FINAL REPORT

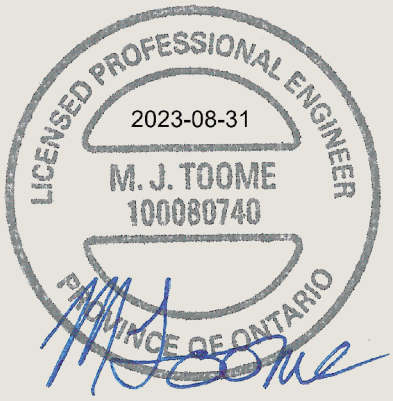
601 SCOTTSDALE DRIVE

GUELPH, ONTARIO

NOISE AND VIBRATION IMPACT STUDY

RWDI #2302908

August 30, 2023



SUBMITTED TO

Sydney Zhang
Coordinator, Real Estate Development
sydneyz@forumam.com

Forum 601 Scottsdale LP
181 Bay Street
East Podium, 2nd Floor
Toronto, ON M5J 2T3

SUBMITTED BY

Mikk Toome, M.Sc., P.Eng.
Technical Director - Acoustics
Mikk.Toome@rwdi.com

Maja Bokara, PGCert, EP
Project Manager
Maja.Bokara@rwdi.com

RWDI
600 Southgate Drive
Guelph Ontario Canada N1G 4P6
T: 519.823.1311 | ext. 2440
F: 519.823.1316

VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	2023/07/24	Draft	Andrew Lambert	Mikk Toome
2	2023/08/30	Final	Andrew Lambert	Mikk Toome

STATEMENT OF LIMITATIONS

This report entitled "601 Scottsdale Drive" was prepared by RWDI AIR Inc. ("RWDI") for Forum 601 Scottsdale LP ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the Project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the Project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

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

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

EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-lw Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The proposed development is intended to be used as student residences and will consist of a 7-storey residential building with two towers joined by a 1-storey podium. This building is in addition to the existing student residence on the property which has 4 storeys in the east part and 1 storey on the west connected by a sloped atrium.

The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
    a. Transportation sound levels at the building façade
3. Minimum sound isolation performance:
    a. Suite window glazing with sound isolation performance meeting a minimum STC-29.
    b. Suite exterior walls with sound isolation performance meeting a minimum STC-45.

Potential impacts of noise from the surrounding environment on the proposed development were assessed. Potential noise impacts from road traffic on Highway 6 and Stone Road were evaluated and found to be compatible with the use of central air conditioning and specified window glazing sound isolation performance. A review of surrounding industrial and commercial uses was completed and the significant noise sources were modeled. There were slight exceedances of the limits due to the existing building on-site, but as they share ownership it is likely feasible to provide mitigation. No incompatibilities with respect to off-site existing land uses and the proposed development were identified. There were no significant identified sources of vibration.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior during detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of this assessment, the proposed development is considered to be feasible from a noise impact aspect.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed residential development located at 601 Scottsdale Drive in Guelph, Ontario. The proposed development is adjacent to the existing student residence on the property and is southwest of the Stone Road Mall on Stone Road West.

The proposed development will consist of two 7-storey buildings connected by a 1-storey podium. The east side of the site has an existing student residence that is 4 storeys tall. The new building will be located to the southwest of the existing building, closer to Highway 6. The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic on: Highway 6 to the southwest; and Stone Road west to the southeast. Other roads around the site area were considered negligible from a noise perspective due to comparably low volumes or their separation distance.

The site is exposed to noise from the existing residence at the property (rooftop HVAC units) and commercial land uses to the north, east and south.

The objective of this assessment was conducted in support of the ZBA submission to determine the feasibility of the proposed residential development that is surrounded by existing sources of environmental noise and vibration. As there are no sources of vibration in proximity to the development, this assessment considers environmental noise only.

This assessment was based on design drawings dated July 4, 2023. These drawings are included in **Appendix A.**

2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources and stationary noise sources are described in this section.

2.1 Transportation Sources

Guidance from Guelph Noise Control Guidelines (GNCG) was used in the assessment of transportation sources. The Guelph Noise Control Guideline incorporates the Ontario Ministry of the Environment, Conservation and Parks NPC-300 Environmental Noise Guideline by reference. The applicable limits for noise generated by transportation-related sources come from NPC-300. There are three aspects to consider, which include the following:

1. Transportation noise levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) and sound insulation design recommendations.
2. Transportation noise levels at the plane of the window, which determines air-conditioning and ventilation system recommendations and associated warning clauses which inform the future occupants that windows and doors must be closed in order to meet the indoor sound level criteria.
3. Transportation noise levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

OLAs would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g., courtyards, rooftop terraces), including designated outdoor amenity areas required under Zoning provisions, passive recreational areas such as parks if identified by the City, and/or private backyards and terraces with a minimum depth of 4 m.

2.1.1 Road Traffic Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in **Table 1** for outdoor living areas (OLAs), and indoor areas of sensitive uses.

Table 1: NPC-300 Sound Level Criteria for Road

Assessment Location	Time Period	NPC-300 Limit L_{EQ} (averaged over time period)	Comments
Indoor Living Quarters	16 hr Daytime 0700-2300h	45 dBA	Indoor sound levels based on the assumption of a closed window.
	8 hr Nighttime 2300-0700h		
Indoor Sleeping Quarters	16 hr Daytime 0700-2300h	45 dBA	
	8 hr Nighttime 2300-0700h	40 dBA	
Outdoor Living Areas	16 hr Daytime 0700-2300h	55 dBA	Where possible, separation distance should be used to achieve compliance in lieu of barriers. If technically and economically feasible, noise barriers should be used to achieve 55 dBA sound levels in OLAs. Otherwise, a warning clause would be recommended for sound levels between 56-60 dBA.

Ventilation, building façade component, and warning clauses requirements for residential buildings are determined based on predicted levels of transportation noise at the exterior Plane of Window (POW) as summarized in **Table 2** below.

Table 2: Ventilation, Building Component, and Warning Clauses Recommendations

Assessment Location	Transportation Noise Level		Recommendations
	Daytime Leq,16-hr	Nighttime Leq,8-hr	
Plane of Window	>65 dBA	>60 dBA	Air conditioning to allow windows to remained closed. The acoustical performance of building components should be designed to meet the indoor sound level limits. GNCG Warning clause "Type D" is recommended.
	Between 55 and 65 dBA	Between 50 and 60 dBA	Forced-air ventilation system to allow for the installation of air-conditioning. GNCG Warning clause "Type C" is recommended.
Outdoor Living Area	Between 55 and 60 dBA	Not Applicable	Noise controls (separation distance/barriers) should be implemented to meet the 55 dBA criterion. If noise mitigation is not feasible to meet the 55 dBA criterion, a GNCG Warning Clause "Type A" or "Type B" would be recommended.
	> 60 dBA	Not applicable	Generally, not acceptable. Noise mitigation required to reduce sound levels to less than 55 dBA if feasible for areas designated for the quiet enjoyment of the outdoors.

Warning clauses, if applicable, are recommended to be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations. Central air conditioning will be included in the proposed development as part of the general design. Therefore, Warning clause "Type D" is applicable in lieu of Warning clause "Type C".

In addition to the ventilation and warning clause, building facade components should be designed to meet the indoor sound level limits based on Plane of Window noise predictions.

2.2 Stationary Sources

Noise from stationary sources is assessed to ensure the proposed development would not affect any environmental noise permits (Environmental Compliance Approvals or Environmental Activity Sector Registrations) of surrounding industrial or commercial properties and to ensure an adequate sound environment would be present for the future residents of the proposed development. Facilities such as residential towers and small commercial establishments are typically exempt from environmental noise permits but may have sources of noise, such as mechanical equipment. Sound from facilities that could require an environmental noise permit is assessed strictly against MECP sound level limits to ensure that the proposed residential use is compatible with the existing industrial and commercial uses.

Under NPC-300, noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case 1-hour average sound level (L_{EQ}) for each period of the day.

For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and façade.

The assessment criteria for all PORs are the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or "Class" of the area. This development should be considered to be in a Class 1 (urban) area.

The NPC-300 exclusion limits for continuously operating stationary sources are summarized in **Table 3**. For the façade, the exclusion limits apply at the exterior plane of window; there are no indoor criteria for stationary sources.

Table 3: NPC-300 Exclusion Limits - Continuous Stationary Sources

Time Period	Exclusion Limit, Class 2 (L_{EQ-1hr})	
	Outdoor	Façade
Daytime 0700-1900h	50 dBA	50 dBA
Evening 1900 – 2300h	45 dBA	50 dBA
Nighttime 2300-0700h	--	45 dBA

The NPC-300 limits in **Table 3** are used as guidance in assessing comfort of the acoustic environment at the proposed development.

3 IMPACT OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

Roadways identified as having the potential to affect the proposed development included Highway 6, and Stone Road West. Other arterial roads around the proposed development were considered negligible from a noise perspective due to comparatively low volumes and/or their separation distance.

The locations of these sources of sound in relation to the proposed development is shown in **Figure 1**.

3.1.1 Road Traffic Volume Data

The Highway 6 and Stone Road West traffic volumes were obtained from traffic data obtained from the Ontario Ministry of Transportation (MTO). Data from the City of Guelph was also obtained, but the traffic volumes from the MTO data were higher and thus conservatively used.

Turning Movement Counts (TMCs) at the intersection of Highway 6 and Stone Road West providing detailed traffic volumes for the AM and PM peaks, and an 8-hour interval was used to determine the AADT on Stone Road West.

The TMCs were used to determine the Average Annual Daily Traffic (AADT) traffic volumes for Stone Road West and vehicle type breakdown for Stone Road West and Highway 6. 24-hour count data was provided for Highway 6 at Kortright and College (one intersection north and south of Stone Road West along Highway 6) and was used to determine the future AADT for Dawson Road.

For Stone Road, the AM and PM peaks and 8-hour interval were assumed to be 9%, 10%, and 60% of the AADT, respectively, based on typical traffic distributions from the International Traffic Engineers (ITE, 2010). The maximum estimated AADT from the AM and PM peaks and 8-hour interval conversions were used in the assessment for each roadway. To determine the traffic volumes for a 10-year horizon, traffic volumes for Highway 6 and Stone Road West were increased at a 2% per year rate (based on information provided by the City of Guelph) to represent the predicted traffic volumes for 2030. An 85%/15% daytime/nighttime split was applied for Stone Road West, based on a typical daytime/nighttime split for local roads from the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) Technical Guide (MECP, 1989). The 24-hour counts for Highway 6 were used to determine a 91%/9% daytime/nighttime split.

Truck percentages were included in the TMC data provided. To further split the truck percentages into medium and heavy trucks for implementation in the modelling, a breakdown of 5%/8% for medium/heavy vehicles was assumed based on typical truck percentages on local roads from the MTO (MTO, 1992).

A summary of the traffic data used is included in **Table 4** below, with more detailed information included in **Appendix B**.

Table 4: Road Traffic Data Summary

Roadway	Future Traffic (AADT)[1]	% Day/ %Night	Post Speed Limit (km/hr.)	% Trucks	
				Medium	Heavy
Highway 6 South of Stone Road West	56737	91% / 9%	80	2.9%	4.7%
Highway 6 North of Stone Road West	56737	91% / 9%	70	2.9%	4.7%
Stone Road West, east of Highway 6	23700	85% / 15%	60	1.4%	2.2%
Stone Road West, West of Highway 6	4680	85% / 15%	60	0.9%	1.5%

Note:
1. Future traffic volumes were based on 2% growth rate forecasted to 2033

3.1.2 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. The worst-case facade receptor F1 was then analyzed and identified to be on the southwest façade of the north tower and faces Highway 6. Common outdoor amenity space is located in the courtyard between the towers and is included as OLA1. The location of all assessed receptors is presented in **Figure 2**.

3.1.3 Transportation Source Assessment - Analysis and Results

The sound from the adjacent roads was modelled at the PORs using the ORNAMENT algorithms (MECP, 1989). Results from the STAMSON implementation of ORNAMENT are included in **Appendix C**.

The results for each worst-case receptor were determined with the results summarized in **Table 5**. Modelling outputs are provided in **Appendix C**.

Table 5: Predicted Sound Levels of Roadway Noise on Facades

Building	Receptor	Daytime L_{EQ}, 16hr / Nighttime L_{EQ}, 8hr Façade Sound Level (dBA)		Recommendations for Warning Clause and/or Ventilation Requirements
		Day	Night	
Proposed Building	F1	68	62	Yes [1]
Outdoor Amenity	OLA	50	-	n/a

Note:

1. Air conditioning to allow windows to remained closed. The acoustical performance of building components should be designed to meet the indoor sound level limits. GNCG Warning clause "Type D" is recommended.

3.2 Stationary Source Assessment

Stationary sources could be grouped into two categories: Those that have a permit with the Ontario Ministry of the Environment, Conservation and Parks (MECP) through an Environmental Compliance Approval (ECA) or Environmental Activity and Sector Registry (EASR); and those that are exempt from ECA or EASR permit requirements.

In the case where a stationary source has an ECA or an EASR permit with the MECP and would be put in a position where it is no longer in compliance with the applicable sound level criteria due to the encroachment of the proposed new development, source-specific mitigation and/or formal classification of the proposed development lands as a "Class 4 Area" (refer to C.4.4.2 "Class 4 Area" in NPC-300) would be required. In this case, coordination and agreements between the stationary source owner, proposed new development owner, the land-use planning authority and potentially the MECP would be needed.

In the case where a stationary source is exempt from ECA or EASR permit requirements with the MECP, the noise provisions of the applicable Municipal Noise By-Law and guidance from NPC-300 would be applicable.

3.2.1 Surrounding Industrial & Commercial Developments

Nearby facilities were assessed for potential noise impacts at the proposed development. Industrial and commercial facilities were identified through aerial and street-level imagery and publicly available business directories and confirmed by an RWDI site visit on July 14, 2023.

A number of commercial and light industrial facilities were identified in the area with the potential for noise impacts at the proposed development, including:

- Stone Road Mall;
- Existing residential building at 601 Scottsdale Drive; and
- Car Wash at Canadian Tire Gas+ across Stone Road W.

Searches of publicly available data from the MECP showed that the Stone Road Mall, as well as the Holiday Inn that was converted to the residence at 601 Scottsdale Drive, have at least previously held Environmental Compliance Approvals (ECA) which would restrict the emission of noise from the facility. For both these facilities, there are either existing receptors located either between the facilities and the proposed development or with similar set-back distances from the facility to the proposed development, or the facilities themselves would have been noise-sensitive. With compliance achieved at the existing residential developments, sound levels would be below the limits at the proposed development, as discussed in detail in **Section 3.2.3**.

The Car Wash at the Canadian Tire Gas+ across Stone Road W from the existing residence does not have an Environmental permit that would restrict noise from this facility.

3.2.2 Representative Receptors

The worst-case façade receptor locations for on-site (POR1) and off-site (POR2) stationary sources were determined using the building evaluation feature in CadnaA. POR1, POR2, and the common outdoor courtyard (as shown in **Figure 2**) were assessed to evaluate the potential stationary source noise impact.

3.2.3 Site Visit

A site visit by RWDI personnel was completed on July 14, 2023. During the site visit, operations of the surrounding industries and commercial uses were confirmed. Measurements indicated sound levels in the area during daytime were between 60 and 70 dBA around the site. Measurements were dominated by the sounds of traffic on Highway 6 and Stone Road West.

Noise sources on the Stone Road Mall were audible near the mall but not audible closer to the site.

The car wash was observed during measurements from the sidewalk north of Stone Road West while it was operating. The car wash was only audible while the fans were operating for about 30 seconds of the car wash cycle, which lasted a few minutes.

RWDI staff were given access to the roof of the existing residence building at 601 Scottsdale Drive, which allowed the equipment that was operating to be measured and the nameplates of the other equipment to be recorded. The Two existing rooftop units on the building were identified as the most significant source of noise.

To confirm whether sound levels from identified stationary sources in the vicinity have the potential to generate significant sound levels at the proposed development, sound modelling was completed to complement the results of the measurements.

3.2.4 Analysis and Results

The potential worst-case impact of sound from the existing residence at 601 Scottsdale Drive were evaluated further through modelling. The Stone Road Mall was not assessed in detail due to significant separation distance and intervening existing residential properties.

The existing building at 601 Scottsdale has a 4-storey section to the northeast, a 1-storey section to the west, and an atrium in the middle with a sloping roof. The east part of the building has residence apartments equipped with PTAC units that point towards the stone road mall and away from the new development. The low roof has three (3)large Lennox KGB or KGA240S HVAC units, one of which was measured. There were also two smaller Lennox KGB048S HVAC Units, two Lennox VRB120H heat recovery ventilators on the roof along with two more similar units at ground level, and a CaptiveAir RTU unit on the low roof as well as at ground level. The car wash was modeled as a single noise source based on the measurement. The measured and/or assumed sound power levels included in the screening level stationary source assessment are presented in **Table 6**. The locations of the sources summarized in **Table 6** included in the stationary source assessment are illustrated in **Figure 3**.

Table 6: Stationary Source Sound Power Level Assumptions

Source	Proxy Data / Calculation	Sound Power Level (dBA)	Duty Cycle	
			Daytime and Evening (07:00h – 23:00h)	Nighttime (23:00h – 07:00h)
Lennox KG(A/B)240S	Measured	82	Continuous	Continuous
Lennox KGB048S	Manufacturer Data	85	Continuous	Continuous
Lennox VRB120H	Manufacturer Data	88	Continuous	Continuous
CaptiveAir CASRTU1	Proxy Data	92	Continuous	Continuous
Canadian Tire Gas+ Car Wash	Measured	100	10 minutes/hour	10 minutes/hour

Potential sound from these properties was modelled in Cadna/A, a commercially available software package that implements the ISO-9613 algorithms for sound propagation. Sound levels for the sources that weren't measured were drawn from historical data on file at RWDI. The results are shown in **Table 7**.

Table 7: Predicted Sound Levels of Stationary Sources

Receptor	Time Period	Predicted 1-hour Sound Level (dBA)	MECP Sound Level Limit (dBA)	Comments
POR1	Daytime / Evening	52	50	2 dB exceedance due to building RTUs
	Nighttime	52	45	7 dB exceedance due to building RTUs
POR2	Daytime / Evening	43	50	Meets Sound Level Limit
	Nighttime	43	45	Meets Sound Level Limit
Courtyard Point of Reception	Daytime / Evening	37	50	Meets criterion

As shown in **Table 7**, the daytime-evening and nighttime continuous sound levels at the façade due to existing stationary sources are predicted to slightly exceed the NPC-300 Class 1 sound level targets based on screening level noise modelling analysis. This exceedance is due to the combined impact from the noise sources at the existing residence building at 601 Scottsdale.

The car wash is much less significant, and its partial contribution is about 4 dB below the nighttime limit using this conservative estimate of its duty cycle. The receptor at the south façade of the building (POR2) that is oriented towards the car wash and around the corner from the existing residence passes the daytime and nighttime limits.

Given that the proposed development shares ownership with the neighbouring building and rooftop units, it is feasible to mitigate the sound levels. Recommendations to ensure a comfortable indoor environment for the proposed development are included in **Section 3.3.2**.

3.3 Recommendations

Based on an analysis of the predicted sound levels, the following recommendations and requirements were determined for the Project. Recommendations are provided for both transportation sources and stationary sources.

3.3.1 Transportation Sources

3.3.1.1 Building Façade Components

Due to the elevated transportation sound levels in the area, acoustical design of the façade components, including spandrel, window glazing, and exterior doors, are recommended to be specified for the proposed development.

To assess the development's feasibility, preliminary window glazing and exterior balcony door sound isolation requirements were determined. These were based on the following assumptions:

- Typical residential living room:
  - Glazing 80% of façade, Door: N/A
  - 55% Façade to floor area Ratio
- Typical residential bedroom:
  - Glazing 80% of façade, Door: N/A
  - 81% Façade to floor area Ratio
- Acoustical character of rooms: intermediate absorption finishes/furniture for bedrooms and intermediate absorption finishes/furniture for living rooms.

Based on the predicted plane of window sound levels and the assumptions listed above, recommendations for the minimum sound insulation ratings for the building components were determined using the National Research Council of Canada "BPN-56 method" (NRCC, 1985). The reported results are in terms of Sound Transmission Class (STC) ratings, as summarized in **Table 8**.

Table 8: Recommended Facade Component Minimum Sound Insulation Rating

Portion of Development	Façade	Window Glazing	Façade Wall
North and South Towers	Southwest Façades	STC 29	STC 45
	Northwest Façades	STC 26	STC 45
	Southeast Façades	STC 26	STC 45
	Northeast Façades	OBC	OBC

Note:

1. "OBC" denotes that the noise insulation design is not required to be specified. Building envelope assemblies meeting the minimum Ontario Building Code (OBC) requirements will also exhibit sufficient noise reduction to meet the interior sound level criteria.

The maximum requirement for the window glazing was determined to be STC-29, which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units. Façade wall meeting a minimum STC-45 would be feasible with typical façade assemblies.

Taking into account the assumptions used as a basis to determine the glazing requirements, the applicable indoor transportation source sound level criteria are predicted to be achieved.

We recommend that the façade construction is reviewed during detailed design to ensure that the indoor sound level limits will be met and that the window/door supplier is requested to provide STC laboratory test reports as part of the shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.

3.3.1.2 Ventilation Recommendations

Due to the transportation sound levels at the plane of the façade, the installation of central air conditioning prior to occupancy is required for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective tenants should be informed by a warning clause as noted in Section 3.3.3.

3.3.2 Stationary Sources

The measured and assumed sound power levels for the stationary sources show that the development would exceed Class 1 targets. To ensure a comfortable indoor environment, air conditioning is required to allow windows to be closed. With windows closed, the development is expected to be acoustically compatible with existing non-permitted stationary sources.

Given that the existing building is owned by the same company, it is feasible for them to reduce the sound levels due to the equipment by 7 dB to meet the NPC-300 criteria. Noise mitigation can be achieved via silencers, compressor covers and quiet condenser fans. Further detailed measurements and analysis are recommended to specify noise control measures, and to confirm assumptions applied in the analysis (such as worst-case duty cycles of the roof top AHUs).

Additionally, we recommend the inclusion of a Warning Clause to note that there are existing commercial and industrial activities in the area.

3.3.3 Warning Clauses

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Warning clauses may be used individually or in combination.

City of Guelph Warning Clause: Recommended to address nearby commercial/industrial land-use

"The Transferee covenants with the Transferor that the below clause, verbatim, will be included in all subsequent Agreements of Purchase of sale or lease and Sale and Deeds conveying the lands described herein, which covenant shall run with the said lands and is for the benefit of the subsequent owners and renters of the said lands and the owner of the adjacent road."

"The Transferee, for himself, his heirs, executors, administrators, successors and assigns acknowledge being additionally advised that due to the proximity of the adjacent industrial/commercial lands-uses, sound levels from the industrial/commercial land-uses may at times be audible."

City of Guelph Warning Clause: Recommended to address transportation noise

"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 municipal and provincial sound level limits."

"The building components of this dwelling unit (walls, windows and exterior doors) have been designed to provide acoustic insulation so that, when windows and exterior doors are closed, the indoor sound levels are within the municipal and provincial sound level limits. The details of this building component design are available by contacting the builder of this unit."

4 IMPACT OF THE PROPOSED DEVELOPMENT ON THE ENVIRONMENT AND ITSELF

On-site stationary sources for the development are expected to consist of HVAC-related equipment in the rooftop mechanical penthouse as well as various exhaust fans. Further, consideration should be given to controlling airborne and structure-borne noise generated within the proposed development.

Within the development itself, the main sources of noise that are likely to affect the uses of the building are the mechanical systems. The potential noise effect of the commercial component of the development is recommended to be reviewed during detailed design to ensure the applicable criteria will be met.

Provided that best practices for the acoustical design of the building are followed, noise from building services equipment associated with the development is expected to be feasible to meet the applicable sound level criteria due to the nature (residential) of the proposed development.

We recommend that the potential noise effect of the proposed development is reviewed during detailed design to ensure the applicable sound level criteria will be achieved.

5 CONCLUSION

RWDI was retained to prepare a Noise and Vibration Impact Study in support of an Official Plan amendment and Zoning By-law Amendment for the proposed residential building located at 601 Scottsdale Avenue in Guelph, Ontario. The proposed development is intended to be used as student residences and will consist of a 7-storey residential building with two towers joined by a 1-storey podium. This building is in addition to the existing student residence on the property which has 4 storeys in the east part and 1 storey on the west connected by a sloped atrium.

The following noise control measures are recommended for the proposed development:

4. Installation of central air-conditioning so that all suites' windows can remain closed.
5. The inclusion of noise warning clauses related to:
    a. Transportation sound levels at the building façade
6. Minimum sound isolation performance:
    a. Suite window glazing with sound isolation performance up to STC-29.
    b. Suite exterior walls with sound isolation performance meeting a minimum STC-45.

Potential impacts of noise from the surrounding environment on the proposed development were assessed. Potential noise impacts from road traffic on Highway 6 and Stone Road were evaluated and found to be compatible with the use of central air conditioning and specified window glazing sound isolation performance. A review of surrounding industrial and commercial uses was completed, and the significant noise sources were modeled. There were slight exceedances of the limits due to the existing building on-site, but as they share ownership, it is likely feasible to provide mitigation. No incompatibilities with respect to existing land uses and the proposed development were identified. There were no significant identified sources of vibration.

At this stage in design, the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior to detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of this assessment, the proposed development is considered to be feasible from a noise impact aspect.

6 REFERENCES

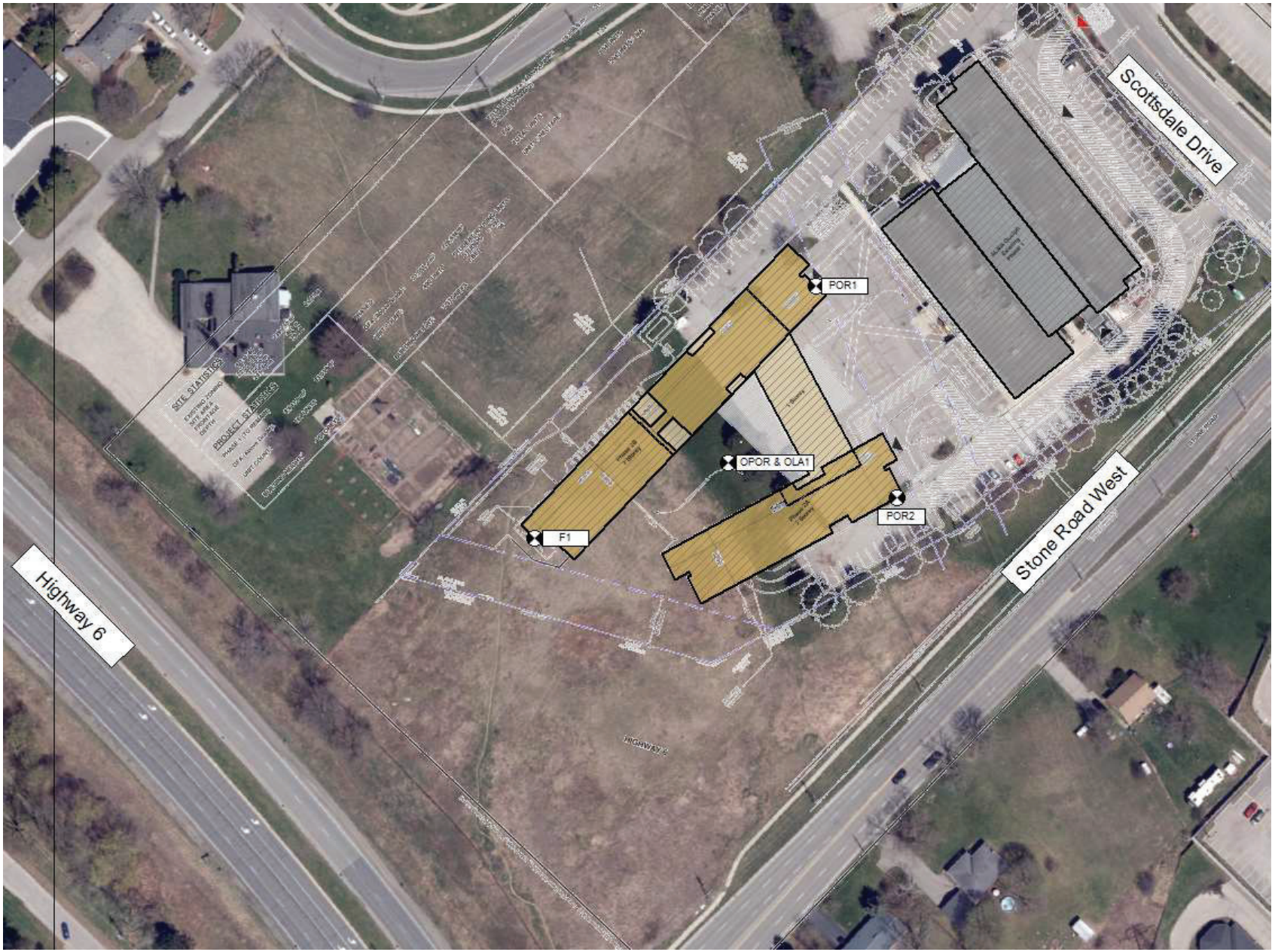
1. Ontario Ministry of the Environment, Conservation, and Parks, August 2013, Publication NPC-300, Environmental Noise Guideline Stationery and Transportation Sources – Approval and Planning (NPC-300)
2. City of Guelph, 2018. *Guelph Noise Control Guidelines* (Guelph, 2018)
3. ORNAMENT, Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, Ontario Ministry of the Environment, ISBN 0-7729-6376, 1989 (ORNAMENT)
4. Institute of Transportation Engineers (ITE), 2010, Traffic Engineering Handbook, 6th Edition.
5. International Organization for Standardization (ISO), 1994b, International Standard ISO 9613-1:1994, Acoustics –Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere. (ISO, 1994)
6. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996)
7. Ontario Ministry of Transportation (MTO), 1992, Environmental Office Manual Technical Areas – Noise, EO-V-1000-00.

FIGURES

Context Site Plan

601 Scottsdale Drive

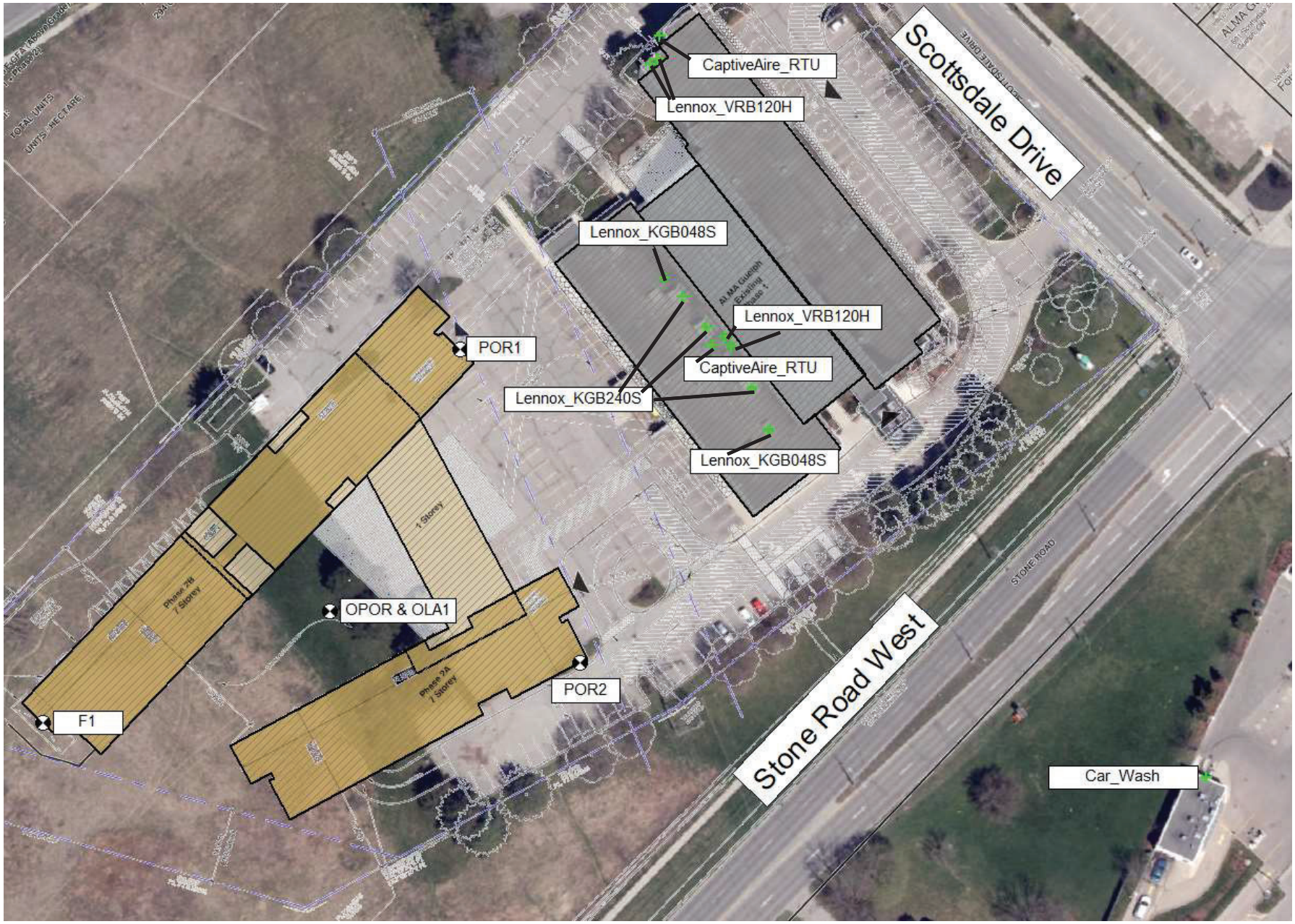
Drawn by:	ACCL	Figure:	1
Project #:			2302908
Date:			2023-08-02



Worst-case Receptors and OLA

601 Scottsdale Drive

Drawn by:	ACCL	Figure:	2
Project #:			2302908
Date:			2023-08-02



Modeled Noise Sources

601 Scottsdale Drive

Drawn by:	ACCL	Figure:	3
Project #:			2302908
Date:			2023-08-02

APPENDIX A

SITE STATISTICS

EXISTING ZONING	SC. 1-40		
SITE AREA	22,226.00 m²	239,239 ft²	2.22 ha
FRONTAGE	122.20 m	401 ft	
DEPTH	241.20 m	791 ft	

PROJECT STATISTICS

PHASE 1 (TO REMAIN)

GFA (Above Grade): 8,641.6 m² 93,017 ft²

UNIT COUNT: 164 UNITS

BUILDING HEIGHT: 4 STOREYS

PHASE 2

GFA (Above Grade): 21,776.8 m² 234,405 ft²

UNIT COUNT: 490 UNITS STUDENT HOUSING UNITS
STUDIOS = 392
2 BED = 98

BUILDING HEIGHT: 7 STOREYS

TOTAL SITE GFA (Above Grade): 29,696.8 m² 319,653 ft²
(Phase 1 + Phase 2)

FSI: 1.34

TOTAL UNITS 654 UNITS

UNITS / HECTARE: 294 UNITS / HA

CAR PARKING

TOTAL PARKING ON SITE: 200
PARKING RATIO: 1 / 3.25 UNITS
(Excl. Visitor Parking)

LOADING

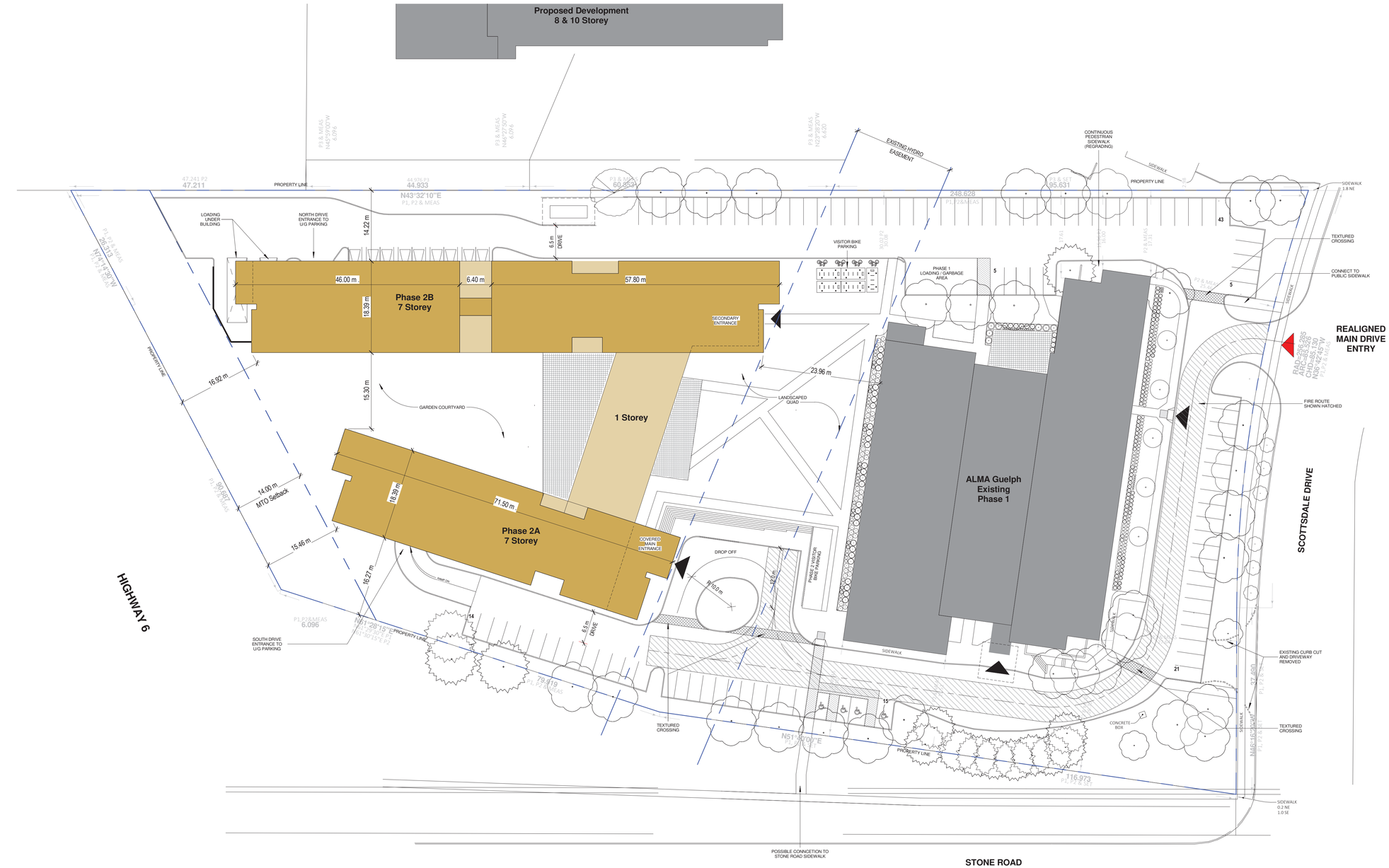
PHASE 1 1 LOADING SPACE

PHASE 2 2 LOADING SPACES

BICYCLE PARKING

PHASE 1 BICYCLE PARKING 93 (Long & Short Term)
PHASE 2 BICYCLE PARKING 500 (Long & Short Term)

TOTAL BICYCLE PARKING ON SITE: 593
BICYCLE PARKING RATIO: 1 / 1.1 UNITS



ISSUED

23-07-04	Draft for Coord

Sweeny&Co Architects

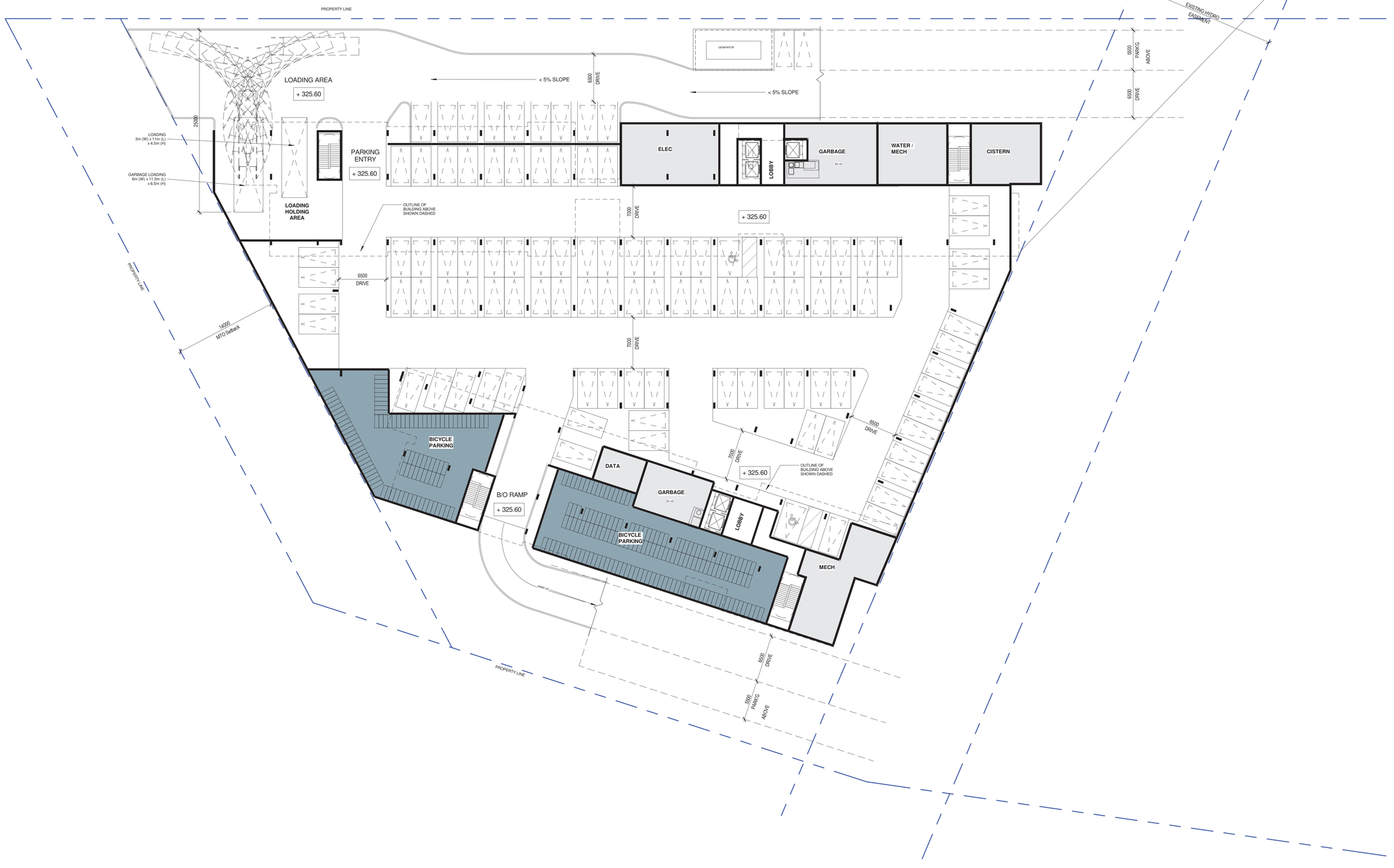
134 PETER STREET | SUITE 1601
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-971-6252 | F: 416-971-5420
E: info@sweenyandco.com | www.sweenyandco.com

PROJ. NAME
ALMA GUELPH Phase 2
601 Scottsdale Dr
Guelph, ON

OWNER
Forum

DWG TITLE
Site Plan

DATE: 03/13/23
SCALE : 1 : 400
DRAWN : Author
CHECKED : Checker
PROJ. No. : 2305 DWG No.
AZS101



DRAWING NOT TO BE SCALED

Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.

ISSUED

23-07-04	Draft for Coord

Sweeny&Co Architects

134 PETER STREET | SUITE 1601
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-971-6252 | F: 416-971-5420
E: info@sweenyandco.com | www.sweenyandco.com

PROJ. NAME
ALMA GUELPH Phase 2
601 Scottsdale Dr
Guelph, ON

OWNER
Forum

DWG TITLE
Floor Plans_Level -1 Parking

DATE:	YY-MM-DD
SCALE :	1 : 250
DRAWN :	Author
CHECKED :	Checker
PROJ. No. :	2305

DWG No.
AZS200

LOADING AREA

+ 325.60

14000
MTO Setback

3200 3200 3200 3200

6395

1600

6395

+ 330.81

SECONDARY ENTRANCE

+ 329.61

22,166.65 mm

+ 330.50

VISITOR BIKE PARKING

PHASE 1
LOADING / GARBAGE
AREA

OUTDOOR
AMENITY

T/O AVERAGE LANDSCAPING = + 329.60

T/O SLAB BELOW = + 329.00

3200 3200 3200 3200 3200

6395

1600

6395

+ 330.81

+ 329.61

OUTDOOR
AMENITY

COVERED
MAIN
ENTRANCE

PHASE 2 VISITOR
BIKE PARKING

< 5% SLOPE

T/O RAMP

+ 328.00

+ 328.41

+ 330.15

+ 331.15

NANO STUDIO	20.4 m²	(220 sf²)
STUDIO	22.2 m²	(239 sf²)
STUDIO ACCESSIBLE	29.6 m²	(319 sf²)
2 BEDROOM	46.6 m²	(502 sf²)
2 BED ACCESSIBLE	54.2 m²	(583 sf²)

INDOOR AMENITY

OUTDOOR AMENITY

DRAWING NOT TO BE SCALED

Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.

ISSUED

23-07-04 Draft for Coord

Sweeny&Co Architects

134 PETER STREET | SUITE 1601
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-971-6252 | F: 416-971-5420
E: info@sweenyandco.com | www.sweenyandco.com

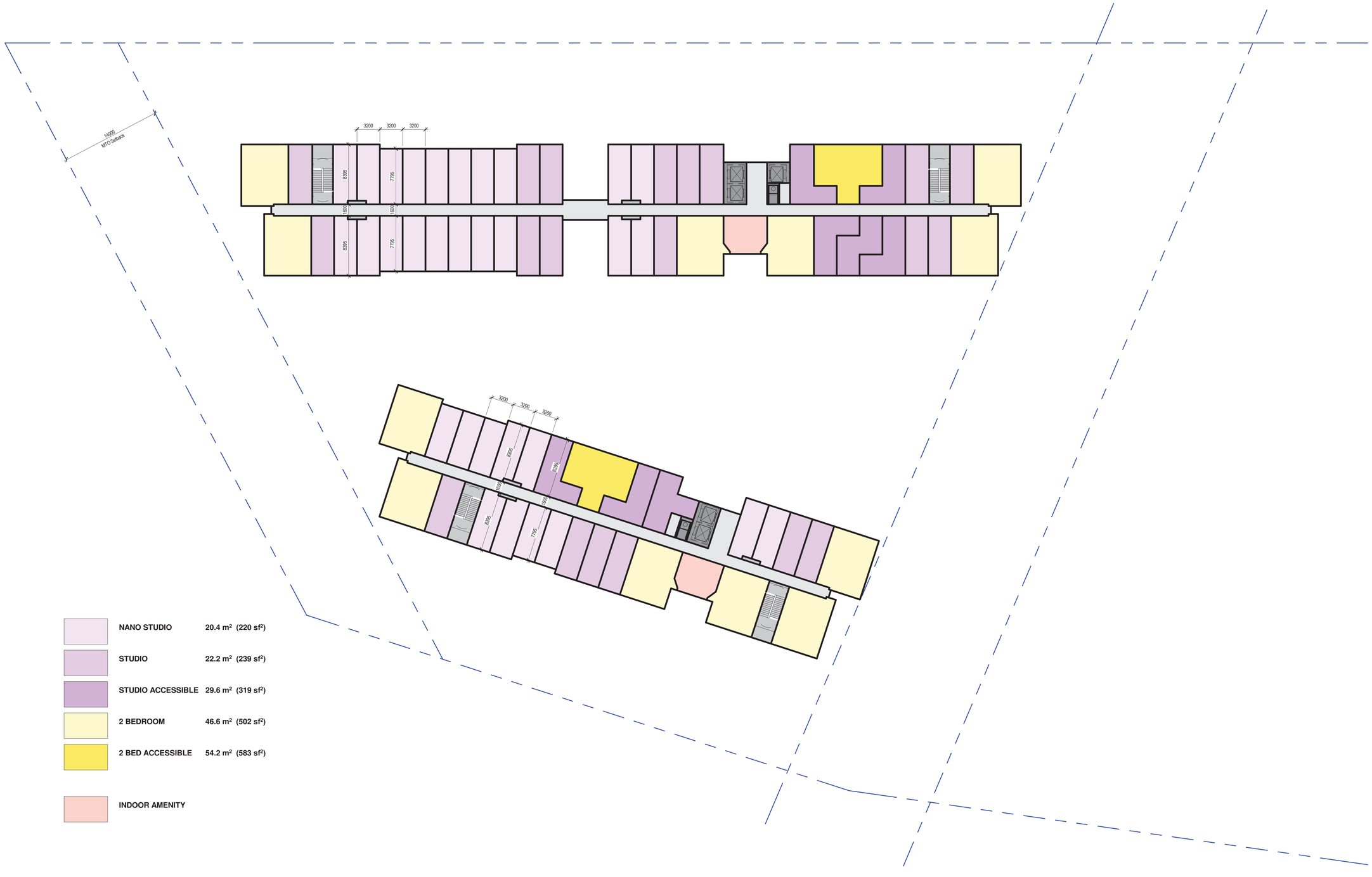
PROJ. NAME
ALMA GUELPH Phase 2
601 Scottsdale Dr
Guelph, ON

OWNER
Forum

DWG TITLE
Floor Plans_Level 1

DATE: YY-MM-DD
SCALE : 1 : 250
DRAWN : Author
CHECKED : Checker
PROJ. No. : 2305 DWG No.

AZS201



NANO STUDIO	20.4 m²	(220 sf²)
STUDIO	22.2 m²	(239 sf²)
STUDIO ACCESSIBLE	29.6 m²	(319 sf²)
2 BEDROOM	46.6 m²	(502 sf²)
2 BED ACCESSIBLE	54.2 m²	(583 sf²)
INDOOR AMENITY		

DRAWING NOT TO BE SCALED

Contractor must check and verify all dimensions on the job and report any discrepancies to the architect before proceeding with the work.

This drawing shall not be used for construction purposes until signed by the consultant responsible. This drawing, as an instrument of service, is provided by and is the property of Sweeny & Co. Architects.

ISSUED

23-07-04	Draft for Coord

Sweeny&Co Architects

134 PETER STREET | SUITE 1601
TORONTO, ONTARIO | M5V 2H2 | CANADA
P: 416-971-6252 | F: 416-971-5420
E: info@sweenyandco.com | www.sweenyandco.com

PROJ. NAME
ALMA GUELPH Phase 2
601 Scottsdale Dr
Guelph, ON

OWNER
Forum

DWG TITLE
Floor Plans_Level Typical

DATE:	YY-MM-DD
SCALE :	1 : 250
DRAWN :	Author
CHECKED :	Checker
PROJ. No. :	2305

DWG No.
AZS202

C:\Users\tj\Documents\&Co - Local Files Revit 2023\2305_ALMA Guelph_7 Storey 490 Units_BJxx.rvt
2023-07-04 12:24:30 PM

APPENDIX B

Ontario

Ministry of Transportation

TVIS II - Traffic Volume information System

ICS Weekly Volume Summary

Hwy:	6	**Between:**	LAIRD RD IC				
TS:	153	**and:**	S JCT HWY 7-WELLINGTON ST IC				
Regn:	WEST	**Pattern:**	C	**PDCS:**	90	**Factor:**	1.03
LHRS:	13599	**Offset:**	2.501	**Locn:**	2.501 KM N OF LAIRD RD IC		
Dir:	N	**Lanes:**	2	**Speed:**	80 km/h	**Dates:**	10-Nov-2019 to 17-Nov-2019

	Sun		Mon		Tue		Wed		Thu		Fri		Sat		Sun	
H. Interval	**11/10**		**11/11**	**Pk.**	**11/12**	**Pk.**	**11/13**	**Pk.**	**11/14**	**Pk.**	**11/15**	**Pk.**	**11/16**	**Pk.**	**11/17**	**Pk.**
00:00-01:00			123		140		183		157		177		282		236	
01:00-02:00			76		133		127		123		117		137		140	
02:00-03:00			49		67		70		54		63		79		105	
03:00-04:00			53		67		73		67		63		70		62	
04:00-05:00			124		102		122		97		121		60		46	
05:00-06:00			290		273		333		323		288		140		67	
06:00-07:00			893		814		906		911		888		277		169	
07:00-08:00			1193		1199		1318		1273		1259		422		233	
08:00-09:00			1387	▯	1449	▯	1522	▯	1484	▯	1552	▯	807	▯	463	▯
09:00-10:00			1066		1237		1241		1330		1255		984		736	
10:00-11:00			972		1043		1116		1095		1141		1222		933	
11:00-12:00			841		1110	▯	1140		1085		1191		1266		1156	▯
AM Total			**7067**		**7634**		**8151**		**7999**		**8115**		**5746**		**4346**	
12:00-13:00	1143		924	▯	1101		1162	▯	1168	▯	1264		1293			
13:00-14:00	1195	▯	865		1086		1083		1135		1335	▯	1302	▯		
14:00-15:00	1186		984		1186		1241		1280		1418		1343			
15:00-16:00	1067		1053		1298		1366		1384		1492		1291	▯		
16:00-17:00	1100	▯	1074	▯	1494	▯	1529		1569	▯	1597	▯	1115			
17:00-18:00	1025		1027		1350		1553	▯	1533		1434		964			
18:00-19:00	804		725		1190		1111		1115		1247		938			
19:00-20:00	753		514		868		755		978		921		761			
20:00-21:00	733		395		623		645		677		702		634			
21:00-22:00	512		267		448		517		508		589		510			
22:00-23:00	385		270		376		413		442		432		479			
23:00-00:00	198		241		287		306		326		421		356			
PM Total	**10101**		**8339**		**11307**		**11681**		**12115**		**12852**		**10986**			
24h. Total	**10101**		**15406**		**18941**		**19832**		**20114**		**20967**		**16732**		**4346**	
Noon - Noon	**17168**		**15973**		**19458**		**19680**		**20230**		**18598**		**15332**			

TVIS II - Traffic Volume information System

ICS Weekly Volume Summary

Hwy:	6	**Between:**	LAIRD RD IC				
TS:	153	**and:**	S JCT HWY 7-WELLINGTON ST IC				
Regn:	WEST	**Pattern:**	C	**PDCS:**	90	**Factor:**	1.03
LHRS:	13599	**Offset:**	2.501	**Locn:**	2.501 KM N OF LAIRD RD IC		
Dir:	S	**Lanes:**	2	**Speed:**	80 km/h	**Dates:**	10-Nov-2019 to 17-Nov-2019

	Sun		Mon		Tue		Wed		Thu		Fri		Sat		Sun	
H. Interval	**11/10**		**11/11**	**Pk.**	**11/12**	**Pk.**	**11/13**	**Pk.**	**11/14**	**Pk.**	**11/15**	**Pk.**	**11/16**	**Pk.**	**11/17**	**Pk.**
00:00-01:00			95		126		139		126		128		214		168	
01:00-02:00			68		62		60		77		85		95		112	
02:00-03:00			50		70		68		75		88		105		115	
03:00-04:00			60		86		78		61		65		61		59	
04:00-05:00			191		192		188		176		176		83		73	
05:00-06:00			578		531		581		611		582		198		104	
06:00-07:00			998		946		1058		1051		958		268		139	
07:00-08:00			1249	▯	1309	▯	1419		1355		1356		466		286	
08:00-09:00			1245		1234		1439	▯	1442	▯	1415	▯	732	▯	417	▯
09:00-10:00			891		1013		1080		968		1067		908		650	
10:00-11:00			866		879		943		900		1032		1119		921	
11:00-12:00			886		1007		958		988		1131		1232		1104	▯
AM Total			**7177**		**7455**		**8011**		**7830**		**8083**		**5481**		**4148**	
12:00-13:00	1250		862		1112		1126		1204		1272		1345	▯		
13:00-14:00	1315	▯	976	▯	1164	▯	1170	▯	1211	▯	1326	▯	1341			
14:00-15:00	1263		980		1218		1347		1388		1555		1332			
15:00-16:00	1238		1229		1575		1638		1644		1789		1350	▯		
16:00-17:00	1278	▯	1259	▯	1625	▯	1860	▯	1767	▯	1855	▯	1307			
17:00-18:00	1084		1152		1479		1642		1413		1707		1210			
18:00-19:00	853		705		1067		1117		1065		1245		1067			
19:00-20:00	788		540		860		844		936		978		727			
20:00-21:00	590		408		657		698		792		761		509			
21:00-22:00	410		328		562		588		626		565		444			
22:00-23:00	295		235		335		339		432		473		387			
23:00-00:00	134		219		258		279		289		364		276			
PM Total	**10498**		**8893**		**11912**		**12648**		**12767**		**13890**		**11295**			
24h. Total	**10498**		**16070**		**19367**		**20659**		**20597**		**21973**		**16776**		**4148**	
Noon - Noon	**17675**		**16348**		**19923**		**20478**		**20850**		**19371**		**15443**			

TVIS II - Traffic Volume information System

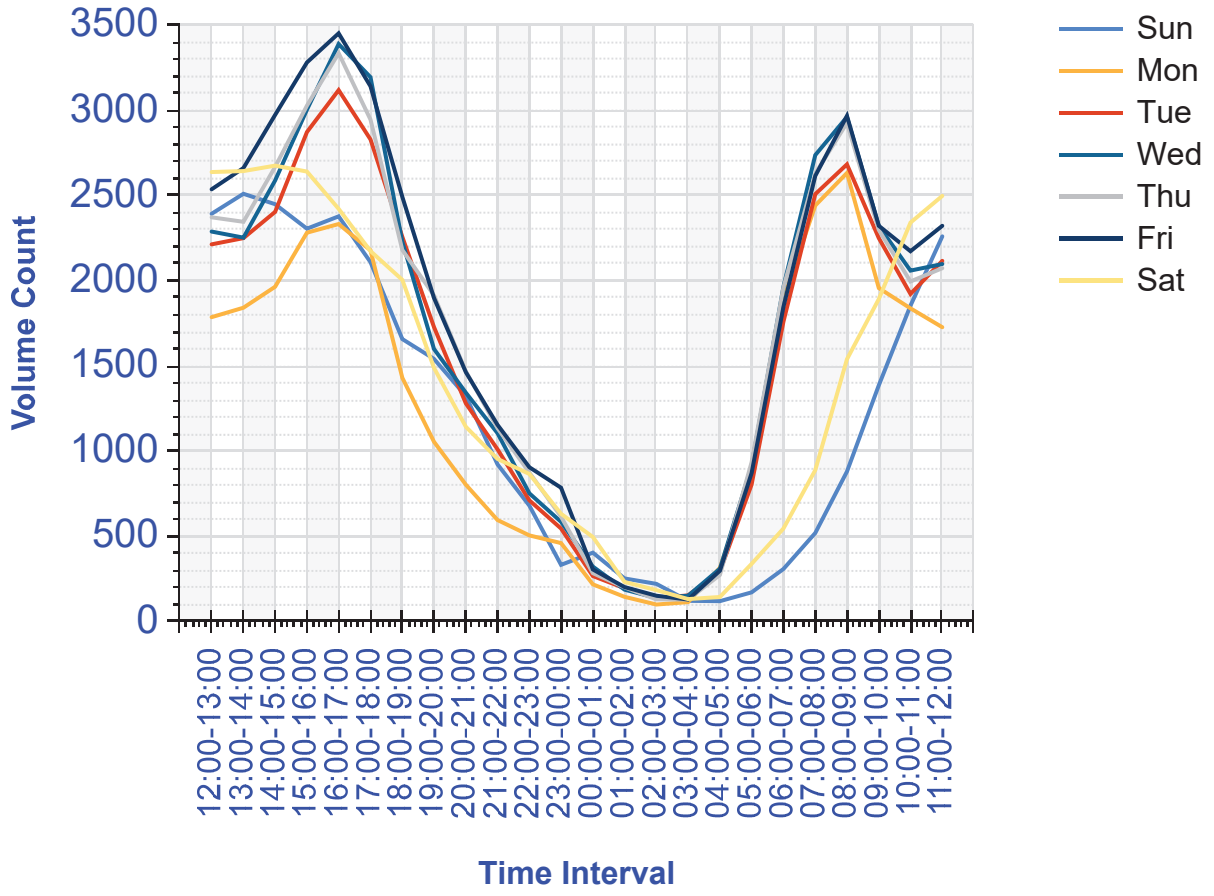
ICS Weekly Volume Summary

Hwy:	6	**Between:**	LAIRD RD IC				
TS:	153	**and:**	S JCT HWY 7-WELLINGTON ST IC				
Regn:	WEST	**Pattern:**	C	**PDCS:**	90	**Factor:**	1.03
LHRS:	13599	**Offset:**	2.501	**Locn:**	2.501 KM N OF LAIRD RD IC		
Dir:	COMBINED	**Lanes:**	4	**Speed:**	80 km/h	**Dates:**	10-Nov-2019 to 17-Nov-2019

	Sun		Mon		Tue		Wed		Thu		Fri		Sat		Sun	
H. Interval	**11/10**		**11/11**	**Pk.**	**11/12**	**Pk.**	**11/13**	**Pk.**	**11/14**	**Pk.**	**11/15**	**Pk.**	**11/16**	**Pk.**	**11/17**	**Pk.**
00:00-01:00			218		266		322		283		305		496		404	
01:00-02:00			144		195		187		200		202		232		252	
02:00-03:00			99		137		138		129		151		184		220	
03:00-04:00			113		153		151		128		128		131		121	
04:00-05:00			315		294		310		273		297		143		119	
05:00-06:00			868		804		914		934		870		338		171	
06:00-07:00			1891		1760		1964		1962		1846		545		308	
07:00-08:00			2442		2508		2737		2628		2615		888		519	
08:00-09:00			2632	▯	2683	▯	2961	▯	2926	▯	2967	▯	1539	▯	880	▯
09:00-10:00			1957		2250		2321		2298		2322		1892		1386	
10:00-11:00			1838		1922		2059		1995		2173		2341		1854	
11:00-12:00			1727		2117		2098		2073		2322		2498		2260	▯
AM Total			**14244**		**15089**		**16162**		**15829**		**16198**		**11227**		**8494**	
12:00-13:00	2393		1786		2213		2288	▯	2372	▯	2536		2638			
13:00-14:00	2510	▯	1841	▯	2250	▯	2253		2346		2661	▯	2643	▯		
14:00-15:00	2449		1964		2404		2588		2668		2973		2675			
15:00-16:00	2305		2282		2873		3004		3028		3281		2641	▯		
16:00-17:00	2378	▯	2333	▯	3119	▯	3389	▯	3336	▯	3452	▯	2422			
17:00-18:00	2109		2179		2829		3195		2946		3141		2174			
18:00-19:00	1657		1430		2257		2228		2180		2492		2005			
19:00-20:00	1541		1054		1728		1599		1914		1899		1488			
20:00-21:00	1323		803		1280		1343		1469		1463		1143			
21:00-22:00	922		595		1010		1105		1134		1154		954			
22:00-23:00	680		505		711		752		874		905		866			
23:00-00:00	332		460		545		585		615		785		632			
PM Total	**20599**		**17232**		**23219**		**24329**		**24882**		**26742**		**22281**			
24h. Total	**20599**		**31476**		**38308**		**40491**		**40711**		**42940**		**33508**		**8494**	

Noon - Noon	34843	32321	39381	40158	41080	37969	30775

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV



Ontario

Ministry of Transportation

TVIS II - Traffic Volume information System

ICS Weekly Volume Summary

Hwy:	6	**Between:**	LAIRD RD IC				
TS:	155	**and:**	S JCT HWY 7-WELLINGTON ST IC				
Regn:	WEST	**Pattern:**	UC	**PDCS:**	74	**Factor:**	0.99
LHRS:	13599	**Offset:**	4.402	**Locn:**	4.402 KM N OF LAIRD RD IC		
Dir:	N	**Lanes:**	2	**Speed:**	70 km/h	**Dates:**	18-Nov-2019 to 25-Nov-2019

	Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon	
H. Interval	**11/18**		**11/19**	**Pk.**	**11/20**	**Pk.**	**11/21**	**Pk.**	**11/22**	**Pk.**	**11/23**	**Pk.**	**11/24**	**Pk.**	**11/25**	**Pk.**
00:00-01:00			138		198		165		180		295		274		131	
01:00-02:00			129		123		127		147		135		171		63	
02:00-03:00			80		65		55		78		94		144		32	
03:00-04:00			78		74		80		74		91		73		60	
04:00-05:00			107		108		97		112		71		55		119	
05:00-06:00			302		335		335		294		132		84		337	
06:00-07:00			935		1009		1027		994		330		184		972	
07:00-08:00			1392		1460		1414		1374		449		247		1357	
08:00-09:00			1571	▯	1691	▯	1672	▯	1666	▯	821	▯	439	▯	1530	▯
09:00-10:00			1333		1336		1408		1328		1087		804		1191	
10:00-11:00			1177		1294		1256		1335		1371		1122		1034	
11:00-12:00			1275		1288		1234		1448		1505		1365		1043	▯
AM Total			**8517**		**8981**		**8870**		**9030**		**6381**		**4962**		**7869**	
12:00-13:00	1183	▯	1390	▯	1363	▯	1401		1578		1683	▯	1578	▯		
13:00-14:00	1104		1378		1325		1487	▯	1651	▯	1665		1536			
14:00-15:00	1259		1534		1568		1675		1724		1734		1467			
15:00-16:00	1418		1682		1836		1806		1901		1783	▯	1467	▯		
16:00-17:00	1477	▯	1967	▯	1957	▯	2042	▯	2045	▯	1573		1391			
17:00-18:00	1303		1650		1899		1923		1931		1340		1253			
18:00-19:00	929		1414		1369		1380		1557		1169		959			
19:00-20:00	720		1064		1007		1238		1146		825		851			
20:00-21:00	528		804		934		952		920		681		707			
21:00-22:00	394		652		642		657		773		560		509			
22:00-23:00	328		442		485		547		543		526		427			
23:00-00:00	277		309		360		377		465		402		216			
PM Total	**10920**		**14286**		**14745**		**15485**		**16234**		**13941**		**12361**			
24h. Total	**10920**		**22803**		**23726**		**24355**		**25264**		**20322**		**17323**		**7869**	
Noon - Noon	**19437**		**23267**		**23615**		**24515**		**22615**		**18903**		**20230**			

TVIS II - Traffic Volume information System

ICS Weekly Volume Summary

Hwy:	6	Between:	LAIRD RD IC				
TS:	155	and:	S JCT HWY 7-WELLINGTON ST IC				
Regn:	WEST	Pattern:	UC	PDCS:	74	Factor:	0.99
LHRS:	13599	Offset:	4.402	Locn:	4.402 KM N OF LAIRD RD IC		
Dir:	S	Lanes:	2	Speed:	70 km/h	Dates:	18-Nov-2019 to 25-Nov-2019

	Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon	
H. Interval	11/18		11/19	Pk.	11/20	Pk.	11/21	Pk.	11/22	Pk.	11/23	Pk.	11/24	Pk.	11/25	Pk.
00:00-01:00			127		130		127		158		222		235		62	
01:00-02:00			54		65		72		82		90		149		41	
02:00-03:00			64		69		72		95		77		102		44	
03:00-04:00			71		75		55		72		61		63		64	
04:00-05:00			166		147		158		155		56		56		166	
05:00-06:00			532		531		549		522		211		99		514	
06:00-07:00			1005		945		971		963		273		153		819	
07:00-08:00			1433		1458		1407		1490		432		245		1263	
08:00-09:00			1811	▯	1826	▯	1765	▯	1633	▯	764	▯	344	▯	1636	▯
09:00-10:00			1320		1313		1423		1465		1111		462		1171	
10:00-11:00			1206		1206		1296		1454		1398		513		1068	
11:00-12:00			1304		1298		1469		1561		1593		630		1167	▯
AM Total			**9093**		**9063**		**9364**		**9650**		**6288**		**3051**		**8015**	
12:00-13:00	1194		1378	▯	1384	▯	1488	▯	1604		1659	▯	730	▯		
13:00-14:00	1236	▯	1325		1287		1431		1612	▯	1598		684			
14:00-15:00	1336		1493		1510		1565		1669		1681		788			
15:00-16:00	1744		1811		1878		1884		2061		1643	▯	791	▯		
16:00-17:00	1872		2097	▯	2056	▯	2086	▯	2193	▯	1570		740			
17:00-18:00	2037	▯	2032		2029		2086		2111		1354		640			
18:00-19:00	1244		1327		1335		1414		1502		1080		494			
19:00-20:00	916		1016		935		1114		1162		770		435			
20:00-21:00	710		756		716		915		818		627		348			
21:00-22:00	485		631		573		613		643		549		262			
22:00-23:00	381		333		365		431		562		464		219			
23:00-00:00	344		369		372		401		451		312		132			
PM Total	**13499**		**14568**		**14440**		**15428**		**16388**		**13307**		**6263**			
24h. Total	**13499**		**23661**		**23503**		**24792**		**26038**		**19595**		**9314**		**8015**	
Noon - Noon	**22592**		**23631**		**23804**		**25078**		**22676**		**16358**		**14278**			

Hwy:	6	Between:	LAIRD RD IC
TS:	155	and:	S JCT HWY 7-WELLINGTON ST IC
Regn:	WEST	Pattern:	UC
LHRS:	13599	Offset:	4.402
Dir:	COMBINED	Lanes:	4

PDCS: 74 Factor: 0.99

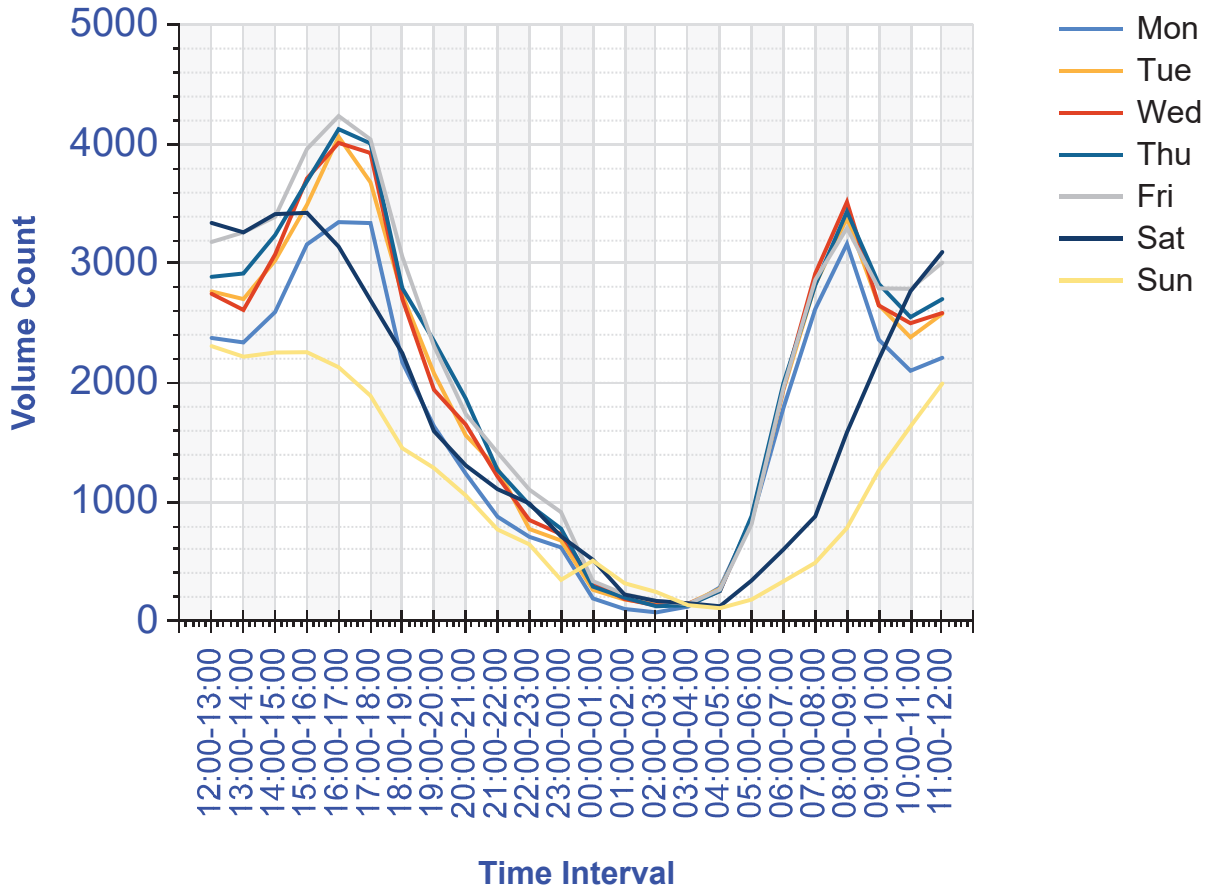
Locn: 4.402 KM N OF LAIRD RD IC

Speed: 70 km/h Dates: 18-Nov-2019 to 25-Nov-2019

	Mon		Tue		Wed		Thu		Fri		Sat		Sun		Mon	
H. Interval	11/18		11/19	Pk.	11/20	Pk.	11/21	Pk.	11/22	Pk.	11/23	Pk.	11/24	Pk.	11/25	Pk.
00:00-01:00			265		328		292		338		517		509		193	
01:00-02:00			183		188		199		229		225		320		104	
02:00-03:00			144		134		127		173		171		246		76	
03:00-04:00			149		149		135		146		152		136		124	
04:00-05:00			273		255		255		267		127		111		285	
05:00-06:00			834		866		884		816		343		183		851	
06:00-07:00			1940		1954		1998		1957		603		337		1791	
07:00-08:00			2825		2918		2821		2864		881		492		2620	
08:00-09:00			3382	▯	3517	▯	3437	▯	3299	▯	1585	▯	783	▯	3166	▯
09:00-10:00			2653		2649		2831		2793		2198		1266		2362	
10:00-11:00			2383		2500		2552		2789		2769		1635		2102	
11:00-12:00			2579		2586		2703		3009		3098		1995		2210	▯
AM Total			**17610**		**18044**		**18234**		**18680**		**12669**		**8013**		**15884**	
12:00-13:00	2377	▯	2768	▯	2747	▯	2889		3182		3342	▯	2308	▯		
13:00-14:00	2340		2703		2612		2918	▯	3263	▯	3263		2220			
14:00-15:00	2595		3027		3078		3240		3393		3415		2255			
15:00-16:00	3162		3493		3714		3690		3962		3426	▯	2258	▯		
16:00-17:00	3349	▯	4064	▯	4013	▯	4128	▯	4238	▯	3143		2131			
17:00-18:00	3340		3682		3928		4009		4042		2694		1893			
18:00-19:00	2173		2741		2704		2794		3059		2249		1453			
19:00-20:00	1636		2080		1942		2352		2308		1595		1286			
20:00-21:00	1238		1560		1650		1867		1738		1308		1055			
21:00-22:00	879		1283		1215		1270		1416		1109		771			
22:00-23:00	709		775		850		978		1105		990		646			
23:00-00:00	621		678		732		778		916		714		348			
PM Total	**24419**		**28854**		**29185**		**30913**		**32622**		**27248**		**18624**			
24h. Total	**24419**		**46464**		**47229**		**49147**		**51302**		**39917**		**26637**		**15884**	

Noon - Noon	42029	46898	47419	49593	45291	35261	34508

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV



Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

AdHoc Turning Movement Total Count and Peak Summary Report

Description: HWY 6 @ STONE RD

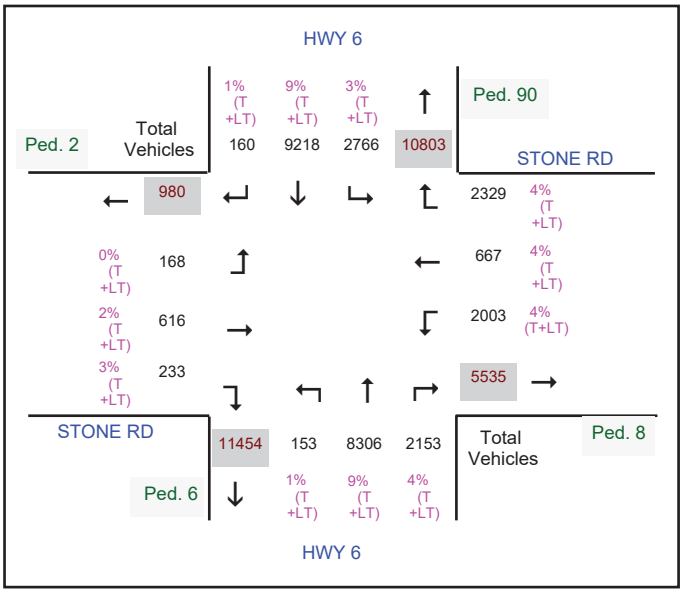
Region: WEST | **Survey Type:** TM – Intersection | **Hwy:** 6

Start Date: 29-Mar-2017 (Wed) | **I/C Side:** | **LHRS:** 13600

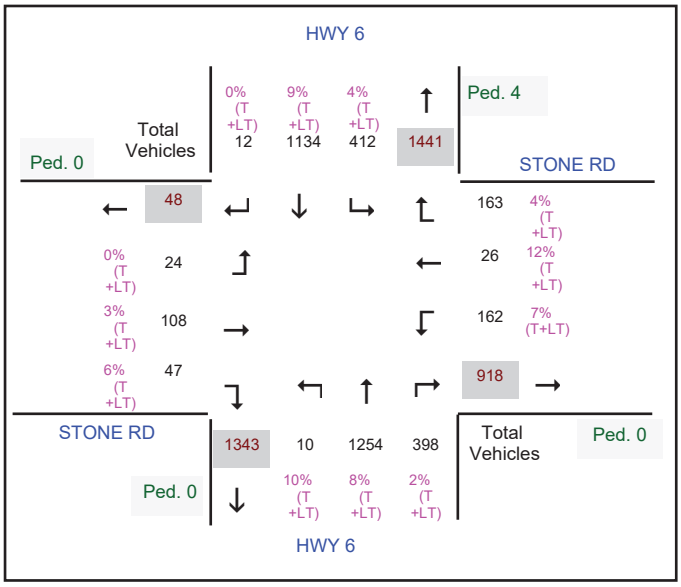
End Date: 29-Mar-2017 (Wed) | **Int. Type:** Four Leg | **Offset:** 4.120

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

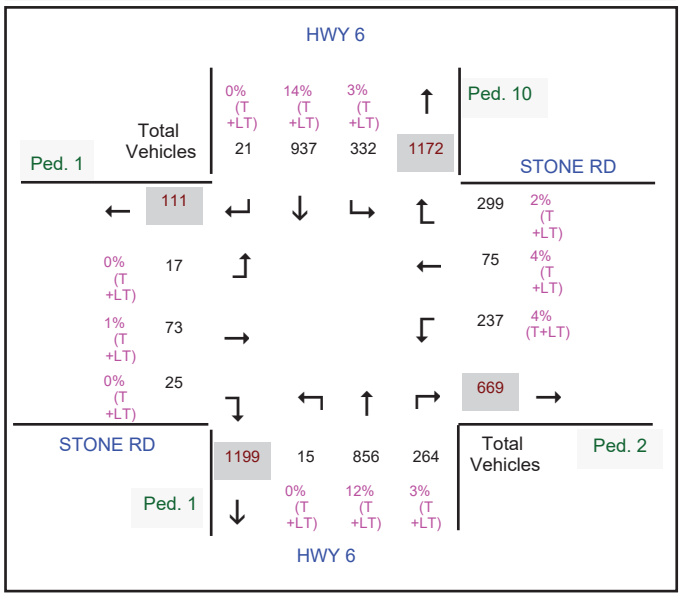
Total Count — Number of hours: 8



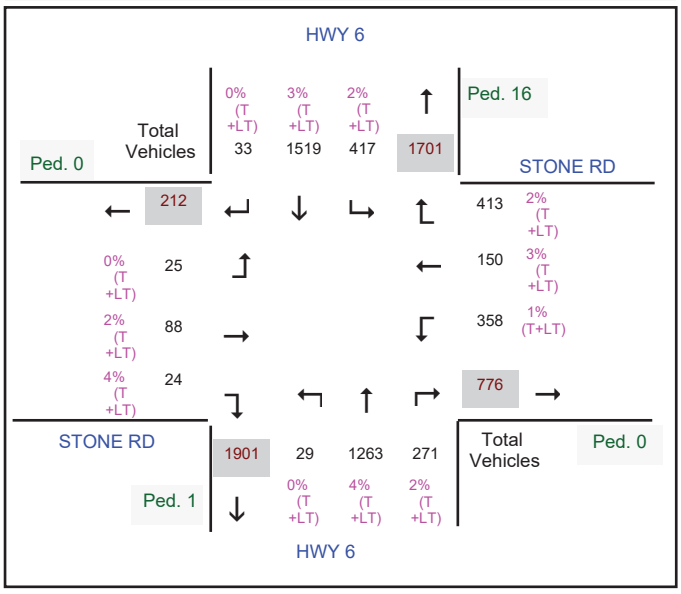
AM Peak Hour Report — Start Time: 07:45



Midday Peak Hour Report — Start Time: 12:00



PM Peak Hour Report — Start Time: 16:30



APPENDIX C

BPN-56 Method for Calculating Façade Sound Transmission Class (STC) Requirements

Project Name: 601 Scottsdale Drice
RWDI Project: 2302908
Date: 7/24/2023

References: National Research Council of Canada (NRCC) Division of Building Research, Building Practice Note No. 56 (BPN 56), "Controlling Sound Transmission Into Buildings", 1985.
Ontario Ministry of the Environment, "Manual for Environmental Noise Assessment In Land Use Planning Course", July 1997.

		Sound Levels and Source Inputs						Room and Façade Properties											Exterior wall (STC 45 to 60)					Window (STC-25 to STC-44)				
Window STC Requirement	Receptor	Source	Façade Sound Level (dBA)	Sound Level Criterion (dBA)	Sound Angle of Incidence (Degrees)	Angle of Incidence Correction (dB)	Required Noise Reduction (dB)	Window to Façade Area (%)	Exterior Door to Façade Area (%)	Exterior Wall to Façade Area (%)	Façade/ Floor Area (%)	Façade Height (m)	Façade Length (m)	Room Depth (m)	Room Absorption	Floor Area (m^2)	Window Area (m^2)	Exterior Door Area (m^2)	Exterior Wall Area (m^2)	STC Rating	Category	Room Correction	Source-Component Correction	Noise Reduction	Category	Room Correction	Source-Component Correction	Minimum Source Specific STC	Window STC Requirement
North Building Southwest Side (worst-case)																												
28	Living Room - Daytime	d. Mixed road traffic	68	45	0 - 90°	0	26	80%	0%	20%	55%	3.0	3.7	5.5	0.80	20.4	8.9	0.0	2.2	45	d. Exterior wall, or roof/ceiling	-9	7	47	c. Sealed thin window	-3	4	28	28
29	Bedroom - Daytime	d. Mixed road traffic	68	45	0 - 90°	0	26	80%		20%	81%	3.0	3.0	3.7	0.80	11.1	7.2	0.0	1.8	45	d. Exterior wall, or roof/ceiling	-7	7	45	c. Sealed thin window	-1	4	29	29
28	Bedroom - Nighttime	d. Mixed road traffic	62	40	0 - 90°	0	25	80%		20%	81%	3.0	3.0	3.7	0.80	11.1	7.2	0.0	1.8	45	d. Exterior wall, or roof/ceiling	-7	7	45	c. Sealed thin window	-1	4	28	28

29	Maxiumum STC Requirment

Worst-case Facade Receptor

Receiver
Name: Worst-case POR
ID: POR1
X: 561309.61 m
Y: 4818354.86 m
Z: 353.08 m

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2	561351.65	4818364.74	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	44.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	44.8
4	561351.65	4818364.74	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	48.9	0.4	-2.4	0.0	0.0	0.0	0.0	2.0	37.9

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
6	561356.01	4818358.92	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	44.8	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	44.2
7	561356.01	4818358.92	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	49.1	0.4	-2.4	0.0	0.0	0.0	0.0	2.0	37.7

Point Source, ISO 9613, Name: "4-fan HVAC", ID: "!0501!Lennox_KGB240S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
8	561364.88	4818347.54	337.70	0	DEN	A	86.9	0.0	0.0	0.0	0.0	46.2	0.3	-2.4	0.0	0.0	0.0	0.0	0.0	42.7
9	561364.88	4818347.54	337.70	1	DEN	A	86.9	0.0	0.0	0.0	0.0	49.7	0.5	-2.4	0.0	0.0	0.0	0.0	2.0	37.1

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!CaptiveAire_RTU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
10	561357.27	4818355.50	337.20	0	DEN	A	82.0	0.0	0.0	0.0	0.0	45.0	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	39.3
11	561357.27	4818355.50	337.20	1	DEN	A	82.0	0.0	0.0	0.0	0.0	49.4	0.2	-2.4	0.0	0.0	0.0	0.0	2.0	32.9

Point Source, ISO 9613, Name: "car wash", ID: "!0501!Car_Wash"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
12	561450.52	4818274.10	334.54	0	DEN	A	92.2	0.0	0.0	0.0	0.0	55.3	0.3	-2.0	0.0	0.0	0.0	0.0	0.0	38.6
13	561450.52	4818274.10	334.54	1	DEN	A	92.2	0.0	0.0	0.0	0.0	55.8	0.3	-2.0	0.0	0.0	0.0	0.0	2.0	36.0

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!CaptiveAire_RTU"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
14	561347.40	4818413.89	334.84	0	DEN	A	82.0	0.0	0.0	0.0	0.0	48.2	0.1	-1.7	0.0	0.0	0.0	0.0	0.0	35.3

Point Source, ISO 9613, Name: "1-fan HVAC", ID: "!0501!Lennox_KGB048S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
15	561348.14	4818368.31	336.95	0	DEN	A	73.6	0.0	0.0	0.0	0.0	43.8	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	31.9
16	561348.14	4818368.31	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	48.8	0.3	-2.4	0.0	0.0	0.0	0.0	2.0	24.8

Point Source, ISO 9613, Name: "2-fan HVAC", ID: "!0501!Lennox_KGB048S"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
17	561367.99	4818339.60	336.95	0	DEN	A	73.6	0.0	0.0	0.0	0.0	46.9	0.2	-2.4	0.0	0.0	0.0	0.0	0.0	28.8
18	561367.99	4818339.60	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	48.2	0.3	-2.4	0.0	0.0	0.0	0.0	3.0	24.5
19	561367.99	4818339.60	336.95	1	DEN	A	73.6	0.0	0.0	0.0	0.0	50.3	0.3	-2.4	0.0	0.0	0.0	0.0	2.0	23.3

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
20	561359.55	4818357.12	337.20	0	DEN	A	65.0	0.0	0.0	0.0	0.0	45.4	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	21.9
21	561359.55	4818357.12	337.20	1	DEN	A	65.0	0.0	0.0	0.0	0.0	49.1	0.2	-2.4	0.0	0.0	0.0	0.0	2.0	16.1

Point Source, ISO 9613, Name: "Lennox VRB Heat Recovery", ID: "!0501!Lennox_VRB120H"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
22	561360.79	4818355.39	337.20	0	DEN	A	65.0	0.0	0.0	0.0	0.0	45.6	0.1	-2.4	0.0	0.0	0.0	0.0	0.0	21.7
23	561360.79	4818355.39	337.20	1	DEN	A	65.0	0.0	0.0	0.0	0.0	49.2	0.2	-2.4	0.0	0.0	0.0	0.0	2.0	16.0

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
24	561345.48	4818408.47	334.51	0	DEN	A	65.0	0.0	0.0	0.0	0.0	47.5	0.1	-1.7	0.0	0.0	4.8	0.0	0.0	14.2

Point Source, ISO 9613, Name: "Lennox VRB heat recovery", ID: "!0501!Lennox_VRB120H"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
27	561346.95	4818409.62	334.64	0	DEN	A	65.0	0.0	0.0	0.0	0.0	47.8	0.1	-1.7	0.0	0.0	6.2	0.0	0.0	12.6
30	561346.95	4818409.62	334.64	1	DEN	A	65.0	0.0	0.0	0.0	0.0	48.1	0.1	-1.7	0.0	0.0	20.0	0.0	2.0	-3.6

STAMSON 5.0 NORMAL REPORT Date: 21-07-2023 12:55:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: F1.te Time Period: Day/Night 16/8 hours
Description: North building SW facade

Road data, segment # 1: Hwy6NofStone (day/night)

Car traffic volume : 47582/4817 veh/TimePeriod
Medium truck volume : 1515/153 veh/TimePeriod
Heavy truck volume : 2425/245 veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Hwy6NofStone (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Hwy6SofStone (day/night)

Car traffic volume : 47582/4817 veh/TimePeriod
Medium truck volume : 1515/153 veh/TimePeriod
Heavy truck volume : 2425/245 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Hwy6SofStone (day/night)

Angle1 Angle2 : -90.00 deg -45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 106.00 / 106.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

```
Road data, segment # 3: StoneRdEof6 (day/night)
------------------------------------------------
Car traffic volume  : 19415/3426  veh/TimePeriod
Medium truck volume :   281/50    veh/TimePeriod
Heavy truck volume  :   449/79    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: StoneRdEof6 (day/night)
------------------------------------------------
Angle1   Angle2           : -90.00 deg   -45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :  25.50 / 25.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: StoneRdWof6 (day/night)
------------------------------------------------
Car traffic volume  :  3880/685   veh/TimePeriod
Medium truck volume :    38/7     veh/TimePeriod
Heavy truck volume  :    60/11    veh/TimePeriod
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: StoneRdWof6 (day/night)
------------------------------------------------
Angle1   Angle2           : -45.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :  25.50 / 25.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy6NofStone (day)
---------------------------------------

Source height = 1.47 m

ROAD (0.00 + 66.55 + 0.00) = 66.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
```

```
   -45     90   0.00  76.29   0.00  -8.49  -1.25   0.00   0.00   0.00  66.55
-------------------------------------------------------------------------------

Segment Leq : 66.55 dBA

↟
Results segment # 2: Hwy6SofStone (day)
---------------------------------------

Source height = 1.47 m

ROAD (0.00 + 62.94 + 0.00) = 62.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -45   0.00  77.45   0.00  -8.49  -6.02   0.00   0.00   0.00  62.94
-------------------------------------------------------------------------------

Segment Leq : 62.94 dBA

↟
Results segment # 3: StoneRdEof6 (day)
--------------------------------------

Source height = 1.22 m

ROAD (0.00 + 54.32 + 0.00) = 54.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -45   0.00  68.84   0.00  -8.49  -6.02   0.00   0.00   0.00  54.32
-------------------------------------------------------------------------------

Segment Leq : 54.32 dBA

↟
Results segment # 4: StoneRdWof6 (day)
--------------------------------------

Source height = 1.11 m

ROAD (0.00 + 46.43 + 0.00) = 46.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45      0   0.00  60.94   0.00  -8.49  -6.02   0.00   0.00   0.00  46.43
-------------------------------------------------------------------------------

Segment Leq : 46.43 dBA

Total Leq All Segments: 68.33 dBA

↟
```

Results segment # 1: Hwy6NofStone (night)

Source height = 1.47 m

ROAD (0.00 + 59.61 + 0.00) = 59.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.00	69.35	0.00	-8.49	-1.25	0.00	0.00	0.00	59.61

Segment Leq : 59.61 dBA

↟
Results segment # 2: Hwy6SofStone (night)

Source height = 1.47 m

ROAD (0.00 + 55.99 + 0.00) = 55.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-45	0.00	70.51	0.00	-8.49	-6.02	0.00	0.00	0.00	55.99

Segment Leq : 55.99 dBA

↟
Results segment # 3: StoneRdEof6 (night)

Source height = 1.22 m

ROAD (0.00 + 49.80 + 0.00) = 49.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-45	0.00	64.31	0.00	-8.49	-6.02	0.00	0.00	0.00	49.80

Segment Leq : 49.80 dBA

↟
Results segment # 4: StoneRdWof6 (night)

Source height = 1.12 m

ROAD (0.00 + 41.98 + 0.00) = 41.98 dBA

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

```
   -45      0   0.00  56.50   0.00  -8.49  -6.02   0.00   0.00   0.00  41.98
--------------------------------------------------------------------------------

Segment Leq : 41.98 dBA

Total Leq All Segments: 61.53 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 68.33
                           (NIGHT): 61.53
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 21-07-2023 09:35:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: quad_w2.te Time Period: Day/Night 16/8 hours
Description: Courtyard OLA1

Road data, segment # 1: Hwy6NofStone (day/night)

Car traffic volume : 47582/4817 veh/TimePeriod
Medium truck volume : 1515/153 veh/TimePeriod
Heavy truck volume : 2425/245 veh/TimePeriod
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Hwy6NofStone (day/night)

Angle1 Angle2 : -10.00 deg 10.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 161.00 / 161.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hwy6NofStone (day)

Source height = 1.47 m

ROAD (0.00 + 49.63 + 0.00) = 49.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	10	0.66	76.29	0.00	-17.11	-9.56	0.00	0.00	0.00	49.63

Segment Leq : 49.63 dBA

Total Leq All Segments: 49.63 dBA

Results segment # 1: Hwy6NofStone (night)

Source height = 1.47 m

ROAD (0.00 + 42.68 + 0.00) = 42.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	10	0.66	69.35	0.00	-17.11	-9.56	0.00	0.00	0.00	42.68

Segment Leq : 42.68 dBA

Total Leq All Segments: 42.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.63
(NIGHT): 42.68