

Noise and Vibration Feasibility Study

**Proposed Mixed-Use Development
0 Humber Station Road
Caledon, Ontario**

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1 INTRODUCTION AND SUMMARY

HGC Noise Vibration Acoustics was retained by Satwant S. Deol to conduct a Noise and Vibration Feasibility Study for a proposed mixed-use development located at 0 Humber Station Road, Caledon, Ontario. This study is required by the municipality as part of the planning and approvals process with the Town of Caledon. Two 20-storey mixed-use apartment buildings and eight commercial buildings are proposed for the site.

The primary noise source at the proposed development site was determined to be rail traffic on the Canadian Pacific (CP) railway line to the northeast. Humber Station Road and King Street are secondary sources of noise. Relevant traffic data was obtained from the Region of Peel and HGC files for past projects in the area. The data was used to predict future traffic sound levels at the locations of the proposed building façades and in the outdoor living area. The predicted sound levels were evaluated with respect to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP), and the railways.

The sound level predictions indicate that with suitable noise control measures integrated into the design of the building, it is feasible to achieve the MECP guideline sound levels for transportation noise. Central air conditioning systems are required for the proposed buildings. Upgraded building and glazing constructions are required for the façades of the proposed building. An acoustic barrier is required for the outdoor amenity area. Warning clauses are also recommended to inform future owners and tenants of the traffic noise impacts.

Ground-borne vibration levels from rail pass-bys were measured at the location of the closest dwelling façades near the CP railway and were found to exceed CP limits for some of the train pass-bys. Vibration levels within the residential units will be reduced relative to the measured levels due to the substantial foundations required for the proposed development. Further mitigation is not recommended at this time. When architectural and structural drawings are available, they should be reviewed to confirm the construction and location of the residential units which form the basis for this report. In any event, strongly

worded warning clauses are required in the property and tenancy agreements of the dwelling units to inform the future owners and tenants of the possible vibration excesses.

A computer model of the area was created to predict the sound levels at the façades of the proposed development due to off-site steady stationary noise sources from existing industrial, commercial, and retail facilities around the site area. The results indicate that the sound emissions of the nearby steady noise sources exceed the applicable MECP guideline sound level limits. Detailed site visits to the neighbouring industrial facilities could be conducted to verify the equipment and operations and to refine mitigation requirements. If sound levels are determined to exceed the applicable criteria, mitigation could be provided in the form of replacing the equipment with quieter units, or silencers.

Alternatively, a Class 4 designation could be requested for Buildings 1 and 2 from the municipality if the neighbouring industries are not cooperative or sound levels continue to exceed the Class 2 criteria. With a Class 4 designation the following is required: upgraded building and glazing constructions, air conditioning, and a Class 4 specific warning clause.

Noise warning clauses are required to inform future occupants of the sound level excesses, the proximity to the railway line, and the proximity to industrial/commercial uses.

An acoustical consultant should review the mechanical drawings and details of demising constructions, when available, to help ensure that the noise impact of the development on the environment, and the development on itself are maintained within acceptable levels.

2 SITE DESCRIPTION AND NOISE SOURCES

Figure 1 shows a key plan indicating the location of the proposed mixed-use development. The proposed development is located at 0 Humber Station Road, with King Street located to the south, in Caledon, Ontario. A site plan prepared by n Architecture Inc., last revised June 27, 2025, is provided as Figure 2, also



showing prediction locations. The proposed development will include two 20-storey apartment buildings with retail units on the ground floor and two levels of underground parking, an outdoor amenity space, six 1-storey commercial buildings, two 2-storey commercial buildings, associated parking lots and roadways.

The development land is fairly flat. The primary sources of transportation noise impacting the site were found to be rail traffic on the CP railway to the north. Road traffic on Humber Station Road and King Street, to the south and east of the site, respectively, are secondary sources of noise. The CP railway right-of-way is located approximately 30 m to the northeast of the site.

Site visits were conducted in February 2025 to investigate the acoustical environment, identify significant noise sources within the vicinity, and perform ground-borne vibration measurements of train pass-bys. The weather conditions during the site visit were fair, with some snow and/or light rain, and the temperature ranged from -10°C to 3°C. The site is currently vacant. There are existing residential uses to the west of the site. There are various industrial facilities located to the east, southeast, and south of the site, including trucking/haulage services, a sawmill, and stone supplier. Figure 3 is an aerial photo showing surrounding land uses. It is noted that the majority of these facilities have residential uses closer to them than the subject site but have nevertheless been assessed in Section 8.

3 TRAFFIC NOISE ASSESSMENT

3.1 Traffic Noise Criteria

Guidelines for acceptable levels of road and rail traffic noise impacting residential developments are given in the MECP publication NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, Part C release date October 21, 2013 and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels [LEQ] in units of A weighted decibels [dBA]. The Federation of Canadian

Municipalities (FCM) and Railway Association of Canada (RAC) “Guidelines for New Development in Proximity to Railway Operations”, dated May 2013 (RAC/FCM guidelines were also reviewed dated November 2006).

Table 1: MECP Traffic Noise Criteria

Space	Daytime L_{EQ} (16 hour) Road / Rail	Nighttime L_{EQ} (8 hour) Road / Rail
Outdoor Living Areas	55 dBA	--
Inside Living/Dining Rooms	45 dBA / 40 dBA	45 dBA / 40 dBA
Inside Bedrooms	45 dBA / 40 dBA	40 dBA / 35 dBA

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term “Outdoor Living Area” (OLA) is used in reference to an outdoor patio, backyard or terrace or other areas where passive recreation is expected to occur. Balconies and terraces that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines, and accordingly the noise criteria are not applicable there. Large private terraces require consideration only if they are the only OLA for the occupant in general. Common outdoor amenity terraces associated with apartment buildings are the only OLA that require consideration.

The guidelines in the MECP publication allow the daytime sound levels in an OLA to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where the OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically, and administratively practical.

Indoor guidelines are 5 dBA more stringent for rail noise than for road noise, to account for the low frequency (rumbling) character of locomotive sound, and its greater potential to transmit through exterior wall/window assemblies.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside



bedroom or living/dining room windows exceed 65 dBA. If the sound level in the plane of a bedroom or living/dining room window is greater than 55 dBA and less than or equal to 65 dBA, the dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise; greater than 55 dBA during the nighttime or greater than 60 dBA during the daytime hours due to rail traffic noise.

Railway guidelines recommend brick veneer or masonry equivalent exterior walls from foundation to rafters as a minimum construction for any dwellings with a 24 hour L_{EQ} that is greater than 60 dBA, and which are within 100 m of the right of way of the railway.

The railway also provides minimum requirements for safety as well as sound for proposed residential developments located adjacent to their rights-of-way. These refer to minimum required setbacks, berms, fencing, and warning clauses. The reader is referred to a copy of the CP requirements for a new development adjacent to a principal main line, which is located in Appendix A.

3.2 Traffic Noise Assessment

3.2.1 Road Traffic Data

Road traffic data King Street was obtained from the Region of Peel in the form of Ultimate Annual Average Daily Traffic (AADT). The data is included in Appendix B. A day/night split of 89/11 was used along with a posted speed limit of 60 km/h. A commercial vehicle percentage of 13.5%, split into 6.0% medium trucks and 7.5% heavy trucks was applied for King Street.

Road traffic data for Humber Station Road was requested from the Town of Caledon but was not provided. Further analysis should be conducted once data is available for Humber Station Road.



Table 2 below summarizes the road traffic volume data used in this study.

Table 2: Ultimate Road Traffic Data

Roadway	AADT	Day / Night Split [%]	Trucks Percentage [%]		Speed Limit [km/h]
			Medium	Heavy	
King Street	16 200	89 / 11	6.0	7.5	60

3.2.2 Rail Traffic Data

Rail traffic data for the CP principal main line was obtained from site measurements as well as HGC project files, attached in Appendix C, since CP has indicated they will no longer be providing rail traffic data. In order to obtain updated rail traffic data, unattended vibration measurements using a Svantek 977 Sound Level Meter with a Wilcoxon Research type 793V velocity transducer was left at the site from February 4 to February 11, 2025. The number of trains counted during the measurements are included in Table 3 below.

Table 3: Number of Measured Trains During Unattended Monitoring

Date	Daytime (07:00 to 23:00)	Nighttime (23:00 to 07:00)
February 4, 2025	3	7
February 5, 2025	7	7
February 6, 2025	5	6
February 7, 2025	4	8
February 8, 2025	4	6
February 9, 2025	5	8
February 10, 2025	3	9
February 11, 2025	4	7

The maximum number trains during a daytime period (7) and nighttime period (9) were used in the analysis. This line is used for freight operations only and is classified as a principal main line. The maximum permissible train speed in the area of the site is 72 km/h (45 mi/h) for the freight trains. In conformance with



CP assessment requirements, the maximum speeds, maximum number of cars and locomotives per train were used in the traffic noise analysis to yield a worst-case estimate of train noise. The measured train volume data was projected to the year 2035 using a 2.5% per year growth rate. Table 4 summarises the CP rail traffic data used in the analysis.

Table 4: Projected Rail Traffic Data to 2035

Type of Train	Number of Trains Day / Night	Number of Locomotives	Number of Cars	Max Speed (KPH)
CP, Freight	9.0 / 11.5	3	51	72

3.2.3 Traffic Noise Prediction

To assess the levels of traffic noise which would impact the subject site in the future, predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix D.

Sound levels were predicted at the façades of the residential buildings during the daytime and nighttime hours to investigate ventilation requirements. Prediction locations were chosen at various façades of the proposed building to obtain a representation of the future sound levels around the development. Sound levels were also predicted in the common outdoor amenity areas at ground level to investigate acoustic barrier requirements. The results of these predictions are summarised in Table 5.

The distance setbacks of the building indicated on the site plan were used in the analysis, along with an aerial photo to determine the distance to the roadway and railway. The acoustic recommendations may be subject to modifications if the site plan is changed significantly.

Table 5: Future Traffic Sound Levels, [dBA], Without Mitigation

Prediction Location	Description	Daytime in OLA L _{EQ} (16 hour)	Daytime at Façade L _{EQ} (16 hour)	Nighttime at Façade L _{EQ} (8 hour)
		Road/Rail/Total	Road/Rail/Total	Road/Rail/Total
[A]	Southeast Façade	--	58 / 61 / 62	51 / 65 / 65
[B]	Northeast Façade	--	<55 / 64 / 64	<50 / 68 / 68
[C]	Outdoor Amenity Space	<55 / 61 / 61	--	--

3.3 Traffic Noise Discussion and Recommendations

The sound level predictions indicate that the future traffic sound levels will exceed the MECP guidelines at the proposed development. The following discussion outlines the recommendations for ventilation requirements, upgraded building façade constructions and warning clauses to achieve the noise criteria stated in Table 1.

3.3.1 Outdoor Living Areas

Typically, for residential developments adjacent to a principal mainline, a minimum 5.5 m acoustic barrier comprised of a 2.5 m high safety berm with a 3.0 m high acoustic fence on top is required. CP personnel should be contacted to verify safety berm requirements.

Balconies and elevated terraces may be provided for individual dwelling units in the proposed residential buildings. Balconies and patios that are less than 4 m in depth are not considered to be OLAs.

An outdoor amenity area is located at the northeast area of the proposed development (prediction location [C]). The predicted sound level in this outdoor amenity area is 61 dBA, 6 dBA in excess of the MECP criterion of 55 dBA. Additional physical mitigation in the form of acoustic barrier is required for the amenity space. A localized barrier of 3.0 m in height would reduce the sound level in the amenity space to 57 dBA. The 2 dBA sound level excess is



acceptable to the MECP with the use of a noise warning clause if it is acceptable to the municipality.

Table 6 below shows the barrier heights required to achieve various sound levels in the common amenity space.

Table 6: Summary of Barrier Heights Required to Meet Various Sound Levels

Prediction Location	Acoustic Barrier Height [m]				
	55 dBA	56 dBA	57 dBA	58 dBA	59 dBA
[C]	4.3	3.9	3.2	3.0	3.0

As a general note, if an acoustic barrier is used as a noise control measure, its height must be such that the line of site between the source and the receiver is obstructed, it is required that the surface density of the noise barrier be a minimum of 20 kg/m². It is further required that the barrier be designed and constructed without cracks or gaps. Any gaps under the noise barrier that are necessary for drainage purposes must be minimized and localised and must not deteriorate the acoustical performance. Barrier requirements are shown in Figure 4.

Further Work

When detailed grading information is available, the acoustic barrier requirements should be refined. Further analysis is recommended when road traffic data for Humber Station Road has been obtained.

3.3.2 Minimum Distance Setbacks

For noise control and safety reasons, the CP policies stipulate that the minimum required setback between a new dwelling and a principal main line is 30 meters. The nearest façade in the proposed development is proposed to be 30 meters from the railway right-of-way.

3.3.3 Indoor Living Areas

The predicted daytime sound levels are greater than 65 dBA and/or nighttime sound levels greater than 60 dBA at the façades of the proposed buildings. Central air conditioning will be required so that the windows can remain closed.

Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulated closet with an access door for maintenance. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-216, within NPC-300, as applicable.

3.3.4 Building Façade Constructions

Future road and rail traffic sound levels at the proposed residential building will exceed 60 dBA during the daytime hours or 55 dBA during the nighttime hours due to rail traffic noise at some of the façades of the building and will require upgraded building components. MECP guidelines recommend that the windows, walls and doors be designed so that the indoor sound levels comply with MECP noise criteria.

Exterior Wall Construction

For the proposed buildings, CP and MECP guidelines require brick veneer or masonry equivalent construction. An equivalent to brick veneer construction for those portions of building façades of high rise buildings in an urban environment near rail lines is typically achieved by using two layers of 16 mm type X gypsum board on separate framing behind the spandrel panels, with batt insulation in the wall cavity and has been used for numerous high rise developments along railway corridors. Further input regarding the sound insulating design of the exterior walls should be provided in the detailed traffic noise studies conducted for site plan approval. .

Acoustical Requirements for Glazing



A summary of the preliminary Sound Transmission Class (STC) requirements is given in Table 6, for the residential buildings, based on the possibility of sound entering the building through walls, windows, and doors for all of the dwelling units. Detailed floor plans and building elevations were not available for review at the time of this report. A window to floor ratio of 50% (30% fixed, 20% operable) for bedrooms were assumed to determine preliminary window STC ratings required to mitigate road and rail traffic noise levels included in Table 7 below, subject to a minimum STC-33.

Table 7: Required Minimum Glazing STC for the Buildings

Prediction Location		Preliminary STC ^{1,2} Glazing Requirements
Building 1	Northeast Façade	STC-40
	Southeast Façade	STC-37
	Southwest Façade	STC-33
	Northwest Façade	STC-37
Building 2	Northeast Façade	STC-40
	Southeast Façade	STC-37
	Southwest Façade	STC-33
	Northwest Façade	STC-37

Note:

¹ Based on 50% window to floor area ratio for living/dining rooms and bedrooms

² STC requirement refers to fixed glazing. Small leaks through operable doors and windows are assumed, however, tight weather seals should be provided to reduce such leakage to the extent feasible.

OBC – Ontario Building Code

The northeast façades of Buildings 1 and 2 have significant STC requirements under these assumptions. It may be difficult to find suitable STC constructions. It is suggested that the window to floor area ratios be minimized, below the assumed window to floor area ratios, along the façades with exposure to the railway. Sliding patio doors should not be included into bedrooms, swing doors are more suitable for suites with exposure to the railway.



Note that acoustic performance varies with manufacturer's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required. Acoustical test data for the selected assemblies should be requested from the suppliers, to ensure that the stated acoustic performance levels will be achieved by their assemblies.

Further Work

When detailed floor plans and building elevations are available for the buildings, the glazing requirements should be refined based on actual window to floor area ratios and the exterior wall construction should be confirmed to meet CP requirements.

4 VIBRATION ASSESSMENT

4.1 Criteria for Ground-Borne Vibration from Rail Traffic

CP provides guidance and vibration criteria for residential developments. CP guidelines require measurements of ground-borne vibration when residential dwelling units are to be located within 75 m of a rail line. The CP railway line to the north is approximately 30 m from the proposed residential buildings. The Railway Association of Canada/Federation of Canadian Municipalities "Report Research Phase 3: Proximity Guidelines and Best Practices" dated November 2006 and Guidelines for New Development in Proximity to Railway Operations dated May 2013 and the US Federal Transit Administration's "Transit Noise and Vibration Impact Assessment" dated May 2006 document was also reviewed.

Vibration is typically measured in terms of oscillatory velocity or acceleration. The limits for acceptable ground-borne vibration are an RMS velocity of 0.14 mm/s (-17 dB re 1 mm/s) between the frequencies of 4 and 200 Hz.

CP limits for acceptable ground-borne vibration are also presented as a frequency spectrum of maximum allowable vibratory RMS acceleration levels, in units of decibels relative to the acceleration due to gravity (dB re 1g), versus

one-third octave band frequency. These curves are based on ISO 10137 *Bases for design of structures – Serviceability of buildings and walkways against vibrations* (2007) for human perception of vibration in structures. Conformance with ANSI criteria does not necessarily ensure imperceptibility for all persons under all conditions but is a reasonable standard for acceptability.

4.2 Rail Vibration Assessment

CP requires an assessment of ground-borne vibration through measurement if building foundations are to be located within 75 metres of the railway right-of-way. The vibration measurements were conducted using a Svantek 977 Sound Level Meter outfitted with a Wilcoxon Research type 793V velocity transducer correctly field calibrated before and after the measurements. Measurements were performed at the anticipated location of the closest future building façade, 30 m from the CP principal mainline right-of-way, indicated as [M1], in Figure 2.

The results of the measurements are presented in Table 8 showing the maximum RMS vibration velocity measurement during each of the highest measured train pass-bys.

Table 8: Maximum RMS Vibration Velocity Measurements of Freight Train Pass-bys

Train Pass-by	Measured Vibration Level (mm/s)	Criteria (mm/s)
15	0.23	0.14
25	0.22	
50	0.22	
62	0.19	
85	0.19	
43	0.18	

The maximum RMS vibration levels are up to 0.23 mm/s at M1. On average, the average of the maximum RMS vibration levels at M1 were 0.10 mm/s with a median of 0.10 mm/s.

Since the development is proposed to be two 20-storey towers, it is reasonably likely that substantial foundations will be required. Research dating back to the “Handbook of Urban Rail Noise and Vibration” prepared by Wilson, Ihrig & Associates, Inc., dated February 1982, and HGC’s experience with vibration impacting high-rise buildings in Chicago and Toronto, suggests that the heavy foundation will reduce the vibration levels within the residential units. Further mitigation is not recommended at this time, however, once available, the architectural and structural drawings should be reviewed to confirm the proposed foundations and building design is in conformance with the construction and building layout assumed herein.

Regardless of the above, a vibration warning clause must be included in the property and tenancy agreements of the closest dwelling units to inform the future owners and tenants of possible vibration excesses.

5 IMPACT OF THE DEVELOPMENT ON ITSELF

Section 5.8.1.1 of the Ontario Building Code (OBC), released on January 1, 2020, specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) or Apparent Sound Transmission Class (ASTC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls must meet or exceed STC-50 or ASTC-47. Suite separation from a refuse chute or elevator shaft must meet or exceed STC-55. In addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion’s Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its



residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising construction and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

6 IMPACT OF THE DEVELOPMENT ON THE ENVIRONMENT

Sound levels from noise sources such as rooftop air-conditioners, cooling towers, exhaust fans, etc. should not exceed the minimum one-hour LEQ ambient (background) sound level from road traffic, at any potentially impacted residential point of reception. HGC has not performed monitoring of the background sound levels in the area during all daytime and nighttime hours, but experience indicates that, for a typical urban environment, a minimum daytime sound level of 50 dBA and a minimum nighttime sound level of 45 dBA can be assumed during the quietest hours. Thus, any electro-mechanical equipment associated with this development (e.g. emergency generator testing, air handling or air conditioning equipment, etc.) should be designed such that they do not result in noise impact beyond the minimum background sound levels.

7 STATIONARY NOISE SOURCE ASSESSMENT

Noise sources associated with industrial, commercial/retail and institutional facilities are assessed separately from traffic sources under MECP guidelines. These facilities are considered to be Stationary Sources of Sound and criteria for their assessment are contained in the following section.

7.1 Noise Source Description

7.1.1 Off-Site Sources of Sound Associated with Near-by Facilities

There are a number of existing industrial facilities to the south, southeast, and east of the subject site. These facilities include transportation/trucking services, agricultural supplier, and a lumber facility, as shown in Figure 3. HGC personnel



visited the subject site to observe the operations of these facilities and identify potentially significant sources of sound. From site observations, discussion with industry personnel, aerial photos, and experience with similar projects, the noise sources identified to be potentially significant with respect to the subject site were determined. It is noted that there are existing residential uses in closer proximity to the majority of these industrial facilities.

The off-site stationary noise sources of concern are described below and indicated on Figure 5.

Cavalier Transportation Services Inc.

Cavalier Transportation Services Inc. is a trucking facility located directly south of the proposed residential buildings. Sounds from this facility were not audible during the time of the site visit, however, through observations and conversations with Cavalier personnel, the facility may operate during daytime and nighttime hours. In an assumed worst-case hour, there are trucks that travel in and out of the facility, a repair shop with a bay door, facing the proposed development, which may be open for periods of 15 min / hour during daytime hours.

Ontario Hardwood Products Ltd.

Ontario Hardwood Products Ltd. is a lumber facility southeast of the proposed development, at 8068 King Street. Assumed sound levels from site observations and previous projects include noise from loaders, truck movements, and open garage doors where repairs take place. Garage doors are expected to be open during the warmer months to allow ventilation into the facility, for an assumed 15 min / hour. This facility operates during daytime hours only.

Alliance Agri-Turf Inc.

Alliance Agri-Turf Inc., located at 8112 King Street, and is a fertilizer supplier facility situated to the east of the subject site. During the HGC site visit, no noise was noted from this facility and the garage doors were closed. From conversations with personnel, it is understood that the facility operates during

daytime and nighttime hours. In a predictable worst-case hour, significant sources of sound include fertilizer trucks travelling in and out of the facility, fertilizer trucks loading, a loading point dust collector, forklifts, and rail coupling.

Bains Bros Haulage

Bains Bros Haulage is located at 14025 Humber Station Road, to the south of the proposed residential development. During the site visit made by HGC, no noise was noted from this facility and the garage doors were closed. After conversation with personnel on site, it is understood that there are two small businesses located on the premises, which include truck movements, a loader on the eastern side of the property, as well as a repair shop with garage doors that may be open in the warmer months.

7.1.2 On-Site Sources of Sound Associated with Proposed Development

The proposed development will include six 1-storey commercial buildings and two 2-storey commercial buildings. There are on-site sources of sound associated with the proposed commercial buildings that could impact the development itself or impact the nearby existing noise sensitive uses. These sources include rooftop mechanical equipment.

7.2 Criteria for Acceptable Sound Levels

Under MECP guidelines, the acoustical environment in this area is classified as "semi-urban" or "Class 2", as background sound levels are set by significant volumes of road traffic on surrounding roadways during daytime and nighttime hours.

Stationary sources of sound are collectively defined as all sources that emit sound within a commercial or industrial facility boundary. The facilities to the east, southeast and south are therefore classified as a stationary sources of sound.

MECP Guideline NPC-300 is the applicable guideline for use in investigating Land Use Compatibility issues with regard to noise. A commercial/industrial facility is



classified in NPC-300 as a stationary source of sound (as compared to sources such as traffic or construction, for example) for noise assessment purposes. A stationary noise source encompasses the noise from all the activities and equipment within the property boundary of a facility including regular on-site heavy truck traffic, material handling and mechanical equipment.

Commercial activities such as the occasional movement of customer/employee vehicles, deliveries to convenience stores and restaurants 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.

Noise Level Limits for Steady Sound Sources

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/industrial operations in that regard. The façade 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 sound level limit for a stationary noise source in urban Class 2 areas are 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. 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.

The predicted quietest daytime hour and nighttime hour sound levels at the façades of the proposed residences, which will be exposed to the commercial/industrial uses are found to be lower than the MECP exclusionary limits in the daytime hours for the northerly façade with exposure to the major roadways. As such, the sound level limits as summarized in Table 9 are

therefore used in the following sections of this report as the applicable criteria for each façade of the proposed residential building.

Table 9: Applicable Sound Level Limits, L_{EQ} (dBA) for Class 2 Areas

Location	Sound Level Limits		
	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Nighttime (23:00 – 07:00)
Building 1	Northeast Façade	50	45
	Southeast Façade	50	45
	Southwest Façade	50	45
	Northwest Façade	50	45
Building 2	Northeast Façade	50	45
	Southeast Façade	50	45
	Southwest Façade	50	45
	Northwest Façade	50	45
Outdoor Amenity Space		50	45
		45	--

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.

Noise Level Limits for Impulsive Sound Sources

Impulsive sound is typically characterized by brief, sharp increases in the sound level (e.g. a discrete bang or thump). Under guideline NPC-300, the exclusion limits for impulsive sounds differ depending on how frequently the impulses occur, as summarized in the following table:

Table 10: Exclusion Limits, Impulsive Sound (Class 2), L_{Im} (dBAI)

Number of Impulses per Hour	Daytime & Evening (07:00 – 23:00)	Nighttime (23:00 – 7:00)	Daytime & Evening in an OLA (07:00 – 23:00)
9 or more	50	45	50
7 to 8	55	50	55
5 to 6	60	55	60
4	65	60	65
3	70	65	70
2	75	70	75
1	80	75	80

The acceptability limits for frequently occurring sounds that are impulsive in character are the same as those for steady sounds, although the relevant parameter is different (average impulsive sound level, L_{LM} , versus average hourly sound level, L_{EQ} , for steady sources).

7.3 Stationary Noise Assessment

Steady Sound Sources

Predictive noise modelling was used to assess the potential sound impact of the nearby land uses at the closest sensitive receptors, and the impact of the proposed development on itself. The noise prediction model was based on sound emission levels for the nearby noise sources, assumed operational profiles (during the day and night), and established engineering methods for the prediction of outdoor sound propagation. These methods include the effects of distance, air absorption, and acoustical screening by barrier obstacles.

The potentially significant noise sources are rooftop equipment associated with the proposed commercial buildings and surrounding industrial facilities. The majority of the neighbouring commercial/industrial uses operate during daytime hours only (07:00 to 23:00). Deliveries are expected to be occasional, light and during daytime hours only for most of the surrounding buildings. The movement



of customer vehicles, occasional deliveries and garbage collection associate with retail facilities are exempt from analysis.

Sound emission data for some of the typical rooftop equipment was obtained from sound level data compiled in HGC project files. The HVAC equipment for the proposed commercial buildings have not yet been selected, as a result, conservative data obtained from HGC project files was used in the analysis. Furthermore, coupling/decoupling events also did not occur during our site visit. The source levels used in the analysis is listed in Table 11 below.

Table 11: Sound Power Levels

Source	Octave Band Centre Frequency [Hz]									Overall [dBA]
	32	63	125	250	500	1k	2k	4k	8k	
Off-Site Steady Sources (Associated with Nearby Industrial Facilities)										
Forklift Movements	96	99	95	91	91	91	88	82	76	95
Truck Movements	--	101	100	94	96	97	95	91	86	101
Truck Idle	--	96	91	88	88	91	90	81	70	95
Dust Collector	102	98	101	102	96	91	87	82	75	98
Open Bay Doors	81	80	79	82	84	87	85	85	88	93
On-Site Sources (Associated with Proposed Development)										
Rooftop 5-Ton HVAC Unit	--	--	67	72	77	76	73	68	61	80

The above data were input to a predictive computer model. The software used for this purpose (*Cadna/A version 2025 MR2, build: 209.5501*) is a computer implementation of ISO Standard 9613-2.2 "Acoustics – Attenuation of Sound During Propagation Outdoors." 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.

The following information and assumptions were used in the analysis:

- As mechanical data for the proposed development are not yet available, sound levels of the rooftop HVAC units of the on-site sources were based on manufacturer's data for similar commercial developments. The rooftop

units were assumed to be located 2 m above the roof, as indicated in Figure 6.

- Truck movements were assumed to travel at a speed of 15 km/h and remain in idle while loading/unloading.
- Forklift and/or loader activities occur in the yards of Ontario Hardwood Products Ltd., Alliance Agri-Turf Inc., and Bains Bros Haulage.
- Open bay doors for the existing industrial facilities include noise emanating from grinding, welding, and use of pneumatic drills, based on observations during the site visit.
- Sound data for the above sources were obtained from past HGC project files of similar facilities, which were either originally obtained from the manufacturer (for HVAC equipment) or measured at similar facilities.
- Locations of off-site steady noise sources are shown in Figure 5. Rooftop HVAC units, idling trucks, loading point dust collectors, are shown as green crosses. Open bay doors and truck movements are shown as green lines. Noise from forklift loading/unloading activity is shown as green hatched areas.

In this impact assessment, we have considered typical worst-case (busiest hour) scenarios for each time period to be as follows:

Assumed day/evening worst-case scenario:

- All rooftop mechanical equipment operating continuously at full capacity.
- Operations at Ontario Hardwood Products Ltd. and Alliance Agri-Turf Inc. involve two forklifts each, while Bains Bros Haulage operates one loader. The forklifts and loader operate continuously for an hour.



- Two trucks from Cavalier Transportation Services Inc., one truck from Ontario Hardwood Products Ltd., six trucks from Alliance Agri-Turf Inc., and twelve trucks from Bains Bros Haulage operate during the daytime.
- Trucks remain in idle while loading/unloading, for 5 minutes in an hour at the Agri-Turf facility and for 15 minutes each at the Ontario Hardwood facility.
- Noise emanating from open bay doors for 15 minutes out of an hour.

Assumed night worst-case scenario:

- All rooftop mechanical equipment operating for 30 minutes in an hour.
- No forklift activity from Ontario Hardwood Products Ltd.
- Two forklifts operate continuously for an hour at Alliance Agri-Turf Inc.
- One loader operates continuously for an hour at Bains Bros Haulage.
- Two trucks from Cavalier Transportation Services Inc., one truck from Ontario Hardwood Products Ltd., six trucks from Alliance Agri-Turf Inc., and twelve trucks from Bains Bros Haulage operate during the nighttime.
- Trucks remain in idle while loading, for 5 minutes in an hour at the Agri-Turf facility.
- No activity from the open bay doors.

Impulsive Sound Sources

Impulsive noise is assessed separately from the non-impulsive sound sources. The main impulsive sound associated with the Alliance Agri-Turf Inc. include the coupling/uncoupling of rail cars. A logarithmic mean impulse sound level (LLM) of 121 dBAI was used in the analysis. This was calculated based on measurements conducted by HGC for similar past projects. The impulsive sounds were assumed to be emitted up to 4 times in a worst-case hour during



daytime hours. Figure 7 shows the location of the modelled impulsive sound sources.

7.4 Results

Steady Sound Levels

The unmitigated sound levels due to steady stationary noise sources associated with the off-site and on-site stationary noise sources are summarized below in Tables 12 and shown graphically in Figures 8a and 8b.

Table 12: Predicted Sound Levels from Steady Stationary Sources on the Proposed Development [dBA]

Location		Daytime/Evening (07:00 – 23:00)	Nighttime (23:00 – 07:00)	Criteria (Daytime/Evening/Nighttime)
Building 1	Northeast Façade	42	40	50 / 50 / 45
	Southeast Façade	46	43	50 / 50 / 45
	Southwest Façade	49	46	50 / 50 / 45
	Northwest Façade	44	41	50 / 50 / 45
Building 2	Northeast Façade	48	45	50 / 50 / 45
	Southeast Façade	49	46	50 / 50 / 45
	Southwest Façade	49	46	50 / 50 / 45
	Northwest Façade	45	43	50 / 50 / 45
Outdoor Amenity Space		47	--	50 / 45 / --

The results of the calculations indicate that the predicted sound levels due to the operations of the steady sources of noise may exceed the applicable MECP sound level limits at the southwest façade of Building 1, and the southeast and southwest façades of Building 2 by 1 dBA during the night; and 2 dBA in the evening in the OLA, during an assumed worst-case operation scenario. These excesses can be primarily attributed to the loader operations conducted by Bains Bros Haulage and the rooftop mechanical equipment associated with the proposed commercial uses.

Impulsive Sound Sources

Sound levels were also predicted at all building façades and compared to the Class 2 criteria for impulsive sound levels. The unmitigated sound levels due to impulsive stationary noise are summarized below in Table 13 and shown graphically in Figure 9.

Table 13: Predicted Sound Levels from Off-Site Impulsive Stationary Sources on the Proposed Development [dBAI]

Location		Daytime/Evening (07:00 – 23:00)	Nighttime (23:00 – 07:00)	*Criteria (Daytime/Evening/ Nighttime)
Building 1	Northeast Façade	60	60	65 / 65 / 60
	Southeast Façade	59	59	65 / 65 / 60
	Southwest Façade	50	50	65 / 65 / 60
	Northwest Façade	43	43	65 / 65 / 60
Building 2	Northeast Façade	64	64	65 / 65 / 60
	Southeast Façade	63	63	65 / 65 / 60
	Southwest Façade	61	61	65 / 65 / 60
	Northwest Façade	45	45	65 / 65 / 60
Outdoor Amenity Space		62	--	65 / 65 / --

Note: *For 4 impulsive events

The results of the analysis indicate that the predicted impulsive sound levels due to the rail coupling associated with the Alliance Agri-Turf Inc. facility may exceed the minimum exclusionary criteria if there are 9 or more impulsive events in an hour. Discussions with the facility personnel indicate the number of events is expected to be closer to 4 events within a busy hour. The criteria for impulse noise with 4 events in an hour is 65 dBAI during the daytime and evening, and 60 dBAI during the nighttime. The predicted sound levels are expected to be within this criteria during the daytime and evening and in excess of the limit by 4 dBA during the night.



Cadna/A output tables are included in Appendix E for a location along the southeastern façade of Building B.

7.5 Discussion and Recommendations with Regard to Stationary Sources

7.5.1 Mitigation Option 1

In order to meet the applicable Class 2 criteria at the proposed residential development, mitigation is required. Excesses at the façades of the proposed buildings are due primarily to activities at the Bains Bros Haulage site and proposed commercial uses. Mitigating sound levels from the proposed commercial sources could be achieved by selecting rooftop mechanical equipment with a maximum sound power level of 78 dBA. A detailed site visit to Bains Bros Haulage and Agri-Turf Inc. should be conducted to obtain sound level measurements of all of the equipment used on site. If sound levels of activity at the facility are determined to exceed the applicable Class 2 criteria, mitigation could be provided in the form of replacing the equipment with quieter units, silencers, or acoustic barriers. This option requires cooperation from the neighbouring industrial uses. Development of specific noise control recommendations and details requires specific knowledge of the equipment and operating parameters.

7.5.2 Mitigation Option 2

Alternatively, if the required mitigation measures to achieve Class 2 limits are deemed too onerous, or the neighbouring industrial uses are not cooperative, a Class 4 designation for the site could also be considered and requested from the municipality. This designation provides relaxed (higher) daytime and nighttime sound level limits from those otherwise permitted in an urban area for both indoor and outdoor areas. The steady stationary sound level limits for a Class 4 area are 60 dBA during the daytime, and 55 dBA during the nighttime at the façade and in an OLA during the day. The impulsive stationary sound level limits for a Class 4 area, at 4 impulses in an hour, are 75 dBA during the daytime, and 70 dBA during the nighttime at the façade and in an OLA during the day. A



Class 4 area permits receptor-based noise control measures (noise walls, specific construction techniques and materials, etc.) to be used within a proposed new sensitive land use within the vicinity of an industrial use. Class 4 areas require formal recognition of the classification by the land use planning authority.

A Class 4 area is defined in NPC-300 as:

- Is an area intended for development with new noise sensitive land use(s) that are not yet built.
- Is in proximity to existing, lawfully established stationary source(s); and
- Has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process.

With a Class 4 designation, the following mitigation is required:

- 1) The building is required to include air conditioning, which is already required due to traffic noise.
- 2) An additional warning clause is required to be included in the property and tenancy agreements and offers of purchase and sale for all dwelling units with a Class 4 designation.
- 3) Additionally, upgraded building and glazing constructions, also required for traffic noise in Section 3.3.4, are recommended for all dwellings with a Class 4 designation, subject to a minimum STC-33 rating for all windows into sensitive spaces to further protect the interior spaces of the dwelling with a Class 4 designation.

With the above mitigation measures in place and a Class 4 designation for Buildings A and B, the predicted sound levels due to the surrounding stationary noise sources under a worst-case operational scenario will meet the Class 4 criteria at these buildings.



7.6 Further Analysis

When details of the commercial and residential buildings are known (e.g. roof plans, mechanical equipment, architectural drawings, etc.), the sound impact on itself and on the nearby noise sensitive uses should be assessed. Detailed sound level measurements of the surrounding industrial facilities should be conducted, particularly for Bain Bros Haulage and Agri-Turf Inc.

8 WARNING CLAUSES

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for all units with anticipated traffic sound level excesses. The following noise warning clauses are required for the proposed development.

A suggested wording for future dwellings with sound level excesses of the MECP criteria but do not require physical mitigation measures is given below.

Type A:

Purchasers/tenants are advised that sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

A suggested wording for future dwellings for which physical mitigation has been provided is given below.

Type B:

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Suitable wording for future dwellings requiring central air conditioning systems is given below.



Type D:

This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.

A suggested wording for dwellings adjacent to the surrounding industrial/commercial uses where sound levels will at times be audible is given below.

Type E:

Purchasers/tenants are advised that due to the proximity of the adjacent industrial/commercial uses, noise from these uses may at times be audible.

If a Class 4 designation is granted by the municipality, the following warning clause is required.

Type F:

Purchasers/tenants are advised that sound levels due to the adjacent industries/commercial facilities are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed.

These sample clauses are provided by the MECP as examples and can be modified by the Municipality as required.

CP requires a standard warning clause as this development is located near a principal mainline. The following sample clause is typical of those included in agreements of purchase and sale or lease on the Lands that are within 300 meters of the railway right-of-way.

Type I:

Purchasers or tenants are to be advised that Canadian Pacific Railway or its successors or assigns, have an operating right-of-way within 300 metres from the land subject hereof and there may be alterations to the



right-of-way including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or its operations.

Suggested wording for future dwellings where vibration excesses is given below.

Type II:

Purchasers/tenants are advised that due to the proximity of this dwelling to the nearby railway tracks, vibration from rail pass-bys will occasionally be perceptible within this unit.

9 SUMMARY OF RECOMMENDATIONS

The following list and Table 14 summarize the recommendations made in this report. The reader is referred to the previous sections of the report where these recommendations are discussed in more detail.

For Transportation Noise

1. An acoustic barrier is required to mitigate noise within the common outdoor amenity space. When detailed grading information is available, the acoustic barrier heights should be refined.
2. Central air conditioning is required for the proposed building. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300, as applicable.
3. Upgraded building and glazing constructions are required for the proposed building as indicated in Table 5. When detailed floor plans and building elevations are available for Buildings 1 and 2, a detailed review should be conducted to determine the required glazing and building façade constructions based on actual window-to-floor area ratios.
4. Noise and vibration warning clauses should be included in the Development Agreements registered on titles, and in purchase, sale and lease

agreements, to inform future owners of noise concerns from transportation and commercial/industrial sources in the area.

5. Tarion Builder's Bulletin B19R requires that the internal design of condominium projects integrates suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels. Outdoor sound emissions should also be checked to ensure compliance with the Town of Caledon noise by-law.

For Stationary Noise

1. Mitigation Option 1

- a. Detailed site visits should be conducted to the neighbouring facilities, particularly Bain Bros Haulage, and Alliance Agri-Turf Inc., to verify sound levels associated with the facilities. Mitigation may be required for sources associated with these facilities. This option requires co-operation with the industrial facilities.
- b. Additionally, rooftop mechanical sources associated with the proposed commercial sources should be selected with maximum sound power levels discussed in Section 7.5.1. When final mechanical selections are available, they should be reviewed to refine mitigation requirements.

2. Mitigation Option 2

- a. If the requirements to achieve Class 2 criteria are deemed onerous. A Class 4 designation should be requested of the municipality. Under a Class 4 designation, the residential buildings will require air



conditioning, upgraded building and glazing constructions, and an additional warning clause indicating the Class 4 designation.

The reader is referred to the previous sections of the report where these recommendations are discussed in more detail.

Table 14: Summary of Noise Control Requirements and Noise Warning Clauses

Location	Acoustic Barrier	*Ventilation Requirements	Type of Warning Clause	Preliminary STC ^{1,2} Glazing Requirements	Stationary Noise
Building 1	Northeast Façade	Central A/C	A, B, D, E, F#, I	STC-40	See section 7.5
	SE Façade			STC-37	
	SW Façade			STC-33	
	NW Façade			STC-37	
	SE Façade			STC-37	
	SW Façade			STC-33	
Building 2	Northeast Façade	Central A/C	A, B, D, E, F#, I	STC-40	See section 7.5
	SE Façade			STC-37	
	SW Façade			STC-33	
	NW Façade			STC-37	
	SE Façade			STC-37	
	SW Façade			STC-33	
Outdoor Amenity	✓	--	--	--	--

Notes:

-- No specific recommendation

* The location, installation, and sound rating of the air conditioning systems must be compliant with MECP Guideline NPC-300, as applicable.

OBC – meeting the minimum requirements of the Ontario Building Code

If Class 4 designation is granted.



9.1 Implementation

To ensure that the noise control recommendations outlined above are properly implemented prior to registration, it is recommended that.

1. When detailed grading information and architectural plans are available for the proposed buildings, an acoustical consultant should review the dwellings to refine acoustic barrier requirements and building façade constructions.
2. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineer services in the Province of Ontario should review the exterior wall constructions, architectural plans and building elevations to ensure the building façade and glazing constructions will provide sufficient sound insulation for the indoor spaces and provide additional recommendations, as required.
3. Prior to the issuance of occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineer services in the province of Ontario should certify that the noise control measures have been properly incorporated, installed and constructed.





Figure 1: Key Plan

BUILDING SETBACKS PHASE-1 (APARTMENT BUILDING-1)		
	REQUIRED	PROPOSED
NORTH SIDE (EXTERIOR SIDE LOT LINE)	3 M.	12.90 M.
SOUTH SIDE (INTERIOR SIDE LOT LINE)	3 M.	67.12 M.
EAST SIDE (REAR LOT LINE)	3 M.	30.00 M.
WEST SIDE (FRONT LOT LINE)	NIL	135.70 M.
BUILDING SETBACKS PHASE-2 (APARTMENT BUILDING-2)		
	REQUIRED	PROPOSED
NORTH SIDE (EXTERIOR SIDE LOT LINE)	3 M.	66.90 M.
SOUTH SIDE (INTERIOR SIDE LOT LINE)	3 M.	13.06 M.
EAST SIDE (REAR LOT LINE)	3 M.	30.17 M.
WEST SIDE (FRONT LOT LINE)	NIL	141.05 M.
BUILDING SETBACKS PHASE-3 (COMMERCIAL BUILDINGS-A,B,C,D)		
	REQUIRED	PROPOSED
NORTH SIDE (EXTERIOR SIDE LOT LINE)	3 M.	4.80 M.
SOUTH SIDE (INTERIOR SIDE LOT LINE)	3 M.	68.39 M.
EAST SIDE (REAR LOT LINE)	3 M.	107.80 M.
WEST SIDE (FRONT LOT LINE)	NIL	3.80 M.
BUILDING SETBACKS PHASE-4 (COMMERCIAL BUILDINGS-E,F,G,H)		
	REQUIRED	PROPOSED
NORTH SIDE (SIDE LOT LINE)	3 M.	67.96 M.
SOUTH SIDE (EXTERIOR SIDE LOT LINE)	3 M.	4.82 M.
EAST SIDE (INTERIOR REAR LOT LINE)	3 M.	108.87 M.
WEST SIDE (FRONT LOT LINE)	NIL	3.80 M.

PARKING CALCULATION PHASE-1(APARTMENT BUILDING-1)		REQUIRED	PROPOSED
APARTMENT		231	220
BASINENT LEVEL PARKING - 2.8M X 5.8M		(0.7 SPACES PER UNIT)	
SURFACE PARKING - 2.75M X 6.0M			
ACCESSIBLE PARKING			10
(TYPE-A 3.4M X 6.0M) (TYPE-B 2.75M X 6.0M)			
RETAIL(431.52 SQM)		22	
		(1 PER 20 SQ.M. OF GFA)	07
VISITOR PARKING (0.10 SPACES PER UNIT)		33	12
TOTAL PARKING		264	239
BIKE PARKING			72
PARKING CALCULATION PHASE-2(APARTMENT BUILDING-2)			
APARTMENT		231	220
BASINENT LEVEL PARKING - 2.8M X 5.8M		(0.7 SPACES PER UNIT)	
SURFACE PARKING - 2.75M X 6.0M			
ACCESSIBLE PARKING			10
(TYPE-A 3.4M X 6.0M) (TYPE-B 2.75M X 6.0M)			
RETAIL(431.52 SQM)		22	
		(1 PER 20 SQ.M. OF GFA)	07
VISITOR PARKING (0.10 SPACES PER UNIT)		33	12
TOTAL PARKING		264	239
BIKE PARKING			72
PARKING CALCULATION PHASE-3(COMMERCIAL BUILDINGS-A,B,C,D)			
COMMERCIAL-2404.32 SQM.		120	
(2.75M X 6.0M)		(1 PER 20 SQ.M. OF GFA)	42
ACCESSIBLE PARKING			07
(TYPE-A 3.4M X 6.0M) (TYPE-B 2.75M X 6.0M)			
RETAIL(431.52 SQM)		120	49
PARKING CALCULATION PHASE-4(COMMERCIAL BUILDINGS-E,F,G,H)			
COMMERCIAL- 2378.92 SQM.		119	
(6.00M X 2.75M)		(1 PER 20 SQ.M. OF GFA)	52
ACCESSIBLE PARKING			07
(TYPE-A 3.4M X 6.0M) (TYPE-B 2.75M X 6.0M)			
TOTAL PARKING		119	60

MUNICIPAL ADDRESS & LEGAL DESCRIPTION
 PART OF LOT 11 CONCESSION 5
 (FORMERLY TOWNSHIP OF ALBION,
 COUNTY OF PEELE) TOWN OF ALBION
 REGIONAL MUNICIPALITY OF PEELE

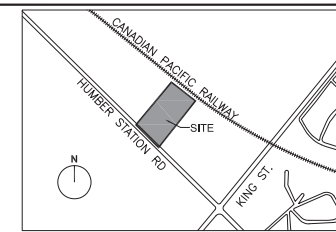
SURVEY INFORMATION TAKEN FROM:
 2 HOLLAND DRIVE, UNIT 5, BOLTON,
 ONTARIO L7E 1E1
 PHONE 905.951.6000
 FAX 905.857.4811
 EMAIL - info@maurogroup.ca

OWNER:
 SATWANT DEOL
 188 La Rocca Avenue
 Woodbridge, Ontario
 L4H 2K3

PHASING KEY MAP	
PHASE	AREA
PHASE-1	9033.42 SQ.M
PHASE-2	5077.88 SQ.M
PHASE-3	5714.38 SQ.M
PHASE-4	6099.70 SQ.M

PHASE-1		
UNIT	1B	PERCENTAGE
1B	145	43.94%
2B	179	54.24%
3B	6	1.82%
TOTAL	330	100%

PHASE-2		
UNIT	1B	PERCENTAGE
1B	145	43.94%
2B	179	54.24%
3B	6	1.82%
TOTAL	330	100%



LEGEND

- PROPERTY LINE
- - - PHASING LINE
- NEW BUILDING
- EXISTING BUILDING
- LANDSCAPE
- CONC. PAVEMENT, 150MM RAISE
- ASPHALT
- BARRIER FREE PARKING
- BARRIER FREE CURB
- BARRIER CURB
- MAIN DOOR ENTRANCE
- OVERHEAD DOOR
- LIGHT STANDARD
- EXISTING FIRE HYDRANT
- LIGHT STANDARD
- WALL MOUNTED LIGHT
- LIGHT BOLLARDS
- PROPOSED FIRE HYDRANT



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PROJECT NORTH

27th JUNE 2025
ISSUED FOR COORDINATION
NOT FOR CONSTRUCTION

5.	27 JUNE 2025	ISSUED FOR COORDINATION	MB
4.	28 MAY 2025	ISSUED FOR COORDINATION	MB
3.	22 APR. 2025	ISSUED FOR REVIEW	ZP.
2.	28 MAR. 2025	ISSUED FOR REVIEW	MB
1.	31 JAN 2025	ISSUED FOR REVIEW	MB
No.	Date	Version	Dw

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PROJECT:

ZERO HUNTER
STATION RD
CALEDON, ON.

DRAWING TITLE:

**SITE PLAN:
GROUND LEVEL**

DRAWN BY: MB	DATE: 08 JAN. 2025
CHECKED BY: NM	SCALE: AS NOTED
PROJECT NO.:	DRAWING NO.:

24-66	A-1.0
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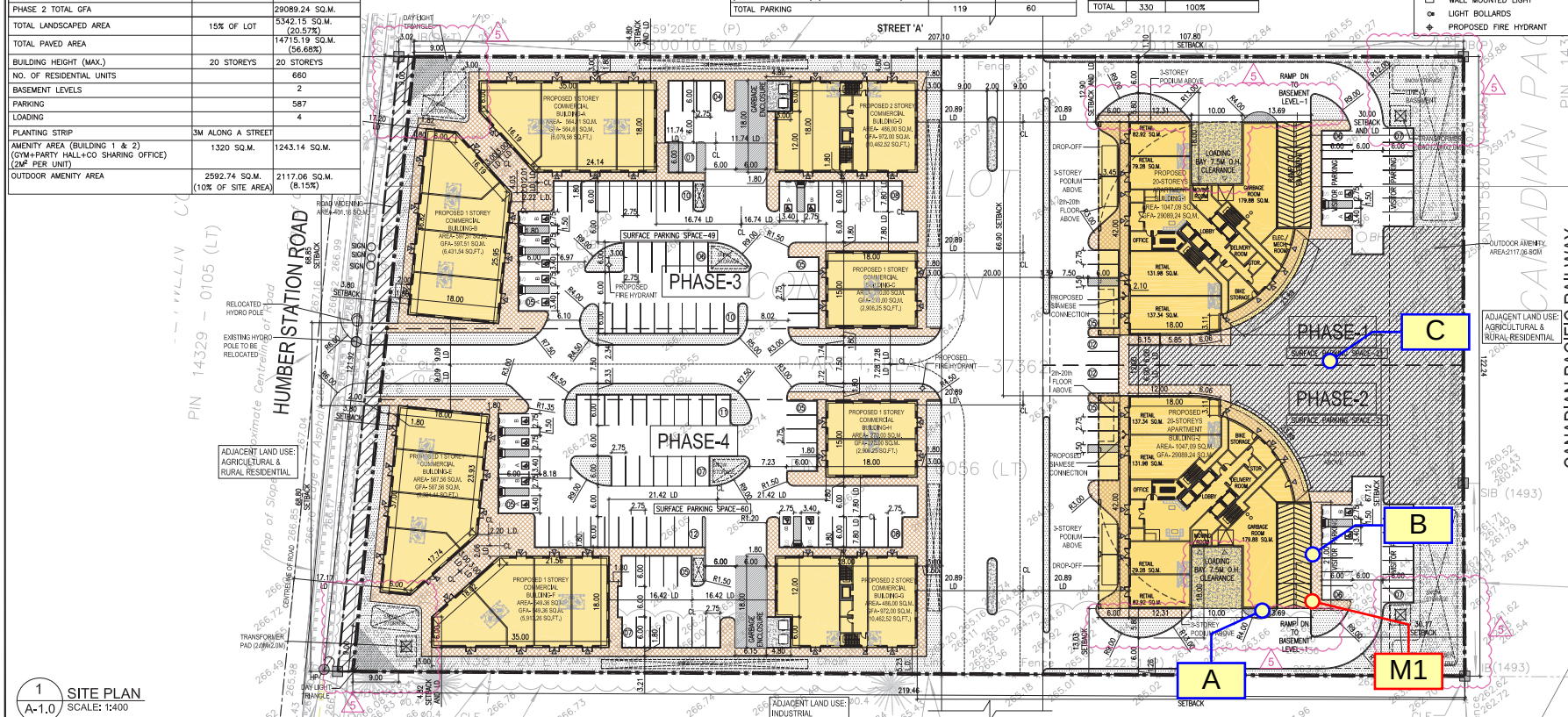


Figure 2: Proposed Site Plan Showing Prediction Locations



Figure 3: Aerial Photo Showing Surrounding Land Uses

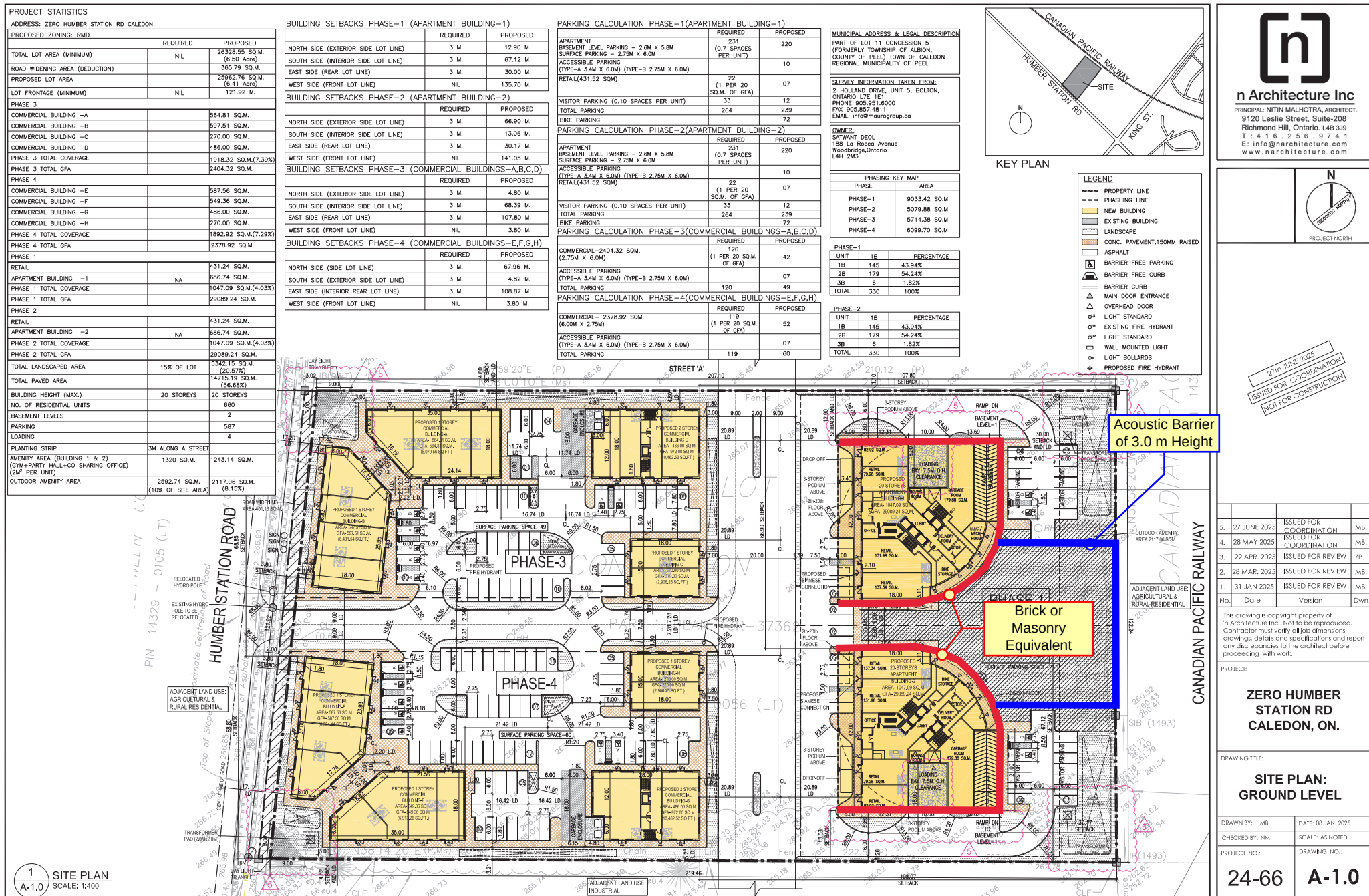


Figure 4: Proposed Site Plan Showing Barrier and Brick Requirements

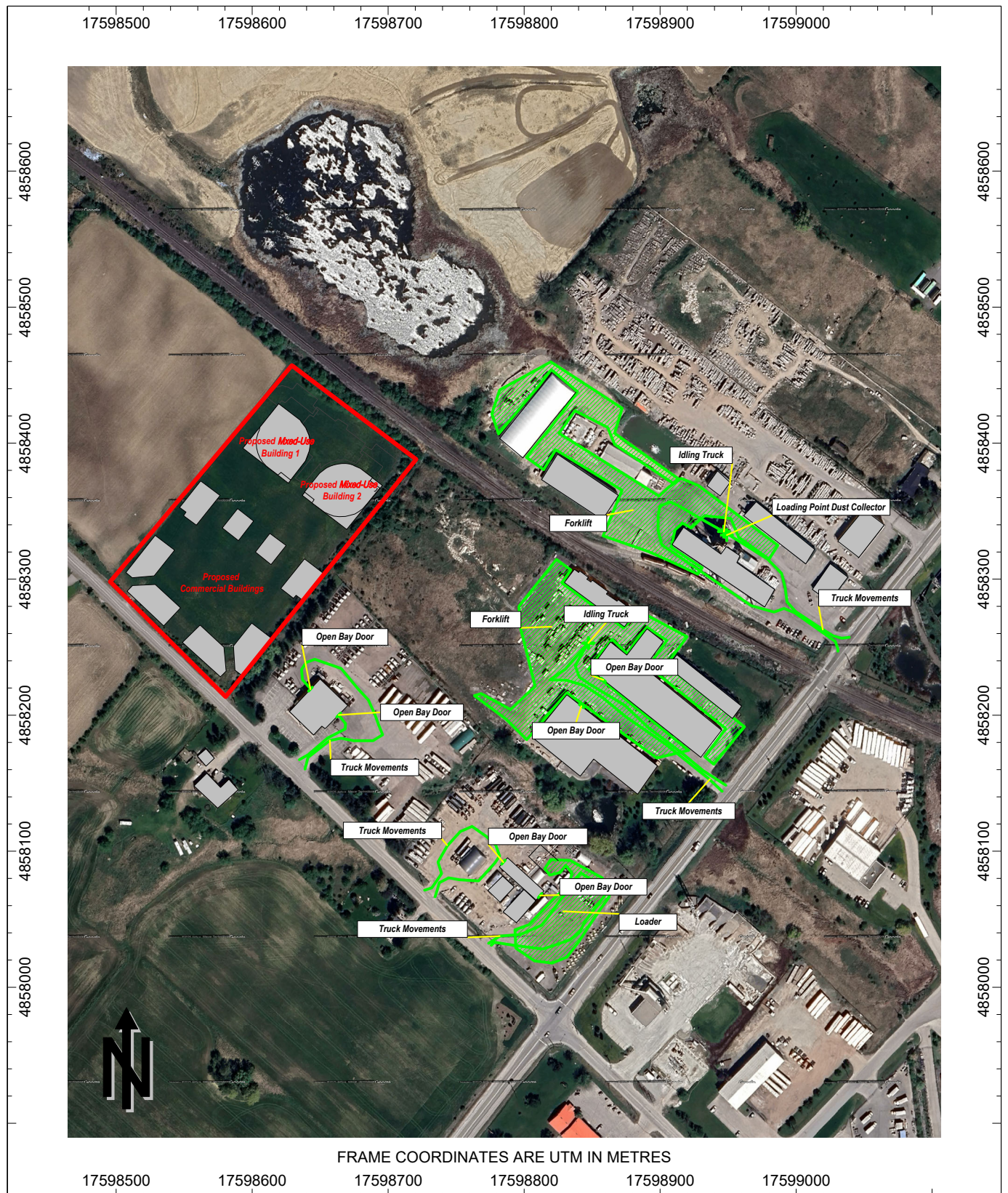


Figure 5: Aerial Photo Showing Off-Site Steady Stationary Noise Sources

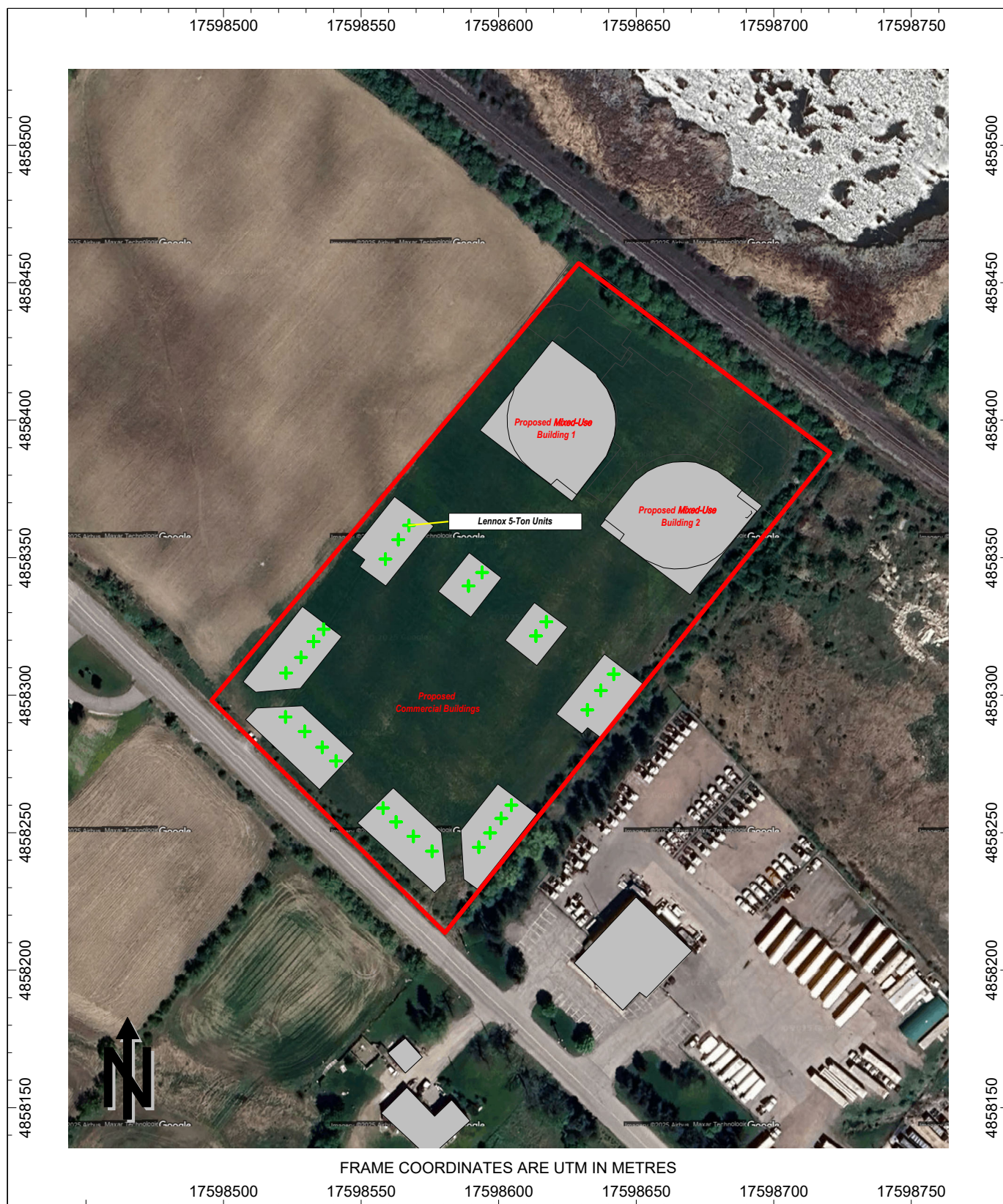


Figure 6: Aerial Photo Showing On-Site Steady Stationary Noise Sources

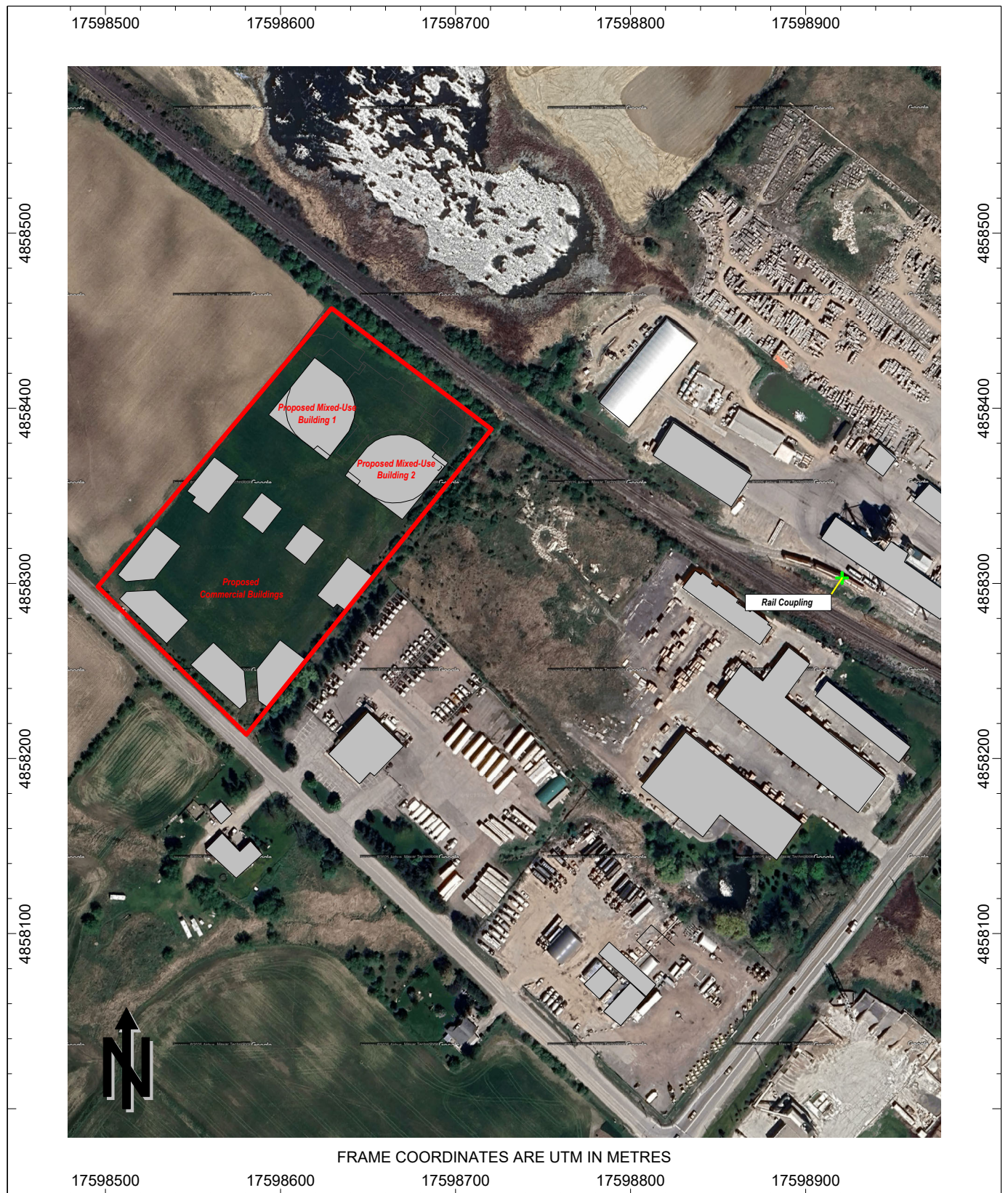


Figure 7: Aerial Photo Showing Impulsive Stationary Noise Sources

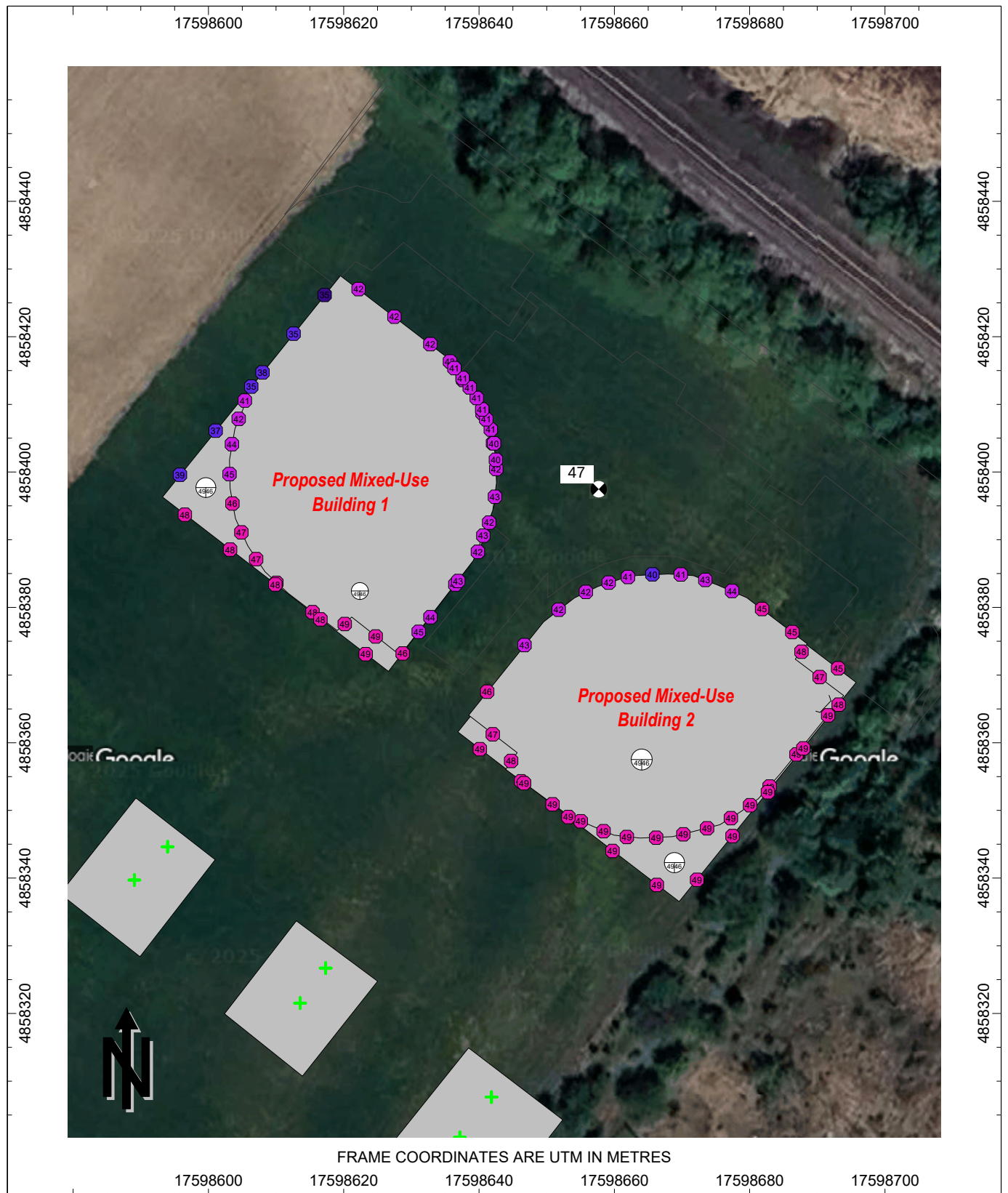


Figure 8a: Aerial Photo Showing Daytime Sound Levels from Steady Stationary Noise Sources [dBA]

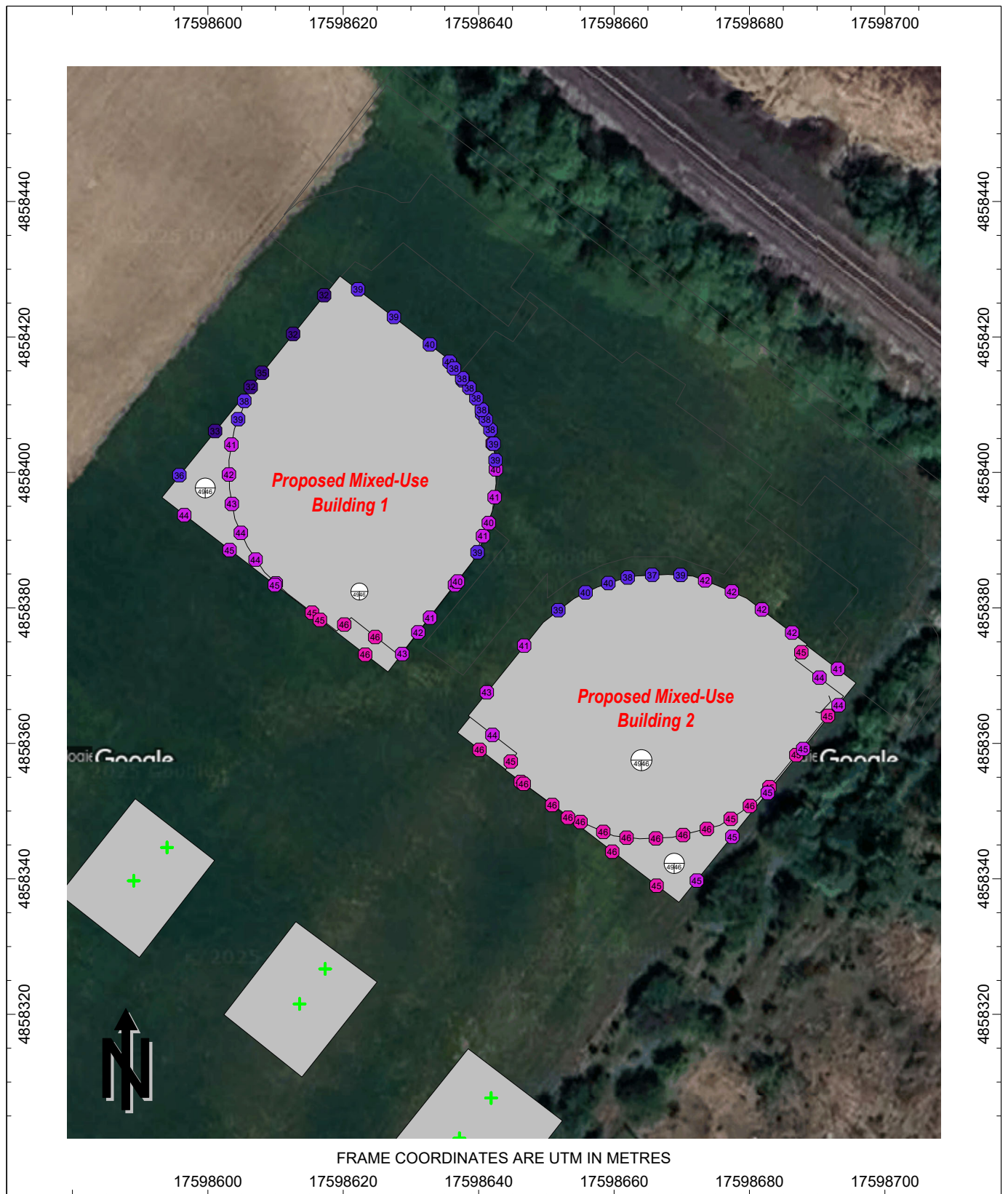


Figure 8b: Aerial Photo Showing Nighttime Sound Levels From Steady Stationary Noise Sources [dBA]



Figure 9: Aerial Photo Showing Daytime and Nighttime Sound Levels From Impulsive Stationary Noise Sources [dBAI]

Appendix A

Rail Guidelines



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Appendix B

Road Traffic Data



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Appendix C

Rail Traffic Data



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Appendix D

Sample STAMSON 5.04 Output



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Appendix E

Cadna/A Model Parameters and Output Tables



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Appendix F

Measured Vibration Velocity Levels and Acceleration Spectrums



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