# ENVIRONMENTAL NOISE & VIBRATION IMPACT STUDY

## Proposed Townhouse Development
## 7956 Spring Blossom Drive
## Niagara Falls, ON
## L2H 3G7

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## EXECUTIVE SUMMARY

Vintec Acoustics was retained by PVG Plumbing to prepare a noise and vibration impact study for the proposed townhouse residential development located at 7956 Spring Blossom Road, Niagara Falls, ON L2H 3G7 to support the zoning bylaw amendment (ZBA) AND rezoning from R1E to R4 land use. The proposed development features seven (7) townhouse units accompanied by 17 designated parking spaces that are located within a residential area that is just north of a commercial corridor located along Lundy's Lane. The proposed site shall be located about 925m east of Queen Elizabeth Way, about 580m east from Montrose Road and about 480m west from Kalar Road.

This study provides an assessment of the anticipated site noise impacts from road traffic on Lundy's Lane, QEW and other local roads as per data data procured from the Ministry of Transportation of Ontario (MTO), and site-specific reference traffic studies. The development is not in proximity to a railway right of way; hence, rail noise and vibration is not relevant this development.

The study has also considered potential noise impact from nearby retail commercial land use located in the study area which includes a local restaurant, motel and a PETRO convenience car wash located to the south of the proposed development property. The Petro car wash and motel currently operate 24/7 with curtailed evening and nighttime. The restaurant hours are typically within the day/evening hours ranging from 700am-1100pm.

An assessment of the road traffic noise impact was completed. Applicable noise and vibration control measures, which include warning clauses, façade design and an acoustic barrier were recommended such that Municipal noise requirements, which are based on the guidelines defined in the NPC-300 [1] publication provided by the Ministry of Environment, Conservation and Parks (MECP) are satisfied.

In due diligence, this noise and vibration impact study has also considered the potential noise impact of the proposed project on the existing community as well as the potential noise impact of the project on itself.

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## 1.0 INTRODUCTION

Vintec Acoustics Inc. was retained by PVG Plumbing to prepare a noise and vibration impact study for the proposed townhouse residential development located at 7956 Spring Blossom Road, Niagara Falls, ON L2H 3G7 to support the zoning bylaw amendment (ZBA) and rezoning from R1E to R4 land use. The proposed development is located on approximately 1864.2 $m^2$ of land and shall comprise of townhouses with an area of 60.7 $m^2$; and is located in between Spring Blossom Drive and Lundy's Lane as shown per key plan presented in Figure 1.

The proposed development features seven (7) townhouse units accompanied by 17 designated parking spaces and the project is located within a residential area that is just north of a commercial corridor located along Lundy's Lane. A site plan showing the proposed town home arrangement is provided in Figure 2a. The subject property is located about 925m east of Queen Elizabeth Way, about 580m east from Montrose Road and about 480m west from Kalar Road. This study provides an assessment of the anticipated site noise impacts from road traffic on the roads and freeway mentioned above. Traffic data has been procured from the Ministry of Transportation (MTO), site specific reference traffic review [2] completed on behalf of the city, and NiagaraOpenData. The designated calculation locations are within the development are identified in Figure 2b. The development is not in proximity to a railway right of way; hence, rail noise and vibration is not relevant this development.

The study area has examined a 300m perimeter for proximity to existing commercial and industrial facilities and potential noise impact from stationary noise sources as defined by Ministry of Environment, Conservation and Parks (MECP) publication NPC 300 [1]. This includes the Petro Canada gas station & car wash facility located about 30m south of the proposed development property, the City South Pizza Restaurant located about 15-20m to the southwest and the A-1 Motel which is about 35 to 40m away.

The primary stationary noise focus of this study is the convenience Petro Canada car wash located to the south as it operates on a 24/7 basis. During peak periods, maximum projected usage includes 10-12 vehicles per hour during the daytime hours (0700-2300), about 6 to 7 vehicles per hour in the evening and about 1 to 2 vehicles per hour during nighttime.

Figures 2a and 2b illustrate a plan view of the key façade and outdoor amenity areas within the project that have been identified for noise assessment and analysis purposes.

It is worth noting at the outset that locating the OLA on the north side does shield it from noise sources to the south.

Applicable noise control measures that include façade design, acoustic fences, and warning clauses have been recommended such that the requirements defined by NPC-300 can be met at the nearest facades and outdoor amenity locations. The recommended noise control measures are typical of residential developments which are adjacent to local arterial roads.

This ENVIS has also considered the effect of the project on itself and the effect of the project on the environment. Regarding the latter, a residential project is not expected to be a significant source of noise in the community. The project's potential noise impact on the existing community has been examined with respect to planned central AC equipment as well as vehicular traffic that is generated by the development itself. The analysis demonstrates that traffic generated by the proposed development is a minimal contributor to future traffic noise levels in the area; and that along with the selection of quiet central AC units, the proposed project is not expected to be a significant noise contributor in the community.

## 2.0 NOISE CRITERIA

The applicable guidelines for new residential development within the city of Niagara Falls are those outlined in NPC-300, for noise assessment in land use planning. The applicable Class 1 and Class 2 sound limits for the proposed development are described in Table A. Based on the site-specific features and proximity of Lundy's Lane and local commercial uses, the proposed development area is urban and is designated as a Class 1 site, as defined by MECP in NPC-300.

**Table A: NPC 300 (Class 1 and 2) Limits for the Client Facility**

| Time of Day | Stationary Source Sound Limits<br>Class 1 (2) |
|---|---|
| **Plane of Window,** 7:00 am to 7:00 pm | 50 dBA (50 dBA) |
| **Plane of Window,** 7:00 pm to 11:00 pm | 50 dBA (50 dBA) |
| **Plane of Window,** 11:00 pm to 7:00 am | 45 dBA (45 dBA) |
| **Outdoor Amenity,** 7:00 am to 11:00 pm | 50 dBA (45 dBA) |

## 2.1 Outdoor Noise Criteria-Transportation Sources

The daytime noise criterion defined in NPC-300 for designated outdoor amenity, outdoor living areas, (OLA) is 50 dBA for vehicular transportation corridors, i.e., road and rail noise sources. Where it is not technically, economically, or administratively feasible to meet the 55 dBA limit, sound levels of up to 60 dBA are permissible with warning clauses. Where the daytime sound level is greater than 60 dBA, noise control measures are usually required to reduce the sound level to 60 dBA or less.

The project has included proposed outdoor living areas with each unit along with protected outdoor landscaped space. It is proposed to ensure that sound levels within the development are within acceptable limits, i.e., 50 dBA and less than 60 dBA with a warning clause, as defined by NPC-300.

Current drawings show that the residential units are not expected to have any elevated balconies but only outdoor living areas. Notwithstanding, balconies in residential buildings are typically not considered as OLAs unless both of the following conditions exist, they are at least 4m in depth and there is no provision for protected amenity space within the development. Neither condition exists in this case; hence any proposed balconies do not require acoustic protection.

Contribution to outdoor noise levels that are attributable to development generated traffic has also been considered in this study. Based on a review of the proposed project details, the subject development is expected to generate some traffic that will be introduced into the existing community. There is a project provision for 17 parking spaces; and this translates into additional daily movements of up to approximately 68 to 85 vehicle cycles (at least 4 movements per household per day).

Based on the existing noise levels in the development area that is attributable to vehicular traffic from local roads, the anticipated additional traffic under worst case conditions is expected to add less than 1 dB(A) which does not represent a significant impact to current ambient sounds in the study area. Changes in environmental noise levels of less than 3 dB(A) are not expected to be noticeable nor significant. Therefore, as per this analysis, any development generated traffic is not expected to impact the existing local community with respect to additional vehicular traffic noise.

## 2.2 Indoor Noise Criteria

For road traffic noise sources, the indoor sound level limits for the living/dining areas are 45 dBA during daytime hours (7:00 am – 11:00 pm). For sleeping quarters, the indoor sound level limit is 40 dBA during night-time hours (11:00 pm- 7:00 am).

An approximate 3 dB(A) margin of conservatism therefore exists for the exterior wall and window (façade) design assessment of this project. This methodology shall help to ensure a quiet indoor environment, with windows closed, given the proximity of Lundy's Lane and expected growth and within the study area.

## 2.3 Exterior Building Facade Noise Criteria

Where the sound levels at the exterior of the building facades (i.e., plane of window) exceed 55 dBA at living/dining room windows during daytime hours and 50 dBA at bedroom windows during night-time periods, the unit must be provided with forced air heating with provision for central air conditioning. Central air conditioning must be incorporated into the building design prior to occupancy for conditions where sound levels exceed the 55/50 dBA plane of window criterion by more than 10 dB (i.e., 65 dBA at living/dining room windows and 60 dBA at bedroom windows). Warning clauses are applicable as well. Central air conditioning is proposed for the project, and the appropriate noise warning clause requirements (Clause B in Appendix D) will be specified.

## 2.4 Noise Criteria and Discussion of Stationary Noise Sources

For stationary noise sources, the applicable MECP criteria at a point of reception (POR) are dictated by Publication NPC-300 for Class 1 & 2 Areas. These guidelines state that the one-hour sound exposures (Leq, 1 hour (dBA) or LLM in dBAI) from stationary noise sources in a Class 1 area, at the plane of an open window, shall meet the following:

- the higher of 50 dBA or background noise between 0700h and 1900h.
- the higher of 50 dBA or background noise between 1900h and 2300h; and
- the higher of 45 dBA or background noise between 2300h and 0700h.

If the background noise is higher than the exclusionary limits, the background noise can be used as the limit. The minimum exclusion sound limits defined by NPC 300 are applicable for this site.

A local zoning map is shown in Figure 3, and it illustrates the current zoning of areas located in the vicinity of the development. Current operation of the Petro Canada Car wash station is considered TC zoning, which represents the tourist commercial classification for Class I area activities.

To further assess the potential noise impact, an outdoor sound propagation model based on ISO-9613 [3] as required by MECP, was applied to three scenarios: the car wash station, the motel and the pizza shop. Each scenario was evaluated individually, with the focus on the car wash station. The car wash station which was designed to simulate the worst-case scenario was done to estimate the cumulative effects of the noise emissions to the proposed townhouse development. A review of the predicted sound level data indicates that noise impacts may be influenced by the car wash doors on the north side when they open. This source was assessed as to be exceeding the applicable NPC-300 limits within the study area. A schematic showing the acoustic model simulation is given in Appendix E. A review of the anticipated noise impact from the car wash station is further discussed in Appendix E along with guidelines for noise management plans.

The results of the acoustic model have been analyzed to develop noise management measures to assist in realizing acoustic compliance at the proposed development. As outlined, the industrial facilities located in the area are considered light commercial uses and thus are not expected to represent a significant noise impact risk as defined in the MECP D-6 Guidelines [4].

### 2.5 Potential Noise Impact of the Development on Itself

In a multi-unit, residential development, architectural and mechanical noise control is often required to ensure an acceptable living environment. The potential noise impact of the project on itself typically considers the following possible scenarios:

1. Airborne noise heard between suites and in particular demising partitions.
2. Airborne and structure borne noise from mechanical and/or electrical equipment.
3. Activity generated sounds from common room spaces and amenities that may be heard by adjacent suite occupants and/or tenants.

It is proposed to meet building code and follow best practices to ensure minimal potential noise impacts and compliance with acoustic requirements defined in TARION Bulletin 19R, especially regarding the certification of construction drawings and the certification and/or acoustic performance testing and verification for the “as built” condition of the building.

## 3.0 NOISE IMPACT ASSESSMENT

The main sources of transportation noise affecting the proposed development include Lundy’s Lane, Beaverdam’s Road, Kalar Road, Montrose Road and the Queen Elizabeth Way. The sound levels at the proposed development due to road traffic were calculated using the MECP software STAMSON, Version 5.04 [5].

### 3.1 Road Traffic Data

The Annual Average Daily Traffic (AADT) volumes for Queen Elizabeth Highway (QEW) was acquired from the 2021 Ministry of Transportation database, and the volumes for Lundy’s Lane, Beaverdam’s Road, Kalar Road, Montrose Road were acquired from the NiagaraOpenData database. The data used in this analysis is per Table 1a and presented in Appendix C.

The traffic data provided was projected 10 years to the year 2044 using an estimated annual growth rate of 2% for vehicular traffic volumes on Lundy’s Lane, Beaverdam’s Road, Kalar Road, Montrose Road and QEW. The posted speed limit has been used in this analysis and as noted this represents a conservative methodology which is representative of the way the project has been assessed.

The applicable noise criteria for this proposed development includes specific sound level requirements in the outdoor living areas (OLA) and at the plane of window for living rooms and bedrooms. The daytime noise criterion for OLA’s is 55 dBA for road noise. Where it is not technically, economically, or administratively feasible to meet the 55 dBA limit, sound levels of up to 60 dBA may be permissible with warning clauses. Where the daytime sound level is greater than 60 dBA, noise abatement measures are required to reduce the sound level to below 60 dBA and/or as close as possible to 55 dBA. The indoor sound level limits for the living/dining areas are 45 dBA during daytime hours (7:00 am – 11:00 pm) and 40 dBA for sleeping quarters.

An appropriate day/night split was used for the subject roads. More specifically, the daytime and night-time noise levels are estimated by applying correction factors of (+1 dB, -3 dB) to the 24 hr Leq for Lundy's Lane, Beaverdam's Road, Kalar Road, Montrose Road which is conservative. Using the projected road traffic data acquired as per the noted methodology, sound levels were calculated using STAMSON and are included in Table 1a in Appendix A.

The details of road traffic data and STAMSON calculation samples are provided in Appendix C. The results of our traffic noise assessment, conducted in accordance with MECP publication NPC-300 indicates that warning clause provisions will therefore be necessary. Please see Clause A, as shown in Appendix D, as this will be required to inform future building owner/occupants of potential noise from the vehicular transportation corridors in the area.

## 3.2 Noise Impact of the Development Itself

### 3.2.1 Guidelines and Criteria

**Airborne Noise Insulation**

The proposed development is required to satisfy the general requirements of the Ontario Building Code. The construction of the partitions within a residential building are proposed to meet the following minimum STC (Sound Transmission Class) requirements.

| | |
|---|---|
| Dwelling/Dwelling – Wall or Floor/Ceiling | STC of 50 (STC 55 recommended) |

**Impact Noise Insulation**

It is recommended that the construction of partitions within a residential building shall meet the Ontario Building Code (OBC) recommendations to minimize impact noise between units and above and below units. It is understood that the proposed dwellings are not stacked townhomes; however, if this becomes applicable, then there shall be consideration to address the degree of Impact Insulation Class (IIC) between suites.

Please note that the noted IIC rating is referenced herein accordingly as a recommendation only and is not a specific Code requirement.

| | |
|---|---|
| Suite/Suite – Wall or Floor | IIC 50/55 |

**Noise Criteria**

Where the sound levels at the exterior of the building facades (i.e., plane of window) exceed 55 dBA at living/dining room windows during daytime hours and 50 dBA at bedroom windows during night-time periods, all units must be provided with forced air heating with provision for central air conditioning. Warning Clause B, as shown in Appendix D shall be required to inform future building owner/occupants of the implementation of forced air heating conditioning system.

Central air conditioning must be incorporated into the building design as a noise mandated requirement prior to occupancy for conditions where sound levels exceed the 55/50 dBA plane of window criterion by more than 10 dB(A) (i.e., 65 dBA at living/dining room windows and 60 dBA at bedroom windows). The proposed central air conditioning units in this housing development should be rated accordingly to minimize potential noise impact; namely that central AC units shall have an acoustic emission rating at 7.3 bels or less, in accordance with MECP publication, NPC-216 [6]. Ideally, the central air conditioning units shall also be placed in a noise insensitive area that is optimally shielded from neighbouring homes.

Furthermore, the interior noise associated with the mechanical/electrical equipment operation should satisfy the NC (Noise Criteria) recommended by ASHRAE (American Society of Heating and Air-conditioning Engineers HVAC Handbook). The criteria as follows:

| | |
|---|---|
| ***Living Rooms, Dining Rooms*** | ***NC-30 to 35*** |
| ***Bedrooms*** | ***NC-25 to 30*** |
| ***Washrooms*** | ***NC-35 to 40*** |

### 3.2.2 Recommendations

It is proposed to follow noise and vibration guidelines to minimize noise impact potential and to ensure acceptable noise levels for future owners and/or tenants within the proposed residential dwellings. It is recommended that the demising walls between adjacent dwelling units shall meet an STC rating of 55.

- An assessment of the noise impact of the project on the existing environment was also conducted. In this regard, the noise levels from outdoor mechanical equipment such as residential air conditioning units shall not exceed the NPC-216 limits [6] defined by MECP

and included as part of NPC-300. Quiet AC units, with ARI ratings of less than 7.3 bels or less shall therefore be considered. Furthermore, the central air conditioning units shall also be placed in a noise insensitive area and where possible is optimally shielded from neighbouring homes.

- In addition, regarding the impact of the project on itself, it is recommended that an acoustic design review of the proposed demising separations and mechanical equipment selection be undertaken to comply with the acoustic requirements defined in TARION Bulletin 19R.
- Please note that the TARION Bulletin 19R Certification process requires that construction (architectural and mechanical also) drawings and the "as built" condition of the project be tested as required to confirm acoustic performance and to meet the relevant building code, and best practices requirement for acoustic design.

## 4.0 INDOOR AND OUTDOOR NOISE REQUIREMENTS

### 4.1 Outdoor Noise Levels

**Traffic Noise Impact due to Lundy's Lane, and other road traffic**

The project evaluates the noise impact at specific locations, including outdoor living areas (OLAs) on the north and south sides, as well as plane of windows on the north, east and south elevations of the townhouse units shown in Figure 2b. The predicted sound levels for the development at these locations were in the range of 51 to 56 dBA as shown in Table 2a. The addition of a 2.44m acoustic fence on the south side did not affect the sound levels from Lundy's Lane, which remains within the direct line of sight from the street. The proposed fence is conceptually illustrated in Figure 2c.

**Stationary Noise Impact due to local stationary noise sources**

Commercial land use located to the south of the proposed development requires assessment to ensure adherence to the NPC 300 limits defined by MECP. The stationary noise sources of concern include the City South pizza fast food restaurant, the Petro Car wash and the A-1 motel. There is another family restaurant that is in proximity to the proposed development, and it is presently closed and unoccupied and thus has not been considered in this assessment. All other stationary noise sources are located at least 150m further to the south and east. This setback

meets the minimum setback assessment requirements as defined by the MECP D-6 publication [4]. Therefore, in accordance with the MECP D-6 guidelines which have also been summarized and presented at the beginning of Appendix E, low potential for noise impact is expected. A basic guideline is that the demonstration of acoustic compliance at the nearest commercial stationary sources is realized, then compliance typically follows at other moderate commercial facilities that are further setback from the site. It is also noteworthy that each stationary noise source is assessed individually to be below the applicable NPC 300 limits.

The Petro Canada gas station & car wash facility is located about 30m south of the proposed development property and car wash equipment represents the main source of noise emissions. The City South Pizza Restaurant located about 15-20m to the southwest and rooftop cooling and exhaust air source emissions dictate off site noise impacts. Similarly, the A-1 Motel which is about 35 to 40m away comprises of motel room cooling equipment and ventilation air.

The primary stationary noise focus of this study is the convenience Petro Canada car wash located to the south as it operates on a 24/7 basis. During peak periods, maximum projected usage includes 10-12 vehicles per hour during the daytime hours (0700-2300), about 6 to 7 vehicles per hour in the evening and about 1 to 2 vehicles per hour during nighttime. Each vehicle car wash cycle lasts approximately 4 minutes, including a brief door opening for 10-30 seconds at the north entrance and 30 seconds at the south exit. As noted, each car wash lasts for about 4 minutes and the equipment consists of pressurized washing sprays within thew car bay and car was drying blower equipment located towards the south end. Please note that any waste pick-ups or occasional shipping or delivery of goods is exempted from assessment as defined by MECP in NPC-300.

### 4.2 Indoor Noise Levels

The predicted sound levels at the key receptor areas are summarized in Table 2a for road noise under both daytime and night-time conditions. Window glazing that meets the minimum requirements defined by the Ontario Building Code will suffice for most of the project, particularly at the lower floor levels as defined in this project. For instance, a double-glazed thermal pane window system such as 6-13-6 mm (i.e., pane-gap-pane) or equivalent should suffice for the project as summarized in Table 3.

The predicted daytime sound levels at the upper storeys of the proposed townhouse blocks are below 65 dBA; hence, central air conditioning is not an acoustically mandated noise control requirement for the project but forced air ventilation with rough in air conditioning (AC) provision is required. Provision has nonetheless been made to supply central AC. Warning Clause B, as described in Appendix D is applicable as forced air with central AC rough-in is a minimum requirement for noise control reasons in this project.

The façade design, glazing calculations and noise control recommendations are based on approximate window to floor area ratios of 20% and 32% for bedrooms and living rooms, respectively. The operable windows for living rooms and bedrooms are to be designed to meet window glazing acoustic performance that is in the range of up to approximately STC 35. A window glazing schedule showing the required façade requirements for the respective areas in the project is given in Table 3.

It is proposed that any window glazing sizes and schedules provided by a supplier shall be reviewed by the acoustical consultant to ensure conformance with the recommendations in this report as well as the acoustic requirements defined by TARION Bulletin 19R. The effective glazing requirement is a direct function of the size of the window relative to the room floor area. A higher ratio of glazing in comparison to the ratios used in this study would entail a higher acoustic performance rating for glazing; similarly, a lower ratio means that the glazing requirement can be relaxed.

### 4.3 Noise Impact of the Development on Itself

Preliminary noise and vibration control guidelines pertaining to the noise and vibration controls within the residential building is discussed in section 3.2 of this noise impact study. It should be noted that limited information on the building (i.e., no detailed description of proposed building construction or proposed mechanical and electrical equipment) was available at the time that this report was prepared.

Drawing review, acoustic certification, and testing of building details as well as mechanical and electrical drawings is recommended to satisfy the TARION Bulletin 19R reporting and acoustic certification requirements.

## 4.4 Recommendations for Noise Impact from Stationary Noise Sources

The study has identified that noise from current operations at all 3 stationary noise sources under review: Petro Canada convenience car wash, City South Pizza and A-1 Motel require an outdoor sound propagation assessment. Predictable worst-case scenarios have been modeled and simulated for each facility, independently with the iNoise ISO-9613 based outdoor sound propagation model in accordance with MECP protocols. Mitigated sound levels (with a 2.44m acoustic fence as described below) for the predictable worst-case conditions in each are in the range of about 45 to 49.9 dBA. It is noteworthy to reiterate that the upper end represents maximum levels (i.e., predictable worst case) and it is expected that sound levels are likely to be below these levels most of the time. The noise analysis and corresponding results of the stationary source noise levels at each receptor are summarized in Appendix E.

It was found that acoustic compliance can be realized with the implementation of the following conditions:

An acoustic barrier, 2.44metres shall be installed on the south side of the development property line (i.e., running E-W) and it shall span at least 30 meters, as shown and an additional 2-meter acoustic barrier running N-S from the southeast corner of the townhouse to where it intersects and links with the E-W fence. This fence is illustrated conceptually in Figures 2c and 5b.

It is worth noting at the outset that locating the OLA on the north side does shield it from noise sources to the south; however, the presence of stationary noise sources dictates the site-specific requirement for an acoustic fence regardless of where the OLA is placed, and this is due to main floor plane of window points of reception.

For conservatism, noise management measures are recommended and are expected to include receptor-based noise control measures as summarized below. It should be noted that receptor-based noise control measures such as an acoustic fence may require site plan reference. A conceptual outline of the noise mitigation planning considerations that have been examined in this study are as follows:

**Receptor-based conceptual noise control measures:**

- A 2.44m acoustic fence is recommended to be placed on the south side of the rear yard amenity area (OLA). This measure effectively attenuates the industrial noise at the west OLA locations by about 5 dB(A). The modelling results of the unmitigated condition and with the acoustic fence installed are provided respectively in Table 5ab. The recommended OLA protection barrier is schematically presented in Figure 2c. Please note that any recommended acoustic barrier shall be continuous with no gaps nor discontinuities and meet a surface weight of at least 4 psf (20kg/sqm). An earthen berm easily meets this requirement. A flanking sound wall, such as an acoustic wooden fence or equal on the east side of the townhouse block will minimize sound flanking into the OLA. Transparent acrylic panel barriers or mass-loaded vinyl acoustic fence barriers can be employed or an approved equivalent from AIL Wall Systems, NEXCEM, Durisol, Stubbe Whispercrete or others that meet these requirements are an acceptable alternative to composite and/or wooden sound walls.
- It is also noteworthy that building construction shall meet the requirements shown in Table 3 where standard building construction which satisfies the Ontario Building Code (OBC) requirements will suffice for most of the development.
- Warning clause provisions are itemized in Appendix D and included is consideration of a warning clause on title to inform future occupants of potential noise from local commercial facilities.

## 5.0 CONCLUSIONS

This environmental noise and vibration impact study has been prepared to address potential road traffic noise on the proposed development; namely, the collective noise contributions from traffic on Lundy's Lane, Beaverdam's Road, Kalar Road, Montrose Road and the Queen Elizabeth Way.

The study also addresses stationary noise sources located in proximity to the study area. This includes particular focus on the Petro car wash facility which represents a low to moderate risk for noise impact to future elevated receptors (i.e., open plane of window scenario) that may have a direct sight line to the facility. A noise management plan has been recommended and includes an acoustic fence barrier and a warning on title per Appendix D to inform future townhome residents and occupants of the proximity of the subject commercial noise sources.

Applicable noise control measures such as an acoustic fence for the south property line of the development have been recommended, Minimum window glazing requirements have been similarly recommended along with forced air ventilation for noise control reasons. It is noteworthy that central air conditioning units will also be provided and that any air-cooled condensing units shall be selected for low noise impact, i.e. ARI 275 rating of less than 7.3 bels or less) with warning clause provisions for affected areas, given that forced air ventilation is required for both OBC compliance and satisfying MECP guidelines for environmental noise assessment in land use planning. The recommended noise control measures are summarized accordingly.

This noise impact study has also considered the noise impact of the project on the environment; and it has provided guidelines and recommendations to address the potential noise impact of the development on itself.

## 6.0 REFERENCES

1. Ontario MECP, NPC- 300, Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning.
2. Paradigm Transportation Solutions Limited, 8885 Lundy's Lane, Niagara Falls , Transportation Impact Study Update, January 2024.
3. Ministry of the Environment Publication D-6, Compatibility between Industrial Facilities and Sensitive Land Uses, July 1995.
4. ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.
5. Ministry of the Environment's STAMSON/STEAM Computer Programme, (Version 5.04), 1989.
6. Ministry of Environment Publication NPC-216, "Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices, 1994 (now part of NPC-300).

# APPENDIX A SUMMARY TABLES

**Table 1a: Projected Road Traffic Volumes (see Appendix C Calculations)**

| Parameters | Lundy's Lane | Beaverdam's Road | Kalar Road | Montrose Road | Queen Elizabeth Way |
|---|---|---|---|---|---|
| Projected 2040 AADT | 19270 | 5120 | 10310 | 5300 | 76500 |
| Percentage Growth | 2% | 2% | 2% | 2% | 2% |
| Number of years of growth | 10 | 10 | 10 | 10 | 24 |
| No. of Lanes | 4 | 4 | 4 | 4 | 8 |
| Percentage of Medium Trucks | 3.5% | 4% | 3% | 3% | 5% |
| Percentage of Heavy Trucks | 2.5% | 3% | 2% | 2% | 8% |
| Speed Limit (km/hr) | 60 | 60 | 60 | 60 | 100 |
| Grade | <2% | <2% | <2% | <2% | <2% |

**Table 2a: Calculated Noise Levels Due to Projected Road Traffic dBA & $L_{eq}$ (all in dBA)**

| Time | Receptor Name | Height (m) | Resultant dB(A) | Lundy's Lane Leq | Beaverdam's Road Leq | Kalar Road Leq | Montrose Road Leq | Queen Elizabeth Way Leq |
|---|---|---|---|---|---|---|---|---|
| Daytime | POR1_OLA | 1.5 | 54 | 53 | 32 | 31 | 28 | 46 |
| | POR1 | 4.5 | 54 | 53 | 32 | 31 | 28 | 46 |
| | POR2 | 4.5 | 54 | 52 | 33 | 32 | 29 | 46 |
| | POR3_OLA | 1.5 | 53 | 52 | 32 | 31 | 28 | 46 |
| | POR3 | 4.5 | 54 | 53 | 33 | 32 | 29 | 46 |
| | POR1_OLA (w/>2m barrier) | 1.5 | 54 | 53 | 32 | 31 | 28 | 46 |
| Nighttime | POR1_OLA | 1.5 | 51 | 50 | 28 | 27 | 24 | 46 |
| | POR1 | 4.5 | 51 | 50 | 28 | 27 | 24 | 46 |
| | POR2 | 4.5 | 50 | 49 | 29 | 28 | 25 | 46 |
| | POR3_OLA | 1.5 | 49 | 48 | 28 | 27 | 24 | 46 |
| | POR3 | 4.5 | 50 | 49 | 29 | 28 | 25 | 46 |
| | POR1_OLA (2m barrier) | 1.5 | 50 | 49 | 28 | 27 | 24 | 46 |

**Table 3: BUILDING CONSTRUCTION AND FAÇADE DESIGN REQUIREMENTS**

- **WINDOW GLAZING:** **STC 35 WILL SUFFICE FOR THIS PROJECT (i.e., 6mm-13mm-6mm) thermal double pane**
- **EXTERIOR WALLS, DOORS, ETC.:** **ANY CONSTRUCTION THAT MEETS OBC REQUIREMENTS WILL SUFFICE**
- **CENTRAL AIR CONDITIONING WILL BE PROVIDED:** **QUIET CONDENSING UNIT WILL BE SELECTED TO MEET AN ARI-275 RATING OF 7.3 bels or less; air condensing unit shall be in a noise insensitive area.**

# APPENDIX B- REPORT FIGURES & PROJECT DRAWINGS

## APPENDIX B: FIGURE 1: KEY PLAN SHOWING THE PROPOSED TOWNHOUSE DEVELOPMENT AT 7956 SPRING BLOSSOM DRIVE, NIAGARA FALLS, ON L2H 3G7.

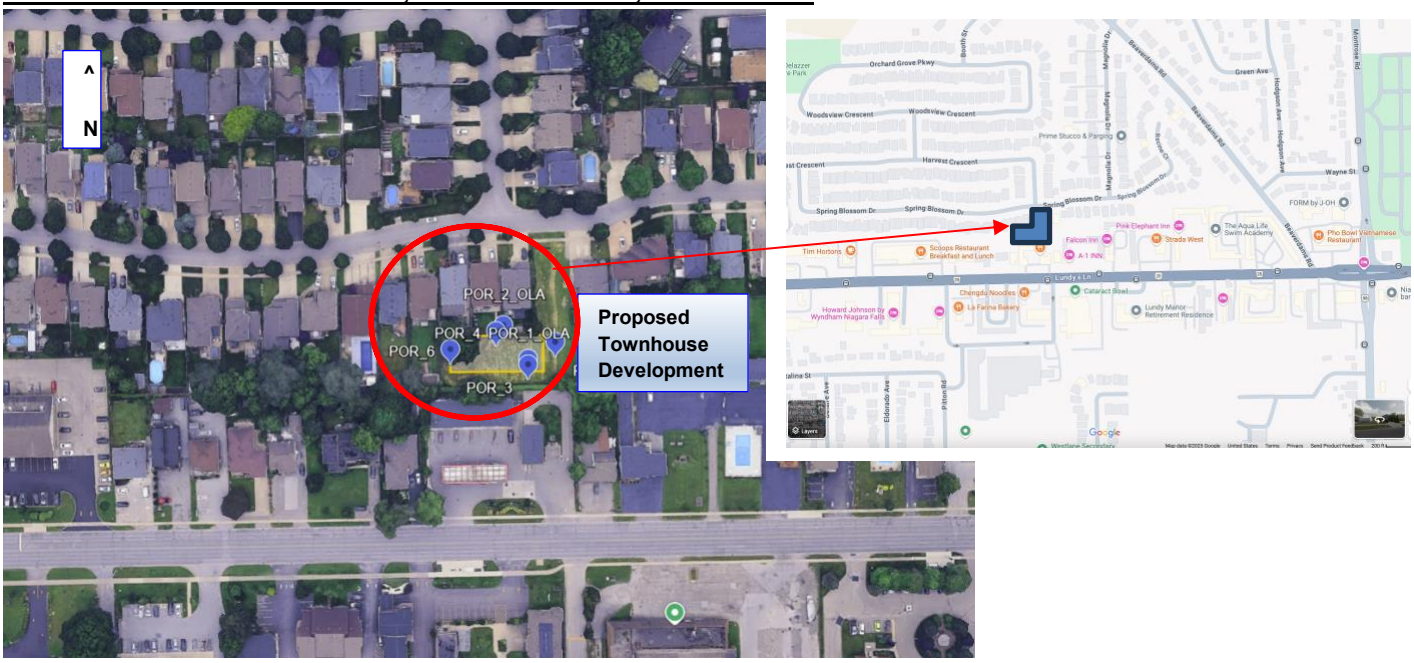


Figure 2a: Site Plan with Development Layout at 7956 Spring Blossom Dr.

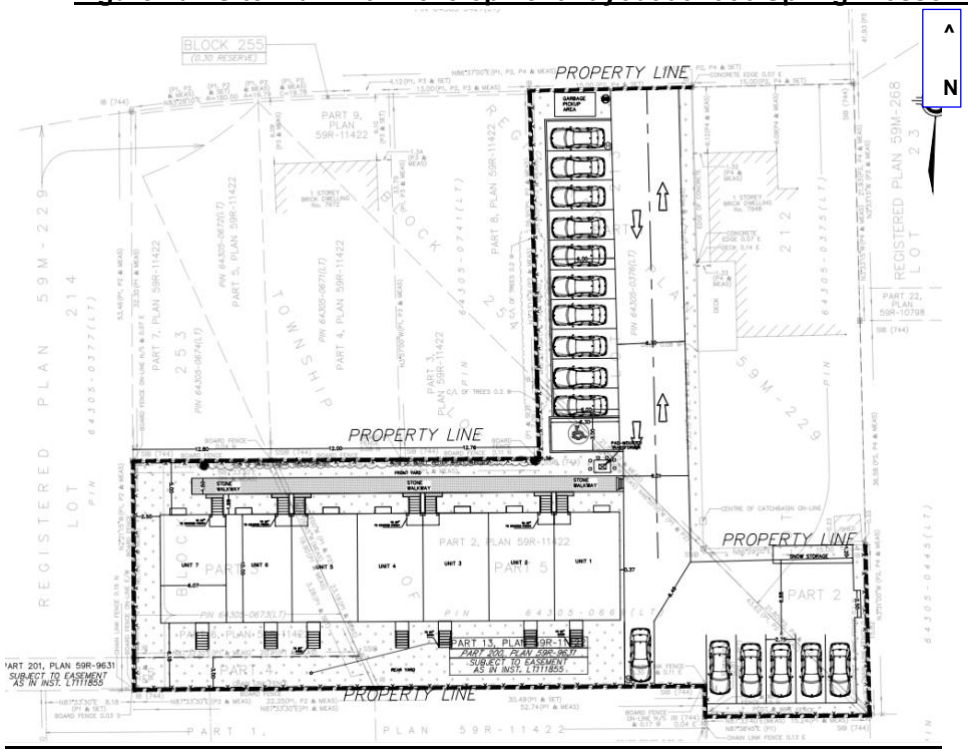


Figure 2b: Site Plan showing Development calculation Locations

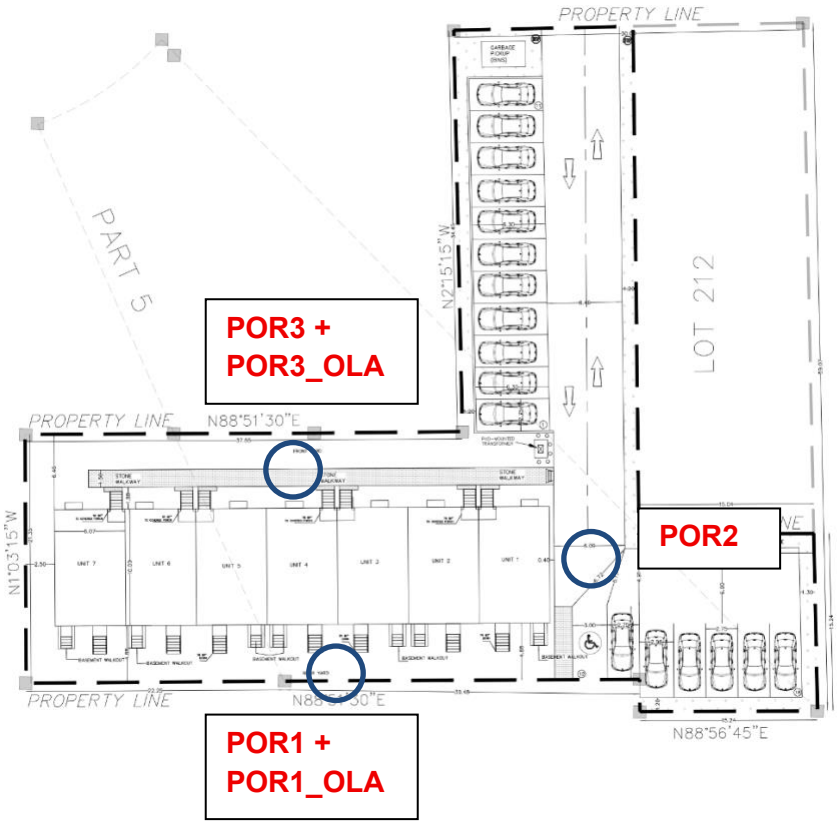


**Figure 2c: Site Plan showing Conceptual Acoustic Fence**


**Figure 3: Zoning Maps of Study Area**


**CLASSIFICATION OF ZONES, see Section 3**

(For reference purposes only - not to form part of by-law)

The new zoning by-law proposed to utilize 39 types of use zones as follows:

| ZONES | SHORT TITLES | PAGE |
|---|---|---|
| Residential 1A Density Zone | R1A | 61 |
| Residential 1B Density Zone | R1B | 62 |
| Residential 1C Density Zone | R1C | 63 |
| Residential 1D Density Zone | R1D | 64 |
| Residential 1E Density Zone | R1E | 65 |
| Residential 1F Density Zone | R1F | 66 |
| Residential Mobile Home Park Zone | RMP | 67 |
| Residential and Two Zone | R2 | 69 |
| Residential Mixed Zone | R3 | 71 |
| Residential Low Density, Group Multiple Dwelling Zone | R4 | 73 |
| Residential Apartment 5A Density Zone | R5A | 75 |
| Residential Apartment 5B Density Zone | R5B | 76 |
| Residential Apartment 5C Density Zone | R5C | 77 |
| Residential Apartment 5D Density Zone | R5D | 78 |
| Residential Apartment 5E Density Zone | R5E | 79 |
| Residential Apartment 5F Density Zone | R5F | 80 |
| Transition Residential Multiple Zone | TRM | 81 |
| Neighbourhood Commercial Zone | NC | 82 |
| General Commercial Zone | GC | 84 |
| Deferred Commercial Zone | DC | 87 |
| Planned Shopping Centre Commercial Zone | SC | 88 |
| Central Business Commercial Zone | CB | 90 |
| Tourist Commercial Zone | TC | 100 |
| Camping Establishment Zone | CE | 103 |
| Deferred Tourist Commercial Zone | DTC | 104 |
| Automobile Service Station and Gasoline Bar Zone | AS | 105 |
| Institutional Zone | I | 107 |
| Prestige Industrial Zone | PI | 111 |
| Light Industrial Zone | LI | 114 |
| General Industrial Zone | GI | 116 |
| Heavy Industrial Zone | HI | 119 |
| Transportation - Distribution Industrial Zone | TDI | 121 |
| Extractive Industrial Zone | EI | 123 |
| Agricultural Zone | A | 125 |
| Rural Zone | R | 127 |
| Open Space Zone | OS | 129 |
| Development Holding Zone | DH | 131 |
| Hazard Land Zone | HL | 132 |
| Parking Zone | P | 133 |
| Parking Holding Zone | PH | 134 |
| Environmental Protection Area Zone | EPA | 135 |

## APPENDIX C ROAD TRAFFIC DATA & STAMSON SAMPLE CALCULATIONS

STAMSON 5.0 NORMAL REPORT Date: 06-08-2001 18:15:22

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: POR1_OLA.te Time Period: 24 hours

Description:

Road data, segment # 1: Lundys Lane

---

Car traffic volume : 22081 veh/TimePeriod *

Medium truck volume : 822 veh/TimePeriod *

Heavy truck volume : 587 veh/TimePeriod *

Posted speed limit : 60 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Lundys Lane

---

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 1

House density : 80 %

Surface : 1 (Absorptive ground surface)

Receiver source distance : 65.00 m

Receiver height : 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Road data, segment # 2: Beaverdam

---

Car traffic volume : 5804 veh/TimePeriod *

Medium truck volume : 250 veh/TimePeriod *

Heavy truck volume : 187 veh/TimePeriod *

Posted speed limit : 60 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Beaverdam

---

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 3

House density : 80 %

Surface : 1 (Absorptive ground surface)

Receiver source distance : 356.00 m

Receiver height : 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Road data, segment # 3: Kalar Rd

---

Car traffic volume : 11939 veh/TimePeriod *

Medium truck volume : 377 veh/TimePeriod *

Heavy truck volume : 251 veh/TimePeriod *

Posted speed limit : 60 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: Kalar Rd

---

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 4

House density : 80 %

Surface : 1 (Absorptive ground surface)

Receiver source distance : 468.00 m

Receiver height : 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Road data, segment # 4: Montrose Rd

---

Car traffic volume : 7335 veh/TimePeriod *

Medium truck volume : 232 veh/TimePeriod *

Heavy truck volume : 154 veh/TimePeriod *

Posted speed limit : 60 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 4: Montrose Rd

---

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 4

House density : 80 %

Surface : 1 (Absorptive ground surface)

Receiver source distance : 500.00 m

Receiver height : 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Road data, segment # 5: QEW

---

Car traffic volume : 107050 veh/TimePeriod *

Medium truck volume : 6152 veh/TimePeriod *

Heavy truck volume : 9844 veh/TimePeriod *

Posted speed limit : 100 km/h

Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 5: QEW

---

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 6

House density : 80 %

Surface : 1 (Absorptive ground surface)

Receiver source distance : 500.00 m

Receiver height : 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Results segment # 1: Lundys Lane

---

Source height = 1.26 m

ROAD (0.00 + 50.54 + 0.00) = 50.54 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 68.45 | 0.00 | -10.57 | -1.46 | 0.00 | -5.88 | 0.00 | 50.54 |

---

Segment Leq : 50.54 dBA

Results segment # 2: Beaverdam

---

Source height = 1.32 m

ROAD (0.00 + 30.82 + 0.00) = 30.82 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 63.16 | 0.00 | -22.83 | -1.46 | 0.00 | -8.06 | 0.00 | 30.82 |

Segment Leq : 30.82 dBA

Results segment # 3: Kalar Rd

---

Source height = 1.19 m

ROAD (0.00 + 29.62 + 0.00) = 29.62 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 65.20 | 0.00 | -24.80 | -1.46 | 0.00 | -9.32 | 0.00 | 29.62 |

Segment Leq : 29.62 dBA

Results segment # 4: Montrose Rd

---

Source height = 1.19 m

ROAD (0.00 + 27.05 + 0.00) = 27.05 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.66 | 63.08 | 0.00 | -25.28 | -1.46 | 0.00 | -9.30 | 0.00 | 27.05 |

Segment Leq : 27.05 dBA

Results segment # 5: QEW----------

Source height = 1.68 m

ROAD (0.00 + 44.01 + 0.00) = 44.01 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.65 | 82.95 | 0.00 | -25.20 | -1.45 | 0.00 | -12.30 | 0.00 | 44.01 |

Segment Leq : 44.01 dBA

Total Leq All Segments: 51.49 dBA

TOTAL Leq FROM ALL SOURCES: 51.49

TRAFFIC DATA REFERENCAES [2]

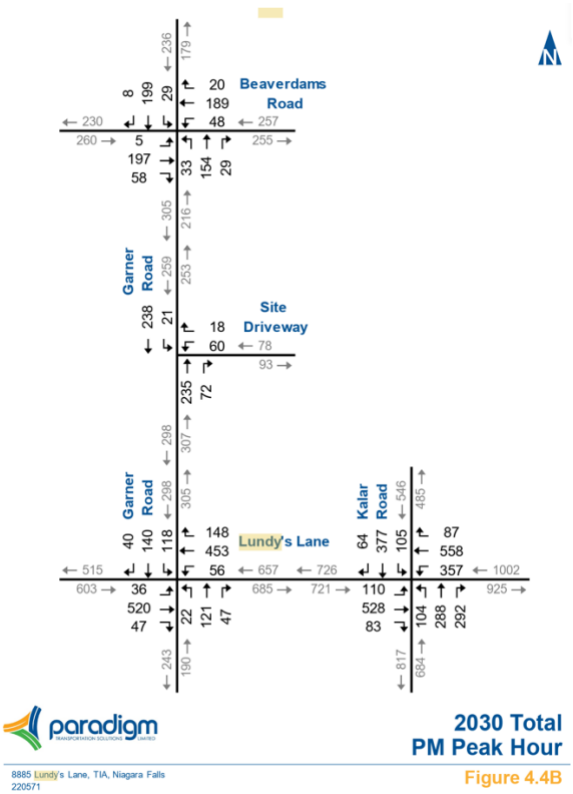


Figure 4.4B

2021 NIAGARA REGION AADT
MONTROSE ROAD

Hi Nicole,

AADT is 5300 vehicles. This data was from 2021, we had the exact same AADT in 2018 as well.

**Manny Rataul, C.E.T., rcji**
**Road Safety Technician**
*Transportation Services Division, Niagara Region*

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**Address:** 1815 Sir Isaac Brock Way St., Thorold ON, L2V4T7
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## APPENDIX D WARNING CLAUSES

**Please note that Warning clause recommendations are subject to specific wording that may be required or desired by the Municipality."*

CLAUSE A

"Purchasers are advised that despite the inclusion of noise control features in this development area and within the dwelling units, noise due to increasing road traffic may be of concern, occasionally interfering with the activities of the occupants as the noise levels may exceed the noise criteria of the Municipality and the Ministry of the Environment, Conservation and Parks."

CLAUSE B

"This dwelling unit has been supplied with forced air heating sized to accommodate 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 Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria."

CLAUSE C: Warning on title re: commercial uses

"Purchasers/tenants are advised that sound levels due to the adjacent commercial facilities which include the Petro Convenience Car Wash and Gas Station, City South Pizza comply with the MECP sound limits defined in NPC-300; however, despite acoustic compliance, noise from these facilities may occasionally be heard and which may thus disrupt the activities of the residents and occupants within the proposed development. "

## APPENDIX E NOISE ASSESSMENT RESULTS AND RECOMMENDATIONS

### Noise Assessment:

An acoustic model based on ISO 9613 was developed using iNoise simulation to assess the estimated worst-case predictable noise scenario from three distinct sources: City South Pizza Restaurant, Petro-Canada Car Wash and Gas Station and A-1 Motel. Activity adjusted to account for an estimated duty cycle correction for all equipment. Sources and noise spectrum are estimated from site measurement results and previous studies for similar commercial sources. Noise sources input is given in Table 4 below. Specific duty cycles are corrected for each of the scenarios to reflect the most accurate representation for these models to be considered conservative.

**Table 4: Noise Source Summary**

| Source ID[1] | Source Description | Height(m) | Sound Power Levels: Octave Band Centre Frequency (Hz): dBA, re: 1pW | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Lw(A) |
| AC_1 | Pizza - Air Conditioner | 5.5 | | | | | 78 | | | | | 78 |
| EXF_1 | Pizza - Exhaust Fan | 5.5 | | | | | 81 | | | | | 81 |
| VENTF_1 | Pizza - Vent Fan | 5.5 | | | | | 71 | | | | | 71 |
| Vehicle_1 | Car Wash - Vehicle queing | 1 | | | | | 74 | | | | | 74 |
| DCN | Car Wash - Doors Closed North | 1.3 | | | | | 70 | | | | | 70 |
| DON | Car Wash - Doors Open North | 1.3 | | | | | 85 | | | | | 85 |
| DCS | Car Wash - Doors Closed South | 1.3 | | | | | 95 | | | | | 95 |
| DOS | Car Wash - Doors Open South | 1.3 | | | | | 80 | | | | | 78 |
| Intake_1 | Car Wash - Intake | 1.3 | | | | | 78 | | | | | 74 |
| AC_2-13 | Motel - Twelve (12) AC unit | 1.5 | | | | | 70 | | | | | 70 |
| EXF_2-13 | Motel - Twelve (12) Exhaust Fan | 5.2 | | | | | 71 | | | | | 71 |

**Note: Duty cycle correction
AC_1, EXF_1 and VENTF_1 ; 100% daytime, 100% evening and 0% nighttime
Vehicle_1; Day flow 100 per day period, evening flow 20-30 per evening period and nighttime flow 10-12 per night period
DON; 33% daytime, 25% evening and 8% nighttime
DCN; 66% daytime,75% evening and 92% nighttime
DOS; 33% daytime, 25% evening and 8% nighttime
DCS; 66% daytime,75% evening and 92% nighttime
Intake_1; 100% daytime, 100% evening and 25% nighttime
AC_2-13 and EXF_2-13; daytime 100%, evening 100% and nighttime 100%

**Figure 4: Receptor Selection**

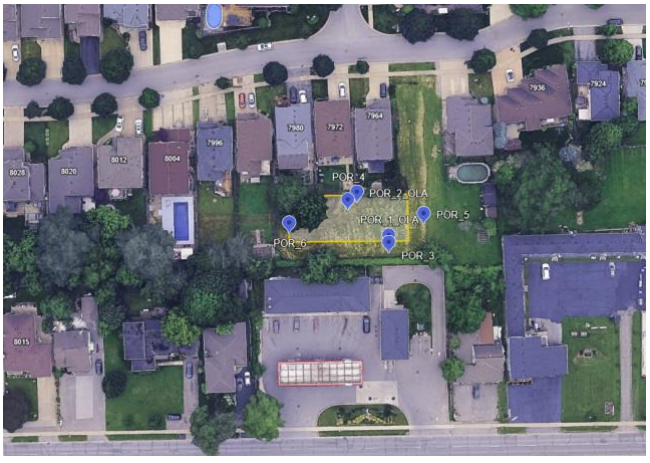


**Figure 5a: UNMITIGATED**

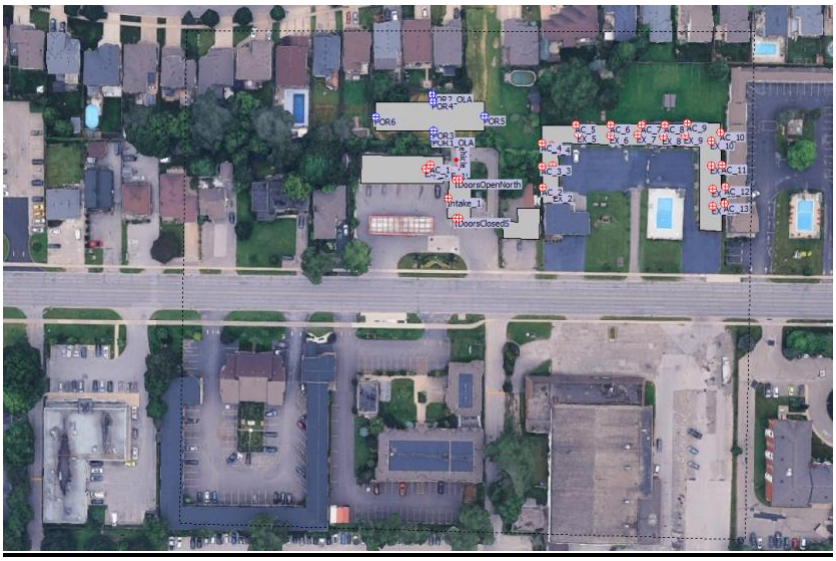


**Figure 5b: Mitigated w/ 2.44m barrier along S. Prop. Line and a 2m flanking barrier on E side.**

**Figure 6a: CONTOURS OF UNMITIGATED MODEL**

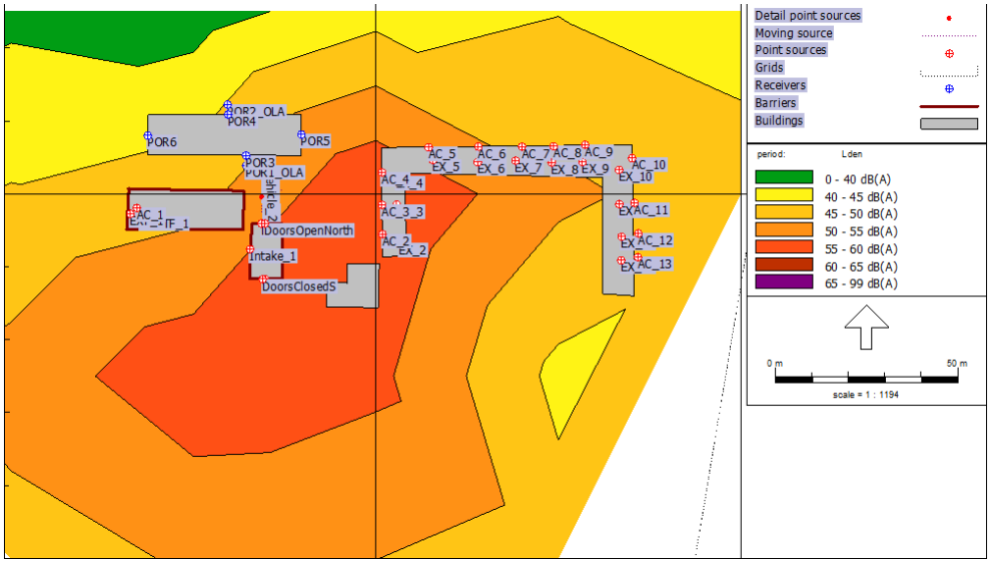
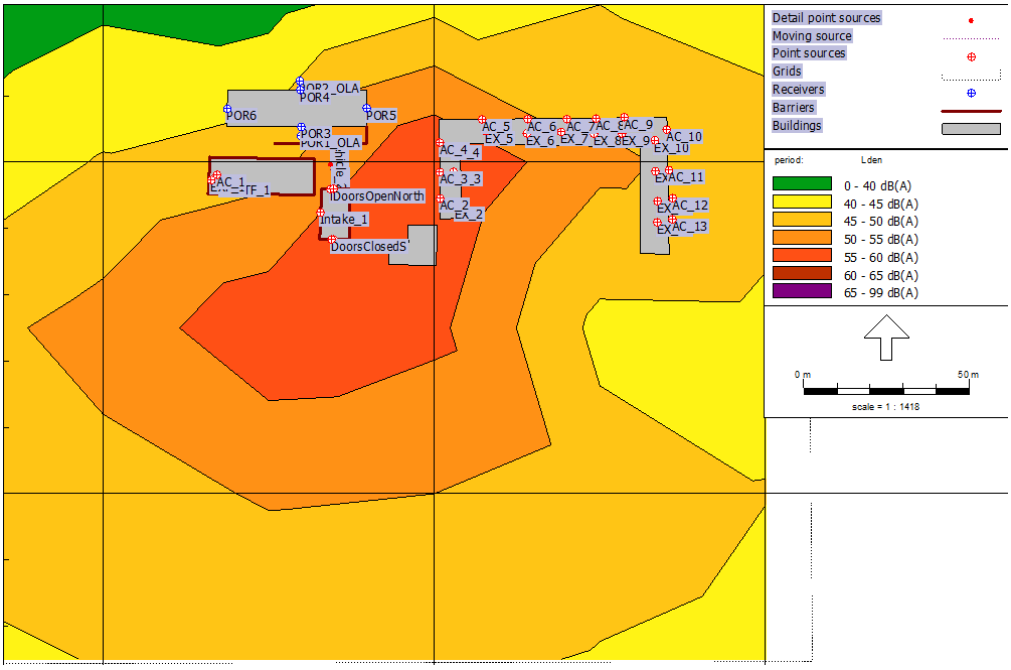



**Figure 6b: CONTOURS OF MITIGATED MODEL**




**Noise Assessment Result and Recommendation:**

The noise modelling results for each scenario were assessed individually, as presented in Tables 5a-5b through Tables 7a-7b. The results indicate that noise levels at the receptors do not exceed the 50 dBA limits during the daytime and evening periods. At night, noise levels are expected to remain below the 45 dBA threshold. Additionally, outdoor living areas (OLAs) are also not expected to exceed 45 dBA during the daytime and evening hours, while nighttime hours do not apply to this. The primary source of noise activity from the convenience Petro Car Wash. The sound levels from these operations remain below 50 dBA limits at the cortical receptor POR3 during their hours of operations with the addition of a 2.44m acoustic barrier spanning 30m along the south property line and joining with a 2m flanking acoustic barrier running N-S from the southeast corner of the townhomes per Figure 2c.

**Table 5a: Pizza Shop - Predicted noise levels at receptors – Unmitigated**

| Receptor ID | Description | Height | Total dBA | | | Octave Band Frequencies (Hz), dBA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | 1.5 | 37 | 37 | -- | -- | -- | -- | -- | 37 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | 1.5 | 20.8 | 20.8 | -- | -- | -- | -- | -- | 20.8 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | 4.5 | 39.4 | 39.4 | -- | -- | -- | -- | -- | 39.4 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | 4.5 | 21.6 | 21.6 | -- | -- | -- | -- | -- | 21.6 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | 4.5 | 30.4 | 30.4 | -- | -- | -- | -- | -- | 30.4 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | 4.5 | 43.8 | 43.8 | -- | -- | -- | -- | -- | 43.8 | -- | -- | -- | -- |

**Table 5b: Pizza Shop – Predicted noise levels at receptors – Mitigated**

| Receptor ID | Description | Height | Total dBA | | | Octave Band Frequencies (Hz), dBA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | 1.5 | 36.9 | 36.9 | -- | -- | -- | -- | -- | 36.9 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | 1.5 | 20.3 | 20.3 | -- | -- | -- | -- | -- | 20.3 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | 4.5 | 39.4 | 39.4 | -- | -- | -- | -- | -- | 39.4 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | 4.5 | 21.6 | 21.6 | -- | -- | -- | -- | -- | 21.6 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | 4.5 | 30.4 | 30.4 | -- | -- | -- | -- | -- | 30.4 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | 4.5 | 43.8 | 43.8 | -- | -- | -- | -- | -- | 43.8 | -- | -- | -- | -- |

**Table 6a: Gas Station / Car Wash – Predicted noise level at receptors – Unmitigated**

| Receptor ID | Description | Time | Height | Total dBA | Octave Band Frequencies (Hz), dBA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | Day | 1.5 | 51.3 | -- | -- | -- | -- | 51.3 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | | 1.5 | 26.5 | -- | -- | -- | -- | 26.5 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | | 4.5 | 50 | -- | -- | -- | -- | 50 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | | 4.5 | 27 | -- | -- | -- | -- | 27 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | | 4.5 | 37.9 | -- | -- | -- | -- | 37.9 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | | 4.5 | 27.2 | -- | -- | -- | -- | 27.2 | -- | -- | -- | -- |
| Receptor ID | Description | Time | Height | Total dBA | Octave Band Frequencies (Hz), dBA | | | | | | | | |
| | | | | Evening | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | Evening | 1.5 | 50.4 | -- | -- | -- | -- | 50.4 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | | 1.5 | 25.4 | -- | -- | -- | -- | 25.4 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | | 4.5 | 49 | -- | -- | -- | -- | 49 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | | 4.5 | 25.9 | -- | -- | -- | -- | 25.9 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | | 4.5 | 36.9 | -- | -- | -- | -- | 36.9 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | | 4.5 | 26.2 | -- | -- | -- | -- | 26.2 | -- | -- | -- | -- |
| Receptor ID | Description | Time | Height | Total dBA | Octave Band Frequencies (Hz), dBA | | | | | | | | |
| | | | | Night | 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | Night | 1.5 | 46.1 | -- | -- | -- | -- | 46.1 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | | 1.5 | 20.9 | -- | -- | -- | -- | 20.9 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | | 4.5 | 44.7 | -- | -- | -- | -- | 44.7 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | | 4.5 | 21.3 | -- | -- | -- | -- | 21.3 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | | 4.5 | 32.7 | -- | -- | -- | -- | 32.7 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | | 4.5 | 21.5 | -- | -- | -- | -- | 21.5 | -- | -- | -- | -- |

**Table 6b: Gas Station / Car Wash – Predicted noise level at receptors – Mitigated**

| Receptor ID | Description | Time | Height | Total dBA Day | Octave Band Frequencies (Hz), dBA 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POR1_OLA | South side façade outdoor living area | Day | 1.5 | 41.7 | -- | -- | -- | -- | 41.7 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | | 1.5 | 26.5 | -- | -- | -- | -- | 26.5 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | | 4.5 | 49.9 | -- | -- | -- | -- | 49.9 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | | 4.5 | 27 | -- | -- | -- | -- | 27 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | | 4.5 | 37.9 | -- | -- | -- | -- | 37.9 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | | 4.5 | 27.2 | -- | -- | -- | -- | 27.2 | -- | -- | -- | -- |
| Receptor ID | Description | Time | Height | Total dBA Evening | Octave Band Frequencies (Hz), dBA 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | Evening | 1.5 | 40.8 | -- | -- | -- | -- | 40.8 | | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | | 1.5 | 25.4 | -- | -- | -- | -- | 25.4 | | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | | 4.5 | 49 | -- | -- | -- | -- | 49 | | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | | 4.5 | 25.9 | -- | -- | -- | -- | 25.9 | | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | | 4.5 | 36.9 | -- | -- | -- | -- | 36.9 | | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | | 4.5 | 26.2 | -- | -- | -- | -- | 26.2 | | -- | -- | -- |
| Receptor ID | Description | Time | Height | Total dBA Night | Octave Band Frequencies (Hz), dBA 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| POR1_OLA | South side façade outdoor living area | Night | 1.5 | 36.5 | -- | -- | -- | -- | 36.5 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | | 1.5 | 20.8 | -- | -- | -- | -- | 20.8 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | | 4.5 | 44.7 | -- | -- | -- | -- | 44.7 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | | 4.5 | 21.3 | -- | -- | -- | -- | 21.3 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | | 4.5 | 32.7 | -- | -- | -- | -- | 32.7 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | | 4.5 | 21.5 | -- | -- | -- | -- | 21.5 | -- | -- | -- | -- |

## Table 7a: Motel – Predicted noise levels at receptors - Unmitigated

| Receptor ID | Description | Height | Total dBA Day | Evening | Night | Octave Band Frequencies (Hz), dBA 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POR1_OLA | South side façade outdoor living area | 1.5 | 37.7 | 37.7 | 37.7 | -- | -- | -- | -- | 37.7 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | 1.5 | 24.1 | 24.1 | 24.1 | -- | -- | -- | -- | 24.1 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | 4.5 | 37.7 | 37.7 | 37.7 | -- | -- | -- | -- | 37.7 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | 4.5 | 23.3 | 23.3 | 23.3 | -- | -- | -- | -- | 23.3 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | 4.5 | 40.2 | 40.2 | 40.2 | -- | -- | -- | -- | 40.2 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | 4.5 | 15.8 | 15.8 | 15.8 | -- | -- | -- | -- | 15.8 | -- | -- | -- | -- |

## Table 7b: Motel – Predicted noise levels at receptors – Mitigated

| Receptor ID | Description | Height | Total dBA Day | Evening | Night | Octave Band Frequencies (Hz), dBA 31 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POR1_OLA | South side façade outdoor living area | 1.5 | 34.1 | 34.1 | 34.1 | -- | -- | -- | -- | 34.1 | -- | -- | -- | -- |
| POR2_OLA | North side façade outdoor living area | 1.5 | 24.1 | 24.1 | 24.1 | -- | -- | -- | -- | 24.1 | -- | -- | -- | -- |
| POR3 | South side façade 2nd storey, plane of window | 4.5 | 37.2 | 37.2 | 37.2 | -- | -- | -- | -- | 37.2 | -- | -- | -- | -- |
| POR4 | North side façade 2nd storey, plane of window | 4.5 | 23.3 | 23.3 | 23.3 | -- | -- | -- | -- | 23.3 | -- | -- | -- | -- |
| POR5 | East side façade 2nd storey, plane of window | 4.5 | 40.2 | 40.2 | 40.2 | -- | -- | -- | -- | 40.2 | -- | -- | -- | -- |
| POR6 | West side façade 2nd storey, plane of window | 4.5 | 15.8 | 15.8 | 15.8 | -- | -- | -- | -- | 15.8 | -- | -- | -- | -- |

*Table B: Guideline D-6 Potential Influence Areas and Recommended Minimum Setback Distances for noted Land Uses*

| Industry Classification | Area of Influence | Recommended Minimum Setback Distance |
|---|---|---|
| Class 1 – Light Industrial | 70 m | 20 m |
| Class 2 – Medium Industrial | 300 m | 70 m |
| Class 3 – Heavy Industrial | 1000 m | 300 m |

## Calculation POR1_OLA Mitigated Gas Station

==========

Testfile openend: 2025-07-19 4:52:34 PM

==========

==========

>>> CALCULATION SPECIFICATION

Version : 3.56 (64-bit)

Mapname : With Barrier Gas Station updated with VG

MethodID : 513

Model bounds - Min : (-199.32, 753.45)

Model bounds - Max : (319.12, 1190.17)

Min. ground level : 0.00

CalcTestLevel : 6

Do Shape Export : No

Fetching radius : 5000.00

ErrorMargin : 0.00

Max.reflection distance: --

Max.reflection depth : 1

Default ground factor : 0.00

Meteo correction : None

Max.barrier attenuation: According to standard

Dmax1 / Dmax2 : 20.00 / 25.00

Full DTM : No

Ground attenuation : Avoid overestimating screening effect

Barrier attenuation : According to ISO 9613-2:1996; also, for direct sight

DIcalculation : No

TemperatureK : 293.15

Humidity : 60.00

Pressure : 101.33

GroundAttAlternative : No

SpeedOfSound : 343.20

Alu : 0.027 \ 0.104 \ 0.386 \ 1.226 \ 2.790 \ 4.803 \ 9.255 \ 25.433 \ 87.773

==========

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Cross section for receiver POR3 (Id=-43) and source Vehicle (Id=-87)

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.304 | 66.29 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Pointsource | Vehicle | 12.176 | 68.69 | 999.15 | 0.00 | 1.00 | 0.00 | |

---

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 74.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 4.66 | 4.54 | 4.30 | 3.78 | 2.48 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.12 | 0.32 | 1.11 |
| A(geo) | 33.05 | 33.05 | 33.05 | 33.05 | 33.05 | 33.05 | 33.05 | 33.05 | 33.05 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

---

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 41.44 | -- | -- | -- | -- | \| 41.44 |

---

Cross section for receiver POR3 (Id=-43) and source Vehicle (Id=-87)

[Reflection in facade Car Wash (Id=2)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.048 | 65.30 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Barrier | 1 | 19.049 | 67.73 | 991.79 | 0.00 | 5.00 | 0.00 | 1 |
| Building(R) | Car Wash | 19.055 | 67.73 | 991.78 | 0.00 | 5.00 | 0.00 | |
| Barrier | 1 | 19.061 | 67.73 | 991.79 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | Vehicle | 26.478 | 68.69 | 999.15 | 0.00 | 1.00 | 0.00 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 74.00 | -- | -- | -- | -- | |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | |
| A(barrier) | 6.44 | 7.64 | 9.33 | 11.51 | 14.03 | 16.78 | 19.65 | 22.59 | 25.00 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.00 | 0.00 | 0.01 | 0.03 | 0.07 | 0.13 | 0.25 | 0.68 | 2.34 | |
| A(geo) | 39.53 | 39.53 | 39.53 | 39.53 | 39.53 | 39.53 | 39.53 | 39.53 | 39.53 | |
| A(refl) | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 22.40 | -- | -- | -- | -- | 22.40 |

Cross section for receiver POR3 (Id=-43) and source Vehicle (Id=-87)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.300 | 79.56 | 1008.26 | 0.00 | 2.00 | 0.00 | 3 |
| Building(R) | Buidling | 37.538 | 101.55 | 1004.94 | 0.00 | 5.00 | 0.00 | |
| Pointsource | Vehicle | 70.900 | 68.69 | 999.15 | 0.00 | 1.00 | 0.00 | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 74.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 4.42 | 4.05 | 3.19 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.01 | 0.03 | 0.09 | 0.20 | 0.34 | 0.66 | 1.81 | 6.23 |
| A(geo) | 48.02 | 48.02 | 48.02 | 48.02 | 48.02 | 48.02 | 48.02 | 48.02 | 48.02 |
| A(refl) | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 27.82 | -- | -- | -- | -- | \| 27.82 |

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Cross section for receiver POR3 (Id=-43) and source Vehicle (Id=-87)

[Reflection in facade 1 (Id=64)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 4.985 | 64.78 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Building | Car Wash | 20.915 | 65.88 | 989.69 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 21.446 | 65.92 | 989.16 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 33.769 | 66.77 | 976.86 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier(R) | 1 | 33.912 | 66.78 | 976.72 | 0.00 | 5.00 | 0.00 | |
| Building | Car Wash | 34.054 | 66.80 | 976.86 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 49.030 | 68.07 | 991.79 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 49.036 | 68.07 | 991.79 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | Vehicle | 56.416 | 68.69 | 999.15 | 0.00 | 1.00 | 0.00 | |

---

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 74.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 6.88 | 8.99 | 12.27 | 15.74 | 18.90 | 21.92 | 24.91 | 25.00 | 25.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.01 | 0.02 | 0.07 | 0.16 | 0.27 | 0.52 | 1.44 | 4.96 |
| A(geo) | 46.04 | 46.04 | 46.04 | 46.04 | 46.04 | 46.04 | 46.04 | 46.04 | 46.04 |
| A(refl) | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 10.94 | -- | -- | -- | -- | 10.94 |

Cross section for receiver POR3 (Id=-43) and source Vehicle (Id=-87)

[Reflection in facade 1 (Id=64)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.032 | 65.21 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Barrier(R) | 1 | 18.984 | 67.36 | 991.80 | 0.00 | 5.00 | 0.00 | |
| Pointsource | Vehicle | 26.454 | 68.69 | 999.15 | 0.00 | 1.00 | 0.00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 74.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 4.13 | 3.39 | 1.38 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.00 | 0.01 | 0.03 | 0.07 | 0.13 | 0.25 | 0.68 | 2.34 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A(geo) | 39.52 | 39.52 | 39.52 | 39.52 | 39.52 | 39.52 | 39.52 | 39.52 | 39.52 | |
| A(refl) | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| L(p) | -- | -- | -- | -- | 36.44 | -- | -- | -- | -- | \| 36.44 |

Cross section for receiver POR3 (Id=-43) and source Doorsclose (Id=19)

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.094 | 65.55 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Pointsource | Doorsclose | 19.096 | 68.61 | 991.92 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 70.00 | -- | -- | -- | -- | |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | |
| A(barrier) | 4.26 | 3.69 | 2.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.00 | 0.00 | 0.01 | 0.02 | 0.05 | 0.09 | 0.18 | 0.49 | 1.70 | |
| A(geo) | 36.73 | 36.73 | 36.73 | 36.73 | 36.73 | 36.73 | 36.73 | 36.73 | 36.73 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| L(p) | -- | -- | -- | -- | 36.21 | -- | -- | -- | -- | \| 36.21 |

Cross section for receiver POR3 (Id=-43) and source Doorsclose (Id=19)

[Reflection in facade Car Wash (Id=2)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier | Id=61 | 5.092 | 65.53 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Building(R) | Car Wash | 19.204 | 68.59 | 991.80 | 0.00 | 5.00 | 0.00 | |
| Pointsource | Doorsclose | 19.321 | 68.61 | 991.92 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 70.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 4.25 | 3.67 | 2.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.00 | 0.01 | 0.02 | 0.05 | 0.09 | 0.18 | 0.50 | 1.72 |
| A(geo) | 36.83 | 36.83 | 36.83 | 36.83 | 36.83 | 36.83 | 36.83 | 36.83 | 36.83 |
| A(refl) | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 35.15 | -- | -- | -- | -- | 35.15 |

Cross section for receiver POR3 (Id=-43) and source Doorsclose (Id=19)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.194 | 79.55 | 1009.08 | 0.00 | 2.00 | 0.00 | 3 |
| Building | Buidling | 37.267 | 101.52 | 1006.94 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 52.175 | 116.36 | 1005.49 | 0.00 | 5.00 | 0.00 | 5 |
| Building(R) | Buidling | 98.130 | 162.10 | 1001.03 | 0.00 | 5.00 | 0.00 | |
| Building | Buidling | 152.446 | 108.04 | 995.76 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 158.849 | 101.67 | 995.14 | 0.00 | 5.00 | 0.00 | 5 |
| Pointsource | Doorsclose | 192.063 | 68.61 | 991.92 | 0.00 | 1.30 | 0.00 | |

---

L(wr) -- -- -- -- 70.00 -- -- -- --

A(ground) -3.28 -3.28 -3.28 -3.28 -3.28 -3.28 -3.28 -3.28 -3.28

A(barrier) 5.44 6.25 7.47 9.18 11.34 13.84 16.58 19.44 22.38

A(veg) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(sit) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(bld) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(air) 0.01 0.02 0.07 0.24 0.54 0.92 1.78 4.89 16.86

A(geo) 56.66 56.66 56.66 56.66 56.66 56.66 56.66 56.66 56.66

A(refl) -- -- -- -- -- -- -0.97 -0.97 -0.97

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

---

L(p) -- -- -- -- -- -- -- -- -- | -200.00

---

Cross section for receiver POR3 (Id=-43) and source Doorsclose (Id=19)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.616 | 79.57 | 1006.72 | 0.00 | 2.00 | 0.00 | 3 |
| Building(R) | Buidling | 38.336 | 101.59 | 1001.14 | 0.00 | 5.00 | 0.00 | |
| Pointsource | Doorsclose | 72.584 | 68.61 | 991.92 | 0.00 | 1.30 | 0.00 | |

---

L(wr) -- -- -- -- 70.00 -- -- -- --

A(ground) -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00

A(barrier) 4.40 4.00 3.08 0.28 0.00 0.00 0.00 0.00 0.00

A(veg) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(sit) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(bld) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A(air) | 0.00 | 0.01 | 0.03 | 0.09 | 0.20 | 0.35 | 0.67 | 1.85 | 6.38 |
| A(geo) | 48.22 | 48.22 | 48.22 | 48.22 | 48.22 | 48.22 | 48.22 | 48.22 | 48.22 |
| A(refl) | -- | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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L(p) -- -- -- -- -- -- -- -- -- | -200.00

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Cross section for receiver POR3 (Id=-43) and source Doorsclose (Id=19)

[Reflection in facade 1 (Id=64)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 4.989 | 64.83 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Building | Car Wash | 18.965 | 65.95 | 991.65 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 19.551 | 66.00 | 991.06 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 33.808 | 67.14 | 976.85 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier(R) | 1 | 33.942 | 67.15 | 976.72 | 0.00 | 5.00 | 0.00 | |
| Building | Car Wash | 34.076 | 67.16 | 976.85 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 49.072 | 68.59 | 991.78 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 49.096 | 68.60 | 991.80 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | Doorsclose | 49.211 | 68.61 | 991.92 | 0.00 | 1.30 | 0.00 | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 70.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 10.21 | 13.62 | 17.72 | 21.47 | 24.73 | 25.00 | 25.00 | 25.00 | 25.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

A(air) 0.00 0.01 0.02 0.06 0.14 0.24 0.46 1.25 4.33

A(geo) 44.85 44.85 44.85 44.85 44.85 44.85 44.85 44.85 44.85

A(refl) -- -- -- -- -0.97 -0.97 -0.97 -0.97 -0.97

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

---

L(p) -- -- -- -- 2.31 -- -- -- -- | 2.31

---

Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=20)

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.029 | 65.19 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Barrier | 1 | 18.973 | 67.29 | 991.80 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 18.994 | 67.29 | 991.78 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 34.162 | 69.57 | 976.78 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 34.242 | 69.59 | 976.70 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsOpen | 34.295 | 69.59 | 976.65 | 0.00 | 1.30 | 0.00 | |

---

L(wr) -- -- -- -- 95.00 -- -- -- --

A(ground) -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00

A(barrier) 5.75 8.38 11.64 15.17 18.43 20.68 22.31 23.45 24.15

A(veg) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(sit) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(bld) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(air) 0.00 0.00 0.01 0.04 0.10 0.17 0.32 0.88 3.02

A(geo) 41.73 41.73 41.73 41.73 41.73 41.73 41.73 41.73 41.73

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

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L(p) -- -- -- -- 37.74 -- -- -- -- | 37.74

---

Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=20)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.369 | 79.56 | 1007.86 | 0.00 | 2.00 | 0.00 | 3 |
| Building | Buidling | 37.713 | 101.56 | 1003.93 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 44.102 | 107.85 | 1002.81 | 0.00 | 5.00 | 0.00 | 5 |
| Building(R) | Buidling | 99.207 | 162.10 | 993.14 | 0.00 | 5.00 | 0.00 | |
| Building | Buidling | 153.786 | 108.37 | 983.56 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 157.793 | 104.42 | 982.86 | 0.00 | 5.00 | 0.00 | 5 |
| Building | FamRest | 169.677 | 92.72 | 980.77 | 0.00 | 6.00 | 0.00 | 4 |
| Building | FamRest | 170.441 | 91.97 | 980.64 | 0.00 | 6.00 | 0.00 | 4 |
| Barrier | 1 | 188.311 | 74.38 | 977.50 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 188.390 | 74.30 | 977.49 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 192.532 | 70.22 | 976.76 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 192.881 | 69.88 | 976.70 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsOpen | 193.171 | 69.59 | 976.65 | 0.00 | 1.30 | 0.00 | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 95.00 | -- | -- | -- | -- |
| A(ground) | -3.30 | -3.30 | -3.30 | -3.30 | -3.30 | -3.30 | -3.30 | -3.30 | -3.30 |
| A(barrier) | 12.55 | 15.74 | 18.72 | 21.69 | 24.67 | 25.00 | 25.00 | 25.00 | 25.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

A(air) 0.01 0.02 0.07 0.24 0.54 0.93 1.79 4.91 16.96

A(geo) 56.71 56.71 56.71 56.71 56.71 56.71 56.71 56.71 56.71

A(refl) -- -- -- -- -- -- -0.97 -0.97 -0.97

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

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L(p) -- -- -- -- -- -- -- -- -- | -200.00

---

Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=20)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 11.532 | 74.85 | 1005.61 | 0.00 | 2.44 | 0.00 | 6 |
| Building(R) | Buidling | 41.250 | 101.69 | 992.86 | 0.00 | 5.00 | 0.00 | |
| Barrier | 1 | 71.859 | 74.37 | 979.06 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 71.923 | 74.31 | 979.03 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 76.936 | 69.84 | 976.77 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 77.095 | 69.70 | 976.70 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsOpen | 77.211 | 69.59 | 976.65 | 0.00 | 1.30 | 0.00 | |

---

L(wr) -- -- -- -- 95.00 -- -- -- --

A(ground) -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00

A(barrier) 9.70 12.01 14.81 18.40 22.79 25.00 25.00 25.00 25.00

A(veg) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(sit) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(bld) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(air) 0.00 0.01 0.03 0.09 0.22 0.37 0.72 1.97 6.78

A(geo) 48.75 48.75 48.75 48.75 48.75 48.75 48.75 48.75 48.75

A(refl) -- -- -- -- -- -0.97 -0.97 -0.97 -0.97

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

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L(p) -- -- -- -- -- -- -- -- -- | -200.00

---

Cross section for receiver POR3 (Id=-43) and source DoorsClose (Id=21)

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.016 | 65.09 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Barrier | 1 | 18.916 | 66.92 | 991.80 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 18.950 | 66.92 | 991.77 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 34.048 | 68.91 | 976.80 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 34.143 | 68.92 | 976.71 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsClose | 34.186 | 68.93 | 976.66 | 0.00 | 1.30 | 0.00 | |

---

L(wr) -- -- -- -- 80.00 -- -- -- --

A(ground) -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00

A(barrier) 5.64 8.22 11.40 14.83 18.04 20.33 22.06 23.28 24.05

A(veg) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(sit) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(bld) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(air) 0.00 0.00 0.01 0.04 0.10 0.16 0.32 0.87 3.01

A(geo) 41.71 41.71 41.71 41.71 41.71 41.71 41.71 41.71 41.71

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

---

L(p) -- -- -- -- 23.16 -- -- -- -- | 23.16

---

Cross section for receiver POR3 (Id=-43) and source DoorsClose (Id=21)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.367 | 79.56 | 1007.87 | 0.00 | 2.00 | 0.00 | 3 |
| Building | Buidling | 37.708 | 101.56 | 1003.96 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 44.096 | 107.85 | 1002.84 | 0.00 | 5.00 | 0.00 | 5 |
| Building(R) | Buidling | 99.195 | 162.10 | 993.21 | 0.00 | 5.00 | 0.00 | |
| Building | Buidling | 153.770 | 108.36 | 983.67 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 158.684 | 103.53 | 982.81 | 0.00 | 5.00 | 0.00 | 5 |
| Building | FamRest | 170.329 | 92.06 | 980.77 | 0.00 | 6.00 | 0.00 | 4 |
| Building | FamRest | 170.427 | 91.96 | 980.75 | 0.00 | 6.00 | 0.00 | 4 |
| Barrier | 1 | 188.289 | 74.38 | 977.63 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 188.366 | 74.30 | 977.62 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 193.160 | 69.58 | 976.78 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 193.590 | 69.16 | 976.70 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsClose | 193.824 | 68.93 | 976.66 | 0.00 | 1.30 | 0.00 | |

---

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 80.00 | -- | -- | -- | -- |
| A(ground) | -3.31 | -3.31 | -3.31 | -3.31 | -3.31 | -3.31 | -3.31 | -3.31 | -3.31 |
| A(barrier) | 12.61 | 15.80 | 18.78 | 21.75 | 24.73 | 25.00 | 25.00 | 25.00 | 25.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.01 | 0.02 | 0.07 | 0.24 | 0.54 | 0.93 | 1.79 | 4.93 | 17.01 |
| A(geo) | 56.74 | 56.74 | 56.74 | 56.74 | 56.74 | 56.74 | 56.74 | 56.74 | 56.74 |
| A(refl) | -- | -- | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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L(p) -- -- -- -- -- -- -- -- -- | -200.00

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Cross section for receiver POR3 (Id=-43) and source DoorsClose (Id=21)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 11.630 | 74.96 | 1005.61 | 0.00 | 2.44 | 0.00 | 6 |
| Building(R) | Buidling | 41.169 | 101.69 | 993.04 | 0.00 | 5.00 | 0.00 | |
| Barrier | 1 | 71.715 | 74.37 | 979.38 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 71.774 | 74.32 | 979.36 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 77.512 | 69.18 | 976.79 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 77.705 | 69.01 | 976.71 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsClose | 77.799 | 68.93 | 976.66 | 0.00 | 1.30 | 0.00 | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 80.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 9.72 | 12.06 | 14.93 | 18.67 | 23.11 | 25.00 | 25.00 | 25.00 | 25.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.01 | 0.03 | 0.10 | 0.22 | 0.37 | 0.72 | 1.98 | 6.83 |
| A(geo) | 48.82 | 48.82 | 48.82 | 48.82 | 48.82 | 48.82 | 48.82 | 48.82 | 48.82 |
| A(refl) | -- | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

---

L(p) -- -- -- -- -- -- -- -- -- | -200.00

---

Cross section for receiver POR3 (Id=-43) and source VentIntake (Id=24)

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 4.978 | 64.65 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Pointsource | VentIntake | 25.764 | 65.54 | 984.81 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 78.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |
| A(barrier) | 4.07 | 3.24 | 0.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.00 | 0.01 | 0.03 | 0.07 | 0.12 | 0.24 | 0.66 | 2.28 |
| A(geo) | 39.28 | 39.28 | 39.28 | 39.28 | 39.28 | 39.28 | 39.28 | 39.28 | 39.28 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 41.65 | -- | -- | -- | -- | 41.65 |

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Cross section for receiver POR3 (Id=-43) and source VentIntake (Id=24)

[Reflection in facade Car Wash (Id=2)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 4.981 | 64.71 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Building(R) | Car Wash | 23.877 | 65.78 | 986.71 | 0.00 | 5.00 | 0.00 | |
| Pointsource | VentIntake | 25.794 | 65.54 | 984.81 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 78.00 | -- | -- | -- | -- |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A(barrier) | 4.07 | 3.24 | 0.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.00 | 0.01 | 0.03 | 0.07 | 0.12 | 0.24 | 0.66 | 2.28 |
| A(geo) | 39.29 | 39.29 | 39.29 | 39.29 | 39.29 | 39.29 | 39.29 | 39.29 | 39.29 |
| A(refl) | -- | -- | -- | -- | -- | -- | -- | -- | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -200.00 |

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Cross section for receiver POR3 (Id=-43) and source VentIntake (Id=24)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.258 | 79.56 | 1008.55 | 0.00 | 2.00 | 0.00 | 3 |
| Building | Buidling | 37.431 | 101.54 | 1005.63 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 43.743 | 107.80 | 1004.81 | 0.00 | 5.00 | 0.00 | 5 |
| Building(R) | Buidling | 98.521 | 162.10 | 997.61 | 0.00 | 5.00 | 0.00 | |
| Building | Buidling | 152.910 | 108.18 | 990.46 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 159.414 | 101.73 | 989.61 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Car Wash | 187.012 | 74.37 | 985.98 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 187.048 | 74.34 | 985.98 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 195.720 | 65.74 | 984.84 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 195.748 | 65.71 | 984.84 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | VentIntake | 195.925 | 65.54 | 984.81 | 0.00 | 1.30 | 0.00 | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 78.00 | -- | -- | -- | -- |

A(ground) -3.34 -3.34 -3.34 -3.34 -3.34 -3.34 -3.34 -3.34 -3.34

A(barrier) 12.66 15.84 18.82 21.79 24.77 25.00 25.00 25.00 25.00

A(veg) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(sit) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(bld) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

A(air) 0.01 0.02 0.08 0.24 0.55 0.94 1.81 4.98 17.20

A(geo) 56.84 56.84 56.84 56.84 56.84 56.84 56.84 56.84 56.84

A(refl) -- -- -- -- -- -- -0.97 -0.97 -0.97

C(meteo) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

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L(p) -- -- -- -- -- -- -- -- -- | -200.00

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Cross section for receiver POR3 (Id=-43) and source VentIntake (Id=24)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 15.424 | 79.04 | 1005.62 | 0.00 | 2.44 | 0.00 | 6 |
| Building(R) | Buidling | 39.264 | 101.63 | 997.99 | 0.00 | 5.00 | 0.00 | |
| Building | Car Wash | 68.261 | 74.39 | 988.04 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 68.329 | 74.33 | 988.02 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 77.468 | 65.74 | 984.89 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 77.498 | 65.72 | 984.88 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | VentIntake | 77.687 | 65.54 | 984.81 | 0.00 | 1.30 | 0.00 | |

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L(wr) -- -- -- -- 78.00 -- -- -- --

A(ground) -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00 -3.00

A(barrier) 9.68 12.11 15.30 19.49 23.79 25.00 25.00 25.00 25.00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| A(air) | 0.00 | 0.01 | 0.03 | 0.10 | 0.22 | 0.37 | 0.72 | 1.98 | 6.82 |
| A(geo) | 48.81 | 48.81 | 48.81 | 48.81 | 48.81 | 48.81 | 48.81 | 48.81 | 48.81 |
| A(refl) | -- | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -200.00 |

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Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=26)

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.157 | 65.81 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Pointsource | DoorsOpen | 19.302 | 69.58 | 991.95 | 0.00 | 1.30 | 0.00 | |

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 85.00 | -- | -- | -- | -- | |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | |
| A(barrier) | 4.27 | 3.70 | 2.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.00 | 0.00 | 0.01 | 0.02 | 0.05 | 0.09 | 0.18 | 0.50 | 1.72 | |
| A(geo) | 36.82 | 36.82 | 36.82 | 36.82 | 36.82 | 36.82 | 36.82 | 36.82 | 36.82 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

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|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 51.12 | -- | -- | -- | -- | 51.12 |

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Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=26)

[Reflection in facade Car Wash (Id=2)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 5.153 | 65.79 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Building(R) | Car Wash | 19.415 | 69.55 | 991.82 | 0.00 | 5.00 | 0.00 | |
| Pointsource | DoorsOpen | 19.544 | 69.58 | 991.95 | 0.00 | 1.30 | 0.00 | |

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|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 85.00 | -- | -- | -- | -- | |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | |
| A(barrier) | 4.26 | 3.68 | 2.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.00 | 0.00 | 0.01 | 0.02 | 0.06 | 0.10 | 0.18 | 0.50 | 1.74 | |
| A(geo) | 36.93 | 36.93 | 36.93 | 36.93 | 36.93 | 36.93 | 36.93 | 36.93 | 36.93 | |
| A(refl) | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

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|---|---|---|---|---|---|---|---|---|---|---|
| L(p) | -- | -- | -- | -- | 50.05 | -- | -- | -- | -- | \| 50.05 |

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Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=26)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.195 | 79.55 | 1009.07 | 0.00 | 2.00 | 0.00 | 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Building | Buidling | 37.268 | 101.52 | 1006.92 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 51.945 | 116.13 | 1005.50 | 0.00 | 5.00 | 0.00 | 5 |
| Building(R) | Buidling | 98.133 | 162.10 | 1001.00 | 0.00 | 5.00 | 0.00 | |
| Building | Buidling | 152.449 | 108.04 | 995.71 | 0.00 | 5.00 | 0.00 | 5 |
| Building | Buidling | 158.853 | 101.67 | 995.09 | 0.00 | 5.00 | 0.00 | 5 |
| Pointsource | DoorsOpen | 191.092 | 69.58 | 991.95 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 85.00 | -- | -- | -- | -- | |
| A(ground) | -3.27 | -3.27 | -3.27 | -3.27 | -3.27 | -3.27 | -3.27 | -3.27 | -3.27 | |
| A(barrier) | 5.47 | 6.31 | 7.57 | 9.31 | 11.49 | 14.02 | 16.76 | 19.63 | 22.57 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.01 | 0.02 | 0.07 | 0.23 | 0.53 | 0.92 | 1.77 | 4.86 | 16.77 | |
| A(geo) | 56.62 | 56.62 | 56.62 | 56.62 | 56.62 | 56.62 | 56.62 | 56.62 | 56.62 | |
| A(refl) | -- | -- | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| L(p) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -200.00 |

Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=26)

[Reflection in facade Buidling (Id=30)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | 2 | 15.629 | 79.57 | 1006.66 | 0.00 | 2.00 | 0.00 | 3 |
| Building(R) | Buidling | 38.369 | 101.59 | 1001.01 | 0.00 | 5.00 | 0.00 | |
| Pointsource | DoorsOpen | 71.639 | 69.58 | 991.95 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 85.00 | -- | -- | -- | -- | |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | |
| A(barrier) | 4.41 | 4.01 | 3.10 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.00 | 0.01 | 0.03 | 0.09 | 0.20 | 0.34 | 0.66 | 1.82 | 6.29 | |
| A(geo) | 48.10 | 48.10 | 48.10 | 48.10 | 48.10 | 48.10 | 48.10 | 48.10 | 48.10 | |
| A(refl) | -- | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| L(p) | -- | -- | -- | -- | -- | -- | -- | -- | -- | \| -200.00 |

Cross section for receiver POR3 (Id=-43) and source DoorsOpen (Id=26)

[Reflection in facade 1 (Id=64)]

| ItemType | Id | Distance | X | Y | Hgrnd | Height | GrndFact | Cluster |
|---|---|---|---|---|---|---|---|---|
| Receiver | POR3 | 0.000 | 64.43 | 1010.55 | 0.00 | 4.50 | 0.00 | |
| Barrier | Id=61 | 4.998 | 64.93 | 1005.58 | 0.00 | 2.44 | 0.00 | 6 |
| Barrier | 1 | 18.838 | 66.31 | 991.81 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 18.893 | 66.31 | 991.75 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 33.888 | 67.81 | 976.83 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier(R) | 1 | 34.007 | 67.82 | 976.71 | 0.00 | 5.00 | 0.00 | |
| Building | Car Wash | 34.126 | 67.83 | 976.83 | 0.00 | 5.00 | 0.00 | 1 |
| Barrier | 1 | 49.161 | 69.56 | 991.77 | 0.00 | 5.00 | 0.00 | 1 |
| Building | Car Wash | 49.219 | 69.57 | 991.83 | 0.00 | 5.00 | 0.00 | 1 |
| Pointsource | DoorsOpen | 49.344 | 69.58 | 991.95 | 0.00 | 1.30 | 0.00 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| L(wr) | -- | -- | -- | -- | 85.00 | -- | -- | -- | -- | |
| A(ground) | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | -3.00 | |
| A(barrier) | 10.21 | 13.62 | 17.72 | 21.46 | 24.72 | 25.00 | 25.00 | 25.00 | 25.00 | |
| A(veg) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(sit) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(bld) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| A(air) | 0.00 | 0.01 | 0.02 | 0.06 | 0.14 | 0.24 | 0.46 | 1.26 | 4.34 | |
| A(geo) | 44.88 | 44.88 | 44.88 | 44.88 | 44.88 | 44.88 | 44.88 | 44.88 | 44.88 | |
| A(refl) | -- | -- | -- | -- | -0.97 | -0.97 | -0.97 | -0.97 | -0.97 | |
| C(meteo) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| L(p) | -- | -- | -- | -- | 17.30 | -- | -- | -- | -- | \| 17.30 |

| Height | Source | Per | LAeq | 32 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.50 | Doorsclose | 1 | 36.98 | -- | -- | -- | -- | 36.98 | -- | -- | -- | -- |
| 4.50 | Doorsclose | 2 | 37.47 | -- | -- | -- | -- | 37.47 | -- | -- | -- | -- |
| 4.50 | Doorsclose | 3 | 38.36 | -- | -- | -- | -- | 38.36 | -- | -- | -- | -- |
| 4.50 | Doorsclose | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 1 | 33.76 | -- | -- | -- | -- | 33.76 | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 2 | 32.51 | -- | -- | -- | -- | 32.51 | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 3 | 26.77 | -- | -- | -- | -- | 26.77 | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.50 | DoorsClose | 1 | 20.94 | -- | -- | -- | -- | 20.94 | -- | -- | -- | -- |
| 4.50 | DoorsClose | 2 | 21.61 | -- | -- | -- | -- | 21.61 | -- | -- | -- | -- |
| 4.50 | DoorsClose | 3 | 22.80 | -- | -- | -- | -- | 22.80 | -- | -- | -- | -- |
| 4.50 | DoorsClose | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.50 | VentIntake | 1 | 41.65 | -- | -- | -- | -- | 41.65 | -- | -- | -- | -- |
| 4.50 | VentIntake | 2 | 41.65 | -- | -- | -- | -- | 41.65 | -- | -- | -- | -- |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.50 | VentIntake | 3 | 35.63 | -- | -- | -- | -- | 35.63 | -- | -- | -- | -- |
| 4.50 | VentIntake | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.50 | Vehicle | 1 | 24.64 | -- | -- | -- | -- | 24.64 | -- | -- | -- | -- |
| 4.50 | Vehicle | 2 | 24.18 | -- | -- | -- | -- | 24.18 | -- | -- | -- | -- |
| 4.50 | Vehicle | 3 | 18.16 | -- | -- | -- | -- | 18.16 | -- | -- | -- | -- |
| 4.50 | Vehicle | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 1 | 48.82 | -- | -- | -- | -- | 48.82 | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 2 | 47.61 | -- | -- | -- | -- | 47.61 | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 3 | 42.66 | -- | -- | -- | -- | 42.66 | -- | -- | -- | -- |
| 4.50 | DoorsOpen | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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| Height | Per | LAeq | 32 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.50 | 1 | 49.94 | -- | -- | -- | -- | 49.94 | -- | -- | -- | -- |
| 4.50 | 2 | 49.04 | -- | -- | -- | -- | 49.04 | -- | -- | -- | -- |
| 4.50 | 3 | 44.73 | -- | -- | -- | -- | 44.73 | -- | -- | -- | -- |
| 4.50 | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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Total; Count; Average; Max; Description

0.0470; --; --; --; "TOTAL" 0.0002; 1466; 0.0000001; 0.0000; "TTimerSet - overhead"

0.0032; 733; 0.0000043; 0.0005; "WriteTestString"

0.0000; --; --; --; "TPolyClipper.Clip"

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Testfile closed: 2025-07-19 4:52:34 PM

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