

## 27 WINONA DRIVE

WHITCHURCH-STOUFFVILLE, ONTARIO

### NOISE IMPACT STUDY

RWDI #2406483

August 19, 2024

#### SUBMITTED TO

**Darul Khair Center Stouffville**

86 Ringwood Drive, Unit 36  
Whitchurch-Stouffville, ON  
[info@darulkhair.ca](mailto:info@darulkhair.ca)

**Worship-Mosque**

27 Winona Drive  
Whitchurch-Stouffville,  
ON L4A 2S9

#### SUBMITTED BY

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# VERSION HISTORY

| Index | Date          | Description       | Prepared by         | Reviewed by    |
|-------|---------------|-------------------|---------------------|----------------|
| 1     | June 13, 2023 | Submitted for ZBA | Caelan Weber-Martin | Jacquie Kelton |



## EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise Impact Study for the proposed mosque, located at 27 Winona Drive in Whitchurch-Stouffville, Ontario. This assessment was completed to support the Zoning Bylaw Amendment (ZBA) submission as required by the Town of Whitchurch-Stouffville.

A screening level assessment of stationary sources associated with the mosque was conducted for existing and proposed surrounding buildings.

At this stage in design, the locations of the rooftop equipment have not been decided. HVAC units should be located as far towards the southwest corner of the mosque rooftop as feasible to minimize sound levels at surrounding noise-sensitive buildings.

The land immediately to the east of the proposed mosque, 28 Fairview Avenue, has an active development application. However, the development has yet not been approved. Since the land is currently zoned as Commercial Residential Mixed, allowing noise-sensitive uses for buildings with a maximum height of 20m, the proposed 28 Fairview Avenue development was conservatively included in this assessment to represent a potential future noise-sensitive building. Depending on the rooftop locations of the HVAC units and on the building orientation of a future noise-sensitive building at 28 Fairview Avenue, sound levels may exceed provincial guidelines. However, if this scenario occurs, various mitigation measures are considered feasible, including at-source mitigation measures such as barrier walls, and at-receptor mitigation measures such as including air conditioning in the building design which allows residents to keep windows closed and reduces indoor sound levels.

This assessment should be refined to include the correct rooftop locations of the HVAC equipment once the information is available. Based on the results of the analysis, the proposed mosque is feasible with respect to noise.



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## 1 INTRODUCTION

RWDI was retained to prepare a Noise Impact Study for the proposed mosque located at 27 Winona Drive in Whitchurch-Stouffville, Ontario. The context site plan is shown in **Figure 1**.

This assessment was completed in support of the Zoning Bylaw Amendment (ZBA) submission as required by the Town of Whitchurch-Stouffville. This assessment was based on design drawings dated June 13, 2023. A copy of the drawings is included in **Appendix A**.

## 2 APPLICABLE CRITERIA

Applicable criteria for stationary noise sources are adopted from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline (MOE, 2013).

Noise from stationary sources requires sound levels to be assessed for the predictable worst-case one-hour average sound level ( $L_{eq}$ ) for each period of the day. For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and plane of the window.

The assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or "Class" of the area. The proposed development site would be characterized as a "Class 1 Area", which is defined according to NPC-300 as an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum."

The NPC-300 exclusion limits for continuously operating stationary sources in a Class 1 Area are summarized in **Table 1**.

**Table 1: NPC-300 Exclusion Limits for Continuous Sources**

| Time Period              | Class 1 Area |                 |
|--------------------------|--------------|-----------------|
|                          | Outdoor      | Plane of Window |
| Daytime<br>07:00-19:00   | 50 dBA       | 50 dBA          |
| Evening<br>19:00-23:00   | 50 dBA       | 50 dBA          |
| Nighttime<br>23:00-07:00 | --           | 45 dBA          |

## 3 STATIONARY SOURCE ASSESSMENT

### 3.1.1 Surrounding Noise-Sensitive Receptors

Lands surrounding the proposed mosque consist of:

- Stouffville Auto Wash Car Wash to the north with residential dwellings beyond that,
- A property with development applications pending to the east (28 Fairview Avenue),
- A commercial plaza to the immediate south,
- Future residential developments to the south (along the south side of Main Street), and
- A commercial plaza to the west.

Representative worst-case receptors were selected to represent the dwellings to the north. A façade receptor with a height of 4.5m was used to represent the worst-case façade sound level at the 2<sup>nd</sup> storey (or 1.5m receptor height for single-storey dwellings). An outdoor receptor with a height of 1.5m was used to assess sound levels in the backyards of the dwellings.

The building shape of the proposed 28 Fairview Avenue was used to assess noise at the lot to the east, with a building height of 20 meters (maximum building height for the current zoning). A worst-case façade receptor was used to assess sound levels at the potential future building. The ZBA for the proposed 28 Fairview Avenue development has currently not been approved, however, the building was conservatively considered in this assessment to account for the case where the development is approved in the future, or if another noise-sensitive building is built on the lot. However, a future development should consider noise from the mosque in their own Noise Impact Study to ensure that appropriate sound levels are met at their building.

Future residential developments to the south, along the south side of Main Street, were included in this assessment. Sound levels were assessed at worst-case façade locations for future developments.

Representative receptor locations included in this assessment are illustrated in **Figure 2**.

### 3.1.2 Stationary Source Modelling

Stationary sources associated with the proposed mosque include 3 rooftop HVAC units and one transformer. There will be no call-to-prayer sound system associated with the proposed mosque. Sound power level data was provided for the 3 HVAC units and is included in **Appendix B**. The transformer associated with the mosque is a small 300 kVA transformer and is considered insignificant from a noise perspective relative to the HVAC units. Therefore, this assessment does not include the transformer.

Since the locations of the rooftop equipment are not currently known, the HVAC units were assumed to be on the west side of the rooftop. The assumed locations of the units are shown in **Appendix C** in **Figure C.1**.

Sound power levels for the HVAC units are shown in **Table 2**.

**Table 2: Stationary Source Sound Power Levels**

| Source Description        | Source ID<br>(As shown in Figure C.1) | Sound Power Level (dBA) | Duty Cycle                             |                               |
|---------------------------|---------------------------------------|-------------------------|--|-------------------------------|
|                           |                                       |                         | Daytime and Evening<br>(07:00 – 23:00) | Nighttime<br>(23:00h – 07:00) |
| <b>12.5 Ton HVAC Unit</b> | JAIN_12_5_T                           | 89                      | Continuous                             | 30 minutes/hour               |
| <b>15 Ton HVAC Unit</b>   | JAIN_15_T                             | 87                      | Continuous                             | 30 minutes/hour               |
| <b>7.5 Ton HVAC Unit</b>  | JAIN_7_5_T                            | 86                      | Continuous                             | 30 minutes/hour               |

The HVAC units were assumed to operate continuously during the daytime and evening, and 30 minutes per hour during nighttime. These assumptions can be refined, if necessary, once information is available regarding the unit locations, to include a more realistic representation of the nighttime operating scenario.

### 3.1.3 Analysis and Results

Stationary source noise modelling was carried out using the Cadna/A software package, a commercially available implementation of the ISO 9613 (ISO, 1994 and ISO, 1996) algorithms. The predicted sound levels are assessed against the Class 1 Area limits. A sample calculation is included in **Appendix C** for the worst-case façade receptor associated with the proposed 28 Fairview Avenue building (R04).

**Table 3: Predicted Sound Levels at Worst-case Receptor Locations – Continuous Stationary Sources**

| Receptor     | Receptor Description                                   | Predicted Sound Level<br>Daytime-Evening /<br>Nighttime<br>LEQ-1hr<br>(dBA) | Criteria  | Meets Class 1<br>Criteria? |
|--------------|--|---|---|----------------------------|
|              |  |   | Class 1<br>Daytime-Evening /<br>Nighttime<br>LEQ-1hr<br>(dBA) |                            |
| <b>R01_f</b> | Façade Receptor – 1-Storey House at 50 Winona Drive    | 45 / 42   | 50 / 45   | Yes / Yes                  |
| <b>R01_o</b> | Outdoor Receptor – 1-Storey House at 50 Winona Drive   | 47 / -- <sup>[1]</sup>  | 50 / -- <sup>[1]</sup>  | Yes / -- <sup>[1]</sup>    |
| <b>R02_f</b> | Façade Receptor – 1-Storey House at 336 Rupert Avenue  | 38 / 35   | 50 / 45   | Yes / Yes                  |
| <b>R02_o</b> | Outdoor Receptor – 1-Storey House at 336 Rupert Avenue | 37 / -- <sup>[1]</sup>  | 50 / -- <sup>[1]</sup>  | Yes / -- <sup>[1]</sup>    |
| <b>R03_f</b> | Façade Receptor – 1-Storey House at 34 Fairview Avenue | 34 / 31   | 50 / 45   | Yes / Yes                  |

| Receptor     | Receptor Description  | Predicted Sound Level<br>Daytime-Evening /<br>Nighttime<br>L <sub>EQ</sub> -1hr<br>(dBA) | Criteria   | Meets Class 1<br>Criteria? |
|--------------|---|--|--|----------------------------|
|              |   |  | Class 1<br>Daytime-Evening /<br>Nighttime<br>L <sub>EQ</sub> -1hr<br>(dBA) |                            |
| <b>R03_o</b> | Outdoor Receptor – 1-Storey House at 34 Fairview Avenue           | 32 / -- <sup>[1]</sup>   | 50 / -- <sup>[1]</sup> dBA   | Yes / -- <sup>[1]</sup>    |
| <b>R04</b>   | Façade Receptor – Future Potential 28 Fairview Avenue Development | 48 / 45  | 50 / 45 dBA  | Yes / Yes                  |
| <b>R05</b>   | Façade Receptor – Future 5991 Main Street Development             | 43 / 40  | 50 / 45 dBA  | Yes / Yes                  |
| <b>R06</b>   | Façade Receptor – Future 5945-5947 Main Street Development        | 43 / 40  | 50 / 45 dBA  | Yes / Yes                  |

Note(s):

1. Outdoor areas are not assessed during the nighttime period.
2. No outdoor points of reception were identified for R04, R05, or R06.

As shown in **Table 3**, based on the modelling assumptions, the continuous sound levels at the façade due to stationary sources are predicted to meet the applicable Class 1 sound level criteria for all surrounding noise-sensitive receptors.

Currently, the proposed development at 28 Fairview Avenue has not been approved for ZBA. Furthermore, the assumed HVAC unit locations at the mosque and the building orientation for the proposed 28 Fairview Avenue may not be realistic. This assessment should be re-visited once more information is known regarding the HVAC unit locations and the future 28 Fairview Avenue building orientation. If a future development is proposed at 28 Fairview Avenue after the approval of the proposed 27 Winona Drive mosque, the development should consider noise from the mosque in their Noise Impact Study.

Rooftop HVAC units for the proposed mosque should be located as far to the southwest as feasible to minimize sound levels at surrounding noise-sensitive lands. It is recommended that a design review be completed once the HVAC locations are confirmed to ensure the final design meets the required sound level criteria.



## 4 CONCLUSIONS

RWDI was retained to prepare a Noise Impact Study for the proposed mosque located in Whitchurch-Stouffville, Ontario.

A screening level assessment of stationary sources associated with the mosque was conducted for existing and proposed surrounding buildings. At this stage in design, the locations of the rooftop equipment have not been decided. HVAC units should be located as far towards the southwest corner of the mosque rooftop as feasible to minimize sound levels at surrounding noise-sensitive buildings. A detailed design review should be completed once the HVAC locations are confirmed to ensure the mosque meets the applicable sound level criteria at the surrounding sensitive receptors.

Based on the results of the analysis, the proposed mosque is feasible with respect to noise.

## 5 REFERENCES

1. Ontario Ministry of the Environment (MOE), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning (MOE, 2013).
2. International Organization for Standardization (ISO), 1994b, International Standard ISO 9613-1:1994, Acoustics – Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere. (ISO, 1994).
3. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996).



## STATEMENT OF LIMITATIONS

This report entitled 27 Winona Drive was prepared by Rowan Williams Davies & Irwin Inc. ("RWDI") for Darul Khair Center Stouffville ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by the Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

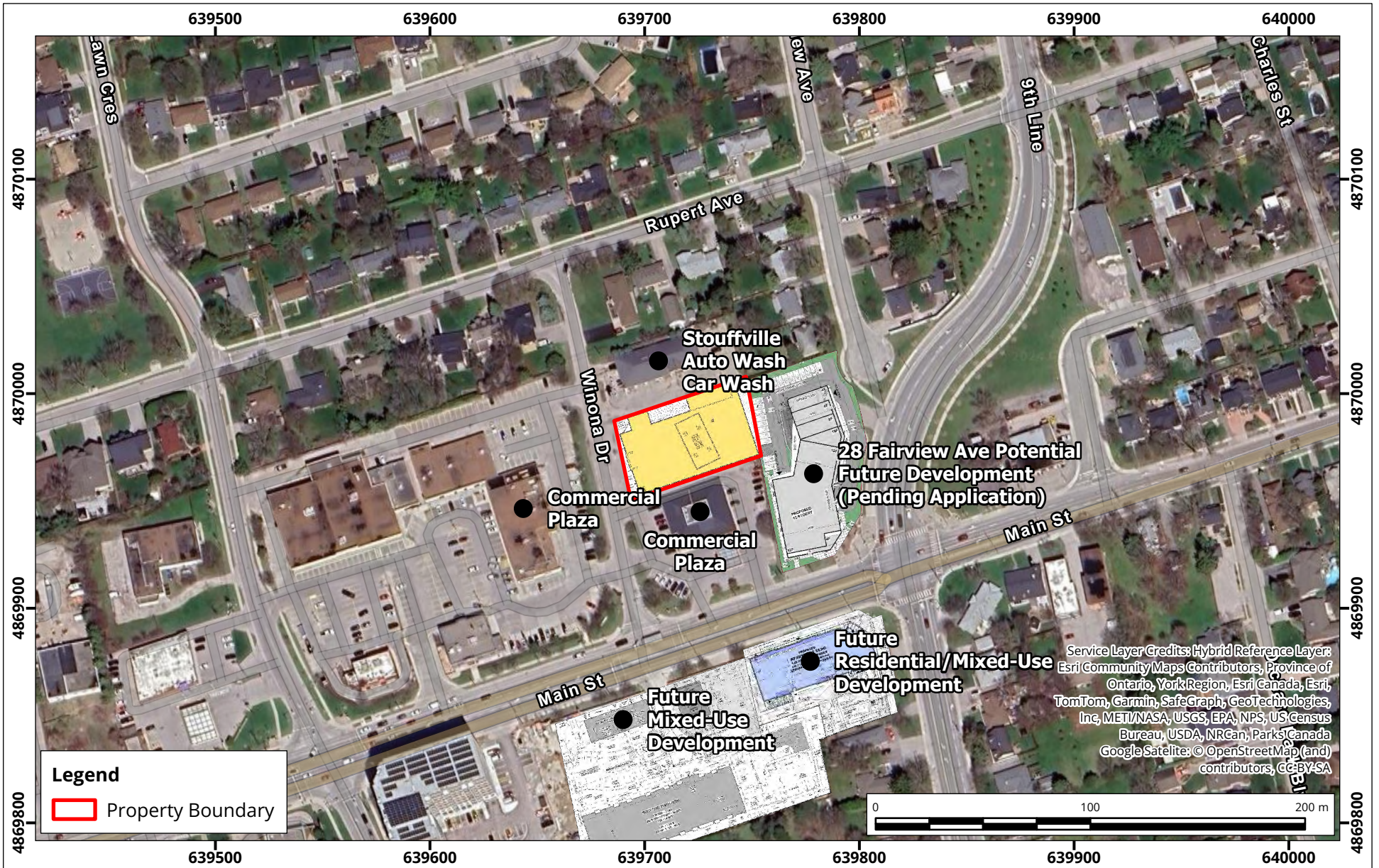
The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

# FIGURES



Map Document: M:\AM\Jobs\2024\2406483\3\WorkItems\20EnvironmentalNoiseAnalysis\ArcGIS\27 Winona Drive - Witchurch-Stouffville, Ontario.aprx



## Site Context Plan

Map Projection: NAD 1983 UTM Zone 17N  
27 Winona Drive - Witchurch-Stouffville, Ontario



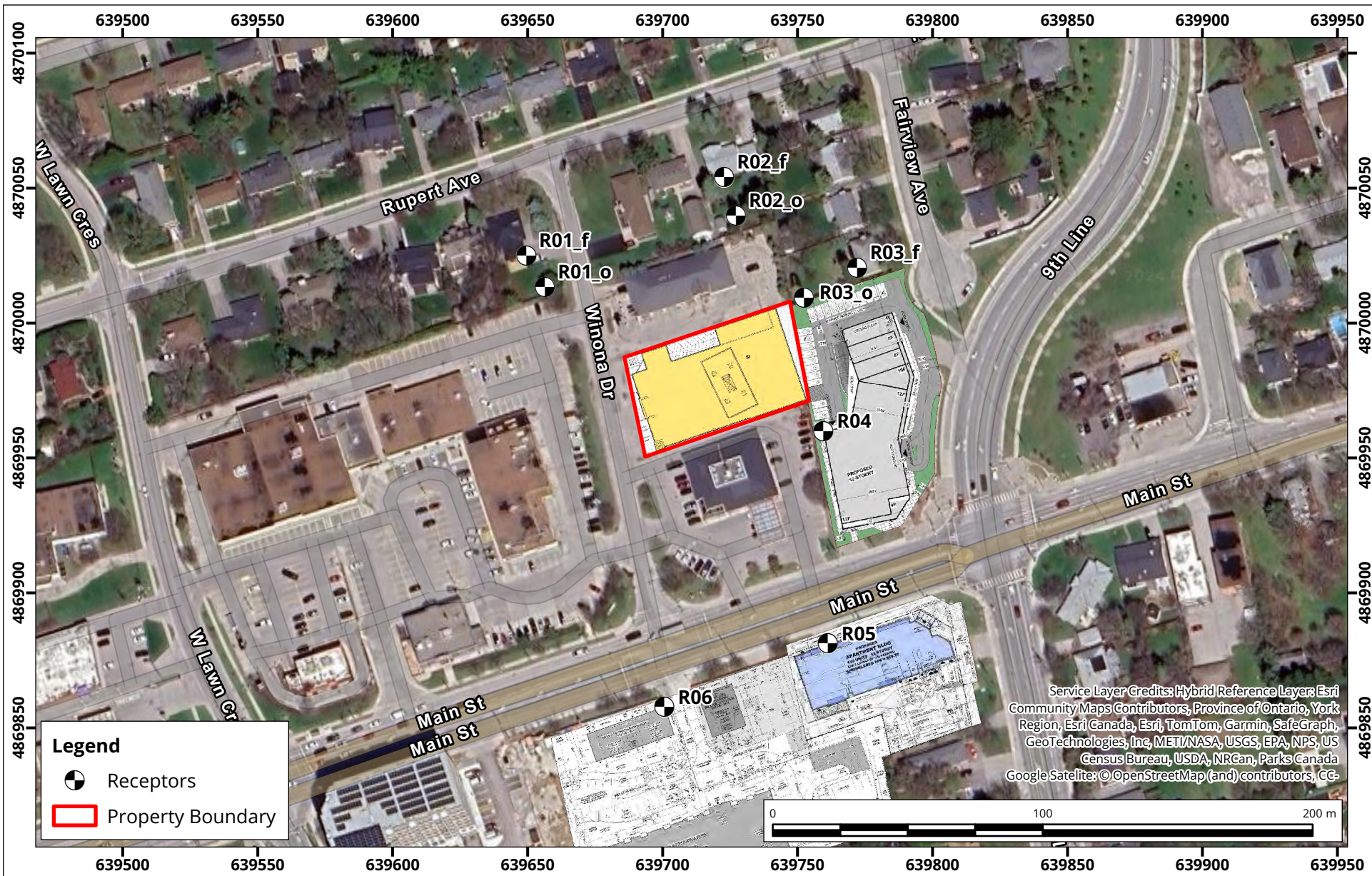
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| Date Revised: Aug 19, 2024 |           |

Project #: 2406483





Map Document: M:\AM\Jobs\2024\2406483\03\WorkItems\20\EnvironmentalNoiseAnalysis\ArcGIS\27 Winona Drive - Witchurch-Stouffville, Ontario.aprx



## Sensitive Receptor Locations

Map Projection: NAD 1983 UTM Zone 17N  
27 Winona Drive - Witchurch-Stouffville, Ontario



|                            |           |
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| Date Revised: Aug 16, 2024 |           |

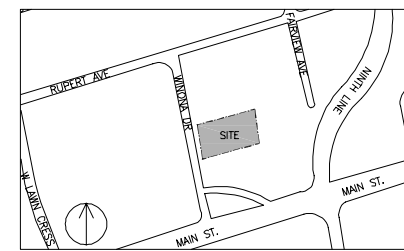
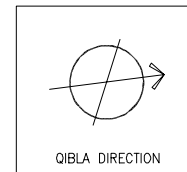
Project #: 2406483



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# APPENDIX A





#### KEY MAP

SCALE: N.T.S.

#### PROJECT STATISTICS

ADDRESS: 27, WINONA DR, WHITCHURCH, STOUFFVILLE, ON

|  | REQUIRED          | PROPOSED                   |
|--|-------------------|----------------------------|
| ZONING : COMMERCIAL RESIDENTIAL MIXED -WESTERN APPROACH(CM2) ( BY-LAW 2010-001-70 TOWN OF WHITCHURCH STOUFFVILLE,2010) | CM-2              | CM-2                       |
| LOT AREA (SQ.M)  | 0 SQ.M. (MIN)     | 2419.62 SQ.M. (0.59 ACRES) |
| LOT FRONTAGE   |                   | 37.78 M                    |
| LOT DEPTH  |                   | 64.99 M                    |
| BUILDING COVERAGE  | N/A               | 183.90 SQ.M (7.60%)        |
| GFA (SQ.M)   |                   | 2386.52 SQ.M               |
| LANDSCAPED AREA  | MINIMUM 5% OF GFA | 322.64 SQ.M (13.53%)       |
| CONC. PAVED AREA   |                   | 31.75 SQ.M (1.38%)         |
| MAX. BUILDING HEIGHT   | 20M               | 9.75M                      |
| PARKING  | 100               | 59                         |

| BUILDING SETBACKS          | REQUIRED  | PROPOSED |
|----------------------------|-----------|----------|
| FRONT YARD (WEST)          | (MIN) 3 M | 1.43 M   |
| REAR YARD (EAST)           | (MIN) 0 M | 1.00 M   |
| INTERIOR SIDE YARD (NORTH) | (MIN) 0 M | 0.84 M   |
| INTERIOR SIDE YARD (SOUTH) | (MIN) 0 M | 0.76 M   |

| PARKING CALCULATION   | REQUIRED | PROPOSED |
|---|----------|----------|
| PLACE OF WORSHIP: 10 PARKING SPACES FOR EACH 100 M <sup>2</sup> OF GFA DEVOTED TO PUBLIC USE (585.99 SQ.M.) | 58       | 60       |
| FITNESS AREA/BASKETBALL COURT (6 PARKING SPACE FOR EACH 100 M <sup>2</sup> ) (458.53 SQ.M.)                 | 27       |          |
| OFFICE: 5 PARKING SPACES FOR EACH 100 M <sup>2</sup> OF GFA (20.66 SQ.M.)                                   | 01       |          |
| FUNERAL ROOM 7.5 SPACES PER 100 M <sup>2</sup> OF GFA (55.63 SQ.M.)   | 04       |          |
| CLASSROOMS 2 SPACES PER CLASSROOM   | 08       |          |
| TOTAL # PARKING SPACES  | 98       |          |
| DIFFERENCE  |          | -38      |
| ACCESSIBLE PARKING 26-100 PARKING SPACES = 1SPACE+4% OF TOTAL REQUIRED PARKING                              | 04       | 04       |

#### LOADING CALCULATION:

OVER 950M<sup>2</sup> UP TO 2,400M<sup>2</sup> OF GFA  
4 LARGE LOADING SPACES REQUIRED (9M X 3.5M)

| AREA DISTRIBUTION   | SPACES | AREA         |
|---------------------|--------|--------------|
| MEN' PRAYER HALL    |        | 361.25 SQ.M. |
| WOMEN'S PRAYER HALL |        | 224.74 SQ.M. |
| CLASSROOMS          |        | 124.10 SQ.M. |
| FUNERAL ROOM        |        | 55.63 SQ.M.  |

#### LEGEND

- PROPERTY LINE
- NEW BUILDING
- EXISTING BUILDING
- LANDSCAPE
- CONC. PAVEMENT, 150MM RAISED
- ASPHALT
- MAIN DOOR ENTRANCE
- OVERHEAD DOOR

#### LEGAL DESCRIPTION:

PART PLAN OF LOT 26 REGISTERED PLAN 455  
TOWN OF WHITCHURCH STOUFFVILLE REGIONAL MUNICIPALITY OF YORK

#### APPLICANT:

n ARCHITECTURE INC.  
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Suite-208  
Richmond Hill, ON, L4B 3J9  
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#### OWNER'S INFO:



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3rd APRIL 2024

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#### PROJECT:

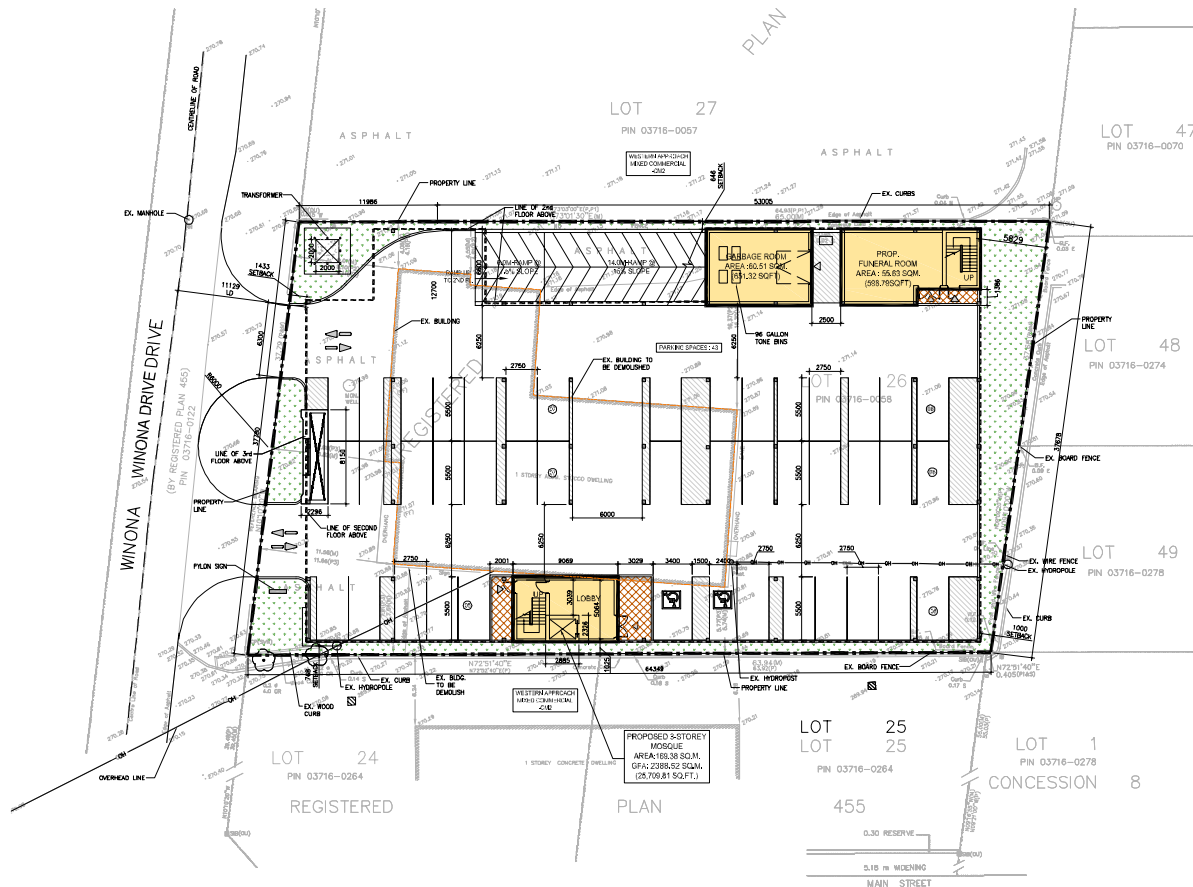
27 WINONA DR,  
WHITCHURCH  
STOUFFVILLE, ON  
PLACE OF  
WORSHIP-MOSQUE

#### DRAWING TITLE:

SITE PLAN  
GROUND FLOOR  
LEVEL

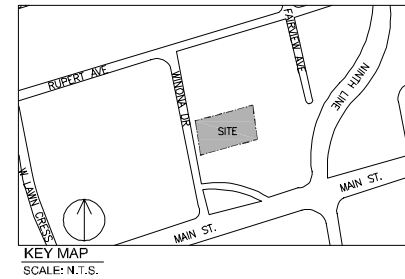
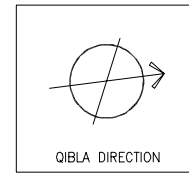
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| PROJECT NO:    | DRAWING NO:       |

22-71 A-1.0



1 SITE PLAN  
A-1.0 SCALE: 1:200

SURVEY INFORMATION:  
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ONTARIO LAND SURVEYORS/ARPENTRES  
171 MAIN STREET SOUTH, UNIT 4A, NEWMARKET, ONTARIO L3Y 3Y9  
PH: 416-907-7327 FAX: 416-907-7328 CELL: 416-845-2655  
PLAN DATED: NOVEMBER 26, 2017



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PROJECT NORTH

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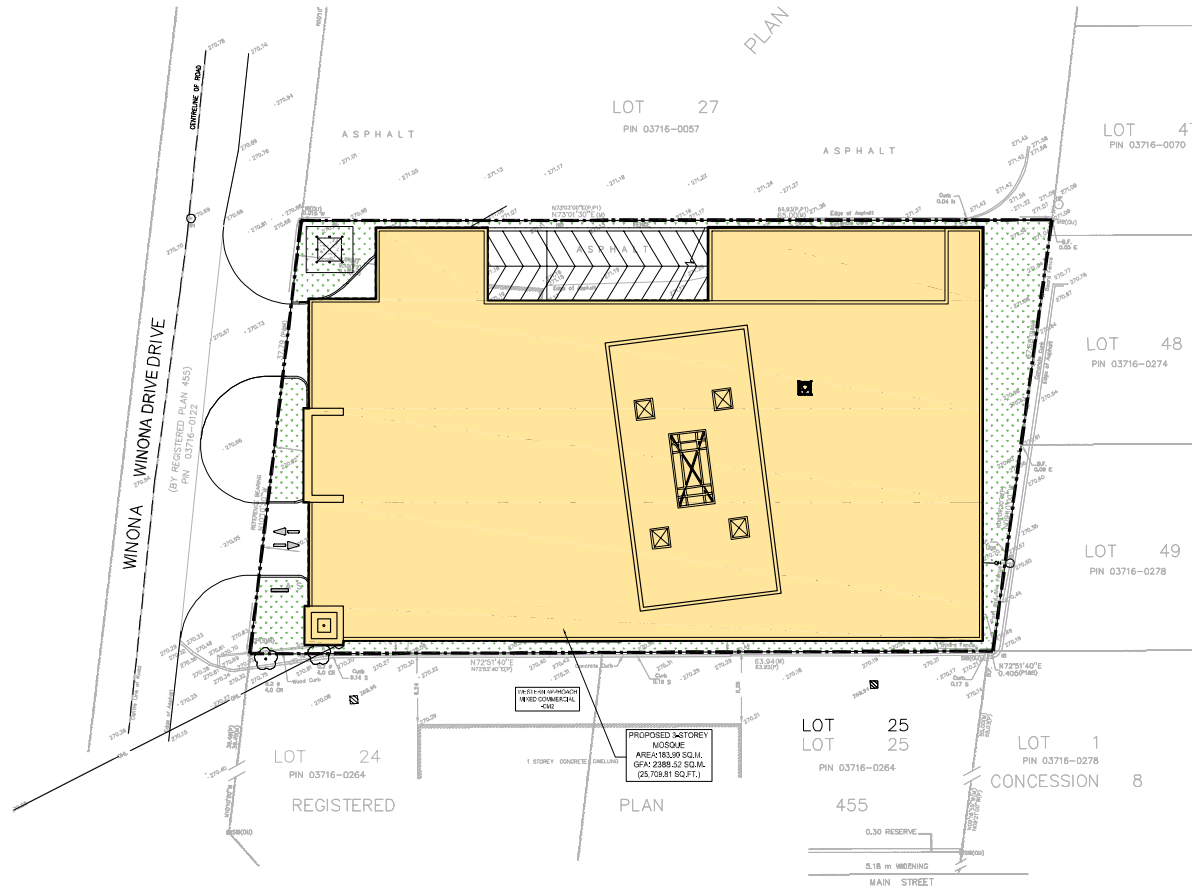
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STOUFFVILLE, ON  
PLACE OF  
WORSHIP-MOSQUE**

DRAWING TITLE:  
**SITE PLAN SHOWING  
ROOF PLAN**

|                |                   |
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**22-71 A-1.0a**



**1 SITE PLAN SHOWING ROOF PLAN**  
SCALE: 1:150





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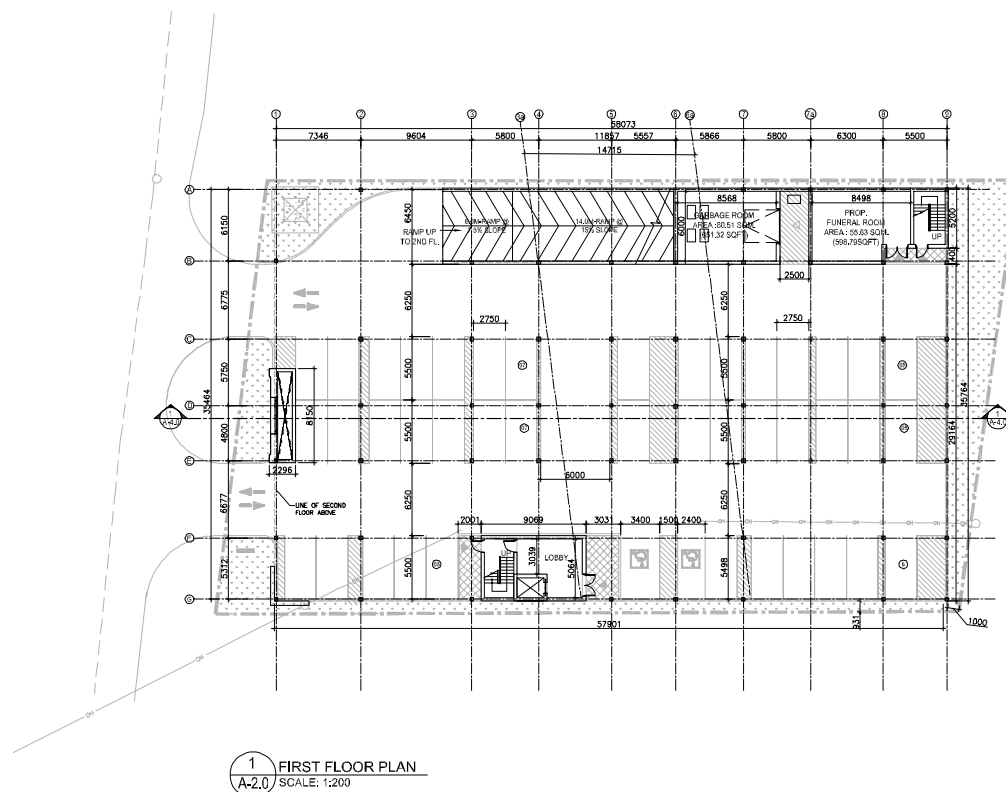
DRAWING TITLE:

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1 FIRST FLOOR PLAN  
A-2.0 SCALE: 1:200

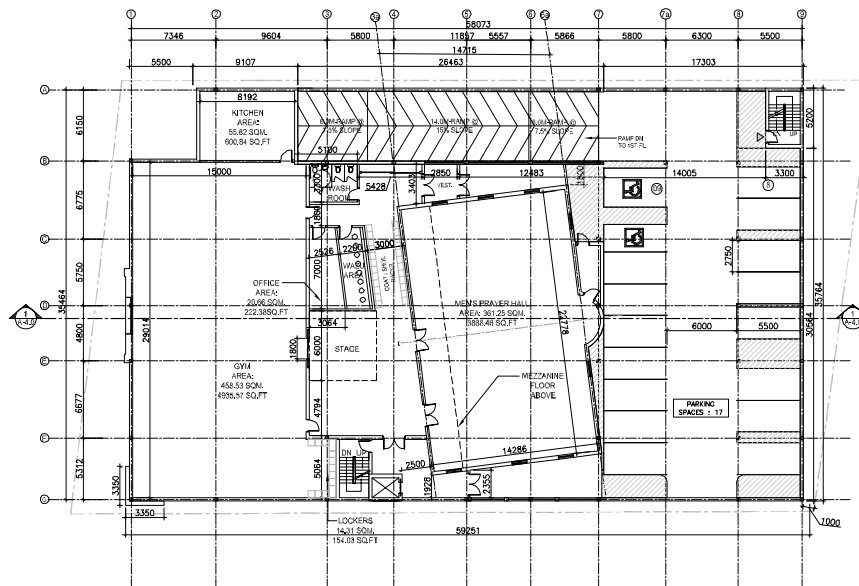


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WORSHIP-MOSQUE

DRAWING TITLE:

2nd FLOOR PLAN

DRAWN BY: JB

DATE: 12 DEC 2022

CHECKED BY: NM

SCALE: AS NOTED

PROJECT NO.:

DRAWING NO.:

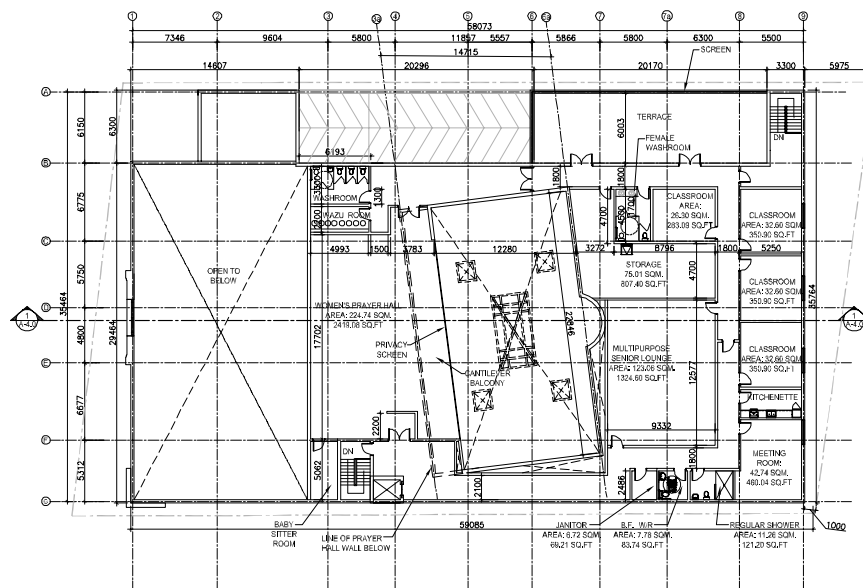
22-71

A-2.1

PRINCIPAL: NITIN MALHOTRA, ARCHITECT  
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PROJECT NORTH-

3rd APRIL 2014  
PRELIMINARY CONCEPT  
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1  
A-2.2 3rd FLOOR PLAN  
SCALE: 1:200

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WHITCHURCH  
STOUFFVILLE, ON  
PLACE OF  
WORSHIP-MOSQUE

DRAWING TITLE:

### 3rd FLOOR PLAN

DRAWN BY: JR

DATE: 12 DEC 2022

CHECKED BY: M

SCALE: AS NOTED

PROJECT NO.:

|  |              |
|--|--------------|
|  | DRAWING NO.: |
|--|--------------|

22-71

## A-2.2



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DRAWING TITLE:

**ROOF PLAN**

DRAWN BY: JB

DATE: 12 DEC 2022

CHECKED BY: NM

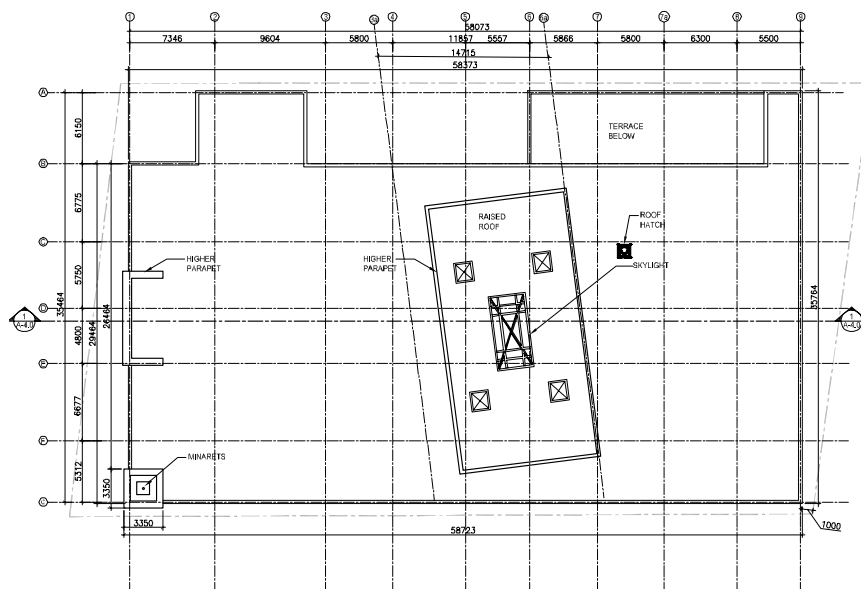
SCALE: AS NOTED

PROJECT NO.:

DRAWING NO.:

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**A-2.3**

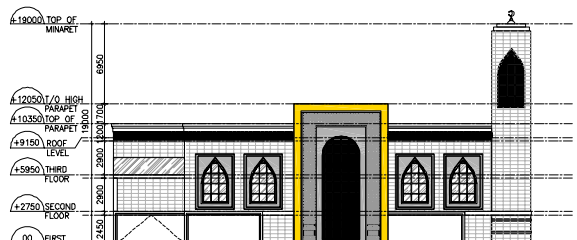


**1** ROOF PLAN  
A-2.3 SCALE: 1:200

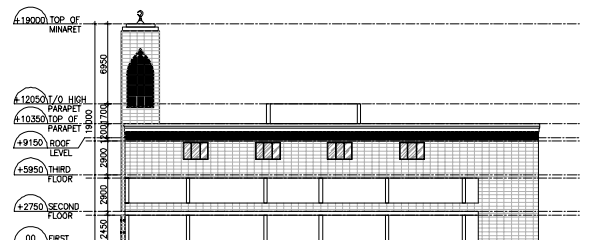


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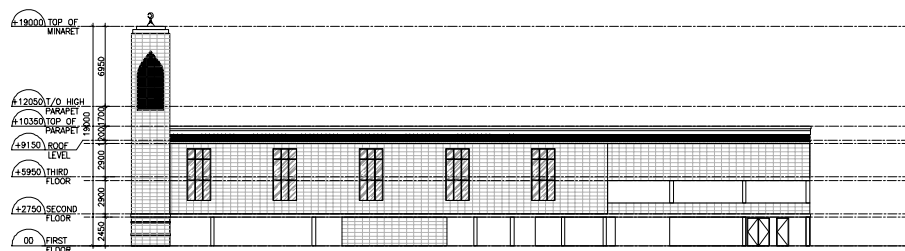
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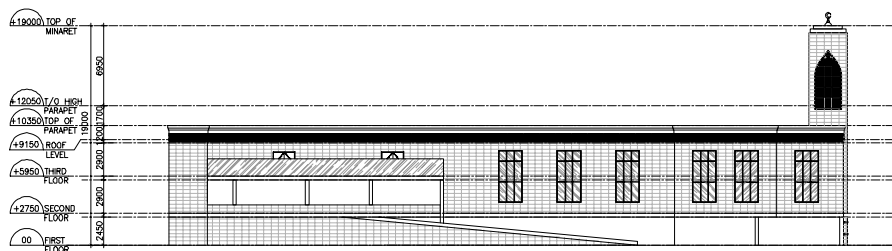
1 WEST ELEVATION  
A-3.0 SCALE: 1:200



2 EAST ELEVATION  
A-3.0 SCALE: 1:200



3 SOUTH ELEVATION  
A-3.0 SCALE: 1:200



4 NORTH ELEVATION  
A-3.0 SCALE: 1:200

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DRAWING TITLE:  
**BUILDING ELEVATION  
OPTION-4**

|                |                   |
|----------------|-------------------|
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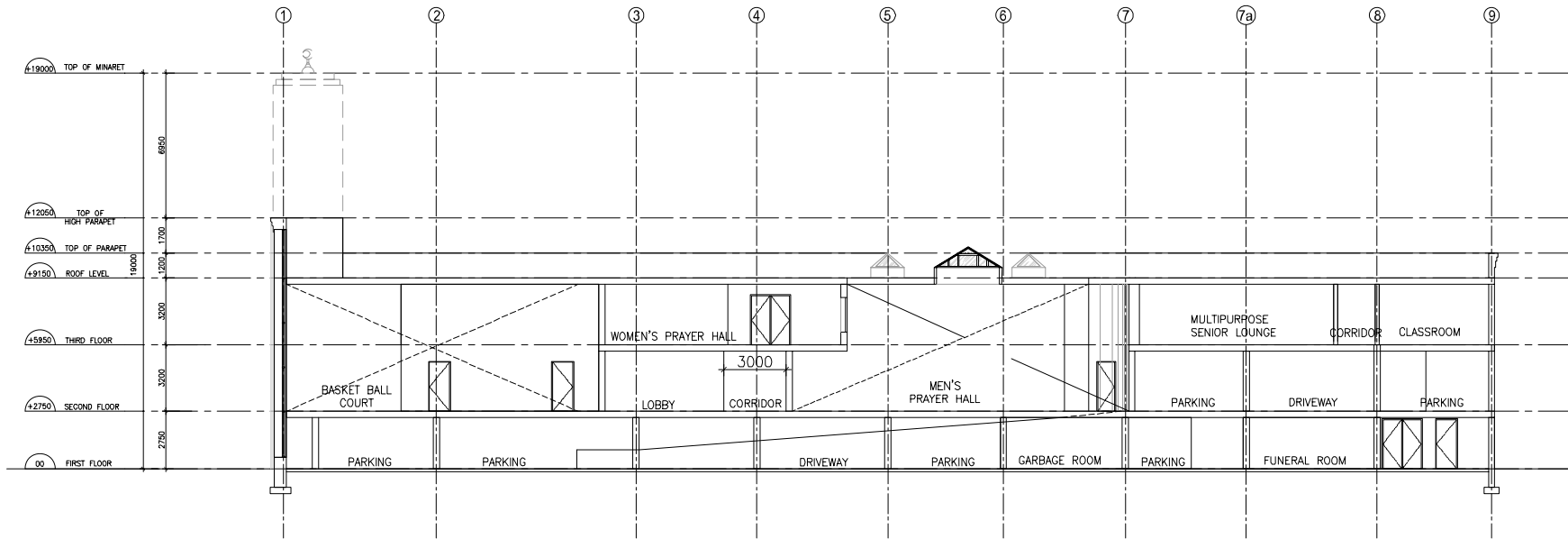
DRAWING TITLE:

## BUILDING SECTION

|                |                   |
|----------------|-------------------|
| DRAWN BY: JB   | DATE: 12 DEC 2022 |
| CHECKED BY: NM | SCALE: AS NOTED   |
| PROJECT NO.:   | DRAWING NO.:      |

22-71

**A-4.0**



1 BUILDING SECTION  
A-4.0 SCALE: 1:100

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## APPENDIX B

**TRANE**

Job Name: Moz Budget Pricing  
Prepared For:  
Unit Tag: JAIN - 12.5T  
Quantity: 1

**12.5 Ton Unit****Fan Section**

| Indoor Fan Data       |                 | Indoor Fan Performance       |                 |
|-----------------------|-----------------|------------------------------|-----------------|
| Airflow Application   | Downflow        | Airflow                      | 5000 cfm        |
| Design ESP            | 1.000 in H2O    | Supply Motor Horsepower      | 4.600 hp        |
| Component SP          | 0.432 in H2O    | Indoor Motor Operating Power | 2.864 hp        |
| Heat SP               | 0.000 in H2O    | Indoor RPM                   | 1634 rpm        |
| Total SP              | 1.432 in H2O    | Outdoor Fan Data             |                 |
| Indoor Fan Drive Type | Variable Direct | Outdoor Fan Drive Type       | Direct          |
| Indoor Fan Quantity   | 1.00 Number     | Outdoor Fan Quantity         | 1               |
| Indoor Fan Type       | BC Plenum       | Outdoor Fan Type             | Propeller       |
|                       |                 | Filters                      |                 |
|                       |                 | 1st Filter Size and Qty      | 3 - 24 x 18 x 2 |
|                       |                 | 2nd Filter Size and Qty      | 3 - 18 x 18 x 2 |

**Field Installed Accessories**

|   |                                   |
|---|-----------------------------------|
| Roof curb                               | 14" Full Perimeter Knockdown Curb |
| Economizer Conversion Kit               | None                              |
| Symbio Adv Controls and BACnet Conv Kit | None                              |

**Acoustics**

| Sound Path       | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz |
|------------------|-------|--------|--------|--------|-------|-------|-------|-------|
| Ducted Discharge | 85 dB | 90 dB  | 82 dB  | 74 dB  | 70 dB | 67 dB | 68 dB | 67 dB |
| Ducted Inlet     | 82 dB | 81 dB  | 76 dB  | 67 dB  | 64 dB | 61 dB | 61 dB | 60 dB |
| Outdoor Noise    | 88 dB | 91 dB  | 90 dB  | 87 dB  | 84 dB | 80 dB | 75 dB | 67 dB |

Note: Ducted Discharge/Ducted Inlet prediction data conform to AHRI 260

**Warranty**

|                    |                         |
|--------------------|-------------------------|
| Labor (first year) | 1st Yr Labor Whole Unit |
|--------------------|-------------------------|



**TRANE**

Job Name: Moz Budget Pricing  
Prepared For:  
Unit Tag: JAIN - 15T  
Quantity: 1

15 Ton Unit

**Field Installed Accessories**

Roof curb 14" Full Perimeter Knockdown Curb

Economizer Conversion Kit None

Symbio Adv Controls and BACnet Conv Kit None

**Acoustics**

| Sound Path       | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz |
|------------------|-------|--------|--------|--------|-------|-------|-------|-------|
| Ducted Discharge | 79 dB | 88 dB  | 77 dB  | 68 dB  | 63 dB | 59 dB | 59 dB | 57 dB |
| Ducted Inlet     | 78 dB | 84 dB  | 69 dB  | 63 dB  | 59 dB | 56 dB | 55 dB | 53 dB |
| Outdoor Noise    | 84 dB | 87 dB  | 88 dB  | 85 dB  | 82 dB | 77 dB | 74 dB | 69 dB |

Note: Ducted Discharge/Ducted Inlet prediction data conform to AHRI 260

**Warranty**

Labor (first year) 1st Yr Labor Whole Unit

**TRANE**

Job Name: Moz Budget Pricing  
Prepared For:  
Unit Tag: JAIN - 7.5T  
Quantity: 1

7 1/2 Ton Unit

**Fan Section**

| Indoor Fan Data       |                 | Indoor Fan Performance       |                 |
|-----------------------|-----------------|------------------------------|-----------------|
| Airflow Application   | Downflow        | Airflow                      | 3000 cfm        |
| Design ESP            | 1.000 in H2O    | Supply Motor Horsepower      | 3.000 hp        |
| Component SP          | 0.151 in H2O    | Indoor Motor Operating Power | 1.281 hp        |
| Heat SP               | 0.000 in H2O    | Indoor RPM                   | 1232 rpm        |
| Total SP              | 1.151 in H2O    | Outdoor Fan Data             |                 |
| Indoor Fan Drive Type | Variable Direct | Outdoor Fan Drive Type       | Direct          |
| Indoor Fan Quantity   | 1.00 Number     | Outdoor Fan Quantity         | 1               |
| Indoor Fan Type       | BC Plenum       | Outdoor Fan Type             | Propeller       |
|                       |                 | Filters                      |                 |
|                       |                 | 1st Filter Size and Qty      | 2 - 18 x 24 x 2 |
|                       |                 | 2nd Filter Size and Qty      | 3 - 24 x 16 x 2 |

**Field Installed Accessories**

|   |                                   |
|---|-----------------------------------|
| Roof curb                               | 14" Full Perimeter Knockdown Curb |
| Economizer Conversion Kit               | None                              |
| Symbio Adv Controls and BACnet Conv Kit | None                              |

**Acoustics**

| Sound Path       | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz |
|------------------|-------|--------|--------|--------|-------|-------|-------|-------|
| Ducted Discharge | 79 dB | 85 dB  | 77 dB  | 70 dB  | 65 dB | 62 dB | 62 dB | 63 dB |
| Ducted Inlet     | 75 dB | 74 dB  | 70 dB  | 58 dB  | 56 dB | 53 dB | 54 dB | 54 dB |
| Outdoor Noise    | 84 dB | 85 dB  | 84 dB  | 85 dB  | 82 dB | 76 dB | 73 dB | 67 dB |

Note: Ducted Discharge/Ducted Inlet prediction data conform to AHRI 200

**Warranty**

|                    |                         |
|--------------------|-------------------------|
| Labor (first year) | 1st Yr Labor Whole Unit |
|--------------------|-------------------------|

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# APPENDIX C

### Cadna/A ISO-9613 Calculation Protocol - Definitions

| Parameter     | Unit         | Definition  |
|---------------|--------------|---|
| <b>Nr</b>     |              | Ray Number  |
| <b>X</b>      | <b>(m)</b>   | X-axis Cartesian Coordinate   |
| <b>Y</b>      | <b>(m)</b>   | Y-axis Cartesian Coordinate   |
| <b>Z</b>      | <b>(m)</b>   | Z-axis Cartesian Coordinate   |
| <b>Refl.</b>  | <b>order</b> | Order of Reflection   |
| <b>DEN</b>    | <b>D/E/N</b> | Time of Day (Day, Evening, or Night)  |
| <b>Freq.</b>  | <b>(Hz)</b>  | 1/1 Octave Band Dominant Frequency or Frequency Type ("A" for A-weighted)         |
| <b>Lw</b>     | <b>(dBA)</b> | Overall Sound Power Level   |
| <b>I/a</b>    | <b>dB</b>    | Line/Area Source Correction   |
| <b>Optime</b> | <b>dB</b>    | Operating Time Correction   |
| <b>K0</b>     | <b>(dB)</b>  | D_omega in ISO 9613-2 (correction for radiation into solid angles less than 4 Pi) |
| <b>Di</b>     | <b>(dB)</b>  | Directivity Index   |
| <b>Adiv</b>   | <b>(dB)</b>  | Attenuation Due to Divergence   |
| <b>Aatm</b>   | <b>(dB)</b>  | Atmospheric Attenuation   |
| <b>Agr</b>    | <b>(dB)</b>  | Ground Attenuation  |
| <b>Afol</b>   | <b>(dB)</b>  | Attenuation Due to Foliage  |
| <b>Ahous</b>  | <b>(dB)</b>  | Attenuation from Houses   |
| <b>Abar</b>   | <b>(dB)</b>  | Barrier Attenuation   |
| <b>Cmet</b>   | <b>(dB)</b>  | Meteorological Correction   |
| <b>RL</b>     | <b>(dB)</b>  | Reflection Loss   |
| <b>Lr</b>     | <b>(dBA)</b> | Resulting Noise Impact at Receptor - Leq (1-Hr)                                   |

**Table C.1: Key Parameters Included in the Cadna/A Noise Modelling**

27 Winona Drive

| Parameter                | Value | Rationale  |
|--------------------------|-------|--|
| Ground Absorption        | 0.2   | Accounts for mostly hard ground (e.g., cement, pavement, packed dirt) surfaces between the proposed mosque and receptors of interest |
| Temperature              | 10 °C | Ontario standard conditions  |
| Relative Humidity        | 70%   | Ontario standard conditions  |
| Max. Order of Reflection | 2     | Accounts for reflections from buildings  |



Map Document: M:\AM\Jobs\2024\2406483\03\WorkItems\20\EnvironmentalNoiseAnalysis\ArcGIS\27 Winona Drive - Witchurch-Stouffville, Ontario.aprx



## Stationary Source Locations

Map Projection: NAD 1983 UTM Zone 17N  
27 Winona Drive - Witchurch-Stouffville, Ontario



|                            |             |
|----------------------------|-------------|
| Drawn by: CWM              | Figure: C.1 |
| Approx. Scale: 1:2,000     |             |
| Date Revised: Aug 19, 2024 |             |

Project #: 2406483



## Receiver

Name: 28 Fairview Avenue Potential Future Development - Worst-case Facade Receptor (10.5m Height)

ID: R04

X: 639759.55 m

Y: 4869959.91 m

Z: 10.50 m

Point Source, ISO 9613, Name: "15 Ton Unit", ID: ""

| Nr. | X<br>(m)  | Y<br>(m)   | Z<br>(m) | Refl. | DEN | Freq.<br>(Hz) | Lw<br>dB(A) | l/a<br>dB | Optime<br>dB | K0<br>(dB) | Di<br>(dB) | Adiv<br>(dB) | Aatm<br>(dB) | Agr<br>(dB) | Afol<br>(dB) | Ahous<br>(dB) | Abar<br>(dB) | Cmet<br>(dB) | RL<br>(dB) | Lr<br>dB(A) |
|-----|-----------|------------|----------|-------|-----|---------------|-------------|-----------|--------------|------------|------------|--------------|--------------|-------------|--------------|---------------|--------------|--------------|------------|-------------|
| 14  | 639710.69 | 4869974.97 | 10.65    | 0     | D   | A             | 87.1        | 0.0       | 0.0          | 0.0        | 0.0        | 45.2         | 0.3          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 0.0        | 44.0        |
| 28  | 639710.69 | 4869974.97 | 10.65    | 1     | D   | A             | 87.1        | 0.0       | 0.0          | 0.0        | 0.0        | 56.3         | 0.8          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 2.0        | 30.3        |

Point Source, ISO 9613, Name: "12.5 Ton Unit", ID: ""

| Nr. | X<br>(m)  | Y<br>(m)   | Z<br>(m) | Refl. | DEN | Freq.<br>(Hz) | Lw<br>dB(A) | l/a<br>dB | Optime<br>dB | K0<br>(dB) | Di<br>(dB) | Adiv<br>(dB) | Aatm<br>(dB) | Agr<br>(dB) | Afol<br>(dB) | Ahous<br>(dB) | Abar<br>(dB) | Cmet<br>(dB) | RL<br>(dB) | Lr<br>dB(A) |
|-----|-----------|------------|----------|-------|-----|---------------|-------------|-----------|--------------|------------|------------|--------------|--------------|-------------|--------------|---------------|--------------|--------------|------------|-------------|
| 34  | 639694.28 | 4869978.89 | 10.65    | 0     | D   | A             | 89.2        | 0.0       | 0.0          | 0.0        | 0.0        | 47.6         | 0.3          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 0.0        | 43.7        |
| 36  | 639694.28 | 4869978.89 | 10.65    | 1     | D   | A             | 89.2        | 0.0       | 0.0          | 0.0        | 0.0        | 56.9         | 0.8          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 2.0        | 31.9        |

Point Source, ISO 9613, Name: "7.5 Ton Unit", ID: ""

| Nr. | X<br>(m)  | Y<br>(m)   | Z<br>(m) | Refl. | DEN | Freq.<br>(Hz) | Lw<br>dB(A) | l/a<br>dB | Optime<br>dB | K0<br>(dB) | Di<br>(dB) | Adiv<br>(dB) | Aatm<br>(dB) | Agr<br>(dB) | Afol<br>(dB) | Ahous<br>(dB) | Abar<br>(dB) | Cmet<br>(dB) | RL<br>(dB) | Lr<br>dB(A) |
|-----|-----------|------------|----------|-------|-----|---------------|-------------|-----------|--------------|------------|------------|--------------|--------------|-------------|--------------|---------------|--------------|--------------|------------|-------------|
| 52  | 639699.96 | 4869959.85 | 10.65    | 0     | D   | A             | 86.4        | 0.0       | 0.0          | 0.0        | 0.0        | 46.5         | 0.3          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 0.0        | 42.0        |
| 57  | 639699.96 | 4869959.85 | 10.65    | 1     | D   | A             | 86.4        | 0.0       | 0.0          | 0.0        | 0.0        | 56.0         | 0.8          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 2.0        | 29.9        |
| 62  | 639699.96 | 4869959.85 | 10.65    | 2     | D   | A             | 86.4        | 0.0       | 0.0          | 0.0        | 0.0        | 56.1         | 0.8          | -2.4        | 0.0          | 0.0           | 0.0          | 0.0          | 13.3       | 18.5        |