M.	ID	Level Lr			Limit. Value			Land Use		Noise Type	Height (m)	Coordinates		
			Day (LBA)	Night (LBA)	Evening (LBA)	Day (LBA)	Night (LBA)	Evening (LBA)	Type	Auto			X (m)	Y (m)	Z (m)
R1		01001	45.5	45.5	45.5	0	0	0	r	Total	4.5	17610184.7	4816177.35	98.5	
R2		01001	41.2	41.1	41.1	0	0	0	r	Total	4.5	17610277.5	4816123.1	98.39	
R3		01001	43.5	43.5	43.5	0	0	0	r	Total	2.5	17610267.1	4816157.82	96.45	
R4		01001	44.9	44.8	44.9	0	0	0	r	Total	2.5	17610233.2	4816158.08	96.64	
R5		01001	38.7	38.4	38.5	0	0	0	r	Total	4.5	17609821.9	4815805.33	99.64	

Screens

Name	M.	ID	Absorption		Z Ext. (m)	Cantilever		Height	
			left	right		horz. (m)	vert. (m)	Begin (m)	End (m)
4.5m High Proposed Screen		03000	0.21	0.21				4.5	
Blackwood Barricade		0301001	0.21	0.21				4.7	

Buildings

Name	M.	ID	RB	Residents	Absorption	Height
						Begin
						(m)
Building A		02001		0	0.37	13.5 f
Building B		02001		0	0.37	11 f
Blackwood Building C		02011		0	0.37	13.49 f
Blackwood Building B		02011		0	0.37	11 f
Blackwood Building A		02011		0	0.37	11 f