

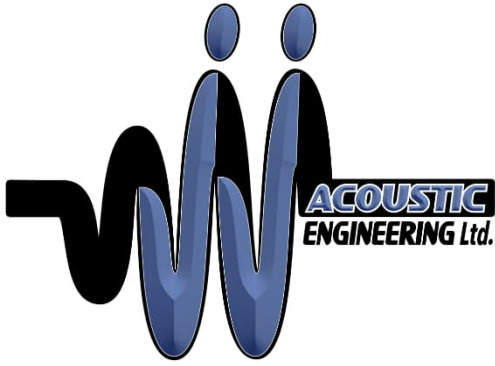


Road Traffic and Stationary Noise Impact Study

Barrick Road, Port Colborne, Ontario

JJ-00464-NIS1





February 22, 2024,

Reference No. JJ-00464-NIS1

Drew Toth
drew@tothgroup.ca
905-246-8097
PO Box 84,
Thorold, ON L2V 3Y7

Dear Mr. Toth:

**Re: Road Traffic and Stationary Noise Impact Study
Barrick Road, Port Colborne, Ontario**

1. Introduction

JJ Acoustic Engineering Ltd. (JJAE) was retained to complete a Road Traffic and Stationary Noise Impact Study (Study) for the residential development located at Barrick Road in Port Colborne, Ontario (Site). The Site will be developed into a residential subdivision with a 6-storey building. JJAE has provided a copy of the most up-to-date Site Plan in Attachment A.

The Study was prepared consistent with Ontario Ministry of the Environment, Conservation and Parks (MOECP) NPC 300, "Environmental Noise Guideline, Stationary and Transportation Sources—Approval and Planning" dated August 2013.

This Study has determined that the potential environmental noise impact from road traffic noise is significant. The proposed development will need the following: a requirement for central air-conditioning, noise warning clauses and special building components. Road traffic noise control requirements for the Site were determined based on road traffic volumes provided by the MTO and forecasted to 10 years from the date of this study. JJAE has included traffic data supplied in Attachment B.

JJ Acoustic Engineering Ltd.
joey@jjae.ca
226-346-6473

The following attachments were included with this Study:

- Attachment A – Site Plan
- Attachment B – Traffic Data Summary Table & Sample Stamson Traffic Model Outputs
- Attachment C – Stationary Noise Impact Figures
- Attachment D – Stationary Noise Impact Source Table

2. Road Traffic Analysis

2.1 Road Traffic Noise Modeling Methodology

The road traffic noise impact calibration was conducted using STAMSON, the MOECP's computerized model of ORNAMENT. The Application of the model for the site was consistent with the ORNAMENT technical documents. The computer model input parameters include, among other data, the number of road segments, number of house rows, the positional relationship of the receptor to a noise source or barrier in terms of distance, elevation and angle of exposure to the source, the basic site topography, the ground surface type, traffic volumes, traffic composition and speed limit. The calibration point was calculated using a day/night split commonly done for road traffic noise analysis.

The predicted sound level is based on the 1-hour equivalent sound level, designated as Leq, and is adjusted by the STAMSON program to the 16-hour daytime and the 8-hour nighttime equivalent sound level. The applicable noise criteria for noise sensitive spaces are specified in terms of the 16-hour daytime period (7:00 a.m. to 11:00 p.m.) and 8-hour nighttime period (11:00 p.m. to 7:00 a.m.) enabling a direct comparison between the STAMSON model output and the noise limits.

Once the calibration point(s) was properly calculated in Stamson, a model was created in an acoustic modelling software called Cadna A. A line source was used to emulate the road sources in Stamson and using the calibration point(s) the model was tuned to match that of STAMSON's outputs. This allows the model to be more accurate allowing for buildings to provide line of sight obstructions from roadways at certain angles. Cadna A uses a 1-hour Leq representation of the noise model and our calibration point uses a day/night calculation method. Although these methods are not similar in design, incorporating the day/night values from Stamson into Cadna A will provide a conservative worst-case scenario for our analysis. Calibration points for day/night times have been shown in Attachment C.

Where there are multiple sources of noise, such as road and rail, JJAЕ evaluated noise control measures by combining both road and rail sources and applying measures as described in Section C7.3 of NPC 300.

2.2 Road Traffic Model Input Parameters

This section describes the STAMSON model input parameters used to predict road traffic noise impact for the Site.

The Site has one significant roadway in the vicinity of the development: Highway 58 approximately 15 meters to the East from block 37-41 and units 9-11. Where there are intervening and off-site structures that provide line-of-sight obstruction to the roads, JJAЕ did not include line-of-sight obstruction in our analysis as to calculate worst-case noise impact.

JJAE reviewed other surrounding roadways in the vicinity of the Site and only the significant roadways were used in our modeling, other roadways were considered to be insignificant or beyond our red flag zone.

2.2.1 Road Traffic Parameters

The traffic data provided by the City has been summarized below:

Highway 58:

- Current AADT (2018): 9,180
- Forecast AADT (2034): 12,602
- Commercial Vehicle Rates: 2.21% medium trucks and 1.47% heavy trucks
- Posted Speed Limit: 80 km/h
- Day Night Splits: 90% day and 10% night

The traffic data is the foundation of this analysis and the Study will be updated if the values change. Traffic data was supplied by the Ministry of Transportation (MTO). The MTO's turning movement count and peak summary has been supplied in Attachment B.

No AADT data was supplied but AM and PM Peak values were supplied. JJAE has used a very conservative calculations method which takes the sum of the AM Peak and PM Peak values for the roadway and multiplies that by 5. This approach is used by traffic engineers as a conservative calculation of the AADT for a roadway and is the calculation method used in this report.

It should be noted that Barrick Road has an AADT of 875 and therefore, JJAE considers this roadway to be environmentally insufficient.

2.3 Road Traffic Noise Modeling Results

JJAE calculated the Plane of Window (POW) noise exposure for each floor at the Site for the separate daytime and nighttime periods.

The STAMSON road traffic model outputs are provided in Attachment B.

2.4 Road Traffic Modeling Discussion

Noise control requirements will be defined based on NPC 300.

Daytime Outdoor Living Area Assessment (NPC 300, Section C7.1.1)

NPC 300 section A5 (pages 13-14) defines an Outdoor Living Area (OLA). As part of this definition, a balcony or terrace is considered an OLA if it has a minimum depth of 4 meters. All balconies are less than 4 m in depth and therefore will not be considered as OLAs.

JJAE has used either the front yards or backyards of each unit, whichever was feasible, for the OLA locations. JJAE's calculation has determined the worst-case scenario for the OLA's. OLA location has been indicated in Attachment C – Figure 2 and our calculations have been summarized below and in Attachment B Table B1:

Outdoor Living Area (OLA)	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Limits met
OLA #1	35	55	Yes
OLA #2	43	55	Yes
OLA #3	42	55	Yes
OLA #4	43	55	Yes
OLA #5	39	55	Yes
OLA #6	42	55	Yes
OLA #7	43	55	Yes
OLA #8	40	55	Yes
OLA #9	40	55	Yes
OLA #10	45	55	Yes
OLA #11	44	55	Yes
OLA #12	44	55	Yes
OLA #13	49	55	Yes
OLA #14	53	55	Yes
OLA #15	52	55	Yes
OLA #16	51	55	Yes
OLA #17	48	55	Yes
OLA #18	46	55	Yes
OLA #19	44	55	Yes
OLA #20	44	55	Yes
OLA #21	44	55	Yes

Plane of a Window – Ventilation Requirements (NPC 300, Section C7.1.2)

The predicted daytime and nighttime Plane of Window (POW) noise impact assumes a worst-case and direct line of sight noise exposure to the roadway(s), unless the building itself blocks line-of-sight (full or partial).

JJAE has used the following criteria, which is a summary of NPC 300 requirements, to evaluate the Site noise impacts from road traffic noise:

Daytime Level (dBA)	Nighttime Level (dBA)	Ventilation Requirements and Warning Clauses	Special Building Components
55	50	Not Required	Not Required
55 – 65	50 – 60	Yes, with Type C Warning Clause	Not Required
66 or more	61 or more	Yes, with Type D Warning Clause	Yes

Table B.1 summarizes the predicted worst-case sound levels and the requirements for the units. The following warning clause is required:

Warning Clause 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."

Warning Clause 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."

Indoor Living Areas – Building Components (NPC 300, Section C7.1.3)

At minimum, the building must be constructed to standard Ontario Building Code requirements. Improved building components are required for Block 37-41, units 9-11 and summarized in Table B1. JJAE has assumed 35% window to floor area coverage and that windows are thick and operable.

3. Stationary Noise Impact Analysis

3.1 Stationary Noise Impact Sound Level Criteria

The general criteria for stationary noise sources are defined by NPC 300. The criteria defined in Table C-5 and C-6, "Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor Points of Reception" and "Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Plane of Window of Noise Sensitive Spaces" are used to evaluate the noise impact at the proposed development.

The criteria for a Class 1 area have been summarized below:

Receiver Category	Time Period	Stationary Noise Criteria
Outdoor Living Area (OLA)	Day = 7:00 to 23:00	Leq = 50 dBA
Plane of Window (POW)	Day = 7:00 to 23:00	Leq = 50 dBA
	Night = 23:00 to 7:00	Leq = 45 dBA

3.2 Modelling Methodology

The stationary noise impact was evaluated using the CADNA A acoustic modelling software that is based on the ISO 9613-2 standard. The data for all potential stationary noise sources was summarized in Attachment D.

JJAE used the following assumptions in our Cadna A model:

- **Ground Absorption:** Default ground absorption coefficient of 0.7 was used.
- **Temperature:** 10°C
- **Humidity:** 70%
- **Building Reflection Coefficient:** Absorption Coefficient Alpha of 0.37 (Reflection Loss of 2dB, Structured Façade) was used.
- **Time-Weighted Adjustment:** where sources operate non-continuously JJAE has provided operating times and as shown in Sections 4 and 5.
- **Tonality:** A 5 dbA tonal penalty was applied to all tonal sources, where applicable. JJAE has provided a (T) for sources identified as tonal in Sections 4 and 5.
- **Reflection Order:** A maximum reflection order of 1 was used to evaluate indirect noise impact.

4. Noise Impact Summary – From Site

The mechanical equipment for these buildings is similar to that of a single-family home and considered to be environmentally insignificant. Therefore, the noise impact from the Site to the neighboring buildings is considered to be environmentally insignificant.

The noise from the 6-storey building to the neighboring buildings could not be accounted for because the 6-storey building has not undergone mechanical design yet. An addendum to this report should be completed once a mechanical design is done to account for noise from the 6-storey building to the rest of the Site and neighboring building.

5. Noise Impact Summary – From Environment to Site

JJAE has identified several potential stationary noise sources including:

- 4 Fan HVAC Units (60 minutes daytime, 30 minutes nighttime)
- 2 Fan HVAC Units (60 minutes daytime, 30 minutes nighttime)

A summary of the noise sources used in our modelling is provided in Attachment D.

JJAE modelled the noise impact from all significant noise sources to the Site. The results are summarized in the table below and illustrated in Figure 2.

Points of Reception	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Worst Case Nighttime Sound Level (dBA)	Nighttime Noise Limit (dBA)	Limits met
Units 1-3, 46-47	<30	50	<30	45	Yes
Units 4-7, 22-23, 48-53	34	50	31	45	Yes
Block 54-58, Units 8-10	33	50	30	45	Yes
Block 69-70, Units 11, 24-29	<30	50	<30	45	Yes
Block 71-72, Units 12-16	<30	50	<30	45	Yes
Block 73-74, Units 17-21	<30	50	<30	45	Yes
Block 67-68, Units 30-37	<30	50	<30	45	Yes
Block 59-61, 64	<30	50	<30	45	Yes
Block 62-63	<30	50	<30	45	Yes
Block 65-66, Units 38-45	<30	50	<30	45	Yes
Block 75	<30	50	<30	45	Yes
Semis	<30	50	<30	45	Yes
6-Storey Building	<30	50	<30	45	Yes

From the table above it can be seen that all points of reception are below noise limits.

Outdoor Living Area (OLA)	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Limits met
OLA #1	<30	50	Yes
OLA #2	<30	50	Yes
OLA #3	<30	50	Yes
OLA #4	<30	50	Yes
OLA #5	<30	50	Yes
OLA #6	<30	50	Yes
OLA #7	<30	50	Yes
OLA #8	<30	50	Yes
OLA #9	<30	50	Yes
OLA #10	<30	50	Yes
OLA #11	<30	50	Yes
OLA #12	<30	50	Yes
OLA #13	<30	50	Yes
OLA #14	<30	50	Yes
OLA #15	<30	50	Yes
OLA #16	<30	50	Yes
OLA #17	<30	50	Yes
OLA #18	<30	50	Yes
OLA #19	<30	50	Yes
OLA #20	<30	50	Yes
OLA #21	<30	50	Yes

From the table above it can be seen that all OLA's are below noise limits

6. Recommendations

The road traffic noise impacts were above the NPC 300 requirements. Noise mitigation measures have been included in Attachment B Table B1 and also summarized below:

- Warning Clause Type C should be registered on Title and/or included in all agreements of purchase and sale and/or leases and/or disclosure statements and declarations for the development for block 66-67, units 4-7.
- Warning Clause Type D should be registered on Title and/or included in all agreements of purchase and sale and/or leases and/or disclosure statements and declarations for the development for block 37-41, units 9-11.
- A minimum of STC 29 is required for all exterior glazing for block 37-41, units 9-11 using 35% window area to floor area and thick operable windows.
- Requirement for Air Conditioning for all units.

These have been summarized in Attachment B under Table B1.

The stationary noise impacts from the neighboring building to the site were evaluated and the sound level predictions were determined to be below the noise limits for all points of reception and OLA's.

The mechanical equipment for these buildings is similar to that of a single-family home and considered to be environmentally insignificant. Therefore, the noise impact from the Site to the neighboring buildings is considered to be environmentally insignificant.

The noise from the 6-storey building to the neighboring buildings could not be accounted for because the 6-storey building has not undergone mechanical design yet. An addendum to this report should be completed once a mechanical design is done to account for noise from the 6-storey building to the rest of the Site and neighboring building.

7. Conclusions

The results of this Study indicate that the potential environmental impact from road traffic noise sources is significant. Mitigation measures will be required including ventilation requirements, special building components and noise warning clauses for each unit. With the mitigation measures provided in Section 6, there will be minimal noise impact from the neighboring buildings to the Site.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

Written by:

Reviewed by:

May 27, 2024



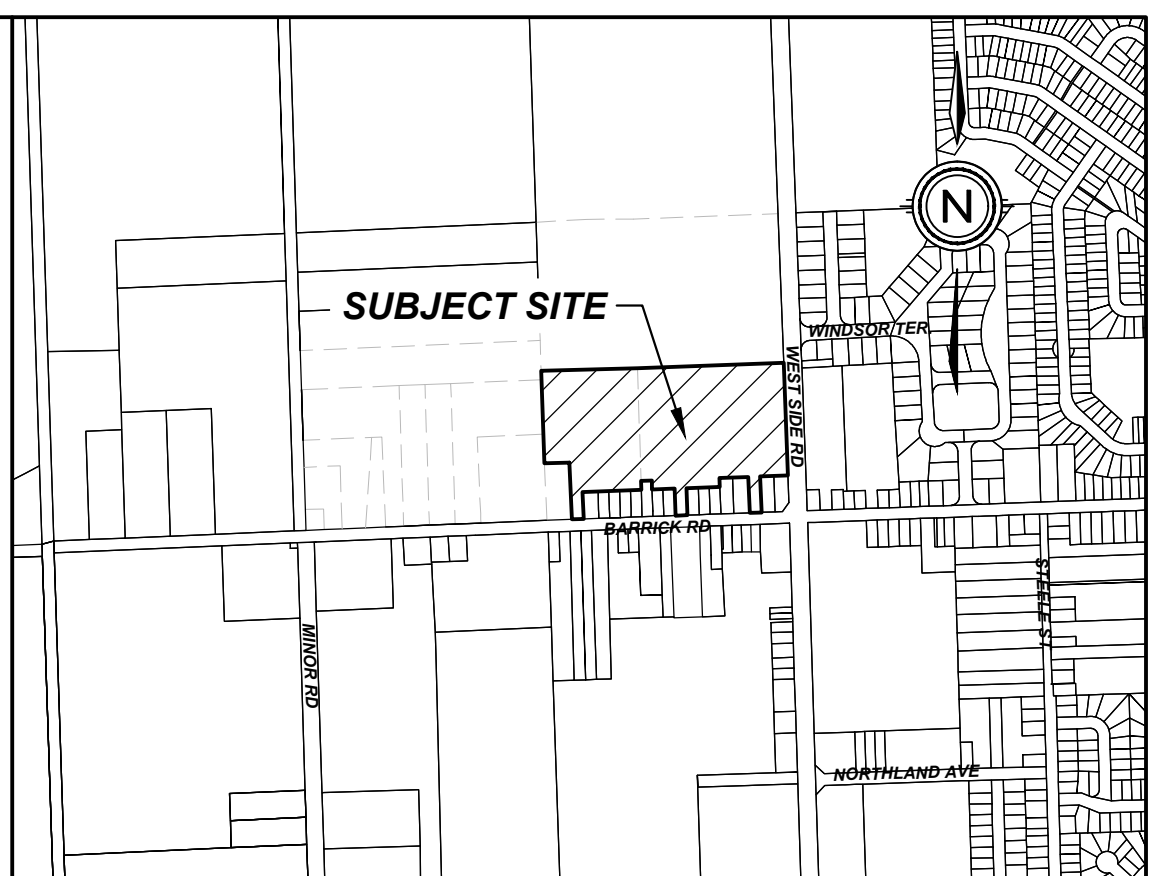
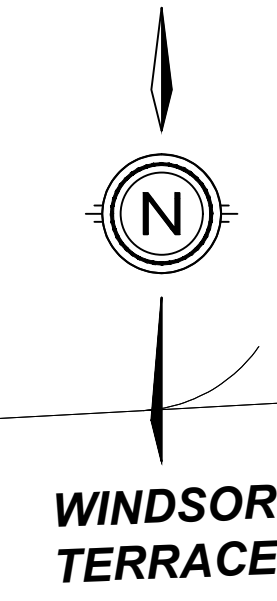
Emmanuel Ghiorghis,
Acoustic Technician

Joey Jraige, P.Eng., B.A.Sc.
President

ATTACHMENT A

STONEBRIDGE VILLAGE

CITY OF PORT COLBORNE



KEY PLAN
N.T.S.

CONCEPT SUBDIVISION PLAN

LEGAL DESCRIPTION

PART OF LOT 31,
CONCESSION 3
GEOGRAPHIC TOWNSHIP OF HUMBERSTONE
CITY OF PORT COLBORNE
REGIONAL MUNICIPALITY OF NIAGARA

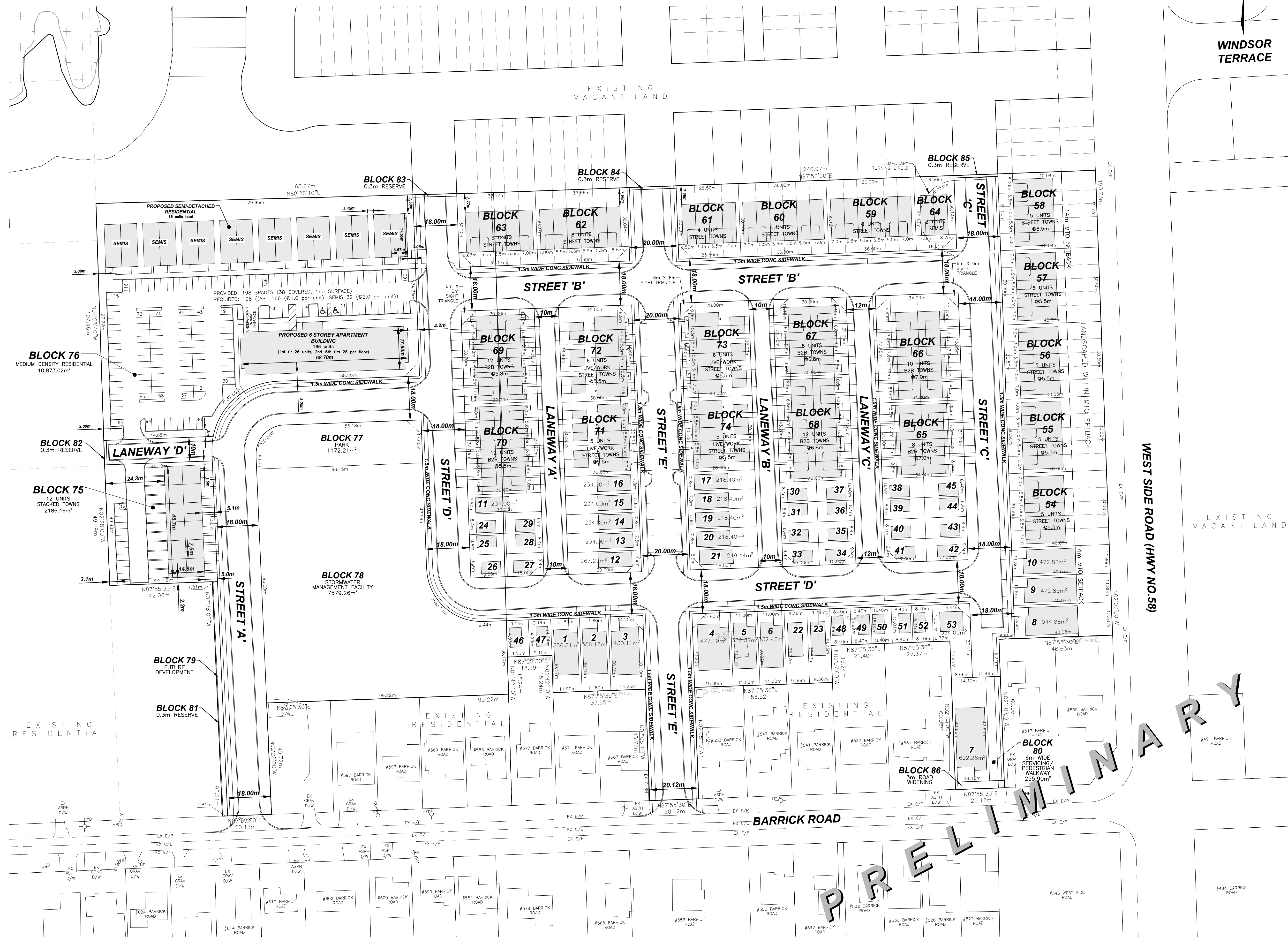
LAND USE SCHEDULE

LAND USE	LOT/BLOCK	# OF UNITS	AREA(ha)	AREA(%)
SINGLE DETACHED RESIDENTIAL	LOT 1-10	10	0.438	5.25
7.8m COTTAGE SINGLE	LOT 11-23	13	0.313	3.75
B2B COTTAGE SINGLE	LOT 24-53	30	0.426	5.11
STREET TOWN RESIDENTIAL	BLOCK 54-63	52	1.119	13.41
SEMI-DETACHED RESIDENTIAL	BLOCK 64	2	0.050	0.60
B2B TOWN RESIDENTIAL	BLOCK 65-70	62	0.706	8.46
LIVE/WORK TOWN RESIDENTIAL	BLOCK 71-74	22	0.403	4.83
STACKED TOWN RESIDENTIAL	BLOCK 75	12	0.219	2.62
MULTIPLE FAMILY RESIDENTIAL	BLOCK 76	182	1.087	13.03
PARK	BLOCK 77		0.117	1.40
STORMWATER MGMT FACILITY	BLOCK 78		0.758	9.08
FUTURE DEVELOPMENT	BLOCK 79		0.017	0.20
SERVICING/PEDESTRIAN ACCESS	BLOCK 80		0.026	0.31
0.3m RESERVE	BLOCK 81-85		0.005	0.06
3m ROAD WIDENING	BLOCK 86		0.006	0.07
ROADWAY			2.654	31.81
TOTAL		385	8.344	100.00
DEVELOPABLE AREA				8.34 Ha.
DENSITY (UNITS/DEVELOPABLE AREA)				46.16u/Ha.

0	ISSUED FOR REVIEW	2024-03-15	M.K
#	REVISION	DATE	INIT



DRAWING TITLE	DRAFTING	MK
DATE	MARCH 8, 2023	
PRINTED	MARCH 15, 2024	
SCALE	1:750	
DWG. No.	2300-CP	REV
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ATTACHMENT B

Table B1
Road Traffic Noise Levels and Mitigation Measures Summary
Barrick Road, Port Colborne, Ontario

Location	Maximum Worst-Case Impact		Ventilation	Warning clauses From NPC 300	Building Elements	
	Road Daytime Sound Level (dBA)	Road Nighttime Sound Level (dBA)	Requirements NPC300		Window STC	Exterior Wall STC
Units 1-3, 46-47	46 (dBA)	40 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Units 4-7, 22-23, 48-53	61 (dBA)	54 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code	N/A
Block 54-58, Units 8-10	68 (dBA)	61 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 29.2	45
Block 69-70, Units 11, 24-29	45 (dBA)	39 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Block 71-72, Units 12-16	46 (dBA)	40 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Block 73-74, Units 17-21	47 (dBA)	41 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Block 67-68, Units 30-37	49 (dBA)	43 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Block 59-61, 64	58 (dBA)	51 (dBA)	Requirement for Air Conditioning	Type C	Compliance with Ontario Building Code	N/A
Block 62-63	51 (dBA)	44 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Block 65-66, Units 38-45	53 (dBA)	47 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Block 75	43 (dBA)	36 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
Semis	47 (dBA)	39 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
6-Storey Building	47 (dBA)	40 (dBA)	Requirement for Air Conditioning	Not Required	Compliance with Ontario Building Code	N/A
OLA #1	35 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #2	43 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #3	34 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #4	43 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #5	39 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #6	42 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #7	43 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #8	40 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #9	40 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #10	45 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #11	44 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #12	44 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #13	49 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #14	53 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #15	52 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #16	51 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #17	48 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #18	46 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #19	44 (dBA)	N/A	N/A	N/A	N/A	N/A
OLA #20	44 (dBA)	N/A	N/A	N/A	N/A	N/A

Block **54-58**, Units **8-10**

Outdoor Sound Level	68	Day/Night	Day
Indoor Sound Level	45	Road/Rail	Road
Noise Reduction	26		

Angle of Sound	60 to 90 Degrees	Angle Correction	3
		Sum	29

Component	Window	Sum	29
Sound Energy Transmitted	100%	Table 3	0
Component Area	35 % Floor Area		
Room Floor Area	100 31		
Room Absorption Category	Intermediate	Table 4	-4
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Openable Thick Window	Table 5	4
	REQUIRED STC FOR COMPONENT		29

Component	Exterior Wall	Sum	29
Sound Energy Transmitted	10%	Table 3	10
Component Area	65 % Floor Area		
Room Floor Area	100 63		
Room Absorption Category	Intermediate	Table 4	-1
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Exterior Wall	Table 5	7
	REQUIRED STC FOR COMPONENT		45

Filename: 24hr.te Time Period: Day/Night 16/8 hours
 Description: Hwy 58 @ 50 Meters - Calibration Point Day/Night

Road data, segment # 1: Highway 58 (day/night)

```
-----
Car traffic volume : 10925/1214 veh/TimePeriod *
Medium truck volume : 251/28 veh/TimePeriod *
Heavy truck volume : 167/19 veh/TimePeriod *
Posted speed limit : 80 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): 9180
Percentage of Annual Growth : 2.00
Number of Years of Growth : 16.00
Medium Truck % of Total Volume : 2.21
Heavy Truck % of Total Volume : 1.47
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: Highway 58 (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 2.00 / 2.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

↑
 Results segment # 1: Highway 58 (day)

Source height = 1.10 m

```
ROAD (0.00 + 63.47 + 0.00) = 63.47 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-----
-90 90 0.00 68.69 0.00 -5.23 0.00 0.00 0.00 0.00 63.47
-----
```

Segment Leq : 63.47 dBA

Total Leq All Segments: 63.47 dBA

↑

Results segment # 1: Highway 58 (night)

Source height = 1.11 m

ROAD (0.00 + 56.97 + 0.00) = 56.97 dBA

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

-90	90	0.00	62.19	0.00	-5.23	0.00	0.00	0.00	0.00	56.97
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Segment Leq : 56.97 dBA

Total Leq All Segments: 56.97 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 63.47

(NIGHT): 56.97

↑

↑

V--" 1Ministere des Transports
JD(£•

Intersection Layout Sheet

Contract #g1/E..tJt)j
Work Order #---1ft.a?...3:--

Date/v\if ()} I Day: Wed...1 Hrs: ___ - _J_t_{J - fJ + IS- - /f

Location: HWY 5ⁿ1 d (/..ftv.icl:: • lbtid- Ramps: ___:___1-----

Reg/Mun: LR- Town/City: Port Co/6orh.f.,. Area:-----

File Name-03J.)-000/ib Device: Gretch / Jamar Unit# f0 I Interval 1: (R) NN / PM

Observer: /e....{J.,\$'(k..olovp... Weathedeat 1c/earRoad Condition: Q (JJ..)

LHRS & O/S: 32700 1.36 Comments:

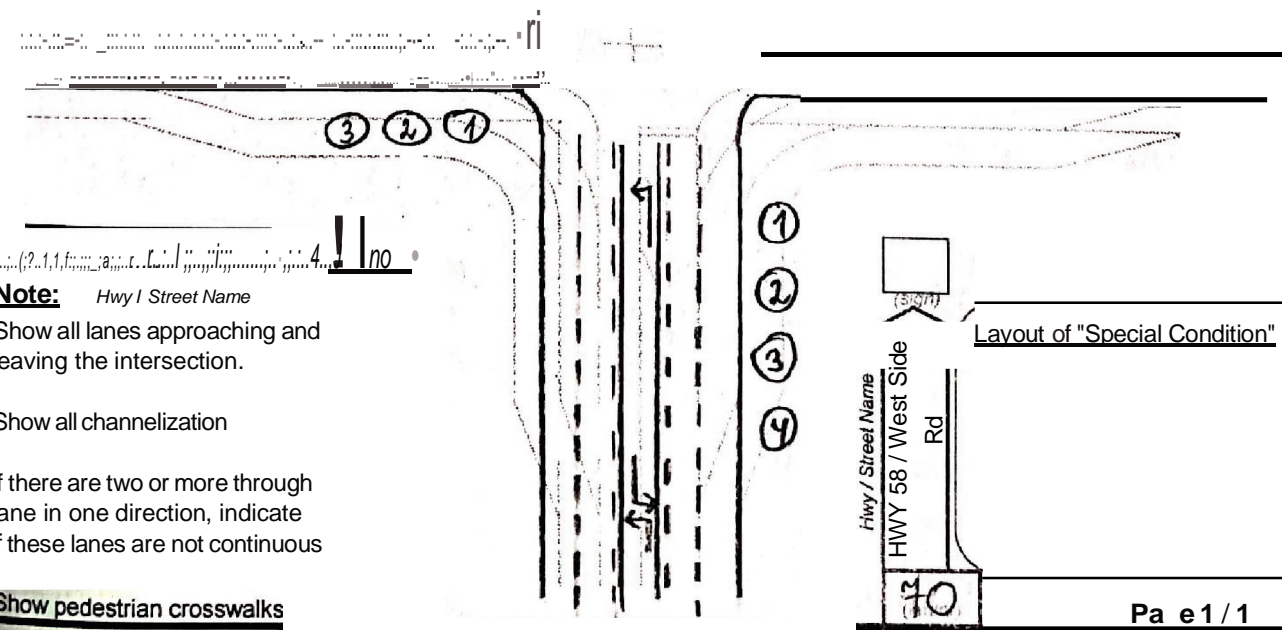
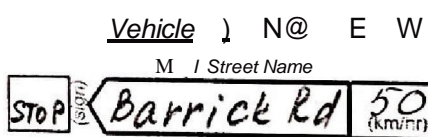
GPS: G-Star IV
Datum: WGS 84 (D) N
Lat: 42.910168
Long: -79.265305

SIGNALIZED Y (N)
If intersection is unsignalized;
Sign Type: (siojD1 Yield
Sign Size: 800 cm x 600
Sign Condition: Good / Poor / Missing
SA: New Good / Poor / Missing
WA: New, oo Poor / Missing
EA: New, oo Poor / Missing

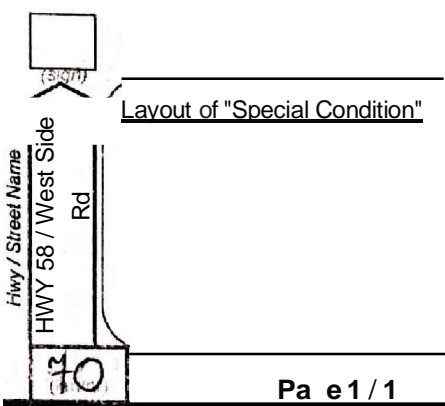
Photograph a app ch's including all Signs(!/ N



INDICATE LOCATION & DIRECTION OF VEHICLE



Note: Hwy / Street Name
Show all lanes approaching and leaving the intersection.
Show all channelization
If there are two or more through lane in one direction, indicate if these lanes are not continuous
Show pedestrian crosswalks





Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Description: **HWY 58 @ BARRICK RD**

Region: **CENTRAL**

Survey Type: **TM - Intersection**

Hwy: **58**

Start Date: **07-Nov-2018 (Wed)**

IC Side:

LHRS: **32700**

End Date: **07-Nov-2018 (Wed)**

Int. Type: **Four Leg**

Offset: **1.360**

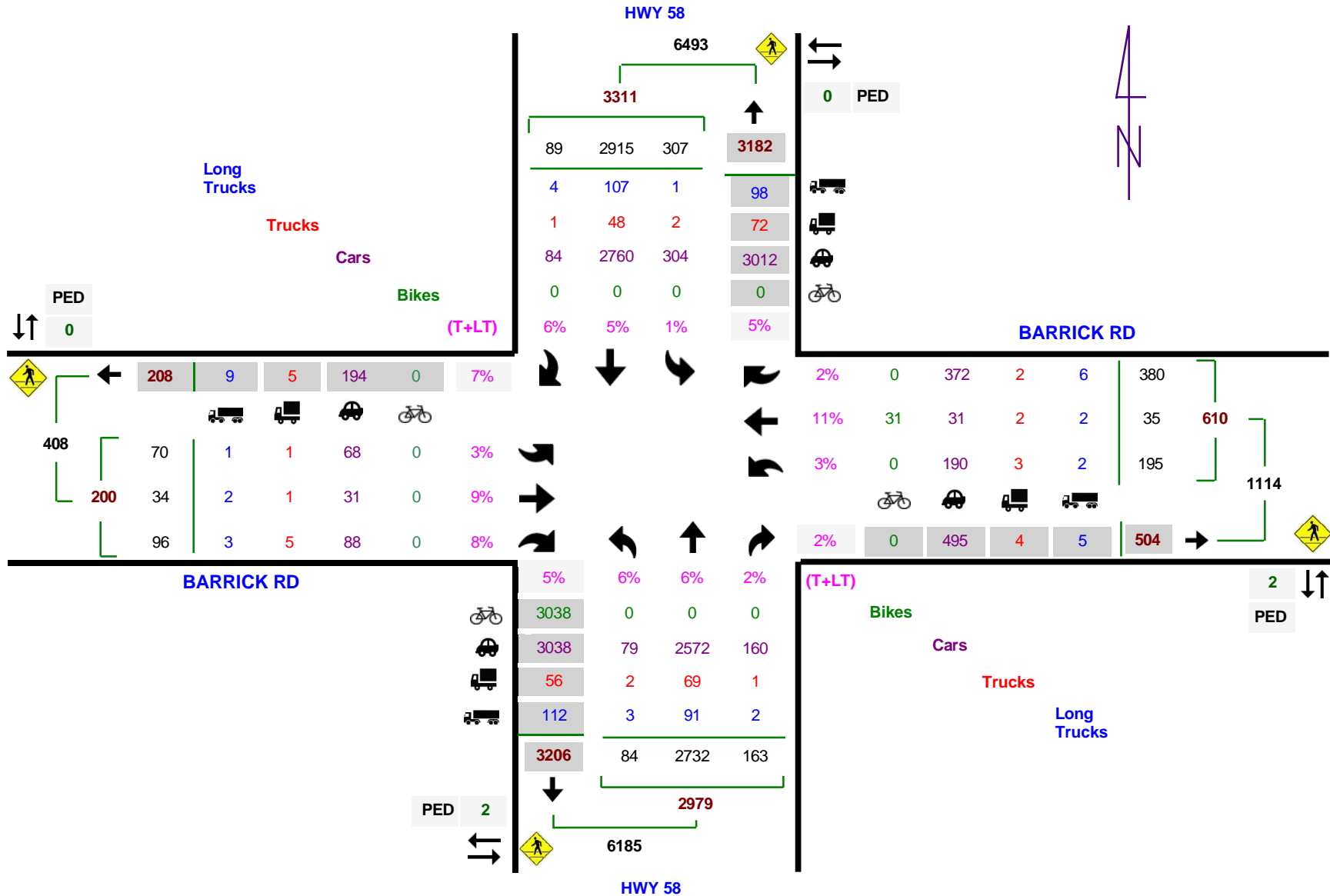
Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Total Count		Number of hours: 8	
HWY 58			
Ped. 0	Total Vehicles	6% (T +LT)	5% (T +LT)
	89	2915	307
		i	Ped. 0
		3182	BARRICK RD
+-	208	+-	J, 4
		t	380
			2% (T +LT)
3% (T +LT)	70	+-	35
			11% (T +LT)
9% (T +LT)	34	--+	r
			195
			3% (T+LT)
8% (T +LT)	96	1	+-
		i	r
			504
			--+
BARRICK RD		3206	84
		2732	163
		Total Vehicles	
Ped. 2			Ped. 2
		J,	6% (T +LT)
			6% (T +LT)
			2% (T +LT)
HWY 58			

AM Peak Hour Report		Start Time: 07:45	
HWY 58			
Ped. 0	Total Vehicles	75% (T +LT)	8% (T +LT)
	4	326	21
		i	Ped. 0
		514	BARRICK RD
+-	11	+-	J, 4
		t	63
			3% (T +LT)
0% (T +LT)	12	+-	2
			0% (T +LT)
0% (T +LT)	4	--+	r
			28
			4% (T+LT)
6% (T +LT)	16	1	+-
		i	r
			42
			--+
BARRICK RD		370	5
		439	17
		Total Vehicles	
Ped. 0			Ped. 1
		J,	40% (T +LT)
			7% (T +LT)
			12% (T +LT)
HWY 58			

Midday Peak Hour Report		Start Time: 11:45	
HWY 58			
Ped. 0	Total Vehicles	0% (T +LT)	6% (T +LT)
	14	343	27
		i	Ped. 0
		340	BARRICK RD
+-	29	+-	J, 4
		t	33
			6% (T +LT)
0% (T +LT)	6	+-	7
			14% (T +LT)
13% (T +LT)	8	--+	r
			46
			7% (T+LT)
0% (T +LT)	11	1	+-
		i	r
			81
			--+
BARRICK RD		400	8
		301	46
		Total Vehicles	
Ped. 0			Ped. 0
		J,	0% (T +LT)
			8% (T +LT)
			0% (T +LT)
HWY 58			

PM Peak Hour Report		Start Time: 15:45	
HWY 58			
Ped. 0	Total Vehicles	0% (T +LT)	4% (T +LT)
	18	484	68
		i	Ped. 0
		436	BARRICK RD
+-	36	+-	J, 4
		t	55
			0% (T +LT)
0% (T +LT)	12	+-	5
			0% (T +LT)
0% (T +LT)	4	--+	r
			24
			0% (T+LT)
13% (T +LT)	8	1	+-
		i	r
			86
			--+
BARRICK RD		516	13
		369	14
		Total Vehicles	
Ped. 0			Ped. 0
		J,	0% (T +LT)
			4% (T +LT)
			7% (T +LT)
HWY 58			





TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **HWY 58 @ BARRICK RD**

Region: **CENTRAL**

Survey Type: **TM ± Intersection**

Hwy: **58**

Start Date: **07-Nov-2018 (Wed)**

I/C Side:

LHRS: **32700**

End Date: **07-Nov-2018 (Wed)**

Int. Type: **Four Leg**

Offset: **1.360**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches								Minor Road Approaches								Total Veh.																									
	North HWY 58				South HWY 58				East BARRICK RD				West BARRICK RD																													
	Cars t →	Trucks t →	Long Trucks t →	Ped	Cars t →	Trucks t →	Long Trucks t →	Ped	Cars t →	Trucks t →	Long Trucks t →	Ped	Cars t →	Trucks t →	Heavy Trucks t →	Ped																										
Period 1																																										
07:00	3	29	0	0	0	0	1	0	0	0	70	3	0	2	0	0	1	0	0	7	0	13	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	133	
07:15	10	51	1	0	1	0	0	2	0	0	0	86	1	0	3	0	0	3	0	0	5	1	13	0	0	1	0	0	1	0	4	0	0	0	0	0	0	0	1	0	0	184
07:30	6	70	1	0	2	0	0	4	0	0	1	112	3	1	3	0	0	4	0	0	3	1	13	0	0	0	1	0	0	0	3	1	2	0	0	1	0	1	1	0	0	234
07:45	6	79	1	0	2	0	0	7	0	0	0	93	2	0	3	0	0	7	0	0	5	0	17	0	0	1	0	0	0	0	0	3	8	0	0	1	0	0	0	0	0	235
08:00	5	75	0	0	0	0	0	6	0	0	1	99	4	1	2	0	0	4	0	0	7	2	13	0	0	0	0	0	0	0	5	0	2	0	0	0	0	0	0	0	0	226
08:15	7	86	0	0	2	0	0	5	2	0	0	97	5	0	1	0	1	5	1	0	6	0	13	0	0	0	0	0	1	1	4	0	5	0	0	0	0	0	0	0	0	241
08:30	3	59	0	0	0	0	0	5	1	0	2	121	4	0	2	0	0	5	1	0	9	0	18	0	0	0	1	0	0	0	3	1	0	0	0	0	0	0	0	0	0	235
08:45	5	84	1	0	4	0	0	7	1	0	3	84	8	0	0	0	0	2	0	0	8	0	14	0	0	0	0	0	0	0	4	1	4	0	0	0	0	0	0	0	0	230
Period 2																																										
11:00	7	76	1	0	1	0	0	5	0	0	4	81	6	0	3	0	0	5	0	0	6	1	9	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	208
11:15	6	88	3	1	3	0	0	3	0	0	1	65	4	0	1	0	0	3	0	0	5	2	8	0	0	0	0	0	0	1	1	1	4	0	0	0	0	0	0	0	0	199
11:30	10	76	1	0	1	0	0	2	0	0	1	73	0	0	2	0	0	1	0	1	6	1	10	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	187
11:45	5	71	5	0	2	0	0	4	0	0	2	65	7	0	4	0	0	4	0	0	10	2	5	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	189
12:00	8	89	2	0	2	0	0	1	0	0	2	65	13	0	3	0	0	1	0	0	18	2	6	0	1	0	0	0	1	0	2	2	2	0	1	0	0	0	0	0	0	221
12:15	4	80	7	0	1	0	0	4	0	0	2	77	16	0	5	0	0	3	0	0	8	1	9	0	0	0	0	0	1	0	1	3	2	0	0	0	0	0	0	0	0	224
12:30	10	84	0	0	0	0	0	5	0	0	2	71	10	0	1	0	0	2	0	0	7	1	11	3	0	0	0	0	0	0	2	2	5	0	0	0	0	0	0	0	0	216
12:45	5	74	1	0	2	0	0	5	0	0	4	70	2	0	4	0	0	5	0	0	2	0	8	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	187
13:00	5	70	3	0	4	0	0	4	0	0	4	68	7	0	3	0	0	4	0	0	6	1	12	0	0	0	0	0	0	0	5	3	4	0	0	0	0	0	0	0	0	203
13:15	5	72	3	0	3	0	0	3	0	0	4	76	2	0	1	0	0	2	0	0	3	1	13	0	1	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	193
13:30	9	86	1	0	1	0	0	5	0	0	0	56	5	0	1	0	0	8	0	1	2	1	8	0	0	0	0	0	0	0	0	1	4	0	0	2	0	0	0	0	0	190
13:45	7	95	3	0	3	0	0	4	0	0	2	91	4	0	4	0	0	6	0	0	4	1	11	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	240
Period 3																																										
15:00	9	84	1	1	1	0	0	5	0	0	3	75	8	0	1	0	1	3	0	0	3	0	15	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	214
15:15	15	101	2	0	3	0	0	3	0	0	2	94	5	0	2	0	0	3	0	0	7	0	14	0	0	0	0	1	0	0	1	1	3	1	0	0	1	0	0	0	0	259



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **HWY 58 @ BARRICK RD**

Region: **CENTRAL**

Survey Type: **TM ± Intersection**

Hwy: **58**

Start Date: **07-Nov-2018 (Wed)**

I/C Side:

LHRS: **32700**

End Date: **07-Nov-2018 (Wed)**

Int. Type: **Four Leg**

Offset: **1.360**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches										Minor Road Approaches										Total Veh.																						
	North HWY 58					South HWY 58					East BARRICK RD					West BARRICK RD																											
	Cars		Trucks		Long Trucks	Cars		Trucks		Long Trucks	Cars		Trucks		Long Trucks	Cars		Trucks		Heavy Trucks		Ped																					
	t	→	t	→	t	→	t	→	t	→	t	→	t	→	t	→	t	→	t	→	Ped																						
15:30	14	92	3	0	1	0	0	0	0	0	0	3	85	6	0	0	0	0	0	1	0	0	7	2	26	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	243
15:45	18	108	4	0	0	0	0	6	0	0	3	82	5	0	2	1	0	1	0	0	0	7	2	12	0	0	0	0	0	0	0	0	2	1	4	0	0	1	0	0	0	0	259
16:00	16	125	4	0	4	0	0	5	0	0	2	90	3	0	4	0	0	1	0	0	3	0	20	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	280	
16:15	10	119	8	0	1	0	1	1	0	0	7	82	1	0	2	0	0	2	0	0	5	1	9	0	0	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	0	255	
16:30	23	114	2	0	0	0	0	1	0	0	1	100	4	0	1	0	0	2	0	0	9	2	14	0	0	0	0	0	0	0	4	1	2	0	0	0	0	0	0	0	280		
16:45	17	110	6	0	0	0	0	1	0	0	5	78	7	0	1	0	0	1	0	0	10	5	9	0	0	0	0	0	0	3	1	5	0	0	0	0	0	0	0	0	259		
17:00	15	115	7	0	0	0	0	3	0	0	5	108	2	0	2	0	1	0	0	3	0	7	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	271		
17:15	13	109	5	0	2	1	0	0	0	0	5	48	4	0	1	0	0	0	0	3	0	7	0	0	0	0	0	1	0	1	1	3	0	0	0	0	0	0	0	0	204		
17:30	15	91	2	0	0	0	0	0	0	0	2	52	7	0	2	0	0	1	0	0	3	0	11	0	0	0	0	0	0	1	2	6	0	0	0	0	0	0	0	0	195		
17:45	13	98	6	0	2	0	0	0	0	0	6	58	2	0	3	0	0	1	0	0	3	1	4	0	0	0	0	0	0	2	1	6	0	0	0	0	0	0	0	0	206		



TVIS II - Traffic Volume Information System
Traffic Signal Warrant

Description: **HWY 58 @ BARRICK RD**

Region: **CENTRAL**

Survey Type: **TM ± Intersection**

Hwy: **58**

Start Date:

I/C Side:

LHRS: **32700**

End Date:

Intersection Type: **Four Leg**

Offset: **1.360**

Schedule Summary: **Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00**
 Default as defined in 2016 Provincial Data Collection Contract

MAJOR ROADS				MINOR ROADS				Intersection Type	
Approach	Name	Channel Right	Pattern	Approach	Name	Channel Right	Pattern		
N	HWY 58	<input type="checkbox"/>	UC	E	BARRICK RD	<input type="checkbox"/>	UNCL	Four Leg	
S	HWY 58	<input type="checkbox"/>	UC	Ramps				Traffic Control	
<input type="checkbox"/> 2 or more approach Lanes				W	BARRICK RD	<input type="checkbox"/>	UNCL	Stop Sign	
				Ramps				Flow Condition	
				<input type="checkbox"/> 2 or more approach Lanes				Free Flow	

Justification 1 - Minimum Vehicle Volume:												Calculated using raw data						
1A: All approach lanes: 1B: Minor road approaches:												1A		1B				
												Min. Req.	%	Min. Req.	%			
												600	100	120	100			
												480	80	96	80			
												Total	%	Total	%			
Time	Major Road Approaches				Minor Road Approaches													
	North Approach	South Approach		East Approach	West Approach													
07:00	25	248	3	2	387	9	21	2	59	10	6	14	786	100	112	80		
08:00	20	333	5	8	422	23	31	2	59	16	2	11	932	100	121	80		
11:00	29	332	10	8	307	17	27	6	32	3	2	10	783	100	80	80		
12:00	27	347	10	10	307	41	38	5	36	7	8	12	848	100	106	80		
13:00	26	350	10	10	320	18	15	5	45	10	5	12	826	100	92	80		
15:00	57	404	10	12	349	25	24	5	67	7	2	13	975	100	118	80		
16:00	67	481	20	15	364	15	27	8	52	13	4	8	1074	100	112	80		
17:00	56	420	21	19	276	15	12	2	30	4	5	16	876	100	69	80		
TotalsTM	307	2915	89	84	2732	163	195	35	380	70	34	96	7100	800	810	621		
Approach	3311				2979				610				200		Section %	100	Section %	78
Justification 1 Minimum Compliance:												78 %						



TVIS II - Traffic Volume Information System
Traffic Signal Warrant

Description: **HWY 58 @ BARRICK RD**

Region: **CENTRAL**

Survey Type: **TM ± Intersection**

Hwy: **58**

Start Date:

I/C Side:

LHRS: **32700**

End Date:

Intersection Type: **Four Leg**

Offset: **1.360**

Schedule Summary: **Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00**
 Default as defined in 2016 Provincial Data Collection Contract

Justification 2 - Delay to Cross Traffic:

Calculated using raw data

2A: Major road approaches:

2B: Minor road approaches:

	Major Road Approaches				Minor Road Approaches								
	North Approach		South Approach		East Approach		West Approach						
Time	←	↑	→	←	↑	→	←	↑	→	←	↑	→	↑
07:00	25	248	3	2	387	9	21	2	59	10	6	14	0
08:00	20	333	5	8	422	23	31	2	59	16	2	11	0
11:00	29	332	10	8	307	17	27	6	32	3	2	10	0
12:00	27	347	10	10	307	41	38	5	36	7	8	12	0
13:00	26	350	10	10	320	18	15	5	45	10	5	12	0
15:00	57	404	10	12	349	25	24	5	67	7	2	13	0
16:00	67	481	20	15	364	15	27	8	52	13	4	8	0
17:00	56	420	21	19	276	15	12	2	30	4	5	16	0
Totals: TM	307	2915	89	84	2732	163	195	35	380	70	34	96	0
Approach	3311		2979		610		200						

2A	
Min. Req.	%
600	100
480	80
Total	%
674	100
811	100
703	100
742	100
734	100
857	100
962	100
807	100
6290	800
Section %	100

2B	
Min. Req.	%
50	100
40	80
Total	%
37	74
49	80
37	74
53	100
31	62
36	72
48	80
21	42
312	584
Section %	73

* Pedestrians crossing major road

Justification 2 Minimum Compliance: 73 %

Justification 3 - Volume / Delay Combination:

Calculated using raw data

Minimum Compliance (%)

Justification 1 - Minimum Vehicle Volume: 78 %

Justification 2 - Delay to Cross Traffic: 73 %

Justification 3 Minimum Compliance: 73 %

TVIS II - Traffic Volume Information System
Traffic Signal Warrant

Description: **HWY 58 @ BARRICK RD**

Region: **CENTRAL**

Start Date:

End Date:

Survey Type: **TM ± Intersection**

I/C Side:

Intersection Type: **Four Leg**

Hwy: **58**

LHRS: **32700**

Offset: **1.360**

Schedule Summary: **Tuesday, Wednesday, Thursday AM 07:00-09:00, Midday 11:00-14:00, PM 15:00-18:00**
 Default as defined in 2016 Provincial Data Collection Contract

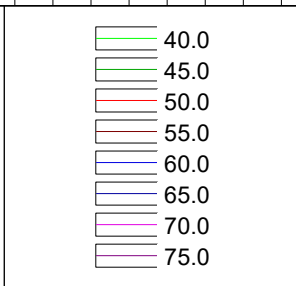
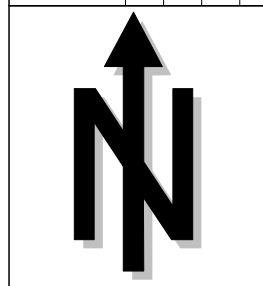
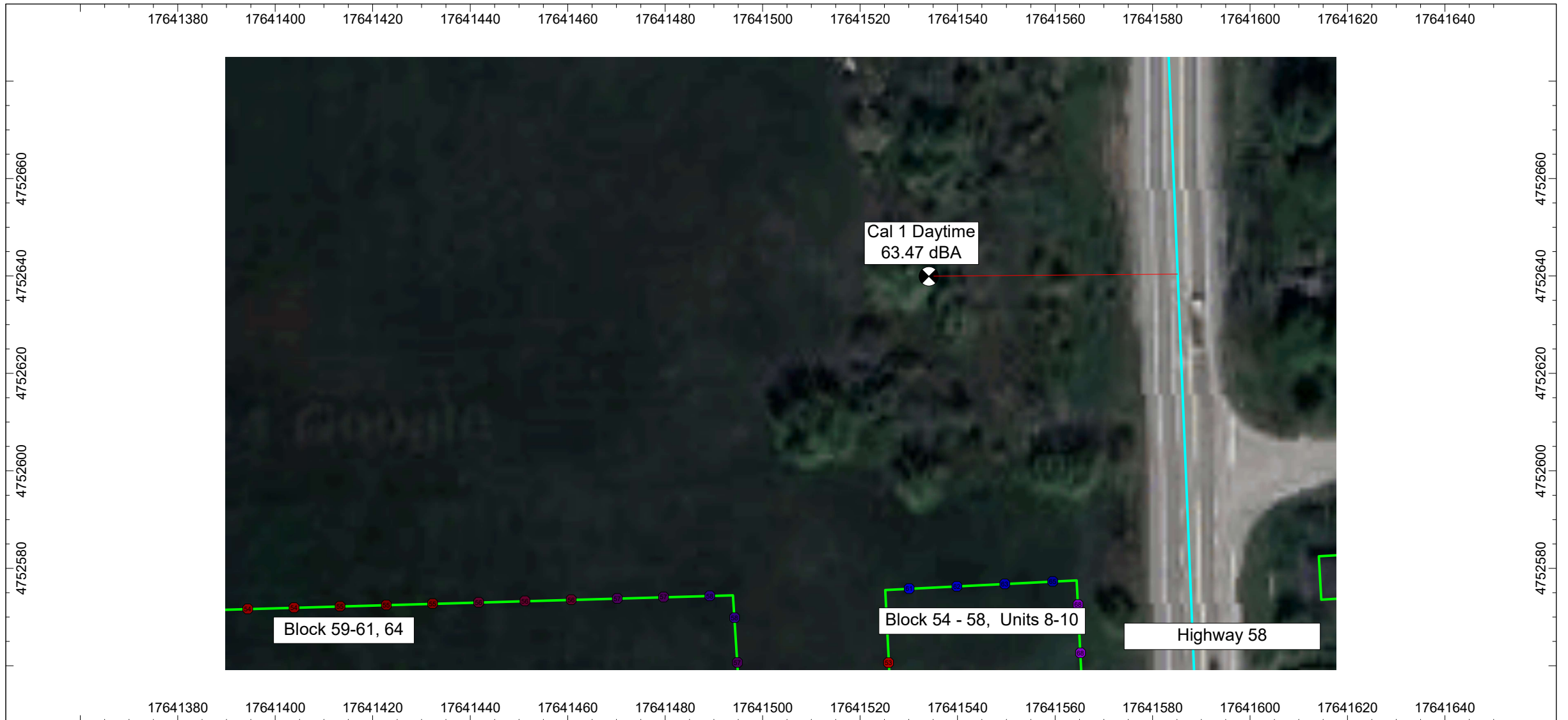
Justification 5 - Collision Experience			
		Warrant Threshold *	%
		5	100
Preceding Months	Number of Collisions **		%
1 - 12	0		0
13 - 24	0		0
25 - 36	0		0
Totals	0		0
Justification 5 Compliance:			0 %

* Per twelve-month period.
 ** Include only collisions that are susceptible to correction

Calculation Options - Use raw data			
Factors for major road approaches		Factors for minor road approaches	
North Approach	South Approach	East Approach	West Approach
Factor 1.0	Factor 1.0	Factor 1.0	Factor 1.0
Factor for pedestrian crossing major road 1.0			

CONCLUSION: TRAFFIC SIGNALS ARE NOT WARRANTED

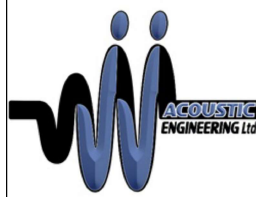
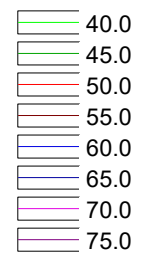
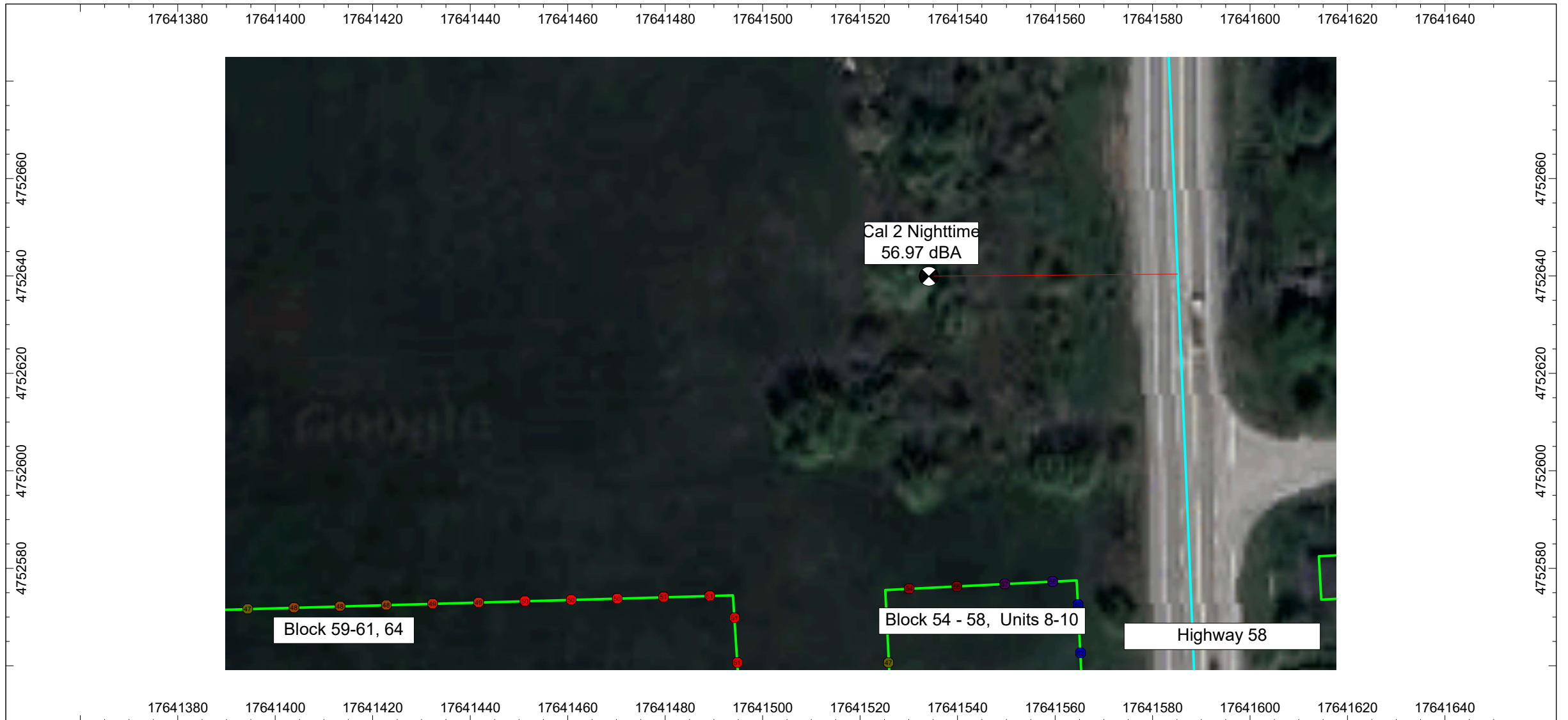
ATTACHMENT C



- + Point Source
- Line Source
- Building
- Receiver
- Building Evaluation

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

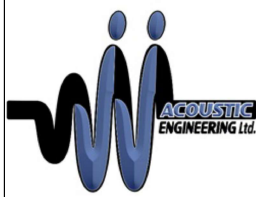
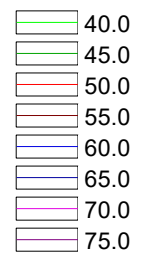
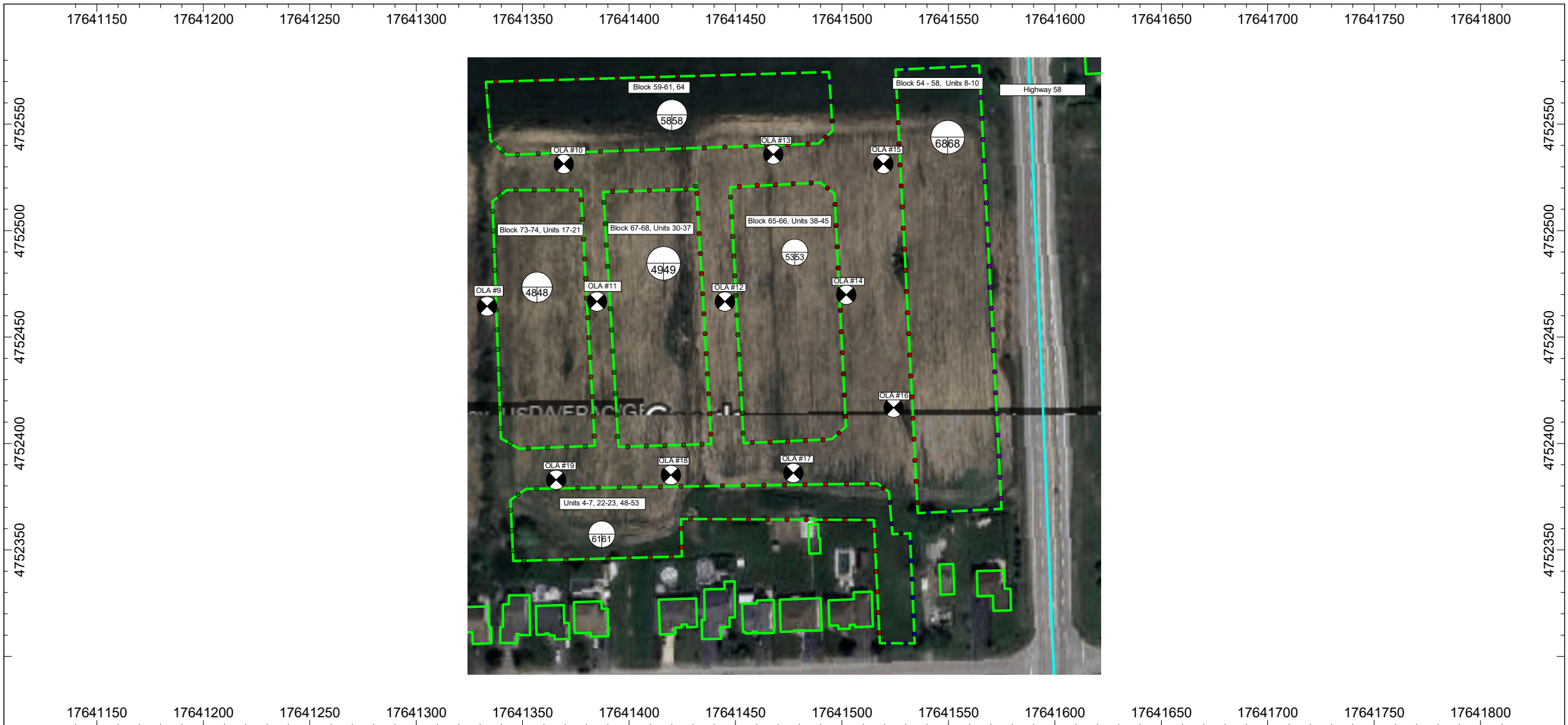
Figure 1A - Calibration Point Daytime





- + Point Source
- Line Source
- Building
- Receiver
- Building Evaluation

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

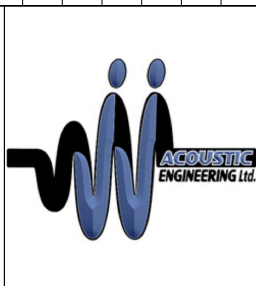
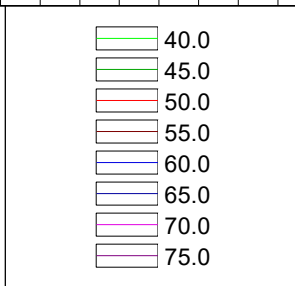
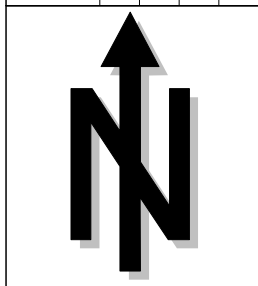
Figure 1B - Calibration Point Nighttime



- + Point Source
- Line Source
- Building
-  Receiver
-  Building Evaluation

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

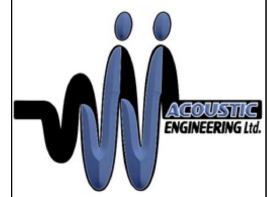
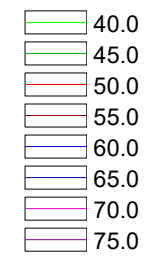
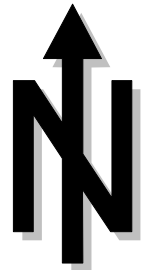
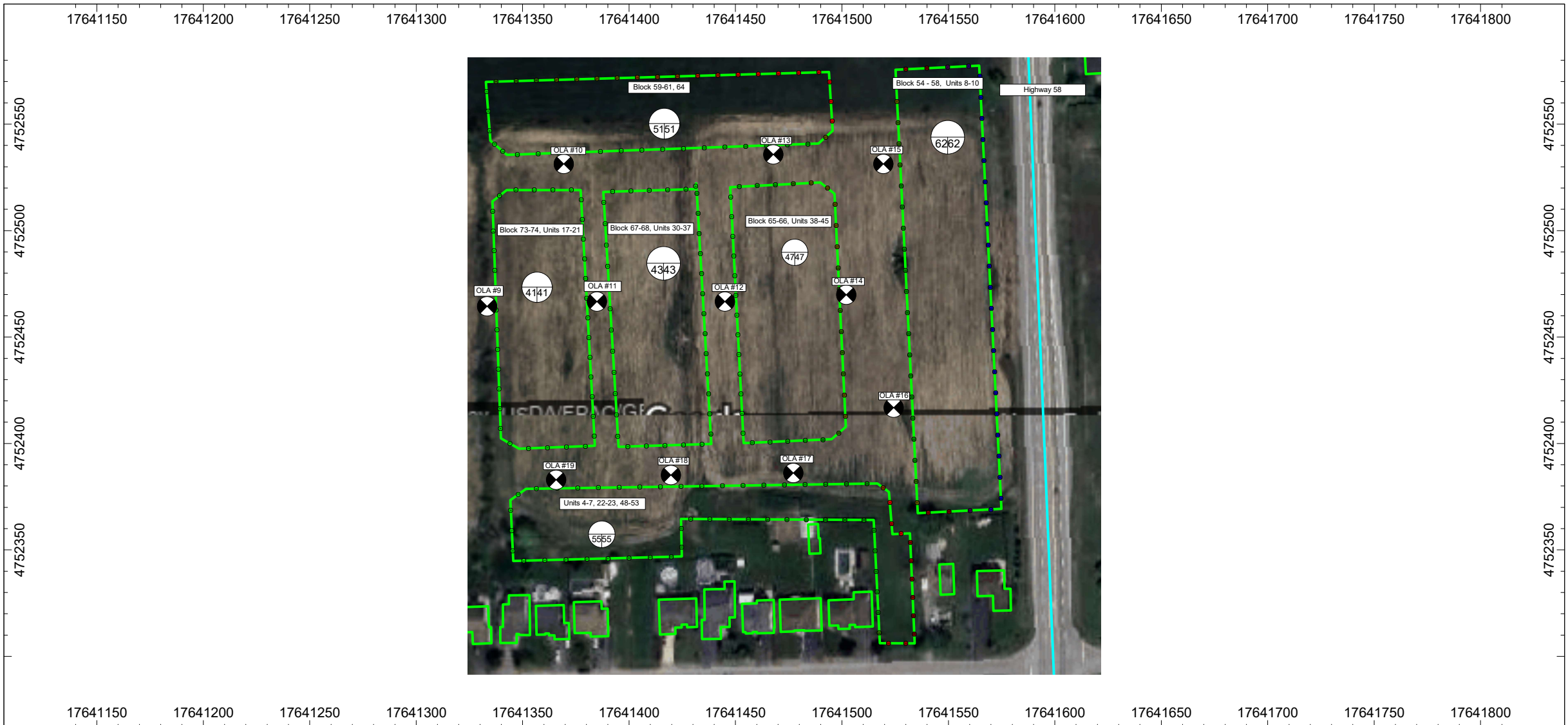
Road Traffic Noise Impact to Site - Part 1 Daytime





- + Point Source
- Line Source
- Building
- Receiver
- Building Evaluation

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

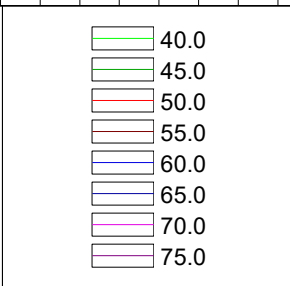
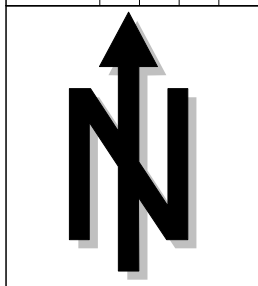
Road Traffic Noise Impact to Site - Part 2 Daytime





- + Point Source
- Line Source
- Building
-  Receiver
-  Building Evaluation

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

Road Traffic Noise Impact to Site - Part 1 Nighttime


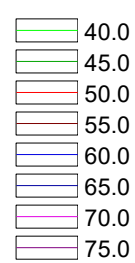
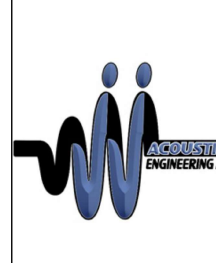


- + Point Source
- Line Source
- Building
-  Receiver
-  Building Evaluation

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

Road Traffic Noise Impact to Site - Part 2 Nighttime



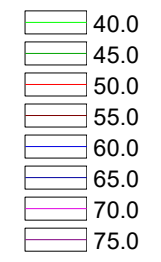
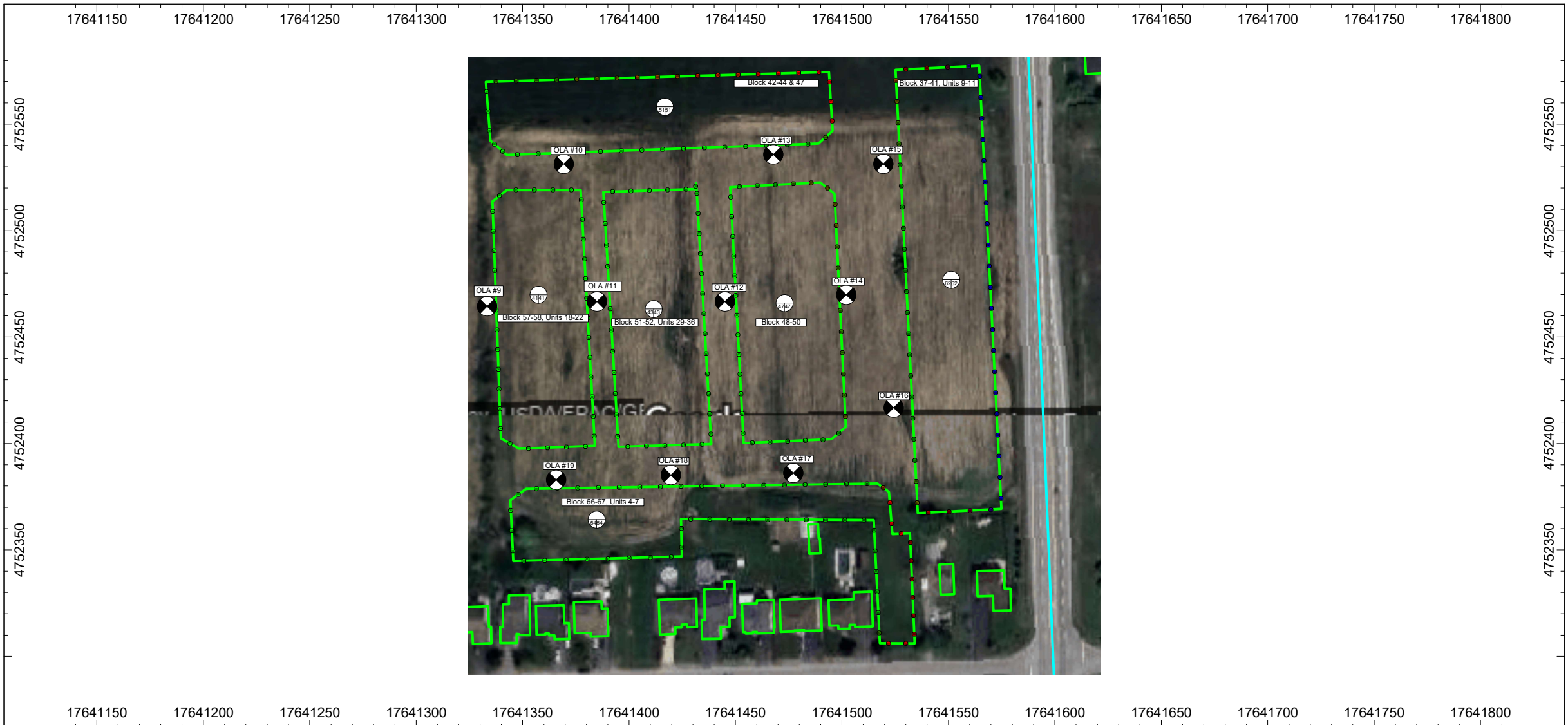
			<ul style="list-style-type: none"> Point Source Line Source Building Receiver Building Evaluation 	<p>STATIONARY NOISE IMPACT BARRICK ROAD, PORT COLBORNE, ONTARIO</p>
				<p>Figure 3 - Stationary Noise Impact From Neighboring Building to Site Part 1</p>



	<table border="1"> <tr><td>40.0</td></tr> <tr><td>45.0</td></tr> <tr><td>50.0</td></tr> <tr><td>55.0</td></tr> <tr><td>60.0</td></tr> <tr><td>65.0</td></tr> <tr><td>70.0</td></tr> <tr><td>75.0</td></tr> </table>	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0		<ul style="list-style-type: none"> + Point Source — Line Source Building Receiver Building Evaluation
40.0											
45.0											
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60.0											
65.0											
70.0											
75.0											

STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO

Figure 3 - Stationary Noise Impact From Neighboring Building to Site
 Part 2



- + Point Source
- Line Source
- Building
- X Receiver
- + Building Evaluation

**STATIONARY NOISE IMPACT
BARRICK ROAD, PORT COLBORNE, ONTARIO**

Road Traffic Noise Impact to Site - Part 2 Nighttime

ATTACHMENT D

Table C1
 Stationary Noise Impact Source Data
 Barrick Road, Port Colborne, Ontario

Noise Source Description	Cadna ID	Total SWL (dBA)	Data Source or Representative Data	Height Absolute (m)	Above Roof (m)		
						x	y
M1	OS_HVAC_4_Fan	86.1	HVAC_4_Fan	9	2	17641663	4752229
M2	OS_HVAC_2FAN	82.8	HVAC_2FAN	9	2	17641668	4752229
M3	OS_HVAC_2FAN	82.8	HVAC_2FAN	9	2	17641674	4752229