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Noise Feasibility Study

Proposed Residential Development


135 Coronation Drive

Port Colborne, ON

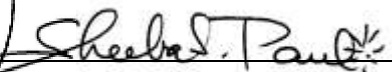
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ACOUSTICS



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1 Introduction and Summary

HGC Engineering was retained by Sobeys Capital Incorporated to conduct a noise feasibility study for a proposed residential development located at 135 Coronation Drive in Port Colborne, Ontario. The residential development will consist of six townhouse blocks. The study is required by the Region of Niagara and the City of Port Colborne as part of the planning and approvals process.

The primary source of noise is road traffic on West Side Road (Highway 58). Road traffic data was obtained from the Ontario Ministry of Transportation (MTO), and was used to predict future traffic sound levels at the proposed building façades and outdoor living areas. The predicted sound levels were compared to the guidelines of the Region of Niagara and the Ministry of Environment, Conservation and Parks (MECP) to develop noise control recommendations.

The results of the study indicate that the proposed development is feasible with the noise control measures described in this report, which will be refined at the Site Plan Control application stage. Central air conditioning and upgraded glazing constructions are required for the townhouse Blocks D, E, and F, which are adjacent to West Side Road. For all blocks, building constructions meeting the minimum requirement of the Ontario Building Code will provide sufficient acoustical insulation for the indoor spaces. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant are required for townhouse Block C. Noise warning clauses are required to inform future occupants of traffic noise impact and proximity to existing commercial uses.

A computational model was created, using acoustical modelling software, to assess the potential sound impact from the nearby commercial uses to the north on the proposed development. The results show that sound emissions from commercial uses have the potential to exceed the applicable criteria during daytime hours. Mitigation is required, and options for mitigation are presented in this report.

2 Site Description and Noise Sources

Figure 1 is a key plan indicating the location of the proposed site. The site is located west of West Side Road and north of Coronation Drive in Port Colborne, Ontario. Figure 2 shows the site plan by

Organica Studio + Inc, dated March 23, 2023. The proposed development will consist of six 3-storey townhouse blocks, totaling to 114 dwelling units.

HGC Engineering personnel visited the site on April 3, 2023 to make observations of the acoustical environment. During the site visit, it was noted that the primary source of noise impacting the site was road traffic on West Side Road. Negligible impact from road traffic was observed on Coronation Drive. The site is currently vacant. There are existing single detached dwellings to the west, south, and east of the site area.

To the north of the site area is a single storey commercial plaza (Port Colborne Mall), containing a grocery store at the south end of the plaza and is adjacent to the site area. There are also two restaurants with drive-throughs (Tim Horton's and Little Caesars Pizza) north of the site area.

An assessment of the noise impact from the commercial uses to the north is detailed in Section 6.

3 Traffic Noise Criteria

Guidelines for acceptable levels of road traffic noise impacting residential developments are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", release date October 21, 2013, and are listed in Table I below.

The values in Table I are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA].

Table I: MECP Road Traffic Noise Criteria (dBA)

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

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace, or other area where passive recreation is expected to occur. Small balconies are

not considered OLAs for the purposes of assessment. Terraces greater than 4 m in depth (measured perpendicular to the building façade) are considered to be OLAs.

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

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

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

Warning clauses to notify future residents of possible noise excesses are also required when nighttime sound levels exceed 50 dBA at the plane of a bedroom/living/dining room window and when daytime sound levels exceed 55 dBA at the plane of a bedroom/living/dining room window due to road traffic.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Traffic data for West Side Road was obtained from the MTO in the form of Average Annual Daily Traffic (AADT) traffic values, and is provided in Appendix A. The traffic data was projected to the year 2033 at an annual growth rate of 2.5 %. A projected volume of 15 119 vehicles per day at a posted speed limit of 70 km/h was applied for the analysis. A commercial vehicle percentage of 11 %

was applied, split into 4.2 % for medium trucks and 6.8 % for heavy trucks as per MTO guidelines. A day/night split of 85 % / 15 % was used, as per MTO guidelines.

Table II summarizes the traffic volume data used in this study.

Table II: Projected Road Traffic Data to Year 2033

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
West Side Road (Highway 58)	Daytime	11 437	540	874	12 851
	Nighttime	2 018	95	154	2 268
	Total	13 456	635	1 028	15 119

4.2 Road Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix B.

Predictions of the traffic sound levels were chosen around the proposed residential buildings to obtain an appropriate representation of future sound levels at various façades. The proposed townhouses are assumed to be 3-storey in height, as indicated on the site plan, and will have 3rd floor terraces greater than 4 m in depth. Sound levels were predicted at the plane of the top storey bedroom and/or living/dining room windows during daytime and nighttime hours to investigate ventilation and façade construction requirements. Sound levels were also predicted on the 3rd floor terraces of the townhouses to investigate the need for noise barriers. Figure 2 shows the site plan with prediction locations. The results of these predictions are summarized in Table III.

Table III: Predicted Road Traffic Sound Levels [dBA], Without Mitigation

Prediction Location	Description	Daytime – in the OLA L _{EQ-16 hr}	Daytime – at the Façade L _{EQ-16 hr}	Nighttime – at the Façade L _{EQ-8 hr}
[A]	Block E, east façade facing West Side Rd	60 ⁺	66	62
[B]	Block F, north façade flanking West Side Rd	60 ⁺	63	59
[C]	Block C, south façade with some exposure to West Side Rd	59 ⁺	57	52
[D]	Proposed Amenity Space	<55	--	--

Note: + with a minimum 1.07m high solid parapet on the 3rd floor terraces

5 Traffic Noise Recommendations

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

5.1 Outdoor Living Areas

The townhouse units are expected to have 3rd floor terraces that are greater than 4 m in depth. The daytime predicted sound levels at these terraces, with a minimum 1.07 m high solid parapet wall, will be up to 60 dBA. While this exceeds the MECP guideline limit of 55 dBA, it is within the allowable exceedance range of 5 dBA as per MECP guidelines. Further mitigation is not required.

The parapet should be of a solid construction with a surface density of no less than 20 kg/m². The walls may be constructed from a variety of materials such as glass, wood, pre-cast concrete or other concrete/wood composite systems provided that it is free of gaps or cracks within or below its extent.

The predicted daytime sound level at the proposed common amenity area during daytime hours will be less than 55 dBA and is within the MECP guideline limits. No mitigation is required.

5.2 Indoor Living Areas and Ventilation Requirements

Air Conditioning

The predicted future sound levels outside the top storey windows of the townhouse façades facing West Side Road will be greater than 60 dBA during nighttime hours and 65 dBA during daytime hours. To address these excesses, these units need to be equipped with central air conditioning systems so that windows may remain closed. These units are indicated in Figure 3. Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300, as applicable.

Provision for Air Conditioning

The predicted future sound levels outside the top storey windows of townhouse Block C, with some exposure to West Side Road, will be between 56 and 65 dBA during the daytime hours and/or between 51 to 60 dBA during the nighttime hours. To address these excesses, these dwelling units require provisions for the future installation of central air conditioning systems so that windows may be kept closed. This requirement is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant. These units are indicated in Figure 3. The installation of central air conditioning for all units will satisfy and exceed ventilation requirements. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

5.3 Building Façade Constructions

The predicted sound levels at the west façades facing West Side Road will exceed 65 dBA during daytime and 60 dBA during nighttime. MECP guidelines stipulate that in such cases, building components including windows, walls, and doors be designed so that the indoor sound levels comply with the noise criteria in Table I.

Calculations were performed to determine the acoustical insulation factors (AIF) to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the anticipated area ratios of the facade components (walls, windows and doors) and the floor area of the adjacent room.

Exterior Doors

There may be glazed exterior doors (sliding or swing) for entry onto the balconies from living/dining rooms and some bedrooms. The glazing areas of the doors should be counted as part of the total window glazing area. All exterior doors should include good weather seals to reduce air infiltration to the minimum achievable levels.

Acoustical Requirements for Glazing

The required building components are selected based on the AIF value for road traffic. A summary of the STC requirements is given in Table IV for the townhouse façades, based on the possibility of sound entering the building through walls, windows and doors for all of the dwellings. Detailed floor plans and building elevations were not available for review at the time of this report, which will be available as a part of a future Site Plan Control application. A window to floor ratio of 50% (40% fixed, 10% operable) for living/dining room and 40% (30% fixed, 10% operable) for bedrooms were assumed to determine preliminary window STC ratings required to mitigate road traffic noise levels.

Table IV: Preliminary Minimum STC Requirements

Block	Description	Space	STC Glazing Requirements
D, E, F	West façades facing West Side Road	+Living/Dining	STC-28
		+Bedroom	STC-28
	Other façades	+Living/Dining	OBC
		+Bedroom	OBC
Others	All façades	+Living/Dining	OBC
		+Bedroom	OBC

Notes: OBC – Ontario Building Code
+ Sound entering through windows and walls

The glazing requirements can be met using fairly standard sealed units. Any double-glazed unit, meeting the minimum requirements of the Ontario Building Code, should provide adequate acoustical insulation for indoor spaces. Operable sections, including doors and operable windows, must be well-fitted and weather-stripped in order to achieve the upper range of target STC values.

Further Analysis

When detailed floor plans and building elevations are available for the dwelling units adjacent to West Side Road, window glazing construction should be refined based on actual window to floor area ratios.

6 Stationary Source Assessment

Noise sources associated with industrial and commercial facilities are assessed separately from traffic sources under MECP guidelines. The grocery store, Tim Horton's restaurant & drive-through, and Little Caesar restaurant & drive-through are potential sources of noise that can impact the proposed development. These facilities are considered to be Stationary Sources of Sound and criteria for their assessment are contained in the following section.

6.1 Sound Level Criteria at the Nearby Receptors

Typical ambient sound levels can be determined through prediction of road traffic volumes in areas where traffic sound is dominant. Where it can be demonstrated that the hourly background sound levels are greater than the exclusionary limits, the criterion becomes the minimum predicted one-hour L_{EQ} sound level during each respective period of the day. At locations where the background sound levels are low, the exclusionary limit of 50 dBA for daytime/evening and 45 dBA for nighttime respectively will apply.

Elevated background sound levels due to road traffic on West Side Road are considerable, especially at the townhouse blocks adjacent to West Side Road. Using the traffic volumes provided by the MTO, the traffic data was applied to a generic 24-hour traffic pattern developed by the US Department of Transportation, Federal Highways Administration contained in the report titled "Summary of National and Regional Travel Trends 1970 – 1995" dated May 1996. The traffic

volumes were then used to predict the minimum hourly background sound levels at the existing dwelling façades and outdoor living areas.

To assess the levels of background road traffic noise, noise predictions were made using a numerical computer modelling package (*Cadna-A version 2023, build: 195.5312*) using hourly traffic volumes. The road noise sources have been included in the *Cadna/A* model as line sources. Our experience suggests that road sound levels predicted by *Cadna/A* are reasonably accurate. In the model, road traffic values have been qualified to be within 1-2 dBA of those predicted in STAMSON 5.04, a computer algorithm developed by the MECP.

The results show that the background sound levels due to road traffic can exceed the exclusionary limits at façades close to West Side Road. Figures 4a and 4b show the applicable sound level criteria for the proposed development.

6.2 Stationary Source Noise Predictions

Predictive noise modelling was used to assess the sound impact of the nearby stationary sources at the most critically impacted façades of the proposed development in accordance with MECP guidelines. The noise prediction model was constructed based on site visit observations, information from grocery store personnel regarding their operations, review of the proposed site and floor plans, satellite aerial photos, and estimates of sound emission levels of stationary sources taken from similar past HGC Engineering project files.

Table V: Source Sound Power Levels [dB re 10-12 W]

Source	Octave Band Sound Level								Overall dBA
	63	125	250	500	1k	2k	4k	8k	
Exhaust Fan	--	79	76	71	72	64	59	55	75
Kitchen Fan	84	85	84	80	76	73	64	57	82
Chiller Condenser Fan (Each)	84	79	78	77	76	70	63	59	80
Trash Compactor	101	95	88	81	77	75	74	67	86
Carrier 48TCxx06 5-Ton HVAC	84	82	76	75	73	69	66	62	78
Tractor Trailer Acceleration	101	100	94	96	97	95	91	86	101
Tractor Trailer Idling	96	91	88	88	91	90	81	70	95
Tractor Trailer Refrigeration Unit	112	105	96	95	93	91	85	77	98
Drive-through speakerboard*	80	75	72	86	83	81	68	53	88
Low Speed or Idling Car	90	86	76	72	71	68	62	58	77

Note: The above drive-through speakerboard sound power specification equates to a sound pressure level of 71 dBA at 1.5 meters from the speaker, while the speaker is active.

* Includes a 5 dB tonal penalty.

The above data were inputted into a predictive computer model. The software used for this purpose (*Cadna-A version 2023, build: 195.5312*) is a computer implementation of ISO Standard 9613-2.2 “Acoustics - Attenuation of Sound During Propagation Outdoors.” The ISO method accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures such as buildings and barriers.

The following information and assumptions were used in the analysis.

- The height of the existing commercial building is assumed to be 5.0 m.
- A minimum 1.07 m high parapet wall surrounds the 3rd storey terraces of the proposed townhouses.
- There is a loading dock associated with the existing grocery store with a wing wall that is approximately 2.5 m tall, which has been included in the analysis.
- The rooftop HVAC units are assumed to be 1.5 m in height and exhaust fans are assumed to be 0.5 m in height. Equipment data was obtained from grocery store personnel for the grocery store rooftop.
- Based on information from the grocery store, tractor trailers deliver food and products to the loading dock during daytime hours, with some of the trucks equipped with refrigeration units (reefers).

- Location of rooftop equipment, truck engine and reefer idling, idling cars, and drive-through speakerboard sources are shown as green crosses, location of truck movements are shown as green lines in Figure 5.

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

Assumed daytime worst-case hour scenario:

- All rooftop equipment operating continuously at 100% capacity (60 minutes in an hour).
- One tractor trailer with a refrigeration unit arrives and departs the loading dock.
- At the loading areas, trucks are assumed to idle engines for 10 minutes as a conservative estimate. The refrigeration units on the trucks are assumed to operate for 30 minutes.
- The trash compactor next to the loading dock is assumed to operate for 5 minutes.
- 10 cars idling at the Tim Hortons drive-through queue for the full hour.
- 5 cars idling at the Little Caesars drive-through queue for the full hour.
- Tim Hortons speakerboard active for 20 minutes out of an hour (10 seconds per order for 120 cars).
- Little Caesars speakerboard active for 10 minutes out of an hour (10 seconds per order for 60 cars).

Assumed nighttime worst-case hour scenario:

- All rooftop equipment operating on a 33% duty cycle (20 minutes in an hour), to account for cooler ambient temperatures, with the exception of kitchen fans of the Little Caesar restaurant which do not operate during nighttime hours (outside of business hours).
- No tractor trailer activity at the grocery store as deliveries occur during daytime hours only.
- 10 cars idling at the Tim Hortons drive-through queue for the 30 minutes in an hour.
- Tim Hortons speakerboard active for 10 minutes out of an hour (10 seconds per order for 60 cars).
- No drive-through activity at the Little Caesar restaurant (outside of business hours).

6.3 Results

The unmitigated sound levels due to stationary noise sources associated with the grocery store, Tim Hortons, and Little Caesars at the façades of the proposed buildings are summarized in Table VI, and presented graphically in Figures 6a and 6b.

Table VI: Predicted Sound Levels from the Existing Commercial Uses on the Proposed Townhouses[dBA]

Block	Description	Daytime/Evening (07:00 – 23:00)	Nighttime (23:00 – 07:00)	Criteria (Day / Night)
A	West Facade	43	<30	50/45
	North Facade	53	43	
	East Facade	52	43	
	South Facade	32	<30	
	3 rd Floor Terrace	50	--	50/45
F	West Facade	49	43	50/45
	North Facade	52	45	52/45
	East Facade	44	41	59/52
	South Facade	37	31	50/45
	3 rd Floor Terrace	46	--	50/45
Others	Other façades	<50	<45	50/45*

Notes: **Bold** indicate sound level excesses over the applicable limits.

*Exclusionary minimum limits shown for façades of other townhouse blocks that are less impacted by the commercial uses to the north. See Figures 4a and 4b for sound level criteria of all façades.

The results of the calculations indicate that the predicted sound levels during a worst case operational scenario have the potential to exceed the applicable criteria at the south and east façades of the proposed townhouse block (Block A) closest to the existing commercial uses.

6.4 Discussions & Conceptual Noise Mitigation Options

The results show that there are sound level excesses, of up to 3 dBA during the daytime at the north and east façades of Block A, primarily due to the grocery store's trucking activities at the loading dock.

While the MECP does not generally accept central air conditioning or mechanical ventilation as mitigation measures for stationary noise sources per se, it is noted that central air conditioning can be installed in the proposed buildings for the residential units so that the windows can remain closed against both traffic and stationary noise.

Conceptual options for noise mitigation include the following:

Option 1: Architectural Modifications

Architectural design for the north façade of townhouse Block A and the east façades of the two townhouse units closest to the grocery store, such that no windows to noise sensitive spaces face towards the loading dock, as shown in Figure 7, will reduce the sound levels to below MECP limits.

When detailed floor plans and building elevations are available, windows to noise sensitive spaces for townhouse Block A should be verified by an acoustical consultant. Windows to non-noise sensitive spaces to those abovementioned north and east façades are permitted. In accordance with MECP noise guidelines, noise sensitive spaces include the following: bedrooms, living/dining rooms, eat-in kitchens, and dens.

Option 2: Property Line Barrier and Architectural Modifications

Alternatively, a combination of a property line barrier and architectural modifications can also mitigate sound levels to be within the limits. A 4.2 m high property line barrier built on the proposed site area lands, approximately 15 m long and shown in Figure 8, along with architectural design for the north façade of townhouse Block A such that no windows to noise sensitive spaces face towards the loading dock, will reduce sound levels to below MECP limits.

Acoustic barriers can be any combination of an earth berm with an acoustic wall on top. The wall component of the barrier should be of a solid construction with a surface density of no less than 20 kg/m². The walls may be constructed from a variety of materials such as wood, brick, pre-cast concrete or other concrete/wood composite systems provided that it is free of gaps or cracks within or below its extent.

When detailed floor plans and building elevations are available, windows to noise sensitive spaces for townhouse Block A should be verified by an acoustical consultant. Windows to non-noise sensitive spaces to the abovementioned north façade are permitted. In accordance with MECP noise guidelines, noise sensitive spaces include the following: bedrooms, living/dining rooms, eat-in kitchens, and dens.

7 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all units with anticipated traffic sound level excesses. The following noise warning clauses are required for specific dwellings as indicated in Table VII.

Suggested wording for future dwellings which have minor sound levels excesses over the MECP criteria is given below.

Type A:

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

Suggested wording for future dwellings with sound levels exceeding the MECP criteria for which air conditioning has been provided is given below.

Type B:

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

Suggested wording for future dwellings which have provisions for central air conditioning to be installed is given below.

Type C:

This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby

ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

Suggest wording for future dwellings which will have central air conditioning units to be installed is given below.

Type D:

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

Suggested wording for future dwelling units in close proximity to commercial buildings is given below.

Type E:

Purchasers are advised that due to the proximity of the existing commercial buildings, sound levels from the facilities may be at times be audible.

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

8 Summary and Recommendations

The following list and Table VII summarize the recommendations made in this report. The reader is referred to Figure 3 and previous sections of the report where these recommendations are applied and discussed in more detail.

Transportation Noise

1. Central air conditioning will be required for townhouse Blocks D, E, and F, which are adjacent to West Side Road.
2. Forced air ventilation systems with ductwork sized for future installation of central air conditioning systems will be required townhouse Block C.
3. A minimum 1.07 m high solid parapet is required on the 3rd floor terraces.

4. Upgraded building constructions are required for the façades facing West Side Road as noted in Section 5.3. When detailed floor plans and building elevations are available for the dwelling units with exposure to the roadways, window glazing construction should be refined on actual window to floor ratios.
5. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of traffic noise issues.

Stationary Noise

6. Mitigation is required for Block A since sound level excesses are predicted due to activity at the grocery store's loading dock. Options for mitigation are presented Section 6.4.

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

Block	Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Constructions	Architectural Modifications
D, E, F	Townhouse block adjacent to West Side Rd - West façades	--	Central A/C	B, D, E	LR/DR: STC-28 BR: STC-28	--
	Townhouse block adjacent to West Side Rd - Other façades				OBC	--
C	Townhouse block with some exposure to West Side Rd	--	Forced Air	A, C, E	OBC	--
B	Interior townhouse block	--	--	E	OBC	--
A	Townhouse block closest to grocery store loading dock	--	--	E	OBC	+

Notes:

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

-- No specific requirements

+ Architectural modifications, such that no windows to noise sensitive spaces are on the north and/or the east façade and/or wing wall improvement at grocery store's loading dock

OBC – Ontario Building Code

LR/DR – Living Room/Dining Room

BR – Bedroom

8.1 Implementation

To ensure that the noise control recommendations outlined above are properly implemented, it is recommended that:

1. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the detailed architectural plans and building elevations to refine glazing requirements based on actual window to floor areas ratios. An acoustical consultant shall review the floor plans and building elevations of Block A to ensure noise sensitive spaces are relocated and/or a property line barrier is implemented.
2. Prior to the issuance of occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated, installed, and constructed.



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Figure 1: Key Plan



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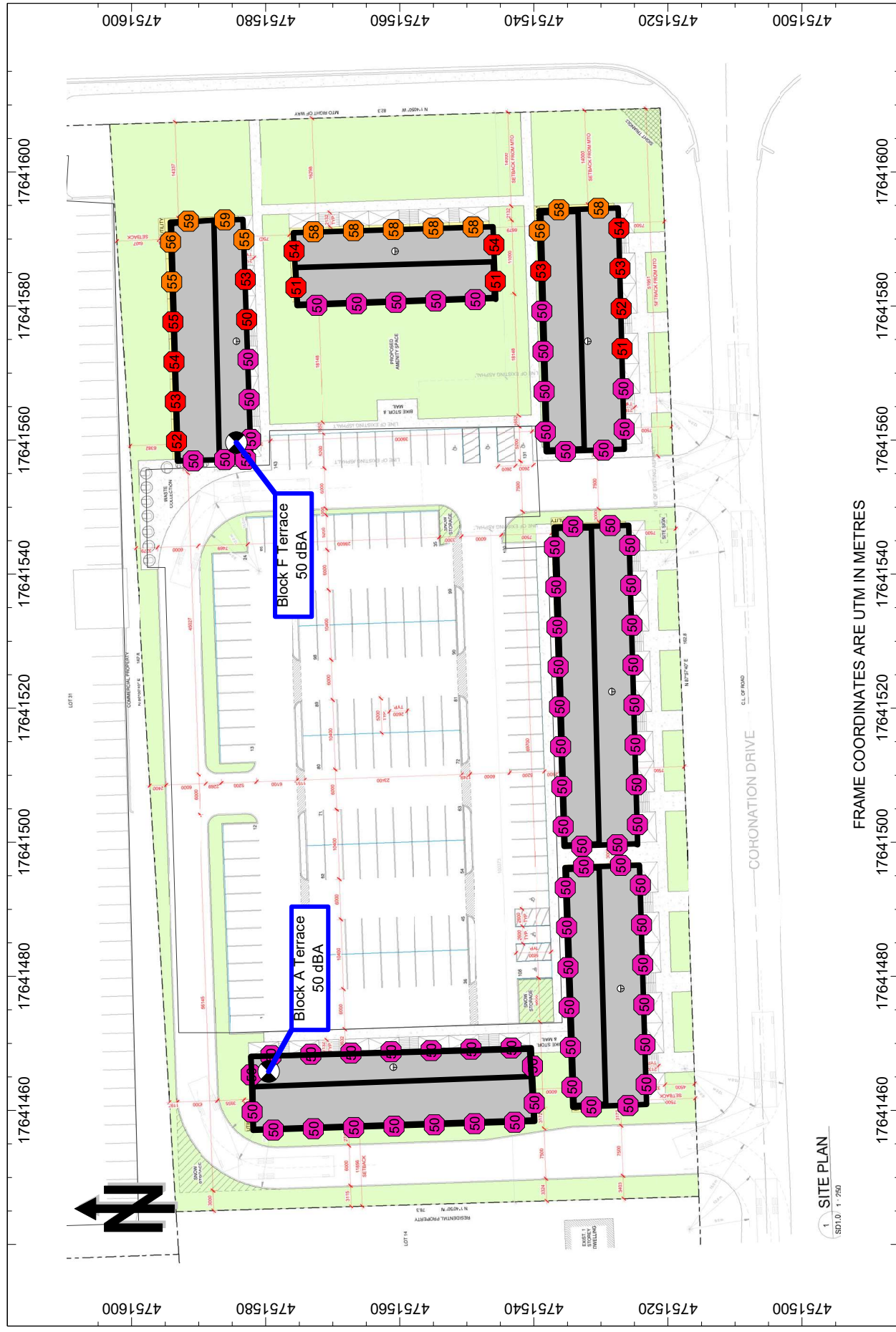




Figure 4b: Stationary Noise Criteria, Nighttime (23:00 - 7:00), Leq [dBA]



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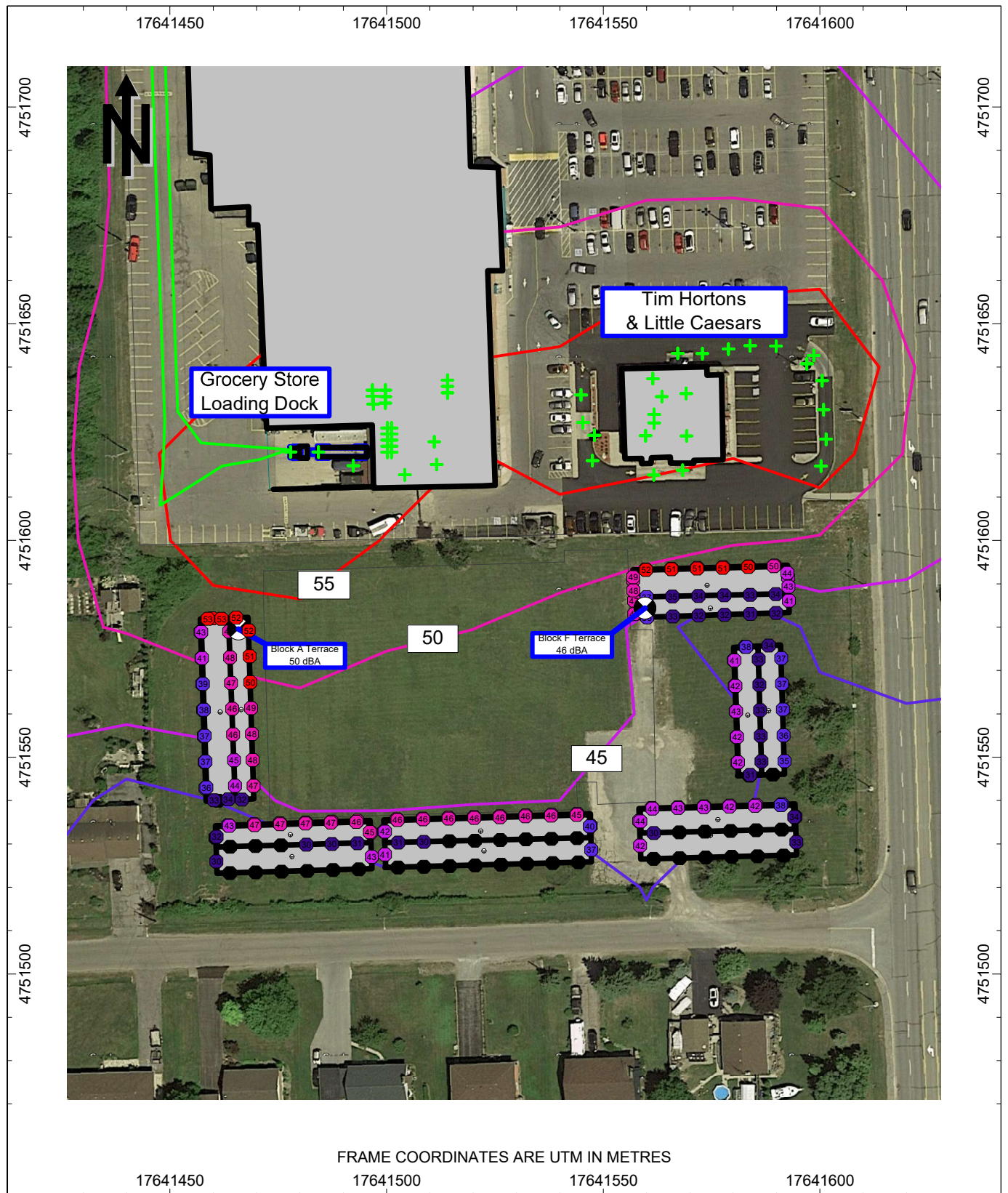


Figure 6a: Stationary Noise Impact, Daytime (7:00 - 23:00), Leq [dBA]

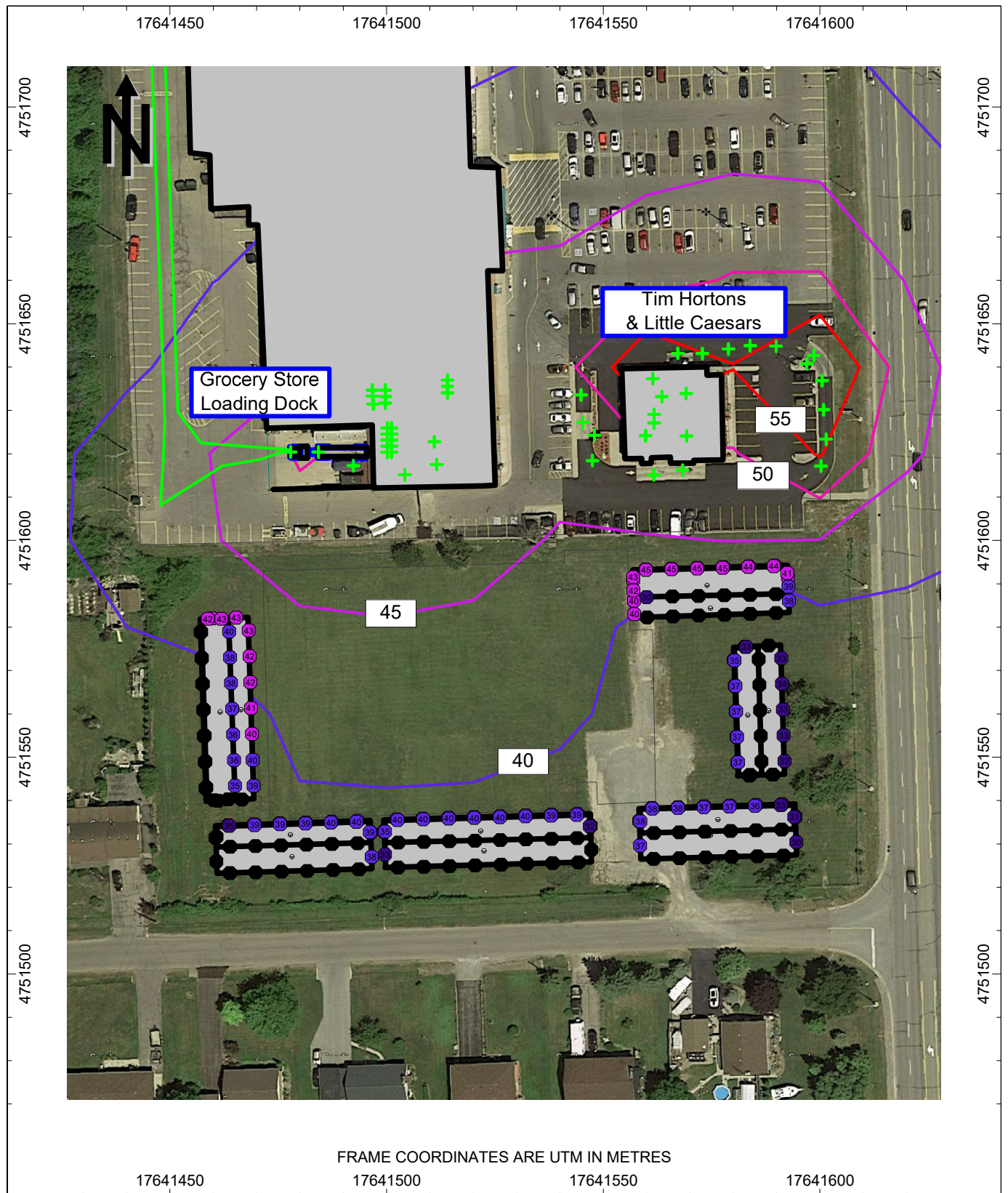


Figure 6b: Stationary Noise Impact, Nighttime (23:00 - 07:00), Leq [dBA]

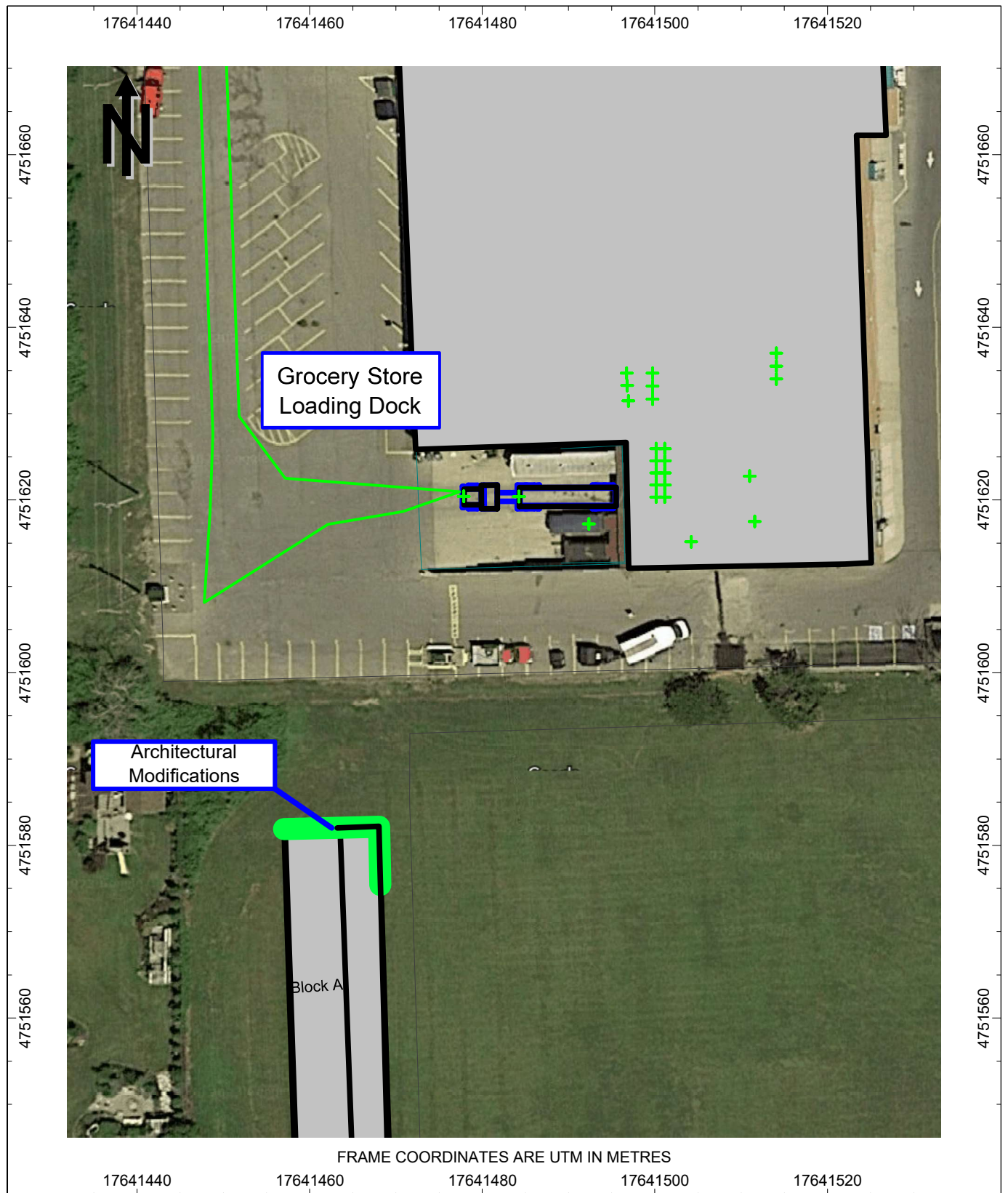


Figure 7: Mitigation Option 1.
Architectural Modifications

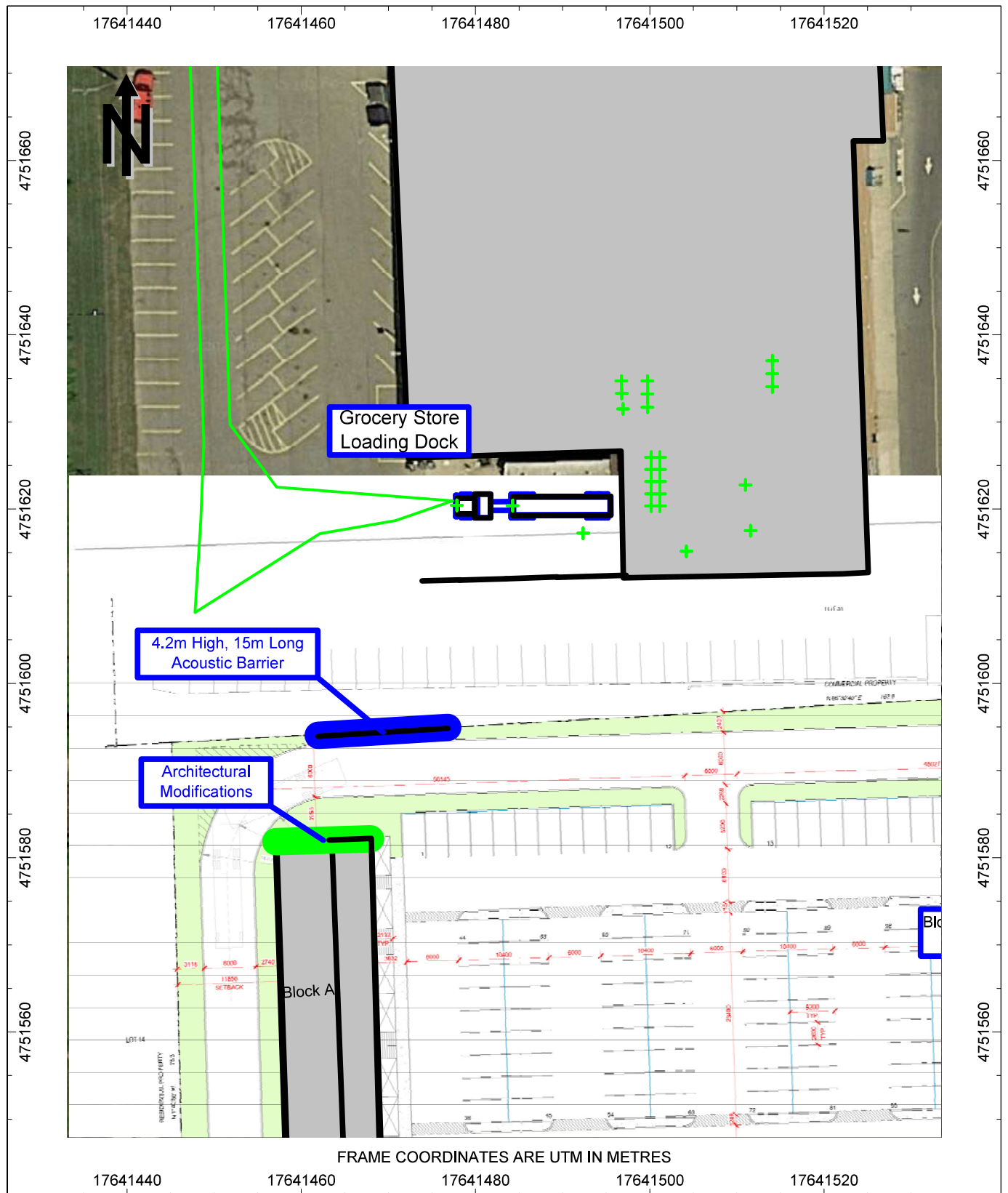


Figure 8: Mitigation Option 2
Property Line Barrier and Architectural Modifications

Appendix A

Road Traffic Information



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NOISE



VIBRATION

From: [Dzbik, Les \(MTO\)](#)
To: [Harry Cai](#)
Cc: [Shabro, Sherry \(MTO\)](#); [Dutchak, Lance \(MTO\)](#)
Subject: FW: DATA REQUEST: Commercial Vehicle Percentages - Hwy 58 & Main St, Port Colborne
Date: March 21, 2023 10:35:10 AM
Importance: High

Hello Mr. Cai: the 2019 AADT and %commercial vehicles is shown in the following table for the described sections of Hwy 58

HWY 3-NIAGARA RD 3-MAIN ST-PORT COLBORNE to S ENT PORT COLBORNE MALL(W)	10700 AADT	11%
North of S ENT PORT COLBORNE MALL(W)	8800 AADT	6%

Thank you.

Regards,

Les Dzbik, P.Eng.
A/Traffic Manager
Ministry of Transportation | Transportation Infrastructure Management Division
| Traffic Central 2
159 Sir William Hearst Avenue | 6th Floor
Toronto, Ontario | M3M 0B7
Cell: 437-772-7193
Email: Les.Dzbik@ontario.ca

From: Guillermo, Danielle (MTO) <Danielle.Guillermo@ontario.ca>
Sent: March 21, 2023 9:52 AM
To: Dzbik, Les (MTO) <Les.Dzbik@ontario.ca>; Dutchak, Lance (MTO) <Lance.Dutchak@ontario.ca>
Cc: Shabro, Sherry (MTO) <Sherry.Shabro@ontario.ca>
Subject: DATA REQUEST: Commercial Vehicle Percentages - Hwy 58 & Main St, Port Colborne
Importance: High

Hi Les/Lance,

Please see request for commercial vehicle percentages for sections of Highway 58 just north of the interchange with Niagara Road 3.

Google maps link [here](#) for reference.

Thank you,
Danielle

From: Harry Cai <hcai@hgcengineering.com>
Sent: March 21, 2023 9:47 AM
To: Guillermo, Danielle (MTO) <Danielle.Guillermo@ontario.ca>
Subject: Commercial Vehicle Percentages - Hwy 58 & Main St, Port Colborne

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Danielle,

HGC Engineering is conducting a noise study located near the intersection of Highway 58 (West Side Road) and Niagara Road 3 (Main Street) in Port Colborne.

See Google maps link [here](#) for reference.

Could you provide the commercial vehicle percentages for sections of Highway 58 just north of the interchange with Niagara Road 3?

Thank you.

Harry Cai, PEng
Project Consultant

HGC Engineering [NOISE](#) | [VIBRATION](#) | [ACOUSTICS](#)
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t: 905.826.4044 ext. 297 e: hcai@hgcengineering.com
Visit our website: www.hgcengineering.com Follow Us – [LinkedIn](#) | [Twitter](#) | [YouTube](#)

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Appendix B

Sample STAMSON 5.04 Output



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VIBRATION

Filename: a.te Time Period: Day/Night 16/8 hours
Description: Pred. Loc. [A], BLock E east facade

Road data, segment # 1: West Side Rd (day/night)

Car traffic volume : 11437/2018 veh/TimePeriod *
Medium truck volume : 540/95 veh/TimePeriod *
Heavy truck volume : 874/154 veh/TimePeriod *
Posted speed limit : 70 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): 10700
Percentage of Annual Growth : 2.50
Number of Years of Growth : 14.00
Medium Truck % of Total Volume : 4.20
Heavy Truck % of Total Volume : 6.80
Day (16 hrs) % of Total Volume : 85.00

Data for Segment # 1: West Side Rd (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 : 29.00 / 29.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: West Side Rd (day)

Source height = 1.61 m

ROAD (0.00 + 66.05 + 0.00) = 66.05 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 90 0.48 71.41 0.00 -4.23 -1.13 0.00 0.00 0.00 66.05

Segment Leq : 66.05 dBA

Total Leq All Segments: 66.05 dBA



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VIBRATION

Results segment # 1: West Side Rd (night)

Source height = 1.61 m

ROAD (0.00 + 61.53 + 0.00) = 61.53 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90	90	0.48	66.88	0.00	-4.23	-1.13	0.00	0.00	0.00	61.53
-----	----	------	-------	------	-------	-------	------	------	------	-------

Segment Leq : 61.53 dBA

Total Leq All Segments: 61.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.05
(NIGHT): 61.53



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VIBRATION

Filename: aola.te Time Period: 16 hours
 Description: 3rd floor terrace of Block E

Road data, segment # 1: West Side Rd

 Car traffic volume : 11437 veh/TimePeriod *
 Medium truck volume : 540 veh/TimePeriod *
 Heavy truck volume : 874 veh/TimePeriod *
 Posted speed limit : 70 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: West Side Rd

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 34.00 m
 Receiver height : 1.50 m
 Topography : 4 (Elevated; with barrier)
 Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
 Barrier height : 1.07 m
 Elevation : 6.00 m
 Barrier receiver distance : 3.00 m
 Source elevation : 0.00 m
 Receiver elevation : 6.00 m
 Barrier elevation : 6.00 m
 Reference angle : 0.00

Results segment # 1: West Side Rd

 Source height = 1.61 m

Barrier height for grazing incidence

 Source ! Receiver ! Barrier ! Elevation of
 Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
 -----+-----+-----+-----
 1.61 ! 1.50 ! 0.98 ! 6.98

ROAD (0.00 + 60.34 + 0.00) = 60.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.41	71.41	0.00	-5.02	-1.01	0.00	0.00	-5.05	60.34



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VIBRATION

Segment Leq : 60.34 dBA

Total Leq All Segments: 60.34 dBA

TOTAL Leq FROM ALL SOURCES: 60.34



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