Thornton Tomasetti

Noise Impact Study

700 Spring Valley Drive
Ottawa, Ontario

SW24127.00

Prepared For
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December 12, 2024

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1.0 Introduction

At the request of N45 Architecture Inc. (Client), Thornton Tomasetti (TT) presents this Noise Impact Study (NIS) regarding the planned Elementary School development located at 700 Spring Valley Drive in Ottawa, ON (the Project).

The purpose of this study is to assess the noise impacts on the Project from surrounding sources and the noise impact of the Project on surrounding noise sensitive areas. This report is intended to support the Site Plan Approval (SPA) application for the Project as a detailed study.

Where applicable, this report will provide noise control recommendations to meet the requirements of the relevant Land Use Planning Authority (LUPA). LUPAs generally adopt the noise criteria developed by the Ontario Ministry of the Environment, Conservation and Parks (MECP), but may also have unique requirements.

Where predicted noise impacts are lower than applicable action thresholds identified, the project should be designed to meet the Ontario Building Code (OBC) as a minimum standard.

2.0 Site and Surrounding Area

2.1 Project Location

The Project is located on the east corner of the intersection of Spring Valley Drive and Joshua Street, approximately 300m south of Renaud Road and Navan Road. The Project is generally surrounded by residential land uses and is bordered on the north side of the site by undeveloped lands, and a park on the east side.

An illustration of the project location and surrounding area is provided in Figure 1.

2.2 Zoning & Official Plan

The Project site is zoned as an Institutional Zone under the City of Ottawa Zoning By-Law No. 2008-250. Surrounding areas are zoned for residential, institutional (to the east), and open space and leisure land (to the north) uses.

Based on public information available through the City of Ottawa, TT understands that no other significant developments or redevelopments are planned in the surrounding area that could potentially introduce new surrounding noise sources or receptors that might impact or be impacted by the development.

A zoning map is presented in Figure 2.

2.3 Planned Development

The Project will consist of a new two storey elementary school which includes a one storey daycare. The Project is expected to include rooftop air handling units (RTUs) as part of the heating, ventilation and air-conditioning (HVAC) systems.

The proposed new site plan is provided in Figure 3.

2.4 Site Inspection

Given the time constraints involved in the Project's timelines, TT personnel could not attended the Project site in order to inspect the acoustical environment in the area of the Project.

2.1 Topography

For the purposes of predictive noise modelling conducted as part of this report, terrain heights on the Project itself were assumed to be not be significantly different of the surrounding terrain heights. Terrain heights outside the boundaries of the Project grading plan were referenced to publicly available topographic data from Google Earth.

3.0 Ministry of the Environment Conservation and Parks

The MECP does not have direct authority in approving land use planning decisions, but their guidance documents have been widely adopted by LUPAs. The MECP's *Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning* (NPC-300) provides province wide guidance regarding assessment standards and criteria for evaluating noise impacts from transportation sources such as roads, railways and aircraft; as well as stationary sources such as mechanical equipment, and industrial facilities. In preparing this report, TT has referred to *Part A Background* and *Part C Land Use Planning* of NPC-300.

This NIS report has been prepared to support land use planning decisions, and is not intended to support an application for an Environmental Compliance Approval (ECA) in accordance with *Part B Stationary Sources* of NPC-300, and Section 9 of the Environmental Protection Act.

4.0 Land Use Planning Authority

In addition to adopting the MECP's recommended standards and criteria, some LUPAs impose additional requirements on applications for development approval. The LUPA for this Project is the City of Ottawa.

4.1 City of Ottawa

In accordance with the City of Ottawa's *Environmental Noise Control Guidelines* (ENCG), available from the City's website, the following additional considerations beyond those required by NPC-300 have been included in this report.

- ENCG includes default road categories with corresponding assumed traffic levels and related parameters;
- ENCG includes different and expanded warning clause language; and,
- ENCG includes additional requirements and recommendations for the construction of noise barriers.

5.0 Transportation Noise Assessment

5.1 Critical Transportation Noise Receptors

ENCG defines a point of reception for the assessment of transportation noise sources as either the Plane of Window (POW) of a noise sensitive indoor space or an Outdoor Amenity Area (OAA) representing an area of a noise sensitive land use intended for quiet enjoyment of the outdoor environment.

Based on the nature of the Project being an institutional development, OAAs associated with the Project are not considered to be points of noise reception as per ENCG. As such, OAAs have not been included as part of this assessment.

Based on provided site plans of the Project, the worst-case locations for POW receptor(s) are those representing the operable classroom windows on the second storey of the proposed school as outlined in Table 1.

Table 1: Points of Reception – Transportation Noise

Receptor ID	Description	Receptor Location
TPOR1	West façade, highest window	Façade centre, 5.3m above ground
TPOR2	South façade, highest window	Façade centre, 5.3m above ground
TPOR3	East façade, highest window	Façade centre, 5.3m above ground

5.2 Transportation Noise Sources

5.2.1 Road Noise Sources

Based on a review of the closest roadways within the vicinity of the development and the City of Ottawa's Official Plan, the significant road noise sources for the Project would be Navan Road categorized as an arterial road, and Renaud Road, Joshua Street and Saddleridge Drive categorized as collector roads. Table 2 and Figure 4 provide a summary of the distances between the roadways and closest noise sensitive façade for the Project.

Table 2: Summary of Road Noise Sources

Road Name	Description	Approximate Separation Distance (m)
Navan Road	Two-way single lane road, located North of the Project	~389
Renaud Road	Two-way single lane road, located Northwest of the Project	~407
Saddleridge Drive	Two-way single lane road, located West of the Project	~163
Joshua Street	Two-way single lane road, located South of the Project	~14

It should be noted that ENCG Section 2.1 states that for new noise-sensitive development the noise impacts from surface transportation noise must be evaluated if it is within 100m from the right-of-way of

an existing arterial, collector or major collector road, or within 250m from an existing highway. As shown in Table 2 and Figure 4, the only roadway in the vicinity of the proposed development that meets these separation distances is Joshua Street. Therefore, an assessment of road noise sources is only required for Joshua Street and has been completed as part of this report.

Following the traffic and road parameters outlined in Appendix B of ENCG, Table 3 provides a summary of the road traffic data utilized as part of this assessment.

Table 3: Road Traffic Data Summary

Parameter	Joshua Street
AADT	8,000
% Annual Growth	-
Years of Annual Growth	-
% Medium Trucks	7%
% Heavy Trucks	5%
% Day (16h) / Night (8h)	92% / 8%
Speed Limit	50 km/hr
Gradient	0%

5.2.2 Rail Noise Sources

Based on a review of rail noise sources within the vicinity of the development, no existing rail lines located within 300m or freight rail yards within 1000m of the Project have been identified. However, based on the City of Ottawa's Official Plan, there is a protected transportation corridor approximately 300m south of the Project Site. This transportation corridor is not expected to result in significant impacts to the Project for the following reasons:

- The Project Site is located at the upper limit of the potential influence area for the future rail corridor;
- There are >200m of intervening residential buildings between the Project Site and the future rail corridor, which are as tall or taller than the Project building; and,
- As the rail corridor is not currently operational, specific data regarding the future operations is not available for assessment.

5.2.3 Aircraft Noise Sources

No airports located in the vicinity of the project have been identified.

5.3 Transportation Sound Level Limits

5.3.1 Indoor Noise Sensitive Areas

Impacts to indoor noise sensitive areas are assessed against a 16-hour daytime (07:00 – 23:00) and 8-hour nighttime (23:00 – 07:00) equivalent sound pressure level (L_{eq}) reported in dBA, at the relevant POW receptors.

Requirements for ventilation and warning clauses to address transportation noise impacts to the project façades are determined based on the impact of road transportation sources. The applicable POW sound level limits and the sliding scale of required ventilation measures and warning clauses are listed in Table 4.

Table 4: POW Sound Level Limit: Ventilation & Warning Clauses – Road Traffic

Category	Daytime $L_{eq,16hr}$ (dBA)	Nighttime $L_{eq,8hr}$ (dBA)	Mitigation Measures	Warning Clause Required
POW Limit	55	50	None	Yes
POW Mitigation Threshold Noise Sensitive Spaces	56 - 65	51 – 60	Include forced air heating and provision for central air conditioning	Yes
POW Mitigation Threshold Noise Sensitive Spaces	>65	>60	Include central air conditioning	Yes

The applicable indoor and POW sound level limits and required building construction measures to address transportation noise impacts to indoor sound levels are listed in Table 5.

Table 5: Indoor Sound Level Limit: Construction Requirements – Road Traffic

Category	Daytime $L_{eq,16hr}$ (dBA)	Nighttime $L_{eq,8hr}$ (dBA)	Total $L_{eq,24hr}$ (dBA)	Mitigation Measures
Road Sound Level Indoor Limit Noise Sensitive Spaces	45 / 45	45 / 40	-	Not Applicable
Road POW Sound Level Noise Sensitive Spaces	>65	>60	-	Design building components to achieve indoor sound level limit

5.4 Transportation Sound Level Predictions

The predicted noise impacts described below are based on the conditions identified in current drawings and information provided to TT at the time of this report and include any barriers, or other measures currently planned for the Project, but do not include additional noise measures identified in Section 5.5 of this report.

5.4.1 Unmitigated Road Traffic

Calculations of road traffic sound levels were performed using STAMSON 5.04, the software implementation of the MECP ORNAMENT model, which was developed and published by the MECP for transportation noise prediction. The calculated sound levels at the receptors are presented in Table 6.

Table 6: Calculated Sound Levels due to Road Sources

POR ID	Predicted Transportation Sound Levels (dBA)	
	Daytime (07:00–23:00) $L_{eq,16hr}$	Nighttime (23:00–07:00) $L_{eq,8hr}$*
TPOR1	57	49
TPOR2	66	58
TPOR3	57	49

*As a school, the Project building is not expected to be used at night, and will not include sleeping quarters, therefore nighttime impacts are not relevant to the following mitigation recommendations.

The STAMSON calculation outputs for the traffic noise predictions are attached in **Error! Reference source not found.**.

5.5 Transportation Noise Control Recommendations

Noise control recommendations for the identified critical receptors and the corresponding noise sensitive land uses that they represent in the proposed redevelopment are summarized in Table 7 and discussed in the subsequent sections.

Table 7: Transportation Noise Control Measures Summary

POR ID	Noise Barrier	Ventilation	Warning Clause	Building Components
TPOR1	N/A	Forced-Air Heating	Yes	Meet OBC Requirements
TPOR2	N/A	Central Air Conditioning	Yes	Designed to achieve indoor sound level criteria
TPOR3	N/A	Forced-Air Heating	Yes	Meet OBC Requirements

5.5.1 Indoor Noise Sensitive Areas - Ventilation

Sensitive receptors along the south facade of the Project are expected to face POW sound levels above 65 dBA during the 16-hour day (07:00 – 23:00) due to road noise, therefore central air conditioning will be required for the spaces on the first and second floors of the school along this facade.

Sensitive receptors along the west and east facades of the Project are expected to face POW sound levels between 55 dBA and 65 dBA during the 16-hour day (07:00 – 23:00) due to road noise, therefore forced air heating with the provision for central air conditioning is the minimum requirement for the spaces on the first and second floors of the school along this facade.

TT understands that the Project buildings will include central air conditioning, which will meet or exceed the above recommendations.

5.5.2 Indoor Noise Sensitive Areas – Building Components

Sensitive receptors along the south facade of the Project are expected to face POW sound levels above 65 dBA during the 16-hour day (07:00 – 23:00) due to road noise, therefore building components on these façades must be designed to achieve the indoor sound level limit.

Sensitive receptors along the west and east façades of the Project are not expected to face POW sound levels above 65 dBA during the 16-hour day (07:00 – 23:00) due to road noise, therefore building components on these façades need only be designed to meet the requirements of OBC.

Table 8 shows TT's estimation of the maximum exterior wall, fixed window, and operable window component areas as a percentage of the floor area of a typical room and the minimum recommended STC requirement of each component. If a component with a higher STC rating than the noted requirement is used, then the maximum allowable area of that component may increase, and if a component occupies a smaller area the STC rating required may decrease.

Table 8: Building Envelope Requirements

Component	Maximum Component Area as Percentage of Floor Area	STC Required
Sensitive Spaces Along the South Facades of the Project		
Solid Exterior	40%	STC 31
Fixed Glazing	29%	STC 27
Operable Glazing	1%	STC 27

Note that these building components are required only for exterior walls of sensitive spaces, such as classrooms. The remaining façades of the Project must meet minimum (non-acoustic) OBC requirements for the glazing and exterior wall constructions.

5.5.3 Warning Clauses

The following examples of warning clause wordings are based on applicable guidance documents and TT's experience regarding common requests from stakeholders. Precise wordings may be modified by the Client with input from the relevant LUPA(s) and legal counsel if required.

A warning clause is required to be included in the development agreements if one or more representative POW receptors is predicted to be exposed to transportation sound pressure levels greater than 55 dBA during the 16-hour day (07:00 – 23:00) and the Project includes central air conditioning. An example of a warning clause is as follows:

> *"To help address the need for sound attenuation this development includes:*
>
> - *STC rated assembly for the south building façade.*
>
> *To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.*

This building has been supplied with a central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment"

6.0 Stationary Noise Assessment

6.1 Critical Stationary Noise Receptors

ENCG defines a point of reception for the assessment of stationary noise sources as any location on a noise sensitive land use where noise from a stationary source is received. This typically includes both Points Of Reception on building façades, representing the plane-of-window of noise sensitive spaces (POR) and Outdoor Points Of Reception representing areas such as balconies, gardens, patios, and terraces (OPOR). These locations may be the same or different from the POW and OLA receptors identified as part of a transportation noise assessment.

6.1.1 Project Receptors

Based on the nature of the Project (institutional), ENCG does not consider outdoor locations to be sensitive to stationary noise sources. As a due diligence measure, TT has considered the stationary noise source impacts to the plane of window of the second storey operable windows along the facade of the school, however compliance with the noise limitations identified in ENCG is not required for these areas.

6.1.2 Surrounding Receptors

The surrounding Point Of Reception (POR) and surrounding Outdoor Point Of Reception (OPOR) receptor(s) most likely to be affected by stationary noise from the Project include those associated with residential areas to the north, east, south and west of the Project.

The locations of the critical receptors in the surrounding area for stationary noise from the Project are summarized in Table 9, and shown in Figure 5. PORs and OPORs were assessed at the most impacted points associated with each cardinal direction.

Table 9: Surrounding Points of Reception – Stationary Noise

Receptor ID	Receptor Description	Receptor Location
POR1	Residential area west of Project	2nd floor (4.5m), east façade centre, 713 Spring Valley Dr
POR2	Residential area northwest of Project	2nd floor (4.5m), east façade centre, 677 Spring Valley Dr
POR3	Residential area northeast of Project	2nd floor (4.5m), south façade centre, 527 Spring Valley Dr
POR4	Residential area east of Project	2nd floor (4.5m), west façade centre, 296 Joshua St
POR5	Goldfinch Park east of Project	1.5m, southeast park area, 280 Joshua St
POR6	Residential area south of Project	2nd floor (4.5m), north façade centre, 247 Joshua St

6.2 Stationary Noise Sources

ENCG defines a stationary source of noise as one or more sources of sound that are normally operated within a given property. Stationary sources typically include mechanical equipment such as Heating, Ventilation and Air Conditioning (HVAC) equipment, standby power generators with routine testing, and heavy vehicle traffic (truck idling, driving, and loading).

6.2.1 Project Sources

Based on information provided by the Client, the HVAC & mechanical noise sources associated with the Project are rooftop air handling units (RTUs), which are expected to be operated 24 hours a day, seven days a week. Table 10 and Figure 5 provide a summary of the equipment selections, sound power levels, and locations.

Table 10: Project Stationary Noise Sources

Source ID	Source Description	Source Location	Source Sound Power dBA	Source Type	Notes & Assumptions
RTU-1	AAON RN-020	1m above roof	84	Steady	Operates at 75% capacity
RTU-2	AAON RQ-005	1m above roof	74	Steady	Operates at 75% capacity
RTU-3	AAON RN-011	1m above roof	77	Steady	Operates at 75% capacity
RTU-4	AAON RN-011	1m above roof	77	Steady	Operates at 75% capacity
RTU-5	AAON RQ-006	1m above roof	74	Steady	Operates at 75% capacity
RTU-6	AAON RN-010	1m above roof	81	Steady	Operates at 75% capacity
RTU-7	AAON RN-007	1m above roof	74	Steady	Operates at 75% capacity
RTU-8	AAON RN-018	1m above roof	84	Steady	Operates at 75% capacity
RTU-9	AAON RN-016	1m above roof	84	Steady	Operates at 75% capacity
RTU-10	AAON RN-011	1m above roof	77	Steady	Operates at 75% capacity
RTU-11	AAON RN-009	1m above roof	77	Steady	Operates at 75% capacity
RTU-12	AAON RN-007	1m above roof	74	Steady	Operates at 75% capacity

Notes: Sound power level estimated based on manufacturer's specifications, provided in Appendix D.

6.2.2 Surrounding Sources

Based on a review of satellite imagery, no significant stationary sources have been identified in the surrounding area.

6.3 Project Area Classification

ENCG defines the applicable sound pressure level limit at a given receptor as the higher of a set exclusionary sound level limit based on the area classification of that receptor, or the actual background sound level at the location of the receptor, whichever is higher. In this report, the defined exclusionary limits were used for the purposes of assessing compliance.

The Project is currently located in a Class 2 area as defined in ENCG, based on the surrounding area features and its distance from major roads.

6.3.1 Class 2 Area Exclusionary Sound Level Limits

ENCG defines a Class 2 area as having an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum" during the daytime (07:00 – 19:00 or 23:00), but with low evening and night background sound levels defined by the natural environment and infrequent human activity (19:00 or 23:00 – 07:00).

Table 11 provides a summary of the applicable exclusionary sound level limits for steady noise sources impacting receptors in a Class 2 area. Steady stationary noise sources are assessed against a 1 hour equivalent sound pressure level (L_{eq}) expressed in A-weighted decibels (dBA).

Table 11: Class 2 Exclusionary Sound Level Limits – Steady Noise

Time Period	Normal Operations Steady Noise ($L_{eq,1hr}$, dBA)	
	POR	OPOR
Daytime (07:00 – 19:00)	50	50
Evening (19:00 – 23:00)	50	45
Nighttime (23:00 – 07:00)	45	-

6.4 Stationary Sound Level Predictions

Sound levels at the PORs due to the nearby stationary sources were calculated using the software CadnaA in accordance with the methods described in ISO 9613-2. The CadnaA calculation outputs are presented in Appendix E.

The predicted noise impacts described below are based on the conditions identified in current drawings and information provided to TT at the time of this report and include any barriers, equipment specifications, or other measures currently planned for the Project.

6.4.1 Unmitigated Project Stationary Noise Impacts on Project Receptors

In modelling the impact of stationary noise sources from the Project onto the Project's noise sensitive plane of window receptor locations, TT has considered only the identified stationary sources associated with the Project. The noise impact of these sources was found to be 47 dBA and below along the façades of the development, which is below the applicable daytime noise level limits (the school is not expected to operate at night).

6.4.2 Unmitigated Project Stationary Noise Impacts on the Surrounding Area

In modelling the impact of stationary noise sources from the Project onto the surrounding area, TT has considered only the identified stationary sources associated with the Project. The noise impact of existing stationary noise sources located in the surrounding area was not considered. Table 12 provides a summary of the modelling results for stationary noise impacts to the surrounding area, and Appendix E contains the full modelling output and Figure 6 provides an illustration of the results.

Table 12: Predicted Stationary Noise Source Impacts To The Surrounding Area

POR ID	Time Period	Steady Sound Level $L_{eq,1hr}$ (dBA)	Steady Sound Level Limit $L_{eq,1hr}$ (dBA)	Compliance
POR1	Daytime	43	50	Yes
	Evening	43	50	Yes
	Nighttime	43	45	Yes
POR2	Daytime	36	50	Yes
	Evening	36	50	Yes
	Nighttime	36	45	Yes
POR3	Daytime	34	50	Yes
	Evening	34	50	Yes
	Nighttime	34	45	Yes
POR4	Daytime	33	50	Yes
	Evening	33	50	Yes
	Nighttime	33	45	Yes
POR5	Daytime	34	50	Yes
	Evening	34	50	Yes
	Nighttime	34	45	Yes
POR6	Daytime	42	50	Yes
	Evening	42	50	Yes
	Nighttime	42	45	Yes

Noise due to stationary noise sources is predicted to meet the applicable sound level limits at all modeled receptors in the surrounding area.

6.5 Stationary Noise Control Recommendations

6.5.1 Mitigation for Surrounding Receptors

No predicted exceedances of the applicable stationary sound level limits at the surrounding receptors have been identified; therefore, no specific mitigation is recommended at this time.

7.0 Concluding Comments

Noise impacts associated with the proposed new elementary school development at 700 Spring Valley Drive are expected to be able to meet all applicable LUPA noise requirements with the inclusion of noise control measures and warning clauses presented in Section 5.3 of this report for transportation noise sources and Section 6.5 of this report for stationary noise sources. The proposed development should therefore be approved.

As described in Section 6.1.1, outdoor spaces on the Project are not considered to be sensitive to stationary noise due to the nature of the Project (institutional) and have not been compared to sound level limits / evaluated as part of this report. However, TT has still considered the stationary noise source impacts to the plane of window of the second storey operable windows along the facade of the school. The noise impact of these sources was found to be 47 dBA and below along the façades of the development, which is below the applicable noise level limits.

If changes to the development's design are done which differ from the design utilized as part of this report, acoustical modelling of the impacts of this equipment should be confirmed in order to evaluate compliance with applicable sound limits at surrounding sensitive receptors.

Please do not hesitate to contact us if there are any questions.

Yours Truly,

Thornton Tomasetti

Marc-André Bois
Senior Scientist

Reviewed by:

Robert Fuller, P.Eng.
Project Engineer

Disclaimer

This report is provided in accordance with the contractual agreement between TT and the Client. In addition to our contractual obligations TT notes the following general disclaimers and qualifications regarding the content of this report.

In preparing this report, TT has relied upon the accuracy and completeness of information provided by the Client and other third parties (manufacturers, other consultants, etc.) and accepts no responsibility for errors or emissions by other parties in the information provided to TT.

This report has been prepared solely for the benefit of the Client and the content of this report is intended for informational purposes only. This report shall not be relied upon by any other parties, including but not limited to other consultants retained by the Client, or utilized for any other purposes.

Ultimate responsibility for the design and construction remains solely with the architect/engineer of record and/or the contractor(s). Achieving the required mitigation requirements relies on correct incorporation of mitigation recommendations into Architectural and Mechanical drawings and specifications, as well as correct installation during construction. It is recommended that the implementation of mitigation measures be reviewed by a qualified acoustical consultant.
On request, TT will provide a proposal for additional work such as to peer review noise control measures or observe on-site conditions as appropriate; however, notwithstanding the foregoing, it is expressly understood and agreed that TT shall not have control or charge of, and shall not be responsible for the acts or omissions, including but not limited to means, methods, techniques, sequences and procedures, of the Design Professionals and/or Contractors performing design and/or construction on the Project. Accordingly, TT shall not be held responsible for the failure of any party to properly incorporate the mitigation measures stated in this report.

Appendix A: Figures

Thornton Tomasetti

Client Name

N45 Architecture Inc.

Project Name

700 Spring Valley Drive
Ottawa, Ontario

Figure Title

Project Location & Surroundings

Produced By

MAB

TT Project #

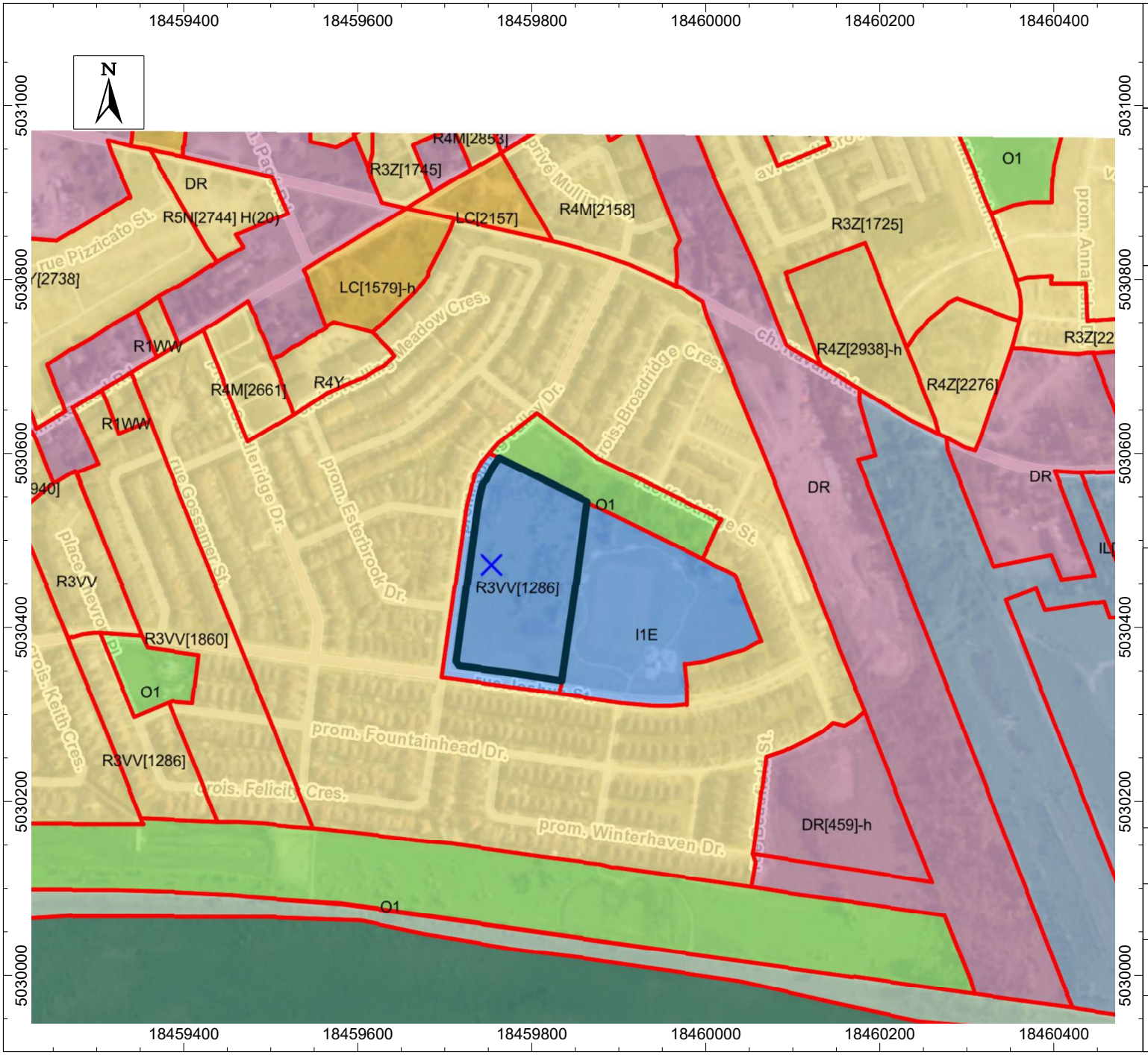
SW24127

Figure #

1

Date

12/12/2024



Thornton Tomasetti

Client Name

N45 Architecture Inc.

Project Name

700 Spring Valley Drive
Ottawa, Ontario

Ottawa Zoning By-Law #2008-250

Zone Code	Zone Name
O1	Open Space and Leisure
R1, R3, R4, R5	Residential
DR	Development Reserve
LC	Mixed Use - Commercial
I1	Institutional
IL	Industrial

Figure Title

Zoning Map

Produced By

MAB

TT Project #

SW24127

Figure #

2

Date

12/12/2024

Thornton Tomasetti

Client Name

N45 Architecture Inc.

Project Name

700 Spring Valley Drive
Ottawa, Ontario

Figure Title

Project Site Plan

Produced By

MAB

TT Project #

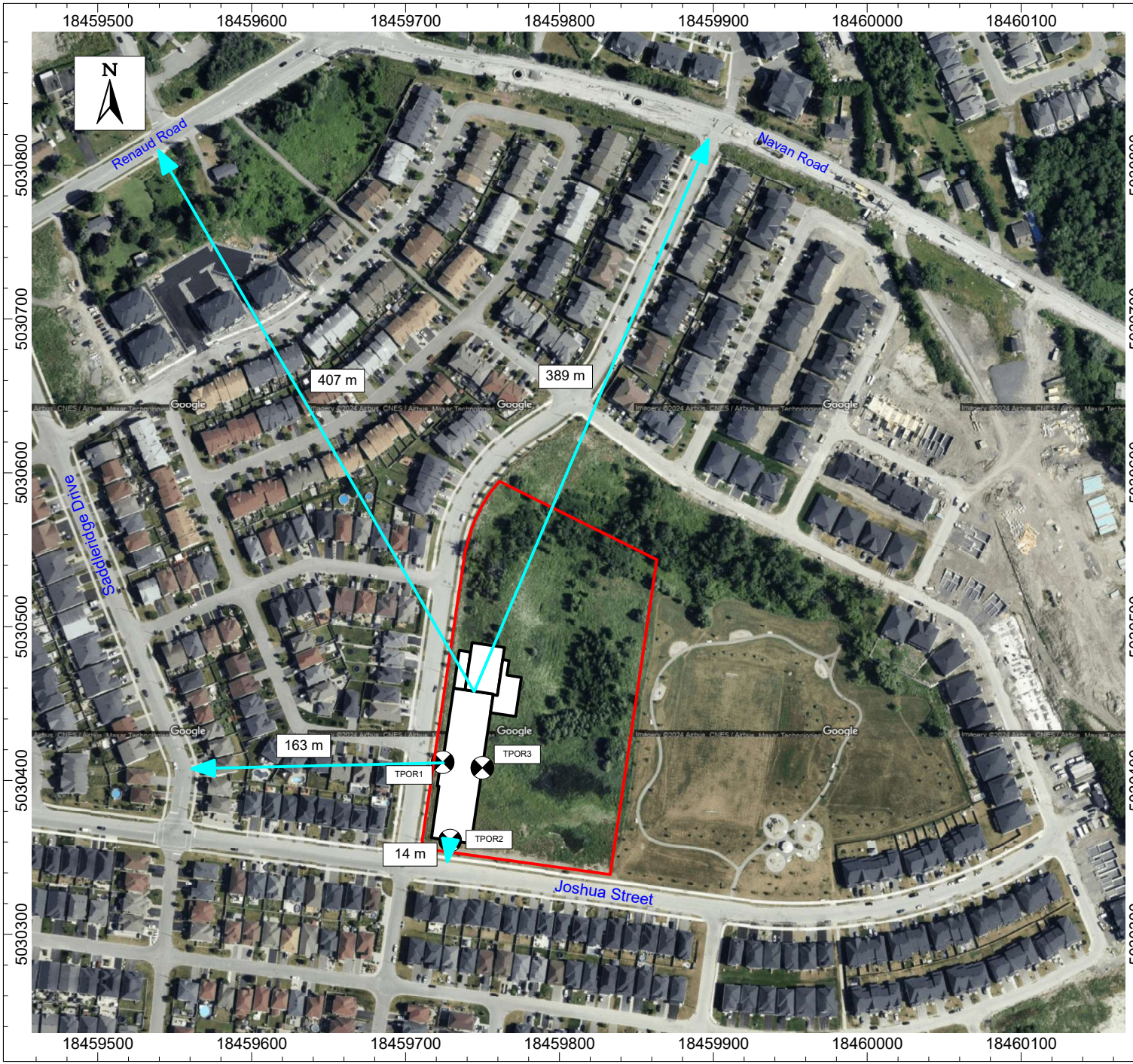
SW24127

Figure #

3

Date

12/12/2024



Thornton Tomasetti

Client Name

N45 Architecture Inc.

Project Name

700 Spring Valley Drive
Ottawa, Ontario

Points of Noise Reception

ID	Height above ground (m)
TPOR1a	4.5
TPOR1b	4.5
TOLA1	1.5
TOLA2	1.5

Legend

- Point Source
- Building
- Receiver

Figure Title

Transportation Noise PORs & Sources

Produced By

MAB

TT Project #

SW24127

Figure #

4

Date

12/12/2024

Thornton Tomasetti

Client Name

N45 Architecture Inc.

Project Name

700 Spring Valley Drive
Ottawa, Ontario

Points of Noise Reception

ID	Height above ground (m)
POR1	4.5
POR2	4.5
POR3	4.5
POR4	4.5
POR5	1.5
POR6	4.5

Legend

Point Source
Building
Receiver

Figure Title

Stationary Noise PORs & Sources

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TT Project #

SW24127

Figure #

5

Date

12/12/2024

Thornton Tomasetti

Client Name

N45 Architecture Inc.

Project Name

700 Spring Valley Drive
Ottawa, Ontario

Sound Pressure Levels

- > -99.0 dB (A)
- > 35.0 dB (A)
- > 40.0 dB (A)
- > 45.0 dB (A)
- > 50.0 dB (A)
- > 55.0 dB (A)
- > 60.0 dB (A)
- > 65.0 dB (A)
- > 70.0 dB (A)
- > 75.0 dB (A)
- > 80.0 dB (A)
- > 85.0 dB (A)

Grid = 5m x 5m ; height = 4.5m

Legend

- Point Source
- Building
- Receiver

Figure Title

Predicted Noise Impacts (Day / Night)
Unmitigated Steady Noise Sources

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SW24127

Figure #

6

Date

12/12/2024

Appendix B: Traffic Data

Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions

Table B1 Traffic And Road Parameters To Be Used For Sound Level Predictions

Row Width (m)	Implied Roadway Class	AADT Vehicles/Day	Posted Speed Km/Hr	Day/Night Split %	Medium Trucks %	Heavy Trucks % [1]
NA [2]	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6 UAD)	50,000	50-80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10,000	50-80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8,000	40-50	92/8	7	5

[1] The MOE Vehicle Classification definitions should be used to estimate automobiles, medium trucks and heavy trucks.

[2] The number of lanes is determined by the future mature state of the roadway.

Appendix C: Transportation Noise Predictions

STAMSON 5.0 NORMAL REPORT Date: 12-12-2024 09:48:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: TPOR1.te Time Period: Day/Night 16/8 hours
Description: Predicted Transportation Noise Impact at TPOR1

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: JoshuaSt (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height : 5.30 / 5.30 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: JoshuaSt (day)

Source height = 1.50 m

ROAD (0.00 + 56.58 + 0.00) = 56.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	65.75	0.00	-6.16	-3.01	0.00	0.00	0.00	56.58

Segment Leq : 56.58 dBA

Total Leq All Segments: 56.58 dBA

Results segment # 1: JoshuaSt (night)

Source height = 1.50 m

ROAD (0.00 + 48.98 + 0.00) = 48.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	58.16	0.00	-6.16	-3.01	0.00	0.00	0.00	48.98

Segment Leq : 48.98 dBA

Total Leq All Segments: 48.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.58
(NIGHT): 48.98

STAMSON 5.0 NORMAL REPORT Date: 12-12-2024 09:50:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: TPOR2.te Time Period: Day/Night 16/8 hours
Description: Predicted Transportation Noise Impact at TPOR2

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: JoshuaSt (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 5.30 / 5.30 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: JoshuaSt (day)

Source height = 1.50 m

ROAD (0.00 + 65.75 + 0.00) = 65.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.75	0.00	0.00	0.00	0.00	0.00	0.00	65.75

Segment Leq : 65.75 dBA

Total Leq All Segments: 65.75 dBA

Results segment # 1: JoshuaSt (night)

Source height = 1.50 m

ROAD (0.00 + 58.16 + 0.00) = 58.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.16	0.00	0.00	0.00	0.00	0.00	0.00	58.16

Segment Leq : 58.16 dBA

Total Leq All Segments: 58.16 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.75
(NIGHT): 58.16

STAMSON 5.0 NORMAL REPORT Date: 12-12-2024 09:52:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: TPOR3.te Time Period: Day/Night 16/8 hours
Description: Predicted Transportation Noise Impact at TPOR3

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: JoshuaSt (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height : 5.30 / 5.30 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: JoshuaSt (day)

Source height = 1.50 m

ROAD (0.00 + 56.58 + 0.00) = 56.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	65.75	0.00	-6.16	-3.01	0.00	0.00	0.00	56.58

Segment Leq : 56.58 dBA

Total Leq All Segments: 56.58 dBA

Results segment # 1: JoshuaSt (night)

Source height = 1.50 m

ROAD (0.00 + 48.98 + 0.00) = 48.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	58.16	0.00	-6.16	-3.01	0.00	0.00	0.00	48.98

Segment Leq : 48.98 dBA

Total Leq All Segments: 48.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.58
(NIGHT): 48.98

Appendix D: Manufacturer Specifications

Speed %			Fans	Dia	RPM	Sound Power Level 63	125	250	500	1000	2000	4000	8000	LwA
100%	RQ 2 & 3 Ton	Inlet	1	30	850	79	74	72	70	66	62	59	59	72
		Outlet				81	77	71	71	67	62	59	58	73
		Total				83	79	74	73	69	65	62	61	75
75%	RQ 2 & 3 Ton	Inlet	1	30	638	73	68	66	63	59	56	53	52	65
		Outlet				75	71	64	65	60	58	53	52	66
		Total				77	73	68	67	63	59	56	55	69
50%	RQ 2 & 3 Ton	Inlet	1	30	425	64	59	57	54	51	47	44	44	57
		Outlet				66	62	56	56	52	47	44	43	57
		Total				68	64	59	58	54	50	47	46	60
25%	RQ 2 & 3 Ton	Inlet	1	30	213	49	44	42	39	36	32	29	29	42
		Outlet				51	47	40	41	37	32	29	28	42
		Total				53	49	44	43	39	35	32	31	45
100%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	1085	85	79	77	75	71	68	65	64	77
		Outlet				86	83	76	76	72	68	65	63	78
		Total				89	84	80	79	75	71	68	67	80
75%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	814	78	73	71	69	65	61	58	58	71
		Outlet				80	77	70	70	66	61	58	57	72
		Total				82	78	73	72	68	64	61	61	74
50%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	543	70	64	62	60	56	53	50	49	
		Outlet				71	66	61	61	57	53	50	48	63
		Total				74	69	65	64	59	56	53	52	65
25%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	271	54	49	47	45	41	37	35	34	47
		Outlet				56	53	46	46	42	38	35	33	48
		Total				59	54	50	48	44	41	38	37	50
100%	RN 8 & 10 Ton	Inlet	1	30	1085	92	86	85	82	78	75	72	71	84
		Outlet				94	90	83	83	79	75	72	71	86
		Total				96	91	87	86	82	78	75	74	88
75%	RN 8 & 10 Ton	Inlet	1	30	814	86	80	78	76	72	68	66	65	78
		Outlet				87	84	77	77	73	69	66	64	79
		Total				90	85	81	80	75	72	69	68	81
50%	RN 8 & 10 Ton	Inlet	1	30	543	77	71	69	67	63	60	57	56	69
		Outlet				79	75	68	68	64	60	57	56	70
		Total				81	76	72	71	67	63	60	59	73
25%	RN 8 & 10 Ton	Inlet	1	30	271	62	56	54	52	48	45	42	41	54
		Outlet				64	60	53	53	49	45	42	41	55
		Total				66	61	57	56	52	48	45	44	58
100%	RN 9 & 11 Ton	Inlet	2	30	1085	88	82	80	78	74	71	68	67	80
		Outlet				89	86	79	79	75	71	68	66	81
		Total				92	87	83	82	78	74	71	70	83
75%	RN 9 & 11 Ton	Inlet	2	30	814	81	76	74	72	68	64	61	61	74
		Outlet				83	80	73	73	69	64	61	60	75
		Total				85	81	76	75	71	67	64	64	77
50%	RN 9 & 11 Ton	Inlet	2	30	407	66	61	59	57	53	49	46	46	59
		Outlet				68	64	58	58	54	49	46	45	60
		Total				70	66	61	60	56	52	49	48	62
25%	RN 9 & 11 Ton	Inlet	2	30	271	57	52	50	48	44	40	38	37	50
		Outlet				59	56	49	49	45	41	38	36	51
		Total				62	57	53	51	47	44	41	40	53
100%	RN 13-20 Ton	Inlet	2	30	1085	95	89	88	85	81	78	75	74	87
		Outlet				97	93	86	86	82	78	75	74	86
		Total				99	94	90	89	85	81	78	77	91
75%	RN 13-20 Ton	Inlet	2	30	814	89	83	81	79	75	71	69	68	81
		Outlet				90	87	80	80	76	72	69	67	82
		Total				93	88	84	83	78	75	72	71	84
50%	RN 13-20 Ton	Inlet	2	30	543	80	74	72	70	66	63	60	59	72
		Outlet				82	78	71	71	67	63	60	59	73
		Total				84	79	75	74	70	66	63	62	76
25%	RN 13-20 Ton	Inlet	2	30	271	65	59	57	55	51	48	45	44	57
		Outlet				67	63	56	56	52	48	45	44	58
		Total				69	64	60	59	55	51	48	47	61
100%	RN 25 & 30 Ton	Inlet	3	30	1085	97	91	89	87	83	80	77	76	89
		Outlet				98	95	88	88	84	80	77	75	90
		Total				101	96	92	91	86	83	80	79	92
75%	RN 25 & 30 Ton	Inlet	3	30	814	90	85	83	81	77	73	70	70	83
		Outlet				92	88	82	82	78	73	70	69	83
		Total				94	90	85	84	80	76	73	72	86
50%	RN 25 & 30 Ton	Inlet	3	30	543	81	76	74	72	68	64	62	61	74
		Outlet				83	80	73	73	69	65	62	60	75
		Total				86	81	77	75	71	67	65	64	77
25%	RN 25 & 30 Ton	Inlet	3	30	271	66	61	59	57	53	49	47	46	59
		Outlet				68	65	58	58	54	49	47	45	60
		Total				70	66	62	60	56	52	50	49	62

Appendix E: CadnaA Calculation Output

Report (Model.cna)

Calculation Configuration

Configuration	
Parameter	Value
General	
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	0.00
Night-time Penalty (dB)	0.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	3
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	20
rel. Humidity (%)	70
Ground Absorption G	0.20
Wind Speed for Dir. (#(Unit,SPEED))	0.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (NONE)	
Strictly acc. to AzB	

Result Table

Receiver		Land Use	Limiting Value		rel. Axis			Lr w/o Noise Control		dL req.		Lr w/ Noise Control		Exceeding		passive NC
Name	ID		Day	Night	Station	Distance	Height	Day	Night	Day	Night	Day	Night	Day	Night	
			dB(A)	dB(A)	m	m	m	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
POR1	!0000!		50	45				0.0	0.0	-	-	0.0	0.0	-	-	-
POR2	!0000!		50	45				0.0	0.0	-	-	0.0	0.0	-	-	-
POR3	!0000!		50	45				0.0	0.0	-	-	0.0	0.0	-	-	-
POR4	!0000!		50	45				0.0	0.0	-	-	0.0	0.0	-	-	-
POR5	!0000!		50	45				0.0	0.0	-	-	0.0	0.0	-	-	-
POR6	!0000!		50	45				0.0	0.0	-	-	0.0	0.0	-	-	-

Group Day and Night

Name	Expression	Partial Sum Level																	
		POR1			POR2			POR3			POR4			POR5			POR6		
		Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Root	!*	42.5	42.5	42.5	36.1	36.1	36.1	34.2	34.2	34.2	32.8	32.8	32.8	33.9	33.9	33.9	42.1	42.1	42.1
General	!00*																		
Receptors	!0000*																		
Buildings	!0001*																		
Site Buildings	!0002*																		
Labels	!0003*																		
Location	!000300*																		
Site	!000301*																		
Property Line	!000302*																		
Transportation	!000303*																		
Bitmap	!0004*																		
Location	!000400*																		
Site	!000401*																		
Zoning	!000402*																		
Steady	!01*	42.5	42.5	42.5	36.1	36.1	36.1	34.2	34.2	34.2	32.8	32.8	32.8	33.9	33.9	33.9	42.1	42.1	42.1
Noise Sources	!0100*	42.5	42.5	42.5	36.1	36.1	36.1	34.2	34.2	34.2	32.8	32.8	32.8	33.9	33.9	33.9	42.1	42.1	42.1
Evaluation Grid	!0101*																		
Labels	!0102*																		
General	!010200*																		
Receptor	!010201*																		
Mitigation	!0103*																		
Impulse	!02*																		
Noise Sources	!0200*																		
Generator	!03*																		
Noise Sources	!0300*																		
Labels	!0301*																		

Partial Day/Night

Source			Partial Level																
Name	M.	ID	POR1			POR2			POR3			POR4			POR5			POR6	
			Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
RTU-1		!0100!	35.7	35.7	35.7	32.7	32.7	32.7	29.2	29.2	29.2	26.0	26.0	26.0	27.1	27.1	27.1	25.0	25.0	25.0
RTU-2		!0100!	25.8	25.8	25.8	21.0	21.0	21.0	17.7	17.7	17.7	15.3	15.3	15.3	16.5	16.5	16.5	15.4	15.4	15.4
RTU-3		!0100!	29.5	29.5	29.5	16.7	16.7	16.7	18.9	18.9	18.9	18.5	18.5	18.5	19.7	19.7	19.7	22.5	22.5	22.5
RTU-4		!0100!	27.7	27.7	27.7	16.8	16.8	16.8	19.0	19.0	19.0	18.8	18.8	18.8	20.0	20.0	20.0	22.5	22.5	22.5
RTU-5		!0100!	25.3	25.3	25.3	14.8	14.8	14.8	15.5	15.5	15.5	15.6	15.6	15.6	16.7	16.7	16.7	21.0	21.0	21.0
RTU-6		!0100!	29.6	29.6	29.6	21.7	21.7	21.7	22.1	22.1	22.1	23.3	23.3	23.3	24.3	24.3	24.3	40.1	40.1	40.1
RTU-7		!0100!	23.1	23.1	23.1	12.9	12.9	12.9	15.4	15.4	15.4	15.9	15.9	15.9	17.1	17.1	17.1	21.9	21.9	21.9
RTU-8		!0100!	36.4	36.4	36.4	24.8	24.8	24.8	26.9	26.9	26.9	26.4	26.4	26.4	27.5	27.5	27.5	29.4	29.4	29.4
RTU-9		!0100!	37.5	37.5	37.5	31.4	31.4	31.4	28.1	28.1	28.1	26.0	26.0	26.0	27.1	27.1	27.1	26.5	26.5	26.5
RTU-10		!0100!	24.7	24.7	24.7	14.9	14.9	14.9	17.5	17.5	17.5	18.8	18.8	18.8	19.9	19.9	19.9	35.1	35.1	35.1
RTU-11		!0100!	26.2	26.2	26.2	16.4	16.4	16.4	18.1	18.1	18.1	18.7	18.7	18.7	19.9	19.9	19.9	26.4	26.4	26.4
RTU-12		!0100!	11.2	11.2	11.2	9.5	9.5	9.5	20.6	20.6	20.6	18.2	18.2	18.2	19.5	19.5	19.5	11.1	11.1	11.1

Sound Sources

Point Sources

Name	Sel.	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
				Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
				(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
RTU-1			!0100!	84.5	84.5	84.5	Lw	RTU1		0.0	0.0	0.0							0.0		(none)	1.00	g	18459752.07	5030471.29	9.40
RTU-2			!0100!	73.9	73.9	73.9	Lw	RTU2		0.0	0.0	0.0							0.0		(none)	1.00	g	18459744.36	5030454.57	9.40
RTU-3			!0100!	76.9	76.9	76.9	Lw	RTU3		0.0	0.0	0.0							0.0		(none)	1.00	g	18459733.39	5030409.56	9.40
RTU-4			!0100!	76.9	76.9	76.9	Lw	RTU4		0.0	0.0	0.0							0.0		(none)	1.00	g	18459740.26	5030408.45	9.40
RTU-5			!0100!	73.9	73.9	73.9	Lw	RTU5		0.0	0.0	0.0							0.0		(none)	1.00	g	18459732.09	5030398.94	9.40
RTU-6			!0100!	81.5	81.5	81.5	Lw	RTU6		0.0	0.0	0.0							0.0		(none)	1.00	g	18459726.01	5030365.75	9.40
RTU-7			!0100!	73.9	73.9	73.9	Lw	RTU7		0.0	0.0	0.0							0.0		(none)	1.00	g	18459739.44	5030391.31	9.40
RTU-8			!0100!	84.5	84.5	84.5	Lw	RTU8		0.0	0.0	0.0							0.0		(none)	1.00	g	18459739.40	5030415.74	9.40
RTU-9			!0100!	84.5	84.5	84.5	Lw	RTU9		0.0	0.0	0.0							0.0		(none)	1.00	g	18459741.33	5030448.85	9.40
RTU-10			!0100!	76.9	76.9	76.9	Lw	RTU10		0.0	0.0	0.0							0.0		(none)	1.00	g	18459731.70	5030366.93	9.40
RTU-11			!0100!	76.9	76.9	76.9	Lw	RTU11		0.0	0.0	0.0							0.0		(none)	1.00	g	18459733.35	5030384.38	9.40
RTU-12			!0100!	73.9	73.9	73.9	Lw	RTU12		0.0	0.0	0.0							0.0		(none)	1.00	g	18459764.84	5030456.03	5.50

Line Sources

Name	Sel.	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src			
				Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number		Speed	
				(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night	(km/h)

Geometry Line Sources

Name	ID	Height		Coordinates			
		Begin	End	x	y	z	Ground
		(m)	(m)	(m)	(m)	(m)	(m)

Receptors

Name	Sel.	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
				Day	Eve	Night	Day	Eve	Night	Type	Auto	Noise Type			X	Y	Z
				(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
POR1			!0000!	42.5	42.5	42.5	50.0	45.0	0.0				4.50	r	18459696.00	5030440.85	4.50
POR2			!0000!	36.1	36.1	36.1	50.0	45.0	0.0				4.50	r	18459727.01	5030602.19	4.50
POR3			!0000!	34.2	34.2	34.2	50.0	45.0	0.0				4.50	r	18459862.54	5030627.28	4.50
POR4			!0000!	32.8	32.8	32.8	50.0	45.0	0.0				4.50	r	18459984.57	5030338.99	4.50
POR5			!0000!	33.9	33.9	33.9	50.0	45.0	0.0				1.50	r	18459947.88	5030357.56	1.50
POR6			!0000!	42.1	42.1	42.1	50.0	45.0	0.0				4.50	r	18459723.60	5030323.43	4.50
TPOR1a		~	!000303!	-88.0	-88.0	-88.0	50.0	45.0	0.0				4.50	r	18459730.91	5030458.01	4.50
TPOR1b		~	!000303!	-88.0	-88.0	-88.0	50.0	45.0	0.0				4.50	r	18459756.87	5030454.27	4.50
TOLA2		~	!000303!	-88.0	-88.0	-88.0	50.0	45.0	0.0				4.50	r	18459832.31	5030382.13	4.50
TOLA1		~	!000303!	-88.0	-88.0	-88.0	50.0	45.0	0.0				4.50	r	18459784.55	5030471.10	4.50

Obstacles

Barriers

Name	Sel.	M.	ID	Absorption		Z-Ext.	Cantilever		Height	
				left	right		horz.	vert.	Begin	End
						(m)	(m)	(m)	(m)	(m)

Geometry Barriers

Name	Sel.	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates			
				left	right		horz.	vert.	Begin	End	x	y	z	Ground
						(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)

Building

Name	Sel.	M.	ID	RB	Residents	Absorption	Height	
							Begin	
							(m)	
			!0002!		0	0.21	8.40	r
			!0002!		0	0.21	5.60	r
			!0002!		0	0.21	8.40	r
			!0002!		0	0.21	4.50	r

Geometry Building

Name	Sel.	M.	ID	RB	Residents	Absorption	Height	Coordinates				
							Begin		x	y	z	Ground
							(m)		(m)	(m)	(m)	(m)
			!0002!		0	0.21	8.40	r	18459742.57	5030358.96	8.40	0.00
									18459716.82	5030362.77	8.40	0.00
									18459721.72	5030396.31	8.40	0.00
									18459720.59	5030396.48	8.40	0.00
									18459722.53	5030409.49	8.40	0.00
									18459723.78	5030409.32	8.40	0.00
									18459731.25	5030460.01	8.40	0.00
									18459757.00	5030456.18	8.40	0.00
			!0002!		0	0.21	5.60	r	18459731.25	5030460.01	5.60	0.00
									18459734.92	5030484.60	5.60	0.00
									18459742.31	5030483.46	5.60	0.00
									18459738.70	5030458.91	5.60	0.00
			!0002!		0	0.21	8.40	r	18459738.71	5030458.91	8.40	0.00
									18459743.27	5030489.63	8.40	0.00
									18459764.32	5030486.49	8.40	0.00
									18459759.73	5030455.22	8.40	0.00
									18459756.92	5030455.62	8.40	0.00
									18459757.00	5030456.18	8.40	0.00
			!0002!		0	0.21	4.50	r	18459755.27	5030444.08	4.50	0.00
									18459756.92	5030455.62	4.50	0.00
									18459759.73	5030455.22	4.50	0.00
									18459763.16	5030478.56	4.50	0.00
									18459767.27	5030477.87	4.50	0.00
									18459765.86	5030468.47	4.50	0.00
									18459775.28	5030467.01	4.50	0.00
									18459771.49	5030441.64	4.50	0.00

3D Reflector

Name	Sel.	M.	ID	Type	Attenuation	B	m	Height
					dB/100m	%	1/m	(m)

Geometry Absorption

Name	Sel.	M.	ID	Type	Attenuation	B	m	Height	Coordinates			
					dB/100m	%	1/m	(m)	x	y	z	Ground
									(m)	(m)	(m)	(m)