



ACOUSTICAL AND VIBRATION REPORT

FRED'S FARM FRESH CONDOS MIX-USE DEVELOPMENT

2144 HURON CHURCH ROAD
WINDSOR, ONTARIO

PROJECT NO. 22-072

DATED: MAY 08, 2023



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1. INTRODUCTION

Baird AE has been retained to prepare an acoustical and vibration report in support of a proposed 6-storey combined use building for land located at 2144 Huron Church Road in the City of Windsor.

The proposed development will include 58 dwelling units with a commercial area on a 0.57 ha (1.36 ac) parcel. The development is bounded by Fred's Farms to the north, Huron Church to the west, Daytona Avenue to the east, and a commercial development to the south. Access to the development will be provided from Huron Church Road and Daytona Avenue.

The proposed building will be six (6) storeys tall. Floor 1 will have an amenity area, lobby, tenant storage, 273.57m² of commercial space, and the rest of the floors (floors 2 to 6) will have residential units.

This report will recommend mitigation measures based on criteria set by the Ministry of Environment and Climate Change (MOECC). The property is shown in Exhibit 1.



Exhibit 1 - Location Plan

2. NOISE CRITERIA

The MOECC publication NPC-300 “Environmental Noise Guideline - Stationary and Transportation Sources – Approval and Planning” was used in this noise study. Based on the initial investigation, the primary noise affecting the development is from Huron Church Road. Air traffic noise was not considered, as the development is located outside the zone of influence of local airports.

Due to the physical features of the surroundings (i.e., a significant urban setting), it is assumed that the development is located in a “Class 1” area as defined by the MOECC. This class of area has an acoustical environment typical of a major population centre during the daytime and nighttime hours. The “Class 1” MOECC criteria for noise levels resulting from traffic and stationary sources for this development are summarized in Table 1 and Table 2.

Table 1 – MOECC Noise Level Criteria – (Road)

Location	Time Period	Noise Levels Requirement
Outdoor - Living Areas	07:00 - 23:00	<55dBA – No Control
		55 to 60dBA – Physical Control or Type A Clause
		> 60dBA – Physical Control and Type B Clause
Outside - Living/dining Plane of Window	07:00 - 23:00	<55dBA – No Control
		55 to 65dBA – Forced Air and Type C Clause
		> 65dBA – Air Conditioner, Type D Clause and Building Components
Outside - Living/dining Plane of Window	23:00 to 07:00	<50dBA – No Control
		50 to 60dBA – Forced Air and Type C Clause
		> 60dBA – Air Conditioner, Type D Clause and Building Components

MOECC Guidelines NPC-300 Section C7.1.1 and C7.1.2 – August 2013

Table 2 – MOECC Noise Level Criteria – Indoor

Type of Space	Type of Space	Sound Exposure Level -Road-
Living/Dining Room	0700 - 2300	45 dBA
	2300 - 0700	45 dBA
Sleeping Quarters	0700 - 2300	45 dBA
	2300 - 0700	40 dBA

MOECC Guidelines NPC-300 Section C3.2.3 – August 2013

Table 2 describes indoor sound level limits used to calculate the Sound Transmission Class (STC) should outdoor sound level limits be triggered for building components.

Table 3 – MOECC Noise Level Criteria – Stationary

Time Period	Outdoor Points of Reception	Plane of Window
0700 - 1900	50 dBA	50 dBA
1900 - 0700	45 dBA	45 dBA

Source: MOE publication NPC-300 "Sound level limits for Stationary Sources in Class 1 & 2 Areas (Rural)", Tables C-5, C-6; August 2013.

The transportation source, i.e., Huron Church Road, noise level is the dominant noise as compared to the stationary noise level. Furthermore, indoor sound level limits (as shown in table 2) represent the worst-case scenario comparing the stationary noise level limits shown in table 3. Hence, Table 2 limits are used to calculate the Sound Transmission Class (STC).

2.1 Transportation Source

Traffic counts at the intersection of Huron Church Road and Northwood Street, dated February 20, 2020, were obtained from the City of Windsor. Traffic counts and other relevant data are included in Appendix A.

Sound level prediction software STAMSON 5.04, based on MOECC ORNAMENT (Ontario Road Noise Analysis Method for Environmental and Transportation, 1989) was used to estimate noise levels from roadway traffic and rail. Furthermore, the MOECC requires that all traffic data be projected ten (10) years into the future from the date of construction, such that the proposed mitigation will be relevant for future volumes.

The K-factor of 0.15 is applied to forecast daily peak volumes. The forecasted traffic volumes along with other relevant traffic data utilized by STAMSON are summarized in Table 3.

Table 4 – Background Traffic Volumes (2034)

Item	Huron Church Road
Annual Average Daily Traffic	17,646 vpd (2,647 vph)
% Medium Trucks	24.8%
% Heavy Trucks	1.5%
Road Grade	< 2.0%
Speed Limit	60 km/h
Day/Night Percent Split	90% / 10%

Using the above data in STAMSON software, daytime and nighttime free field limits were established. Noise level limits are shown in Sheet 1 – Noise Information Plan, and detailed results are provided in Appendix B.

2.1.1 Free Field Analysis

The free field analysis is an assessment of noise impacts on the proposed development with no proposed structures or features to provide noise mitigation. Based on the free field analysis, traffic noise from Huron Church Road will impact building facades. The limit at which building components need to be implemented is 60 dBA during the day and 55 dBA during the night. Mitigation measures, such as warning clauses, air conditioning, building components and forced air heating, are therefore required. Further analysis was carried out using the INoise Software. Stamson output results are provided in Appendix B.

2.2 Stationary Noise Source

A review of all surrounding users was conducted, and two properties were identified as being potentially significant noise sources, namely:

Fred's Farm Fresh – to the north of the subject property: the building is within 27.5m of the nearest proposed building façade. The development operates until 7pm.

Car Wash – to the south of the subject property: the building is within 35.1m of the nearest proposed building facade and operates 24/7. The car wash's blow dryers face Northwood Street; hence they would not significantly impact the development.

Restaurants – to the south of the subject property: the building is within 35.1m of the nearest proposed building facade and operates until 12am. No significant noise was observed from restaurant operations.

Ambient noise levels at both monitoring locations are dominated by traffic noise from Huron Church Road.

Noise level monitoring was conducted on February 22, 2023 (weekday) at 3:30 pm for 20 minutes at two locations. Measurements were taken using an Extech Noise Meter model 407780A noise monitoring device. The sound levels were measured at a height of 1.5m above the ground. The following measurements were taken:

- a) The first measurement was 13m from Huron Church Road.
- b) The second monitoring location was 16m from Huron Church Road. The monitored noise level was 66.4 dBA.

2.3 Receiver Locations

The sample receiver locations were identified and are located at the worst-case locations (most exposed) for both day and nighttime noise. For daytime, receivers are placed 1.5m above the ground (floor) and for nighttime, receivers are placed 4.5m above the ground floor.

For indoor living areas, the plane of window (POW) will represent the worst case for both daytime and nighttime receivers.

The term "outdoor living area" (OLA) refers to an outdoor patio, a backyard, a terrace, balconies, or other areas where passive recreation is expected to occur. It should

be noted that the dwelling units will have private balconies under 4 meters deep and are not considered OLA's, as per MOECC guidelines.

Table 4 identifies the various receiver heights chosen as the "worst case" locations within the proposed development. These locations are shown in Appendix A, Figure 1.

Table 5 – Receiver Locations

Receiver Location	Height of Receivers		Represents
	Grade (m)	Type	
Receiver – Floor 1	1.5	POW	All side facades
Receiver – Floor 2	6.0m	POW	All side facades
Receiver – Floor 3	9.04m	POW	All side facades
Receiver – Floor 4	12.08m	POW	All side facades
Receiver – Floor 5	15.12m	POW	All side facades
Receiver – Floor 6	18.16m	POW	All side facades

2.4 Noise Environment

In order to obtain the current noise level, noise level monitoring was conducted at two locations on Tuesday, November 22, 2022, for 20 minutes. Measurements were taken using an Extech Noise Meter model 407780A noise monitoring device. The sound levels were measured at a height of 1.5m above the ground. The equivalent sound pressure level (Leq) at the monitoring locations is provided in Table 5 and shown in Appendix A, Figure 1.

Table 6 – Transportation Noise Level

Receiver Location	Monitoring Level Daytime (dBA)
Monitoring 1	53 (avg) – 65.4 (max)
Monitoring 2	56.4 (avg) – 66.4 (max)

The noise propagation analysis was completed using the noise modelling program “iNoise”, produced by DGMR Software to match the monitoring noise levels at monitoring locations M1 and M2 from surrounding sources. The iNoise program follows International Standards Organization (ISO) standards 9613 parts 1 and 2. The model is capable of incorporating various site features such as elevations, berms, absorptive grounds and barriers to accurately predict noise levels at specific receptors, pertaining to noise emission from sources. The model is considered conservative, since it represents atmospheric conditions that promote the propagation of sound from the source to the receiver.

The following assumptions were used in the iNoise modelling:

Reflections: A building reflection of **0.8** was assumed to be representative of the brick façade present for the surrounding buildings, including the proposed building.

Ground Absorption & Topography: A ground absorption coefficient of **0** was used to represent the most reflective surface (i.e., paved surface) The area surrounding the monitoring location is characterized by generally flat. As such, topography was not incorporated into the noise modelling.

Potentially significant noise sources associated with rail and roadway sources have been considered as well. Details are provided in Appendix A. The following potential stationary and transportation noise levels were established for iNoise software:

- Car wash - dryer level is 81.12dBA.
- HVAC – rooftop air conditioner cooler is 91.61dBA.
- Roadway car noise level is 79.2dBA at 60km/h speed.
- Slow moving truck noise level is 95.4dBA.

3. NOISE ASSESSMENT

Overall unattenuated daytime and nighttime sound levels at the receiver locations are shown in Figure 3 and are described in Table 6.

Table 7 – Post Development Predicted Noise Levels

Location	Noise Level (dBA)				MOECC Criteria (dBA) Road	Meets MOECC
	Receiver 1	Receiver 2	Receiver 3	Receiver 4		
Floor 1						
Daytime	70	71	74	71	45	No
Nighttime	68	60	51	69	40	No
Floor 2						
Daytime	70	71	74	70	45	No
Nighttime	68	59	52	68	40	No
Floor 3						
Daytime	70	70	73	70	45	No
Nighttime	68	59	52	68	40	No
Floor 4						
Daytime	70	70	73	70	45	No
Nighttime	68	59	53	68	40	No
Floor 5						
Daytime	70	69	73	70	45	No
Nighttime	68	59	53	68	40	No
Floor 6						
Daytime	69	68	72	69	45	No
Nighttime	68	58	53	67	40	No

Based on predicted sound levels as shown in Figures 2 and 3 (Appendix B) and Table 7, mitigation measures are required, such as warning clauses, in order to meet the MOECC Limit of 45dBA daytime and 40dBA nighttime. Mitigation measures are discussed in Section 4.

For indoor living and bedroom areas, noise levels are above 40 dBA during daytime and 35 dBA at nighttime for all receiver locations. Therefore, an assessment of glazing requirements is necessary to meet indoor sound levels for buildings at all receiver locations.

4. MITIGATION MEASURES

Acoustical Fence

No acoustical fence is needed as the noise level is less than 60dBA.

Building Components

To calculate the required building components, the dimensions of the rooms and their wall/window sizes must be known. Table 8 summarizes the building components.

Table 8 – Building Component Sizes

South, West Façade	Window	Door	Floor
Bedroom	3.3 m ²	2.3 m ²	8.7 m ²
Living room	3.3 m ²	2.3 m ²	11.7 m ²

Detailed calculations are included in Appendix D, and Table 9 summarizes the required STC values for the various façades. Sample building components and their associated STC ratings are included in Appendix D.

Table 9 – Required STC Values (Window/Door)

Location	Type	North/West Façade	South Façade	East Façade
Level 1 - 6	Bedroom	42	42	45
	Living	38	38	41

It is also recommended that an acoustical consultant review the building components to ensure that noise levels satisfy the requirements, as stated in Table 9. For the proposed development, the estimated building components are shown in Appendix B, Figure 1.

The Ontario Building Code (OBC) section 5.8.1 specifies the minimum required sound insulation characteristics for partitions in terms of Sound Transmission Class (STC) values. For acoustic privacy in a multi-tenant building between suites, the inter-unit wall should meet or exceed STC-50. Walls separating suites from noisy spaces, such as

refuse chutes or elevator shafts, should meet or exceed STC-55. In addition, it is recommended that the separation of suites from any amenities or commercial space for building component (floor/ceiling) construction also meet or exceed STC-55.

5. VIBRATION MONITORING

Vibration measurement was completed on November 22, 2022, and the location is labelled “VIB” A in Appendix A, Figure 1. The vibration analyzer SSEYL Landtek VM3670 was securely placed on top of the concrete surface to measure ground vibration generated by light and heavy vehicles. Details are provided in Appendix B. Vibration ranges are:

- Velocity: 0.01 to 0.69 mm/s
- Displacement: 0.002mm to 0.025mm
- Acceleration: 0.00 mm/s²

It is therefore recommended that the building design incorporate the maximum vibration parameters in addition to the requirements provided by the Ontario Building Code 4.1.3.6.

6. RECOMMENDATIONS

As demonstrated in this report, mitigation measures are required to bring residential units within the development into compliance with the MOECC criteria. With these measures, MOECC noise criteria will be satisfied.

Recommendation #1 (All Units Within Developments)

Due to the exceedance of the MOECC criteria for daytime and nighttime acoustical levels from Huron Church Road and commercial development, the units are to be equipped with air conditioning and forced air heating. Further, these units shall include the following warning clause:

"Due to its proximity to Huron Church Road, these dwelling units have been supplied with a central air conditioning system which allows windows and

exterior doors to remain closed, ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment."

Recommendation #2 (All Units Within Developments)

A noise warning clause should be included in the property and tenancy agreements and offer of purchase and sale for the dwelling units to inform the future owners/occupants of the noise issues and the presence of the existing facilities, and that sound from these facilities may at times be audible during a period of low background sound and which reads as follows:

"Purchasers/tenants are advised that due to the proximity of the adjacent roadway, noise from the railway may at times be audible."

Recommendation #3 (Building Components)

Due to exposure to train noise, the units facing east, south, west and north facades require special building components for areas of sensitive use (i.e., bedroom, living room, dining room, kitchen, etc.) and the following are required:

Window Requirements:

All windows leading to sensitive living areas are to have a minimum sound transmission class (STC) as provided in Table 9 in order to meet the MOECC indoor noise level criteria.

Door Requirements:

All doors leading to sensitive living areas are to have a minimum sound transmission class (STC) as provided in Table 9 in order to meet the MOECC indoor noise level criteria.

Wall Requirements:

Acoustic privacy between units in a multi-tenant building, the inter-unit wall, should meet or exceed STC-50. Wall separation between noisy spaces, such as refuse chutes or elevator shafts, and suites should meet or exceed STC-55.

Furthermore, these units shall include the following warning clause in the purchase or lease agreements:

"Purchasers/tenants are advised that due to close proximity of the adjacent industries, noise from said industries may at times be audible."

Recommendation #4 (All units within the development)

Prior to the issuance of building permits, it is recommended that an acoustical consultant review the sound transmission class (STC) for the proposed development's walls, windows, and doors to ensure they conform to the recommendations outlined in this report.

Recommendation #5 (All units within the development)

The design of the building should consider the monitored vibration values in addition to those provided in Section 4.1.3.6 of the OBC.

7. SUMMARY

We conclude that this development can, with the implementation of the above-described mitigation measures, be designed to address impacts from the surrounding noise sources.

If you have any questions or wish to discuss our findings, please advise us.

Yours truly,

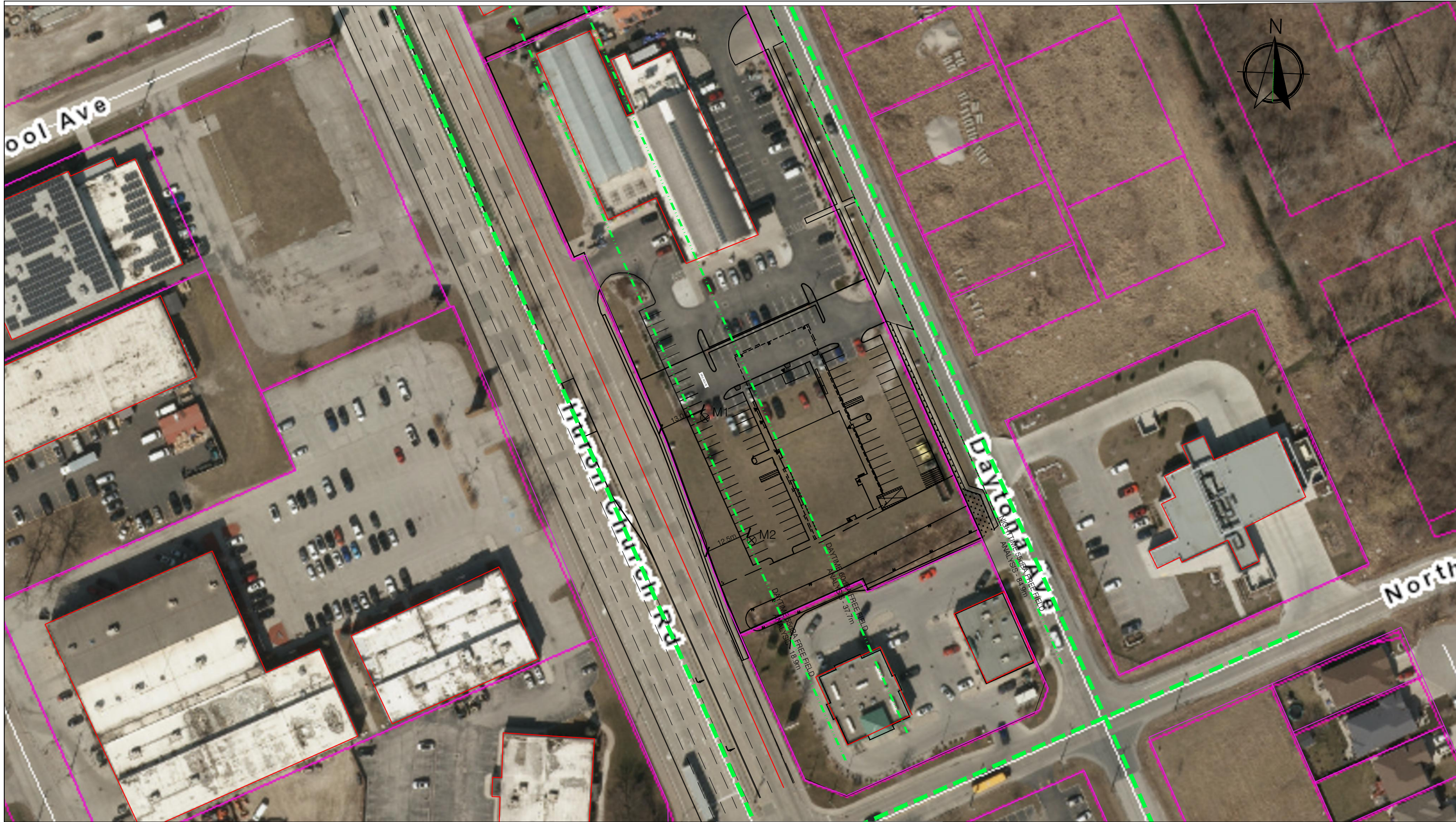
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27 PRINCESS STREET, UNIT 102
LEAMINGTON, ONTARIO N8H 2X8

Shurjeel Tunio, P.Eng.
Senior Project Manager
Baird AE






Appendix A

NOISE INFORMATION PLAN AND BACKGROUND INFORMATION



LEGEND

-  RECEIVER LOCATION
-  PROPOSED DEVELOPMENT
-  NOISE SOURCES



BAIRD|AE
architecture + engineering

27 Princess Street, Unit 102 Leamington ON N8H 2X8
1350 Provincial Road, Unit 700 Windsor ON N9W 5W1
519-326-6161 www.bairdae.ca info@bairdae.ca

PROJECT TITLE:
FRED'S FARM FRESH CONDO
2144 HURON CHURCH ROAD, WINDSOR ON

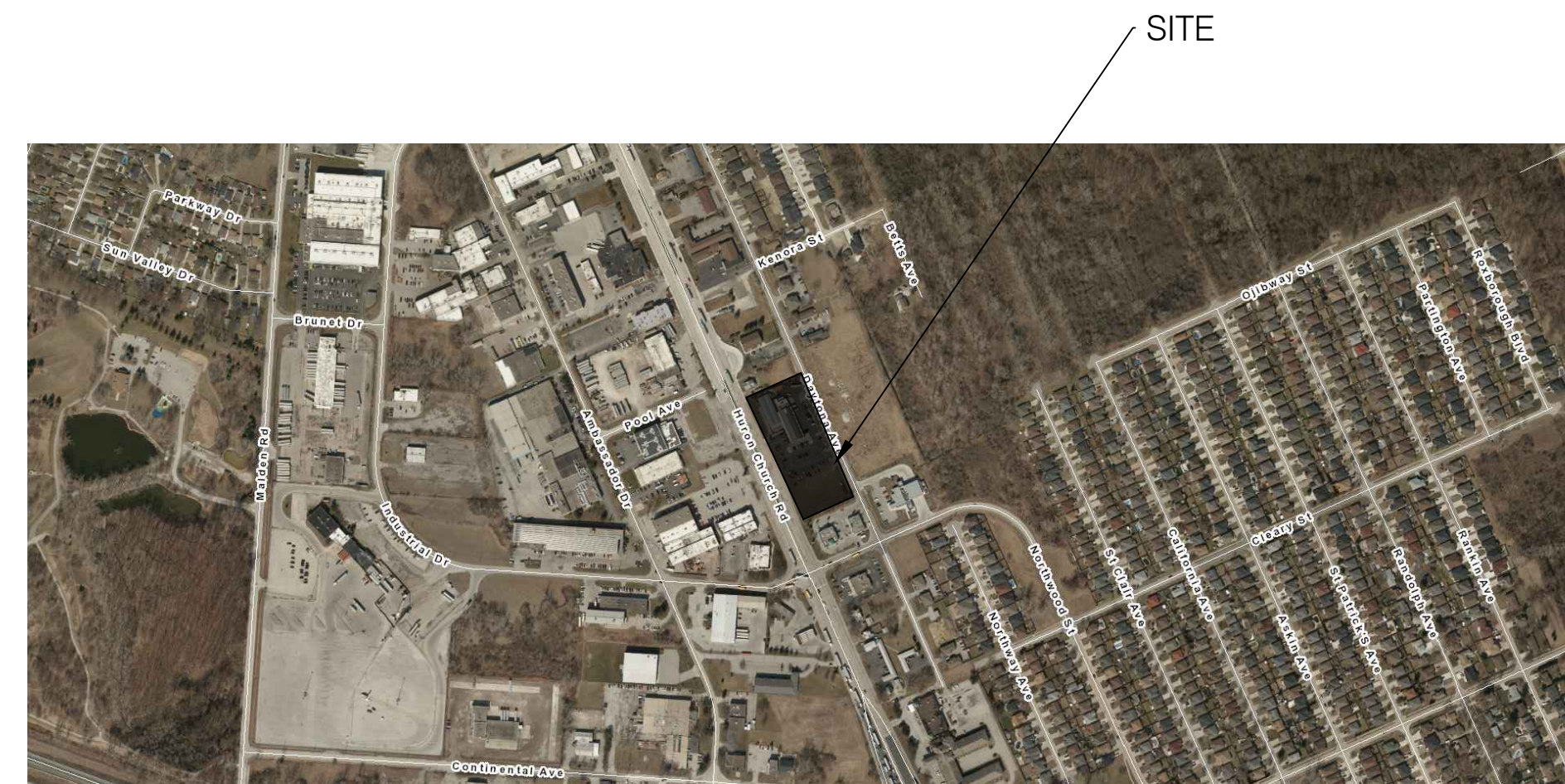
WINDSOR, ON

SHEET TITLE:
FIGURE 1 - NOISE INFORMATION PLAN

DRAWN BY: S.T.	SCALE: NTS	DATE: FEB 14, 2023
CHK'D BY: ST.	SHEET No. : 1 OF 3	PROJECT No. : 22-072

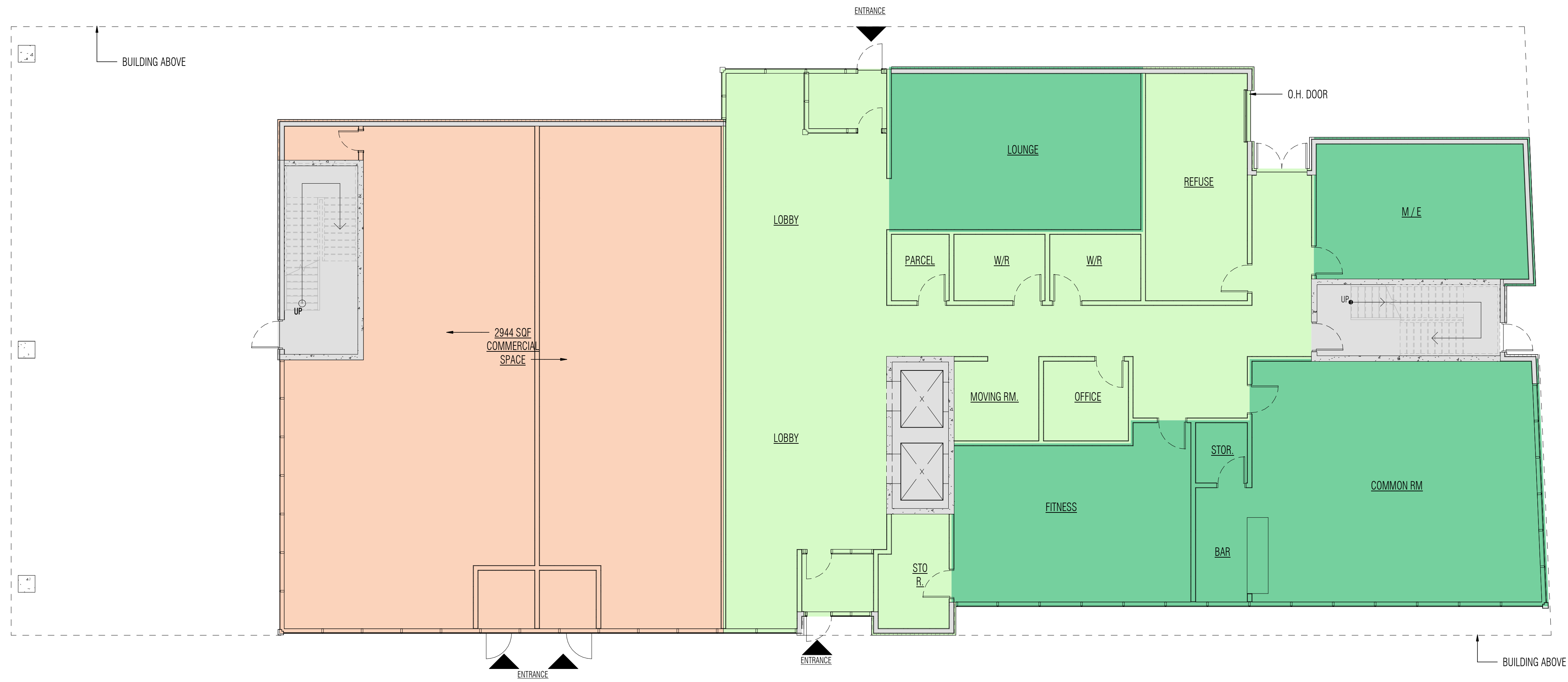
General Notes

- 1) Owner and BairdAE do not guarantee the accuracy of the utilities shown on the drawings. Other utilities may be present or the utilities shown may differ in location shown. The Contractor assumes full responsibility to contact the various utility companies and to repair any damage he may cause to these utilities or to other third parties. The Contractor agrees to indemnify the Owner and BairdAE against any claims which may arise from his/her actions.
- 2) All work shall be done in accordance with the Standards and Specifications of the City of Windsor. Where no such standards or specifications exist, the Ontario Provincial Standards and Specifications will govern.
- 3) The following is a partial list of abbreviations found in these drawings:
 OPSS - Ontario Provincial Standard Specification
 OPSP - Ontario Provincial Standard Drawing
 MECP - Ministry of the Environment Conservation & Parks (Ontario)



KEY PLAN
N.T.S

BENCHMARK LOCATED IN SOUTHWEST CORNER OF SITE NEAR HURON CHURCH RD. & BASIN DRAIN
TOP OF NUT OF FH - ELEV. 182.410 m



LEGEND	
	COMMON AREA
	AMENITY AREA
	1 BEDROOM SUITES
	2 BEDROOM SUITES
	COMMERCIAL AREA

FIRST FLOOR PLAN
SCALE: 1/8"=1'-0"

PARTNER / CONSULTANTS

SUBMISSION RECORD

NO.	DESCRIPTION	DATE

REVISIONS

NO.	DESCRIPTION	DATE

Drawn by: **MK** PRELIMINARY

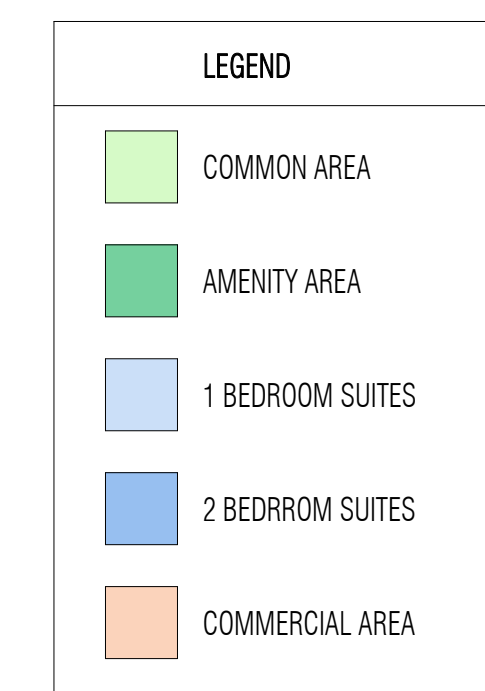
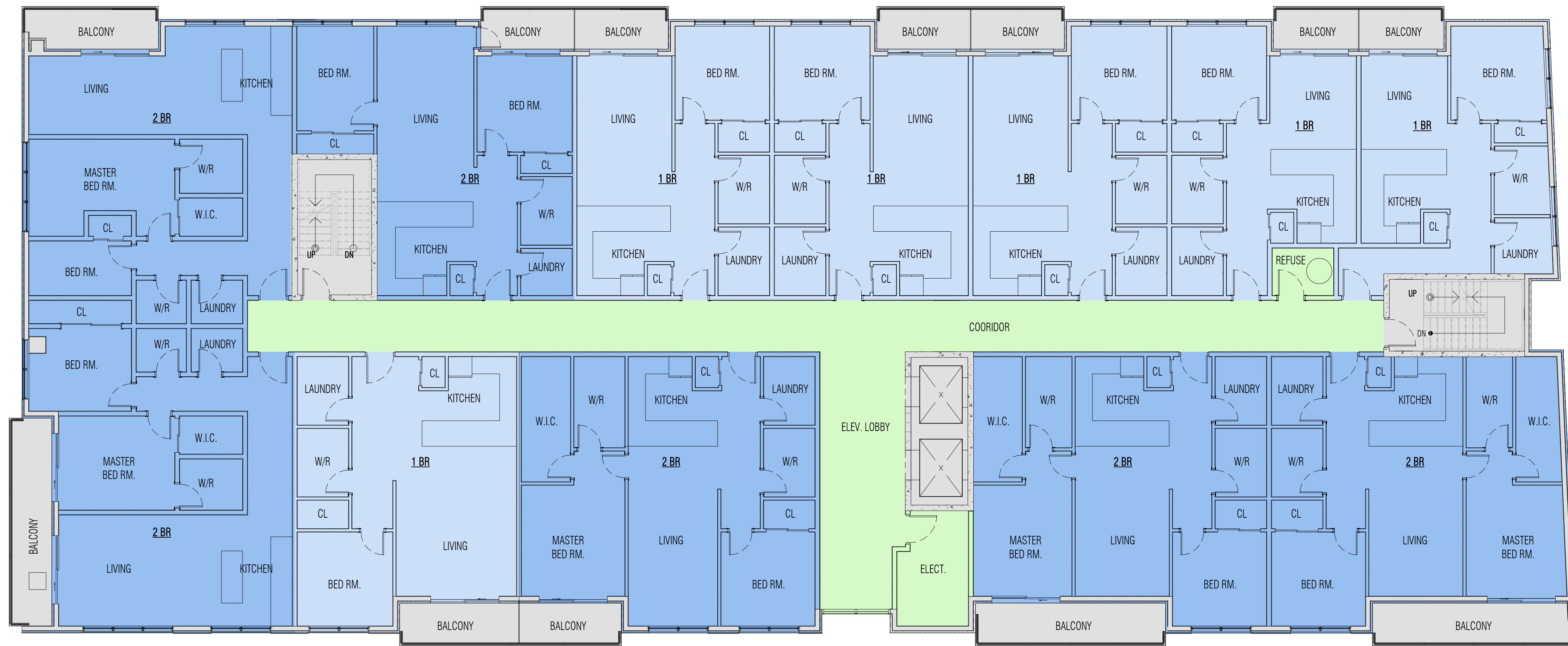
Checked by: **PW** CONSTRUCTION

Approved by: **PW** RECORD

FRED'S FARM FRESH CONDOS
2144 HURON CHURCH RD.
FIRST FLOOR PLAN

SHEET NUMBER: 22-072

A102



2ND - 4TH FLOOR PLAN
 SCALE: 1/8"=1'-0"

PARTNER / CONSULTANTS

SUBMISSION RECORD

NO.	DESCRIPTION	DATE

NO.	DESCRIPTION	DATE

REVISIONS

NO.	DESCRIPTION	DATE

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 Checked by: **PW** CONSTRUCTION
 Approved by: **PW** RECORD

FRED'S FARM FRESH CONDOS
 2144 HURON CHURCH RD.
SECOND - FOURTH FLOOR PLAN

22-072

A103



LEGEND	
	COMMON AREA
	AMENITY AREA
	1 BEDROOM SUITES
	2 BEDROOM SUITES
	COMMERCIAL AREA

5TH - 6TH FLOOR PLAN
SCALE: 1/8"=1'-0"

PARTNER / CONSULTANTS

SUBMISSION RECORD

NO.	DESCRIPTION	DATE

NO. DESCRIPTION DATE

NO.	DESCRIPTION	DATE

REVISIONS

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Approved by: **PW** RECORD

FRED'S FARM FRESH CONDOS
2144 HURON CHURCH RD.
FIFTH - SIXTH FLOOR PLAN

PROJECT TITLE
JOB NUMBER
SHEET NUMBER

22-072

A104



WEST-ELEVATION
SCALE: 1/8" = 1'-0"

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SUBMISSION RECORD

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REVISIONS

NO.	DESCRIPTION	DATE

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 Checked by: **PW** CONSTRUCTION
 Approved by: **PW** RECORD

PROJECT TITLE: **FRED'S FARM FRESH CONDOS**
 2144 HURON CHURCH RD.
 SHEET NUMBER: **WEST ELEVATION**

22-072
A105

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EAST-ELEVATION
SCALE: 1/8" = 1'-0"

PARTNER / CONSULTANTS

SUBMISSION RECORD

NO.	DESCRIPTION	DATE

NO.	DESCRIPTION	DATE

REVISIONS

SCALE

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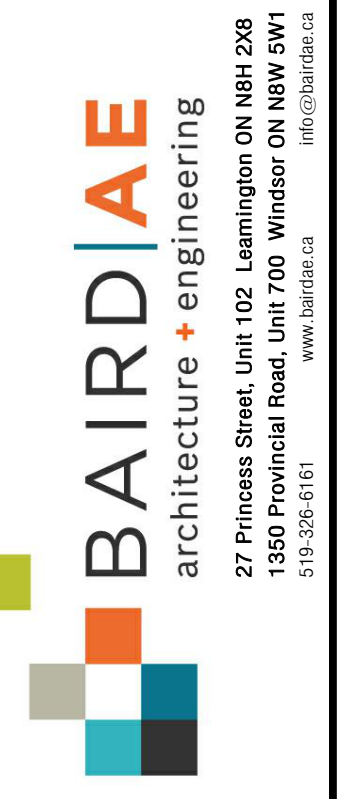
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2144 HURON CHURCH RD.
PROJECT FILE
EAST ELEVATION

JOB NUMBER
22-072

SHEET NUMBER
A106



SOUTH-ELEVATION
SCALE: 1/8" = 1'-0"



PARTNER / CONSULTANTS

SUBMISSION RECORD		
NO.	DESCRIPTION	DATE

REVISIONS		
NO.	DESCRIPTION	DATE

Drawn by: **MK** PRELIMINARY
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 Approved by: **PW** RECORD

PROJECT TITLE
FRED'S FARM FRESH CONDOS
 2144 HURON CHURCH RD.
 PROJECT FILE
SOUTH ELEVATION

JOB NUMBER
 22-072
 SHEET NUMBER
A107

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NORTH-ELEVATION
SCALE: 1/8" = 1'-0"

PARTNER / CONSULTANTS

SUBMISSION RECORD

NO.	DESCRIPTION	DATE

REVISIONS

NO.	DESCRIPTION	DATE

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FRED'S FARM FRESH CONDOS

2144 HURON CHURCH RD.

NORTH ELEVATION

22-072

SHEET NUMBER

A108

Noise Level - Assumption

Level	31	63	125	250	500	1000	2000	4000	8000
Rail Yard and Locomotive									
Car wash – Dryer	0.00	57.50	58.90	63.30	69.30	71.10	71.60	65.80	54.50
Air Conditioner Cooler	0.00	63.00	72.00	79.00	82.00	81.00	78.500	74.00	67.00
Cars and Trucks									
Light Vehicles 50km/h	57.92	63.92	67.02	73.26	80.53	88.48	86.65	79.26	69.12
Trucks - Diesel	0.00	71.20	81.20	83.20	85.20	86.20	82.20	78.20	72.20
Cars	0.00	64.20	71.20	83.20	76.20	79.20	79.20	73.20	66.0



Ontario Traffic Inc.
TRAFFIC MONITORING  SERVICES & PRODUCTS

Project #20-035 - City of Windsor

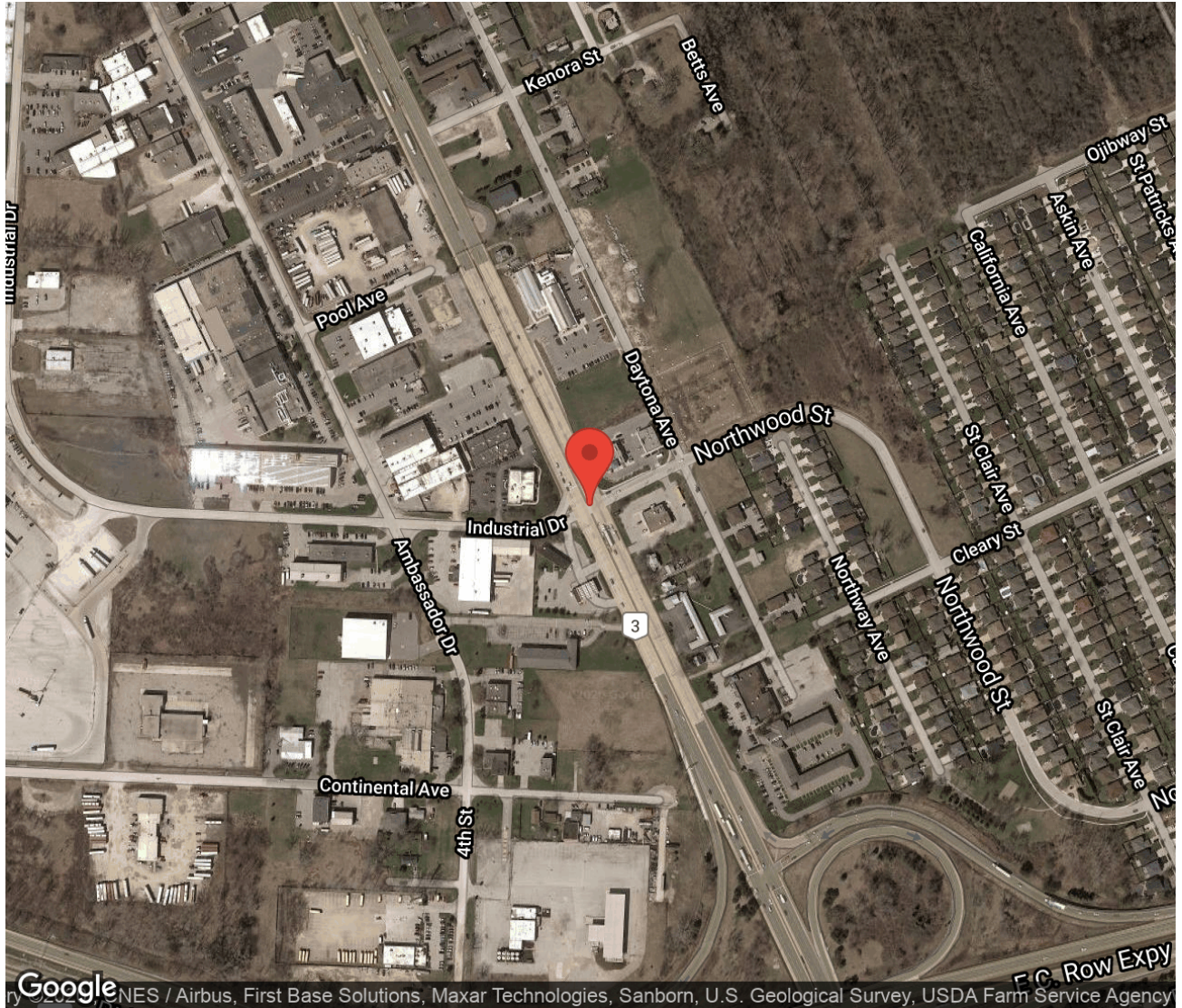
Intersection Count Report

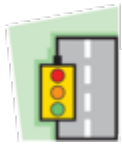
Intersection: Huron Church Rd & Northwood St-Industrial Dr
Municipality: Windsor
Count Date: Feb 20, 2020
Site Code: 2003500003
Count Categories: Cars, Medium Trucks, Heavy Trucks, Peds, Bicycles
Count Period: 07:00-10:00, 11:00-14:00, 15:00-18:00
Weather: Clear



Traffic Count Map

Intersection: Huron Church Rd & Northwood St-Industrial Dr
Municipality: Windsor
Count Date: Feb 20, 2020





Peak Hour Diagram

Specified Period

From: 07:00:00
To: 10:00:00

One Hour Peak

From: 07:45:00
To: 08:45:00

Intersection: Huron Church Rd & Northwood St-Industrial Dr
Site ID: 2003500003
Count Date: Feb 20, 2020

Weather conditions:

**** Signalized Intersection ****

Major Road: Huron Church Rd runs N/S

North Approach

	Out	In	Total
🚗	671	1223	1894
MT	9	20	29
HT	187	301	488
🚲	0	0	0
Totals	867	1544	2411

Huron Church Rd

🚲	0	0	0	0
HT	2	185	0	0
MT	2	7	0	0
🚗	46	605	20	0
Totals	50	797	20	0

East Approach

	Out	In	Total
🚗	325	180	505
MT	1	3	4
HT	4	5	9
🚲	0	0	0
Totals	330	188	518

Industrial Dr

🚲	HT	MT	🚗	Totals
0	0	0	0	0
0	5	0	12	17
0	2	1	33	36
0	18	7	50	75

Peds: 0



Northwood St

Totals	🚗	MT	HT	🚲
0	0	0	0	0
59	59	0	0	0
60	56	1	3	0
211	210	0	1	0

West Approach

	Out	In	Total
🚗	95	367	462
MT	8	7	15
HT	25	17	42
🚲	0	0	0
Totals	128	391	519

Totals	🚗	MT	HT	🚲
281	265	1152	127	0
MT	4	20	2	0
HT	12	296	3	0
🚲	0	0	0	0

Huron Church Rd

South Approach

	Out	In	Total
🚗	1544	865	2409
MT	26	14	40
HT	311	204	515
🚲	0	0	0
Totals	1881	1083	2964

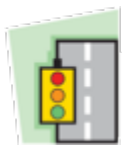
🚗 - Cars

MT - Medium Trucks

HT - Heavy Trucks

🚲 - Bicycles

Comments



Peak Hour Diagram

Specified Period

From: 11:00:00
To: 14:00:00

One Hour Peak

From: 12:15:00
To: 13:15:00

Intersection: Huron Church Rd & Northwood St-Industrial Dr
Site ID: 2003500003
Count Date: Feb 20, 2020

Weather conditions:

**** Signalized Intersection ****

Major Road: Huron Church Rd runs N/S

North Approach

	Out	In	Total
🚗	567	638	1205
MT	14	12	26
HT	355	278	633
🚲	0	0	0
Totals	936	928	1864

Huron Church Rd

🚲	0	0	0	0
HT	6	349	0	0
MT	5	9	0	0
🚗	37	518	12	0
Totals	48	876	12	0

East Approach

	Out	In	Total
🚗	180	135	315
MT	1	1	2
HT	2	1	3
🚲	0	0	0
Totals	183	137	320

Industrial Dr

🚲	HT	MT	🚗	Totals
0	0	0	0	0
0	4	0	17	21
0	1	1	23	25
0	25	3	51	79

Peds: 0



Northwood St

Totals	🚗	MT	HT	🚲
0	0	0	0	0
21	21	0	0	0
55	53	0	2	0
107	106	1	0	0

West Approach

	Out	In	Total
🚗	91	209	300
MT	4	13	17
HT	30	33	63
🚲	0	0	0
Totals	125	255	380

Totals	🚗	MT	HT	🚲
152	119	600	100	0
886	8	12	0	0
100	25	274	0	0
0	0	0	0	0

Huron Church Rd

South Approach

	Out	In	Total
🚗	819	675	1494
MT	20	13	33
HT	299	374	673
🚲	0	0	0
Totals	1138	1062	2200

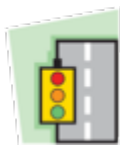
🚗 - Cars

MT - Medium Trucks

HT - Heavy Trucks

🚲 - Bicycles

Comments



Peak Hour Diagram

Specified Period

From: 15:00:00
To: 18:00:00

One Hour Peak

From: 15:45:00
To: 16:45:00

Intersection: Huron Church Rd & Northwood St-Industrial Dr
Site ID: 2003500003
Count Date: Feb 20, 2020

Weather conditions:

**** Signalized Intersection ****

Major Road: Huron Church Rd runs N/S

North Approach

	Out	In	Total
🚗	1134	820	1954
MT	28	8	36
HT	369	288	657
🚲	0	0	0
Totals	1531	1116	2647

Huron Church Rd

🚲	0	0	0	0
HT	11	358	0	0
MT	1	17	10	0
🚗	13	1099	22	0
Totals	25	1474	32	0

East Approach

	Out	In	Total
🚗	218	177	395
MT	6	12	18
HT	18	3	21
🚲	0	0	0
Totals	242	192	434

Industrial Dr

🚲	HT	MT	🚗	Totals
0	0	0	0	0
0	0	1	15	16
0	1	2	49	52
0	9	4	236	249

Peds: 1



Northwood St

Totals	🚗	MT	HT	🚲
0	0	0	0	0
25	23	0	2	0
72	52	5	15	0
145	143	1	1	0

Peds: 2

West Approach

	Out	In	Total
🚗	300	183	483
MT	7	16	23
HT	10	61	71
🚲	0	0	0
Totals	317	260	577

Totals	🚗	MT	HT	🚲
163	118	782	106	0
1075	10	7	0	0
108	35	286	2	0
0	0	0	0	0

Huron Church Rd

South Approach

	Out	In	Total
🚗	1006	1478	2484
MT	17	22	39
HT	323	368	691
🚲	0	0	0
Totals	1346	1868	3214

🚗 - Cars

MT - Medium Trucks

HT - Heavy Trucks

🚲 - Bicycles

Comments



DIRECT FIT™

TECHNICAL GUIDE

ZX/ZY/ZQ SERIES
3 - 12.5 TON
60 HERTZ



AHRI Cooling Rating Table

UNIT	COOLING STAGES	NOM. COOLING CAPACITY (TONS)	NET COOLING CAPACITY (MBH)	TOTAL POWER (kW)	SEER	EER (COOLING ONLY)	EER (A/C WITH GAS HEAT)	IEER (COOLING ONLY)	IEER (A/C WITH GAS HEAT)	IEER WITH IntelliSpeed (COOLING ONLY)	IEER WITH IntelliSpeed (GAS HEAT)
ZX08	2	7.5	85.0	6.6	---	11.2	11.0	N/A	N/A	13.5	13.4
ZX09	2	8.5	99.0	7.7	---	11.2	11.0	N/A	N/A	13.3	13.0
ZX12	2	10.0	116.0	9.2	---	11.2	11.0	N/A	N/A	14.6	14.4
ZX14	2	12.5	135.0	10.8	---	11.0	10.8	N/A	N/A	12.7	12.5
ZY04	1	3	36.0	2.6	15.0	12.0	12.0	---	---	---	---
ZY05	1	4	49.0	3.5	15.4	12.0	12.0	---	---	---	---
ZY06	1	5	58.0	4.4	15.2	12.0	12.0	---	---	---	---
ZY07	1	6	72.0	5.0	---	12.2	12.0	12.9	12.7	---	---
ZY08	2	7.5	89.0	6.6	---	12.2	12.0	12.9	12.7	14.1	14.0
ZY09	2	8.5	98.0	7.3	---	12.2	12.0	12.9	12.7	14.8	14.6
ZY12	2	10.0	116.0	8.9	---	11.7	11.5	12.9	12.7	14.0	14.0
ZQ04	1	3	35.0	2.8	14.0	12.2	12.2	---	---	---	---
ZQ05	1	4	48.0	4.0	14.0	12.0	12.0	---	---	---	---
ZQ06	1	5	58.5	4.8	14.1	12.1	12.1	---	---	---	---

AHRI 270 Outdoor Sound Power Levels

Unit (Tons)	Sound Rating ¹ (dB-A)	Octave Bands (Hz)							
		63	125	250	500	1000	2000	4000	8000
ZX08 (7.5)	84	87.0	86.0	82.0	80.5	79.5	75.0	70.5	66.5
ZX09 (8.5)	83	91.0	86.0	79.0	79.5	78.0	74.0	70.5	69.0
ZX12 (10)	84	87.5	85.0	81.0	80.0	80.0	74.5	70.0	66.5
ZX14 (12.5)	90	87.5	88.5	85.0	86.0	85.0	81.0	78.5	73.0
ZY04 (3)	79	81.0	86.5	77.0	76.0	75.0	70.5	66.5	63.5
ZY05 (4)	79	84.0	83.0	76.0	75.0	74.0	70.0	66.0	63.5
ZY06 (5)	79	83.0	83.0	76.0	75.0	75.0	69.5	66.0	63.0
ZY07 (6)	84	90.0	87.0	81.5	81.0	79.0	74.5	71.0	69.5
ZY08 (7.5)	83	91.5	84.5	79.5	79.5	78.5	74.0	68.5	66.0
ZY09 (8.5)	83	92.0	87.0	81.0	80.5	79.0	74.0	69.0	66.0
ZY12 (10)	87	88.0	88.5	84.5	84.0	82.5	78.5	76.0	73.0
ZQ04 (3)	79	81.5	84.5	76.5	75.0	74.0	69.5	65.5	61.0
ZQ05 (4)	79	82.0	85.0	77.5	75.5	74.0	70.0	66.5	62.0
ZQ06 (5)	79	83.0	83.0	76.0	75.0	75.0	69.5	66.0	63.0

1. Rated in accordance with AHRI 270 standard.

Memo**Re: Drive-Thru Sound Pressure Levels From the Menu Board or Speaker Post**

The sound pressure levels from the menu board or speaker post are as follows:

1. Sound pressure level (SPL) contours (A weighted) were measured on a typical HME SPP2 speaker post. The test condition was for pink noise set to 84 dBA at 1 foot in front of the speaker. All measurements were conducted outside with the speaker post placed 8 feet from a non-absorbing building wall and at an oblique angle to the wall. These measurements should not be construed to guarantee performance with any particular speaker post in any particular environment. They are typical results obtained under the conditions described above.
2. The SPL levels are presented for different distances from the speaker post:

Distance from the Speaker (Feet)	SPL (dBA)
1 foot	84 dBA
2 feet	78 dBA
4 feet	72 dBA
8 feet	66 dBA
16 feet	60 dBA
32 feet	54 dBA

3. The above levels are based on factory recommended operating levels, which are preset for HME components and represent the optimum level for drive-thru operations in the majority of the installations.

Also, HME incorporates automatic volume control (AVC) into many of our Systems. AVC will adjust the outbound volume based on the outdoor, ambient noise level. When ambient noise levels naturally decrease at night, AVC will reduce the outbound volume on the system. See below for example:

Distance from Outside Speaker	Decibel Level of standard system with 45 dB of outside noise <u>without</u> AVC	Decibel level of standard system with 45 dB of outside noise <u>with</u> AVC active
1 foot	84 dBA	60 dBA
2 feet	78 dBA	54 dBA
4 feet	72 dBA	48 dBA
8 feet	66 dBA	42 dBA
16 feet	60 dBA	36 dBA

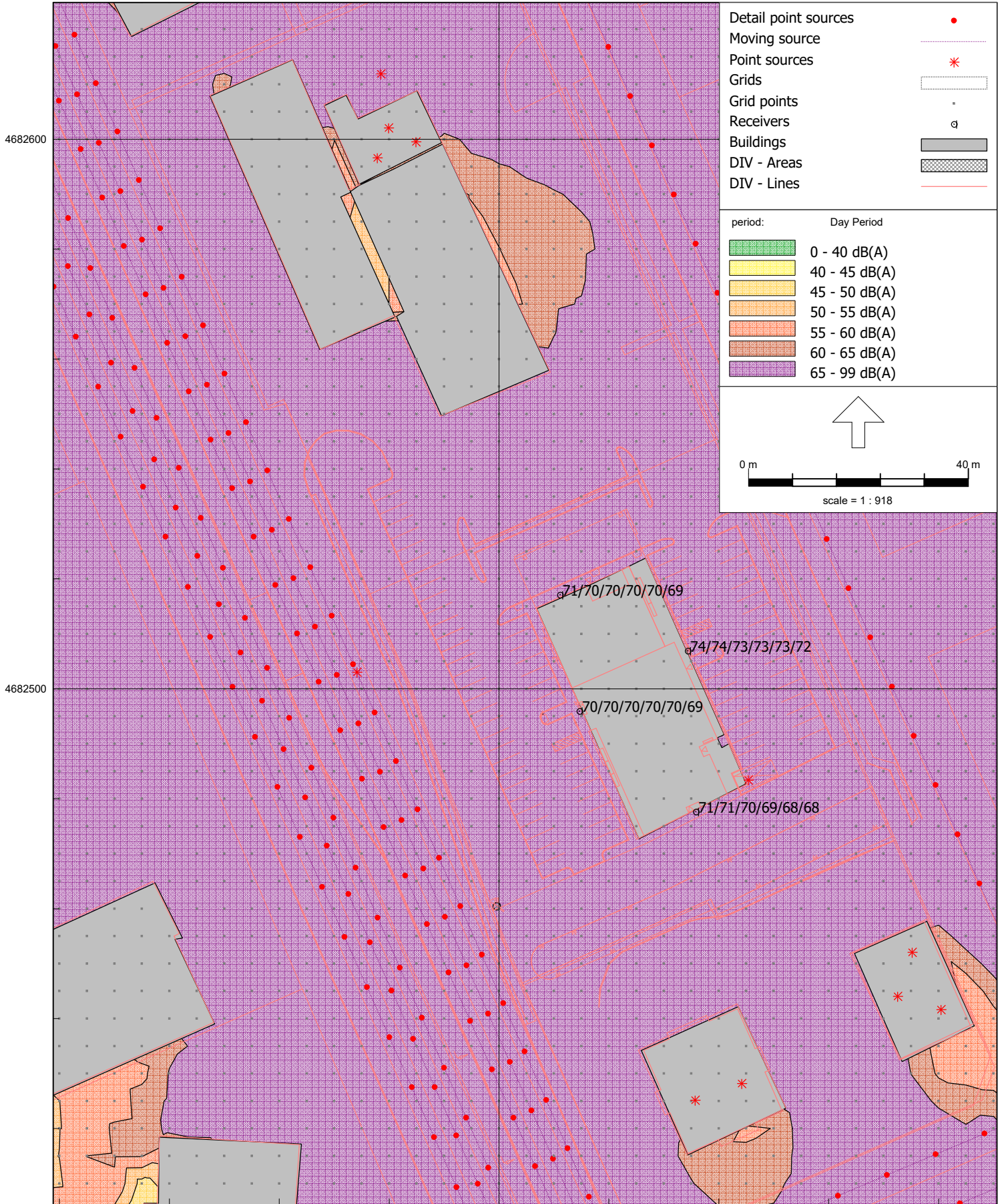
If there are any further questions regarding this issue please contact HME customer service at 1-800-848-4468.

Thank you for your interest in HME's products.

Appendix B

NOISE OUTPUT AND NOISE MONITORING

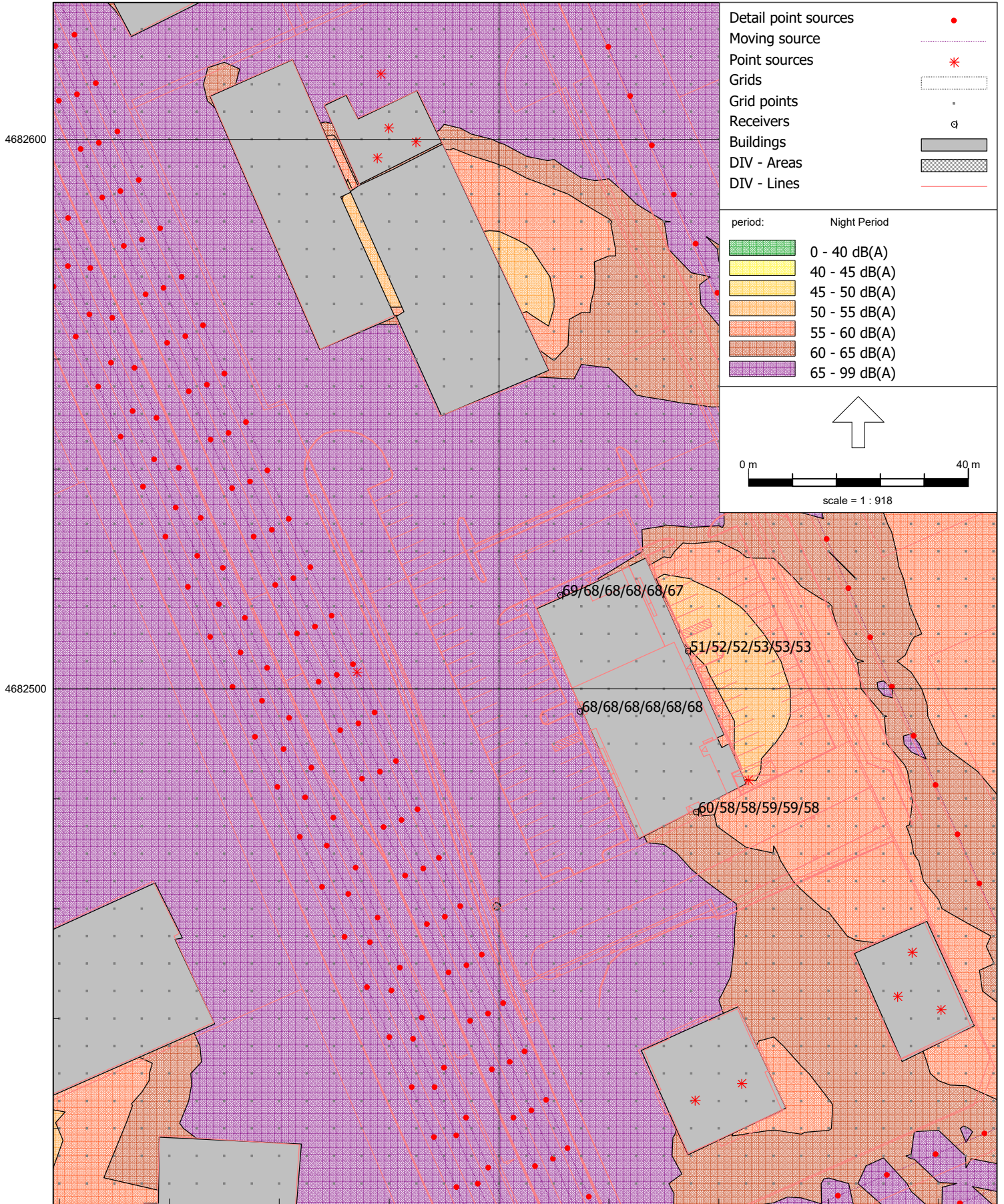
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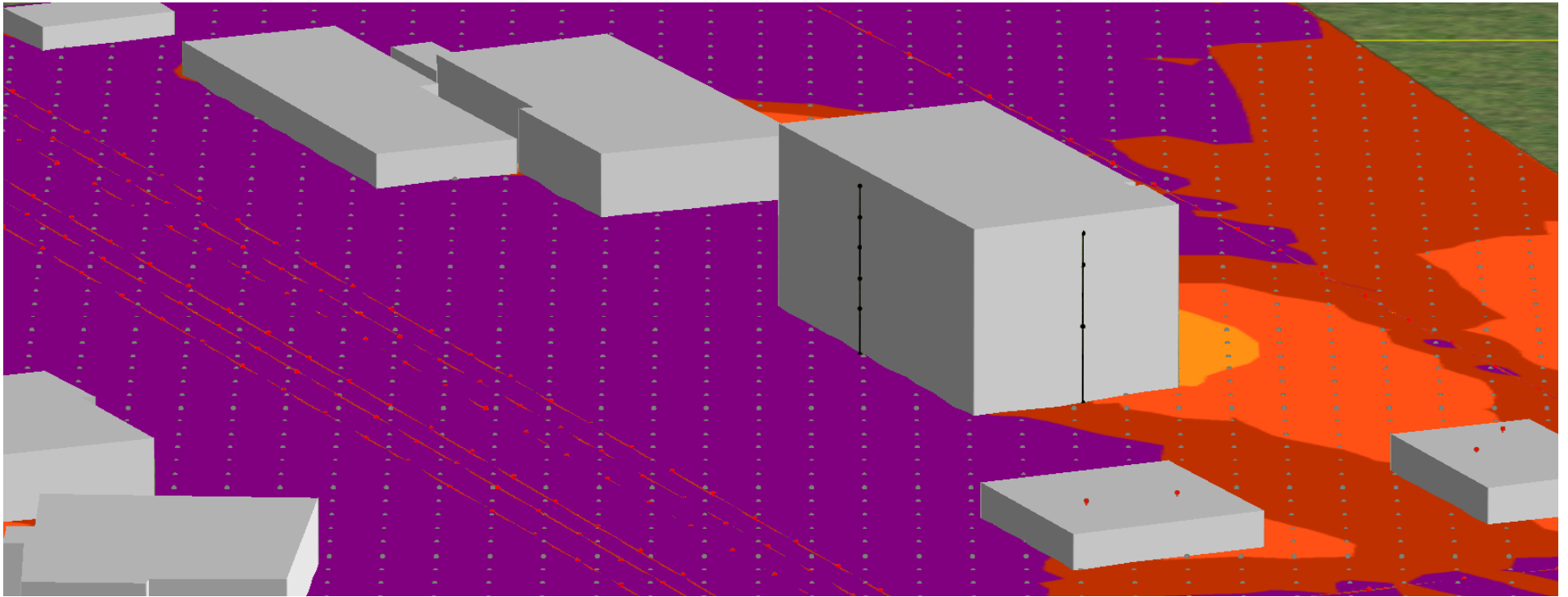
330900

Night-time Model Results

9 Feb 2023, 16:03



330900



3D Model

Appendix C

PICTURES



Exhibit 3: Looking north on Huron Church Road Toward Northwood Street



Exhibit 4: Looking south on Huron Church Road Toward Northwood Street



Exhibit 5: Looking west on Northwood Street toward on Huron Church Road

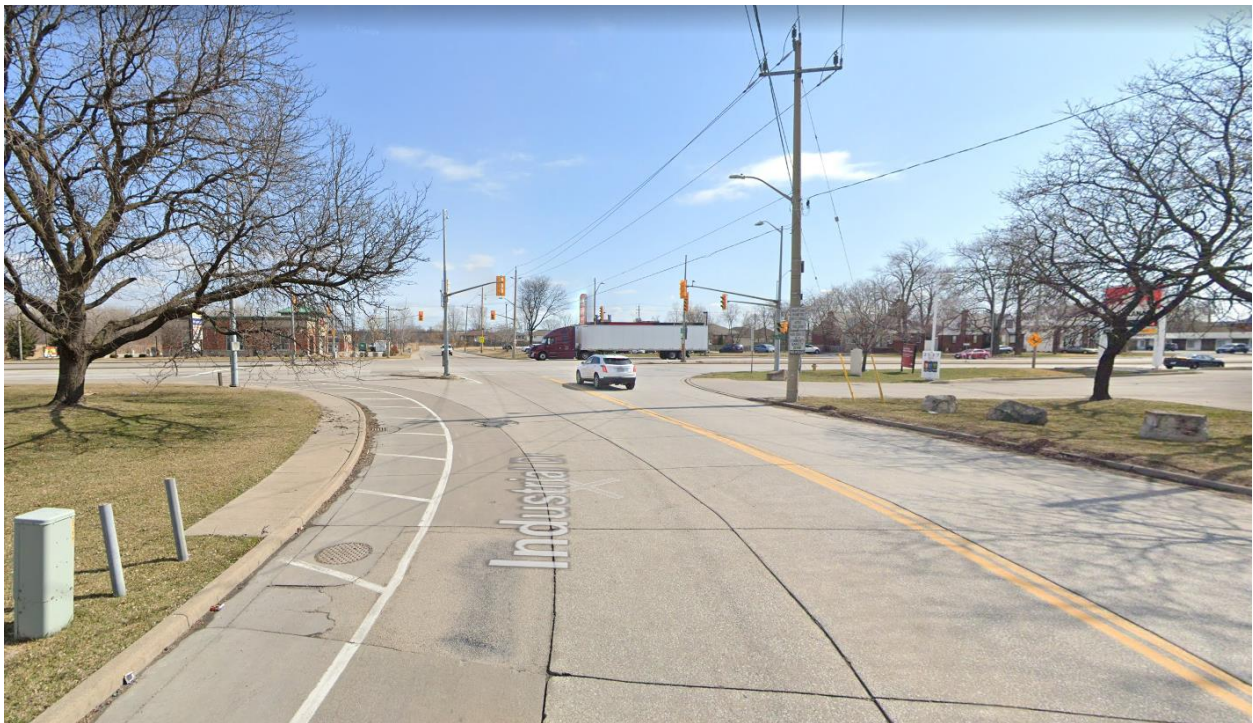


Exhibit 6: Looking east on Northwood Street toward on Huron Church Road



Exhibit 7: Looking north on Huron Church Road toward Existing Access Road



Exhibit 8: Looking north on Daytona Road toward Existing Access Road

Appendix D

SOUND TRANSMISSION CLASS

Fred's Farms Development Building Component Review

West Façade					
Receiver 1	BR/LR	COMPONENT	F AREA	W AREA	STC
Floor 1	Bed	Window	8.7	3.3	41
Floor 2-6	Bed	Window	8.7	3.3	41
6 Floors	Living	Window	11.7	3.3	37

South Façade					
Receiver 2	BR/LR	COMPONENT	F AREA	W AREA	STC
Floor 1	Bed	Window	8.7	3.3	42
Floor 2-6	Bed	Window	8.7	3.3	41
6 Floors	Living	Window	11.7	3.3	38

East Façade					
Receiver 3	BR/LR	COMPONENT	F AREA	W AREA	STC
Floor 1	Bed	Window	8.7	3.3	45
Floor 2-6	Bed	Window	8.7	3.3	44
6 Floors	Living	Window	11.7	3.3	41

North Façade					
Receiver 4	BR/LR	COMPONENT	F AREA	W AREA	STC
Floor 1	Bed	Window	8.7	3.3	42
Floor 2-6	Bed	Window	8.7	3.3	41
6 Floors	Living	Window	11.7	3.3	38

*NOTE: STC VALUES ARE BASED OFF A SOUND LEVEL OF RECEIVER LOCATIONS

FRED'S FARM FRESH CONDO - DOOR WINDOWS COMPONENT

Receiver 1	BR/LR	dB(A)	STC	Noise Source	Indoor Quarters	Reflections	Room Sound Level	Sound Angle of Incidence	C1 from Table 7.7	Sum	Component	Floor Area	Component Area	Room Absorption Category	# of Components	Transmit %	C2 from Table 7.8	Noise Spectrum Type	% Floor Area	C3 from Table 7.9	Component Category	Δ4 from Table 7.10
Floor 1	Bed	70	41	Road	Sleeping	3	40	60 to 90 degrees	3	36	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
Floor 2-6	Bed	70	41	Road	Sleeping	3	40	60 to 90 degrees	3	36	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
6 Floors	Living	70	37	Road	Living	3	45	60 to 90 degrees	3	31	Window	11.7	3.3	Intermediate	3	33.33333333	5	E - Road Traffic Screen	28.21	-5	c. Sealed thin window	6
				Road	Living						Door											
Receiver 2	BR/LR	dB(A)	STC	Noise Source	Indoor Quarters	Reflections	Room Sound Level	Sound Angle of Incidence	C1 from Table 7.7	Sum	Component	Floor Area	Component Area	Room Absorption Category	# of Components	Transmit %	C2 from Table 7.8	Noise Spectrum Type	% Floor Area	C3 from Table 7.9	Component Category	Δ4 from Table 7.10
Floor 1	Bed	71	42	Road	Sleeping	3	40	60 to 90 degrees	3	37	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
Floor 2-6	Bed	70	41	Road	Sleeping	3	40	60 to 90 degrees	3	36	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
6 Floors	Living	71	38	Road	Living	3	45	60 to 90 degrees	3	32	Window	11.7	3.3	Intermediate	3	33.33333333	5	E - Road Traffic Screen	28.21	-5	c. Sealed thin window	6
				Road	Living						Door											
Receiver 3	BR/LR	dB(A)	STC	Noise Source	Indoor Quarters	Reflections	Room Sound Level	Sound Angle of Incidence	C1 from Table 7.7	Sum	Component	Floor Area	Component Area	Room Absorption Category	# of Components	Transmit %	C2 from Table 7.8	Noise Spectrum Type	% Floor Area	C3 from Table 7.9	Component Category	Δ4 from Table 7.10
Floor 1	Bed	74	45	Road	Sleeping	3	40	60 to 90 degrees	3	40	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
Floor 2-6	Bed	73	44	Road	Sleeping	3	40	60 to 90 degrees	3	39	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
6 Floors	Living	74	41	Road	Living	3	45	60 to 90 degrees	3	35	Window	11.7	3.3	Intermediate	3	33.33333333	5	E - Road Traffic Screen	28.21	-5	c. Sealed thin window	6
				Road	Living						Door											
Receiver 4	BR/LR	dB(A)	STC	Noise Source	Indoor Quarters	Reflections	Room Sound Level	Sound Angle of Incidence	C1 from Table 7.7	Sum	Component	Floor Area	Component Area	Room Absorption Category	# of Components	Transmit %	C2 from Table 7.8	Noise Spectrum Type	% Floor Area	C3 from Table 7.9	Component Category	Δ4 from Table 7.10
Floor 1	Bed	71	42	Road	Sleeping	3	40	60 to 90 degrees	3	37	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
Floor 2-6	Bed	70	41	Road	Sleeping	3	40	60 to 90 degrees	3	36	Window	8.7	3.3	Intermediate	2	50	3	E - Road Traffic Screen	37.93	-4	c. Sealed thin window	6
6 Floors	Living	71	38	Road	Living	3	45	60 to 90 degrees	3	32	Window	11.7	3.3	Intermediate	3	33.33333333	5	E - Road Traffic Screen	28.21	-5	c. Sealed thin window	6
				Road	Living						Door											



DIRECT FIT™

TECHNICAL GUIDE

ZX/ZY/ZQ SERIES
3 - 12.5 TON
60 HERTZ



AHRI Cooling Rating Table

UNIT	COOLING STAGES	NOM. COOLING CAPACITY (TONS)	NET COOLING CAPACITY (MBH)	TOTAL POWER (kW)	SEER	EER (COOLING ONLY)	EER (A/C WITH GAS HEAT)	IEER (COOLING ONLY)	IEER (A/C WITH GAS HEAT)	IEER WITH IntelliSpeed (COOLING ONLY)	IEER WITH IntelliSpeed (GAS HEAT)
ZX08	2	7.5	85.0	6.6	---	11.2	11.0	N/A	N/A	13.5	13.4
ZX09	2	8.5	99.0	7.7	---	11.2	11.0	N/A	N/A	13.3	13.0
ZX12	2	10.0	116.0	9.2	---	11.2	11.0	N/A	N/A	14.6	14.4
ZX14	2	12.5	135.0	10.8	---	11.0	10.8	N/A	N/A	12.7	12.5
ZY04	1	3	36.0	2.6	15.0	12.0	12.0	---	---	---	---
ZY05	1	4	49.0	3.5	15.4	12.0	12.0	---	---	---	---
ZY06	1	5	58.0	4.4	15.2	12.0	12.0	---	---	---	---
ZY07	1	6	72.0	5.0	---	12.2	12.0	12.9	12.7	---	---
ZY08	2	7.5	89.0	6.6	---	12.2	12.0	12.9	12.7	14.1	14.0
ZY09	2	8.5	98.0	7.3	---	12.2	12.0	12.9	12.7	14.8	14.6
ZY12	2	10.0	116.0	8.9	---	11.7	11.5	12.9	12.7	14.0	14.0
ZQ04	1	3	35.0	2.8	14.0	12.2	12.2	---	---	---	---
ZQ05	1	4	48.0	4.0	14.0	12.0	12.0	---	---	---	---
ZQ06	1	5	58.5	4.8	14.1	12.1	12.1	---	---	---	---

AHRI 270 Outdoor Sound Power Levels

Unit (Tons)	Sound Rating ¹ (dB-A)	Octave Bands (Hz)							
		63	125	250	500	1000	2000	4000	8000
ZX08 (7.5)	84	87.0	86.0	82.0	80.5	79.5	75.0	70.5	66.5
ZX09 (8.5)	83	91.0	86.0	79.0	79.5	78.0	74.0	70.5	69.0
ZX12 (10)	84	87.5	85.0	81.0	80.0	80.0	74.5	70.0	66.5
ZX14 (12.5)	90	87.5	88.5	85.0	86.0	85.0	81.0	78.5	73.0
ZY04 (3)	79	81.0	86.5	77.0	76.0	75.0	70.5	66.5	63.5
ZY05 (4)	79	84.0	83.0	76.0	75.0	74.0	70.0	66.0	63.5
ZY06 (5)	79	83.0	83.0	76.0	75.0	75.0	69.5	66.0	63.0
ZY07 (6)	84	90.0	87.0	81.5	81.0	79.0	74.5	71.0	69.5
ZY08 (7.5)	83	91.5	84.5	79.5	79.5	78.5	74.0	68.5	66.0
ZY09 (8.5)	83	92.0	87.0	81.0	80.5	79.0	74.0	69.0	66.0
ZY12 (10)	87	88.0	88.5	84.5	84.0	82.5	78.5	76.0	73.0
ZQ04 (3)	79	81.5	84.5	76.5	75.0	74.0	69.5	65.5	61.0
ZQ05 (4)	79	82.0	85.0	77.5	75.5	74.0	70.0	66.5	62.0
ZQ06 (5)	79	83.0	83.0	76.0	75.0	75.0	69.5	66.0	63.0

1. Rated in accordance with AHRI 270 standard.

Memo**Re: Drive-Thru Sound Pressure Levels From the Menu Board or Speaker Post**

The sound pressure levels from the menu board or speaker post are as follows:

1. Sound pressure level (SPL) contours (A weighted) were measured on a typical HME SPP2 speaker post. The test condition was for pink noise set to 84 dBA at 1 foot in front of the speaker. All measurements were conducted outside with the speaker post placed 8 feet from a non-absorbing building wall and at an oblique angle to the wall. These measurements should not be construed to guarantee performance with any particular speaker post in any particular environment. They are typical results obtained under the conditions described above.
2. The SPL levels are presented for different distances from the speaker post:

Distance from the Speaker (Feet)	SPL (dBA)
1 foot	84 dBA
2 feet	78 dBA
4 feet	72 dBA
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16 feet	60 dBA
32 feet	54 dBA

3. The above levels are based on factory recommended operating levels, which are preset for HME components and represent the optimum level for drive-thru operations in the majority of the installations.

Also, HME incorporates automatic volume control (AVC) into many of our Systems. AVC will adjust the outbound volume based on the outdoor, ambient noise level. When ambient noise levels naturally decrease at night, AVC will reduce the outbound volume on the system. See below for example:

Distance from Outside Speaker	Decibel Level of standard system with 45 dB of outside noise <u>without</u> AVC	Decibel level of standard system with 45 dB of outside noise <u>with</u> AVC active
1 foot	84 dBA	60 dBA
2 feet	78 dBA	54 dBA
4 feet	72 dBA	48 dBA
8 feet	66 dBA	42 dBA
16 feet	60 dBA	36 dBA

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Thank you for your interest in HME's products.