



**Noise Feasibility Report
Ottawa Train Yards
200, 230, 260 Steamline Street
Ottawa, Ontario**

Type of Document
Site Plan Submission

Client:
Controlex Corporation

Project Number
OTT-00243337-A0

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Date Submitted
January 2018

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Project Name:
Steamline Street Multi Residential Buildings

Project Number:
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1 Introduction

Controlex Corporation retained exp Services Inc. to undertake a noise control feasibility study in support of a site plan application for a proposed residential project phase 1 located at 200, 230, 260 Steamline Street in the Ottawa Train Yards. The site is located east of Sandford Fleming Avenue and north of Industrial Avenue. The site is subject to noise generated from vehicles travelling along Industrial Ave, which is classified as a 4-lane urban arterial-undivided (4-UAU) and Sandford Fleming Avenue which is classified as a 2-lane urban collector (2-UCU). The site is also subject to noise generated from railway traffic from the VIA Rail tracks located north of the site.

This report addresses concerns with respect to anticipated noise levels at Outdoor Living Areas (OLAs) and at the proposed building façade and makes recommendations based on calculations obtained from noise prediction methods. Noise levels were calculated on all three sides of each of the two proposed buildings, and on the roof top amenity areas.

This report assesses noise impact from surface transportation sources only. No stationary noise sources were noted at the site which would exceed the sound level criteria, and therefore an assessment of stationary noise sources was outside the scope of this project.

This study was carried out in accordance with the Ministry of the Environment and Climate Change's (MOECC) Environmental Noise Control Guideline NPC-300 and the City of Ottawa's Environmental Noise Control Guidelines (COENCG). The findings of the study will address noise levels, and recommend if noise abatement measures are necessary to bring noise levels to acceptable levels. This noise impact study is prepared to address the following requirements as identified in Section 2.1 of the COENCG and Section 4.8.7 of the City's Official Plan (COOP):

Development proposals for new noise sensitive land uses are required to include a noise feasibility study and/or detailed noise study in the following locations:

- *Mixed Use Centre, Town Centre and Mainstreets as identified on Schedule B;*
or within
- *100 metres from the right-of-way of:*
 - ◆ *an existing or proposed arterial, collector or major collector road identified on Schedules E and F; or*
 - ◆ *a light rail transit corridor; bus rapid transit, or transit priority corridor identified on Schedule D;*
- *250 metres from the right-of-way of:*
 - ◆ *an existing or proposed highway;*
- *300 metres from the right of way of*
 - ◆ *a proposed or existing rail corridor or;*
 - ◆ *secondary main railway line;*
- *500 metres from the right-of-way of:*
 - ◆ *a 400-series provincial highway, freeway or*
 - ◆ *a principle main railway line.*

2 References

A summary of the documents that were referenced during the preparation of this report include the following:

- Ministry of the Environment Technical Document, ORNAMENT, Ontario Road Noise Analysis Method for Environment and Transportation, Sept 1999.
- Ministry of the Environment & Climate Change Publication NPC-300, Stationary and Transportation Sources Approvals and Planning, August 2013.
- City of Ottawa Official Plan (COOP), 2013.
- City of Ottawa Transportation Master Plan (COTMP), November 2013.
- City of Ottawa Environmental Noise Control Guidelines (COENCG), January 2016.

3 Sound Level Criteria

Ministry of the Environment & Climate Change requirements and the City of Ottawa Guidelines place limitations on indoor and outdoor sound levels from road traffic which are summarized in Table 3-1 below. Noise criteria is taken from Tables 2.2a and 2.2b from the COENCG.

Table 3-1: MOECC and City of Ottawa Indoor and Outdoor Criteria for Noise from Road Traffic

Location	Space	Time Period	Equivalent Level Leq (dBA)
Indoors	Sleeping quarters of residences, hospitals, schools, nursing / retirement homes, etc.	Nighttime 23:00 to 07:00	40
	Sleeping quarters of hotels/motels	Nighttime 23:00 to 07:00	45
	Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Daytime 07:00 to 23:00	45
	Living/dining, den areas of residences, hospitals, nursing homes, etc (except schools, daycare centres).	Nighttime 23:00 to 07:00	45
	General offices, reception areas, retail stores, etc.	Daytime 07:00 to 23:00	50
Outdoors	Outdoor Living Areas	Daytime 07:00 to 23:00	55

As the proposed project consists of a multi-storey residential building and includes outdoor amenity spaces, the noise criteria that applies for the indoor and outdoor areas are the rows shown **bold** in Table 3-1.

The basic physical measurement of noise used in this report is the A-weighted sound level measured in dBA, which is an overall measurement of sound over a full range of frequencies. Because noise from roadway traffic fluctuates over the audible range of hearing, it is convenient to describe noise in terms of an equivalent 24-hour sound level (denoted as Leq). MOE Guidelines require that traffic noise be evaluated in relation to specific locations during certain time periods.

In general, noise levels are predicted for outdoor living areas (generally the backyard of a residential home) during the day and for indoor areas (living areas during the day and bedrooms on the second floor) during the night-time. A summary of these requirements are shown in Tables 3-2 through 3-5.

Table 3-2: Outdoor, Ventilation & Warning Clause Requirements Road Noise, Daytime (0700-2300)

ASSESSMENT LOCATION	Leq (16 hr) (dBA)	VENTILATION REQUIREMENTS	OUTDOOR CONTROL MEASURES	WARNING CLAUSE
Outdoor Living Area (OLA)	Less than or equal to 55 dBA	N/A	None required	Not required
	Greater than 55 dBA to less than or equal to 60 dBA	N/A	Control measures (barriers) may not required but should be considered	Required if resultant Leq exceeds 55 dBA, Type A
	Greater than 60 dBA	N/A	Control measures (barriers) required to reduce the Leq to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant Leq exceeds 55 dBA, Type B
Plane of Living Room Window	Greater than 50 dBA to less than or equal to 55 dBA	None required	N/A	Not required
	Greater than 55 dBA to less than or equal to 65 dBA	Forced air heating with provision for central air conditioning	N/A	Required Type C
	Greater than 65 dBA	Central air conditioning	N/A	Required Type D

Table 3-3: Ventilation and Warning Clause Requirements Road Noise, Nighttime (2300-0700)

ASSESSMENT LOCATION	L_{eq} (8 hr) (dBA)	VENTILATION REQUIREMENTS	WARNING CLAUSE
Plane of Bedroom Window	Greater than 50 dBA to less or equal to 60 dBA	Forced air heating with provision for central air conditioning	Required Type C
	Greater than 60 dBA	Central air conditioning	Required Type D

Table 3-4: Building Component Requirements Road Noise, Daytime (0700-2300)

ASSESSMENT LOCATION	NOISE SOURCE	L_{eq} (16 hr) (dBA)	WARNING CLAUSE
Plane of Living Room Window	Road	Less than or equal to 65 dBA	Building compliant with Ontario Building Code
		Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

Table 3-5: Building Component Requirements Road Noise, Nighttime (2300-0700)

ASSESSMENT LOCATION	NOISE SOURCE	L_{eq} (8 hr) (dBA)	WARNING CLAUSE
Plane of Bedroom Window	Road	Less than or equal to 60 dBA	Building compliant with Ontario Building Code
		Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

The warning clauses referred to above are contained in Table 3-6 below. Ministry of the Environment & Climate Change warning clauses and City of Ottawa specific warning clauses (*red italics*) are shown. Where applicable, these clauses are to be inserted on all Offers/Agreements of Purchase and Sale or Leases to notify potential purchasers and tenants of these environmental concerns. The City of Ottawa warning clauses were taken from Table A1 of the COENCG.

Table 3-6: MOECC Warning Clauses

Type A	“Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.” <i>“Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.”</i>
Type B	“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.” <i>“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road/rail/Light Rail/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.”</i>
Type C	“This dwelling unit has been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.” <i>“This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning 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.”</i>
Type D	“This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.” <i>“This dwelling unit 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.”</i>
Type E	“Purchasers/tenants are advised that due to the proximity of the adjacent industry (facility) (utility), noise from the industry (facility) (utility) may at times be audible.” <i>“Purchasers/tenants are advised that due to the proximity of the adjacent industry (facility) (utility), noise from the industry (facility) (utility) may at times interfere with outdoor activities.”</i>

3.1 Vehicular Traffic Noise

The proposed site is located within 100 meters from the right-of-way of Industrial Ave which is classified as a 4-Lane Urban Arterial-Undivided (4-UAU) and within 100m from the right of way of Sandford Fleming Ave which is classified as a 2-Lane Urban Collector (2-UCU). Terminal Ave right-of-way is greater than 100m from the site and therefore is not accessed as a noise source. Steamline Street is a public local road and therefore is not accessed as a noise source. Figure 1 below shows the overall site location.

Figure 2 in Appendix A illustrates the noise source and receiver locations used. Noise levels were assessed at Building 100 and Building 200. Building 100 consists of a 15-storey building with a rooftop outdoor living area. Building 200 consists of a 22-storey Building with a rooftop outdoor living area. In general, noise levels are predicted for:

- Outdoor living areas (OLAs) during the day;
- Indoor living/dining areas during the day, and;
- Bedrooms during the night time.

Noise levels were calculated (or predicted) for the outdoor living area (OLA) at the Plane of the Window (POW) for a particular time period, either daytime or nighttime, and were used to dictate the action required to achieve the recommended sound level requirements. The mitigation of the indoor sound levels are achieved by proper selection of building architectural components (walls, windows, doors), based on the noise reduction required.

The 16-hour daytime and 8-hour nighttime sound levels were calculated at six (6) façade locations and two (2) amenity areas within the proposed development. The results of the predicted noise levels at the eight locations stipulate the ventilation and building code and associated warning clause requirements.

STAMSON file names used were denoted based on the location, Building 100 (B1), Building 200 (B2), façade direction (N, E, S, W) and at the outdoor living area (OLA)(i.e. B1N, denotes Building 100 North façade, whereas B2OLA denotes Building 200 outdoor living area)

3.2 Noise Levels from Rail Traffic

The VIA Rail station is located approximately 300m north of the site. The railway tracks that run through the station are used solely for passenger trains, as no freight trains are used. The VIA schedule “to” and “from” Toronto and Montreal were used to estimate the total daytime and nighttime volumes. Refer to Appendix E for the schedules. It was assumed that each train had a total of eight (8) railway cars, and one diesel locomotive engine. The track alignment adjacent to the property is relatively straight with little grade change. Train speeds along the railway in vicinity of the station is 20 km/hr.

3.3 Aircraft/Airport Noise

The site is located outside the Airport Vicinity Development Zone and outside the Airport Operating Influence Zone as per Schedule K of the Ottawa Official Plan. The site is also outside both the 25 NEF and NEP contours therefore noise from air traffic does not impact this site and will not be examined in this report.

3.4 Stationary Noise

A review of the surrounding building uses and the zoning of adjacent properties were completed in order to determine if there was a potential impact or influence from stationary noise sources. Typically industrial and commercial land uses can be a potential stationary noise source. For a Class 1 area, the potential influence area is 70 metres. There is one commercial building, located at Industrial Avenue, which has a rooftop air conditioner unit, and is 63m from the closest point of Building 100. Given the relatively small size of the unit, and the separation distance of greater than 50m, noise emanating from this equipment is anticipated to be negligible to the project, relative to the noise emanating from traffic.

4 Road Noise Prediction Procedures

All noise levels have been predicted using MOE's software and methodology. STAMSON Version 5.03 (1999), which is based on the Ontario Road Noise Analysis Method for Environment and Transportation ("ORNAMENT") Model, was used for all calculations in this report. Detailed output files are attached in Appendix E for reference. In addition to the traffic data that was used in the analysis, theoretical noise predictions were based on the following information:

- Truck traffic on all streets and roadways consists of 5% heavy trucks, 7% medium trucks.
- The Day/Night split used for roadways and freeways was 92% and 8%.
- Intermediate surfaces between the source and receiver locations were assessed as a reflective ground surface.
- Topography was assessed as flat/gentle slope.
- Road pavement and road gradient was assessed as typical asphalt or concrete and flat grade.

All source and receivers were assumed to be elevated with a reflective separating surface. This ensures that no ground absorption is applied to the prediction results. Therefore, when no ground absorption is applied, the predicted sound levels do not increase with the height of the receiver, and the results are the same for all floors. This is a conservative assumption which simplifies the prediction of sound levels on all floors. Noise levels were assessed at the building façade and the outdoor living areas on the roof of the buildings. Traffic information used for this study was obtained from the review of existing roadway conditions and reference to the City of Ottawa's Noise Control Guidelines. In proximity to the site, both Industrial Avenue and Sandford Fleming Avenue are located within the required distance for potential noise impact evaluation. Road and traffic parameters used in our analysis are summarized in Table 4-1 below.

Table 4-1: Road and Rail Traffic Parameters

Traffic Parameters	Industrial	Sandford Fleming	VIA Rail
R.O.W. Width (m)	Approx. 24 m	Approx. 20 m	Approx. 30m
Roadway Type	Urban Arterial (4-UAU)	Urban Collector (2-UCU)	Railway (single track)
Volume (veh/day)	30,000	8,000	33
Day/night split (%)	92 / 8	92 / 8	88 / 12
16-hr Daytime (veh/T)	27,600	7,360	29 (42) See note
8-hr Nighttime (veh/T)	2,400	640	4 (5.8) See note
Medium trucks (%)	7	7	-----
Heavy trucks (%)	5	5	-----
Speed/Operating Limit (km/hr)	60 km/hr	50 km/hr	20 km/hr
Number of Locomotives	-----	-----	1
Number of Passenger Cars	-----	-----	8
Welded tracks	-----	-----	yes
<i>Note: Rail Volumes increase by 2.5% over 15 years as per City Noise Control Guidelines</i>			

5 Summary of Results

The predicted noise levels ranged from approximately 51.63 dBA to 66.75 dBA during the day and 49.10 dBA to 59.16 dBA for the nighttime. A summary of predicted noise levels for various assessment locations is summarized below in Table 5-1 below. This table provides the unattenuated noise levels or the anticipated noise levels that would occur without any noise attenuation (noise barriers) measures in place. Detailed results and output from Stamson Version 5.03 are contained in Appendix E.

Table 5-1: Summary of Noise Levels (Unattenuated)

Receiver Location	Location	Receiver Type and (direction)	Combined Equivalent Noise Level Leq (dBA)	
			Daytime (07:00–23:00)	Nighttime (23:00–07:00)
B1N	Building 100	Façade (North)	56.58	49.48
B1W		Façade (West)	65.50	57.93
B1S		Façade (South)	66.75	59.16
B1OLA		OLA	59.93	
B2OLA	Building 200	OLA	51.63	
B2N		Façade (north)	55.78	49.10
B2E		Façade (east)	60.45	53.05
B2S		Façade (south)	63.64	56.05

6 Mitigation Measures

Table 6-1 below summarizes the requirements for ventilation, outdoor control measures and building components for all assessment locations.

Table 6-1: Summary of Warning Clause Requirements for Façade Receiver Locations

Receiver Location	Outdoor Control Measures, Warning Clause	Ventilation Requirements		Building Components Requirements	
		Plane of Living Room Window (Day)	Plane of Bedroom Windows (Night)	Plane of Living Room Window (Day)	Plane of Bedroom Window (Night)
B1N	NA	Type C	None	Compliant	Compliant
B1W	NA	Type D	Type C	Required	Compliant
B1S	NA	Type D	Type C	Required	Compliant
B2N	NA	Type C	None	Compliant	Compliant
B2E	NA	Type C	Type C	Compliant	Compliant
B2S	NA	Type C	Type C	Compliant	Compliant
Note: Required = Building components must be designed to achieve indoor sound levels criteria, or Compliant = Building compliant with Ontario Building Code					

Table 6-2: Summary of Amenity Area Warning and Attenuation Requirements

Assessment Location	Outdoor Control Measures, Warning Clause	Height of Barrier Required (m)
B1OLA (Rooftop Patio on Building 100)	Type A	Not Required
B2OLA (Rooftop Patio on Building 200)	None	Not Required

7 Indoor Noise Control Measures

When noise levels exceed 65 dBA during the daytime or 60 dBA during the nighttime as noted Tables 3-4 and 3-5 at the Plane of Window (POW) locations, then the building envelope (or building components) must be acoustically designed to ensure the indoor noise criteria is achieved. The indoor noise level required is 45 dBA during the daytime or 40 dBA during the nighttime as noted in Table 3-1. The appropriate building components are selected based on the Acoustic Insulation Factor (AIF), which is related to the difference in indoor and outdoor levels. The Acoustic Insulation Factor (AIF) needed to control the road traffic noise is calculated as follows:

$$\text{AIF} = \text{Leq outdoor façade} - \text{Leq indoor} + 10 \log C + 2$$

where:

$\text{Leq outdoor façade}$ = Outdoor façade sound level
 Leq indoor = Indoor objective sound level
 C = Number of building components forming envelope of room
 (typically equals 3 for a corner room and 2 for other rooms)

Table 7-1 below outlines the AIF required for various road traffic sound levels as well as the glazing requirements to meet MOECC guidelines. Based on the values below the nighttime sound levels require that both window and wall treatment comply with the Ontario Building Code.

Table 7-1 – AIF Values and Typical Building Treatments For Road Traffic Sound Levels

Daytime Façade Sound Level (dBA)	Nighttime Façade Sound Level (dBA)	Air Conditioning Requirement	AIF Required	Window Treatments	Wall Treatments
55 or less	50 or less	None	17 or less	None (OBC)	EW1
56 to 65	51 to 60	Provisions	18 to 27	None (OBC)	EW1
66 to 68	61 to 63	Required	28 to 30	None (OBC)	EW2
69 to 70	64 to 65	Required	31 to 32	STC 31 to 32	EW3
71 to 72	66 to 67	Required	33 to 34	STC 33 to 34	EW4
73 to 78	68 to 73	Required	35 to 40	STC 35 to 40	EW5
79	74	Required	41	STC 41	EW5

Source: "Road and Rail Noise: Effects on Housing", NHA 5156, 08/86 CMHC, 1986

Building treatments are based upon an assumed window/floor ratio of 25% and wall/floor ratio of 80%.

AIF is based on 3 components (i.e. corner room location. For 2 components (ie only one exterior wall) AIF would be 2 points lower. OBC window: Requires Ontario Building Code compliant construction.

EW1 denotes a typical metal or vinyl clad siding exterior wall. EW1R denotes an EW1 exterior wall with interior drywall mounted on resilient channels. EW2 denotes an EW1 exterior wall with an additional 25mm of rigid insulation. EW4 denotes a typical 20mm stucco clad exterior wall. EW5 denotes a typical brick veneer clad exterior wall.

Floor plans and building elevations are still preliminary and therefore preparation of detailed acoustical specifications for the building envelope are not provided. Based on an assumed window/floor and window/floor ratios, the wall and window component requirements were estimated. Preliminary architectural plans are illustrated in Appendix B.

Once detailed building architectural plans are finalized, it is recommended that an acoustical consultant review and/or design the building components to ensure that indoor noise levels will meet the requirements.

Based on the results of Table 5-1 and the formula above for the required indoor AIF of 45 dBA, the minimum acoustical performance for the exterior wall was based on the predicted daytime $L_{Eq} = 66.75$ for receiver B1S (Building 100 South Facade) and an assumed wall/floor ratio of 80%, which results in a required **AIF = 28.5, or STC of 33.5**. For the window requirements, having an assumed window/floor ratio of 25% results in a required **AIF = 29 or an STC = 29**. A double-glazed window with a 3mm pane, 6mm airspace and 3mm pane (3-6-3) would be the minimum required.

Similarly, the window and wall components on the west facade of Building 100 which face Sandford Fleming (Receiver B1W), with a predicted $L_{eq} = 65.5$, would require a minimum AIF=27, resulting in a **STC 27 for the windows**, and **STC = 32.3 for walls**.

8 Recommendations

We recommend that the site plan application for the proposed development at 200 Steamline Street be approved from a noise assessment perspective, based on the following conditions:

For Proposed Buildings B-100 and B-200

A Type “A” warning clause is required for the outdoor living area (OLA) or amenity space proposed on the rooftop as follows:

“Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.”

For Building 100

For any units having either west facing or south facing exposures, then an Type D Warning Clause for daytime and a Type C Warning Clauses for night time is required. As the daytime ventilation requirements govern, a Type D Warning clauses will be required for these units as follows:

Type D Warning Clause: “This dwelling unit 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.”

A preliminary estimate of the acoustical specifications for the exterior windows and walls facing Sandford Fleming and Industrial Avenue was completed. Building units facing south towards Industrial Avenue require a minimum STC of 33.5 for the walls and STC = 29 for the windows. The window and wall components on the west facade of Building 100 which face Sandford Fleming would require a minimum STC 27 for the windows, and STC = 32.3 for walls.

For Building 200

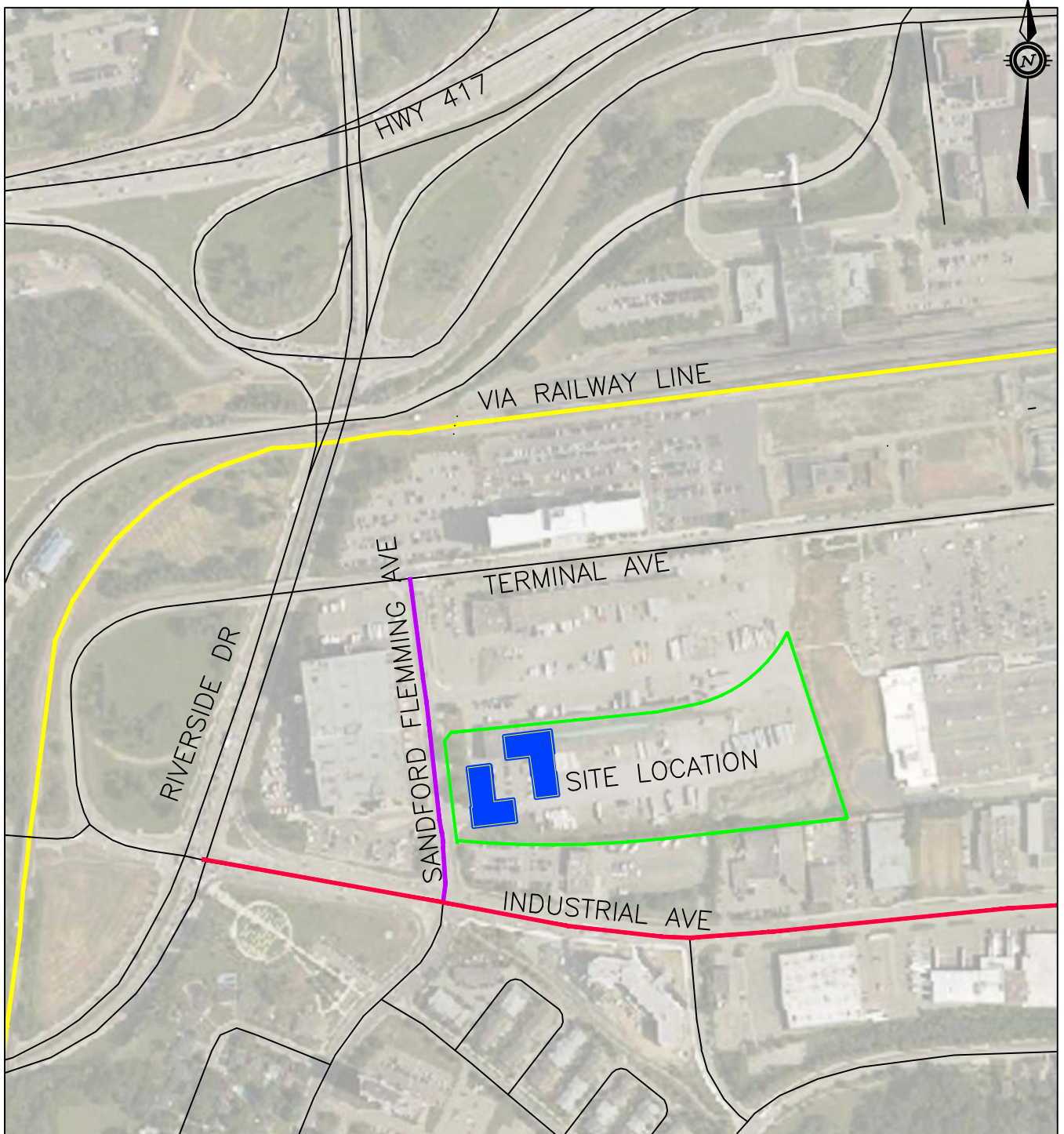
All units require at a minimum, a Type C Warning Clause, which is noted below, however it should be noted that the entire building will have a central air conditioning therefore meeting this requirement.

“This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning 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.”

Once detailed building architectural plans are finalized, it is recommended that an acoustical consultant review and/or design the building components to ensure that anticipated indoor noise levels meet the requirements.

Warning clause shall be included in all Agreements of Purchase and Sale in accordance with the terms specified by the Development Agreement.

Appendix A – Figures



LEGEND

- VIA RAILWAY LINE NOISE SOURCE
- 4-LANE URBAN ARTERIAL UNDIVIDED NOISE SOURCE
- 2-LANE URBAN COLLECTOR NOISE SOURCE
- SITE BOUNDARY
- PROPOSED BUILDING FOOTPRINT

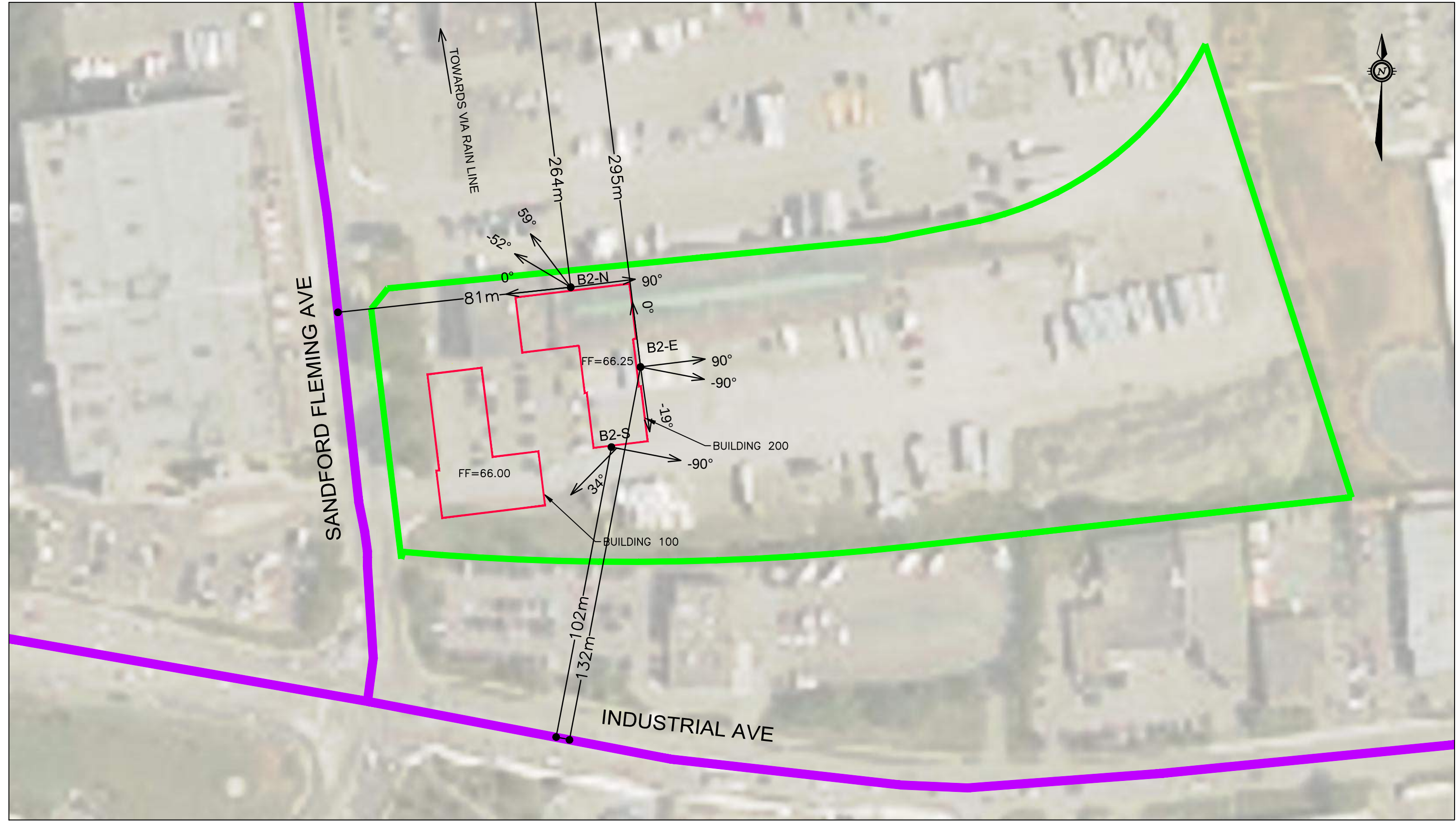
scale 1:5000	PROJECT: OTY 200, 230, 260 STEAMLINE STREET	project no. OTT-00243337-A0
date JANUARY 2018	TITLE: NOISE SOURCE/SITE LOCATION PLAN	FIG 1
drawn by ML		

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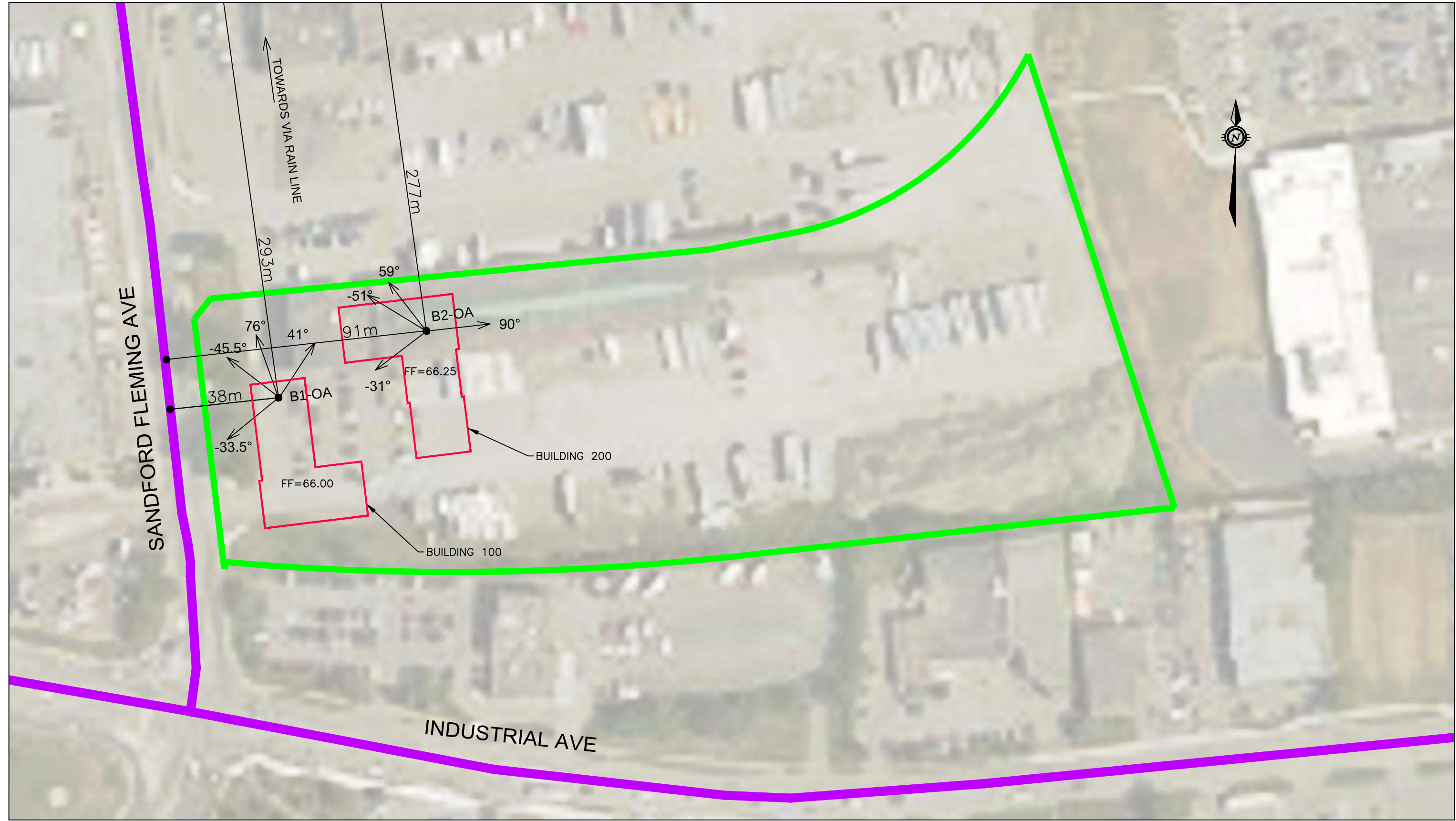
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	DATE	JAN 2018	NOISE SOURCE-RECEIVER LOCATIONS BLDG 100 FACADE	FIG 2
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	DATE	JAN 2017	NOISE SOURCE-RECEIVER LOCATIONS BLDG 200 FACADE	FIG 3
	FILE NO	OTT-00243337		

Filename: P:\Projects\Civil\243000\OTT-00243332-A0 - Multi Res Bldgs - Steamline - Controlex\60-EXECUTION\64-DWG\Figures and Sketches\fig2-noise-sources & Receiver Locations.dwg
Last Saved: Jan 9, 2018 5:21 PM Last Plotted: Jan 9, 2018 5:22 PM Plotted by: LafleurMA



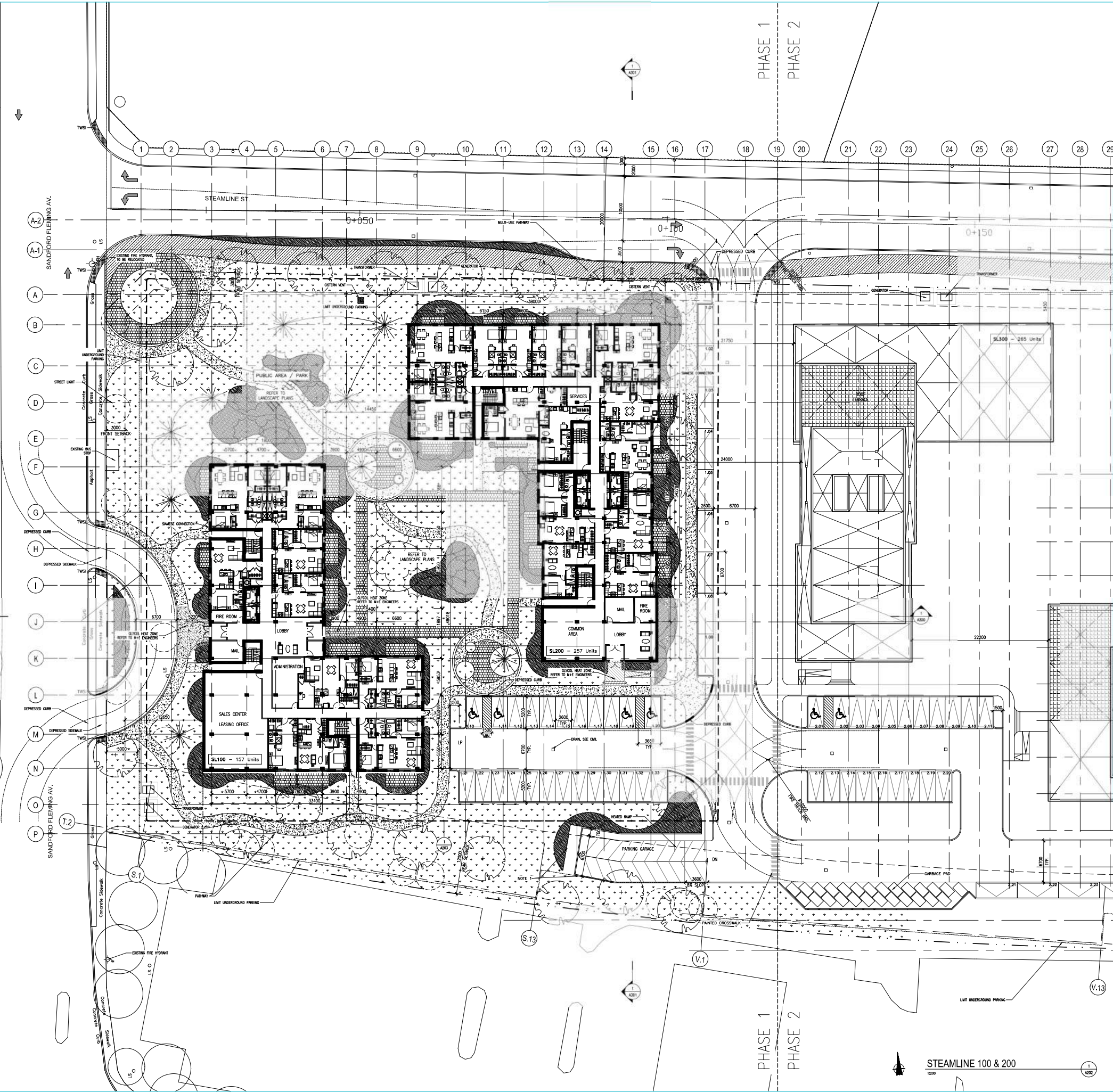
exp Services Inc. 100-2650 Queensview Drive Ottawa, ON K2B 8H6 www.exp.com		DESIGN	ML	OTTAWA TRAIN YARDS 200, 230, 260 STEAMLINE ST	SCALE 1:1250
		DRAWN	ML		SKETCH NO
		DATE	DEC 2017	NOISE SOURCE-RECEIVER LOCATIONS - OUTDOOR AMENITY	FIG 4
		FILE NO	OTT-00243332		

exp Services Inc.

Controlex Corporation
Steamline Street Multi Res Buildings
OTT-00243337-A0
January 2018

Appendix B – Architectural Plans

I:\P_1060010618\CAD\A202_Site Plan.dwg



NOTES GÉNÉRALES - General Notes

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SCAUX



JAMES B. LENNOX & ASSOCIATES INC.
LANDSCAPE ARCHITECTS



OUTRAGE Project
Ottawa Train Yards - PH1

EMPLACEMENT Location NO PROJET No
OTTAWA, CANADA 10618

NO.	REVISION	DATE (mm/aa)

DESIGNÉ PAR Drawn by
ACA
DATE (mm/aa)
18.01.17
ÉCHELLE Scale
INDICATED
TITRE ON DESIGN Drawing Title
Site Plan

REVISION Revision NO. DESIGN Draw Number
A202

Appendix C – Noise Source / Receiver Table

TABLE C1 - SOURCE/RECEIVER DATA

Assessment Location		Noise Source	Subtended Angles		Source to Receiver Distance (m)	Source Ground Elev (m)	Building Finished Floor Elev (m)	*Receiver Ground Elev (m)	Elevation Change (m)	**Receiver Height (m)	Unattenuated Leq (dBa)	
Name	Type		From	To							Day	Night
B1N	Façade	VIA RAIL	-45	+50	286	65.00	66.00	65.85	0.85	1.5	56.58	49.48
		SANDFORD	0	+44	38	65.50			0.35	1.5		
B1W	Façade	VIA RAIL	-40	+0	315	65.00	66.00	65.85	0.85	1.5	65.50	57.93
		SANDFORD	-68	+81	28	65.00			0.85	1.5		
		INDUSTRIAL	-18	+68	88	64.75			1.10	1.5		
B1S	Façade	SANDFORD	-51	+0	43	65.00	66.00	65.85	0.85	1.5	66.75	59.16
		INDUSTRIAL	-90	+73	71	65.00			0.85	1.5		
B2N	Façade	VIA RAIL	-52	+90	264	65.00	66.25	66.10	1.10	1.5	55.78	49.10
		SANDFORD	0	+44	81	65.50			0.60	1.5		
B2E	Façade	VIARAIL	0	+90	295	65.00	66.25	66.10	1.10	1.5	60.45	53.05
		INDUSTRIAL	-90	-19	132	65.00			1.10	1.5		
B2S	Façade	INDUSTRIAL	-90	+34	102	65.00	66.25	66.10	1.10	1.5	63.64	56.05
B1OA	OLA	VIA RAIL	-46	+41	293	65.00	66.00	112.0	47.00	1.5	59.93	NA
		SANDFORD	-34	+76	38	65.50			46.50	1.5		
B2OA	OLA	VIA RAIL	-51	+90	277	65.00	66.25	136.25	71.25	1.5	51.63	NA
		SANDFORD	-31	+59	91	65.50			70.75	1.5		

Notes

*Receiver Ground Elavation for OLA's are set at roof elevation. Receiver Ground Elevation for Façade set to 150mm below Finished Floor Elevation

**Receiver Heights are 1.5m. Receiver Elevations therefore 1.5m above Receiver Ground Elevation.

Appendix D – VIA Rail Information

TABLE C2 - VIA Rail Train Schedule Ottawa

Train Arriving From	Train Departing Towards	# Day Time Trips (0700-2300)	# Night Time Trips (2300-0700)
	Montreal	4	1
	Toronto	11	1
Montreal		5	0
Toronto		9	2
TOTAL:		29	4

OTTAWA → KINGSTON → TORONTO

TRAIN		41	641	43	51	643	45 □*	53 ^{NEW NOUVEAU}	47	645	55	647	59
DAYS / JOURS		1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567
 BUSINESS AFFAIRES		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ottawa, ON	DP	05:30	06:40	07:20	08:25	09:05	10:30	11:40	12:30	14:30	15:30	17:00	18:17
Fallowfield	↓	05:55	06:59	07:40	08:45	09:26	10:49	11:59	12:51	14:55	15:49	17:18	18:42
Smiths Falls		06:22	07:26		09:14	09:54							19:16
Brockville		06:51	07:55		09:43	10:29			13:57		16:54		19:51
Gananoque									14:23				
Kingston		AR	07:31	08:35	09:10	10:23	11:09	12:28	13:36	14:42	16:32	17:34	18:54
	DP	07:34	08:38	09:13	10:26	11:12	12:30	13:39	14:46	16:35	17:38	18:56	20:35
Napanee	↓					11:33							
Belleville		08:16	09:19			11:56		14:21	15:29	17:16	18:18		21:17
Trenton Jct.						12:08							21:28
Cobourg		08:51	09:54		11:36	12:34					18:52		21:57
Port Hope						12:42							
Oshawa		09:27	10:29			13:14		15:31	16:38	18:23	19:25	20:44	22:32
Guildwood			10:46		12:26	13:32			16:58				22:50
Toronto 		AR	10:02	11:02	11:25	12:42	13:47	14:48	16:03	17:15	19:05	19:57	21:16

No local service between Ottawa and Fallowfield, or Guildwood and Toronto. / Pas de service local entre Ottawa et Fallowfield, ainsi qu'entre Guildwood et Toronto.

- ✕ Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes. / Voyagez entre la gare Union et l'aéroport Pearson à bord des trains UP Express. Trajet de 25 minutes et départs toutes les 15 minutes.

- ☑ Checked baggage is available on this train at certain stations only. For more information, please call VIA Rail (1 888 842-7245) or visit our website (viarail.ca). / L'enregistrement des bagages est offert pour ce train à certaines gares seulement. Pour plus d'information, veuillez appeler VIA Rail (1 888 842-7245) ou visiter notre site Web (viarail.ca).

- * Baggage car available only on Wednesday. / Voiture à bagages disponible seulement mercredi.

E-boarding pass / Carte d'embarquement électronique



CARTE D'EMBARQUEMENT





BOARDING PASS
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N° confirmation : **DV3553**
ETF : 2909201424222

PASSENGER : **DENISE MARTIN**, Adult
VIA PRÉFÉRENCE : [Join VIA Préférence](#)

Confirmation # : **DV3552**
FTR : 2909201424221

MONTREAL → **OTTAWA**
Date : Mon, Dec 15, 2014 Date : Mon, Dec 15, 2014
Departure : **12:50 PM** Arrival : 14:54 PM

Train #	Carrier	Class	Car	Seat
55	VIA Rail Canada	Economy Plus	3	14A Window

S déc. 2014
PM

Sigle
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We'll email you a boarding pass with a bar code whenever you book a seat. You can present a printed version of this e-boarding pass or display its bar code on your mobile device, along with a photo ID upon request, at the boarding gate and on board the train. Skip the ticket counter – you can board the train directly.

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How to use the timetable / Comment utiliser l'horaire

In all sections, schedules are linear and usually read from the top down. Schedules for some routes read from the bottom up. Arrows will indicate the direction to follow. In general, the schedule for each route indicates the departure time only. Stations at which the train stops are listed on the left. Locations in bold indicate a possible connection.

Les horaires de chaque section sont linéaires et se lisent généralement de haut en bas. Pour certaines liaisons, l'horaire se lit de bas en haut. Suivez le sens des flèches pour orienter votre lecture.

En général, l'horaire de chaque liaison n'indique que l'heure de départ. Le nom des localités desservies est inscrit à gauche. Les localités en gras indiquent une possibilité de correspondance.

Legend / Légende

Days / Jours

- 1 Monday / Lundi
- 2 Tuesday / Mardi
- 3 Wednesday / Mercredi
- 4 Thursday / Jeudi
- 5 Friday / Vendredi
- 6 Saturday / Samedi
- 7 Sunday / Dimanche

Time Zone

- Atlantic Time AT / HA
Eastern Time ET / HE
Central Time CT / HC
Mountain Time MT / HR
Pacific Time PT / HP

Fuseaux horaires

- Heure de l'Atlantique
Heure de l'Est
Heure du Centre
Heure des Rocheuses
Heure du Pacifique

Bold numbers indicate the days when train service is offered. Grey numbers indicate days when no service is offered on a given route.

Example: **1234567**

Les chiffres en caractères gras indiquent les jours où les trains sont en service. Ceux en gris désignent les jours où il n'y a pas de service sur la liaison.

Example : **1234567**

There is a seat assignment in Economy class in the Québec City – Windsor corridor, except on trains 650 and 651. / Il y a une assignation des sièges en classe Économie dans le corridor Québec – Windsor, sauf pour les trains 650 et 651.



Shuttle service runs between the station and the airport. / Service de navette assuré entre la gare et l'aéroport.

Telephone numbers / Numéros de téléphone

Canada or United States / Canada ou États-Unis

..... 1 888 VIA-RAIL* – 1 888 842-7245* – viarail.ca

Montréal: Local call from 514, 450 and 438 area codes /

Appel local des indicatifs régionaux 514, 450 et 438 514 989-2626

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Available on most trains.

Offert dans la plupart des trains.

OTTAWA → MONTRÉAL → SAINTE-FOY → QUÉBEC

TRAIN	20	22	622	624	24	26	28	14	
DAYS / JOURS	1234567	1234567	1234567	1234567	1234567	1234567	123457	123567	
BUSINESS AFFAIRES	✓	✓	✓	✓	✓	✓	✓		
Fallowfield, ON	DP	06:04			09:50				
Ottawa	AR	06:21			10:07				
	DP	06:30		10:15	10:19	14:20	16:10		
Casselman									
Alexandria, ON		07:18		11:07	11:11	15:08			
Coteau, ON		07:46				15:29 ⁵			
Dorval		08:11		11:56	11:56	15:55	17:45		
Montréal	AR	08:31		12:16	12:15	16:15	18:05		
	DP	06:20	08:56	09:06	12:45	16:40	18:25	19:00	
Saint-Lambert		06:33	09:18	09:18	13:08	17:02	18:48	19:25	
Saint-Hyacinthe		07:00		09:43		17:29	19:16	19:58	
Drummondville		07:29	10:12	10:12	14:01	18:15	19:55	20:47	
Charny				15:55	15:55				
Sainte-Foy		09:19	11:58	11:57	16:03	20:00	21:30	22:34	
Québec, QC	AR	09:43	12:22	12:22	16:26	20:24	21:54	To/Vers Halifax	

OTTAWA
 MONTREAL
 QUÉBEC

No local service between Québec City, Sainte-Foy and Charny, or Saint-Lambert and Montréal. / Pas de service local entre Québec, Sainte-Foy et Charny, ainsi qu'entre Saint-Lambert et Montréal.

Seat assignment is not available on train 14. / L'assignation des sièges n'est pas offerte pour le train 14.

Shuttle service runs between the station and the airport. / Service de navette assuré entre la gare et l'aéroport.

⁵ The train stops at this station only on Fridays. / Le train arrête à cette gare seulement les vendredis.

Checked baggage is available on this train at certain stations only. For more information, please call VIA Rail (1 888 842-7245) or visit our website (viarail.ca). / L'enregistrement des bagages est offert pour ce train à certaines gares seulement. Pour plus d'information, veuillez appeler VIA Rail (1 888 842-7245) ou visiter notre site Web (viarail.ca).

^{*} Baggage car available only on Saturday. / Voiture à bagages disponible seulement samedi.

^{**} Baggage car available only on Sunday. / Voiture à bagages disponible seulement dimanche.

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PASSENGER : **DENISE MARTIN**, Adult
VIA PRÉFÉRENCE : [Join VIA Préférence](#)

Confirmation # : **DV3552**
FTR : 2909201424221

MONTREAL → **OTTAWA**

Date : **Mon, Dec 15, 2014** Date : **Mon, Dec 15, 2014**
Departure : **12:50 PM** Arrival : **14:54 PM**

Train #	Carrier	Class	Car	Seat
55	VIA Rail Canada	Economy Plus	3	14A Window

S déc. 2014
PM

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Days / Jours

- 1 Monday / Lundi
- 2 Tuesday / Mardi
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- 5 Friday / Vendredi
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- Heure de l'Atlantique
Heure de l'Est
Heure du Centre
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Heure du Pacifique

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Available on most trains.

Offert dans la plupart des trains.

QUÉBEC → STE-FOY → MONTRÉAL → OTTAWA

TRAIN	33	15	35	37	25	637	39	29*	
DAYS / JOURS	1234567	1234567	1234567	1234567	1234567	1234567	1234567	1234567	
BUSINESS AFFAIRES	✓		✓	✓	✓	✓	✓	✓	
Québec, QC	DP	05:25	From/De Halifax	08:15	13:00	13:00	15:00	17:45	
Sainte-Foy		05:52	06:28	08:41	13:26	13:26	15:26	18:11	
Charny			08:49						
Drummondville		07:15	08:36	10:31	15:07	15:07	16:54	19:42	
Saint-Hyacinthe		07:58	09:15	11:09				20:20	
Saint-Lambert		08:24	09:50	11:38	16:01	16:01	18:00	20:47	
Montréal	AR	08:35	10:03	11:49	16:12	16:12	18:11	20:58	
	DP	09:00		12:04	16:50	16:50	18:50		
Dorval, QC		09:34		12:39	17:24	17:24	19:24		
Coteau, ON							19:51		
Alexandria		10:22		13:27	18:08	18:08	20:13		
Casselman		10:44		13:50					
Ottawa	AR	11:14		14:15	18:57	18:57	20:58		
	DP			19:12			21:08		
Fallowfield, ON	AR			19:34			21:24		

QUÉBEC
MONTREAL
OTTAWA

No local service between Québec City, Sainte-Foy and Charny, or Saint-Lambert and Montréal. / Pas de service local entre Québec, Sainte-Foy et Charny, ainsi qu'entre Saint-Lambert et Montréal.
Seat assignment is not available on train 15. / L'assignation des sièges n'est pas offerte pour le train 15.
✕ Shuttle service runs between the station and the airport. / Service de navette assuré entre la gare et l'aéroport.

☑ Checked baggage is available on this train at certain stations only. For more information, please call VIA Rail (1 888 842-7245) or visit our website (viarail.ca). / L'enregistrement des bagages est offert pour ce train à certaines gares seulement. Pour plus d'information, veuillez appeler VIA Rail (1 888 842-7245) ou visiter notre site Web (viarail.ca).
* Baggage car not available on Saturday. / Voiture à bagages non-disponible le samedi.

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N° confirmation : **DV3553**
ETF : 2909201424222

PASSENGER : **DENISE MARTIN**, Adult
VIA PRÉFÉRENCE : [Join VIA Préférence](#)

Confirmation # : **DV3552**
FTR : 2909201424221

MONTRÉAL → **OTTAWA**

Date : **Mon, Dec 15, 2014** Date : **Mon, Dec 15, 2014**
Departure : **12:50 PM** Arrival : **14:54 PM**

Train #	Carrier	Class	Car	Seat
55	VIA Rail Canada	Economy Plus	3	14A Window

S déc. 2014
PM

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Heure du Centre
Heure des Rocheuses
Heure du Pacifique

Bold numbers indicate the days when train service is offered. Grey numbers indicate days when no service is offered on a given route.

Example: **1234567**

Les chiffres en caractères gras indiquent les jours où les trains sont en service. Ceux en gris désignent les jours où il n'y a pas de service sur la liaison.

Example : **1234567**

There is a seat assignment in Economy class in the Québec City – Windsor corridor, except on trains 650 and 651. / Il y a une assignation des sièges en classe Économie dans le corridor Québec – Windsor, sauf pour les trains 650 et 651.



Shuttle service runs between the station and the airport. /
Service de navette assuré entre la gare et l'aéroport.

Telephone numbers / Numéros de téléphone

Canada or United States / Canada ou États-Unis

..... 1 888 VIA-RAIL* – 1 888 842-7245* – viarail.ca

Montréal: Local call from 514, 450 and 438 area codes /

Appel local des indicatifs régionaux 514, 450 et 438 514 989-2626

Moncton: Local call / Appel local 506 857-9830

Reward Program / Programme de récompense

VIA Préférence 1 888 VIA-PREF* – 1 888 842-7733* – viapreference.ca

TTY / ATS 1 800 268-9503*

Amtrak 1 800 USA-RAIL* – 1 800 872-7245* – Amtrak.com

*toll-free / sans frais

Visit viarail.ca or call one of our telephone sales agents to find out when stations are open. / Pour connaître les heures d'ouverture des gares, consultez le site viarail.ca ou communiquez par téléphone avec un agent de VIA Rail.

Available on most trains.

Offert dans la plupart des trains.

TORONTO

KINGSTON

OTTAWA

TRAIN	50	52	40	42	644	44 □*	46	646	54 ^{NEW NOUVEAU}	48	648	
DAYS / JOURS	1234567	1234567	1234567	1234567	1234567	1234567	12345 7	12345 7	12345 7	1234567	12345 7	
 BUSINESS AFFAIRES	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Toronto, ON  DP	06:40	09:20	10:45	12:20	13:20	14:20	15:40	16:35	17:40	18:40	18:40	
Guildwood	07:00								17:58	18:58	18:59	
Oshawa	07:19	09:53		12:52	13:53	14:54	16:17	17:06	18:14	19:16	19:16	
Port Hope									18:40	19:43	19:44	
Cobourg	07:54	10:25			14:27		16:50		18:48	19:53	19:53	
Trenton Jct.									19:15	20:19	20:21	
Belleville	08:29				15:04			18:11	19:30	20:36	20:38	
Napanee									19:50	20:54	20:58	
Kingston AR	09:07	11:34	12:50	14:31	15:40	16:32	17:59		20:09	21:13	21:17	
	DP 09:11	11:38	12:52	14:33	15:43	16:36	18:02		20:12	21:16	21:23	
Gananoque										21:38	21:45	
Brockville	10:08	12:34				17:20	18:47			22:03	22:11	
Smiths Falls	10:39					17:50				22:33	22:41	
Fallowfield	11:11	13:40	14:33	16:16	17:27	18:24	19:47	20:24	21:49	23:00	23:08	
Ottawa, ON AR	11:29	13:56	14:55	16:33	17:50	18:46	20:09	20:42	22:07	23:16	23:26	

TORONTO
OTTAWA

No local service between Toronto and Guildwood, or Fallowfield and Ottawa. / Pas de service local entre Toronto et Guildwood, ainsi qu'entre Fallowfield et Ottawa.

✕ Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes. / Voyagez entre la gare Union et l'aéroport Pearson à bord des trains UP Express. Trajet de 25 minutes et départs toutes les 15 minutes.

☑ Checked baggage is available on this train at certain stations only. For more information, please call VIA Rail (1 888 842-7245) or visit our website (viarail.ca). / L'enregistrement des bagages est offert pour ce train à certaines gares seulement. Pour plus d'information, veuillez appeler VIA Rail (1 888 842-7245) ou visiter notre site Web (viarail.ca).

* Baggage car available only on Tuesday. / Voiture à bagages disponible seulement mardi.

E-boarding pass / Carte d'embarquement électronique



CARTE D'EMBARQUEMENT





BOARDING PASS
Please present this document for boarding



N° confirmation : **DV3553**
ETF : 2909201424222

PASSENGER : **DENISE MARTIN**, Adult
VIA PRÉFÉRENCE : [Join VIA Préférence](#)

Confirmation # : **DV3552**
FTR : 2909201424221

MONTREAL → **OTTAWA**

Date : **Mon, Dec 15, 2014** Date : **Mon, Dec 15, 2014**
Departure : **12:50 PM** Arrival : **14:54 PM**

Train #	Carrier	Class	Car	Seat
55	VIA Rail Canada	Economy Plus	3	14A Window

S déc. 2014
PM

Sigle
12D Fenêtre

We'll email you a boarding pass with a bar code whenever you book a seat. You can present a printed version of this e-boarding pass or display its bar code on your mobile device, along with a photo ID upon request, at the boarding gate and on board the train. Skip the ticket counter – you can board the train directly.

Lorsque vous réserverez une place à bord d'un train, nous vous ferons parvenir par courriel une carte d'embarquement comportant un code-barres. Vous pourrez imprimer cette carte d'embarquement ou l'afficher sur votre appareil mobile et la présenter à la porte d'embarquement ou à bord du train, en l'accompagnant d'une carte d'identité avec photo. Plus besoin de passer à la billetterie, vous pourrez monter à bord directement.

You're mobile. So are we. / Vous êtes mobile, nous aussi.

VIA Rail is never very far from wherever you are. With the VIA mobile version of our booking engine, you can book a trip and consult arrivals and departures, all from your smartphone.

Où que vous soyez, VIA Rail n'est jamais bien loin. Grâce à la version mobile de notre moteur de réservation, réservez un voyage ou consultez les arrivées et les départs, le tout à l'aide de votre téléphone intelligent.

How to use the timetable / Comment utiliser l'horaire

In all sections, schedules are linear and usually read from the top down. Schedules for some routes read from the bottom up. Arrows will indicate the direction to follow. In general, the schedule for each route indicates the departure time only. Stations at which the train stops are listed on the left. Locations in bold indicate a possible connection.

Les horaires de chaque section sont linéaires et se lisent généralement de haut en bas. Pour certaines liaisons, l'horaire se lit de bas en haut. Suivez le sens des flèches pour orienter votre lecture.

En général, l'horaire de chaque liaison n'indique que l'heure de départ. Le nom des localités desservies est inscrit à gauche. Les localités en gras indiquent une possibilité de correspondance.

Legend / Légende

Days / Jours

- 1 Monday / Lundi
- 2 Tuesday / Mardi
- 3 Wednesday / Mercredi
- 4 Thursday / Jeudi
- 5 Friday / Vendredi
- 6 Saturday / Samedi
- 7 Sunday / Dimanche

Time Zone

- Atlantic Time AT / HA
Eastern Time ET / HE
Central Time CT / HC
Mountain Time MT / HR
Pacific Time PT / HP

Fuseaux horaires

- Heure de l'Atlantique
Heure de l'Est
Heure du Centre
Heure des Rocheuses
Heure du Pacifique

Bold numbers indicate the days when train service is offered. Grey numbers indicate days when no service is offered on a given route.

Example: **1234567**

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Appendix E – Stamson Output

B1N
STAMSON 5.0 NORMAL REPORT Date: 05-01-2018 20:13:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b1n.te Time Period: Day/Night 16/8 hours
Description: Building 100 North Facade

Rail data, segment # 1: VIA (day/night)

Train Type	! Trains	! Speed !(km/h)	!# loc	!# Cars	! Eng	! Cont
* 1. VIA	42.0/5.8	20.0	1.0	8.0	!Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type: No Name	! Unadj. ! Trains	! Annual % ! Increase	! Years of ! Growth
1. VIA	29.0/4.0	2.50	15.00

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

Angle1	Angle2	: -45.00 deg	50.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	2	(Reflective ground surface)
Receiver source distance	:	286.00 / 286.00 m	
Receiver height	:	1.50 / 1.50 m	
Topography	:	3	(Elevated; no barrier)
No Whistle	:		
Elevation	:	0.85 m	
Reference angle	:	0.00	

Results segment # 1: VIA (day)

LOCOMOTIVE (0.00 + 49.50 + 0.00) = 49.50 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-45 50 0.00 65.08 -12.80 -2.78 0.00 0.00 0.00 49.50

WHEEL (0.00 + 35.48 + 0.00) = 35.48 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

B1N
-45 50 0.00 51.06 -12.80 -2.78 0.00 0.00 0.00 35.48

Segment Leq : 49.67 dBA

Total Leq All Segments: 49.67 dBA

Results segment # 1: VIA (night)

LOCOMOTIVE (0.00 + 43.92 + 0.00) = 43.92 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-45 50 0.00 59.50 -12.80 -2.78 0.00 0.00 0.00 43.92

WHEEL (0.00 + 29.90 + 0.00) = 29.90 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-45 50 0.00 45.47 -12.80 -2.78 0.00 0.00 0.00 29.90

Segment Leq : 44.09 dBA

Total Leq All Segments: 44.09 dBA

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

Angle1 Angle2 : 0.00 deg 44.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 38.00 / 38.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 0.35 m
Reference angle : 0.00

Results segment # 1: Sandford (day)

Source height = 1.50 m

ROAD (0.00 + 55.59 + 0.00) = 55.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	44	0.00	65.75	0.00	-4.04	-6.12	0.00	0.00	0.00	55.59

Segment Leq : 55.59 dBA

Total Leq All Segments: 55.59 dBA

Results segment # 1: Sandford (night)

Source height = 1.50 m

ROAD (0.00 + 48.00 + 0.00) = 48.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	44	0.00	58.16	0.00	-4.04	-6.12	0.00	0.00	0.00	48.00

Segment Leq : 48.00 dBA

Total Leq All Segments: 48.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.58
(NIGHT): 49.48

B1N

B1W
STAMSON 5.0 NORMAL REPORT Date: 06-01-2018 11:23:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b1w.te Time Period: Day/Night 16/8 hours
Description: Building 100 West Facade

Rail data, segment # 1: VIA Rail (day/night)

Train Type	! Trains	! Speed	!# loc	!# Cars	! Eng	! Cont
	!	!(km/h)	!/Train!	/Train!	type	!weld
* 1.	!	42.0/5.8	!	20.0	!	1.0
				8.0	!Diesel	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj.	! Annual %	! Years of
No Name	! Trains	! Increase	! Growth
1.	!	29.0/4.0	!
			2.50
			15.00

Data for Segment # 1: VIA Rail (day/night)

Angle1	Angle2	:	-40.00 deg	0.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	2	(Reflective ground surface)	
Receiver source distance	:	315.00 / 315.00 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	3	(Elevated; no barrier)	
No Whistle	:			
Elevation	:	0.85 m		
Reference angle	:	0.00		

Results segment # 1: VIA Rail (day)

LOCOMOTIVE (0.00 + 45.33 + 0.00) = 45.33 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-40	0	0.00	65.08	-13.22	-6.53	0.00	0.00	0.00	45.33	

WHEEL (0.00 + 31.31 + 0.00) = 31.31 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	

B1W										
-40	0	0.00	51.06	-13.22	-6.53	0.00	0.00	0.00	31.31	

Segment Leq : 45.50 dBA

Total Leq All Segments: 45.50 dBA

Results segment # 1: VIA Rail (night)

LOCOMOTIVE (0.00 + 39.74 + 0.00) = 39.74 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-40	0	0.00	59.50	-13.22	-6.53	0.00	0.00	0.00	39.74	

WHEEL (0.00 + 25.72 + 0.00) = 25.72 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-40	0	0.00	45.47	-13.22	-6.53	0.00	0.00	0.00	25.72	

Segment Leq : 39.91 dBA

Total Leq All Segments: 39.91 dBA

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

Angle1 Angle2 : -68.00 deg 81.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 28.00 / 28.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 3 (Elevated; no barrier)
 Elevation : 0.85 m
 Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
 Medium truck volume : 1932/168 veh/TimePeriod *
 Heavy truck volume : 1380/120 veh/TimePeriod *
 Posted speed limit : 60 km/h
 Road gradient : 2 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
 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 # 2: Industrial (day/night)

Angle1 Angle2 : -17.50 deg 68.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 88.00 / 88.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 3 (Elevated; no barrier)
 Elevation : 1.10 m
 Reference angle : 0.00

Results segment # 1: Sandford (day)

Source height = 1.50 m

ROAD (0.00 + 62.22 + 0.00) = 62.22 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 -68 81 0.00 65.75 0.00 -2.71 -0.82 0.00 0.00 0.00 62.22

Segment Leq : 62.22 dBA

Results segment # 2: Industrial (day)

Source height = 1.50 m

ROAD (0.00 + 62.67 + 0.00) = 62.67 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 -18 68 0.00 73.59 0.00 -7.68 -3.23 0.00 0.00 0.00 62.67

Segment Leq : 62.67 dBA

Total Leq All Segments: 65.46 dBA

Results segment # 1: Sandford (night)

Source height = 1.50 m

ROAD (0.00 + 54.63 + 0.00) = 54.63 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 -68 81 0.00 58.16 0.00 -2.71 -0.82 0.00 0.00 0.00 54.63

Segment Leq : 54.63 dBA

Results segment # 2: Industrial (night)

Source height = 1.50 m

ROAD (0.00 + 55.07 + 0.00) = 55.07 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 -18 68 0.00 65.99 0.00 -7.68 -3.23 0.00 0.00 0.00 55.07

B1W

Segment Leq : 55.07 dBA

Total Leq All Segments: 57.87 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.50
(NIGHT): 57.93



B1S
STAMSON 5.0 NORMAL REPORT Date: 05-01-2018 20:58:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b1s.te Time Period: Day/Night 16/8 hours
Description: Building 100 South Facade

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

Angle1 Angle2 : -50.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 0.85 m
Reference angle : 0.00

▲
Road data, segment # 2: Industrial (day/night)

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

B1S

24 hr Traffic Volume (AADT or SADT): 30000
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 # 2: Industrial (day/night)

Angle1 Angle2 : -90.00 deg 73.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 71.00 / 71.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 0.85 m
Reference angle : 0.00

▲
Results segment # 1: Sandford (day)

Source height = 1.50 m

ROAD (0.00 + 55.61 + 0.00) = 55.61 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-50 0 0.00 65.75 0.00 -4.57 -5.56 0.00 0.00 0.00 55.61

Segment Leq : 55.61 dBA

▲
Results segment # 2: Industrial (day)

Source height = 1.50 m

ROAD (0.00 + 66.40 + 0.00) = 66.40 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 73 0.00 73.59 0.00 -6.75 -0.43 0.00 0.00 0.00 66.40

Segment Leq : 66.40 dBA

B1S

Total Leq All Segments: 66.75 dBA

⬆
Results segment # 1: Sandford (night)

Source height = 1.50 m

ROAD (0.00 + 48.02 + 0.00) = 48.02 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-50 0 0.00 58.16 0.00 -4.57 -5.56 0.00 0.00 0.00 48.02

Segment Leq : 48.02 dBA

⬆
Results segment # 2: Industrial (night)

Source height = 1.50 m

ROAD (0.00 + 58.81 + 0.00) = 58.81 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 73 0.00 65.99 0.00 -6.75 -0.43 0.00 0.00 0.00 58.81

Segment Leq : 58.81 dBA

Total Leq All Segments: 59.16 dBA

⬆

TOTAL Leq FROM ALL SOURCES (DAY): 66.75
(NIGHT): 59.16

⬆
⬆

B2N
STAMSON 5.0 NORMAL REPORT Date: 06-01-2018 11:49:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b2n.te Time Period: Day/Night 16/8 hours
Description: Building 200 North Facade

Rail data, segment # 1: VIA (day/night)

Train Type	! Trains	! Speed	!# loc	!# Cars	! Eng	! Cont
	!	!(km/h)	!/Train!	/Train!	type	!weld
* 1. VIA	!	42.0/5.8	!	20.0	!	1.0
				8.0	!Diesel	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj.	! Annual %	! Years of
No Name	! Trains	! Increase	! Growth
1. VIA	!	29.0/4.0	!
		2.50	!
		15.00	!

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

Angle1	Angle2	:	-52.00 deg	90.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	2	(Reflective ground surface)	
Receiver source distance	:	264.00 / 264.00 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	3	(Elevated; no barrier)	
No Whistle	:			
Elevation	:	1.10 m		
Reference angle	:	0.00		

Results segment # 1: VIA (day)

LOCOMOTIVE (0.00 + 51.60 + 0.00) = 51.60 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-52	90	0.00	65.08	-12.46	-1.03	0.00	0.00	0.00	51.60	

WHEEL (0.00 + 37.58 + 0.00) = 37.58 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	

B2N										
-52	90	0.00	51.06	-12.46	-1.03	0.00	0.00	0.00	37.58	

Segment Leq : 51.77 dBA

Total Leq All Segments: 51.77 dBA

Results segment # 1: VIA (night)

LOCOMOTIVE (0.00 + 46.01 + 0.00) = 46.01 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-52	90	0.00	59.50	-12.46	-1.03	0.00	0.00	0.00	46.01	

WHEEL (0.00 + 31.99 + 0.00) = 31.99 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-52	90	0.00	45.47	-12.46	-1.03	0.00	0.00	0.00	31.99	

Segment Leq : 46.18 dBA

Total Leq All Segments: 46.18 dBA

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

Angle1 Angle2 : 0.00 deg 59.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 81.00 / 81.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 0.60 m
Reference angle : 0.00

Results segment # 1: Sandford (day)

Source height = 1.50 m

ROAD (0.00 + 53.58 + 0.00) = 53.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	59	0.00	65.75	0.00	-7.32	-4.84	0.00	0.00	0.00	53.58

Segment Leq : 53.58 dBA

Total Leq All Segments: 53.58 dBA

Results segment # 1: Sandford (night)

Source height = 1.50 m

ROAD (0.00 + 45.99 + 0.00) = 45.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	59	0.00	58.16	0.00	-7.32	-4.84	0.00	0.00	0.00	45.99

Segment Leq : 45.99 dBA

Total Leq All Segments: 45.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.78
(NIGHT): 49.10

B2E
STAMSON 5.0 NORMAL REPORT Date: 06-01-2018 11:53:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b2e.te Time Period: Day/Night 16/8 hours
Description: Building 200 East Facade

Rail data, segment # 1: VIA (day/night)

Train Type	! Trains	! Speed	!# loc	!# Cars	! Eng	! Cont
	!	!(km/h)	!/Train!	/Train!	type	!weld
* 1. VIA	!	42.0/5.8	!	20.0	!	1.0
				8.0	!Diesel	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj.	! Annual %	! Years of				
No Name	! Trains	! Increase	! Growth				
1. VIA	!	29.0/4.0	!	2.50	!	15.00	!

Data for Segment # 1: VIA (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	:	295.00 / 295.00 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	3	(Elevated; no barrier)	
No Whistle	:			
Elevation	:	1.10 m		
Reference angle	:	0.00		

Results segment # 1: VIA (day)

LOCOMOTIVE (0.00 + 49.14 + 0.00) = 49.14 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
0	90	0.00	65.08	-12.94	-3.01	0.00	0.00	0.00	49.14	

WHEEL (0.00 + 35.11 + 0.00) = 35.11 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	

B2E										
0	90	0.00	51.06	-12.94	-3.01	0.00	0.00	0.00	35.11	

Segment Leq : 49.31 dBA

Total Leq All Segments: 49.31 dBA

Results segment # 1: VIA (night)

LOCOMOTIVE (0.00 + 43.55 + 0.00) = 43.55 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
0	90	0.00	59.50	-12.94	-3.01	0.00	0.00	0.00	43.55	

WHEEL (0.00 + 29.53 + 0.00) = 29.53 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
0	90	0.00	45.47	-12.94	-3.01	0.00	0.00	0.00	29.53	

Segment Leq : 43.72 dBA

Total Leq All Segments: 43.72 dBA

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

Car traffic volume	:	24288/2112	veh/TimePeriod	*
Medium truck volume	:	1932/168	veh/TimePeriod	*
Heavy truck volume	:	1380/120	veh/TimePeriod	*
Posted speed limit	:	60 km/h		
Road gradient	:	2 %		
Road pavement	:	1 (Typical asphalt or concrete)		

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

24 hr Traffic Volume (AADT or SADT):	30000
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: Industrial (day/night)

Angle1 Angle2 : -90.00 deg -19.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 132.00 / 132.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 3 (Elevated; no barrier)
 Elevation : 1.10 m
 Reference angle : 0.00

B2E

B2E

Results segment # 1: Industrial (day)

Source height = 1.50 m

ROAD (0.00 + 60.10 + 0.00) = 60.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-19	0.00	73.59	0.00	-9.44	-4.04	0.00	0.00	0.00	60.10

Segment Leq : 60.10 dBA

Total Leq All Segments: 60.10 dBA

Results segment # 1: Industrial (night)

Source height = 1.50 m

ROAD (0.00 + 52.51 + 0.00) = 52.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-19	0.00	65.99	0.00	-9.44	-4.04	0.00	0.00	0.00	52.51

Segment Leq : 52.51 dBA

Total Leq All Segments: 52.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.45
 (NIGHT): 53.05

B2S
STAMSON 5.0 NORMAL REPORT Date: 06-01-2018 11:56:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b2s.te Time Period: Day/Night 16/8 hours
Description: Building 200 South Facade

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
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: Industrial (day/night)

Angle1 Angle2 : -90.00 deg 34.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 102.00 / 102.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 1.10 m
Reference angle : 0.00

Results segment # 1: Industrial (day)

Source height = 1.50 m

ROAD (0.00 + 63.64 + 0.00) = 63.64 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 34 0.00 73.59 0.00 -8.33 -1.62 0.00 0.00 0.00 63.64

B2S

Segment Leq : 63.64 dBA

Total Leq All Segments: 63.64 dBA

Results segment # 1: Industrial (night)

Source height = 1.50 m

ROAD (0.00 + 56.05 + 0.00) = 56.05 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-90 34 0.00 65.99 0.00 -8.33 -1.62 0.00 0.00 0.00 56.05

Segment Leq : 56.05 dBA

Total Leq All Segments: 56.05 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.64
(NIGHT): 56.05

B10LA
STAMSON 5.0 NORMAL REPORT Date: 08-01-2018 14:51:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b10la.te Time Period: Day/Night 16/8 hours
Description: Building 100 outdoor living area

Rail data, segment # 1: VIA (day/night)

Train Type	! Trains	! Speed	!# loc	!# Cars	! Eng	! Cont
	!	!(km/h)	!/Train!	/Train!	type	!weld
* 1. VIA	!	42.0/5.8	!	20.0	!	1.0
				8.0	!Diesel	! Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type:	! Unadj.	! Annual %	! Years of
No Name	! Trains	! Increase	! Growth
1. VIA	!	29.0/4.0	!
			2.50
			15.00

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

Angle1	Angle2	:	-46.00 deg	41.00 deg
Wood depth	:	0	(No woods.)	
No of house rows	:	0 / 0		
Surface	:	2	(Reflective ground surface)	
Receiver source distance	:	293.00 / 293.00 m		
Receiver height	:	1.50 / 1.50 m		
Topography	:	3	(Elevated; no barrier)	
No Whistle	:			
Elevation	:	47.00 m		
Reference angle	:	0.00		

Results segment # 1: VIA (day)

LOCOMOTIVE (0.00 + 49.02 + 0.00) = 49.02 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-46	41	0.00	65.08	-12.91	-3.16	0.00	0.00	0.00	49.02	

WHEEL (0.00 + 35.00 + 0.00) = 35.00 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	

B10LA
-46 41 0.00 51.06 -12.91 -3.16 0.00 0.00 0.00 35.00

Segment Leq : 49.19 dBA

Total Leq All Segments: 49.19 dBA

Results segment # 1: VIA (night)

LOCOMOTIVE (0.00 + 43.43 + 0.00) = 43.43 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-46	41	0.00	59.50	-12.91	-3.16	0.00	0.00	0.00	43.43	

WHEEL (0.00 + 29.41 + 0.00) = 29.41 dBA										
Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq	
-46	41	0.00	45.47	-12.91	-3.16	0.00	0.00	0.00	29.41	

Segment Leq : 43.60 dBA

Total Leq All Segments: 43.60 dBA

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

B10LA

Angle1 Angle2 : -33.50 deg 76.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 38.00 / 38.00 m
Receiver height : 1.50 / 1.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -33.00 deg Angle2 : 76.00 deg
Barrier height : 1.50 m
Elevation : 46.50 m
Barrier receiver distance : 9.00 / 9.00 m
Source elevation : 65.50 m
Receiver elevation : 112.00 m
Barrier elevation : 112.00 m
Reference angle : 0.00

Results segment # 1: Sandford (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	-9.51	102.49

ROAD (36.15 + 39.72 + 0.00) = 41.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-34	-33	0.00	65.75	0.00	-4.04	-25.56	0.00	0.00	0.00	36.15
-33	76	0.00	65.75	0.00	-4.04	-2.18	0.00	0.00	-19.82	39.72

Segment Leq : 41.30 dBA

Total Leq All Segments: 41.30 dBA

Results segment # 1: Sandford (night)

Source height = 1.50 m

Barrier height for grazing incidence

B10LA

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	1.50	-9.51	102.49

ROAD (28.56 + 32.12 + 0.00) = 33.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-34	-33	0.00	58.16	0.00	-4.04	-25.56	0.00	0.00	0.00	28.56
-33	76	0.00	58.16	0.00	-4.04	-2.18	0.00	0.00	-19.82	32.12

Segment Leq : 33.71 dBA

Total Leq All Segments: 33.71 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.84
(NIGHT): 44.02

B2OLA
STAMSON 5.0 NORMAL REPORT Date: 08-01-2018 14:45:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b2ola.te Time Period: Day/Night 16/8 hours
Description: Building 200 outdoor living area

Rail data, segment # 1: VIA (day/night)

Train Type	! Trains	! Speed (km/h)	!# loc	!# Cars	! Eng type	! Cont weld
* 1. VIA	42.0/5.8	20.0	1.0	8.0	Diesel	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train No	Name	! Unadj. Trains	! Annual % Increase	! Years of Growth
1. VIA		29.0/4.0	2.50	15.00

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

Angle1 Angle2 : -51.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 277.00 / 277.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
No Whistle
Elevation : 71.25 m
Reference angle : 0.00

Results segment # 1: VIA (day)

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-51	90	0.00	65.08	-12.66	-1.06	0.00	0.00	0.00	51.36

WHEEL (0.00 + 37.34 + 0.00) = 37.34 dBA
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

B2OLA
-51 90 0.00 51.06 -12.66 -1.06 0.00 0.00 0.00 37.34

Segment Leq : 51.53 dBA

Total Leq All Segments: 51.53 dBA

Results segment # 1: VIA (night)

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-51	90	0.00	59.50	-12.66	-1.06	0.00	0.00	0.00	45.77

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-51	90	0.00	45.47	-12.66	-1.06	0.00	0.00	0.00	31.75

Segment Leq : 45.94 dBA

Total Leq All Segments: 45.94 dBA

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

Angle1 Angle2 : -31.00 deg 59.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 91.00 / 91.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 4 (Elevated; with barrier)
 Barrier angle1 : -31.00 deg Angle2 : 59.00 deg
 Barrier height : 1.50 m
 Elevation : 70.75 m
 Barrier receiver distance : 9.00 / 9.00 m
 Source elevation : 65.50 m
 Receiver elevation : 136.25 m
 Barrier elevation : 136.25 m
 Reference angle : 0.00

Results segment # 1: Sandford (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source	Receiver	Barrier	Elevation of
Height (m)	Height (m)	Height (m)	Barrier Top (m)
1.50	1.50	-5.50	130.75

ROAD (0.00 + 35.22 + 0.00) = 35.22 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 -31 59 0.00 65.75 0.00 -7.83 -3.01 0.00 0.00 -19.69 35.22

Segment Leq : 35.22 dBA

Total Leq All Segments: 35.22 dBA

Results segment # 1: Sandford (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source	Receiver	Barrier	Elevation of
--------	----------	---------	--------------

B20LA
 Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
 1.50 ! 1.50 ! -5.50 ! 130.75
 ROAD (0.00 + 27.63 + 0.00) = 27.63 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 -31 59 0.00 58.16 0.00 -7.83 -3.01 0.00 0.00 -19.69 27.63

Segment Leq : 27.63 dBA

Total Leq All Segments: 27.63 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 51.63
 (NIGHT): 46.00