

Environmental Noise Feasibility Report in Support of Land Use Conversion Request

4570 Sheppard Avenue East

Proposed Mixed-use Development

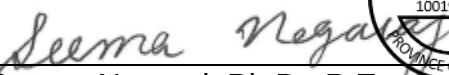
In the Vicinity of Sheppard Avenue East and McCowan Road
City of Toronto

July 27, 2021
Project: 121-0207

Prepared for

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1.0 INTRODUCTION

The landowner has made a formal request to convert the Subject Land at 4570 Sheppard Avenue East from General Employment Areas to non-employment uses, to permit a greater range and mix of uses, including employment, commercial and residential mixed uses, as part of the City of Toronto's ongoing Growth Plan conformity exercise and Municipal Comprehensive Review (the 'MCR'). This Environmental Noise Feasibility Report has been prepared in support of the conversion request. It has reviewed surrounding noise sources and land uses and concludes that the requested conversion can be made compatible with the existing environment.

The proposed development consists of three 40-storey residential towers (Towers A to C) and one 10-storey office building (Building D).

This report discusses relevant policy, legislative background and provincial guidelines related to environmental noise (and vibration) and planning, in the context of the type of development proposed for the subject site. Both transportation (road and rail sound sources in this case) as well as industrial/commercial operations sound sources (known as “stationary sources” in the terminology of the Ministry of Environment, Conservation and Parks – MECP) must be addressed. The proposed development must be made compatible with the surrounding environment and land uses.

Appropriate noise mitigation measures are proposed in order to achieve compliance with Provincial policy and the applicable MECP noise guidelines and to ensure land use compatibility.

2.0 SITE AND AREA DESCRIPTION

2.1 SITE AND SURROUNDING AREA

The site is rectangular in shape, located to the northwest of the intersection of Sheppard Avenue East and McCowan Road in the City of Toronto. The site is bounded by:

- An existing commercial plaza to the east. The anchor tenant, Canadian Tire, is located at the west side of the plaza, adjacent to the subject site.
- Sheppard Avenue East, with existing residential dwellings beyond, to the south;
- An existing fire station (including a firefighter training facility), with commercial/office/light industrial uses beyond, to the west; and
- The existing Dufferin Concrete facility, with the Canadian Pacific Railway (CP) Belleville Subdivision beyond, to the north.

FIGURE 1 shows a key plan of the area.

2.2 THE PROPOSED DEVELOPMENT

FIGURE 2 shows the proposed Site Plan, dated June 3, 2021 prepared by Caricari Lee Architects. The proposed development will consist of:

Tower A and Tower B – 40-storey residential towers connected by a 6-storey podium. There will be commercial uses on the ground floor, facing Sheppard Avenue East. Towers A and B are located on the south half of the site.

Tower C – A 40-storey residential tower with a 6-storey podium, located near the centre of the site.

Building D – A 10-storey office building located at the north end of the site.

Note, it is understood that there is desire to redevelop the lands to the east for residential uses as well and a similar conversion request is being made to the city. The site concept shown on Figure 2 includes a road connection to these lands. The connection of the road would only be possible once the existing buildings on that site are demolished. Similarly, there is the potential for Nugget Avenue to be extended west of McCowan Road and connect into with the future road on the west side of the site. Nugget Avenue is shown to pass through the Dufferin Concrete site and would only be possible with the demolition (at least of portions) of the facility.

3.0 PROVINCIAL POLICIES AND GUIDELINES APPLICABLE TO PLANNING AND ENVIRONMENTAL NOISE

3.1 THE 2020 PROVINCIAL POLICY STATEMENT (PPS 2020)

As of May 1, 2020, the Provincial Policy Statement (PPS 2020), issued under Section 3 of the Planning Act, came into effect, replacing the 2014 PPS. The most relevant policy to the matter of environmental noise is 1.2.6 Land Use Compatibility. *Major Facilities* and *Sensitive Land Uses* must be planned and developed to avoid or minimize (where avoid is not possible) any *Adverse Effects* from noise, specifically, along with other factors and to ensure the long-term operational and economic viability of *Major Facilities*.

A new paragraph, 1.2.6.2 has been added in PPS 2020 in relation to encroachment of proposed *Sensitive Land Uses*. Where avoidance of adverse effects as per 1.6.2.1 is not possible the long-term viability of existing or planned industrial or manufacturing uses must be protected and, amongst other considerations, any adverse effects on the proposed *Sensitive Land Use* minimized and mitigated and potential impacts to industrial, manufacturing and other uses minimized and mitigated.

The term *Major Facilities* is defined to include industries and manufacturing plants. With respect to noise, the part of the definition of *Adverse Effects* that is most relevant to *Sensitive Land Uses* is “(g) loss of enjoyment of normal use of property”. Examples of *Sensitive Land Uses* are residences, day care centres, education facilities and health facilities. An adverse effect on a *Major Facility* could be “(h) interference with normal conduct of business”. This could take the form of a new *Sensitive Land Use* coming into effect (e.g. by designation or zoning) and thereby putting a *Major Facility* out of compliance with its environmental approvals. This could also contravene the policy of ensuring long term operational or economic viability of the *Major Facility*. All of the above is relevant to the consideration of introducing *Sensitive Land Uses* at this site in relation to the existing industrial uses in the area, many of which would be defined as *Major Facilities*.

3.2 ENVIRONMENTAL PROTECTION ACT (EPA)

The EPA, in Section 14, prohibits the discharge of a defined contaminant into the natural environment, if the discharge causes or may cause an adverse effect. Sound (noise) and vibration are defined contaminants. The definition of “adverse effect” in the Act includes:

- 1.(1) (a) *impairment of the quality of the natural environment for any use that can be made of it;*
- (c) *harm or material discomfort to any person;*
- (g) *loss of enjoyment of normal use of property;*
- (h) *interference with the normal conduct of business.*

The defined concepts of adverse effect are very broad.

Under Section 9 or 20.21 of the EPA, which are administered by the MECP, an industrial/commercial facility (stationary source) that emits a defined contaminant to the environment requires an Environmental Compliance Approval (ECA) or to be registered on the Environmental Activity and Sector Registry (EASR), to operate. In fact, a literal reading of the EPA shows that an ECA or EASR must be obtained, not just to operate, but prior to even constructing a new process or altering an existing process that emits a defined contaminant, even if the alteration reduces emissions.

To obtain an ECA, where there are sound or vibration sources and emissions, the facility must make formal application to MECP and show compliance with the applicable noise and vibration guidelines (discussed later). For EASR registration there must be compliance with O.Reg. 1/17. Technically, the requirements with respect to environmental noise for obtaining an ECA or EASR registration are very similar. That is, the same sound limits apply. The reporting and “approval” procedures are logistically different. Whether an operation/facility requires an ECA or qualifies for EASR registration depends on its specific activities (as determined by its NAICS code). O.Reg. 1/17 specifically lists the NAICS codes for industries which require ECA’s. All other industries must register on the EASR.

3.3 MECP D SERIES GUIDELINES - D-1, D-2 AND D-6

These MECP Guidelines (D series) are intended to assist in the planning process when new sensitive land uses are proposed within the potential influence area of existing facilities (stationary sources) or when new facilities are proposed where existing sensitive land uses would be within the new influence area.

Guideline D-6 addresses compatibility between Industrial Facilities and Sensitive Land Uses.

Guideline D-1 states:

“The objective of this guideline is to minimize or prevent, through the use of buffers, the exposure of any person, property, plant or animal life to adverse effects associated with the operation of specific facilities.”

Environmental noise is one identified, potential, source of adverse effect.

The D series guidelines rely upon distance between stationary and sensitive land uses as the default approach to addressing potential impacts expressed either as "influence areas" or "minimum separation distances" according to the Class of Industrial use being considered. Other types of buffers or mitigation are recognized, such as sound barrier berms, walls or buildings. Where a specific site is proposed for development, it is the proponent's responsibility, to investigate, propose and implement alternative forms of mitigation that can be located either at the source, elsewhere on the facility site, on the sensitive land use site, or on intervening sites.

Where noise is an issue, Guideline D-6 (4.6.1) requires MECP Guideline LU-131 to be used. LU-131 has now been replaced by Publication NPC-300 (see later).

The literal application of the separation distance recommendations of Guideline D-6 can be problematic.

The D series guidelines are broad guidelines that consider a variety of potential environmental impacts, including noise and air quality, etc. Distance separation alone is generally not an efficient mitigation technique for noise, because of the non-linear relationship between sound level and distance from a source. That is, the rate of fall-off of sound level diminishes with increasing distance. Thus, relying on distance alone to create land use compatibility with respect to noise can lead to inefficient use of infrastructure and available land. Including mitigation such as sound barriers, building orientation (e.g., direction that loading docks face), or noise control at source (e.g., equipment selection, silencers on fans, etc.) can often lead to appropriate compliance with noise criteria and land use compatibility, using separation distances less than the minimum identified in the D-6 guidelines.

Furthermore, the D series guidelines predate all versions of the PPS, more particularly the 2020 version, and the current noise guideline, NPC-300. In some respects, D-1 and D-6 are inconsistent with current planning policies. D-1 and D-6 together with recently replaced noise guideline LU-131 either discourage or attempt to preclude juxta positioning stationary sources and sensitive land uses, such as residential in mixed use settings, contrary to the current reality in many municipalities and the PPS policies.

The MECP has updated the applicable noise guideline to address this type of situation (see NPC-300 below). However, D-1 and D-6 are in need of updating to be consistent with current planning objectives and policy in the province. (We note that at the time of writing, the MECP is in the process of releasing a new land use compatibility guideline that would replace the D series guidelines. However, this new land use planning document is not yet finalized.)

It should be noted that in processing an application for an ECA or EASR where environmental noise is involved, MECP does not concern itself with D-6 and the distance separation approach;

MECP only concerns itself as to whether there is compliance with O.Reg 1/17 or the NPC-300 noise guidelines (whichever is applicable).

For these reasons, this report focuses on the numerical sound limits in NPC-300 (the numerical sound limits in O.Reg 1/17 are the same as those in NPC-300).

3.4 ENVIRONMENTAL VIBRATION CRITERIA

There are no vibration regulations or guidelines that are formally part of the land use planning process in Ontario, although vibration is defined as an environmental contaminant in the EPA.

The MECP has had a draft proposed vibration guideline relating to the effects of impulse vibration on people in buildings for a number of years (decades). An example of a source creating impulse vibration would be a metal stamping plant (e.g., producing auto parts). However, this draft vibration guideline has never been issued, although it is occasionally referred to and used by MECP. In the absence of any governmental regulations or guidelines, the railways have adopted their own vibration guidelines for reviewing proposed development adjacent to their rights-of-way. Canadian National Railways and Canadian Pacific Railways recommend a vibration velocity limit of 0.14 mm/sec overall (RMS). Vibration studies for railways are required when a site is located within 75 m of the rail right-of-way.

Some guidance about vibration criteria for people in buildings including residential uses may be found in ISO 2631, "Evaluation of Human Exposure to Whole-Body Vibration". However, it does not contain specific vibration limit recommendations.

The site is greater than 75 m from the rail right of way. As such, there are no anticipated significant sources of environmental vibration in the vicinity.

3.5 MECP GUIDELINE NPC-300

3.5.1 Introduction

In October 2013, MECP issued the updated noise guideline NPC-300 (although dated August 2013), replacing former noise guidelines LU-131, NPC-205 and NPC-232. Previously, LU-131 was the noise guideline for development of noise sensitive land uses such as residential. NPC205 and NPC-232 were the noise guidelines applying to stationary sources for ECA's in urban/suburban and rural areas, respectively. One of the major difficulties with the use of the previous MECP documents related to inconsistencies/discrepancies between the noise guidelines with respect to stationary sources. This caused unnecessary confusion and difficulty in planning sensitive land uses in the vicinity of stationary sources.

NPC-300 consolidates and harmonizes the various (noise) requirements related to planning new noise sensitive land uses, planning new stationary noise sources and environmental approvals for stationary sources, removing many of the former discrepancies. NPC-300 is more consistent with the PPS. Another purpose of the consolidation of environmental noise requirements in NPC-300 is to emphasize the link between local planning and environmental approvals.

NPC-300, as did LU-131, also contains noise criteria for transportation (road, rail and aircraft) sources for new noise sensitive development. In this case, only road and rail traffic noise are relevant as transportation sources.

The sound (noise) limit criteria of NPC-300 are summarized in Appendix A.

3.5.2 Road and Rail Traffic Noise

If the sound level at the exterior face of a dwelling, in terms of $L_{eq\ Day}$ (16-hour energy equivalent sound level – 0700-2300 hours or $L_{eq\ Night}$ (8-hour energy equivalent sound level - 2300-0700 hours), exceeds 65 dBA or 60 dBA (respectively), means must be provided so that windows can be kept closed, if desired, for noise control purposes and central air conditioning is required. For daytime sound levels between 56 and 65 dBA inclusive, or for nighttime sound levels between 51 and 60 dBA inclusive, there need only be the provision for adding air conditioning at a later date, at the occupant's discretion. A warning clause advising the occupants of the potential interference with some activities is also required.

For outdoor amenity areas ("Outdoor Living Areas" - OLA), the guideline is 55 dBA $L_{eq\ Day}$ (0700 to 2300 hours), with an excess not exceeding 5 dBA considered acceptable if it is technically not practicable to achieve the 55 dBA objective, providing warning clauses are registered on title. Note that for road and rail traffic sources, a balcony is not considered an OLA, unless it is the only OLA for the occupant and it is:

- at least 4 m in depth;
- outside the building facade; and
- unenclosed.

For indoor areas, the daytime guideline when dealing with road/rail traffic sources for sensitive spaces such as living/dining rooms, and bedrooms, private offices and conference rooms is $L_{eq\ Day} = 45\text{ dBA}/40\text{ dBA}$. For general office, reception areas, retail stores, etc., the daytime indoor guideline limit is $L_{eq\ Day} = 50\text{ dBA}/45\text{ dBA}$. The nighttime guideline for living rooms and dens is $L_{eq\ Night} = 45/40\text{dBA}$. For bedrooms at night, the indoor limit is $L_{eq\ Night} = 40\text{ dBA}/35\text{ dBA}$. There are no nighttime indoor sound level guideline limits for office or commercial uses. The architectural design of the building envelope (walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound limits. Where standard construction would otherwise result in exceeding the indicated noise limits, the building envelope elements must be upgraded.

3.5.3 Stationary Sources

Stationary sources are treated differently than transportation sources of noise. The sound limits apply at the exterior planes of windows associated with noise sensitive indoor spaces as well as outdoors in areas amenable for use (this applies to a 30 m radius around the dwelling, where large properties exist). Unlike for transportation sources, there are no indoor noise criteria. In the case of road/rail/aircraft noise, the building envelope must be designed (e.g., upgraded windows and exterior walls) to adequately reduce the sound to no more than the indicated indoor limit. In the case of stationary sources, since there are no indoor sound limits, only exterior plane of window sound limits, upgraded windows for sensitive (e.g. residential) land uses would not result in compliance with the noise guidelines even if adequate noise buffering of indoor spaces is achieved in practice.

A further difference between transportation and stationary source sound limits is the acoustic descriptor used. For stationary sources it is a one-hour L_{eq} as opposed to the 16-hour day and 8-hour night L_{eq} used for road sources. The one-hour time period results in more stringent criteria.

Tables C-5 to C-8 from NPC-300 summarize the stationary source sound limits, termed "exclusion limits". Tables C-5 and C-6 are for non-impulsive sources, such as machinery like fans,

compressors, chillers, etc. Tables C-7 and C-8 are for impulsive sources such as punch presses or coupling of tractors to trailers or coupling of railway cars (i.e. banging sounds). At any point of reception, the applicable stationary source sound limit is the relevant value in Table C-5 to C-8 or the ambient sound level whichever is higher. Regardless of ambient, a stationary source does not have to attenuate below the exclusion limits in Tables C-5 to C-8. That is, if the ambient sound level is less than the relevant values in the tables, the sound level limit is the applicable numerical value from the appropriate table. If the ambient sound level is higher than the relevant table entry, the ambient value becomes the sound limit for the stationary source at the point of reception. In many cases, particularly in urban areas, the ambient sound environment is dominated by, and determined by, road traffic sound (noise). In particular circumstances, in addition to traffic noise, the ambient sound level may also include contributions from existing adjacent stationary sources.

In Tables C-5 to C-8, a Class 1 Area is one where the sound environment around the clock is determined by the activities of people; i.e., an urban area. A Class 3 Area is one where the sound environment is determined primarily by the sounds of nature and where there is little road traffic: typical of a rural area. A Class 2 Area is one with the sound environment characteristics of Class 1 during day and Class 3 during evening and night.

Table C-5

Exclusion Limit Values of One-Hour Equivalent Sound Level (L_{eq} dBA)

Outdoor Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
0700 – 1900	50	50	45	55
1900 – 2300	50	45	40	55

Table C-6

**Exclusion Limit Values of One-Hour Equivalent Sound Level (L_{eq} dBA)
Plane of Window of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
0700 – 1900	50	50	45	60
1900 – 2300	50	50	40	60
2300 – 0700	45	45	40	55

For impulsive sounds, the guideline sound limits are in Tables C-7 and C-8 of NPC-300.

Table C-7
Exclusion Limit Values for Impulsive Sound Level (L_{LM} dBAI)
Outdoor Points of Reception

Time of Day	Actual # of Impulses in Period of One-Hour	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
0700 – 2300	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 for Impulsive Sound Level (L_{LM} dBAI)
Plane of Window – Noise Sensitive Spaces

Actual # of Impulses in Period of One-Hour	Class 1 Area 0700 –2300/ 2300-0700	Class 2 Area 0700 –2300/ 2300-0700	Class 3 Area 0700 –1900/ 1900-0700	Class 4 Area 0700 –2300/ 2300-0700
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

The Class 4 Area is newly introduced in NPC-300. This is an area or a specific site that would otherwise be Class 1 or 2 and which is:

- intended for development with new sensitive land use(s) that are not yet built;
- is in proximity to existing, lawfully established stationary source(s);
- has formal confirmation from the land use planning authority (the municipality in this case) that it agrees with classifying the site or area in question as Class 4.

Existing noise sensitive land uses cannot be classified as Class 4; that is, it cannot be used retroactively. Class 4 is intended to be used where compliance with Class 1 or 2 noise criteria is

not practical for valid technical, administrative or financial reasons. Further discussion of Class 4 and its use is found later.

4.0 CLASS 4

4.1 USE AT THE SUBJECT SITE

It is recommended that the subject site be deemed a Class 4 receptor under MECP noise guideline NPC-300, by the City of Toronto.

The Class 4 status is being recommended to better promote land use compatibility between the new sensitive-uses and the existing commercial/industrial uses in the area. The subject site meets the requirements from the MECP for Class 4 consideration. The Class 4 status is considered appropriate for this site since:

- The site is intended for new sensitive uses and is in proximity to several existing industrial/commercial operations.
- There will be a future transit stop within 250 m of the site. Thus, it is in the long-term interest of the city to redevelop these lands and bring greater transit ridership. The Class 4 status will better facilitate this transition.
- The subject site is also located in the Major Transit Station Area (“MTSA”). The conversion of the lands within MTSA’s is contemplated by the Province on Policy 2.2.5.10 c) of the Growth Plan. An increase in density can be achieved on the site to realize the significant investment in public transit being made by the City of Toronto, as well as the Provincial and Federal Governments. The development of a low density, car-oriented retail/service commercial development would not maximize ridership along the Scarborough Subway Extension.
- The Class 4 status was specifically designed for situations such as this where there are existing stationary sources and there is desire to develop new sensitive uses in proximity and mitigation to meet the otherwise applicable sound levels limits (Class 1 in this case) would not be practicable/feasible.
 - For example, the concrete plant has a line-of-sight to the new sensitive uses. Mitigation for truck activity at the plant would require enclosures over the loading and washing areas. Given the space constraints, financial implications, and potential temporary nature of the sources (see below), this form of mitigation would not be feasible.
- The Class 4 status allows for at-receptor, “on-building” noise control measures to be used at the new sensitive uses. At-receptor, on-building noise control measures would otherwise be precluded in a Class 1 or 2 area. That is, in Class 4 receptor areas, there is a wider range of at-receptor noise mitigation measures that are acceptable, compared to the other classes. For high-rise multi-family buildings, there are several situations where on-building noise control measures are the most practicable.
- The use of Class 4 is mutually beneficial for both the commercial/industrial uses as well as the new community, in that the higher sound levels afforded by the Class 4 status can be used for approval of the development as well as any future approvals that may be needed for the industries from the MECP. The use of Class 4 will better promote the long-term viability and operation of the industrial/commercial uses.

- It is important to note that, like for transportation noise sources, in Class 4 receptor areas, it is assumed that windows are closed for noise control purposes. In Class 1, 2, and 3 areas, windows are assumed to be open. This is the reason that the exterior plane of window sound levels for Class 4 are higher than for Class 1 or 2. The net effect on indoor sound levels under these circumstances is nil.
- The subject site is an infill development and part of an overall area in transition.
 - It is expected that at least some of the existing industrial/commercial uses in the area will eventually be converted to sensitive uses. The commercial plaza to the east is planned for redevelopment to a mixed-use site with residential towers, similar to the subject site. There are also plans to extend Nugget Avenue through the Dufferin Concrete site.
 - As such the current noise environment is likely temporary and only an interim condition prior to the redevelopment of the area.

In summary, based on all of the above, it is concluded that the Class 4 receptor classification under NPC-300 is the most appropriate receptor class for sensitive land uses in this proposed development. However, given that the area is one in transition the Class 4 status should be reviewed at the time of the formal land use approval application to better reflect the existing environment and surrounding land uses at the time.

4.2 CLASS 4 WARNING CLAUSE

If the site is made Class 4, warning clauses should be registered on title to inform future occupants/residents of the noise situation. This is in accordance with both NPC-300. Sample wording for the warning clause is given in NPC-300. A recommended, revised version is given below:

“Purchasers/tenants are advised that sound levels due to adjacent industry or infrastructure 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. Notwithstanding any noise mitigation at source or in the design of this development and individual dwellings, noise from the industrial/infrastructure facilities may at time interfere with some activities of the dwelling occupants. In the event of such an occurrence, residents are advised to close the windows.”

5.0 NOISE SOURCES

5.1 TRANSPORTATION NOISE SOURCES

5.1.1 Road Traffic

The road traffic noise sources with potential to impact the proposed development are vehicles using Sheppard Avenue East and McCowan Road. Highway 401 and Brimley Road are approximately 1000 m to the south and 500 m to the west of the west of the subject site, respectively. Due to the distance separation, these roads are not expected to have a significant impact at the subject site. Thus, these roadways have not been included in the assessment.

Road traffic volumes for Sheppard Avenue East at McCowan Road (year 2019) were obtained from the City of Toronto Traffic Safety Unit. Daily (24-hour) volumes were obtained by multiplying the 8-hour turning movement count data by a factor of 2.2. A day/night split of 90%/10% was used for all roads, as is typical for well-travelled roadways. A growth rate of 2%, compounded annually, was used to obtain future (year 2031) traffic volumes. Overall truck percentages were obtained from the turning movement counts. The ratio of heavy trucks to medium trucks was assumed to be 60%/40% of the total truck volume. Buses were considered as medium trucks.

The traffic data is summarized in the table below.

TABLE 1 ROAD TRAFFIC DATA⁽¹⁾

Roadway	24-Hour Traffic Volume	Truck Percentages (%)		Speed (km/h)	Day/Night Split (%)
		Medium	Heavy		
Sheppard Avenue East	31 638 (40 125)	6.3	6.2	50	90/10
McCowan Road	51 207 (64 943)	7.3	6.4	50	90/10

Note:

- (1) Year 2019 traffic volumes for Sheppard Avenue East and McCowan Road were obtained from the City of Toronto. The future traffic volumes (shown in parentheses) were obtained by projecting the existing counts at a growth rate of 2%, compounded annually. Medium and heavy trucks were assumed to be 40% and 60%, respectively, of the total truck volume. The day/night split was assumed.

5.1.2 Rail Traffic

The CP Belleville Subdivision is located approximately 120 m to the north of the subject site. Rail traffic on the CP Belleville Subdivision consists of freight trains.

Rail traffic data applicable to the year 2016 was obtained from CP. The rail traffic volumes were escalated to the year 2031 using a growth rate of 2.5%, compounded annually. This growth rate is recommended by MECP and rail authorities in preparing environmental noise studies.

The rail traffic data is summarized in the table below.

TABLE 2 RAIL TRAFFIC DATA

Period	Train Type	# of Trains	# Average of Cars / Train	# Average of Locomotives / Train	Maximum Speed (km/h)
Daytime (0700 to 2300)	Freight ⁽¹⁾	19 (27.5)	54	2	97
Nighttime (2300 to 0700)	Freight ⁽¹⁾	9 (13.0)	54	2	97

Note:

- (1) Obtained from CP for the year 2016. Data shown in brackets was projected to the year 2031 with a 2.5% growth rate, compounded annually.

5.2 STATIONARY NOISE SOURCES

5.2.1 Existing Sources

5.2.1.1 Stationary Sources Included in Assessment

The surrounding uses with the potential for noise impact and for which additional investigation has been done include:

Dufferin Concrete (1940 McCowan Road)

- The Dufferin Concrete facility is a concrete batching plant that consists of stockpile areas, a maintenance building, parking and storage for the ready-mix trucks. Based on observations of the plant from the subject site and knowledge of other similar facilities: traffic enters and leaves the facility using driveways from McCowan Road; Dump trucks are used to deliver aggregate materials to the stockpile area; A front-end loader then transfers the aggregate to the batching plant through a hopper and conveyor system; Cement is delivered using trucks with on-board blowers and transferred to the storage silos; The cement deliveries occur at the north side of the building. Ready mix trucks are loaded and washed at the south side of the building.

Canadian Tire (4630 Sheppard Avenue East)

- The Canadian Tire retail store is the anchor tenant in the adjacent commercial plaza to the east. The store is at the west side of the plaza, closest to the proposed development. Potential noise sources at the Canadian Tire store are truck activities at the loading docks and the rooftop mechanical equipment.

Commercial/Light Industrial Plaza (4500 Sheppard Avenue East)

- A multi-tenant commercial/light industrial facility is located to the west of the church and commercial/office building. There are loading docks facing the subject site. The main noise source associated with this facility would be the truck activities on site.

Fire Training Facility (4560 Sheppard Avenue East)

- Toronto Fire Station 243 is located to the immediate west of the subject site. Under NPC-300, noise sources associated with emergency operations are exempt from the noise guideline limits. Noise associated with the fire trucks responding to emergency calls was therefore not included in the assessment. However, there is an emergency simulator at the north side of the site that is used for firefighter training. Noise associated with the training facility was included in the assessment.

Canadian Pacific Railway (CP) Toronto Yard

- The CP Toronto Yard is located to the northeast of the subject site, at a distance of about 400 m to the southwestern entrance of the yard and about 1.6 km to the centre of the yard. The CP Toronto Yard is a marshalling yard used to switch freight cars. The yard was originally designed as a hump yard, but has since transitioned to a Remote Control Locomotive System. As such, significant impulse noise is not expected from activities at the yard. The most significant noise source would be locomotive noise during train movements when in proximity to the site. Idling noise within the yard occurs far enough away that significant noise impact

would not be expected. It is understood that trains occasionally use the tracks at the yard entrances as “pull-back” tracks, where a train can move back and forth on the line when assembling railcars. Train movements along the entrance to the yard (to the northeast corner of the subject site) were thus included in the assessment.

FIGURE 31 shows the locations of the stationary noise sources relative to the subject site.

5.2.1.2 Stationary Sources Not Included in Assessment

There are existing commercial/light industrial uses along the north side of the CP rail line. An inventory of these uses is included in Appendix B. Most of these facilities will have minimal noise emissions or are far enough away to not have any significant noise impact at the subject site.

In addition, a commercial/office building (4544 Sheppard Avenue East) and the Toronto East Seventh-Day Adventist Church (4548 Sheppard Avenue East) are located approximately 90 m and 50 m, respectively, to the west of the subject site. The main noise sources associated with these facilities are the rooftop mechanical units. Due to the distance separation and the high ambient sound level due to road traffic on Sheppard Avenue West, noise from the commercial/office building and the church is not expected to have a significant impact at the subject site. Thus, noise from these facilities has not been considered further in this assessment.

5.2.2 Future Potential Noise Sources in Proposed Development

As indicated earlier, in addition to sensitive uses, the northernmost building in the development will be an office. There will likely also be retail/commercial uses integrated into the lower levels of the residential buildings.

These uses would not be expected to have any significant noise sources. The only anticipated noise source would be the mechanical equipment used for comfort heating and air conditioning. These uses would need to be designed to meet sound emission limits in Publication NPC-300. Doing so would be a matter of proper engineering during development design. As such, these uses are not considered further in this report.

6.0 VIBRATION SOURCES

The CP rail line is approximately 120 m from the northernmost building in the subject site. In addition, there are no heavy industrial uses (e.g. stamping plants) in close proximity to the site. Due to the distance separation from the rail line and the nature of the surrounding uses, there are no anticipated sources of significant environmental vibration. Thus, vibration impact at the site has not been considered further in this assessment.

7.0 ENVIRONMENTAL NOISE ASSESSMENT PURSUANT TO NPC-300

7.1 TRANSPORTATION NOISE SOURCES

Using the road and rail traffic data in Tables 1 and 2, respectively, the sound levels, in terms of $L_{eq\ Day}$ and $L_{eq\ Night}$, were calculated using STAMSON – ORNAMENT/STEAM, the road and rail traffic noise prediction models of the MECP.

7.1.1 Predicted Future Transportation (Road or Rail) Noise Impact

The highest daytime sound levels of 71 dBA are predicted to occur at the south facade of Tower A, adjacent to Sheppard Avenue East. The highest nighttime sound level of 64 dBA is predicted to occur at the north facade of Tower C, in the direction of the rail line. The predicted daytime (L_{eq16}) and nighttime (L_{eq8}) road and rail traffic sound levels at all buildings within the development are shown in Table 3.

TABLE 3 PREDICTED UNMITIGATED SOUND LEVELS OUTDOORS – ROAD AND RAIL TRAFFIC

Location ⁽¹⁾	Source	Distance (m) ⁽²⁾	L_{eq} Day (dBA) ⁽³⁾	L_{eq} Night (dBA) ⁽³⁾
<u>Tower A</u>				
Southeast Corner (South Facade)	Sheppard Avenue East	31	70	64
	McCowan Road	222	61	54
	TOTAL	-	71	64
Southeast Corner (East Facade)	Sheppard Avenue East	31	67	60
	McCowan Road	222	64	57
	CP Belleville Subdivision	339	58	58
	TOTAL	-	69	63
Southwest Corner (West Facade)	Sheppard Avenue East	31	67	60
	CP Belleville Subdivision	330	60	59
	TOTAL	-	68	63
Northwest Corner (North Facade)	McCowan Road	253	59	53
	CP Belleville Subdivision	304	61	61
	TOTAL	-	63	61
<u>Tower B</u>				
Southeast Corner (South Facade)	Sheppard Avenue East	87	65	58
	McCowan Road	258	57	50
	TOTAL	-	65	59
Southeast Corner (East Facade)	Sheppard Avenue East	87	61	54
	McCowan Road	258	61	54
	CP Belleville Subdivision	275	57	57
	TOTAL	-	65	60
Southwest Corner (West Facade)	Sheppard Avenue East	118	61	55
	CP Belleville Subdivision	237	61	61
	TOTAL	-	64	62
Northwest Corner (North Facade)	McCowan Road	285	58	51
	CP Belleville Subdivision	237	62	62
	TOTAL	-	63	62

.../cont'd

TABLE 3 PREDICTED UNMITIGATED SOUND LEVELS OUTDOORS – ROAD AND RAIL TRAFFIC (continued)

Location ⁽¹⁾	Source	Distance (m) ⁽²⁾	L _{eq} Day (dBA) ⁽³⁾	L _{eq} Night (dBA) ⁽³⁾
<u>Tower C</u>				
Southeast Corner (South Facade)	Sheppard Avenue East	149	61	55
	McCowan Road	222	61	54
	TOTAL	-	64	57
Southeast Corner (East Facade)	Sheppard Avenue East	149	60	54
	McCowan Road	222	64	57
	CP Belleville Subdivision	228	60	59
	TOTAL	-	66	62
Southwest Corner (West Facade)	Sheppard Avenue East	178	57	51
	CP Belleville Subdivision	191	62	62
	TOTAL	-	63	62
Northwest Corner (North Facade)	McCowan Road	250	60	54
	CP Belleville Subdivision	191	64	63
	TOTAL	-	65	64
<u>Building D</u>				
Southeast Corner (South Facade)	Sheppard Avenue East	203	59	-
	McCowan Road	221	61	-
	TOTAL	-	63	-
Southeast Corner (East Facade)	Sheppard Avenue East	203	59	-
	McCowan Road	221	64	-
	CP Belleville Subdivision	176	61	-
	TOTAL	-	66	-
Southwest Corner (West Facade)	Sheppard Avenue East	225	58	-
	CP Belleville Subdivision	136	63	-
	TOTAL	-	65	-
Northwest Corner (North Facade)	McCowan Road	284	60	-
	CP Belleville Subdivision	136	65	-
	TOTAL	-	66	-

Notes:

- (1) See Figure 2.
- (2) Distance shown is from the centre line of the noise source to the indicated facade
- (3) Daytime and nighttime sound levels were predicted at the top storey of each building.

The road and rail noise analysis results are used to determine the sound isolation requirements for building envelope design, in order to achieve the indoor road and rail noise criteria. Similarly, these results are used to determine whether road and rail noise mitigation is needed for outdoor living (amenity) areas.

7.2 TRANSPORTATION NOISE SOURCES - NOISE ABATEMENT REQUIREMENTS

7.2.1 Architectural Upgrades

Based on the predicted sound levels, it is expected that upgrades to the building envelope construction will be required for all buildings in the development.

Floor plans and elevations are not yet available. In determining the worst-case architectural requirements, wall and window areas were assumed to be 20% and 80%, respectively, of the associated floor area, on each facade of a corner room with both facades directly exposed to and at an angle to the noise sources, for living/dining rooms and bedrooms in Towers A to C and private offices in Building D.

Based on the predicted sound levels:

- Exterior wall construction should meet a minimum STC 54 construction; and
- Exterior windows should meet a minimum STC 37.

The assessment should be reviewed once detailed floor plans and elevations for the dwellings are available.

7.2.2 Ventilation Requirements

The sound levels are such that all suites in the development will require mandatory air conditioning to allow windows to remain closed for noise control purposes.

7.2.3 Outdoors – Sound Barriers

The sound barrier requirements for the proposed development will depend on the setback distance and orientation of the amenity areas relative to the traffic noise sources. At this early stage of the development, the site layout has not been finalized nor detailed. Detailed sound barrier assessments are therefore premature. However, general guidance on the expected requirements is provided below.

Towers A to C will likely not have grade level amenity spaces but may have balconies or terraces. For balconies/terraces that are less than 4 m in depth, the NPC-300 OLA sound level limits do not apply. Thus, sound barriers would not be required at these locations.

The sound level limits do apply at balconies/terraces that are greater than 4 m in depth, provided they are the only OLA for the occupants. Terraces in proximity to Sheppard Avenue East or the rail line would likely require sound barriers to meet the noise guideline limits. At locations that are farther setback from the roadways and rail line, it is expected that the sound level limits can be met without sound barriers, or with sound barriers that are the height of typical safety parapets/railings.

Acoustic fences/sound barriers must be of solid construction with no gaps, cracks or holes and have a minimum surface density of 20 kg/m² (4lbs/ft²).

Sound barrier requirements should be determined as part of the detailed noise studies to be completed later.

7.3 STATIONARY SOURCES

7.3.1 Acoustic Modelling

A 3-D acoustic model of the subject site and neighbouring industries, as shown on Figures 3A to 8B, was developed to predict the potential sound levels at the residential points of reception from the neighbouring facilities. The model was developed using the CadnaA v2020 MR1 environmental noise modelling software, which implements the protocols of ISO Standard 9613-2, "Acoustics – Attenuation of Sound During Propagation Outdoors". Two orders of sound reflection were included in the analysis. Paved areas were modelled as hard ground ($G=0.0$). All other areas were modelled as soft ground ($G=1.0$).

The sound levels at the building facades were assessed using the Building Evaluation feature in CadnaA, which calculates the sound levels at each storey, at multiple points around a building facade. The number shown in the centre of the octagon represents the highest sound level at any storey at the corresponding location along the facade. Locations with excesses over the Class 4 guideline limits are shown in red. Locations that comply with the Class 4 guideline limits are shown in white.

Note that the office building is not considered noise sensitive relative to stationary sources. Thus, there are no points of reception on the office building.

7.3.2 Applicable Noise Limits

The applicable sound limit for any stationary source at any point of reception is the higher of the exclusion limits in Tables C-5 to C-8 in NPC-300, or the ambient (background) sound level, typically established by road traffic.

It is likely that once the site is built out, the ambient would exceed the minimum exclusion limits at the buildings closest to Sheppard Avenue East, at least in the daytime. However, for this preliminary assessment, the Class 4 minimum exclusion limits (most stringent) have been used.

7.3.3 Dufferin Concrete

The Dufferin Concrete plant is located to the north of the subject site. This facility operates from 0600 to about 1700 hours. The facility operates under an Amended Environmental Compliance Approval Number 5084-757LAM dated March 26, 2015.

For this preliminary assessment, noise from the concrete facility was modelled using VCL sound measurements of activities at similar facilities. Spot measurements were done on the subject site to confirm that the predicted sound levels were similar to the measured levels.

Cement deliveries are done using trucks with on-board blowers. Personnel from Rossbro Group visited the site to observe the operations. It is understood that the offloading is done at a reduced pressure (maximum 12.5 PSI), which results in reduced noise emissions from the activity. VCL personnel completed sound measurements from the subject site to confirm the sound levels. Sound levels from the cement offloading were much lower relative to the other activities at the facility, specifically the filling of concrete trucks. The reference sound level from the activity was derived from the measurement data. To be conservative a 5 dB penalty was added to this source, even though tonality was not observed on the site, as these sources often exhibit this characteristic.

The noise sources and operating times used in the assessment are summarized in Table 4. See Figure 3A for source locations.

Note, it is understood that although the site opens at 0600, the first trucks do not leave the site until around 0630. Thus, in this nighttime (0600 to 0700) hour it was assumed that the activities were less than in the typical daytime hours, as the plant most likely ramps up its operations to normal capacity after opening. The operating times during the 0600 to 0700 hour were therefore assumed to be 50% of the operating times during the busiest daytime/evening hour.

TABLE 4 NOISE SOURCES AT DUFFERIN CONCRETE

Source ID	Source Description	Sound Power Level (dBA)	Source Height (m) ⁽²⁾	Operating Time (min/hour or movements/hour)	
				Daytime	Nighttime
TrkIdle01	Ready mix truck idling before loading	101	2.4	10	10
TrkIdle02	Ready mix truck idling before loading	101	2.4	10	0
TrkIdle03	Ready mix truck idling before loading	101	2.4	10	10
TrkIdle04	Ready mix truck idling before loading	101	2.4	10	0
TrkIdle05	Ready mix truck idling before loading	101	2.4	10	10
TrkIdle06	Ready mix truck idling before loading	101	2.4	10	0
TrkIdle07	Ready mix truck idling before loading	101	2.4	10	10
TrkIdle08	Ready mix truck idling before loading	101	2.4	10	0
TrkIdle09	Ready mix truck idling before loading	101	2.4	10	10
TrkIdle10	Ready mix truck idling before loading	101	2.4	10	0
Maintenance_Bay	Sound emitted from overhead door in maintenance building	104	2.5	10	5
DustCollector	Dust collector at loading area	96	5.0	60	30
CementTrk_Loading	Cement truck unloading at silo	105 ⁽³⁾	1.0	60	30
ReadyMix_Load	Ready mix trucks being loaded	114	3.5	50	25
ReadyMix_Wash1	Ready mix trucks being washed	103	1.5	60	30
ReadyMix_Wash2	Ready mix trucks being washed	103	1.5	60	30

.../cont'd

TABLE 4 NOISE SOURCES AT DUFFERIN CONCRETE (continued)

Source ID	Source Description	Sound Power Level (dBA)	Source Height (m) ⁽²⁾	Operating Time (min/hour or movements/hour)	
				Daytime	Nighttime
ReadyMixTrk_Movement	Ready mix trucks moving from parking area, loading, washing and exiting site (travelling at 10 km/h)	106	2.4	10 movements	5 movements
CementTrk_Movement	Cement truck arriving, unloading and departing (travelling at 10 km/h)	106	2.4	1 movement	1 movement
AggregateTrk_Movement	Aggregate truck arriving, unloading and departing (travelling at 10 km/h)	106	2.4	1 movement	1 movement
FEL	Front end loader moving aggregate from yard to hopper	105	2.5	60	30

Notes:

- (1) See Figure 3A for source locations.
- (2) Source heights relative to grade.
- (3) A 5 dB tonal penalty was added to the sound power level shown in the table as part of the modelling of the cement truck.

The predicted daytime sound levels are shown on Figure 3B. The results of the modelling indicate that sound levels up to 66 dBA are predicted to occur at the north and east sides of Tower C during the daytime. This exceeds the 60 dBA daytime Class 4 noise guideline limits. Sound levels up to 57 dBA, 56 dBA and 63 dBA are predicted to occur at Towers A, B and C, respectively, during the nighttime (0600 to 0700). This exceeds the 55 dBA nighttime Class 4 guideline limits. Figure 3C (a 3D view from the northeast) shows the extents of the excesses along the facades.

7.3.4 Canadian Tire

The Canadian Tire store is located to the east of the subject site. The store is open during the daytime and evenings only. However, truck deliveries may occur during the early morning (nighttime) hours. Details of the operations will need to be confirmed at the time of the detailed noise studies.

The noise sources and operating times used in the assessment are summarized in Table 5. The noise sources were modelled using VCL library data. See Figure 4A for source locations.

TABLE 5 NOISE SOURCES AT CANADIAN TIRE

Source ID ⁽¹⁾	Source Description	Sound Power Level (dBA)	Source Height (m) ⁽²⁾	Operating Time (min/hour or movements/hour)	
				Daytime / Evening	Nighttime
HVAC01 to HVAC07	Rooftop HVAC units (large)	94 (each)	1.7 ⁽³⁾	60	30
HVAC08 to HVAC10	Rooftop HVAC units (small)	76 (each)	1.3 ⁽³⁾	60	30
TrkIdle01	Truck idling at loading dock	101	2.4	10	10
TrkIdle02	Truck idling at loading dock	101	2.4	10	0
Trk_Movement	Trucks arriving and departing the loading dock (travelling at 10 km/h)	106	2.4	2 movements	1 movement

Notes:

- (1) See Figure 4A for source locations.
- (2) Source heights relative to grade unless otherwise noted.
- (3) Source heights relative to the top of the roof.

The predicted levels are shown on Figure 4B. The assessment shows that the sound levels up to 62 dBA are predicted to occur during the daytime/evening and sound levels up to 60 dBA are predicted to occur during the nighttime at the east facade of Tower C. This exceeds the 60 dBA daytime/evening and 55 dBA nighttime Class 4 limits. Figure 4C (3D view from the northeast) shows the extents of the excesses along the facades. The sound levels are predicted to meet the Class 4 limits at Towers A and B.

7.3.5 Commercial/Light Industrial Plaza

The commercial/light industrial plaza is located to the west of the subject site.

Based on aerial imagery, the rooftop mechanical units at the plaza are relatively small. Due to their size and the distance separation, these units are not expected to have a significant impact at the subject site. Activities at the east-facing loading docks (i.e. in the direction of the subject site) are expected to have the greatest noise impact.

The noise sources and operating times used for this assessment are summarized in Table 6. See Figure 5A for source locations.

TABLE 6 NOISE SOURCES AT COMMERCIAL/INDUSTRIAL PLAZA

Source ID ⁽¹⁾	Source Description	Sound Power Level (dBA)	Source Height (m) ⁽²⁾	Operating Time (min/hour or movements/hour)	
				Daytime / Evening	Nighttime
TrkIdle01 to TrkIdle05	Trucks idling at east facing loading docks	101 (each)	2.4	10	10
Trk_Movement	Trucks arriving and departing site (travelling at 10 km/h)	106	2.4	12 movements	12 movements

Notes:

- (1) See Figure 5A for source locations.
(2) Source heights relative to grade.

The predicted daytime/evening/nighttime sound levels due to the plaza are shown on Figure 5B. The assessment shows that the predicted sound levels meet the Class 4 guideline limits at all buildings on the subject site without the need for mitigation measures.

7.3.6 Fire Training Facility

The firefighter training facility is located to the west of the subject site. The fire training simulator is used during the daytime hours only (0700 to 1600).

The site consists of a 3-storey tower simulator in the approximate centre of the training site and an enclosed burn-container (appears to be constructed from two sea containers offset by a vertical height of about 1.5 m) at the rear of the property. Personnel from Rossbro Group visited the site to observe the operations. It is understood that the tower is used 1 or 2 times per year. Thus, this would be an infrequent source and would not be required to be included in the assessment, per NPC-300. There are about 25 drills per year using the enclosed burn-container. The drill lasts about 30 minutes, most of which is preparation. The burn-container was in use during a site visit (at the subject site) by VCL staff. The main noise source associated with the simulator was observed to be a single, tonal source (although not entirely clear, the source seems to be a fan or pump linked to the burn container).

The noise source and operating times used in the assessment are summarized in Table 7. The noise sources were modelled using sound measurements done by VCL staff from the subject site. See Figure 6A for source location. Note that a 5 dB penalty was applied to the source sound level to account for the tonal nature of the sound.

TABLE 7 NOISE SOURCES AT COMMERCIAL/INDUSTRIAL PLAZA

Source ID ⁽¹⁾	Source Description	Sound Power Level (dBA)	Source Height (m) ⁽²⁾	Operating Time (min/hour)	
				Daytime / Evening	Nighttime
FireTraining	Firefighter training simulator	104 ⁽³⁾	2.0	30	0

Notes:

- (1) See Figure 6A for source locations.
- (2) Source heights relative to grade.
- (3) A 5 dB tonal penalty was added to the sound power level shown in the table as part of the modelling.

The predicted daytime/evening sound levels are shown in Figure 6B. The assessment shows that the sound levels up to 59 dBA are predicted to occur during the daytime/evening at the subject site, which meets the Class 4 guideline limits.

7.3.7 CP Toronto Yard

The CP rail yard is located to the northeast of the subject site. Activities at the rail yard can occur 24 hours a day.

As discussed above, the main noise source associated with the rail yard is the locomotive movements within the yard. The locomotive movements at the southwest entrance to the rail yard are expected to have the greatest impact at the subject site. To be conservative, the analysis considers one train moving back and forth on the section of rail line in proximity to the site for a full hour at any time.

The noise source and operating times used in the assessment are summarized in Table 8. The noise sources were modelled using a reference sound levels for a moving freight train done by VCL staff at a similar rail yard. See Figure 7A for source location

TABLE 8 NOISE SOURCES AT CPR TORONTO YARD

Source ID ⁽¹⁾	Source Description	Sound Power Level (dBA)	Source Height (m) ⁽²⁾	Operating Time (min/hour or movements/hour)	
				Daytime / Evening	Nighttime
RailYard_Movements	Train movements at the entrance to the yard	111	4.0	60	60

Notes:

- (1) See Figure 7A for source locations.
- (2) Source heights relative to grade.

The predicted daytime/evening/nighttime sound levels are shown in Figure 7B. The assessment shows that the highest sound level of 53 dBA is predicted to occur at the north facade of Tower C. Due to the increased distance separation from the rail yard, the sound levels are lower at Towers A and B. The daytime, evening and nighttime Class 4 limits are met at all towers.

7.3.8 Mitigation and Discussion

The analysis shows that the Class 4 guideline limits are exceeded at Towers A, B and C. At-source mitigation measures are not practical for the adjacent facilities. For the concrete facility, the major sources are the trucks, the sound barriers would need to be high enough to break the line-of-sight between the windows of the suites on the upper storeys of the tower and the concrete facility. At the Canadian Tire facility, the loading dock would need to be fully enclosed, and the rooftop units would need to be replaced with quieter units or mitigated with custom acoustic enclosures. These mitigation measures are not considered feasible.

As mentioned above, it is noted that there are also plans to re-develop the commercial plaza to the east with the high-rise mixed-use development, similar to that proposed on the subject site. It is therefore expected that this noise source would not be operating in the long term. Further, it is noted that there are future plans to extend Nugget Avenue west through the current site of the Dufferin Concrete facility. The time frame for this extension is unknown. When the extension does occur, Dufferin Concrete would likely need to move to accommodate the road allotment.

To address the interim condition (i.e. while these facilities continue to operate), “on building” noise mitigation measures, such as enclosed noise buffers (ENB), could be used at noise sensitive windows where excesses over the Class 4 guideline limits occur. (Note, an enclosed noise buffer is a form of on-building noise control measures, which can only be used in a Class 4 area. It cannot be used for Class 1, 2 or 3 areas).

The ENB concept means an enclosed area outside of the exterior wall of a building such as an enclosed balcony specifically intended to buffer one or more windows of noise sensitive spaces. The exterior balcony is glassed in to protect the balcony space from excessive noise levels. The noise sensitive spaces within the building (i.e., bedrooms, living/dining rooms, etc.) have their windows opening into the ENB instead of directly to the building exterior.

As indicated in NPC-300, the characteristics of an enclosed noise buffer (ENB) are:

- not less than 1 m and not more than 2 m deep;
- fully enclosed with floor to ceiling glazing or a combination of solid parapet plus glazing above that can potentially be operable to the maximum permitted by the OBC;
- separated from interior space with a weatherproof boundary of exterior grade wall, exterior grade window, exterior grade door, or any combination, in compliance with exterior envelope requirements of the OBC;
- of sufficient horizontal extent to protect windows of noise sensitive spaces; and
- the architectural design is not amenable to converting the enclosed space to being noise sensitive.

Where an ENB is provided, the exterior plane of window point of reception does not apply to the enclosed noise buffer. However, the planes of window on the facade of the building in the enclosed noise buffer are considered to be points of reception. The exterior glazing will still need to be designed to ensure the guideline limit is met at the exterior plane of sensitive windows within the ENB.

Another “on building” noise control measure that could be considered is the buffer window concept. This concept was approved by the MECP as an acceptable receptor-based noise mitigation measure in a Class 4 area.

It is noted that the buffer window concept is not a typical control measure and may require MECP approval for use, given that Dufferin Concrete has an ECA. This concept, if approved, would be reviewed by the Ministry at the time of a future application.

The locations requiring mitigation are shown in Figures 8A and 8B.

Note, if the proposed development is deemed Class 4, the buildings must be provided with air conditioning. This will allow windows to remain closed for noise control purposes. In addition, warning clauses must be registered on title to make future occupants aware of the noise situation. The warning clause must be included in all Offers of Purchase and Sale, lease/rental agreements and condominium declarations for all units within the building:

“Purchases/tenants are advised that sound levels due to adjacent commercial plaza 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.”

Upgrades to the exterior wall and window construction may also be appropriate if the proposed development is deemed Class 4. This can be investigated further as part of any future study.

8.0 THE EFFECT OF THE PROJECT ON THE NEIGHBOURHOOD

The main source of noise associated with this development, with the potential for significant impact on surrounding buildings, is the mechanical equipment.

Mechanical equipment interfacing to the outdoors must comply with the MECP noise guideline limits in NPC-300. By proper engineering design, all requirements can be met and no significant noise impact would be created for surrounding uses. Appropriate choice of location, equipment type, and noise control features should be considered during detailed design for such items as rooftop equipment and air intakes and exhausts, including underground parking garage ventilation systems. The noise emissions from parking garage air shafts located immediately adjacent to residential uses can be designed to comply with the noise guideline limits by acoustically lining the shaft and/or providing silencers.

For any emergency generators, appropriate steps should be taken to ensure that the equipment placement, treatment, and the routine testing schedule will not generate significant noise impact on neighbouring properties. The generator will require silencers on the intake and exhaust cooling air paths, as well as a muffler on the combustion exhaust.

The additional road traffic generated by this project will be small relative to existing traffic volumes within the general area and is not expected to create significant additional noise impact.

9.0 THE EFFECT OF THE PROJECT ON ITSELF

Consideration should be given to the control of airborne and/or structure-borne noise generated within the building as part of the detailed design. The major items requiring attention are the common boundaries and building services.

The common boundaries, in general, are those between adjacent noise sensitive areas (such as two adjacent residential units) and between noise sensitive areas and noisy service areas (such as a residential unit and a mechanical space). Building services that will need to be addressed during the design of these buildings include mechanical equipment, plumbing and electrical equipment. A suitable environment can be provided for the future occupants through the proper building design.

9.1 COMMON BOUNDARIES

The Ontario Building Code (OBC) has requirements for airborne sound isolation of residential units. The requirements apply to both separating partitions between spaces (direct path) as well as flanking partitions (i.e. any path, other than the direct path, that allows the transmission of sound between spaces). The requirements are:

- The demising partition separating a *dwelling unit* from an elevator shaft or a refuse chute must have an *STC* rating not less than 55.
- A *dwelling unit* shall be separated from every other space in a *building* in which noise may be generated by:
 - a separating assembly and adjoining construction, which, together, provide an *apparent sound transmission class (ASTC) rating* not less than 47 (note that the *ASTC* accounts for all flanking sound paths); or
 - a separating assembly that provides an *STC* rating not less than 50 and adjoining construction that conforms to prescribed methods outlined in the OBC.

There are no requirements for impact noise control in the OBC. However, a minimum Impact Insulation Class (IIC) rating for floors between two sensitive spaces of 50 to 55 is recommended. This rating procedure, the IIC, is deliberately configured so that the significance of the IIC number is similar to the *STC* rating system for airborne sound.

Adequate sound isolation can be achieved if pertinent details of design and construction are followed consistently. Included in these details, for example, is careful closure of all cracks by caulking or equivalent, and the sealing of all wall penetrations, including electrical outlets. Attention must be paid to items which can degrade the performance of the boundaries such as services passing through or mounted to the walls or floors/ceilings (e.g., plumbing). Electrical boxes serving two different units should not be within the same stud space or masonry cavity.

During design, consideration should be given to the noise impact at the noise sensitive spaces in the vicinity of potentially noisy areas. High sound isolation construction may be required to adequately mitigate any potential noise impacts. Secondary sound isolation ceilings, floating floors, and cavity walls are some examples of high sound isolation construction.

A satisfactory environment is readily achievable with proper design and construction.

9.2 BUILDING SERVICES

There will be insignificant effect of the building services on the occupants, except potentially in close proximity to any mechanical equipment areas and in those areas affected by sound transmitted by ducts and other paths, from mechanical equipment. Here, the isolation of sound will be a matter of design of the mechanical system and of the sound control associated with it. A satisfactory environment is readily achievable with proper design.

Table 9 indicates accepted guidelines for indoor sound levels from continuous building services such as air handling units, cooling towers, chillers, and pumps. These criteria are specified in terms of Noise Criteria (NC) curves which are based on the maximum desirable sound level in the various frequency bands, based on the use of the space in question.

**TABLE 9 TYPICAL INDOOR NOISE CONTROL DESIGN GUIDELINES
FOR CONTINUOUS BUILDING SERVICES⁽¹⁾**

Type of Space	Recommended Maximum NC (Noise Criteria) Curves ⁽²⁾
Residences, Apartments, Condominiums • Living areas • Bathrooms, kitchens, utility rooms	30 35
Hotels/Motels • Individual rooms or suites • Meeting/banquet rooms • Corridors and lobbies • Service/support area	30 30 40 40
Office Buildings • Executive and private offices • Conference rooms • Teleconference rooms • Open-plan offices • Corridors and lobbies	30 30 25 40 40

Notes:

(1) Mechanical and electrical systems.

(2) Taken from Reference 14. Each number rating typically represents a range of ± 5 dB for the design target.

10.0 CONCLUSIONS AND RECOMMENDATIONS

This preliminary assessment shows that the proposed development can be made to comply with the applicable noise requirements and the proposed development will be feasible, in terms of achieving land use compatibility, acoustically, both with nearby existing land uses and within the development itself. Thus, with proper design, no adverse effects of the proposed development on existing industries/major facilities is to be expected. Compliance with applicable policies relating to environmental noise, such as the PPS, etc. will result.

Applicable Noise Guidelines

1. The applicable MECP noise guideline is NPC-300 (as of October 2013). NPC-300 provides guidance and criteria with respect to environmental noise from transportation, and as well as from stationary sources, for planning of noise sensitive land uses such as residential. NPC-300 is also the basis for ECA's issued by MECP for stationary sources, under Section 9 of the EPA or EASR registration under O.Reg.1/17.
2. The proposed development, with the implementation of the recommendations in this preliminary assessment, will comply with NPC-300, as well as the other relevant municipal and regional requirements for environmental noise.

Transportation Noise Sources

3. With implementation of the noise control measures indicated above, which are reasonable and practicable, the transportation noise policies and guidelines will be met by the proposed development.
4. Mandatory air conditioning should be anticipated for all suites in the development.
5. Architectural upgrades to windows and/or exterior facade construction should be anticipated for the development.
6. Sound barriers to mitigate transportation noise at the OLA's may be required, depending on the locations of the amenity areas.

Class 4

7. The development being an in-fill development, in proximity to existing industrial/commercial uses is recommended to be Class 4.
8. The area is in transition and it is expected that, ultimately, some of the existing industrial/commercial uses will be converted to residential. The Class 4 status will help to facilitate the transition by addressing potential temporary noise issues in a more feasible manner.
9. The use of Class 4 will allow on-building noise control measures to be used as a form of mitigation. On-building noise control measures would not be useable in a Class 1, 2 or 3 area. The use of on-building noise control measures is more practicable in this case, given the proposed building massing.
10. The use of the Class 4 receptor classification, which is concluded to be more suitable technically, practically and economically than Class 1 in this case, would be fully in compliance with the requirements and intent of NPC-300 and PPS 2020.
11. The Class 4 status will further promote land use compatibility by allowing for the approval of the proposed development while also allowing the nearby stationary sources to continue to operate in compliance with the applicable noise guidelines.
12. The Class 4 status should be reviewed as part of the formal land use application.

Vibration Impact

13. Significant vibration impact on to the new buildings is not expected.

Existing Stationary Sources

14. Sources at Dufferin Concrete and Canadian Tire are predicted to result in excesses over the Class 4 limits at Tower A, B and C;
15. It is expected that these sources could be addressed by on-building mitigation measures at Towers A, B and C. This should be investigated further as part of the detailed studies. See below.

Future Stationary Source in the Development

16. Ensuring that any potential, stationary sources within the development itself create no adverse noise impact on neighbouring land uses is a matter of proper engineering design, as is commonly done.

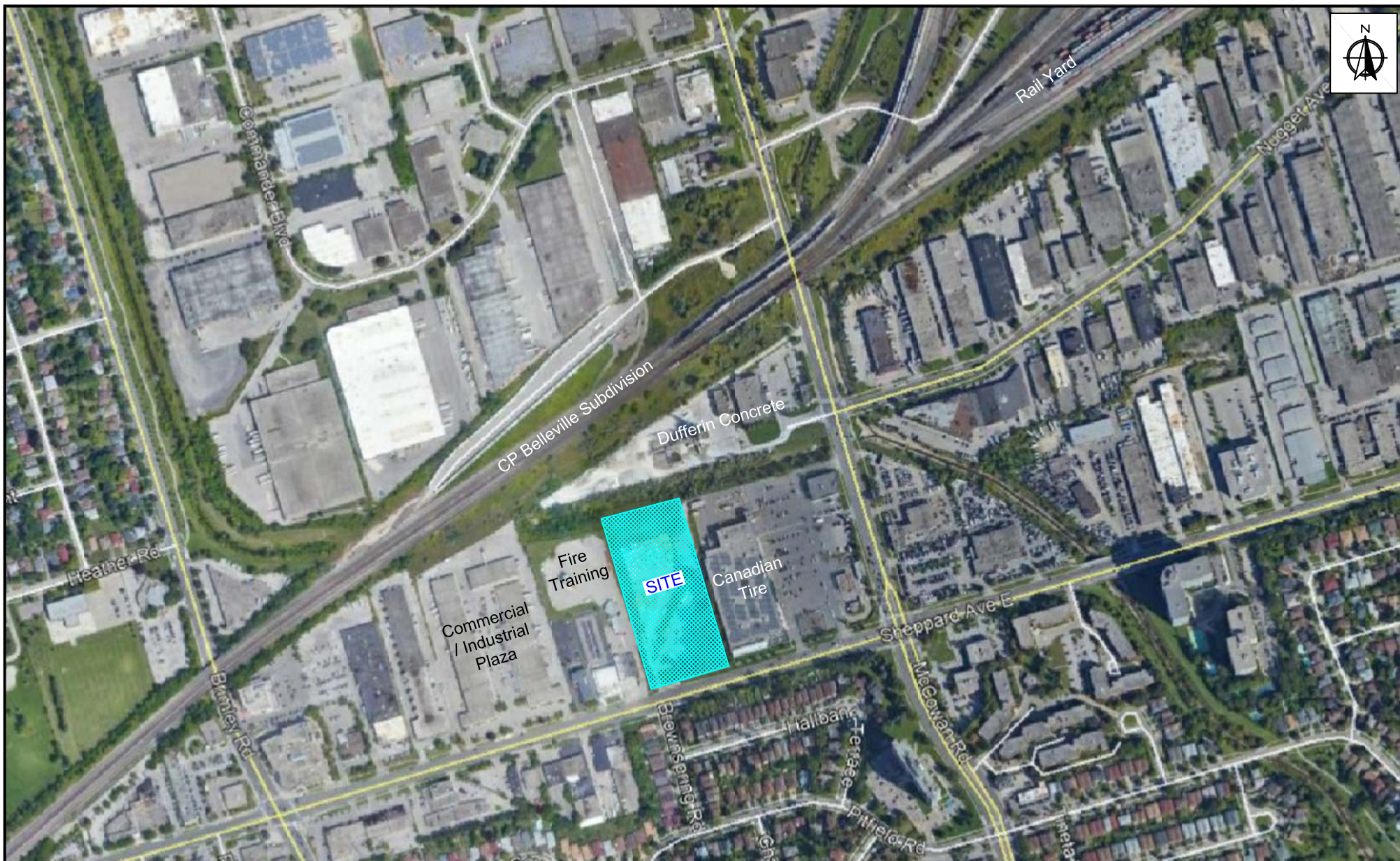
Future Studies

17. This preliminary study concludes that the proposed development site is feasible acoustically and can achieve land use compatibility with the surrounding environment and existing land uses.
18. Detailed noise studies should be completed as part of future land use approval applications (e.g. site-specific zoning by-law applications or site plan approval applications) to further refine the assessment and noise control requirements once further details of the building designs are known. Site visits and sound measurements at the adjacent sources should also be completed as part of these studies.

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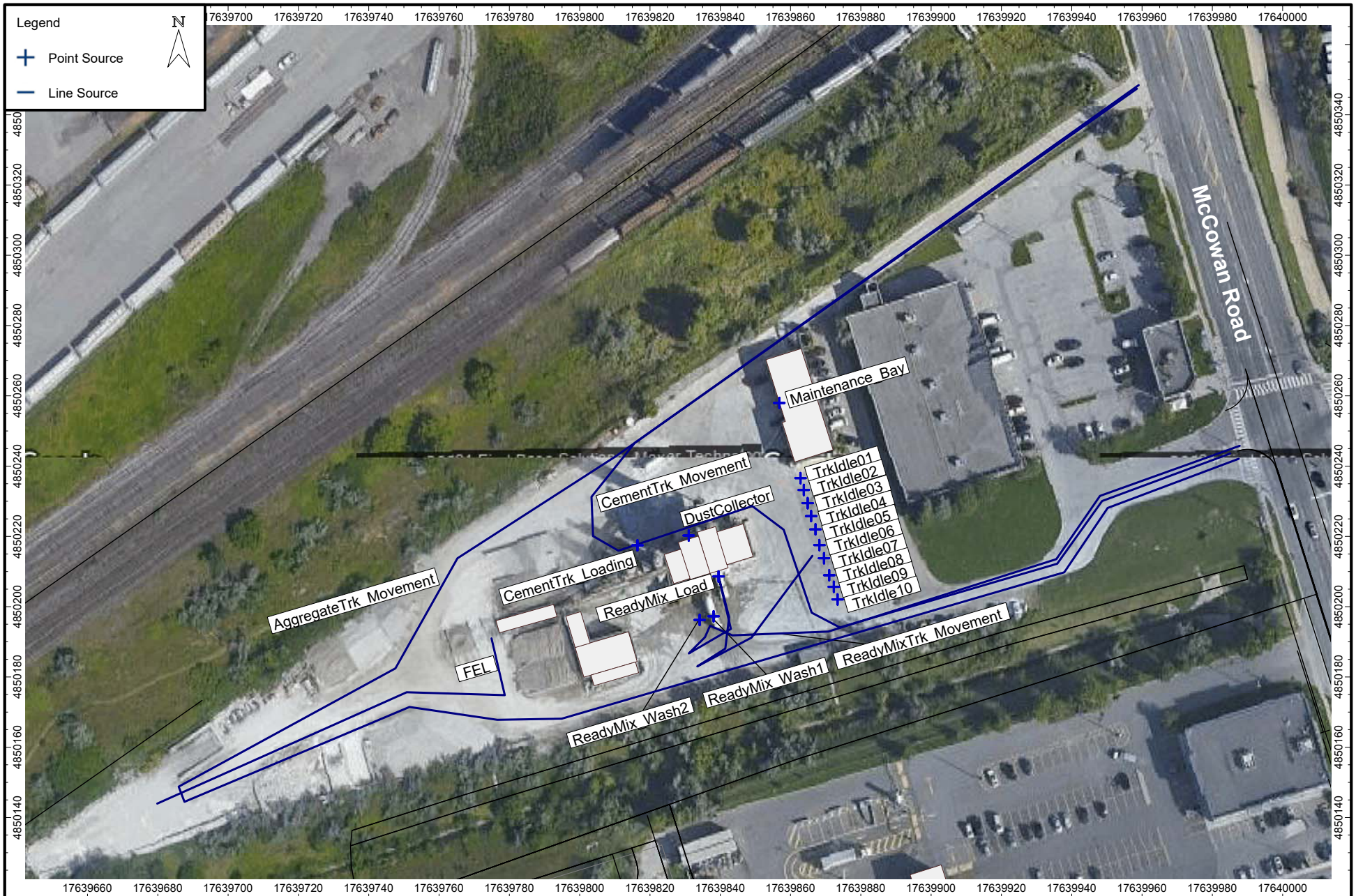
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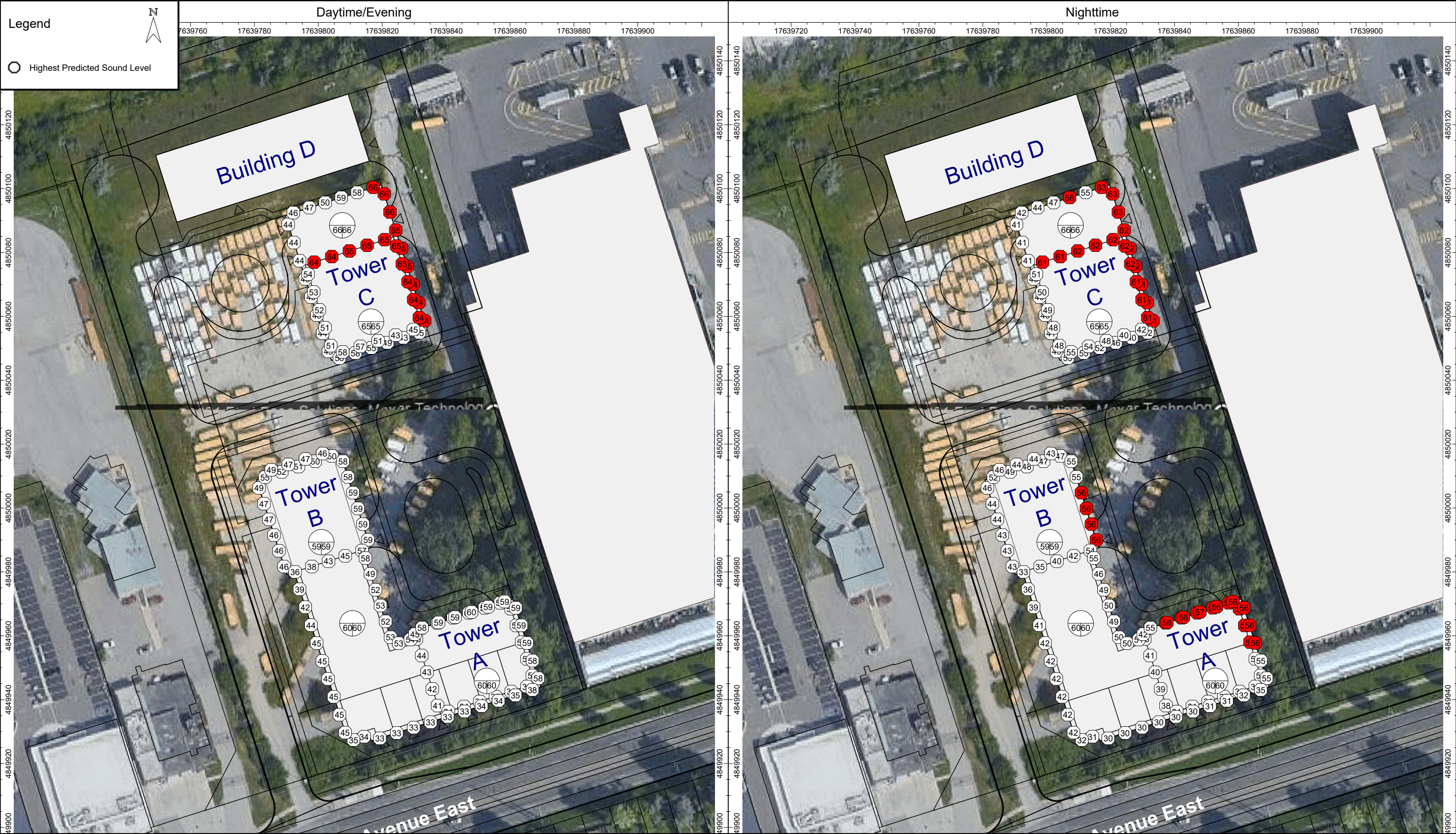
			 30 Wertheim Court, Unit 25 Richmond Hill, Ontario Canada L4B 1B9 solutions@valcoustics.com Phone: (905) 764-5223 Fax: (905) 764-6813	Title Key Plan		Project No. 121-0207	Date July 12, 2021
				Project Name 4570 Sheppard Avenue East, Toronto		Scale N.T.S.	Figure 1
No.	Revision/Issue	Date					



			 30 Wertheim Court, Unit 25 Richmond Hill, Ontario Canada L4B 1B9 Tel: 905-764-5223 Fax: 905-764-6813 solutions@valcoustics.com	Title	Project No.	Date
				Site Plan	121-0207	July 12, 2021
				Project Name	Scale	Figure
				4570 Sheppard Avenue East, Toronto	N.T.S.	2
No.	Revision/Issue	Date				



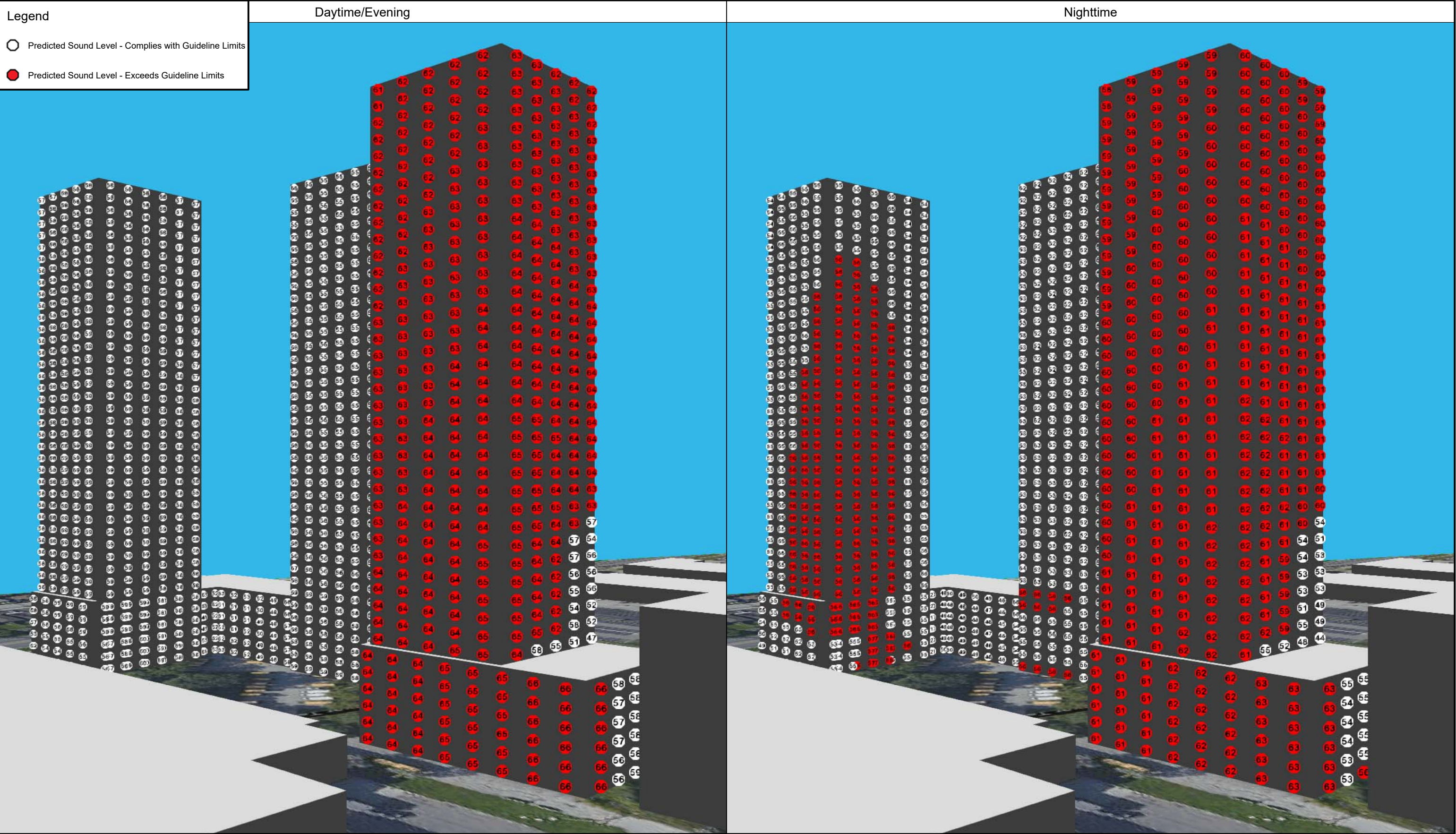
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	Project Name		Project No.	3A
	4570 Sheppard Avenue East, Toronto		121-0207	

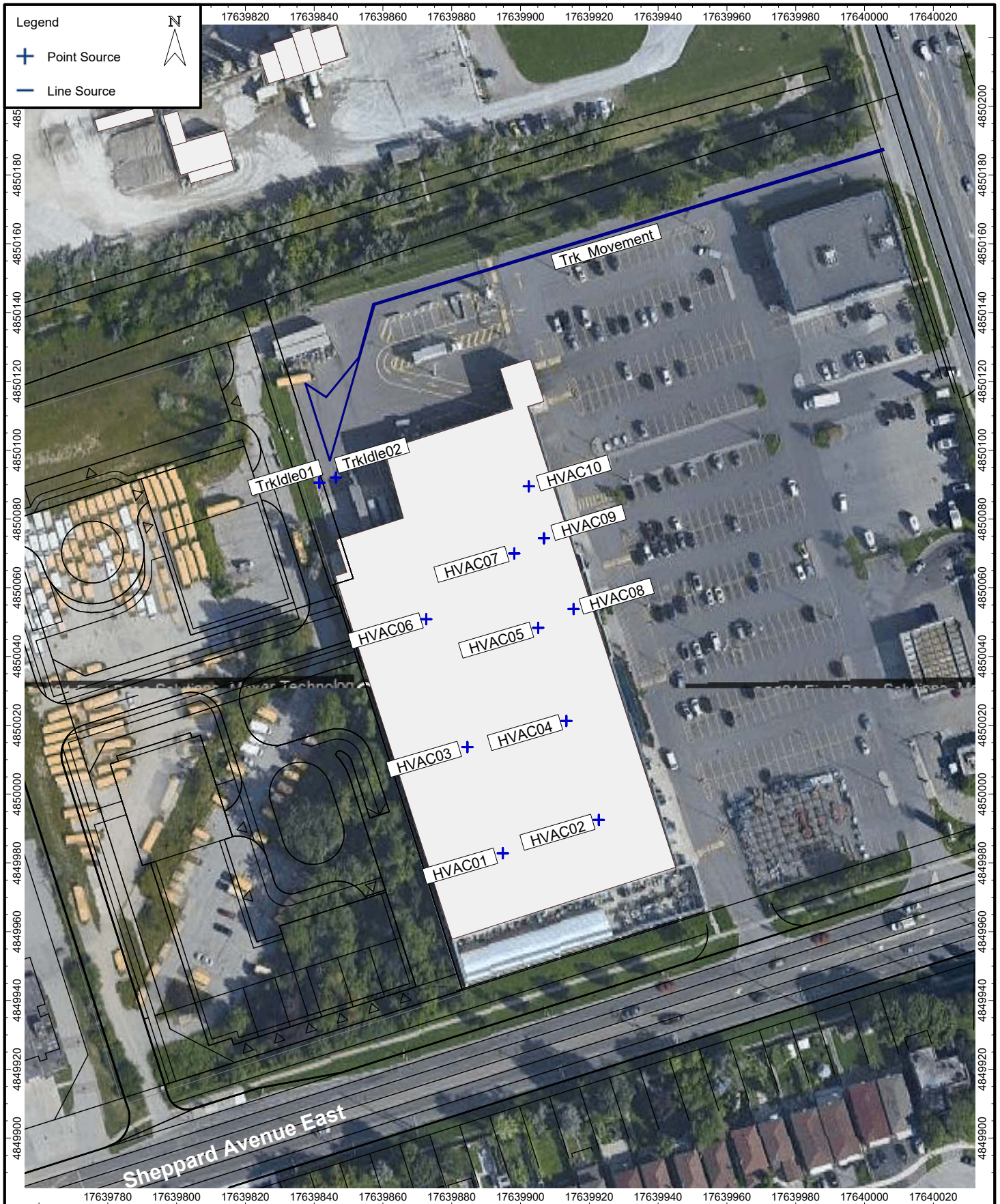


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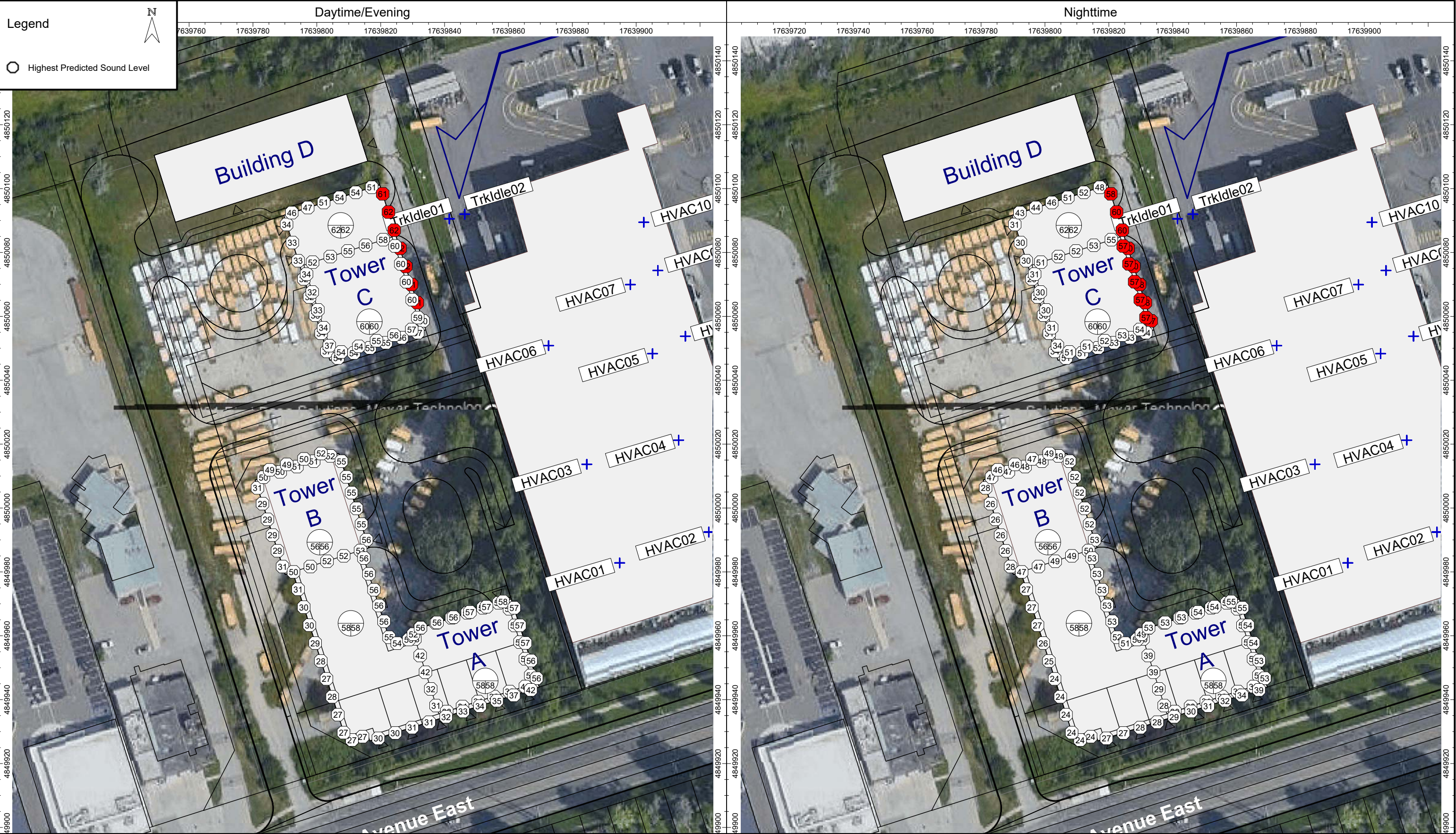
Highest Predicted Sound Level

 VALCOUSTICS <i>Canada Ltd.</i> consulting acoustical engineers	Title		Date	Figure 3B
	Predicted Sound Levels due to Dufferin Concrete (dBA)		July 12, 2021	
	Project Name		Project No.	
	4570 Sheppard Avenue East, Toronto		121-0207	



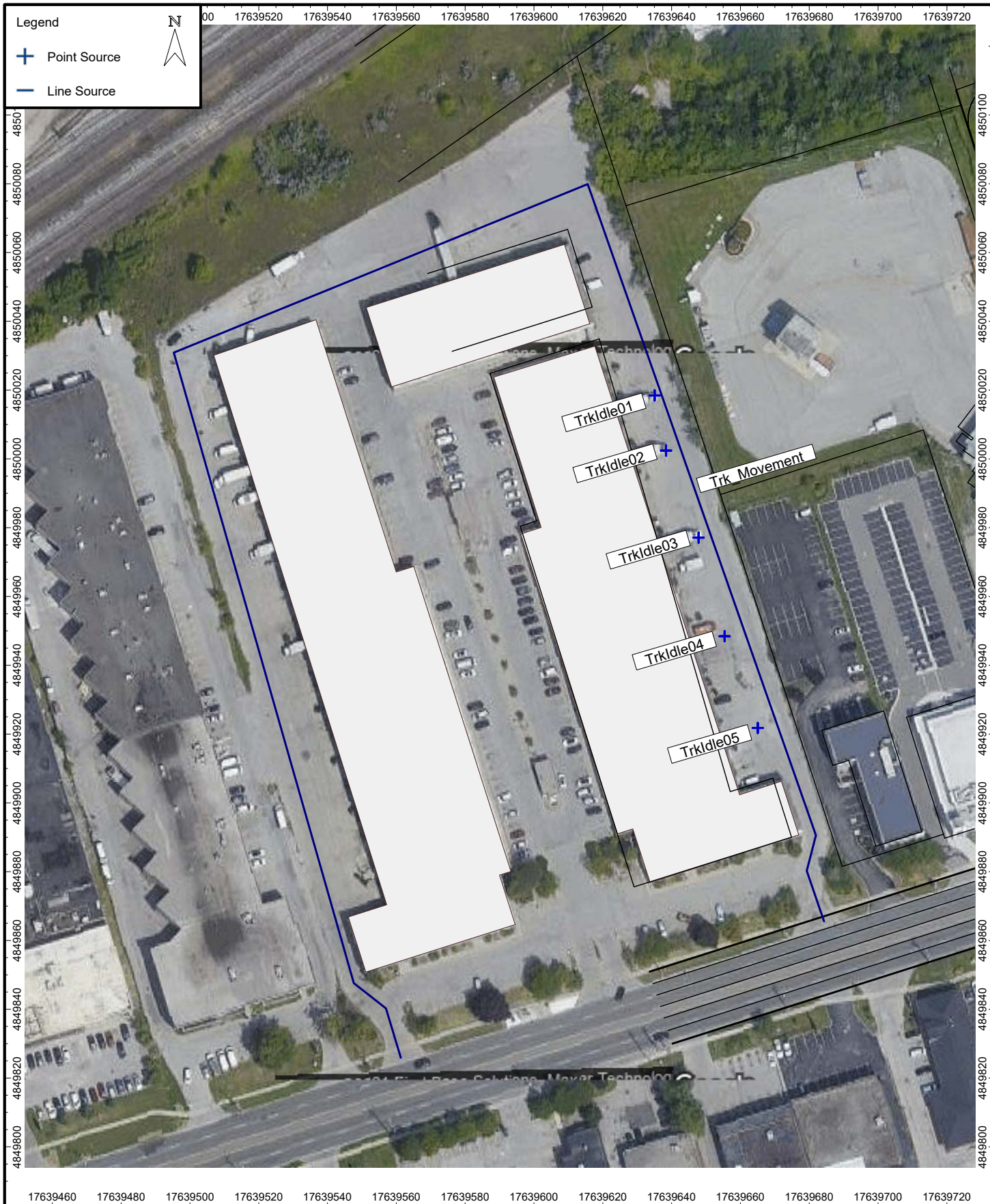


	Title	Date	Figure
	Source ID's - Canadian Tire	July 12, 2021	4A
	Project Name	Project No.	
	4570 Sheppard Avenue East, Toronto	121-0207	

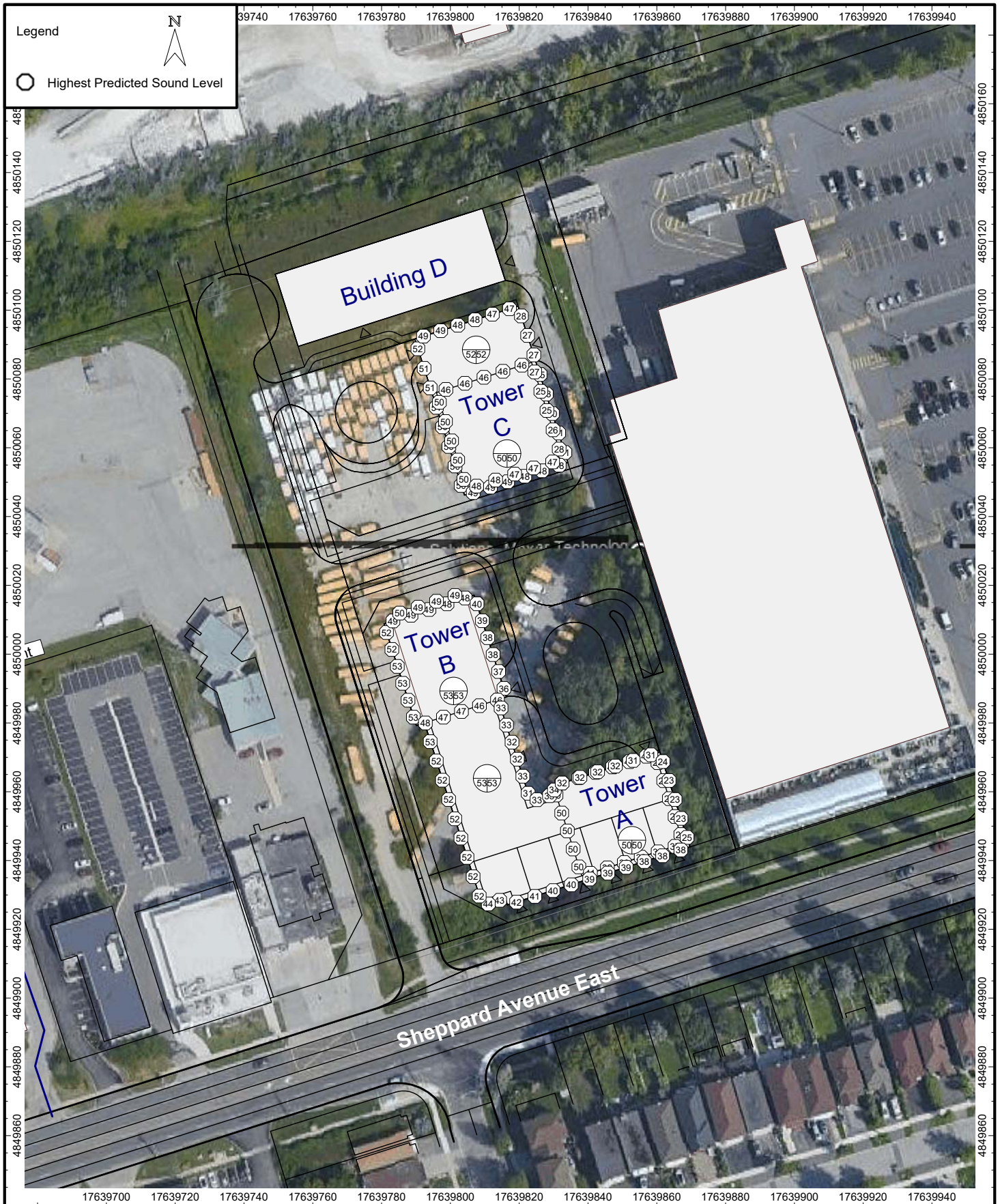


	Title Predicted Sound Levels due to Canadian Tire (dBA)		Date July 12, 2021	4B
	Project Name 4570 Sheppard Avenue East, Toronto		Project No. 121-0207	

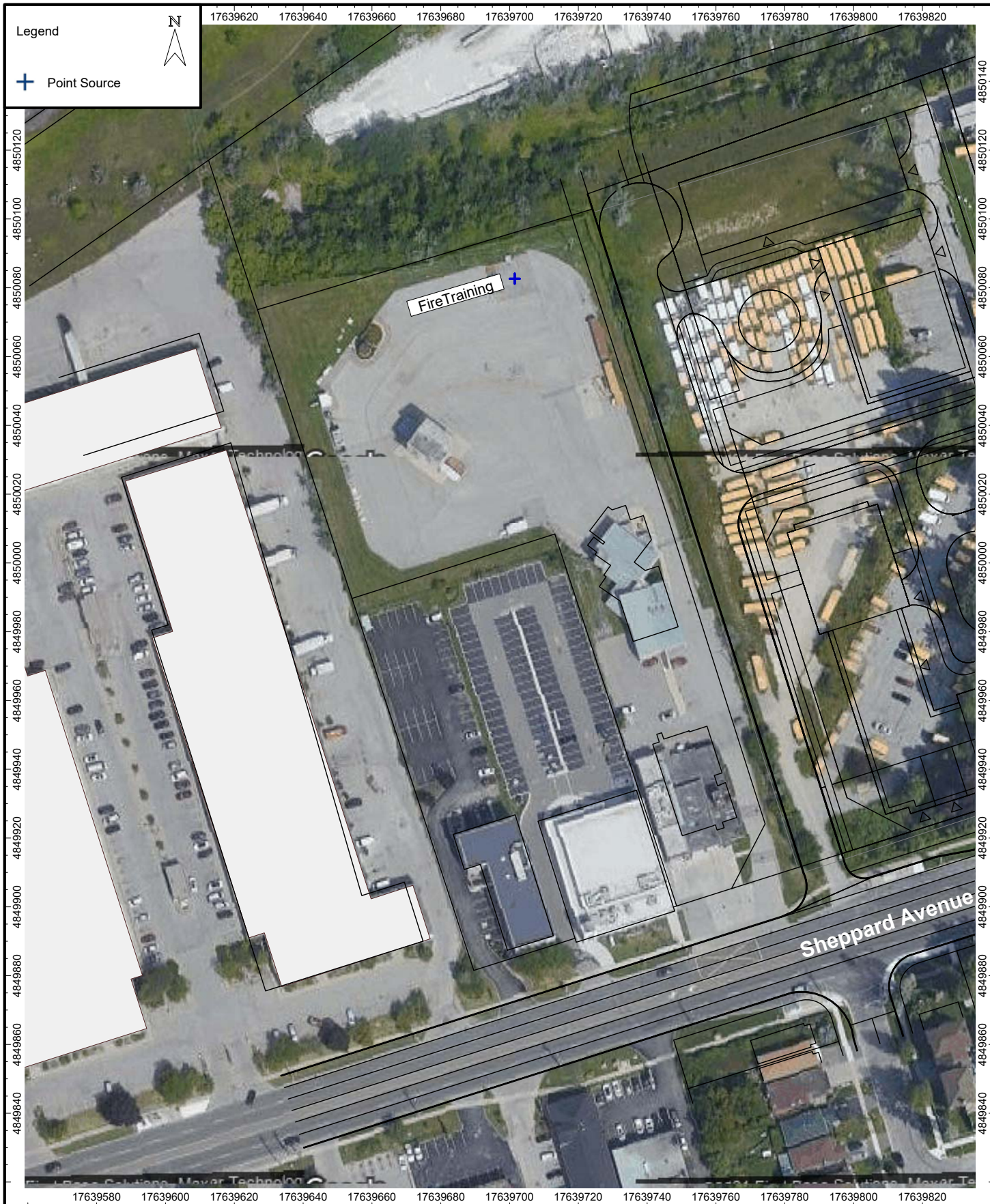




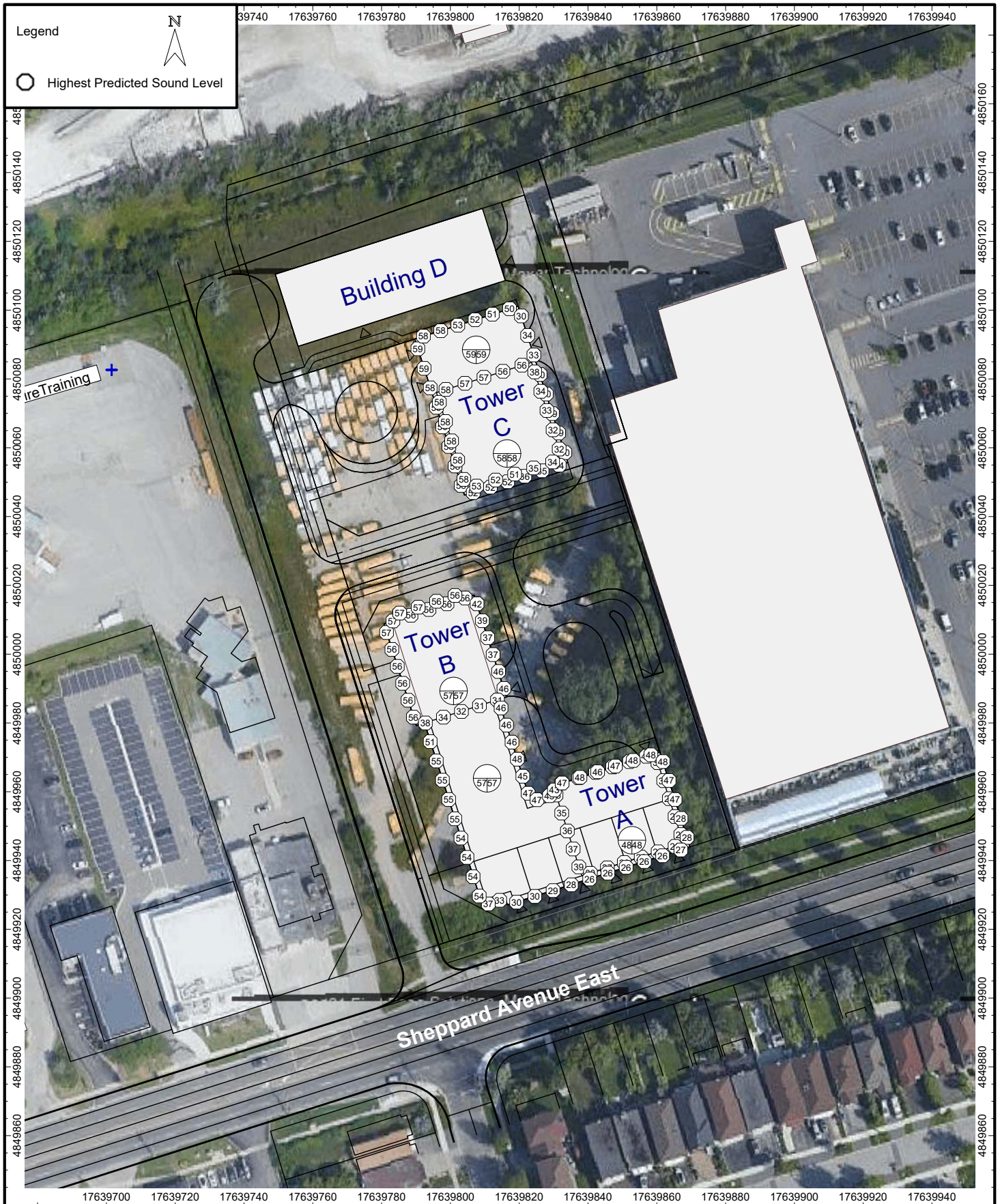
	Title		Date	Figure
	Source ID's - Commercial/Industrial Plaza		July 12, 2021	
	Project Name		Project No.	
	4570 Sheppard Avenue East, Toronto		121-0207	5A



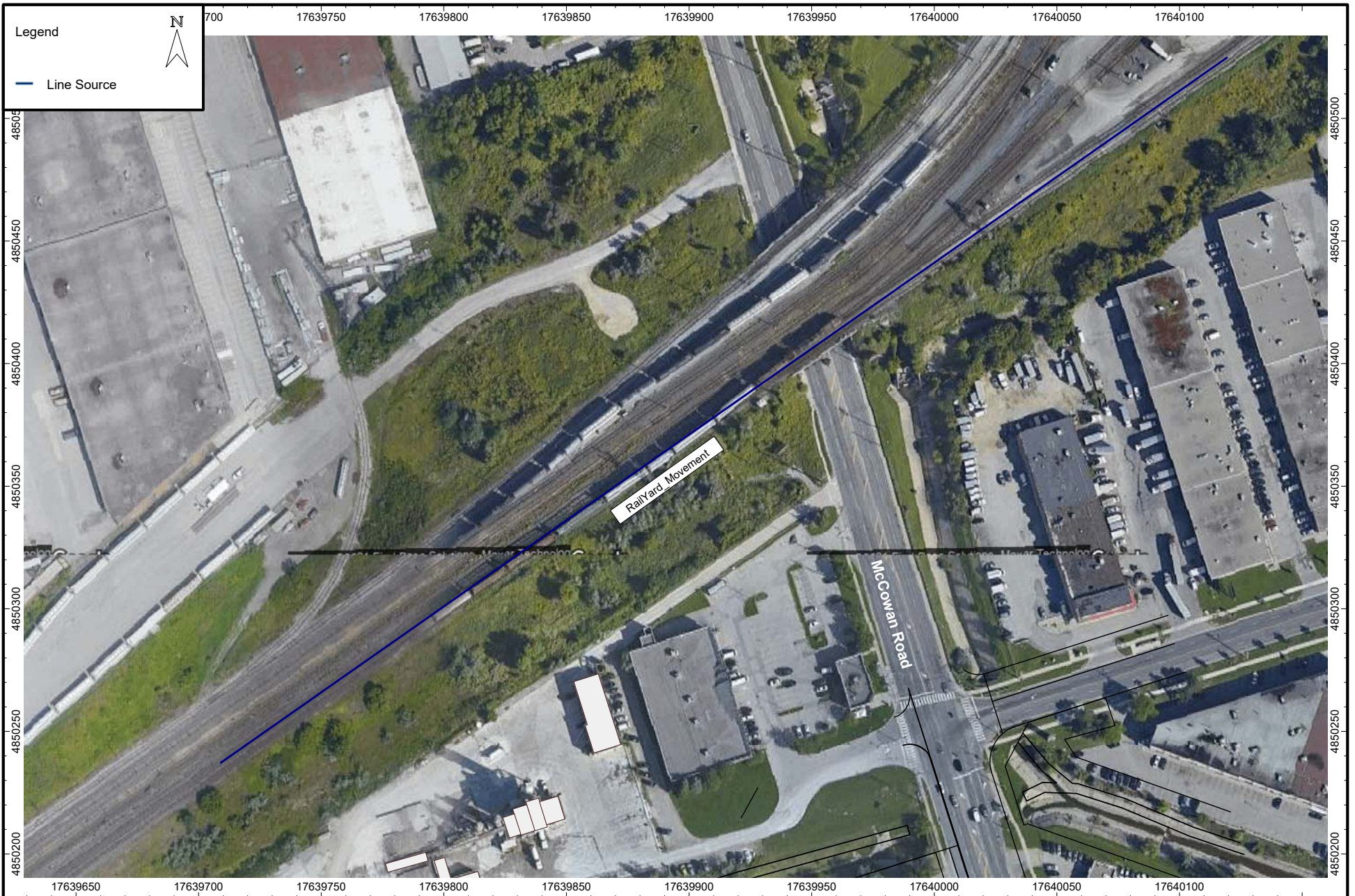
	Title Predicted Sound Levels due to Commercial/Industrial Plaza (dBA)	Date July 12, 2021	Figure 5B
	Project Name 4570 Sheppard Avenue East, Toronto	Project No. 121-0207	



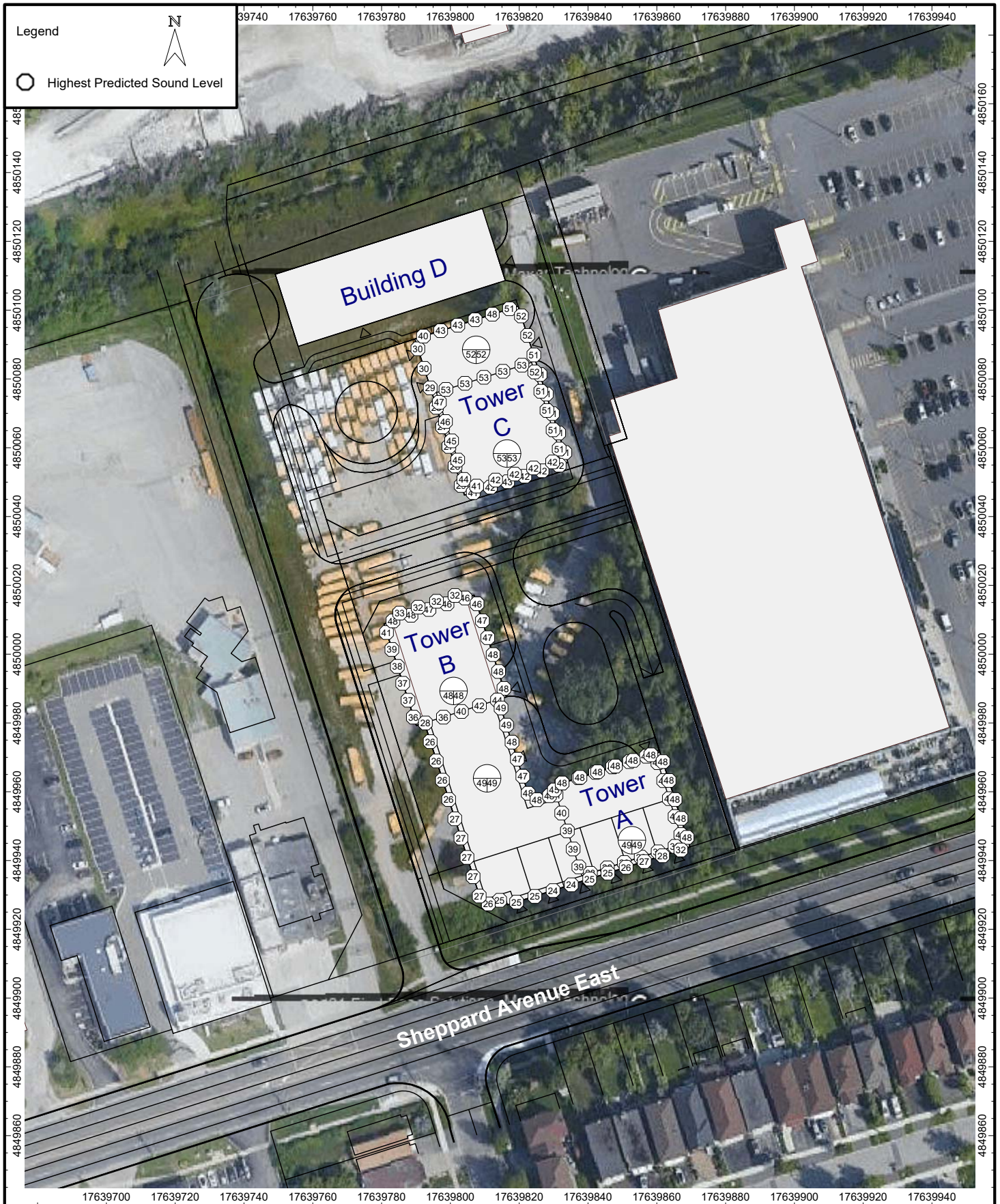
	Title		Date	Figure
	Source ID's - Firefighter Training Facility		July 12, 2021	
	Project Name		Project No.	
	4570 Sheppard Avenue East, Toronto		121-0207	6A



	Title Predicted Sound Levels due to Firefighter Training Facility (dBA)	Date July 12, 2021	Figure 6B
	Project Name 4570 Sheppard Avenue East, Toronto	Project No. 121-0207	



	Title		Date	Figure
	Source ID's - CPR Toronto Rail Yard		July 12, 2021	
	Project Name		Project No.	
	4570 Sheppard Avenue East, Toronto		121-0207	7A



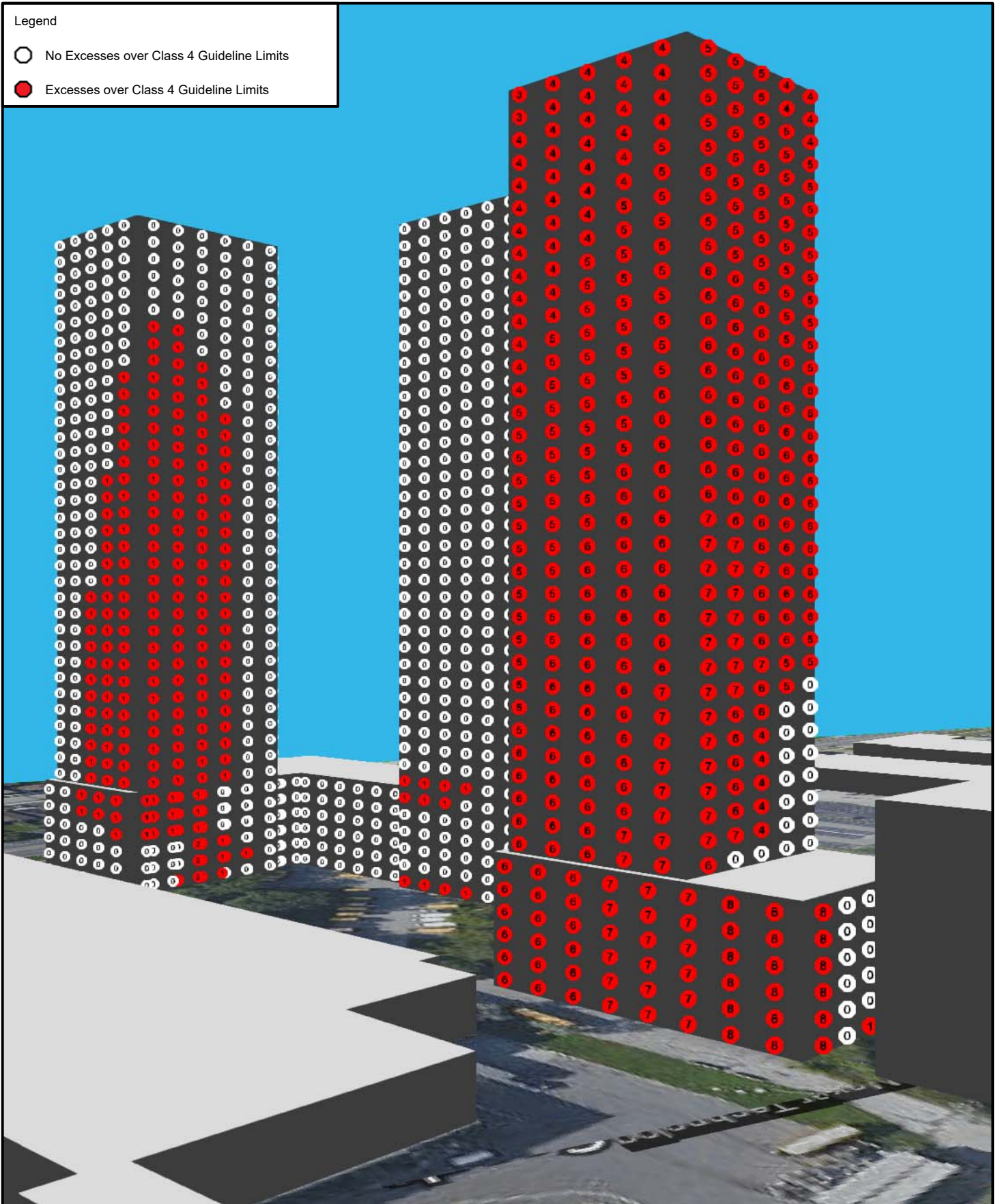
	Title Predicted Sound Levels due to CPR Toronto Rail Yard (dBA)	Date July 12, 2021	Figure 7B
	Project Name 4570 Sheppard Avenue East, Toronto	Project No. 121-0207	



	Title	Date	Figure
	Excesses over Class 4 Guideline Limits (dBA)	July 12, 2021	
	Project Name	Project No.	
	4570 Sheppard Avenue East, Toronto	121-0207	8A

Legend

-  No Excesses over Class 4 Guideline Limits
-  Excesses over Class 4 Guideline Limits



 VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title Locations Requiring Noise Mitigation - View from Northeast	Date July 12, 2021	Figure 8B
	Project Name 4570 Sheppard Avenue East, Toronto	Project No. 121-0207	

APPENDIX A

SUMMARY OF MECP NPC-300 NOISE GUIDELINE CRITERIA

APPENDIX A

ENVIRONMENTAL NOISE GUIDELINES – MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP)

Reference: MECP Publication NPC-300, October 2013: “Environmental Noise Guideline, Stationary and Transportation Source – Approval and Planning”.

Space	Time	Sound Level Limit (L _{eq})						
		Road (dBA)	Rail (dBA)	Aircraft (NEF)	Sound Source (dBA) ⁽⁵⁾			
					Class 1 ⁽⁶⁾	Class 2 ⁽⁶⁾	Class 3 ⁽⁶⁾	Class 4 ⁽⁶⁾
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	0700 – 2300 16 hours	45 ⁽¹⁾	40 ⁽¹⁾	5 ⁽⁴⁾	—	—	—	—
	2300 – 0700 8 hours	45 ^{(2), (3)}	40 ^{(2), (3)}	5 ⁽⁴⁾	—	—	—	—
Sleeping quarters	0700 – 2300	45 ⁽¹⁾	40 ⁽¹⁾	0 ⁽⁴⁾	—	—	—	—
	2300 – 0700	40 ⁽²⁾	35 ⁽²⁾	0 ⁽⁴⁾	—	—	—	—
Outdoor Living Areas	0700 – 2300	55 – 60	55 – 60	—	—	—	—	—
Plane of Window	0700 – 1900	—	—	—	50	50	45	60
	1900 – 2300	—	—	—	50	50	40	60
	2300 – 0700	—	—	—	45	45	40	55
Outdoor Point of Reception	0700 – 1900	—	—	—	50	50	45	55
	1900 – 2300	—	—	—	50	45	40	55

Notes:

- (1) 16 hour L_{eq}.
- (2) 8 hour L_{eq}.
- (3) Not including schools, daycare centres.
- (4) Over 24 hours.
- (5) One-hour L_{eq} (dBA).
- (6) Receptor area class.

APPENDIX B

INVENTORY OF STATIONARY SOURCES IN THE VICINITY

Appendix B – Nearby Industries



1. Richardson Industrial Finishers (21 Commander Boulevard)

- Provides liquid and powder coating and abrasive blasting services
- Operates under Amended Environmental Compliance Approval Number 9205-A2LQ25 dated October 5, 2015
- Main noise sources are expected to be rooftop HVAC unit, spray booth exhausts and vehicle movements at the rear (south side) of the building
- Due to distance separation, no significant noise impact from this facility is expected at the subject site

2. A) Hung Shing Meat Trading Ltd. (23 Commander Boulevard)

- A meat wholesaler
- Sources anticipated to be rooftop mechanical equipment and truck movements in the rear of the facility
- Due to distance separation, noise from this facility is not expected to have a significant impact at the subject site

B) The Stone Depot (25 Commander Boulevard)

- Marble and granite retail and wholesale facility
- Main noise sources are expected to be the rooftop HVAC units and vehicle movements at the rear (south side) of the building
- Due to distance separation, noise from this facility is not expected to have a significant impact at the subject site

3. Canada Goose (33 Commander Boulevard)

- Outdoor clothing manufacturing facility
- Main noise sources are expected to be the rooftop HVAC units, vehicle movements on site and activities at loading area
- Due to distance separation, noise from this facility is not expected to have a significant impact at the subject site

4. Canada Goose (45 Commander Boulevard)

- Same as above

5. Multi-tenant facility (67 Commander Boulevard)

- CelPlast
 - Manufacturer of metallized and clear high-barrier films
 - Operates under Certificate of Approval Air Number 3444-6GFJCU dated September 30, 2005
- Dulux Paints
 - Paint retail store
- ICI Canada Inc
 - This facility has a Certificate of Approval Air Number 2866-69HT54 dated February 17, 2005 that indicates that the facility has a paint spray booth
 - It is not clear if ICI Canada is still operating at this location
- Main noise sources at these facilities are expected to be the rooftop HVAC units, vehicle movements on site and activities at loading area
- Due to distance separation, noise from these facilities is not expected to have a significant impact at the subject site
- The tenants in this facility can be investigated as part of the future detailed study

6. Leland Industries (95 Commander Boulevard)

- Screws, nuts and bolts manufacturing facility
- Operates under Environmental Compliance Approval Number 7611-AJTSLV dated March 21, 2017
- Main noise sources are expected to be rooftop HVAC units, paint booth exhaust, vehicle movements on site and activities at loading area
- Due to distance separation, noise from this facility is not expected to have a significant impact at the subject site

7. Grain Process Enterprises (105 Commander Boulevard)

- Food products supplier
- Main noise sources are expected to be rooftop HVAC units, vehicle movements on site and activities at loading areas
- Due to distance separation, noise from this facility is not expected to have a significant impact at the subject site

8. Dufferin Concrete (1940 McCowan Boulevard)

- Concrete batching plant
- Main noise sources are aggregate/cement/ready-mix truck movements on site, front end loader movements on site, and ready-mix truck loading and washing
- This facility is included in the assessment

9. Canadian Tire (4630 Sheppard Avenue East)

- Neighbouring retail store
- Main noise sources are expected to be the rooftop HVAC units, vehicle movements on site and activities at the loading areas
- This facility is included in the assessment

10. Commercial/Light Industrial Plaza (4500 Sheppard Avenue East)

- Multi-tenant commercial/light industrial facility
- Main noise sources are expected to be the rooftop HVAC units and vehicle movements on site
- This facility was included in the assessment

11. Fire Training Facility (4560 Sheppard Avenue East)

- Neighbouring fire station and firefighter training facility
- Emergency operations are exempt from the noise guidelines
- Main noise source is the training simulator at the north side of the property
- Noise from the training simulator is included in the assessment

APPENDIX C

TRANSPORTATION SOURCE ASSESSMENT DETAILS

Intersection Detailed 15 Minutes Movement Report

MCCOWAN RD AT SHEPPARD AVE (PX 938)

Survey Date: December 5, 2019 Thursday

Time Period		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND		
		Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left
07:45	CARS	223	17	33	64	29	16	266	28	6	215	32	31
	TRUCKS	16	1	4	6	1	9	13	2	0	13	1	7
	BUSES	11	0	1	4	0	0	9	0	0	6	0	1
08:00	CARS	258	13	38	90	21	18	295	28	12	180	14	18
	TRUCKS	23	1	3	9	3	5	15	2	1	27	1	4
	BUSES	13	0	0	5	0	0	14	1	0	5	1	5
08:15	CARS	250	25	43	77	26	20	264	24	14	191	14	32
	TRUCKS	29	3	7	6	4	6	19	5	1	19	2	2
	BUSES	11	1	0	2	0	1	13	2	1	4	1	1
08:30	CARS	274	11	41	105	25	18	332	32	11	209	16	33
	TRUCKS	42	6	4	13	4	2	22	0	0	22	1	6
	BUSES	14	1	3	3	0	0	10	0	0	6	1	1
08:45	CARS	227	24	39	118	41	27	328	23	18	201	18	32
	TRUCKS	36	2	4	0	0	5	17	2	1	23	1	4
	BUSES	10	0	1	3	3	0	13	0	0	9	1	0
09:00	CARS	239	20	38	150	33	27	336	25	18	148	19	32
	TRUCKS	27	3	7	8	4	6	27	4	2	14	2	5
	BUSES	17	0	0	7	1	0	11	0	0	3	1	0
09:15	CARS	205	15	34	94	34	11	303	24	16	141	24	31
	TRUCKS	20	5	4	16	6	4	24	4	2	18	2	4
	BUSES	14	1	1	7	1	1	16	1	3	10	1	0
09:30	CARS	208	15	37	98	26	10	264	27	18	110	19	31
	TRUCKS	44	8	4	7	6	2	20	5	1	21	1	1
	BUSES	8	5	1	8	0	0	12	0	2	3	0	0
10:15	CARS	180	24	41	112	26	11	239	24	10	118	17	32
	TRUCKS	35	4	9	18	1	4	28	3	2	11	8	4
	BUSES	8	1	0	7	0	0	9	0	1	2	0	0
10:30	CARS	176	24	41	86	34	10	209	23	14	110	19	37
	TRUCKS	40	7	6	13	9	3	29	2	2	8	4	2
	BUSES	10	2	0	7	0	0	9	0	0	4	1	1
10:45	CARS	177	29	40	98	27	10	210	26	27	115	30	37
	TRUCKS	38	7	4	15	10	3	32	3	1	13	0	7
	BUSES	9	0	0	4	0	0	7	0	0	2	0	1
11:00	CARS	195	30	41	117	35	17	206	24	15	117	25	29
	TRUCKS	36	1	12	14	3	6	33	2	1	7	2	4
	BUSES	7	0	0	3	0	0	9	0	0	5	0	0
11:15	CARS	164	40	43	96	40	16	211	13	10	120	25	39
	TRUCKS	33	9	9	11	3	6	32	4	3	11	2	6
	BUSES	8	0	0	5	0	0	10	0	0	1	1	1
11:30	CARS	195	26	37	112	36	15	222	18	18	130	20	29
	TRUCKS	35	2	7	4	9	5	29	2	3	13	3	7
	BUSES	7	1	0	3	0	0	7	0	0	2	0	0
11:45	CARS	208	27	33	103	38	17	244	24	19	131	24	55
	TRUCKS	47	6	8	16	5	5	33	2	6	22	4	4
	BUSES	9	2	0	4	0	0	8	0	0	2	0	0
12:00	CARS	209	27	54	133	35	19	219	24	23	122	27	37
	TRUCKS	42	5	7	13	5	9	29	6	1	17	3	6
	BUSES	9	0	0	2	0	0	12	0	0	2	1	0
13:15	CARS	207	17	41	109	39	20	223	26	20	96	25	44
	TRUCKS	47	2	6	9	6	9	37	7	2	15	3	6
	BUSES	9	0	0	3	0	0	7	0	0	4	0	0
13:30	CARS	175	36	41	134	42	13	233	23	24	106	20	47
	TRUCKS	45	5	4	14	8	6	30	5	1	21	4	4
	BUSES	7	0	0	2	1	0	12	0	0	2	1	1
13:45	CARS	198	7	47	108	41	24	211	25	21	108	34	41
	TRUCKS	49	9	8	15	12	5	28	4	0	28	0	8
	BUSES	11	0	0	3	0	0	4	0	0	2	0	0
14:00	CARS	202	20	57	124	49	22	205	18	16	133	25	35
	TRUCKS	41	8	7	22	7	3	30	7	1	21	2	3
	BUSES	9	2	1	2	1	0	14	0	0	2	0	0
14:15	CARS	223	35	51	119	56	19	235	24	24	110	31	45
	TRUCKS	47	4	10	17	7	7	34	6	0	29	3	5
	BUSES	14	3	0	4	0	0	7	0	0	2	0	0
14:30	CARS	220	29	40	143	41	14	242	25	17	170	23	38
	TRUCKS	48	6	11	16	6	5	30	4	2	26	2	5
	BUSES	7	1	1	3	0	0	10	0	0	16	0	3
14:45	CARS	236	18	45	121	45	19	237	20	20	111	36	44
	TRUCKS	37	9	9	13	11	5	23	2	4	18	0	1
	BUSES	15	0	1	2	0	0	11	0	0	11	2	1

15:00	CARS	234	30	47	114	38	20	251	12	16	140	43	47
	TRUCKS	39	13	7	9	5	4	20	4	2	28	5	4
	BUSES	8	0	0	2	1	0	11	1	1	11	1	4
16:15	CARS	236	29	46	194	42	34	275	24	16	107	26	40
	TRUCKS	29	3	3	15	1	4	17	1	0	9	2	1
	BUSES	14	1	2	6	1	0	16	0	1	5	0	1
16:30	CARS	263	23	46	205	38	24	282	16	20	190	23	40
	TRUCKS	33	4	3	20	5	6	24	3	2	6	3	3
	BUSES	9	0	0	6	0	0	10	0	0	4	0	0
16:45	CARS	273	37	37	169	42	35	313	25	15	123	36	32
	TRUCKS	24	3	5	24	5	3	21	4	0	3	2	3
	BUSES	11	0	0	2	0	0	8	0	0	6	0	0
17:00	CARS	282	22	45	204	41	33	274	20	16	150	31	40
	TRUCKS	21	4	2	17	2	1	21	4	2	4	3	4
	BUSES	8	0	0	2	0	0	10	0	0	4	0	0
17:15	CARS	268	36	45	188	53	25	310	29	24	150	37	43
	TRUCKS	20	1	7	9	1	3	21	2	1	6	2	0
	BUSES	11	0	0	4	0	0	8	0	0	2	0	0
17:30	CARS	278	36	25	262	30	29	340	26	26	165	32	40
	TRUCKS	17	2	2	8	2	4	18	1	0	7	0	3
	BUSES	8	0	0	6	0	0	8	0	0	3	0	0
17:45	CARS	275	32	60	170	34	28	293	19	21	113	32	34
	TRUCKS	23	5	7	15	1	1	18	1	1	3	0	1
	BUSES	7	0	0	3	0	0	6	0	0	4	0	0
18:00	CARS	264	39	42	166	40	32	262	22	20	156	35	44
	TRUCKS	19	1	1	12	3	2	10	2	1	4	4	0
	BUSES	8	0	0	4	0	0	13	0	0	3	0	0

Turning Movement Count Summary Report

MCCOWAN RD AT SHEPPARD AVE (PX 938)

Survey Date: December 5, 2019 Thursday

Time Period		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND		
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:30-18:00	CARS	1348	7222	813	653	4183	1177	565	8334	741	1189	4486	832
	TRUCKS	191	1082	149	148	404	155	46	784	105	124	487	72
8 HR SUM	BUSES	12	321	21	2	128	9	9	324	5	21	147	13



Real Estate and Facility Management
800 – 1290 Central Parkway West
Mississauga, ON, L5C 4R3

www.cpr.ca

November 16, 2016

Via email: seema@valcoustics.com

Seema Nagaraj
Valcoustics Canada Ltd.
30 Wertheim Court
Unit 25
Richmond Hill, ON L4B 1B9

Dear Sir/Madam:

**Re: Rail Traffic Volumes, CP Mileage 204.36, Belleville Subdivision,
905 Don Mills Road, Toronto**

This is in reference to your request for rail traffic data in the vicinity of 905 Don Mills Road in the City of Toronto. The study area is located at mile 204.36 of our Belleville Subdivision, which is classified as a Principal Main line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 19
Number of freight trains between 2300 & 0700: 9
2. Average number of cars per train: 54
Maximum cars per train freight: 174
Number of locomotives per train: 2 (4 Maximum)
3. There are no at-grade crossings requiring whistle signals to be sounded through the study area, only if deemed necessary by the train crew for safety reasons.
4. Maximum permissible train speed is 60 miles per hour.
5. Two main line tracks comprised of welded joints and are located through this section of right-of-way. The study area is located in close proximity to a bridge at Don Mills Road.

The information provided is based on rail traffic over the past month to date. Variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer needs.

Yours truly,

Josie Tomei
Specialist Real Estate Sales
& Acquisitions – Ontario
905-803-3429
josie_tomei@cpr.ca

STAMSON 5.04 NORMAL REPORT Date: 26-07-2021 10:36:20
 MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: a_se_ef.te Time Period: Day/Night 16/8 hours

Description: Tower A - East Facade

Rail data, segment # 1: CP Bellevill (day/night)

Train Type	! Trains	! Speed (km/h)	! # loc / Train	! # Cars / Train	! Eng type	! Cont weld
* 1. Freight	27.5/13.0	97.0	2.0	54.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Train Name	! Unadj. Trains	! Annual % Increase	! Years of Growth
1.	Freight	19.0/9.0	2.50	15.00

Data for Segment # 1: CP Bellevill (day/night)

Angle1	Angle2	: 15.00 deg	90.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	339.00 / 339.00 m	
Receiver height	:	118.50 / 118.50 m	
Topography	:	1	(Flat/gentle slope; no barrier)
No Whistle	:		
Reference angle	:	0.00	

Results segment # 1: CP Bellevill (day)

LOCOMOTIVE (0.00 + 56.89 + 0.00) = 56.89 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	74.24	-13.54	-3.80	0.00	0.00	0.00	56.89

WHEEL (0.00 + 50.59 + 0.00) = 50.59 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	67.93	-13.54	-3.80	0.00	0.00	0.00	50.59

Segment Leq : 57.80 dBA

Total Leq All Segments: 57.80 dBA

Results segment # 1: CP Bellevill (night)

LOCOMOTIVE (0.00 + 56.65 + 0.00) = 56.65 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	73.99	-13.54	-3.80	0.00	0.00	0.00	56.65

WHEEL (0.00 + 50.34 + 0.00) = 50.34 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	67.68	-13.54	-3.80	0.00	0.00	0.00	50.34

Segment Leq : 57.56 dBA

Total Leq All Segments: 57.56 dBA

Road data, segment # 1: Sheppard (day/night)

Car traffic volume : 31598/3511 veh/TimePeriod *
 Medium truck volume : 2275/253 veh/TimePeriod *
 Heavy truck volume : 2239/249 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 31638
 Percentage of Annual Growth : 2.00
 Number of Years of Growth : 12.00
 Medium Truck % of Total Volume : 6.30
 Heavy Truck % of Total Volume : 6.20
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Sheppard (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 31.00 / 31.00 m
 Receiver height : 118.50 / 118.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 2: McCowan (day/night)

Car traffic volume : 50441/5605 veh/TimePeriod *
 Medium truck volume : 4267/474 veh/TimePeriod *
 Heavy truck volume : 3741/416 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 51207
 Percentage of Annual Growth : 2.00
 Number of Years of Growth : 12.00
 Medium Truck % of Total Volume : 7.30
 Heavy Truck % of Total Volume : 6.40
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: McCowan (day/night)

```

-----
Angle1   Angle2       : -90.00 deg   90.00 deg
Wood depth      :      0           (No woods.)
No of house rows :      0 / 0
Surface         :      1           (Absorptive ground surface)
Receiver source distance : 222.00 / 222.00 m
Receiver height  : 118.50 / 118.50 m
Topography      :      1           (Flat/gentle slope; no barrier)
Reference angle  :      0.00

```

Results segment # 1: Sheppard (day)

Source height = 1.58 m

ROAD (0.00 + 67.02 + 0.00) = 67.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	73.18	0.00	-3.15	-3.01	0.00	0.00	0.00	67.02

Segment Leq : 67.02 dBA

Results segment # 2: McCowan (day)

Source height = 1.59 m

ROAD (0.00 + 63.76 + 0.00) = 63.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	75.47	0.00	-11.70	0.00	0.00	0.00	0.00	63.76

Segment Leq : 63.76 dBA

Total Leq All Segments: 68.70 dBA

Results segment # 1: Sheppard (night)

Source height = 1.58 m

ROAD (0.00 + 60.49 + 0.00) = 60.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	66.65	0.00	-3.15	-3.01	0.00	0.00	0.00	60.49

Segment Leq : 60.49 dBA

Results segment # 2: McCowan (night)

Source height = 1.59 m

ROAD (0.00 + 57.23 + 0.00) = 57.23 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.94	0.00	-11.70	0.00	0.00	0.00	0.00	57.23

Segment Leq : 57.23 dBA

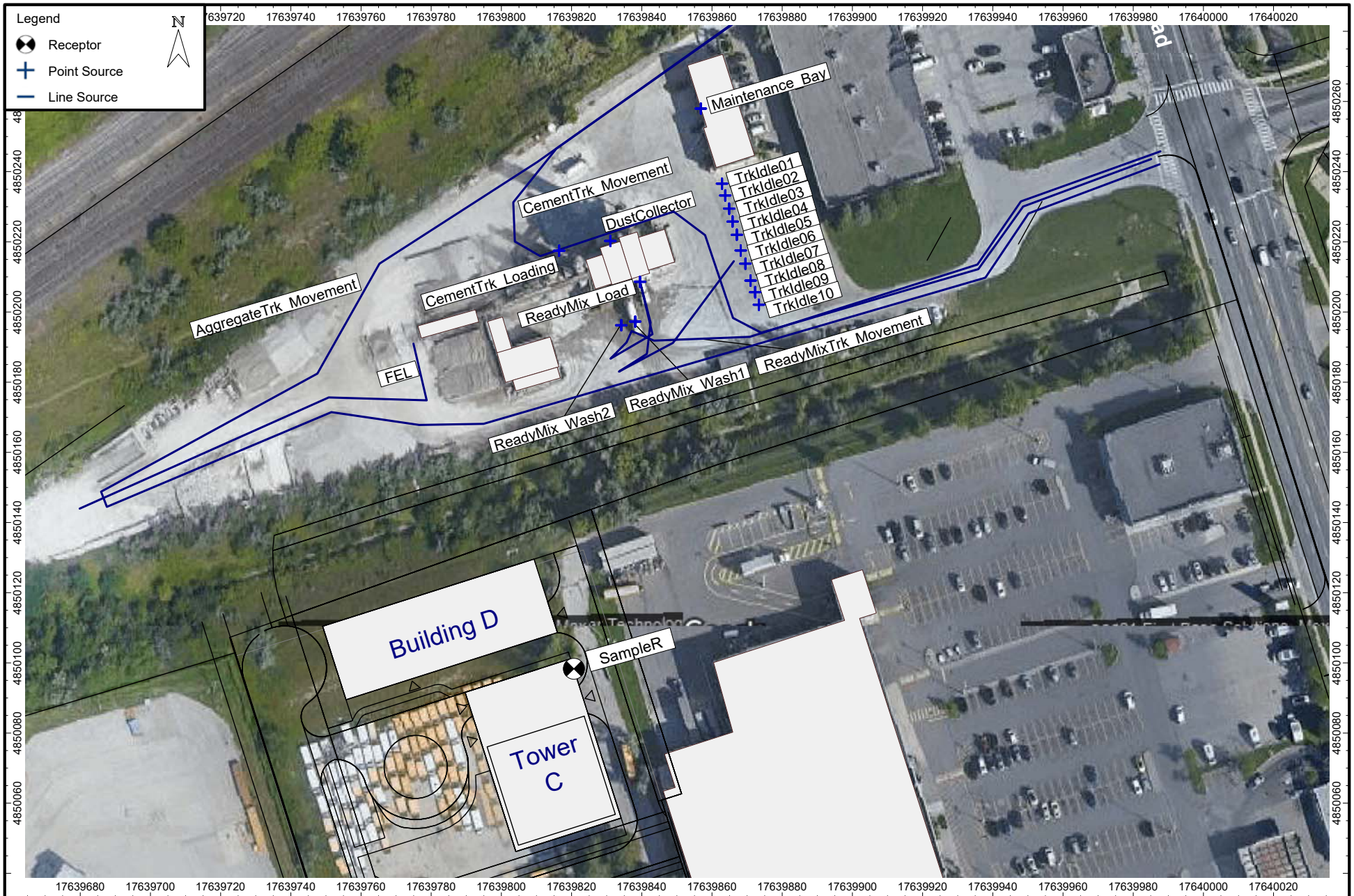
Total Leq All Segments: 62.17 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.04
 (NIGHT): 63.46

APPENDIX D

STATIONARY SOURCE ASSESSMENT DETAILS

Configuration	
Parameter	Value
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.00
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	



 VALCOUSTICS <i>Canada Ltd.</i> consulting acoustical engineers	Title		Date	Figure D1
	Sample Calculation Receptor Location		July 12, 2021	
	Project Name		Project No.	
	4570 Sheppard Avenue East, Toronto		121-0207	

Receiver

Name: SampleR

ID: SampleR

X: 17639820.66 m

Y: 4850098.29 m

Z: 16.50 m

Point Source, ISO 9613, Name: "ReadyMix_Load", ID: "Concrete_ReadyMix_Load"																				
Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	l/a dB	Optime dB	K0 (dB)	Di (dB)	Adiv (dB)	Aatm (dB)	Agr (dB)	Afol (dB)	Ahous (dB)	Abar (dB)	Cmet (dB)	RL (dB)	Lr dB(A)
1	17639839.49	4850208.60	3.50	0	D	32	61.3	0.0	-0.8	0.0	0.0	52.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	11.5
1	17639839.49	4850208.60	3.50	0	D	63	79.7	0.0	-0.8	0.0	0.0	52.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	29.9
1	17639839.49	4850208.60	3.50	0	D	125	89.2	0.0	-0.8	0.0	0.0	52.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	37.3
1	17639839.49	4850208.60	3.50	0	D	250	97.0	0.0	-0.8	0.0	0.0	52.0	0.1	-0.8	0.0	0.0	0.0	0.0	0.0	44.8
1	17639839.49	4850208.60	3.50	0	D	500	107.5	0.0	-0.8	0.0	0.0	52.0	0.2	-1.8	0.0	0.0	0.0	0.0	0.0	56.3
1	17639839.49	4850208.60	3.50	0	D	1000	110.1	0.0	-0.8	0.0	0.0	52.0	0.4	-1.8	0.0	0.0	0.0	0.0	0.0	58.7
1	17639839.49	4850208.60	3.50	0	D	2000	108.4	0.0	-0.8	0.0	0.0	52.0	1.1	-1.8	0.0	0.0	0.0	0.0	0.0	56.3
1	17639839.49	4850208.60	3.50	0	D	4000	104.4	0.0	-0.8	0.0	0.0	52.0	3.7	-1.8	0.0	0.0	0.0	0.0	0.0	49.7
1	17639839.49	4850208.60	3.50	0	D	8000	95.1	0.0	-0.8	0.0	0.0	52.0	13.2	-1.8	0.0	0.0	0.0	0.0	0.0	30.9
1	17639839.49	4850208.60	3.50	0	N	32	61.3	0.0	-3.8	0.0	0.0	52.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	8.5
1	17639839.49	4850208.60	3.50	0	N	63	79.7	0.0	-3.8	0.0	0.0	52.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	26.8
1	17639839.49	4850208.60	3.50	0	N	125	89.2	0.0	-3.8	0.0	0.0	52.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	34.3
1	17639839.49	4850208.60	3.50	0	N	250	97.0	0.0	-3.8	0.0	0.0	52.0	0.1	-0.8	0.0	0.0	0.0	0.0	0.0	41.8
1	17639839.49	4850208.60	3.50	0	N	500	107.5	0.0	-3.8	0.0	0.0	52.0	0.2	-1.8	0.0	0.0	0.0	0.0	0.0	53.2
1	17639839.49	4850208.60	3.50	0	N	1000	110.1	0.0	-3.8	0.0	0.0	52.0	0.4	-1.8	0.0	0.0	0.0	0.0	0.0	55.7
1	17639839.49	4850208.60	3.50	0	N	2000	108.4	0.0	-3.8	0.0	0.0	52.0	1.1	-1.8	0.0	0.0	0.0	0.0	0.0	53.3
1	17639839.49	4850208.60	3.50	0	N	4000	104.4	0.0	-3.8	0.0	0.0	52.0	3.7	-1.8	0.0	0.0	0.0	0.0	0.0	46.7
1	17639839.49	4850208.60	3.50	0	N	8000	95.1	0.0	-3.8	0.0	0.0	52.0	13.2	-1.8	0.0	0.0	0.0	0.0	0.0	27.9
1	17639839.49	4850208.60	3.50	0	E	32	61.3	0.0	-0.8	0.0	0.0	52.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	11.5
1	17639839.49	4850208.60	3.50	0	E	63	79.7	0.0	-0.8	0.0	0.0	52.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	29.9
1	17639839.49	4850208.60	3.50	0	E	125	89.2	0.0	-0.8	0.0	0.0	52.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	37.3
1	17639839.49	4850208.60	3.50	0	E	250	97.0	0.0	-0.8	0.0	0.0	52.0	0.1	-0.8	0.0	0.0	0.0	0.0	0.0	44.8
1	17639839.49	4850208.60	3.50	0	E	500	107.5	0.0	-0.8	0.0	0.0	52.0	0.2	-1.8	0.0	0.0	0.0	0.0	0.0	56.3
1	17639839.49	4850208.60	3.50	0	E	1000	110.1	0.0	-0.8	0.0	0.0	52.0	0.4	-1.8	0.0	0.0	0.0	0.0	0.0	58.7
1	17639839.49	4850208.60	3.50	0	E	2000	108.4	0.0	-0.8	0.0	0.0	52.0	1.1	-1.8	0.0	0.0	0.0	0.0	0.0	56.3
1	17639839.49	4850208.60	3.50	0	E	4000	104.4	0.0	-0.8	0.0	0.0	52.0	3.7	-1.8	0.0	0.0	0.0	0.0	0.0	49.7
1	17639839.49	4850208.60	3.50	0	E	8000	95.1	0.0	-0.8	0.0	0.0	52.0	13.2	-1.8	0.0	0.0	0.0	0.0	0.0	30.9
2	17639839.49	4850208.60	3.50	1	D	63	79.7	0.0	-0.8	0.0	0.0	52.2	0.0	-3.0	0.0	0.0	0.0	0.0	2.0	27.6
2	17639839.49	4850208.60	3.50	1	D	125	89.2	0.0	-0.8	0.0	0.0	52.2	0.0	-1.1	0.0	0.0	0.0	0.0	2.0	35.2
2	17639839.49	4850208.60	3.50	1	D	250	97.0	0.0	-0.8	0.0	0.0	52.2	0.1	-0.9	0.0	0.0	0.0	0.0	2.0	42.7
2	17639839.49	4850208.60	3.50	1	D	500	107.5	0.0	-0.8	0.0	0.0	52.2	0.2	-1.9	0.0	0.0	0.0	0.0	2.0	54.1
2	17639839.49	4850208.60	3.50	1	D	1000	110.1	0.0	-0.8	0.0	0.0	52.2	0.4	-1.9	0.0	0.0	0.0	0.0	2.0	56.5
2	17639839.49	4850208.60	3.50	1	D	2000	108.4	0.0	-0.8	0.0	0.0	52.2	1.1	-1.9	0.0	0.0	0.0	0.0	2.0	54.1
2	17639839.49	4850208.60	3.50	1	D	4000	104.4	0.0	-0.8	0.0	0.0	52.2	3.8	-1.9	0.0	0.0	0.0	0.0	2.0	47.5
2	17639839.49	4850208.60	3.50	1	D	8000	95.1	0.0	-0.8	0.0	0.0	52.2	13.5	-1.9	0.0	0.0	0.0	0.0	2.0	28.5
2	17639839.49	4850208.60	3.50	1	N	63	79.7	0.0	-3.8	0.0	0.0	52.2	0.0	-3.0	0.0	0.0	0.0	0.0	2.0	24.6
2	17639839.49	4850208.60	3.50	1	N	125	89.2	0.0	-3.8	0.0	0.0	52.2	0.0	-1.1	0.0	0.0	0.0	0.0	2.0	32.2
2	17639839.49	4850208.60	3.50	1	N	250	97.0	0.0	-3.8	0.0	0.0	52.2	0.1	-0.9	0.0	0.0	0.0	0.0	2.0	39.7
2	17639839.49	4850208.60	3.50	1	N	500	107.5	0.0	-3.8	0.0	0.0	52.2	0.2	-1.9	0.0	0.0	0.0	0.0	2.0	51.1
2	17639839.49	4850208.60	3.50	1	N	1000	110.1	0.0	-3.8	0.0	0.0	52.2	0.4	-1.9	0.0	0.0	0.0	0.0	2.0	53.5
2	17639839.49	4850208.60	3.50	1	N	2000	108.4	0.0	-3.8	0.0	0.0	52.2	1.1	-1.9	0.0	0.0	0.0	0.0	2.0	51.1
2	17639839.49	4850208.60	3.50	1	N	4000	104.4	0.0	-3.8	0.0	0.0	52.2	3.8	-1.9	0.0	0.0	0.0	0.0	2.0	44.5
2	17639839.49	4850208.60	3.50	1	N	8000	95.1	0.0	-3.8	0.0	0.0	52.2	13.5	-1.9	0.0	0.0	0.0	0.0	2.0	25.5
2	17639839.49	4850208.60	3.50	1	E	63	79.7	0.0	-0.8	0.0	0.0	52.2	0.0	-3.0	0.0	0.0	0.0	0.0	2.0	27.6
2	17639839.49	4850208.60	3.50	1	E	125	89.2	0.0	-0.8	0.0	0.0	52.2	0.0	-1.1	0.0	0.0	0.0	0.0	2.0	35.2
2	17639839.49	4850208.60	3.50	1	E	250	97.0	0.0	-0.8	0.0	0.0	52.2	0.1	-0.9	0.0	0.0	0.0	0.0	2.0	42.7
2	17639839.49	4850208.60	3.50	1	E	500	107.5	0.0	-0.8	0.0	0.0	52.2	0.2	-1.9	0.0	0.0	0.0	0.0	2.0	54.1
2	17639839.49	4850208.60	3.50	1	E	1000	110.1	0.0	-0.8	0.0	0.0	52.2	0.4	-1.9	0.0	0.0	0.0	0.0	2.0	56.5
2	17639839.49	4850208.60	3.50	1	E	2000	108.4	0.0	-0.8	0.0	0.0	52.2	1.1	-1.9	0.0	0.0	0.0	0.0	2.0	54.1
2	17639839.49	4850208.60	3.50	1	E	4000	104.4	0.0	-0.8	0.0	0.0	52.2	3.8	-1.9	0.0	0.0	0.0	0.0	2.0	47.5
2	17639839.49	4850208.60	3.50	1	E	8000	95.1	0.0	-0.8	0.0	0.0	52.2	13.5	-1.9	0.0	0.0	0.0	0.0	2.0	28.5

Point Source, ISO 9613, Name: "TrkIdle05", ID: "Concrete_TrkIdle05"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
32	17639867.08	4850221.99	2.40	0	D	63	74.4	0.0	-7.8	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	16.1
32	17639867.08	4850221.99	2.40	0	D	125	82.2	0.0	-7.8	0.0	0.0	53.5	0.1	-1.3	0.0	0.0	0.0	0.0	0.0	22.2
32	17639867.08	4850221.99	2.40	0	D	250	85.6	0.0	-7.8	0.0	0.0	53.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	24.2
32	17639867.08	4850221.99	2.40	0	D	500	93.7	0.0	-7.8	0.0	0.0	53.5	0.3	-1.4	0.0	0.0	0.0	0.0	0.0	33.6
32	17639867.08	4850221.99	2.40	0	D	1000	97.0	0.0	-7.8	0.0	0.0	53.5	0.5	-1.8	0.0	0.0	0.0	0.0	0.0	37.1
32	17639867.08	4850221.99	2.40	0	D	2000	95.4	0.0	-7.8	0.0	0.0	53.5	1.3	-1.8	0.0	0.0	0.0	0.0	0.0	34.7
32	17639867.08	4850221.99	2.40	0	D	4000	88.4	0.0	-7.8	0.0	0.0	53.5	4.4	-1.8	0.0	0.0	0.0	0.0	0.0	24.6
32	17639867.08	4850221.99	2.40	0	D	8000	80.5	0.0	-7.8	0.0	0.0	53.5	15.5	-1.8	0.0	0.0	0.0	0.0	0.0	5.5
32	17639867.08	4850221.99	2.40	0	N	32	61.7	0.0	-7.8	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	3.4
32	17639867.08	4850221.99	2.40	0	N	63	74.4	0.0	-7.8	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	16.1
32	17639867.08	4850221.99	2.40	0	N	125	82.2	0.0	-7.8	0.0	0.0	53.5	0.1	-1.3	0.0	0.0	0.0	0.0	0.0	22.2
32	17639867.08	4850221.99	2.40	0	N	250	85.6	0.0	-7.8	0.0	0.0	53.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	24.2
32	17639867.08	4850221.99	2.40	0	N	500	93.7	0.0	-7.8	0.0	0.0	53.5	0.3	-1.4	0.0	0.0	0.0	0.0	0.0	33.6
32	17639867.08	4850221.99	2.40	0	N	1000	97.0	0.0	-7.8	0.0	0.0	53.5	0.5	-1.8	0.0	0.0	0.0	0.0	0.0	37.1
32	17639867.08	4850221.99	2.40	0	N	2000	95.4	0.0	-7.8	0.0	0.0	53.5	1.3	-1.8	0.0	0.0	0.0	0.0	0.0	34.7
32	17639867.08	4850221.99	2.40	0	N	4000	88.4	0.0	-7.8	0.0	0.0	53.5	4.4	-1.8	0.0	0.0	0.0	0.0	0.0	24.6
32	17639867.08	4850221.99	2.40	0	N	8000	80.5	0.0	-7.8	0.0	0.0	53.5	15.5	-1.8	0.0	0.0	0.0	0.0	0.0	5.5
32	17639867.08	4850221.99	2.40	0	E	32	61.7	0.0	-7.8	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	3.4
32	17639867.08	4850221.99	2.40	0	E	63	74.4	0.0	-7.8	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	16.1
32	17639867.08	4850221.99	2.40	0	E	125	82.2	0.0	-7.8	0.0	0.0	53.5	0.1	-1.3	0.0	0.0	0.0	0.0	0.0	22.2
32	17639867.08	4850221.99	2.40	0	E	250	85.6	0.0	-7.8	0.0	0.0	53.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	24.2
32	17639867.08	4850221.99	2.40	0	E	500	93.7	0.0	-7.8	0.0	0.0	53.5	0.3	-1.4	0.0	0.0	0.0	0.0	0.0	33.6
32	17639867.08	4850221.99	2.40	0	E	1000	97.0	0.0	-7.8	0.0	0.0	53.5	0.5	-1.8	0.0	0.0	0.0	0.0	0.0	37.1
32	17639867.08	4850221.99	2.40	0	E	2000	95.4	0.0	-7.8	0.0	0.0	53.5	1.3	-1.8	0.0	0.0	0.0	0.0	0.0	34.7
32	17639867.08	4850221.99	2.40	0	E	4000	88.4	0.0	-7.8	0.0	0.0	53.5	4.4	-1.8	0.0	0.0	0.0	0.0	0.0	24.6
32	17639867.08	4850221.99	2.40	0	E	8000	80.5	0.0	-7.8	0.0	0.0	53.5	15.5	-1.8	0.0	0.0	0.0	0.0	0.0	5.5

Point Source, ISO 9613, Name: "Maintenance_Bay", ID: "Concrete_Maintenance_Bay"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
33	17639856.81	4850257.98	2.50	0	D	32	51.0	0.0	-7.8	0.0	0.0	55.3	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	-12.1
33	17639856.81	4850257.98	2.50	0	D	63	65.3	0.0	-7.8	0.0	0.0	55.3	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	2.2
33	17639856.81	4850257.98	2.50	0	D	125	77.7	0.0	-7.8	0.0	0.0	55.3	0.1	-2.6	0.0	0.0	2.9	0.0	0.0	14.2
33	17639856.81	4850257.98	2.50	0	D	250	90.6	0.0	-7.8	0.0	0.0	55.3	0.2	-2.6	0.0	0.0	2.9	0.0	0.0	27.0
33	17639856.81	4850257.98	2.50	0	D	500	94.1	0.0	-7.8	0.0	0.0	55.3	0.3	-2.6	0.0	0.0	2.9	0.0	0.0	30.3
33	17639856.81	4850257.98	2.50	0	D	1000	96.2	0.0	-7.8	0.0	0.0	55.3	0.6	-2.6	0.0	0.0	3.0	0.0	0.0	32.0
33	17639856.81	4850257.98	2.50	0	D	2000	98.5	0.0	-7.8	0.0	0.0	55.3	1.6	-2.6	0.0	0.0	3.2	0.0	0.0	33.2
33	17639856.81	4850257.98	2.50	0	D	4000	97.2	0.0	-7.8	0.0	0.0	55.3	5.4	-2.6	0.0	0.0	3.5	0.0	0.0	27.8
33	17639856.81	4850257.98	2.50	0	D	8000	93.8	0.0	-7.8	0.0	0.0	55.3	19.2	-2.6	0.0	0.0	3.9	0.0	0.0	10.2
33	17639856.81	4850257.98	2.50	0	N	32	51.0	0.0	-10.8	0.0	0.0	55.3	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	-15.1
33	17639856.81	4850257.98	2.50	0	N	63	65.3	0.0	-10.8	0.0	0.0	55.3	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	-0.8
33	17639856.81	4850257.98	2.50	0	N	125	77.7	0.0	-10.8	0.0	0.0	55.3	0.1	-2.6	0.0	0.0	2.9	0.0	0.0	11.2
33	17639856.81	4850257.98	2.50	0	N	250	90.6	0.0	-10.8	0.0	0.0	55.3	0.2	-2.6	0.0	0.0	2.9	0.0	0.0	24.0
33	17639856.81	4850257.98	2.50	0	N	500	94.1	0.0	-10.8	0.0	0.0	55.3	0.3	-2.6	0.0	0.0	2.9	0.0	0.0	27.3
33	17639856.81	4850257.98	2.50	0	N	1000	96.2	0.0	-10.8	0.0	0.0	55.3	0.6	-2.6	0.0	0.0	3.0	0.0	0.0	29.0
33	17639856.81	4850257.98	2.50	0	N	2000	98.5	0.0	-10.8	0.0	0.0	55.3	1.6	-2.6	0.0	0.0	3.2	0.0	0.0	30.2
33	17639856.81	4850257.98	2.50	0	N	4000	97.2	0.0	-10.8	0.0	0.0	55.3	5.4	-2.6	0.0	0.0	3.5	0.0	0.0	24.8
33	17639856.81	4850257.98	2.50	0	N	8000	93.8	0.0	-10.8	0.0	0.0	55.3	19.2	-2.6	0.0	0.0	3.9	0.0	0.0	7.2
33	17639856.81	4850257.98	2.50	0	E	32	51.0	0.0	-7.8	0.0	0.0	55.3	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	-12.1
33	17639856.81	4850257.98	2.50	0	E	63	65.3	0.0	-7.8	0.0	0.0	55.3	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	2.2
33	17639856.81	4850257.98	2.50	0	E	125	77.7	0.0	-7.8	0.0	0.0	55.3	0.1	-2.6	0.0	0.0	2.9	0.0	0.0	14.2
33	17639856.81	4850257.98	2.50	0	E	250	90.6	0.0	-7.8	0.0	0.0	55.3	0.2	-2.6	0.0	0.0	2.9	0.0	0.0	27.0
33	17639856.81	4850257.98	2.50	0	E	500	94.1	0.0	-7.8	0.0	0.0	55.3	0.3	-2.6	0.0	0.0	2.9	0.0	0.0	30.3
33	17639856.81	4850257.98	2.50	0	E	1000	96.2	0.0	-7.8	0.0	0.0	55.3	0.6	-2.6	0.0	0.0	3.0	0.0	0.0	32.0
33	17639856.81	4850257.98	2.50	0	E	2000	98.5	0.0	-7.8	0.0	0.0	55.3	1.6	-2.6	0.0	0.0	3.2	0.0	0.0	33.2
33	17639856.81	4850257.98	2.50	0	E	4000	97.2	0.0	-7.8	0.0	0.0	55.3	5.4	-2.6	0.0	0.0	3.5	0.0	0.0	27.8
33	17639856.81	4850257.98	2.50	0	E	8000	93.8	0.0	-7.8	0.0	0.0	55.3	19.2	-2.6	0.0	0.0	3.9	0.0	0.0	10.2

Point Source, ISO 9613, Name: "TrkIdle03", ID: "Concrete_TrkIdle03"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
34	17639864.89	4850229.47	2.40	0	D	32	61.7	0.0	-7.8	0.0	0.0	53.9	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	3.0
34	17639864.89	4850229.47	2.40	0	D	63	74.4	0.0	-7.8	0.0	0.0	53.9	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	15.7

Line Source, ISO 9613, Name: "CementTrk_Movement", ID: "Concrete_CementTrk_Movement"																				
Nr.	X	Y	Z	Ref.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB(A))
195	17639870.02	4850196.19	2.40	0	DEN	1000	58.8	9.6	0.0	0.0	0.0	51.9	0.4	-1.2	0.0	0.0	0.0	0.0	0.0	17.2
195	17639870.02	4850196.19	2.40	0	DEN	2000	58.5	9.6	0.0	0.0	0.0	51.9	1.1	-1.2	0.0	0.0	0.0	0.0	0.0	16.3
195	17639870.02	4850196.19	2.40	0	DEN	4000	56.8	9.6	0.0	0.0	0.0	51.9	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	12.0
195	17639870.02	4850196.19	2.40	0	DEN	8000	51.5	9.6	0.0	0.0	0.0	51.9	12.9	-1.2	0.0	0.0	0.0	0.0	0.0	-2.5
196	17639867.35	4850197.58	2.40	1	DEN	500	58.8	4.8	0.0	0.0	0.0	54.2	0.3	-2.2	0.0	0.0	0.0	0.0	2.0	9.3
196	17639867.35	4850197.58	2.40	1	DEN	1000	58.8	4.8	0.0	0.0	0.0	54.2	0.5	-2.3	0.0	0.0	0.0	0.0	2.0	9.2
196	17639867.35	4850197.58	2.40	1	DEN	2000	58.5	4.8	0.0	0.0	0.0	54.2	1.4	-2.3	0.0	0.0	0.0	0.0	2.0	8.0
196	17639867.35	4850197.58	2.40	1	DEN	4000	56.8	4.8	0.0	0.0	0.0	54.2	4.7	-2.3	0.0	0.0	0.0	0.0	2.0	3.0
196	17639867.35	4850197.58	2.40	1	DEN	8000	51.5	4.8	0.0	0.0	0.0	54.2	16.9	-2.3	0.0	0.0	0.0	0.0	2.0	-14.5
197	17639803.78	4850221.55	2.40	0	DEN	32	-79.4	4.6	0.0	0.0	0.0	53.0	0.0	-3.0	0.0	0.0	7.8	0.0	0.0	-132.5
197	17639803.78	4850221.55	2.40	0	DEN	63	46.1	4.6	0.0	0.0	0.0	53.0	0.0	-3.0	0.0	0.0	7.8	0.0	0.0	-7.0
197	17639803.78	4850221.55	2.40	0	DEN	125	54.7	4.6	0.0	0.0	0.0	53.0	0.1	-1.8	0.0	0.0	6.6	0.0	0.0	1.5
197	17639803.78	4850221.55	2.40	0	DEN	250	58.2	4.6	0.0	0.0	0.0	53.0	0.1	-1.0	0.0	0.0	5.8	0.0	0.0	5.0
197	17639803.78	4850221.55	2.40	0	DEN	500	58.8	4.6	0.0	0.0	0.0	53.0	0.2	-2.0	0.0	0.0	6.7	0.0	0.0	5.4
197	17639803.78	4850221.55	2.40	0	DEN	1000	58.8	4.6	0.0	0.0	0.0	53.0	0.5	-2.2	0.0	0.0	7.0	0.0	0.0	5.2
197	17639803.78	4850221.55	2.40	0	DEN	2000	58.5	4.6	0.0	0.0	0.0	53.0	1.2	-2.2	0.0	0.0	7.0	0.0	0.0	4.2
197	17639803.78	4850221.55	2.40	0	DEN	4000	56.8	4.6	0.0	0.0	0.0	53.0	4.1	-2.2	0.0	0.0	7.0	0.0	0.0	-0.4
197	17639803.78	4850221.55	2.40	0	DEN	8000	51.5	4.6	0.0	0.0	0.0	53.0	14.6	-2.2	0.0	0.0	7.0	0.0	0.0	-16.3
198	17639803.55	4850227.13	2.40	0	DEN	32	-79.4	9.2	0.0	0.0	0.0	53.3	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-120.5
198	17639803.55	4850227.13	2.40	0	DEN	63	46.1	9.2	0.0	0.0	0.0	53.3	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	4.9
198	17639803.55	4850227.13	2.40	0	DEN	125	54.7	9.2	0.0	0.0	0.0	53.3	0.1	-2.1	0.0	0.0	0.0	0.0	0.0	12.6
198	17639803.55	4850227.13	2.40	0	DEN	250	58.2	9.2	0.0	0.0	0.0	53.3	0.1	-1.5	0.0	0.0	0.0	0.0	0.0	15.5
198	17639803.55	4850227.13	2.40	0	DEN	500	58.8	9.2	0.0	0.0	0.0	53.3	0.3	-2.2	0.0	0.0	0.0	0.0	0.0	16.6
198	17639803.55	4850227.13	2.40	0	DEN	1000	58.8	9.2	0.0	0.0	0.0	53.3	0.5	-2.3	0.0	0.0	0.0	0.0	0.0	16.5
198	17639803.55	4850227.13	2.40	0	DEN	2000	58.5	9.2	0.0	0.0	0.0	53.3	1.3	-2.3	0.0	0.0	0.0	0.0	0.0	15.4
198	17639803.55	4850227.13	2.40	0	DEN	4000	56.8	9.2	0.0	0.0	0.0	53.3	4.3	-2.3	0.0	0.0	0.0	0.0	0.0	10.7
198	17639803.55	4850227.13	2.40	0	DEN	8000	51.5	9.2	0.0	0.0	0.0	53.3	15.3	-2.3	0.0	0.0	0.0	0.0	0.0	-5.6
199	17639855.17	4850224.07	2.40	0	DEN	32	-79.4	8.6	0.0	0.0	0.0	53.4	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-121.2
199	17639855.17	4850224.07	2.40	0	DEN	63	46.1	8.6	0.0	0.0	0.0	53.4	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	4.3
199	17639855.17	4850224.07	2.40	0	DEN	125	54.7	8.6	0.0	0.0	0.0	53.4	0.1	-1.4	0.0	0.0	0.0	0.0	0.0	11.3
199	17639855.17	4850224.07	2.40	0	DEN	250	58.2	8.6	0.0	0.0	0.0	53.4	0.1	-0.3	0.0	0.0	0.0	0.0	0.0	13.5
199	17639855.17	4850224.07	2.40	0	DEN	500	58.8	8.6	0.0	0.0	0.0	53.4	0.3	-1.6	0.0	0.0	0.0	0.0	0.0	15.3
199	17639855.17	4850224.07	2.40	0	DEN	1000	58.8	8.6	0.0	0.0	0.0	53.4	0.5	-1.9	0.0	0.0	0.0	0.0	0.0	15.4
199	17639855.17	4850224.07	2.40	0	DEN	2000	58.5	8.6	0.0	0.0	0.0	53.4	1.3	-1.9	0.0	0.0	0.0	0.0	0.0	14.3
199	17639855.17	4850224.07	2.40	0	DEN	4000	56.8	8.6	0.0	0.0	0.0	53.4	4.3	-1.9	0.0	0.0	0.0	0.0	0.0	9.6
199	17639855.17	4850224.07	2.40	0	DEN	8000	51.5	8.6	0.0	0.0	0.0	53.4	15.3	-1.9	0.0	0.0	0.0	0.0	0.0	-6.8
200	17639850.70	4850227.43	2.40	0	DEN	32	-79.4	6.1	0.0	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	3.0	0.0	0.0	-126.9
200	17639850.70	4850227.43	2.40	0	DEN	63	46.1	6.1	0.0	0.0	0.0	53.5	0.0	-3.0	0.0	0.0	3.6	0.0	0.0	-1.9
200	17639850.70	4850227.43	2.40	0	DEN	125	54.7	6.1	0.0	0.0	0.0	53.5	0.1	-1.7	0.0	0.0	3.9	0.0	0.0	5.0
200	17639850.70	4850227.43	2.40	0	DEN	250	58.2	6.1	0.0	0.0	0.0	53.5	0.1	-0.8	0.0	0.0	4.7	0.0	0.0	6.8
200	17639850.70	4850227.43	2.40	0	DEN	500	58.8	6.1	0.0	0.0	0.0	53.5	0.3	-1.8	0.0	0.0	6.5	0.0	0.0	6.4
200	17639850.70	4850227.43	2.40	0	DEN	1000	58.8	6.1	0.0	0.0	0.0	53.5	0.5	-2.1	0.0	0.0	8.6	0.0	0.0	4.3
200	17639850.70	4850227.43	2.40	0	DEN	2000	58.5	6.1	0.0	0.0	0.0	53.5	1.3	-2.1	0.0	0.0	11.0	0.0	0.0	0.9
200	17639850.70	4850227.43	2.40	0	DEN	4000	56.8	6.1	0.0	0.0	0.0	53.5	4.4	-2.1	0.0	0.0	13.6	0.0	0.0	-6.6
200	17639850.70	4850227.43	2.40	0	DEN	8000	51.5	6.1	0.0	0.0	0.0	53.5	15.6	-2.1	0.0	0.0	16.3	0.0	0.0	-25.7
201	17639807.43	4850218.01	2.40	0	DEN	32	-79.4	9.2	0.0	0.0	0.0	52.7	0.0	-3.0	0.0	0.0	7.8	0.0	0.0	-127.6
201	17639807.43	4850218.01	2.40	0	DEN	63	46.1	9.2	0.0	0.0	0.0	52.7	0.0	-3.0	0.0	0.0	7.8	0.0	0.0	-2.2
201	17639807.43	4850218.01	2.40	0	DEN	125	54.7	9.2	0.0	0.0	0.0	52.7	0.0	-1.7	0.0	0.0	6.5	0.0	0.0	6.4
201	17639807.43	4850218.01	2.40	0	DEN	250	58.2	9.2	0.0	0.0	0.0	52.7	0.1	-0.7	0.0	0.0	5.5	0.0	0.0	9.8
201	17639807.43	4850218.01	2.40	0	DEN	500	58.8	9.2	0.0	0.0	0.0	52.7	0.2	-1.8	0.0	0.0	6.6	0.0	0.0	10.3
201	17639807.43	4850218.01	2.40	0	DEN	1000	58.8	9.2	0.0	0.0	0.0	52.7	0.4	-2.1	0.0	0.0	6.9	0.0	0.0	10.1
201	17639807.43	4850218.01	2.40	0	DEN	2000	58.5	9.2	0.0	0.0	0.0	52.7	1.2	-2.1	0.0	0.0	7.0	0.0	0.0	9.0
201	17639807.43	4850218.01	2.40	0	DEN	4000	56.8	9.2	0.0	0.0	0.0	52.7	4.0	-2.1	0.0	0.0	7.0	0.0	0.0	4.4
201	17639807.43	4850218.01	2.40	0	DEN	8000	51.5	9.2	0.0	0.0	0.0	52.7	14.2	-2.1	0.0	0.0	7.2	0.0	0.0	-11.3