



**Proposed Millennium Lands –
Block 320, Plan 58M-506 331 – City of
Waterloo, ON – Noise Impact Study**

Final Report

November 9, 2023

Prepared for:
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Project Number:
160310788

Limitations and Sign-off

The conclusions in the Report titled Proposed Millennium Lands – Block 320, Plan 58M-506 331 – City of Waterloo, ON – Noise Impact Study are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Project Manager,
Community Development

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Owner/Authorized Agent Statement

I am the owner of the property, or the owner's agent, and that I understand and agree with the noise attenuation measures proposed (if any) in the study entitled Noise Impact Study for the Proposed Millennium Lands – Block 320, Plan 58M-506 331 – City of Waterloo, ON – Noise Impact Study

The application has been designed to avoid the use of berms or walls as noise attenuation features where feasible. Where berms or walls are recommended, the Noise Study provides economic, planning and engineering justification.

If the application is changed in a way that may affect the noise level calculations, I will have a revised Noise Study submitted to the City of Waterloo.

Activa Holdings Inc.
155 Washburn Drive
Kitchener, Ontario N2R 1S1

Title

Date



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Executive Summary

Stantec Consulting Ltd. was retained by Aactiva Holdings Inc. (Aactiva) to prepare a Noise Impact Study in support of an Official Plan and Zoning By-law Amendment and Draft Plan of subdivision applications for the Development of lands located at Block 320, Plan 5M-506, in Waterloo, Ontario (the Site). The proposed subdivision includes residential and multiple residential blocks, a park block, a stormwater management block, and one commercial block. Stantec divided the site into lettered Blocks for the Noise Impact Study as the numbered blocks included in the Site plan did not provide unique noise impact assessment points.

The purpose of this Study is to evaluate the noise impact from vehicle traffic from Millennium Blvd. and surrounding stationary noise sources and recommend applicable noise control measures, as required by the Ministry of the Environment, Conservation, and Parks (MECP) *“Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300)”* (MECP, 2013) and the *“Noise Policy Implementation Guideline”* Regional Municipality of Waterloo (2019) (RMOW).

The MECP guidance document NPC-300, Part C, *“Guidelines for Land Use Planning”* (MECP, 2013) and the *“Noise Policy Implementation Guideline”* (2019) RMOW document were applied for this noise impact assessment.

Millennium Blvd. located south of the site was identified as a potential source of road traffic noise on the proposed Development. Stantec completed a site visit to the property in September 2022 and determined that there are potential sources of stationary noise in the surrounding area. In particular, the Enova Power Corporation Facility to the northwest of the site and the RIM park athletic center to the southwest of the site were identified as potentially impactful stationary noise sources. As no rail lines exist within 500 m of the proposed site and the site is beyond the NEF 25 noise contours for local airport, an assessment of rail and aircraft traffic noise impacts to the site was not warranted.

The road traffic noise levels at the points of reception (PORs) were predicted according to the MECP and RMOW guidelines using STAMSON v4.1 noise modelling software which implements the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) (MECP, 1989). ORNAMENT is the MECP recommended road traffic noise prediction method.

Based on the road traffic noise level predictions at the representative receptors within the Development, units within the areas defined as Block A and Block B require noise warning clauses and compliance with the Ontario Building Code as specified in the MECP/RMOW Guidelines. The following suggested Warning Clause is adapted from MECP and the RMOW, and should be presented to the occupants/owners when the agreements of Offers of Purchase and Sale are prepared:

Type C Warning Clause:

“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, Conservation and Parks.”



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Executive Summary
November 9, 2023

The predictive analysis for the stationary noise impact from nearby commercial and industrial facilities was conducted using the commercially available software package CADNA/A 2021, published by Datakustik GmbH and configured to implement the ISO 9613-2 environmental noise propagation algorithms. The predicted levels consider geometrical divergence, attenuation from barriers, ground effect and air absorption as determined from ISO 9613-2.

Representative sound level data was used to estimate the noise impact of equipment from nearby stationary noise sources and the impact was evaluated based on applicable MECP and RMOW criteria. Modelled sound levels from stationary noise are predicted to be at or below applicable MECP criteria, no mitigation or warning clauses are required to mitigate the impact of stationary noise on the Development.

Stantec recommends that this Noise Impact Study be updated prior to final site plan approval to reflect final building setback distances, receptor heights, and building layouts.



Acronyms / Abbreviations

AADT	Annual Average Daily Traffic
dBA	A-weighted Decibel
HVAC	Heating, Ventilation, and Air Conditioning
ISO	International Standards Organization
MECP	Ontario Ministry of Environment, Conservation and Parks
NEF	Noise Exposure Forecast
NPC	Noise Pollution Control
NWC	Noise Warning Clause
OBC	Ontario Building Code
OLA	Outdoor Living Area
ORNAMENT	Ontario Road Noise Analysis Method for Environment and Transportation
POR	Point of Reception
RMOW	Regional Municipality of Waterloo



1 Introduction

Stantec Consulting Ltd. was retained by Activa Holdings Inc. (Activa) to prepare a Noise Impact Study in support of an Official Plan and Zoning By-law Amendment and Draft Plan of subdivision applications for the Development of lands located at Block 320, Plan 5M-506, in Waterloo, Ontario (the Site). Stantec divided the site into lettered Blocks for the Noise Impact Study as the numbered blocks included in the Site plan did not provide unique noise impact assessment points.

The proposed subdivision includes residential blocks that provide for a mix and range of unit types, a park block, a stormwater management block, and one commercial block. The Development will consist of a combination of single-family residential units, stacked town houses, and low-rise residential units. The proposed development layout is illustrated in a conceptual plan of development, prepared by MHBC, dated October 26, 2023.

The purpose of this Study is to determine the noise impact from vehicle traffic from Millennium Blvd. and surrounding stationary noise sources and recommend applicable noise control measures, as required by the Ministry of the Environment, Conservation, and Parks (MECP) “*Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (NPC-300)*” (MECP, 2013) and the “*Noise Policy Implementation Guideline*” Regional Municipality of Waterloo (2019) (RMOW).

The MECP guidance document NPC-300, Part C, “*Guidelines for Land Use Planning*” (MECP, 2013) and the “*Noise Policy Implementation Guideline*” (2019) RMOW document were applied for this noise impact assessment.

Millennium Blvd., located south of the site, was identified as a potential source of road traffic noise on the proposed Development. A review of the land uses surrounding the property determined that there are potential sources of stationary noise in the surrounding area. In particular, the Enova Power Corporation Facility to the northwest of the site and the RIM park athletic center to the southwest of the site were identified as potentially impactful stationary noise sources. As no rail lines exist within 500 m of the proposed site and the site is beyond the NEF 25 noise contours for local airport, an assessment of rail and aircraft traffic noise impacts to the site was not warranted.

Stantec conducted a site visit in September 2022 and determined that the existing background ambient sound is dominated by local road traffic noise during daytime hours (07:00-19:00). Ambient sound levels are assumed to be dominated by natural sounds during evening (19:00-23:00) and nighttime (23:00-07:00) hours. The project location is provided in Appendix A - Figure 1.



2 Site Location and Plan

The proposed subdivision includes residential blocks that provide for a mix and range of unit types, a park block, a stormwater management block, and one commercial block. The Development will consist of a combination of single-family residential units, stacked town houses, and low-rise residential units. The proposed development layout is illustrated in a conceptual plan of development, prepared by MHBC, dated October 26, 2023 (Appendix B).

The site is located within the City of Waterloo sharing a boundary with Township of Woolwich. The proposed site is bounded by residentially zoned lands to the east, Institutional, Commercial and Residential to the south, , residential, open space and employment area to the west, and agricultural to the north. A copy of the proposed site layout is attached as Appendix B. Appendix C contains the referenced zoning maps for the City of Waterloo and the Township of Woolwich. The Enova Power Corporation Facility is located to the northwest of the site and the RIM park athletic center to the southwest of the site.



3 Guidelines and Criteria

The Ministry of the Environment, Conservations and Parks (MECP) NPC-300, Part C, guidelines for land use planning (MECP 2013), and the RMOW Implementation Guideline for Noise Policies (RMOW 2019) are used for this noise impact assessment.

3.1 Transportation Noise

Noise criteria as set by the MECP NPC-300 and RMOW guidelines are adopted for this assessment. Table 3-1 provides a summary of the applicable limits for road traffic noise assessment.

Table 3-1: MECP Noise Criteria Limits for Road Traffic

Type of Space	Time Period	Noise Criteria L_{eq} (dBA)
Indoor Living/Dining room	Daytime - (07:00 - 23:00)	45
	Nighttime - (23:00 - 07:00)	45
Indoor Sleeping Quarters (Bedrooms)	Daytime - (07:00 - 23:00)	45
	Nighttime - (23:00 - 07:00)	40
Outdoor Living Areas (OLA)	Daytime - (07:00 - 23:00)	55
	Nighttime - (23:00 - 07:00)	N/A

An OLA is defined as an outdoor amenity area where the enjoyment of the outdoor environment is important during the daytime period (07:00 to 23:00). Such areas may include:

- The backyard or patio within 3 meters (m) of the rear wall of a residential unit, or the recreational area designated on the development application;
- The common outdoor area allocated for recreational purposes outside residential buildings such as apartments or condominiums;
- Balconies¹; and
- Parks and open spaces identified by the Area Municipality for passive recreation purposes within a plan of subdivision.

¹ Balconies are considered part of the outdoor living area where they are the only outdoor living area for the occupant and meet the following conditions: depth greater than 4 m; Outside exterior building façade; and unenclosed.



3.2 Stationary Noise

MECP NPC-300 environmental noise guideline establishes criteria limit for noise level from stationary sources for both Outdoor Receptors and Plane of Window Receptors (MECP, 2013). The sound level is expressed in terms of one-hour equivalent sound levels (L_{eq} , 1hr) at the receptor. The higher of the MECP exclusion limit and the lowest existing hourly background sound level (ambient) at any point of reception is used as the applicable criteria for stationary noise.

Stantec performed a site visit to the proposed Development on September 20, 2022, and September 26, 2022. Based on measurements at several locations around the Site, Stantec determined that the acoustic environment of the proposed Development is representative of an MECP Class 2 Area. The MECP defines a Class 2 area as an area with an acoustical environment typical of a major population centre, where the daytime background sound level is dominated by the activities of people, usually road traffic, often referred to as “urban hum”. The nighttime background sound level for a Class 2 area, as defined by the MECP, is dominated by natural sounds with little or no road traffic.

The MECP Class 2 noise criteria limits are outlined in NPC-300 and are summarized in Table 3-2.

Table 3-2: MECP Noise Exclusion Limits-Stationary Noise Sources – Class 2 Area

Receiver Category	Time Period (hh:mm)	L_{eq} (1hr) dBA ^a
Outdoor Receptor	Day (07:00 - 19:00)	50
	Evening (19:00 - 23:00)	45
Plane of Window Receptor	Day (07:00 - 19:00)	50
	Evening (19:00 – 23:00)	50
	Night (23:00 to 07:00)	45

Note:

^a Higher of the minimum existing hourly background (ambient) sound level or the exclusion limits.



4 Point of Reception

Noise Impacts are evaluated at physical locations defined as points-of-reception (PORs). A summary of potential PORs considered in this assessment is provided in Table 4-1. Stantec divided the site into lettered Blocks for the Noise Impact Study as the numbered blocks included in the Site plan did not provide unique noise impact assessment points.

The modelled PORs were located at the anticipated exterior plane of window, at the mid height of each storey as representative of the indoor living areas. The height of the first storey was modelled as 1.5 m. Each subsequent storey was modeled in 3 m increments. Representative heights were selected for each Block based on potential residential building heights. An outdoor point of reception for the common amenity area or outdoor-living-area (OLA) was also identified on the site. Setback distances are based on estimated typical setbacks for Developments within the RMOW. The location of the modelled Block is shown in Figure 1.

Table 4-1 Point of Reception Summary

POR ID	Highest Impacted Façade	Reference Road Setback Distance (m)^a	Receptor Height (m)
Block A	South	36	10.5
Block B	Southeast	21	10.5
Block C	Southeast	66	7.5
Block D	South	152	4.5
Block E	South	121	7.5
Amenity Area/Planned Park	-	109	1.5

Table Notes:

^a Refers to the setback distance from the centreline of the reference road in the adjacent column.



5 Assessment Methodology

5.1 Road Traffic

The road traffic noise levels at the PORs were predicted according to the MECP and RMOW guidelines using STAMSON v5.03 noise modelling software which implements the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) (MECP, 1989). ORNAMENT is the MECP recommended road traffic noise prediction method.

STAMSON modelling was configured to account for the separation distance from Millennium Blvd. and set to calculate road traffic noise levels over an acoustically reflective intermediate surface (pavements, hard packed gravel, earth, etc.) between the roadway and the PORs. Stantec has assumed that Block B will provide shielding to Block C.

The City of Waterloo provided the 2023 Annual Average Daily Traffic (AADT) count for Millennium Blvd. and forecasted 2033 AADT count. The City of Waterloo did not provide AADT counts for Country Squire drive as road traffic volumes are assumed to have an insignificant noise impact relative to Millennium Blvd. Stantec observed limited traffic along Country Squire drive during the September 2022 site visit relative to Millennium Blvd.

A summary of the road traffic data used in the noise model is provided in Table 5-1. Traffic speed limit, traffic composition (% of automobiles, % of medium trucks, % of heavy trucks), and the daytime/nighttime traffic volume split are provided in the table. This traffic data is based on information provided by the Region of Waterloo attached as Appendix D.

Table 5-1: Forecasted 2033 Road Traffic Volume Summary

Roadway	Speed Limit (km/h)	Traffic Volume					
		Daytime Hour			Nighttime Hour		
		Autos	Medium Trucks	Heavy Trucks	Autos	Medium Trucks	Heavy Trucks
Millennium Blvd.	50	5,530	115	115	614	13	13

5.2 Stationary Noise

Stantec performed a site visit at the Development on September 20, 2022, and September 26, 2022, to assess the impact of noise emitted from nearby industrial and commercial facilities. Short term measurements were collected at several locations around the Site during the visit. The noise measurements were collected in accordance with MECP NPC-103 guideline using a Larson Davis Model LXT Type 1 sound level meter (Serial No. 4572).



The following types of significant stationary noise sources with the potential to impact the Development were identified during the site visit:

- Rooftop heating, ventilation, and air conditioning (HVAC) mechanical equipment associated with the RIM Park complex, the Enova Power corporation facility, and commercial facilities southeast of the site.
- Vehicle noise associate with the Enova Power corporation facility
- Cooling towers associated with the RIM Park Complex

Representative sound level data for modelled equipment was taken from Stantec's sound database based on previous measurements of similar sources as well as measurements collected on September 22nd, 2022. Rooftop HVAC equipment was assumed to operate on a continuous 100% duty cycle during daytime hours and 50% duty cycle during nighttime hours.

A predictive analysis was conducted using the commercially available software package CADNA/A, published by Datakustik GmbH and configured to implement the ISO 9613-2 environmental noise propagation algorithms (International Organization for Standardization, 1996). The predicted levels consider geometrical divergence, attenuation from barriers, ground effect and air absorption as determined from ISO 9613-two. This standard also makes provisions to include a correction to address downwind or ground-based temperature inversion conditions. Noise predictions assume a downwind or moderate temperature inversion conditions for all PORs, consistent with MECP accepted practice.

As described in ISO 9613-2, ground factor values that represent the ground effect on sound levels range between 0 and 1. A ground absorption factor of 0.2 was applied in the model as the Facility and surrounding areas represent hard surface with paved ground conditions (i.e., roads, parking lots, etc.). For the areas covered in vegetation, a ground absorption factor of 0.8 was applied. Ground topography around the site is relatively flat.



6 Noise Control Measures and Provisions

6.1 Transportation Noise

In accordance with MECP Guidelines, where predicted noise levels exceed the criteria in Table 3-1, appropriate warning clauses and/or noise control measures will be required as a condition of development application. These noise control measures are summarized in terms of ventilation requirements, building component requirements, and outdoor noise controls in Table 6-1, Table 6-2, and Table 6-3 and are further explained below.

Noise Warning Clause (NWC): Since sensitivity to noise varies among individuals, the projected noise level may be allowed to exceed the noise level objective by up to 5 dBA without attenuation provided that a clause warning the future occupant of the potential noise concern is included in the Regional or Area Municipal Development Agreement whereby the owner agrees to advise future owners or tenants through all offers of purchase and sale, and rental agreements.

Provision for air conditioning: Units with this requirement must be designed to allow future occupants to install central air conditioning which will provide alternative ventilation if windows must be closed to reduce interior noise levels. In general, a forced air ducted heating system suitably sized and designed to permit the future installation of a central air conditioning system by the occupant is required. A sentence will be added to the Noise Warning Clause to notify future occupants of this provision. The provision for, or installation of, window or through-the-wall box air conditioners is not generally acceptable as a means of satisfying the requirement for air conditioning.

Central air conditioning or provision of alternate ventilation: Central air conditioning is required where projected interior noise levels are more than 10 dB in excess of the noise level objectives, so that windows may be closed to provide effective noise attenuation.

Building components designed to achieve indoor sound level criteria: Special wall, window and door construction that exceeds Ontario Building Code specifications may be required as determined by the Acoustic Insulation Factor or Sound Transmission Class. The recommendations must comply with local regulations; it should be clearly stated how the recommendations differ from Ontario Building Code requirements.

Outdoor Noise Control Measures: These are acoustic walls and/or berms, which are collectively referred to as noise barriers. Where a noise barrier is required the daytime noise level in the OLA must be attenuated to 60 dBA or less.



Table 6-1: Noise Control Ventilation Requirements for Indoor Living Areas

Predicted Plane of Window Noise Level, Leq (dBA)		Required Noise Control Measures
Daytime (07:00 to 23:00)	Nighttime (23:00 to 07:00)	
56-65	51-60	Provision for air conditioning (A/C) and NWC ^a -C
>=66	>=61	Central A/C or other ventilation system installed prior to occupancy and NWC ^a -D

Notes:

^a NWC is Noise Warning Clause.

Table 6-2: Building Component Requirements for Indoor Living Areas

Predicted Plane of Window Noise Level, Leq (dBA)		Required Noise Control Measures
Daytime (07:00 to 23:00)	Nighttime (23:00 to 07:00)	
<66	<61	Compliance with Ontario Building Code
>=66	>=61	Building components designed and/or specified to achieve indoor sound level criteria

Table 6-3: Noise Control Requirements for Outdoor Living Areas

Predicted Outdoor Noise Level, Leq (dBA)	Required Noise Control Measures
Daytime (07:00 to 23:00)	
56-60	NWC ^a -A or Noise Control Measures
>=61	Alternative Land Use, Alternative Draft Plan Designs, Barriers and Possible NWC

Notes:

^a NWC is Noise Warning Clause



6.2 Stationary Noise

The RMOW Noise Policy Implementation guideline does not apply to stationary and mobile sources of noise from industrial or commercial activities, as described in Section 2 of the guideline. The guideline defers to applicable MECP guidelines for stationary noise assessment and mitigation (if required). The applicable MECP guideline is NPC-300, section C4.

Section C4 indicates that, where practical, source mitigation is the preferred option for noise abatement if sound levels exceed noise criteria and that the implementation of noise control measures at sources typically requires MECP approval. Only in circumstances where a Class 4 acoustic designation is authorized by the land use planning authority, are receptor-based noise controls considered. Receptor based site configuration is a permissible option to reduce the noise impact of stationary noise sources to meet applicable MECP criteria. This option includes orienting sensitive noise receptors away from stationary noise source(s) and replaced with insensitive spaces such as hallways, stairwells, and bathrooms.



7 Noise Impact Assessment

7.1 Road Traffic Noise

Equivalent Sound Levels (L_{eq}) due to traffic were predicted at the worst impacted façades of each modelled block and at the amenity area. The predicted road traffic noise levels at the PORs and applicable noise controls are summarized in Table 7-1. STAMSON calculation summaries are attached as Appendix E.

7.2 Stationary Noise

Equivalent sound level contours due to nearby stationary noise sources were modelled at a height of 4.5m AG. Daytime noise impacts are presented in Figure 2. Daytime noise impacts are assumed to be representative of nighttime noise impacts.



Table 7-1: Summary of Predicted Road Traffic Noise Levels and Noise Control Measures

Point of Reception		Predicted Road Traffic Noise Level (dBA)				Noise Control Measures		
ID	Type	Time Period	Outdoor Plane of Window	Predicted Indoor ^a	Within Limits?	Ventilation Requirements	Building Components ^b	Noise Warning Clause
Block A	POW	Day	58	48	No	Provision for Air conditioning	OBC	Type C
		Night	51	41	No	Provision for Air conditioning	OBC	Type C
Block B	POW	Day	60	50	No	Provision for Air conditioning	OBC	Type C
		Night	54	44	No	Provision for Air conditioning	OBC	Type C
Block C	POW	Day	50	40	Yes	-	OBC	
		Night	44	34	Yes	-	OBC	-
Block D	POW	Day	52	42	Yes	-	OBC	-
		Night	45	35	Yes	-	OBC	-
Block E	POW	Day	53	43	Yes	-	OBC	-
		Night	46	36	Yes	-	OBC	-
Common Amenity Area	OLA	Day	54	-	Yes	-	-	-

Notes:

^a Projected indoor noise level is assumed to be 10 dB less than the noise level calculated at the exterior plane of the window.

^b OBC - Ontario Building Code.



8 Mitigation and Warning Clauses

8.1 Road Traffic Noise

The following suggested Warning Clauses are adapted from MECP and the RMOW, and they should be presented to the occupants/owners when the agreements of Offers of Purchase and Sale are prepared:

Type C Warning Clause:

“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, Conservation and Parks.”

8.2 Stationary Noise

Sound levels from stationary noise are predicted to be at or below applicable MECP criteria, no mitigation or warning clauses are required.



9 Conclusion and Recommendations

Stantec Consulting Ltd. was retained by Aactiva Holdings Inc. (Aactiva) to prepare a Noise Impact Study in support of an Official Plan and Zoning By-law Amendment and Draft Plan of subdivision applications for the Development of lands located at Block 320, Plan 5M-506, in Waterloo, Ontario (the Site). The proposed subdivision includes residential blocks that provide for a mix and range of unit types, a park block, a stormwater management block, and one commercial block. The proposed development layout is illustrated in a conceptual plan of development, prepared by MHBC, dated October 26, 2023.

Millennium Blvd. located south of the site was identified as a potential source of road traffic noise on the proposed Development. A site review of the property determined that there are potential sources of stationary noise in the surrounding area. In particular, the Enova Power Corporation Facility to the northwest of the site and the RIM park athletic center to the southwest of the site were identified as potentially impactful stationary noise sources. As no rail lines exist within 500 m of the proposed site and the site is beyond the NEF 25 noise contours for local airport, an assessment of rail and aircraft traffic noise impacts to the site was not warranted.

Modelled sound levels from stationary noise are predicted to be at or below applicable MECP criteria, no *mitigation or warning* clauses are required to mitigate the impact of stationary noise on the Development.

Based on the road traffic noise level predictions at modelled receptors within the Development, noise warning clauses are required in addition to compliance with Ontario Building Code as specified in the applicable MECP and RMOW guidelines.

Stantec recommends that this Noise Impact Study be updated prior to final site plan approval to reflect final building setback distances, receptor heights, and building layouts.

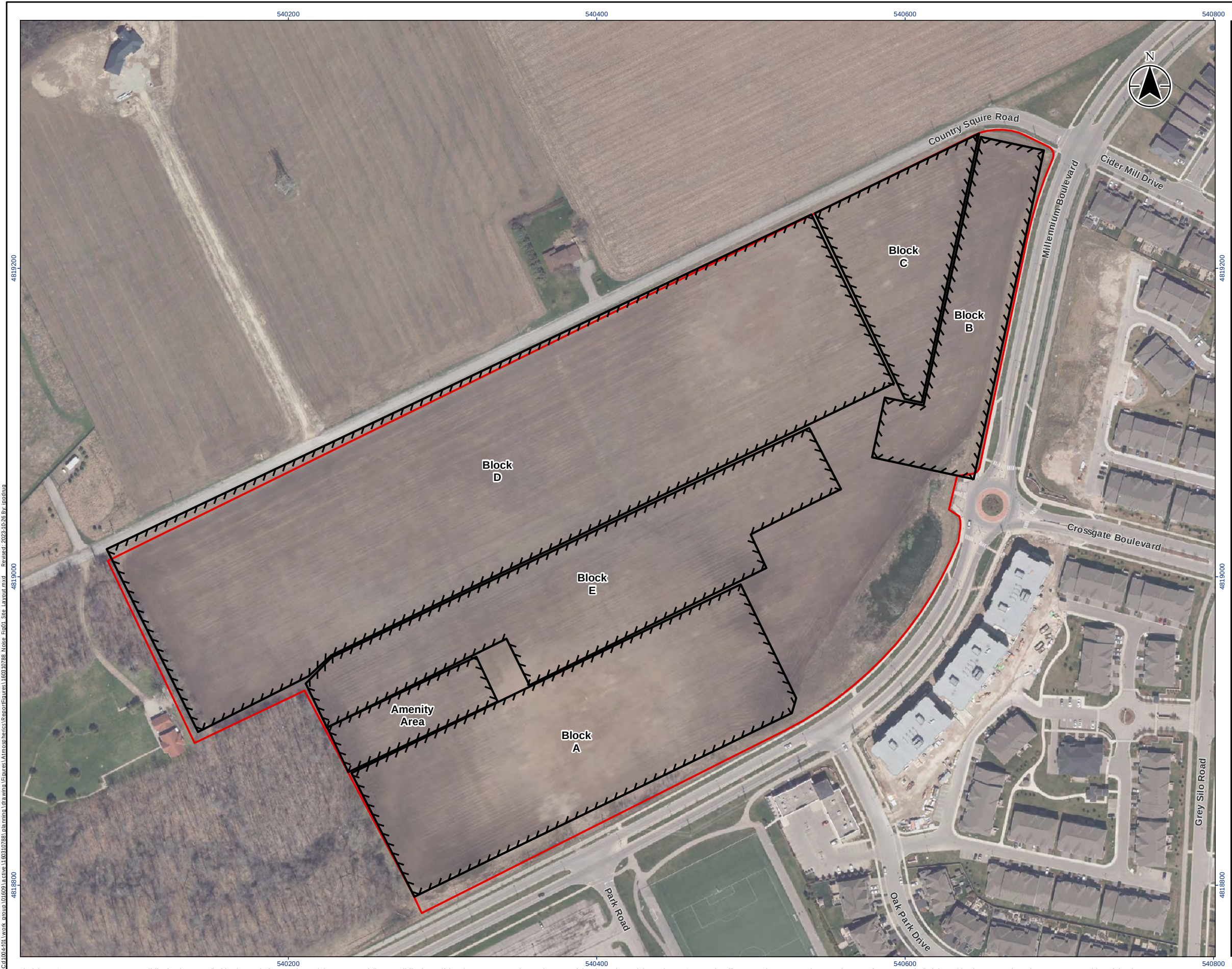


Appendices

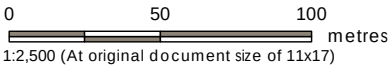


Appendix A Figures

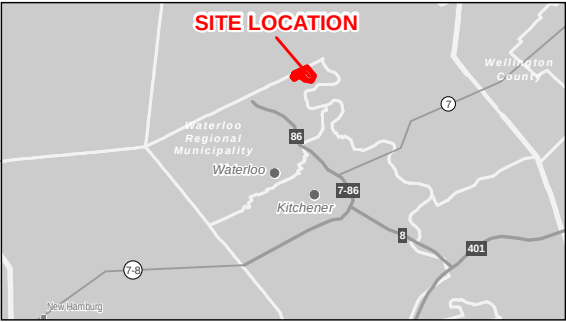




- Site Boundary
- Building Block



- Notes
- 1. Coordinate System: NAD 1983 UTM Zone 17N
 - 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.
 - 3. Orthoimagery © First Base Solutions, 2022. Imagery Date, 2020.



Project Location
Waterloo, ON

160310788 REVF
Prepared by IP on 2023-10-26
Technical Review by SA on 2023-07-11

Client/Project
ACTIVA HOLDINGS INC.
MILLENNIUM BOULEVARD,
WATERLOO, ON

Figure No.

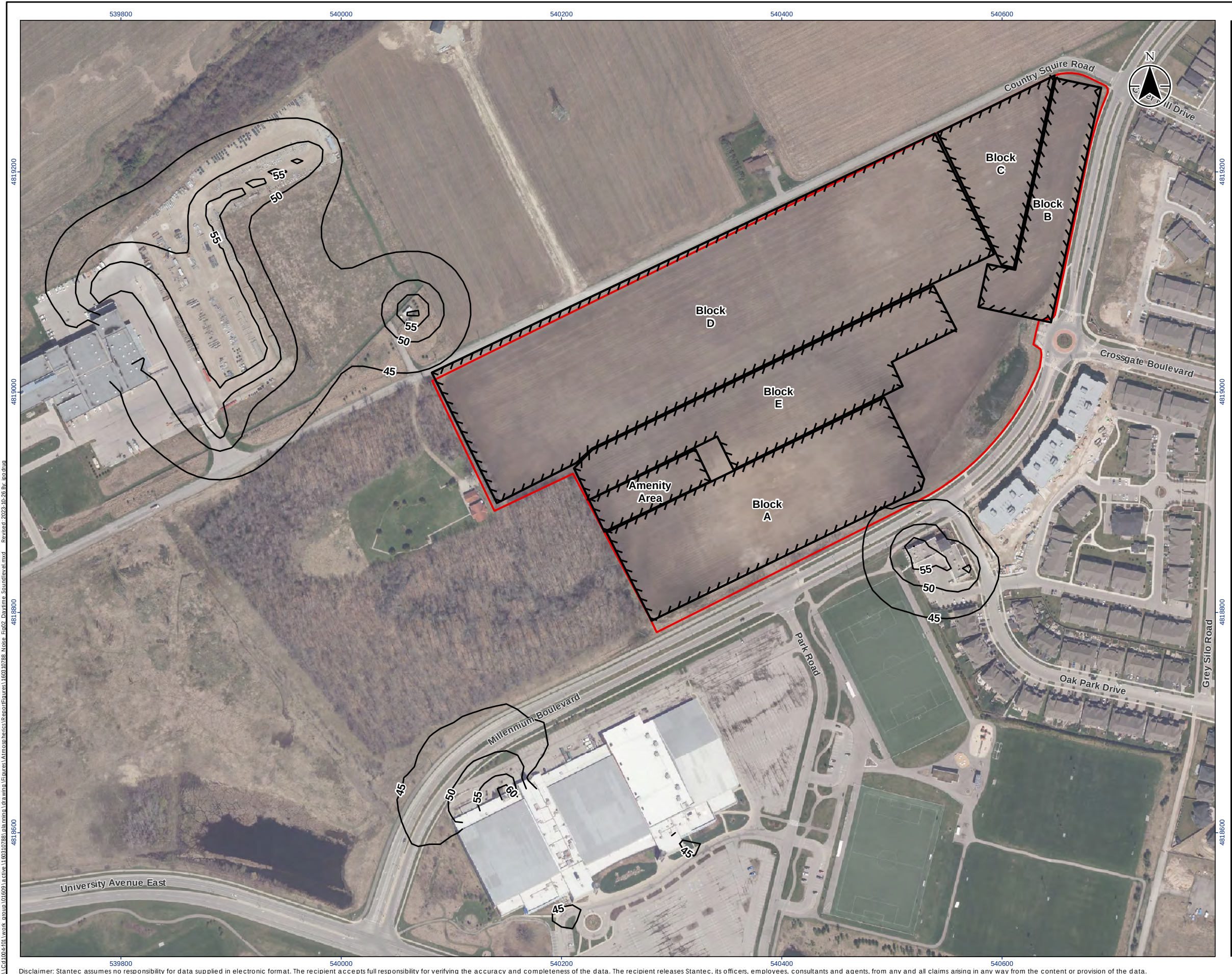
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Title

Site Layout

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— Daytime Contour (dBA)

 Site Boundary

 Building Block

050100metres

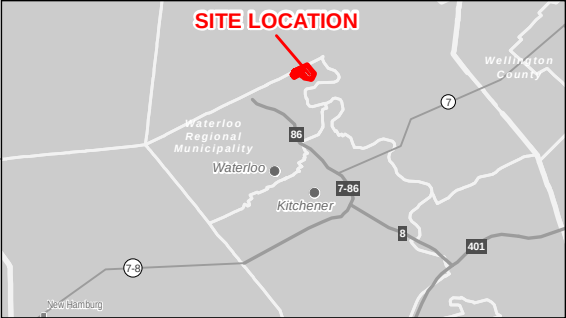
1:3,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N

2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017.

3. Orthoimagery © First Base Solutions, 2022. Imagery Date, 2020.



SITE LOCATION

Waterloo Regional Municipality

Waterloo

Kitchener

Wellington County

New Hamburg

7-86

8

401

7-3

Project Location

Waterloo, ON

160310788 REV F

Prepared by IP on 2023-10-26

Technical Review by SA on 2023-07-11

Client/Project

ACTIVA HOLDINGS INC.

MILLENNIUM BOULEVARD,

WATERLOO, ON

Figure No.

2

Title

Modelled Daytime Sound Level Contours (dBA)

539800540000540200540400540600

4818200481900048198004819600

539800540000540200540400540600

4818200481900048198004819600

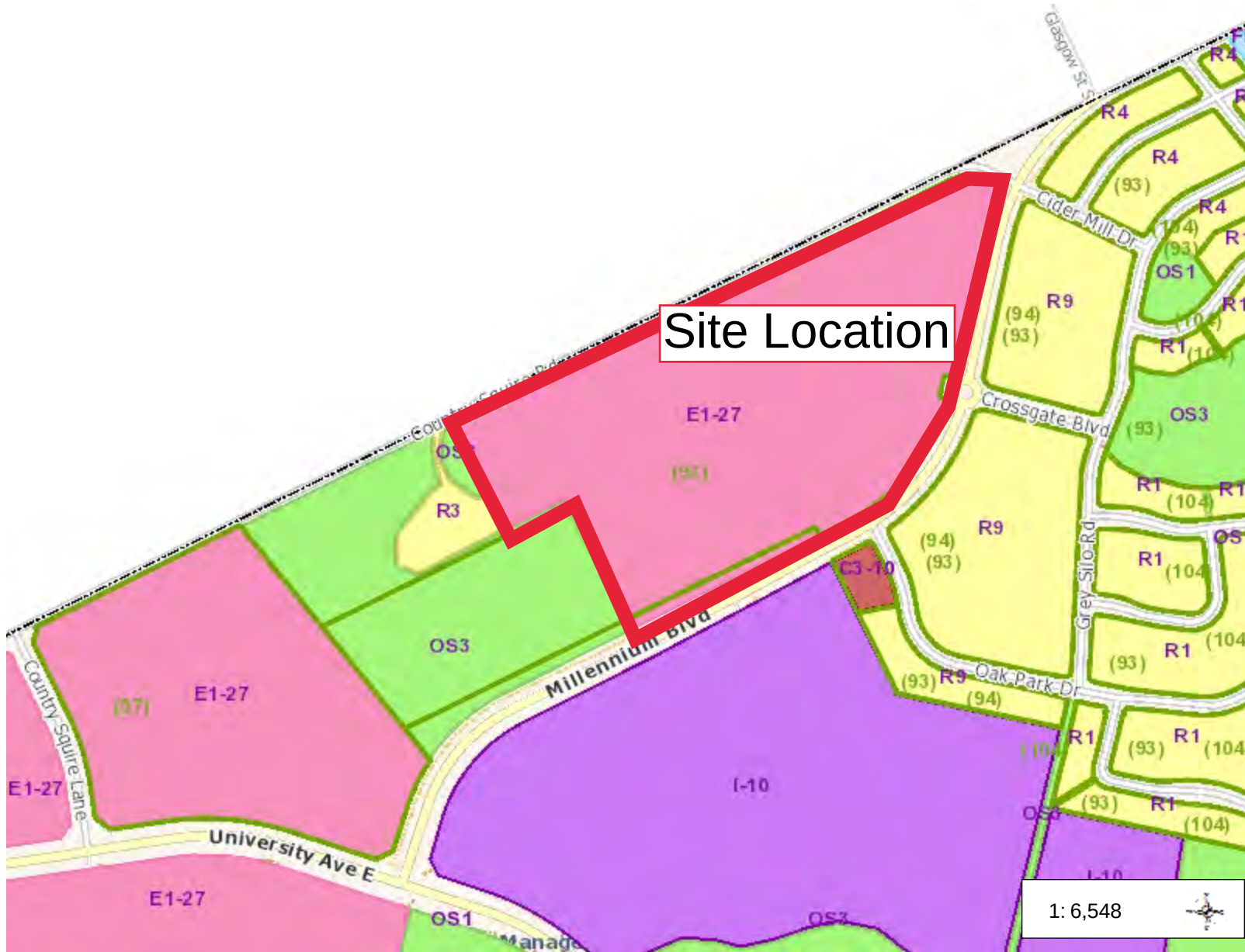
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Appendix B Site Plan



Appendix C Zoning Map





Legend

- Schedule C1 - Site Specific Zo
- Lands Subject to LPAT Decisic 2018-050
- Zoning By-law 2018-050**
- Academic
- Institutional
- Educational Institution
- School
- Residential
- Residential Mixed-Use
- Residential Northdale
- Residential High
- Open Space
- Environmentally Sensitive Landscap
- Commercial
- Uptown
- Employment
- Waste Management
- Future Determination
- Zone Change
- City Boundary
- Railways
- Roads**
- Highway
- Overpass
- Underpass

1: 6,548



0.3 0 0.17 0.3 Kilometers

NAD_1983_UTM_Zone_17N

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This map is a user-generated static output from an internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS IS NOT A PLAN OF SURVEY.
THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes

TOWNSHIP OF WOOLWICH ZONING MAP- "Mundil"



B20



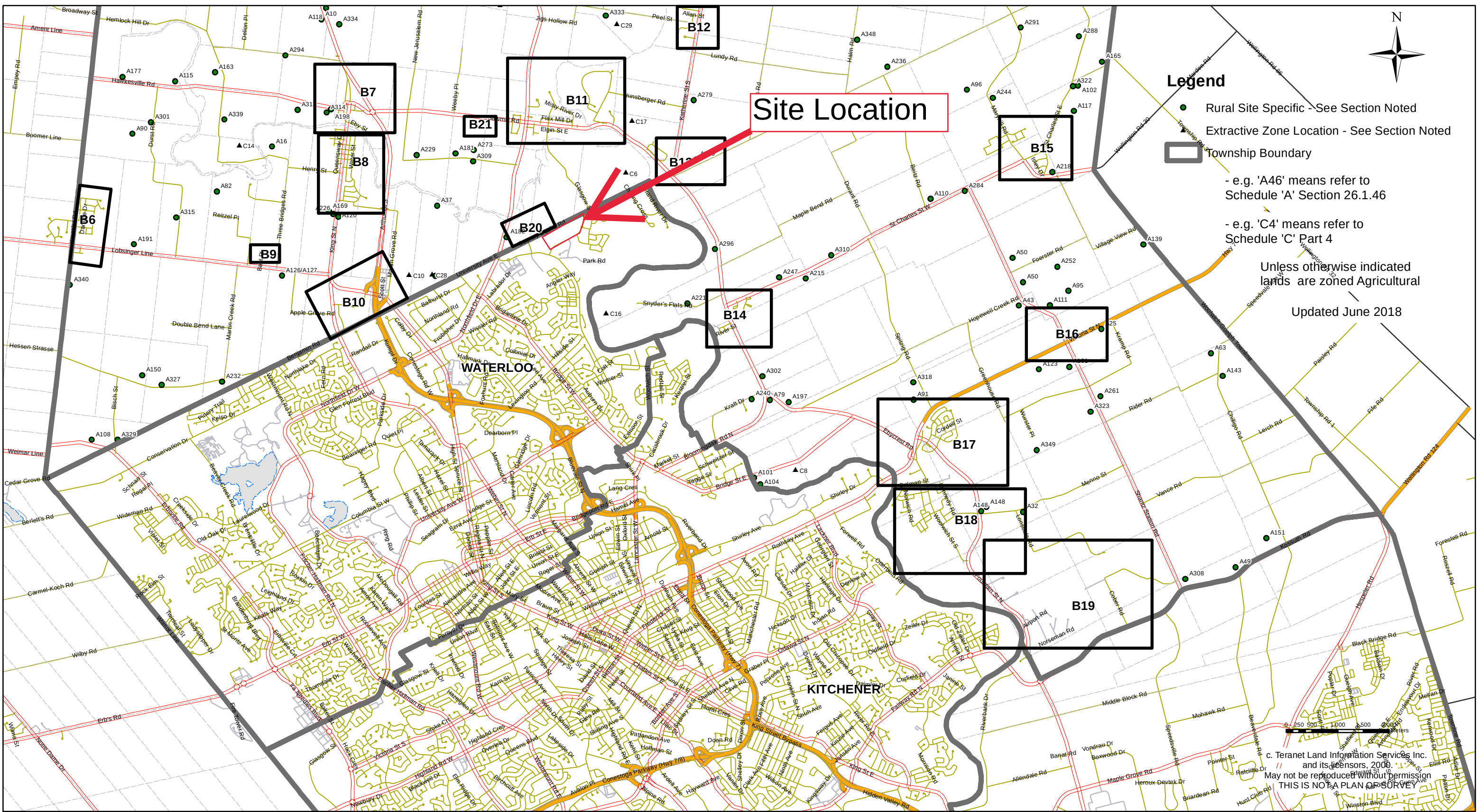
Legend

- Extraction (see site specific)
- Site Specific - Rural (see section noted)
- Site Specific - Urban (see section noted)
- Holding Zone (Overlay)
- FloodPlain (Overlay)
- Flood Way (Overlay)
- Flood Fringe (Overlay)
- A
- C-1
- C-2
- C-2A
- C-3
- C-4
- C-4A
- C-5
- C-6
- C-7
- C-8
- E
- M-1
- M-2
- M-3
- M-5
- M-6
- O-1
- O-2
- P
- R-1
- R-2
- R-2A
- R-3
- R-3A
- R-4
- R-4A
- R-5
- R-5A
- R-6
- R-7
- R-7A

0 25 50 100 150 200 Meters

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TOWNSHIP OF WOOLWICH
KEY MAP-
"A.2"



Appendix D Road Traffic Data



Region of Waterloo AADT Forecast for Noise Studies

1. Development/Location

Millennium Blvd, Waterloo, ON

2. Current AADT (2023)

Millennium Blvd

4,000

3. Forecast AADT (2033)

Millennium Blvd

6,400

4. Commercial Vehicle Rates

Millennium Blvd

% Medium Trucks	2%
% Heavy Trucks	2%

5. Posted Speed Limit

Millennium Blvd

50 km/h

6. Day/Night Splits

Regional Standard 90/10 Day/Night Split

7. Expiry

Dec 31 2024

8. Notes

This forecast is intended for the purpose of carrying out a noise study for the **Millennium Blvd Development** in Waterloo only, located west of the Millenium Blvd and Country Squire Dr intersection. The above AADT represents the traffic volumes on the east leg of the intersection of Millenium Blvd and University Ave, assuming Millenium Blvd runs in an east-west direction.

Millenium Blvd is under the jurisdiction of City of Waterloo, so its forecast should be validated by City of Waterloo staff.

This forecast remains valid up to the date indicated above. The Region of Waterloo should be contacted for an updated forecast if there are plans to use this forecast beyond the above validity period.

Appendix E STAMSON Calculation Summary

STAMSON 5.0 NORMAL REPORT Date: 10-07-2023 13:30:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: AAMHBC.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 5530/614 veh/TimePeriod
Medium truck volume : 115/13 veh/TimePeriod
Heavy truck volume : 115/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 109.00 / 109.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Main_St (day)

Source height = 1.19 m

ROAD (0.00 + 53.03 + 0.00) = 53.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.65	0.00	-8.61	0.00	0.00	0.00	0.00	53.03

Segment Leq : 53.03 dBA

Total Leq All Segments: 53.03 dBA

↑

Results segment # 1: Main_St (night)

Source height = 1.19 m

ROAD (0.00 + 46.55 + 0.00) = 46.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	55.16	0.00	-8.61	0.00	0.00	0.00	0.00	46.55

Segment Leq : 46.55 dBA

Total Leq All Segments: 46.55 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 53.03
(NIGHT): 46.55

↑

↑

Filename: BLKAMHBC.te Time Period: Day/Night 16/8 hours
 Description:

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

 Car traffic volume : 5530/614 veh/TimePeriod
 Medium truck volume : 115/13 veh/TimePeriod
 Heavy truck volume : 115/13 veh/TimePeriod
 Posted speed limit : 50 km/h
 Road gradient : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 36.00 / 36.00 m
 Receiver height : 7.50 / 7.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Main_St (day)

 Source height = 1.19 m

ROAD (0.00 + 57.85 + 0.00) = 57.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.65	0.00	-3.80	0.00	0.00	0.00	0.00	57.85

 Segment Leq : 57.85 dBA

Total Leq All Segments: 57.85 dBA

↑
 Results segment # 1: Main_St (night)

 Source height = 1.19 m

ROAD (0.00 + 51.36 + 0.00) = 51.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	55.16	0.00	-3.80	0.00	0.00	0.00	0.00	51.36

Segment Leq : 51.36 dBA

Total Leq All Segments: 51.36 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 57.85
(NIGHT): 51.36

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 10-07-2023 13:28:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BLKBMHBC.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 5530/614 veh/TimePeriod
Medium truck volume : 115/13 veh/TimePeriod
Heavy truck volume : 115/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Main_St (day)

Source height = 1.19 m

ROAD (0.00 + 60.19 + 0.00) = 60.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.65	0.00	-1.46	0.00	0.00	0.00	0.00	60.19

Segment Leq : 60.19 dBA

Total Leq All Segments: 60.19 dBA

↑

Results segment # 1: Main_St (night)

Source height = 1.19 m

ROAD (0.00 + 53.70 + 0.00) = 53.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	55.16	0.00	-1.46	0.00	0.00	0.00	0.00	53.70

Segment Leq : 53.70 dBA

Total Leq All Segments: 53.70 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 60.19
(NIGHT): 53.70

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 10-07-2023 13:30:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BLKDMHBC.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 5530/614 veh/TimePeriod
Medium truck volume : 115/13 veh/TimePeriod
Heavy truck volume : 115/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 152.00 / 152.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Main_St (day)

Source height = 1.19 m

ROAD (0.00 + 51.59 + 0.00) = 51.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.65	0.00	-10.06	0.00	0.00	0.00	0.00	51.59

Segment Leq : 51.59 dBA

Total Leq All Segments: 51.59 dBA

↑

Results segment # 1: Main_St (night)

Source height = 1.19 m

ROAD (0.00 + 45.10 + 0.00) = 45.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	55.16	0.00	-10.06	0.00	0.00	0.00	0.00	45.10

Segment Leq : 45.10 dBA

Total Leq All Segments: 45.10 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 51.59
(NIGHT): 45.10

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 10-07-2023 13:30:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BLKEMHBC.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 5530/614 veh/TimePeriod
Medium truck volume : 115/13 veh/TimePeriod
Heavy truck volume : 115/13 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 121.00 / 121.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Main_St (day)

Source height = 1.19 m

ROAD (0.00 + 52.58 + 0.00) = 52.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	61.65	0.00	-9.07	0.00	0.00	0.00	0.00	52.58

Segment Leq : 52.58 dBA

Total Leq All Segments: 52.58 dBA

↑

Results segment # 1: Main_St (night)

Source height = 1.19 m

ROAD (0.00 + 46.09 + 0.00) = 46.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	55.16	0.00	-9.07	0.00	0.00	0.00	0.00	46.09

Segment Leq : 46.09 dBA

Total Leq All Segments: 46.09 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 52.58
(NIGHT): 46.09

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 16-09-2023 01:19:46
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 600olaar.te Time Period: Day/Night 16/8 hours
 Description:

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

Train Type	! Trains !	! Speed ! (km/h)	!# loc !/Train!	!# Cars !/Train!	Eng type	!Cont !weld
1.	! 3.0/1.0 !	! 35.0 !	! 2.0 !	! 7.0 !	!Diesel!	No

Data for Segment # 1: (day/night)

Angle1	Angle2	: -90.00 deg	90.00 deg
Wood depth		: 0	(No woods.)
No of house rows		: 0 / 0	
Surface		: 2	(Reflective ground surface)
Receiver source distance		: 18.70 / 15.00 m	
Receiver height		: 4.50 / 4.50 m	
Topography		: 1	(Flat/gentle slope; no barrier)
No Whistle			
Reference angle		: 0.00	

↑

Results segment # 1: (day)

LOCOMOTIVE (0.00 + 54.15 + 0.00) = 54.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	55.11	-0.96	0.00	0.00	0.00	0.00	54.15

WHEEL (0.00 + 45.46 + 0.00) = 45.46 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	46.42	-0.96	0.00	0.00	0.00	0.00	45.46

Segment Leq : 54.70 dBA

Total Leq All Segments: 54.70 dBA

↑

Results segment # 1: (night)

LOCOMOTIVE (0.00 + 53.35 + 0.00) = 53.35 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	53.35	0.00	0.00	0.00	0.00	0.00	53.35

WHEEL (0.00 + 44.66 + 0.00) = 44.66 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	44.66	0.00	0.00	0.00	0.00	0.00	44.66

Segment Leq : 53.90 dBA

Total Leq All Segments: 53.90 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 54.70
(NIGHT): 53.90

↑

↑

Filename: 600POWNA.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 13738/1526 veh/TimePeriod
Medium truck volume : 143/16 veh/TimePeriod
Heavy truck volume : 429/48 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 27.70 / 27.70 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: (day)

Source height = 1.32 m

ROAD (0.00 + 63.70 + 0.00) = 63.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	66.36	0.00	-2.66	0.00	0.00	0.00	0.00	63.70

Segment Leq : 63.70 dBA

Total Leq All Segments: 63.70 dBA

↑

Results segment # 1: (night)

Source height = 1.32 m

ROAD (0.00 + 57.19 + 0.00) = 57.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	59.85	0.00	-2.66	0.00	0.00	0.00	0.00	57.19

Segment Leq : 57.19 dBA

Total Leq All Segments: 57.19 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 63.70
(NIGHT): 57.19

↑

↑