

## ENVIRONMENTAL NOISE IMPACT STUDY - **Project: 21043.00**

---

### **Proposed Residential Development** **200 Dundas Street South** Cambridge, Ontario

---

Prepared for:

**AAA Architects Inc.**  
2121 Argentia Rd. Suite 105  
Mississauga ON L5N 2X4

Prepared by:



---

**Iwona Stasiewicz Sr.Eng./Arch.Tech.**



---

**Bob Rimrott, M.A.Sc., P.Eng**

November 3, 2021



---

## Table of Contents

<b>1</b>	<b>Introduction</b>	<b>3</b>
<b>2</b>	<b>Guidelines and Criteria</b>	<b>4</b>
<b>3</b>	<b>Noise Level Predictions Procedures and Data</b>	<b>6</b>
<b>4</b>	<b>Transportation Noise Predictions</b>	<b>9</b>
<b>5</b>	<b>Transportation Noise Control Recommendations</b>	<b>9</b>
<b>6</b>	<b>Stationary Sources Noise Predictions</b>	<b>10</b>
<b>7</b>	<b>Stationary Noise Control Recommendations</b>	<b>14</b>
<b>8</b>	<b>Warning Clauses and Notes</b>	<b>16</b>
<b>9</b>	<b>References</b>	<b>16</b>

## 1 Introduction

AAA Architects Inc. has retained the services of Aercoustics Engineering Limited (Aercoustics) to prepare an Environmental Noise Impact Study (ENIS) in support of the required rezoning permits for a proposed mixed-use development located at 200 Dundas Street South in Cambridge ON.

The purpose of this study was to examine the existing and future noise environment in the development area and evaluate its impact potential on future noise sensitive receptors. This study also investigates the noise controls required for the development to meet the noise guidelines of the Ontario Ministry of the Environment Conservation, and Parks (MECP) and to satisfy the requirements of the Municipality. This report considered the MECP guideline NPC-300 “*Stationary and Transportation Sources – Approval and Planning*” (August 2013).

Figure 1 provides a key plan showing the proposed development location.



Figure 1: Key Plan

Figure 2 (in Section 3.1) shows the Site Plan of the proposed development with road traffic noise calculation locations indicated. The Draft Plan of Subdivision for the project was prepared by AAA Architects Inc.

The proposed site is located at the south side of Dundas Street South and about 150m west of Franking Boulevard Cambridge, Ontario. The adjacent land uses include commercial facilities to the west, north and east, and residential subdivision to the south of the subject property.

The major existing noise sources are road traffic on Dundas Street South and activities/operation of Fast Eddie's Burgers and Coin Car Wash, both located to the west of the property under review.

This report is based on the following information:

- Preliminary architectural drawings dated 2021-06-30, prepared by AAA Architects Inc.
- Road traffic information provided by the Region of Waterloo,
- Observations and measurements from a site visit conducted by Aercoustics' personnel on October 13, 2021.

## 2 Guidelines and Criteria

### 2.1 Transportation Noise – Outdoor Living Area (OLA)

MECP Guidelines recommend that equivalent noise levels (Leq-16hr) in outdoor living areas should not exceed 55 dBA. Predicted noise levels between 55 dBA and 60 dBA may be acceptable provided that the future occupants of the building are made aware of the potential noise problems through appropriate warning clauses. Noise levels above 60 dBA are generally not acceptable.

### 2.2 Transportation Noise – Indoor Living Spaces

Indoor noise levels due to road traffic were examined with respect to the MECP Guidelines. Bedrooms are required to meet an indoor Leq-8hr of 40 dBA from road traffic. The indoor equivalent noise level (Leq-16hr) due to road traffic should not exceed 45 dBA for living or dining rooms. Lounges, lobbies, retail or general office spaces should meet the indoor noise level of 50 dBA from road traffic. In order to achieve these levels, the MECP Guidelines provide a basis for the types of windows, exterior walls, and doors that will be required based on projected outdoor noise levels.

The MECP also requires that a central air conditioning system be installed for dwellings when the daytime or nighttime outdoor transportation noise levels at the façade of the dwelling are above 65 dBA or 60 dBA, respectively. The provision for the future installation of central air conditioning must be made if:

- the nighttime sound level is greater than 50 dBA and less than or equal to 60 dBA on the outside face of a bedroom window;
- the daytime sound level is greater than 55 dBA and less than or equal to 65 dBA on the outside face of a bedroom window; or
- the daytime sound level is greater than 55 dBA and less than or equal to 65 dBA on the outside face of a living/dining room window.

This provision involves a ducted heating system sized to accommodate the addition of central air conditioning by the occupant.

The required limits as per the NPC-300 noise guidelines are summarized in Table 1 below.

Table 1: Indoor Noise Limits Due to Road Traffic

Type of Space	Time Period	Minimum LEQ (dBA) Road Traffic
Living/dining, den areas of residences, hospitals, nursing homes, schools, day-care centres (Indoor)	07:00 – 23:00	45 dBA
Living/dining, den areas of residences, hospitals, nursing homes (Indoor)	23:00 – 07:00	45 dBA
Sleeping quarters (Indoor)	07:00 – 23:00	45 dBA
	23:00 – 07:00	40 dBA
Outdoor Living Areas (OLA)	07:00 – 23:00	55 dBA

### 2.3 Stationary Noise Sources

The noise level limits pertaining to stationary noise sources have been established based on the MECP publication NPC-300. For sound from a stationary source, the sound level limit at a point of reception, expressed in terms of the one-hour equivalent sound level (Leq-1hr), is the higher of the applicable exclusion limit value given in Table 2, or the background sound level for that point of reception.

As the traffic on Mara Road dominates the sound environment in the area, the proposed site was considered an MECP Class 1 area.

Table 2: Noise Exclusion Limits – Stationary Noise Sources – Classes 1, 2, 3, and 4

Time of Day	Sound Level Exclusion Limit*	Sound Level Exclusion Limit*	Sound Level Exclusion Limit*	Sound Level Exclusion Limit*
	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
	Outdoor Points of Reception			
Day (07:00 to 19:00)	50 dBA	50 dBA	45 dBA	55 dBA
Evening (19:00 to 23:00)	50 dBA	45 dBA	40 dBA	55 dBA
	Plane of Window of Noise Sensitive Spaces			
Day (07:00 to 19:00)	50 dBA	50 dBA	45 dBA	60 dBA
Evening (19:00 to 23:00)	50 dBA	50 dBA	40 dBA	60 dBA
Night (23:00 to 07:00)	45 dBA	45 dBA	40 dBA	55 dBA

\* or the minimum existing hourly background sound level  $L_{eq}$ , whichever is higher

The outdoor sound level limits for stationary sources apply only to daytime and evening hours while sound level limits apply during the nighttime period for the plane of the window of a noise sensitive space. In general, the outdoor points of reception will be protected during the nighttime because of meeting the sound level limits at the adjacent plane of window of noise sensitive spaces.

Note that for Class 1, 2, and 3 areas, the plane of window limits apply to a window that is assumed to be open. For Class 4 areas, the plane of window limits apply to a window which is assumed to be closed. This distinction does not affect the prediction of plane of window sound levels.

The above listed sound level limits for an outdoor point of reception define the point of reception as any area in the development that is amenable for use. The sound level limit is also valid for a point of reception location at the centre of the plane of a window. In the night-time period, the criterion is defined at the plane of a bedroom window.

It should be noted that the MECP guidelines do not require that a noise source be inaudible but rather that specific sound level limits be achieved.

### 3 Noise Level Predictions Procedures and Data

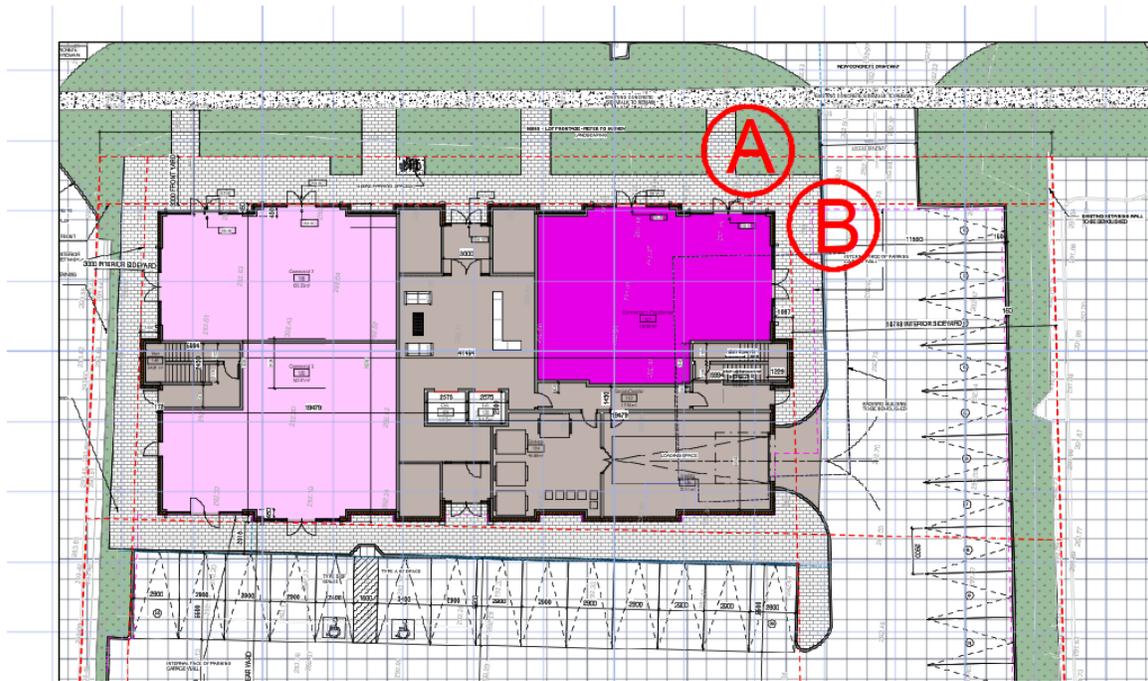
#### 3.1 Road Traffic Noise Calculations Procedure

The dominant road traffic source in the proposed development is Dundas Street South.

Noise level calculations were performed in accordance with the MECP Guidelines and by the Guidelines of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT). Sample copies of the traffic noise predictions from MECP's Road and Rail Traffic Noise Prediction Model STAMSON (Version 5.04) are included in Appendix B.

The equivalent sound levels (Leq) due to road traffic were calculated at worst case noise sensitive receptors in the proposed development. Calculations were performed for both daytime and nighttime conditions at receiver heights representing the top storey receptors at Level 5 of the proposed building. No outdoor living areas (OLAs) associated with this project have been noted in the preliminary architectural design.

Calculation locations A and B, shown in Figure 2 below represent the 'worst case noise sensitive receptors' within the proposed development.



**Figure 2: Site Plan showing Critical Calculation Locations**

### 3.2 Road Traffic Data

Road traffic noise predictions were based on the road traffic data outlined in Table 3 below. The road traffic volumes for Dundas Street South and Franklin Boulevard were obtained from Region of Waterloo.

Copies of the correspondence and received data are included in Appendix A.

Table 3: Road Traffic Volumes

	Dundas Street South (west leg)	Franklin Blvd (south leg)
Ultimate AADT	20 600	15 900
Day/Night Split (%)	90/10	90/10
Percentage of Trucks (%)	4	3
Medium/Heavy Ratio (%)	1/3	1/2
Posted Speed (km/hr)	50	60

### 3.3 Stationary Noise Sources

#### **Fast Eddie's Hamburgers**

This fast food restaurant is located in the very close proximity to the west property line of 200 Dundas St S. Based on Google images, there are two kitchen exhaust and an HVAC unit located at the roof top level of the main restaurant building. In addition to the main building, there is a refrigeration unit located in the back of the property.

It is our understanding Fast Eddie's opening hours are 10:30 to 23:00; the restaurant is not operating during the nighttime hours. With that, it has been assumed that HVAC unit operates at 50% duty cycle and the kitchen fans are switched off between 23:00 and 7:00.

Aercoustics' personnel, during the site visit, was not able to access the roof of this facility. Also, the facility was not operational at the time of the visit. Therefore, sound power levels for HVAC and exhaust fans used in Aercoustics' prediction model was sourced from our data base.

The noise emissions of the refrigeration unit were measured on October 13, 2021 and the measured data was included in our noise prediction model. It has been assumed that the unit operates 24/7.

#### **Coin Car Wash**

A coin car wash is located adjacent to the west of Fast Eddie's Hamburgers site. The site of this car wash facility has been visited by Aercoustics' personnel on October 13, 2021, and the noise generated by the operation of this this facility was measured; the sound data collected at the site has been used to model the noise impact of this facility on the proposed residential development.

There are five bays/washing stations at the facility, each bay is open to both side of the building with the east side facing the proposed mixed use building. Each basic washing

cycle lasts 5 minutes. It also takes about 1 minute for a car to enter and exit the wash bay, and about 4 minutes of noisy operation/using the pressure washer during the 5 minute wash cycle. It has been assumed for the purpose of this study that there are 20 car washes occurring during the worst case scenario/hour during the daytime and 10 car washes during the busiest (worst-case scenario) nighttime hour.

There are also two vacuums located to the north of the car wash building. It has been assumed that during the worst case scenario hour each of the vacuums can be operational for up to 20 minutes. Sound emissions of the vacuum were measured during October 13, 2021 site visit.

It appears that the facility is open 24/7 and as such was addressed in the prediction model.

## 4 Transportation Noise Predictions

Table 4 below, list the daytime and nighttime unmitigated sound levels due to the road traffic in the area. The results are predicted at a critical noise sensitive locations, Locations A and B shown in Figure 2 of this report. Sample calculations are provided in Appendix A.

Table 4: Calculated Unmitigated Noise Levels Due to Road Traffic

Calculation Location (Figure 2)	Lot Number/ Description	Leq (dBA)		
		Day	Night	OLA
A	North Façade	66	60	n/a
B	East Façade	63	57	n/a

The noise levels listed in the table above were used to determine the window glazing as well as exterior wall requirements for each designated point of reception. These requirements were based on assumed 50% ratios of window surface area to the floor area.

## 5 Transportation Noise Control Recommendations

### 5.1 Transportation Noise – Outdoor Living Spaces

No outdoor living areas are shown in the architectural drawings.

### 5.2 Transportation Noise – Indoor Living Spaces

Indoor sound levels were examined with respect to MECP Guidelines as summarized in Section 2 of this report.

Based on the sound level predictions, the project will not require upgraded window glazing, the building envelope construction meeting general requirements of the Ontario Building Code (OBC) will also suffice for the noise control reasons. However, the dwelling units

facing Dundas St S require installation of mandatory central air conditioning. The remaining units with windows on west, east and south facades require provisions for future A/C. These requirements are summarized in Table 5 below.

Table 5: Summary of Traffic Noise Control Recommendations

Location	Daytime STC(*)	Nighttime STC(*)	Central Air Conditioning	Warning Clauses
North Façade (facing Dundas St S)	OBC	OBC	Mandatory	A, C
West Façade(**)	OBC	OBC	provisions	B, C
South Façade(**)	OBC	OBC	provisions	B, C
East Facade	OBC	OBC	provisions	B

(\*) Window Glazing STC is based on an assumed window-to-floor ration of 50%, this needs to be verified once the final architectural design of the project becomes available

(\*\*) This façade is affected by Fast Eddie's Hamburgers and Coin Car Wash. Refer to Section 7 for noise control recommendations addressing these facilities

OBC indicates window/door glazing that meets minimum Ontario Building Code requirements, no upgrades are needed for noise control reasons

The results of this study indicate the proposed dwellings are predicted to be in compliance with the MECP criteria for indoor sound levels due to the traffic noise, given that the recommendations listed in Table 5 above are implemented.

## 6 Stationary Sources Noise Predictions

The stationary noise source prediction model was generated using Datakustik's CadnaA Noise Prediction Software. This model is based on established noise prediction methods outlined in the ISO 9613-2 standard "Acoustic – Attenuation of sound during propagation outdoors – Part 2: General method and calculation". Noise levels were predicted using conditions of downwind propagation, generally with hard ground in paved areas.

### 6.1 Fast Eddie's Hamburgers – Roof Top Equipment

There is no acoustic screening between the existing restaurant and the proposed residential development and therefore there will be direct line of sight between the residential units with windows located on the west façade of the proposed building and the stationary noise sources associated with the operation of Fast Eddie's. Specifically, the future residential units located on the west side of the building will be directly exposed to the sound emissions from two exhaust fans, HVAC unit as well as the refrigeration unit located behind the main building of Fast Eddie's.

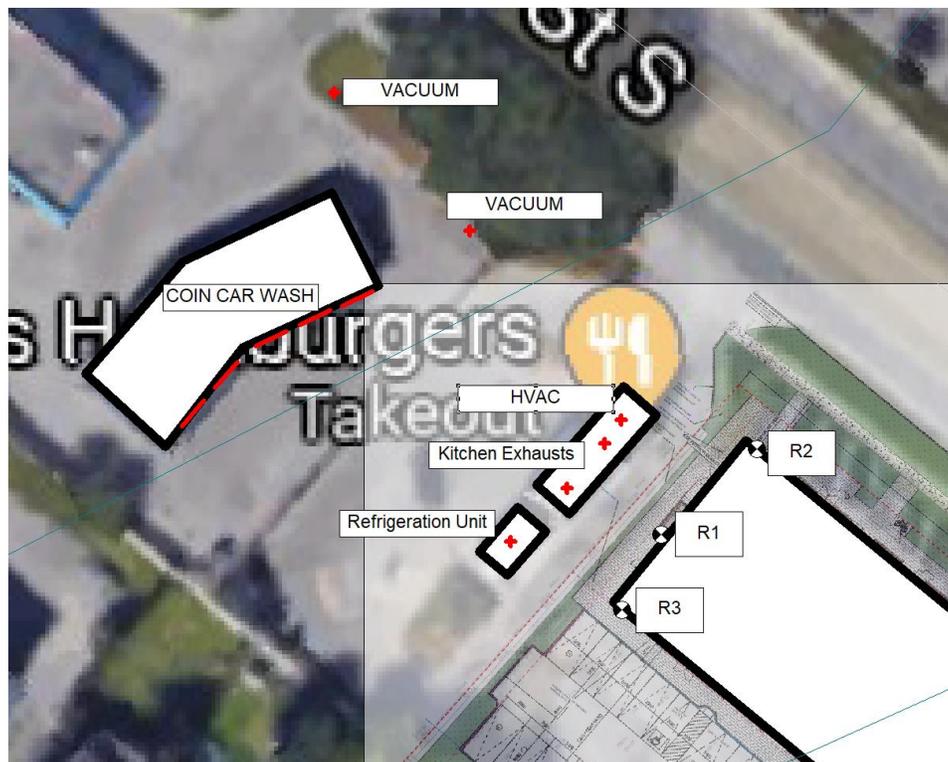
The sound emissions of the HVAC unit as well as kitchen exhaust fans operation have been based on the Aercoustics data base for similar type of equipment.

It is our understanding Fast Eddie's opening hours are 10:30 to 23:00; the restaurant is not operating during the nighttime hours. With that, it has been assumed that HVAC unit operates at 50% duty cycle and the kitchen fans are switched off between 23:00 and 7:00.

The noise emissions of the refrigeration unit were measured on October 13, 2021 and the measured data was included in our noise prediction model. It has been assumed that the unit operates 24/7.

The calculation locations representing critical noise sensitive receptors, residential windows located at Level 5 (top residential floor) are shown in Figure 4 below.

Table 6a below shows the results of the unmitigated worst-case noise predictions at sample receptors due to the stationary noise sources located at Fast Eddie's Hamburgers. Sound power information and sample printouts of calculation results are included in Appendix B.



**Figure 3: Site Plan showing Calculation Locations re Stationary Noise Sources**

Table 6a:  
 Predicted Unmitigated Sound Levels Due to Stationary Noise Sources at **Fast Eddie's Hamburgers**

DAYTIME (07:00 TO 23:00)			
Receptor ID	Unmitigated Sound Level (dBA)	Class 1 Applicable Sound Level Limit (dBA)	Unmitigated Sound Level Meets Class 1 Limit (YES/NO)
R01	60	50	NO
R02	48	50	YES
R03	48	50	YES

NIGHTTIME (23:00 TO 07:00)			
Receptor ID	Unmitigated Sound Level (dBA)	Class 1 Applicable Sound Level Limit (dBA)	Unmitigated Sound Level Meets Class 1 Limit (YES/NO)
R01	54	45	NO
R02	44	45	YES
R03	43	45	YES

## 6.2 Coin Car Wash

There is no acoustic screening between the existing Coin Car Wash and the upper floors of the proposed residential development and therefore there will be direct line of sight between the residential units with windows located on the west façade of the proposed building and the stationary noise sources associated with the operation of Coin Car Wash. Specifically, the future residential units located on the west side of the building will be directly exposed to the sound emissions from the five car washing bays, and two vacuums.

The site of this car wash facility has been visited by Aercoustics' personnel on October 13, 2021, and the noise generated by the operation of this facility was measured; the sound data collected at the site has been used to model the noise impact of this facility on the proposed residential development.

There are five bays/washing stations at the facility, each bay is open to both side of the building with the east side facing the proposed mixed use building. Each basic washing cycle lasts 5 minutes. It also takes about 1 minute for a car to enter and exit the wash bay, and about 4 minutes of noisy operation/using the pressure washer during the 5 minute wash cycle. It has been assumed for the purpose of this study that there are 20 car washes occurring during the worst case scenario/hour during the daytime and 10 car washes during the busiest (worst-case scenario) nighttime hour.

There are also two vacuums located to the north of the car wash building. It has been assumed that during the worst case scenario hour each of the vacuums can be operational for up to 20 minutes. Sound emissions of the vacuum were measured during October 13, 2021 site visit.

The calculation locations representing critical noise sensitive receptors, residential windows located at Level 5 (top residential floor) are shown in Figure 4 above.

Table 6b below shows the results of the unmitigated worst-case noise predictions at sample receptors due to the stationary noise sources located at Fast Eddie's Hamburgers. Sound power information and sample printouts of calculation results are included in Appendix B.

Table 6b:  
Predicted Unmitigated Sound Levels Due to Stationary Noise Sources at **Coin Car Wash**

DAYTIME (07:00 TO 23:00)			
Receptor ID	Unmitigated Sound Level (dBA)	Class 1 Applicable Sound Level Limit (dBA)	Unmitigated Sound Level Meets Class 1 Limit (YES/NO)
R01	56	50	NO
R02	49	50	YES
R03	54	50	NO

NIGHTTIME (23:00 TO 07:00)			
Receptor ID	Unmitigated Sound Level (dBA)	Class 1 Applicable Sound Level Limit (dBA)	Unmitigated Sound Level Meets Class 1 Limit (YES/NO)
R01	52	45	NO
R02	40	45	YES
R03	51	45	NO

## 7 Stationary Noise Control Recommendations

### 7.1 Fast Eddie's Hamburgers

Based on the noise level predictions, noise control measures are required to address the worst-case noise sensitive receptor location – location R1 where the predicted noise levels exceed the applicable limits. R1 represents the west façade of the proposed building.

The noise control measures are required to address this exceedance. There are two options to address this.

- **Option 1**, at the source mitigation measures which would involve replacing the existing stationary noise sources at Fast Eddie's with a quieter equipment and/or silencing the equipment by means of constructing noise wall/enclosures. This option must be discussed/coordinated and approved by the restaurant's owner. Note that this option may not be feasible due the proximity of the noise sources and a significant difference in elevation between the noise sources and top residential floors (e.g., sort separation distance and apparent line of sight).
- **Option 2**, eliminating noise sensitive receptors/noise sensitive space windows from the west façade. Examples of possible windows on this façade include 1) operable windows to non-sensitive spaces such bathroom or 2) sealed windows to noise sensitive spaces such bedrooms or daytime living spaces.

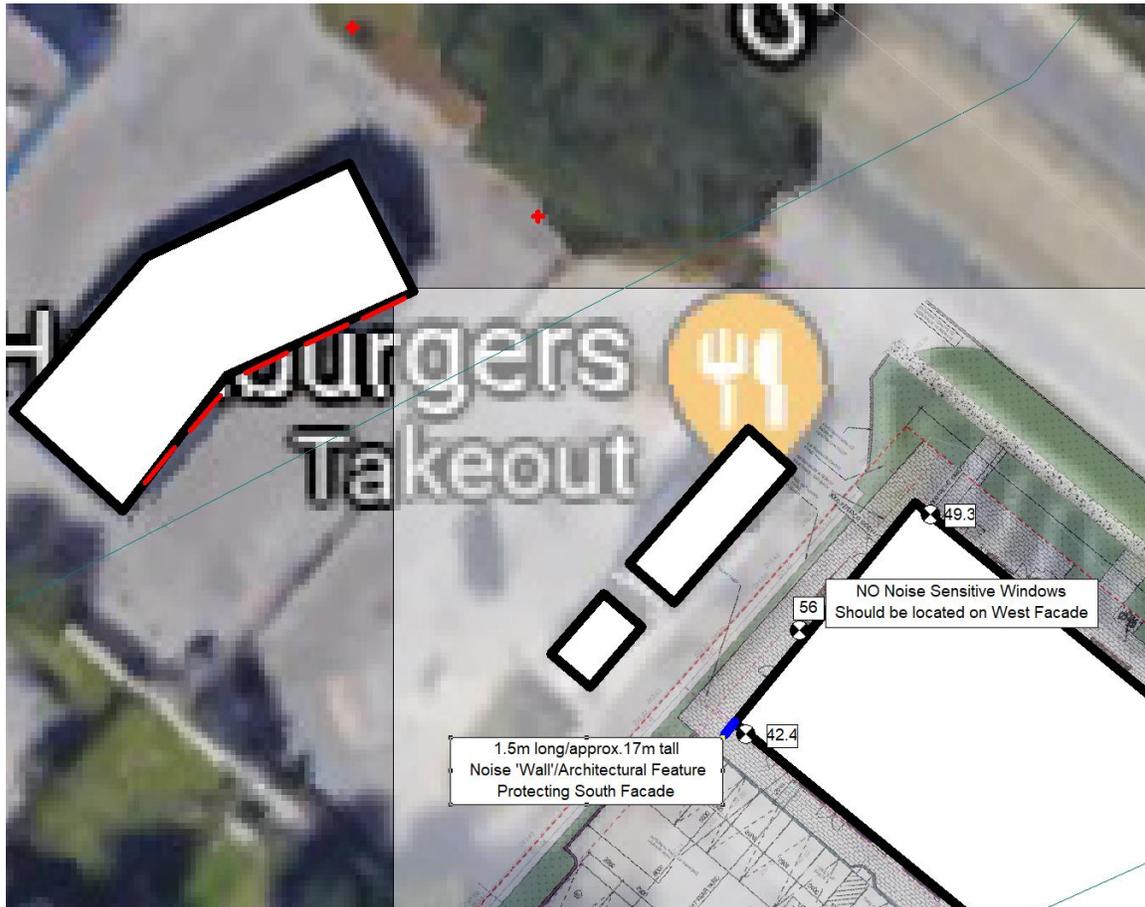
### 7.2 Coin Car Wash

Based on the noise level predictions, noise control measures are required to address the worst-case noise sensitive receptor locations – locations R1 and R3 where the predicted noise levels exceed the applicable limits. R1 represents the west façade and R3 is on the south face of the proposed building.

The noise control measures are required to address this exceedance. There are two options to address this.

- **Option 1**, at the source mitigation measures which would involve eliminating car wash bays openings/doors on the east side of the car wash AND replacing one of the vacuums with a quieter unit or erecting an acoustic barrier to shield this vacuum from the proposed residences. This option must be discussed/coordinated and approved by the restaurant's owner.
- **Option 2**, eliminating noise sensitive receptors/noise sensitive space windows from the west façade AND protecting residential receptors located on south façade

with an acoustic wall/architectural feature 1.5m long and extending the height of the building; (blue line) as shown in Figure 4 below.



**Figure 4: Site Plan showing Noise Control addressing Stationary Noise Sources at both, Fast Eddie's and Coin Car Wash**

With the incorporation of the noise controls discussed above, the sound levels at the noise sensitive receptors of the proposed residential development will comply with the noise guidelines of the MECP.

Warning clauses are recommended for the dwelling units located nearest to the stationary noise sources, namely residential units on West, North and South sides of the proposed building. This is to advise residents that noise generated from the activities at Fast Eddie's

Hamburgers and/or Coin Car Wash may at times be audible. Refer to Section 8 for sample wording of the Warning Clauses as well as the notes.

## 8 Warning Clauses and Notes

Purchase, rental and lease agreements for the units in the proposed residential development are recommended to include warning clauses as summarized in Table 5 of the report. A preliminary/sample wording of such clauses is provided below.

### Warning Clause A:

*“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.”*

### Warning Clause B:

*“This dwelling unit has been designed with the provisions 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.”*

### Warning Clause C:

*“Purchasers/tenants are advised that due to proximity of the adjacent Fast Eddie’s Hamburgers and/or Coin Car Wash noise from these facilities may at times be audible.”*

### **Notes:**

Acoustic barriers shall be erected where required and discussed in Section 7 of this report. The barrier(s) shall be continuous with no openings through or beneath it, and it shall be of durable material, with a mass of 20 kg. per sq. meter or more. Any gaps under the noise barrier that are necessary for drainage purposes must be minimized and localized and must not deteriorate the acoustical performance.

## 9 References

1. ORNAMENT – “Ontario Road Noise Analysis Method for Environmental and Transportation”, Ontario Ministry of the Environment, October 1989.
2. “Stationery and Transportation Sources – Approval and Planning”, Ontario Ministry of the Environment, Publication NPC-300, August 2013.

---

**Appendix A**

Road Traffic Data and Sample Calculations

---

**Region of Waterloo AADT Forecast for Noise Studies**

**1. Development/Location** 200 Dundas St S, Cambridge, ON

	Dundas St S (west leg)	Dundas St S (east leg)	Franklin Blvd (south leg)	Franklin Blvd (north leg)
<b>2. Current AADT (2021)</b>	16,900	18,700	13,100	17,400

	Dundas St S (west leg)	Dundas St S (east leg)	Franklin Blvd (south leg)	Franklin Blvd (north leg)
<b>3. Forecast AADT (2031)</b>	20,600	22,800	15,900	21,200

**4. Commercial Vehicle Rates**

	Dundas St S (west leg)	Dundas St S (east leg)	Franklin Blvd (south leg)	Franklin Blvd (north leg)
% Medium Trucks	1%	2%	1%	2%
% Heavy Trucks	3%	3%	2%	3%

**5. Posted Speed Limit**

	Dundas St S (west leg)	Dundas St S (east leg)	Franklin Blvd (south leg)	Franklin Blvd (north leg)
	50 km/h	60 km/h	60 km/h	60 km/h

**6. Day/Night Splits** Regional Standard 90/10 Day/Night Split

**7. Expiry** Dec 31 2022

**8. Notes**

This forecast is intended for the purpose of carrying out a noise study for **200 Dundas St S** only. The above AADT represents the traffic volumes at the intersection of Dundas St S with Franklin Blvd, considering Dundas St S runs in an east-west direction and Franklin Blvd runs in a north-south direction.

This forecast remains valid up to the date indicated above. The Region of Waterloo should be contacted for an updated forecast if there are plans to use this forecast beyond the above validity period.

Filename: 21043a.te                    Time Period: Day/Night 16/8 hours

Description:

Road data, segment # 1: dundas\_open (day/night)

-----  
Car traffic volume : 17798/1978 veh/TimePeriod \*  
Medium truck volume : 185/21 veh/TimePeriod \*  
Heavy truck volume : 556/62 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 20600  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 10.00  
Medium Truck % of Total Volume : 1.00  
Heavy Truck % of Total Volume : 3.00  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: dundas\_open (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 : 19.00 / 19.00 m  
Receiver height : 15.00 / 15.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

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

-----  
Car traffic volume : 13881/1542 veh/TimePeriod \*  
Medium truck volume : 143/16 veh/TimePeriod \*  
Heavy truck volume : 286/32 veh/TimePeriod \*  
Posted speed limit : 60 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): 15900  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 10.00  
Medium Truck % of Total Volume : 1.00  
Heavy Truck % of Total Volume : 2.00  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: franklin opn (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 2 / 2  
House density : 80 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 130.00 / 130.00 m  
Receiver height : 15.00 / 15.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 3: franklin bld (day/night)

-----  
Car traffic volume : 13881/1542 veh/TimePeriod \*  
Medium truck volume : 143/16 veh/TimePeriod \*  
Heavy truck volume : 286/32 veh/TimePeriod \*  
Posted speed limit : 60 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): 15900  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 10.00  
Medium Truck % of Total Volume : 1.00  
Heavy Truck % of Total Volume : 2.00  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: franklin bld (day/night)

-----  
Angle1 Angle2 : 0.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 2 / 2  
House density : 80 %  
Surface : 1 (Absorptive ground surface)  
Receiver source distance : 130.00 / 130.00 m  
Receiver height : 15.00 / 15.00 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : 0.00 deg Angle2 : 90.00 deg  
Barrier height : 19.70 m  
Barrier receiver distance : 0.50 / 0.50 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00



Segment Leq : 36.84 dBA

Total Leq All Segments: 66.49 dBA

Results segment # 1: dundas\_open (night)

-----  
Source height = 1.32 m

ROAD (0.00 + 59.94 + 0.00) = 59.94 dBA

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

SubLeq

-----  
-----  
-90        90    0.00   60.97    0.00   -1.03    0.00    0.00    0.00    0.00  
59.94

-----  
Segment Leq : 59.94 dBA

Results segment # 2: franklin opn (night)

-----  
Source height = 1.19 m

ROAD (0.00 + 37.88 + 0.00) = 37.88 dBA

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

SubLeq

-----  
-----  
-90        0    0.26   60.51    0.00   -11.86   -3.70    0.00   -7.07    0.00  
37.88

-----  
Segment Leq : 37.88 dBA

Results segment # 3: franklin bld (night)

-----  
Source height = 1.19 m

Barrier height for grazing incidence

-----  
-----  
Source        ! Receiver        ! Barrier        ! Elevation of  
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)  
-----+-----+-----+-----  
          1.19 !        15.00 !        14.95 !        14.95

ROAD (0.00 + 30.32 + 0.00) = 30.32 dBA

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

SubLeq

-----  
-----  
0 90 0.26 60.51 0.00 -11.86 -3.70 0.00 -7.07 0.00  
37.88  
0 90 0.00 60.51 0.00 -9.38 -3.01 0.00 0.00 -17.80  
30.32

Segment Leq : 30.32 dBA

Total Leq All Segments: 59.97 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.49

(NIGHT): 59.97

Filename: 21043b.te                    Time Period: Day/Night 16/8 hours  
Description:

Road data, segment # 1: dundas\_bldg (day/night)

-----  
Car traffic volume : 17798/1978    veh/TimePeriod    \*  
Medium truck volume :    185/21            veh/TimePeriod    \*  
Heavy truck volume :    556/62            veh/TimePeriod    \*  
Posted speed limit :       50 km/h  
Road gradient :           0 %  
Road pavement :           1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 20600  
Percentage of Annual Growth : 0.00  
Number of Years of Growth : 10.00  
Medium Truck % of Total Volume : 1.00  
Heavy Truck % of Total Volume : 3.00  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: dundas\_bldg (day/night)

-----  
Angle1    Angle2                    : -90.00 deg    0.00 deg  
Wood depth :                    0                (No woods.)  
No of house rows :                    0 / 0  
Surface :                        2                (Reflective ground surface)  
Receiver source distance :    20.00 / 20.00    m  
Receiver height :                15.00 / 15.00    m  
Topography :                    2                (Flat/gentle slope; with  
barrier)  
Barrier angle1 : -90.00 deg    Angle2 : 0.00 deg  
Barrier height :                19.70 m  
Barrier receiver distance :    0.50 / 0.50    m  
Source elevation :                0.00 m  
Receiver elevation :                0.00 m  
Barrier elevation :                0.00 m  
Reference angle :                0.00

Road data, segment # 2: dundas\_open (day/night)

-----  
Car traffic volume : 17798/1978    veh/TimePeriod    \*  
Medium truck volume :    185/21            veh/TimePeriod    \*  
Heavy truck volume :    556/62            veh/TimePeriod    \*  
Posted speed limit :       50 km/h  
Road gradient :           0 %  
Road pavement :           1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 20600  
 Percentage of Annual Growth : 0.00  
 Number of Years of Growth : 10.00  
 Medium Truck % of Total Volume : 1.00  
 Heavy Truck % of Total Volume : 3.00  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: dundas\_open (day/night)

-----

Angle1 Angle2 : 0.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 20.00 / 20.00 m  
 Receiver height : 15.00 / 15.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Road data, segment # 3: franklin opn (day/night)

-----

Car traffic volume : 13881/1542 veh/TimePeriod \*  
 Medium truck volume : 143/16 veh/TimePeriod \*  
 Heavy truck volume : 286/32 veh/TimePeriod \*  
 Posted speed limit : 60 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): 15900  
 Percentage of Annual Growth : 0.00  
 Number of Years of Growth : 10.00  
 Medium Truck % of Total Volume : 1.00  
 Heavy Truck % of Total Volume : 2.00  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: franklin opn (day/night)

-----

Angle1 Angle2 : -90.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 2 / 2  
 House density : 80 %  
 Surface : 1 (Absorptive ground surface)  
 Receiver source distance : 130.00 / 130.00 m  
 Receiver height : 15.00 / 15.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00



-90 90 0.26 67.03 0.00 -11.86 -0.69 0.00 -7.07 0.00  
47.41

-----  
-----  
Segment Leq : 47.41 dBA

Total Leq All Segments: 63.40 dBA

Results segment # 1: dundas\_bldg (night)

-----  
Source height = 1.32 m

Barrier height for grazing incidence

-----  
Source ! Receiver ! Barrier ! Elevation of  
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)  
-----+-----+-----+-----  
1.32 ! 15.00 ! 14.66 ! 14.66

ROAD (0.00 + 38.27 + 0.00) = 38.27 dBA

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

-----  
-----  
-90 0 0.00 60.97 0.00 -1.25 -3.01 0.00 0.00 -18.44  
38.27

-----  
-----  
Segment Leq : 38.27 dBA

Results segment # 2: dundas\_open (night)

-----  
Source height = 1.32 m

ROAD (0.00 + 56.71 + 0.00) = 56.71 dBA

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

-----  
-----  
0 90 0.00 60.97 0.00 -1.25 -3.01 0.00 0.00 0.00  
56.71

-----  
-----  
Segment Leq : 56.71 dBA

Results segment # 3: franklin opn (night)

-----  
Source height = 1.19 m

ROAD (0.00 + 40.89 + 0.00) = 40.89 dBA

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

SubLeq

-----  
-----  
-90        90    0.26   60.51    0.00 -11.86   -0.69    0.00   -7.07    0.00  
40.89

-----  
-----  
Segment Leq : 40.89 dBA

Total Leq All Segments: 56.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.40  
                                  (NIGHT): 56.88



---

**Appendix B**

Samples of Stationary Noise Source(s) Level Calculations/Printouts

---

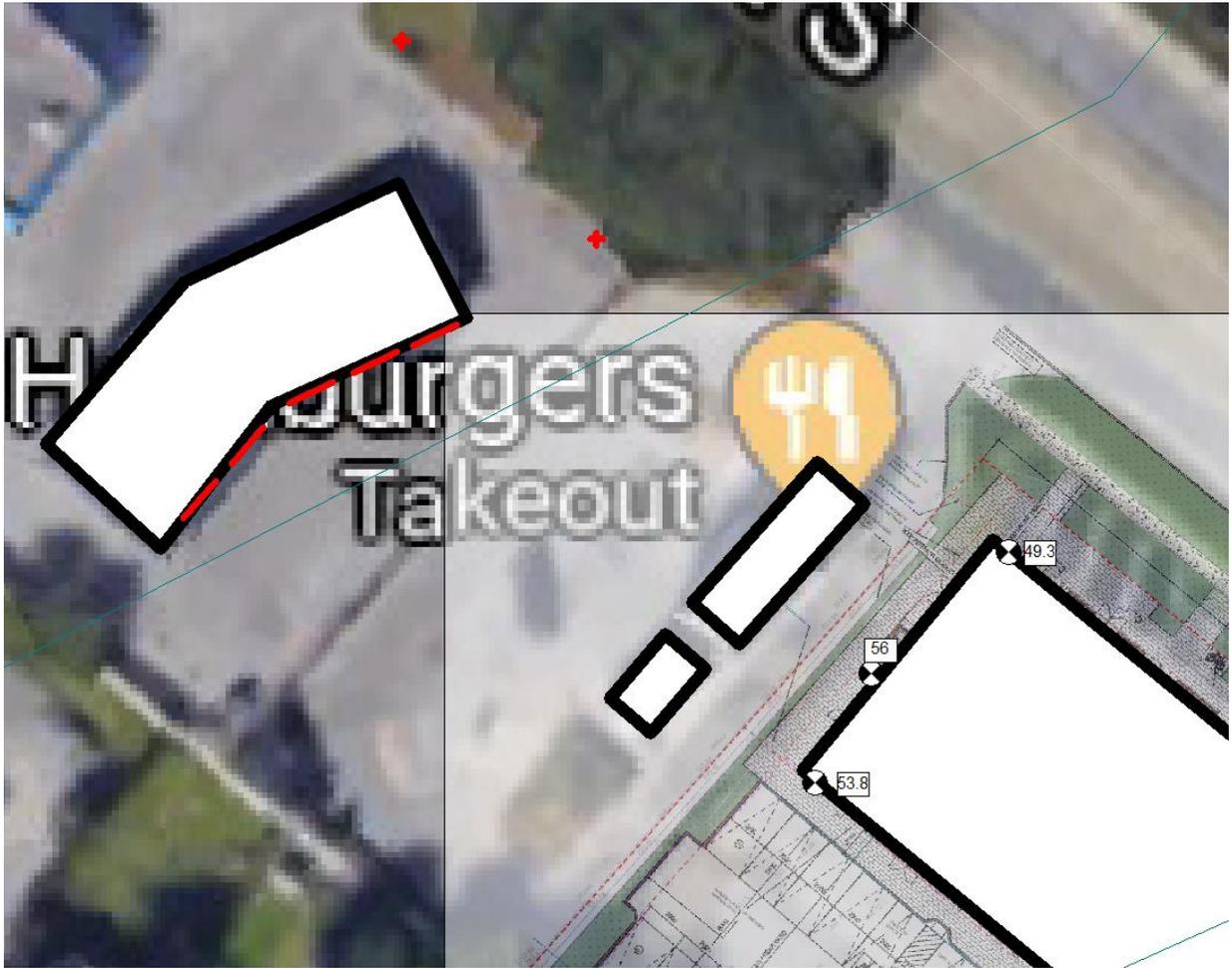


Figure B1: Unmitigated Sound Levels due to Coin Carwash

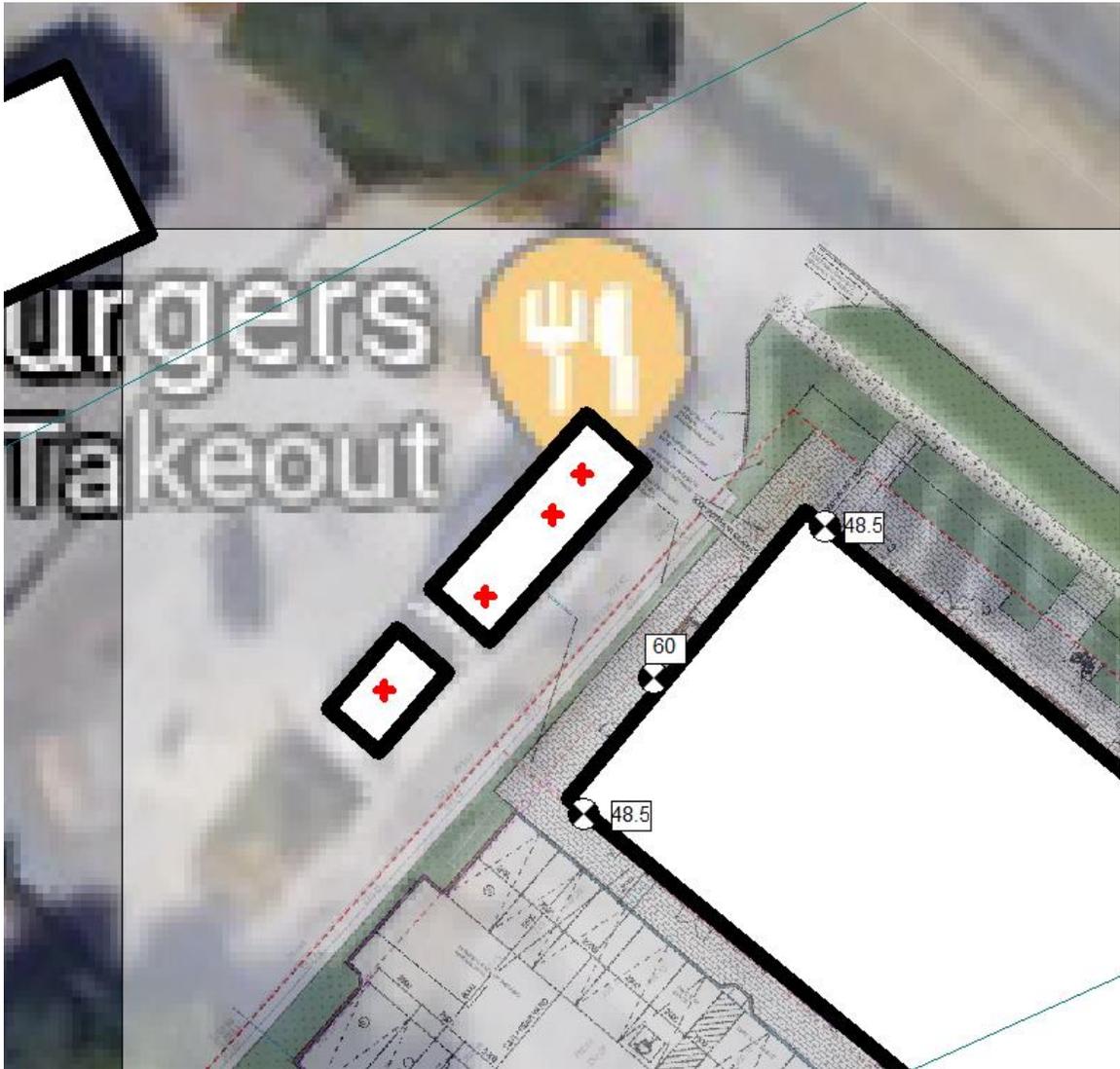


Figure B2: Unmitigated Sound Levels Due to Fast Eddies Equipment



---

**End of Report**

---