Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

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Prepared by:

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Revision Record

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Executive Summary

SLR Consulting (Canada) Ltd. (SLR), was retained by Parkbridge Lifestyle Communities, to conduct a Land Use Compatibility Study focusing on air quality, odour, dust, noise, and vibration in support of a development application. The development site is located north of Uppers Lane in Thorold, Ontario ("the Project site").

A portion of the Project site is located within 500 m lands east of the Thorold Townline Road that have been identified as a potential bedrock resource area. In accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan, a study is required to assess the land use compatibility of the Project site with the potential future aggregate extraction site. The Official Plan requires that a study considering operational noise, blasting and traffic impacts be prepared in support of a development application in this 500 m area.

This assessment considered the following:

- Industrial air quality, odour, and dust emissions;
- Industrial/ commercial noise and vibration; and
- Transportation-related noise and vibration.

Based on this assessment, the proposed development is anticipated to be compatible with the proposed Upper's Quarry and other existing and future surrounding industries from an air quality perspective. It is recommended that a warning clause be included in agreements registered on Title for the residential units and included in all agreements of purchase and sale or lease and all rental agreements, noting the proximity of the Upper's Quarry and potential for dust to be visible at times.

Furthermore, Publication NPC-300 and the City of Thorold Noise By-Law requirements met with respect to noise/vibration with the use of appropriate warning clauses in agreements registered on Title for residential units, in all agreements of purchase and sale or lease, and all rental agreements, and quarry-related mitigation along the east side of the proposed development. The Project site is anticipated to be compatible with the surrounding land uses from a noise and vibration perspective.

The requirements of MECP Guideline D-6 are met with respect to air quality, dust, odour, noise and vibration. Recommended warning clauses are provided in **Appendix E**.

The proposed development will not affect the ability for industrial facilities to obtain or maintain compliance with applicable Provincial environmental policies, regulations, approvals, authorizations, and guidelines. The proposed development is:

- Unlikely to result in increased risk of complaint and nuisance claims;
- Unlikely to result in operational constraints for the major facilities; and
- Unlikely to result in constraints on major facilities to reasonably expand, intensify or introduce changes to their operations.

In accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan, the proposed development should not preclude or hinder future aggregate extraction at the proposed Upper's Quarry. It is expected that there will be future discussions with Walker Aggregates Inc., the municipality/planning authorities, and/or other nearby landowners regarding final decisions on noise mitigation design.

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1.0 Introduction

SLR Consulting (Canada) Ltd. (SLR), was retained by Parkbridge Lifestyle Communities, to conduct a Land Use Compatibility Study focusing on air quality, odour, dust, noise, and vibration in support of a development application. The development site is located near Uppers Lane in Thorold, Ontario ("the Project site").

A portion of the Project site is located within 500 m of the lands east of the Thorold Townline Road that have been identified as a potential bedrock resource area and the site of the proposed Upper's Quarry. In accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan, a study is required to assess the land use compatibility of the Project site with the potential future aggregate extraction site. The Official Plan requires that a study considering operational noise, blasting and traffic impacts be prepared in support of a development application in this 500 m area, as part of the Land Use Compatibility Study.

This assessment has considered the following:

- Industrial air quality, odour, and dust emissions;
- Industrial/commercial noise and vibration; and
- Transportation-related noise and vibration.

The assessment has included a review of air quality and noise emissions from existing industrial facilities in the area as well as the proposed Upper's Quarry.

In this assessment, SLR has reviewed the surrounding land uses and major facilities in the area with respect to the following guidelines:

- The Provincial Policy Statement;
- Ministry of the Environment, Conservation and Parks ("MECP") Guidelines D-1 and D-6;
- Ontario Regulation 419/05: Air Pollution – Local Air Quality and its associated air quality standards and assessment requirements;
- The MECP draft policies on odour impacts and assessment;
- MECP Publication NPC-300 noise guidelines for industrial and transportation; and
- City of Thorold Noise By-law No. 37-2014.

This report identifies existing and potential land use compatibility issues and identifies and evaluates options to achieve appropriate design, buffering and/or separation distances between the proposed sensitive land uses, including residential uses, and nearby Employment Areas and/or major industrial/commercial land uses.

2.0 Description of Development and Surroundings

2.1 Proposed Development

The proposed Project site is located on the north side of Uppers Lane, between Barker Parkway (to the west) and Thorold Townline Road (to the east) in Thorold, Ontario. The Project site is currently occupied by agricultural and natural areas.

The proposed development is to consist of residential single detached homes, street townhouses, bungalows, a park space, and natural heritage areas.

A context plan is provided in **Figure 1**. The Proposed Draft Plan of Subdivision and a Block Concept Plan are included for reference in **Appendix A**.

2.2 Surrounding Area

The Project site is bounded by Upper's Lane to the south and a Hydro One corridor to the north and west. The area surrounding the Project site currently consists of neighbourhood residential to the west, agricultural lands to the south and east and some industrial uses to the north, north of Beaverdams Road/Ontario 7186.

2.3 Land Use Designations in the Area

2.3.1 City of Thorold Official Plan

The City of Thorold Official Plan Map for the area is provided as **Figure 2a**. The Project site is designated in the Official Plan as 'Residential and Environmental Protection Two Areas'. **Figure 2a** also shows that the eastern portion of the Project site is within an Aggregate Impact Area. The lands immediately to the east of the Project Site are designated as Employment – Light Industrial, and Employment – Prestige Industrial Areas. The lands to the north are designated Open Space & Parks. The lands to the west are predominately designated as Residential with sections that are designated as Open Space & Parks and Environmental Protection Two. The lands to the south are designated Residential Areas.

2.3.2 City of Thorold Zoning By-Law 60-2019

The City of Thorold Zoning Map for the area is provided as **Figure 2b**.

The Project site is currently zoned as Future Development ("FD") and Environmental Protection Two ("EP2"). The lands to east are also zoned as FD and EP2. The lands to the west and south are zoned FD and Single Detached, Duplex ("R1B"). To the north, the lands are zoned Utility ("U").

3.0 Assessment Framework

The intent of this report is to identify any existing and potential land use compatibility issues and to identify and evaluate options to achieve appropriate design, buffering and/or separation distances between the surrounding sensitive land uses, including residential uses, and nearby Employment Areas and/or major facilities. Recommended measures intended to eliminate or mitigate negative impacts and adverse effects are provided.

The requirements of the Ontario planning regime are organized such that generic policy is informed by specific policy, guidance, and legislation, as follows:

- The Ontario Planning Act, Section 2.1 – sets the ground rules for land use planning in Ontario, whereby planning decisions have regard to matters of provincial interest including orderly development, public health, and safety; then
- The Provincial Policy Statement ("PPS") sets out goals – making sure adjacent land uses are compatible from a health and safety perspective and are appropriately buffered; then
- The Provincial Growth Plan, Section 2.2.5 – builds on the PPS to establish a unique land use planning framework for the Greater Golden Horseshoe, where the development of sensitive land uses will avoid, or where avoidance is not possible, minimize and mitigate

adverse impacts on industrial, manufacturing, or other uses that are particularly vulnerable to encroachment; then

- The MECP D-series of guidelines set out methods to determine if assessments are required (Areas of Influence, Recommended Minimum Separation Distances, and the need for additional studies); then
- MECP and Municipal regulations, policies, standards, and guidelines then set out the requirements of additional air quality studies and the applicable policies, standards, guidelines, and objectives to ensure that adverse effects do not occur.

3.1 Ontario Planning Act

The Ontario Planning Act is provincial legislation that sets out the ground rules for land use planning in Ontario. It describes how land uses may be controlled, and who may control them. "The purpose of the Act is to:

- provide for planning processes that are fair by making them open, accessible, timely and efficient;
- promote sustainable economic development in a healthy natural environment within a provincial policy framework;
- provide for a land use planning system led by provincial policy;
- integrate matters of provincial interest into provincial and municipal planning decisions by requiring that all decisions be consistent with the Provincial Policy Statement and conform/not conflict with provincial plans;
- encourage co-operation and coordination among various interests;
- recognize the decision-making authority and accountability of municipal councils in planning."[1]

Section 2.1 of the Ontario Planning Act describes how approval authorities and Tribunals must have regard to matters of provincial interest including orderly development, public health, and safety.

3.2 Provincial Policy Statement

The PPS "provides policy direction on matters of provincial interest related to land use planning and development. As a key part of the Ontario policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians."

The PPS is a generic document, providing a consolidated statement of the government policies on land use planning and is issued under section 3 of the Planning Act. Municipalities are the primary implementers of the PPS through policies in their local official plans, zoning by-laws and other planning related decisions. The current 2020 PPS came into effect on May 1, 2020. Policy direction concerning land use compatibility is provided in Section 1.2.6 of the PPS.

[1] https://www.ontario.ca/document/citizens-guide-land-use-planning/planning-act

From the current 2020 version:

> "1.2.6 Land Use Compatibility
>
> 1.2.6.1 Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures.
>
> 1.2.6.2 Where avoidance is not possible in accordance with policy 1.2.6.1, planning authorities shall protect the long-term viability of existing or planned industrial, manufacturing or other uses that are vulnerable to encroachment by ensuring that the planning and development of proposed adjacent sensitive land uses are only permitted if the following are demonstrated in accordance with provincial guidelines, standards and procedures:
>
> a) there is an identified need for the proposed use;
>
> b) alternative locations for the proposed use have been evaluated and there are no reasonable alternative locations;
>
> c) adverse effects to the proposed sensitive land use are minimized and mitigated; and
>
> d) potential impacts to industrial, manufacturing, or other uses are minimized and mitigated."

The goals of the PPS are implemented through Municipal and Provincial policies, as discussed below. Provided the Municipal and Provincial policies, guidelines, standards, and procedures are met, the requirements of the PPS will be met.

3.3 MECP D-Series of Guidelines

The D-series of guidelines were developed by the MECP in 1995 as a means to assess Recommended Minimum Separation Distances and other control measures for land use planning proposals in an effort to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. D-series guidelines address sources including sewage treatment (Guideline D-2), gas and oil pipelines (Guideline D-3), landfills (Guideline D-4), water services (Guideline D-5) and industries (Guideline D-6).

For this assessment, the applicable guideline is Guideline D-6 - Compatibility between Industrial Facilities and Sensitive Land Uses.

Adverse effect is a term defined in the Environmental Protection Act and "means one or more of

- impairment of the quality of the natural environment for any use that can be made of it,
- injury or damage to property or to plant or animal life,
- harm or material discomfort to any person,
- an adverse effect on the health of any person,
- impairment of the safety of any person,
- rendering any property or plant or animal life unfit for human use,

- loss of enjoyment of normal use of property, and
- interference with the normal conduct of business."

3.3.1 Guideline D-6 Requirements

To minimize the potential to cause an adverse effect from industrial operations, areas of influence and recommended minimum setback distances are included within Guideline D-6. The areas of influence and recommended separation distances from the guideline are summarized in **Table 1**.

Table 1: Guideline D-6 – Potential Influence Area and Recommended Minimum Setback Distances for Industrial Land Uses

Industry Classification	Area of Influence	Recommended Minimum Setback Distance (m)
Class I – Light Industrial	70 m	20 m
Class II – Medium Industrial	300 m	70 m
Class III – Heavy Industrial	1000 m	300 m

Industrial categorization criteria are supplied in Guideline D-6 and are shown in **Table 2**.

Table 2: Guideline D-6 – Industrial Categorization Criteria

Category	Outputs	Scale	Process	Operations/ Intensity	Possible Examples
Class I Light Industry	• Noise: Sound not audible off-property • Dust: Infrequent and not intense • Odour: Infrequent and not intense • Vibration: No ground-borne vibration on plant property	• No outside storage • Small-scale plant or scale is irrelevant in relation to all other criteria for this Class	• Self-contained plant or building which produces/ stores a packaged product • Low probability of fugitive emissions	• Daytime operations only • Infrequent movement of products and/or heavy trucks	• Electronics manufacturing and repair • Furniture repair and refinishing • Beverage bottling • Auto parts supply • Packaging and crafting services • Distribution of dairy products • Laundry and linen supply

Category	Outputs	Scale	Process	Operations/ Intensity	Possible Examples
Class II Medium Industry	• Noise: Sound occasionally heard off-property • Dust: Frequent and occasionally intense • Odour: Frequent and occasionally intense • Vibration: Possible ground-borne vibration, but cannot be perceived off-property	• Outside storage permitted • Medium level of production allowed	• Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions	• Shift operations permitted • Frequent movements of products and/or heavy trucks with the majority of movements during daytime hours	• Magazine printing • Paint spray booths • Metal command • Electrical production • Manufacturing of dairy products • Dry cleaning services • Feed packing plants
Class III Heavy Industry	• Noise: Sound frequently audible off property • Dust: Persistent and/ or intense • Odour: Persistent and/ or intense • Vibration: Ground-borne vibration can frequently be perceived off property	• Outside storage of raw and finished products • Large production levels	• Open process • Frequent outputs of major annoyances • High probability of fugitive emissions	• Continuous movement of products and employees • Daily shift operations permitted	• Paint and varnish manufacturing • Organic chemical manufacturing • Breweries • Solvent recovery plants • Soaps and detergent manufacturing • Metal refining and manufacturing

3.3.2 Requirements for Assessments

Guideline D-6 requires that studies be conducted to assess impacts where sensitive land uses are proposed within the Potential Area of Influence of an industrial facility. This report is intended to fulfill this requirement.

The D-series guidelines reference previous versions of the air quality regulation (Regulation 346). However, the D-Series of guidelines are still active, still represent current MECP policy and are specifically referenced in numerous other current MECP policies. In applying the D-series guidelines, the current policies, regulations, standards, and guidelines have been used (e.g., Regulation 419).

3.3.3 Recommended Minimum Separation Distances

Guideline D-6 also recommends that no sensitive land use be placed within the Recommended Minimum Separation Distance. However, it should be noted that this is a recommendation only. Section 4.10 of the Guideline allows for development within the Recommended Minimum Separation Distance, in cases of redevelopment, infilling, and transitions to mixed use, provided that the appropriate studies are conducted and that the relevant air quality and noise guidelines are met.

4.0 Nearby Industries and Developments

The Guideline D-6 Separation distances from the Project site are shown in **Figure 3a** and **Figure 3b**. SLR personnel conducted a site visit to the area on May 9, 2023. Local industries within 1 km of the Project site were inventoried. The lands surrounding the Project site generally include residential and agricultural uses, as well as the proposed Upper's Quarry to the east.

In Ontario, facilities that emit significant amounts of contaminants to the environment are required to obtain and maintain an Environmental Compliance Approval ("ECA") from the MECP or submit to the Environmental Activity and Sector Registry ("EASR"). ECAs/EASRs within 1 km of the Project site were obtained from the MECP Access Environment website.

Table 3 lists the identified industries within 1000 m of the Project site and within their applicable Area of Influence. A detailed table of all industries within 1000 m is provided in **Appendix B**. Industries which lie within their applicable Area of Influence with respect to the Project site are discussed in the following subsections.

Table 3: Industrial Identifies Within the Potential Area of Influence of the Project Site

Facility	Type of Operation	ECA No.	Industry Class	Area of Influence (m)	Actual Distance to Project Site (m)	Additional Assessment Required?
Upper's Quarry (Proposed)	Proposed Quarry	-	Class III	1000	260	Yes
Rankin Asphalt	Asphalt Plant	6254-7F3NWM (2008)	Class III	1000	730	Yes

The industries listed in **Table 3** were identified inside the Potential Area of Influence and therefore require additional assessment.

All other industries, detailed in **Appendix B**, are outside of their respective Guideline D-6 Area of Influence; therefore, they are anticipated to be compatible with the proposed development.

4.1 Class III Heavy Industries

The area within 1 km of the Project site was reviewed. As shown in **Figure 3a** and **Figure 3b**, there are two Class III Heavy industries within 1 km of the Project site, namely the proposed Upper's Quarry, and Rankin Asphalt.

4.1.1 Proposed Upper's Quarry

ADDRESS:	Part Lots 119, 120, 136, 137 in City of Niagara Falls, Ontario
DISTANCE TO PROJECT:	260 m
D-6 CLASSIFICATION:	Class III Heavy Industry

The proposed Upper's Quarry will be located on Part of Lots 119, 120, 136 and 137 in the City of Niagara Falls. The proposed facility is located approximately 260 m east of the Project site. The facility will produce and distribute materials such as aggregate, sand, stone, and gravel. SLR obtained copies of publicly available reports entitled *Air Quality Assessment For the Proposed Upper's Quarry* and *Upper's Quarry: Acoustic Assessment Report*, completed by RWDI and dated July 12, 2023 and August 2, 2023, respectively, and submitted as part of the quarry application to the Ministry of Natural Resources.

Operations at the proposed quarry will consist of the following:

- Overburden stripping;
- Berm construction;
- Drilling;
- Blasting;
- Extraction;
- Processing;
- Stockpiling; and
- Shipping of aggregate.

In addition to aggregate extraction and processing, the site will also include a hot mix asphalt batch plant capable of producing 4,900 tonnes per day.

Based on the size and nature of the of the facility operations, including daytime, evening and night-time operations, the proposed Upper's Quarry is considered a Class III Heavy Industry under MECP Guideline D-6, with a Recommended Minimum Separation Distance of 300 m and a Potential Area of Influence of 1000 m. Portions of the Project site lie within the Recommended Minimum Separation distance, and the entire Project Site within the Potential Area of Influence. Therefore, additional assessment is warranted and is provided in subsequent sections of this report. Note that the Upper's Quarry application is currently under review and the facility is not yet approved. The facility was considered in the assessment based on the current application materials, in accordance with Section B1.8.12.3 Aggregate Resources protection Policies of the Official Plan of the City of Thorold.

4.1.2 Rankin Asphalt

ADDRESS:	3299 Thorold Townline Road, Thorold, Ontario
DISTANCE TO PROJECT:	750 m
D-6 CLASSIFICATION:	Class III Heavy Industry

The Rankin Asphalt facility is a hot mix asphalt plant that is permitted to produce a maximum of 300 tonnes of asphalt per hour. The facility is located approximately 750 m north of the Project

site. The facility operates under MECP ECA number 6254-7F3NWM, dated June 11, 2008. The permit is issued to Rankin Construction Inc. A copy of the MECP permit can be found in **Appendix B**.

Based on a review of the permit, air emission sources related to Rankin Asphalt include:

- Flow drum mixer;
- Batch tower with vibrating screen;
- Two hot mix asphalt storage silos;
- Two liquid asphalt cement storage tanks;
- Scavenger exhaust fan;
- Natural gas fired hot oil heaters;
- No. 2 Fuel oil heater; and
- Fugitive emissions resulting from delivery, storage, and transfer of materials.

On May 9, 2023, SLR personnel conducted a site visit to the area. Faint, intermittent odours were detected along Beaverdams Road, approximately 150 m from the facility's property line. Odours were not detected in other locations. Visible dust was not observed during the site visit.

The combined operations have the following characteristics:

- Outputs: potential for fugitive dust and odours;
- Scale: Outside storage of vehicles, equipment and raw materials and large production levels;
- Process: Open processes, with the potential for fugitive emissions; and
- Operations/ Intensity: Shift operations permitted, frequent movements of products and/ or heavy trucks with the majority of movements during daytime hours.

The Rankin Asphalt facility has the potential for fugitive emissions of odour and dust.

Based on the size and nature of Rankin Asphalt, the operations are considered a Class III Heavy Industry under MECP Guideline D-6, with a 1000 m Area of Influence and a Recommended Minimum Separation Distance of 300 m.

The Project site lies outside the Minimum Recommended Separation Distance (300 m); however, it is within the Potential Area of Influence (1000 m) of this Class III Heavy Industry. Additional assessment is, therefore warranted and provided further within this report.

4.2 Future Land Uses

4.2.1 Development Applications

A review of development applications in the area indicated that there is 1 active development application within 1000 m of the Project site. The following is a summary of the significant applications and excludes committee of adjustment applications such as minor variance or consent. This information is reflective of those applications listed online at the City of Thorold applications information centre as of January 23, 2024:

Table 4: Development Applications in the Surrounding Area

Facility	Date	Development Application Information	Details
Rolling Meadows Phases 14 & 16	April 2021	D14-05-2021 D12-03-2021	Official Plan Amendment, Zoning By-Law Amendment. The applicant is proposing a Redline Revision to the draft approved plan of subdivision. The proposed changes include: • Adjustment of the lotting patterns and dimensions in order to provide a diverse range of housing forms, resulting in increased low density dwelling unit count. • Amending the Official Plan Designation and Zoning of a portion of the Village Square node at the intersection of Barker Parkway and Uppers Lane to include a park on the South West corner and parkette at the North West corner of the intersection. The park lands will be split by open space for a natural gas pipeline. • In addition to the OPA revisions for a parkette included in the proposed changes is a revision to the lands formerly known as Block 1237. Single Detached and Street Townhouse dwelling units are now to replace the lands identified as mixed-use commercial / residential. • Site-specific Amendments to the Zoning By-law to facilitate lotting patterns and housing forms in Phase 14 & 16. This report contains a detailed overview of all relief requested. • Relocating the institutional block lands previously known as Block 1278 to the east side of the hydro corridor.

4.2.2 Future Uses Envisioned by Official Plan

The Project site is currently zoned as Future Development (“FD”) and Environmental Protection Two (“EP2”). The lands to east are also zoned as FD and EP2. The lands to the west and south are zoned FD and Single Detached, Duplex (“R1B”). To the north, the lands are zoned Utility (“U”). SLR completed a review of the City of Thorold Comprehensive Zoning By-law No. 60-2019. Based on the Zoning By-law the permitted uses for the Future Development Zone consist of agricultural uses, single detached dwellings, and home occupation.

Though the existing zoning does not permit employment uses on the lands to the east of the Project site, the Official Plan envisions employment uses including Prestige Industrial and Light Industrial. Therefore, SLR completed a review of the permitted land uses under Employment Zones within the City of Thorold Comprehensive Zoning By-law No. 60-2019. It is expected that the lands identified as Prestige Industrial and Light Industrial would fall into the Employment Zone categories Prestige Employment (M1) and General Industrial (M2). See **Figure 2a**.

4.3 Summary

From the list of industries discussed in Section 4, both are identified to require further analysis as a result of being within their Area of Influence. These industries include:

- Proposed Uppers Quarry; and
- Rankin Asphalt.

5.0 Air Quality, Dust and Odour Assessment

5.1 Industrial Sources

5.1.1 Guidelines and Regulations

Within Ontario, facilities which emit significant amounts of contaminants to the environment are required to obtain and maintain an ECA from the MECP or submit an EASR. Facilities with an ECA/EASR should already meet the MECP guidelines for air quality contaminants at their property line.

5.1.2 Air Quality

Under O.Reg. 419/05, a facility is required to meet prescribed standards for air emissions at their property boundary line and any location off-site. The MECP does not require industries to assess their emissions at elevated points off-site, if a receptor does not exist at that location. While the introduction of mid-rise or high-rise residential buildings could trigger a facility to re-assess compliance at new receptor locations, the introduction of new low-rise receptors does not introduce any new receptors, as the facility is already required to be in compliance at grade-level at their property line.

5.1.2.1 Odour

There are a select few compounds that are provincially regulated from an odour perspective; however, there is no formal regulation with respect to mixed odours. Impacts from mixed odours produced by industrial facilities are generally only considered and regulated by the MECP in the presence of persistent complaints (ECO 2010).

The MECP released an updated Draft Guideline to address odour mixtures in Ontario May 4, 2021. At the time of preparation of this report, the Draft Guideline has not been finalized.[2]

The MECP assesses mixed odours, in Odour Units, following draft guidelines. One odour unit (1 OU) has been used as a default threshold. This is the concentration at which 50 % of the population will just detect an odour (but not necessarily identify/recognize or object to it). Recognition of an odour will typically occur between 3 and 5 odour units. The following factors may be considered:

- **Frequency** – How often the odour occurs. The MECP typically allows odours to exceed 1 OU with a 0.5 % frequency.
- **Intensity** – The strength of the odour, in odour units. 1 OU is often used in odour assessments in Ontario.
- **Duration –** How long the odour occurs.
- **Offensiveness** – How objectionable the odour is.
- **Location** – Where the odour occurs. The MECP assesses at odours where human activity is likely to occur.

[2] https://prod-environmental-registry.s3.amazonaws.com/2021-03/Draft%20Odour%20Guidance.pdf

The MECP has decided to apply odour-based standards to locations "where human activities regularly occur at a time when those activities regularly occur," which is generally accepted to be places that would be considered sensitive such as residences and public meeting places. As a guide, the MECP May 2021 document provides clarification of point of Odour Receptors as follows:

"Each of the following locations is a Point of Odour Reception if the location is not on the same property as the facility from which the odour is or will be discharged:

1 *A building or structure that contains one or more dwellings.*
2 *A building used for a commercial purpose that includes one or more habitable rooms used as sleeping facilities, such as a hotel or motel.*
3 *A building used for an institutional purpose, including an educational facility, a child care centre, a health care facility, a community centre.*
4 *A building used for a place of worship, other than a place of worship located on land that is zoned for commercial or industrial use.*
5 *A location on a vacant lot, other than an inaccessible vacant lot, that has been zoned to permit a building mentioned in paragraph 1, 2, 3 or 4.*
6 *A portion of a property used for recreational purposes, not including a portion used for a recreational trail.*
7 *A portion of a property that is used for as a campsite or campground at which overnight accommodation is provided by or on behalf of a public agency or as part of a commercial operation.*

The MECP notes that the above definition of a "Point of Odour Reception" is for screening purposes only. When assessing odour, the facility should consider additional points of odour reception such as commercial buildings, office buildings or outdoor areas where there is human activity."

In addition, the MECP provided proposed clarification of human odour receptors, as shown in **Table 5**.

Table 5: Proposed Clarification of Human Receptors (MECP 2016)

Receptor Category	Examples	Exposure Type	Type of Assessment
Permanent potential 24-hour sensitivity	Anywhere someone could sleep including any residence or house, motels, hospitals, senior citizen homes, campgrounds, farmhouse, etc.	Individual likely to receive multiple exposures	Considered sensitive 24 hours per day
Permanent daily hours but with definite periods of shutdown/closure	Schools, daycares, community centres, soccer fields, farmland, churches, bicycle paths, hiking areas, lakes, commercial or institutional facilities (with consideration of hours of operation such as night clubs, restaurants, etc.)	Individual could receive multiple exposures	Night-time or daytime exclusion only (consider all other hours)

Receptor Category	Examples	Exposure Type	Type of Assessment
Seasonal variations with clear restrictions on accessibility during the off season	Golf courses, amusement parks, ski hills, other clearly seasonal private property	Short term potential for exposure	Exclusions allowed for non-seasonal use
Transient	Open fields, roadways, easements, driveways, parking lots, pump houses	Very short-term potential for exposure, may not be a single resident exposed to multiple events	Generally, would not be included as human receptors unless otherwise specified.

Under the May 2021 Guideline, MECP recommends that Land use compatibility assessments of potential odour sources identify facilities with the potential to emit mixed odours under the following industrial tiers (refer to **Table 6**).

Table 6: Industrial Tiers for Odourous Activities and Processes

MECP Tier	Activities/Processes Requiring Assessment	MECP Industry Requirements
Not Applicable	• Foundries, Forest Products, Pulp and paper, Petroleum Refining, Petrochemical and Asphalt Mix	• Screen out of Odour Assessment requirements if registered to MECP Industry Specific Technical Standard
Tier 1	• Wastewater facilities with design capacity <25,0000 m^3/day • Paint and Coating Manufacturing • Portable Asphalt paving mixture and block manufacturing • Adhesive manufacturing • Printing ink manufacturing • Blowing or expanding foam products • Crematory • Meat and poultry processing • Landfills • Thermal treatment of waste (non-biomass) • Plastic extrusion or melting • Printing <100 kg/hour and <400 kg/hour • Process using resins • Scented products manufacturing <10 million kg/year • Spraying operations <10 litres/hour • Indoor waste transfer and/or processing station (residential or IC&I)	• Regulated industry • Require an up-to-date Best Management Practice Plan (BMPP) to ensure odours are minimized

MECP Tier	Activities/Processes Requiring Assessment	MECP Industry Requirements
Tier 2	• Wastewater facilities with design capacity >25,0000 m^3/day and <100,000 m^3/day • Paper, newsprint, and Paperboard mills • Asphalt paving mixture and block manufacturing • Asphalt shingle and coating material manufacturing • Cooking or drying animal products • Leaf and yard waste composting • Food frying • Printing >400 kg/hour • Scented products manufacturing >10 million kg/year • Wastewater sludge pelletization • Spraying operations >10 litres/hour • Vulcanized rubber product manufacturing • Outdoor waste transfer and/or processing station (residential or IC&I)	• Regulated industry • Require an up-to-date Best Management Practice Plan (BMPP) to ensure odours are minimized • If in compliance with MECP Industry Standard required to implement Odour controls • Potentially require an up-to-date Odour Technology Benchmarking Report
Tier 3	• Wastewater facilities with design capacity <100,000 m^3/day • Wet corn milling • Oilseed processing • Fat and oil refining and blending • Anaerobic digestion • Animal or poultry slaughtering • Biofuel production • Rendering or tallow production • Thermal Treatment of biomass, other than wood waste • Waste transfer and/or processing of putrescible waste	• Regulated industry • Require an up-to-date Best Management Practice Plan (BMPP) to ensure odours are minimized • If in compliance with MECP Industry Standard required to implement Odour controls • Potentially require an up-to-date Odour Technology Benchmarking Report

The May 2021 Guideline further recommends that the Recommended Minimum Separation Distance for assessment of odour be measured from the point of reception to the nearest source of odour, not property boundary to property boundary.

5.1.2.2 Dust

Ontario Regulation 419/05 also provides limits for dust, including limits for suspended particulates and dust fall. Under Reg. 419/05, these air quality limits must be met at the property line and all points beyond. This is not changed by the addition of the Project site. That is to say,

the existing mutual property line is already a point of reception for dust, and the limits must already be met at that location.

5.1.2.3 Cumulative Assessment

Cumulative impact assessments, examining the combined effects of individual industries, or the combined effects of industry and roadway emissions, are generally not required. Neither the PPS, the D-Series of guidelines, Regulation 419/05, or the current MECP odour assessment protocols require an assessment of cumulative impacts.

Which is not to say that such assessments are never warranted; rather, the need to do so is considered on a case-by-case basis, depending on the nature and intensity of the industrial operation(s), and the nature of the pollutants released. Based on the types of pollutants released by the industries in this area, cumulative effects assessments are not warranted.

5.1.2.4 Local Meteorology

Pre-processed Regional Meteorological data was obtained from the MECP website[3] to generate a wind rose. The surface wind data collected for Welland is from 1989 through 2018. The wind rose, as shown in **Figure 4**, represents the frequency of winds blowing from a certain wind direction.

As can be seen in the wind rose, predominant winds are from the western and southwest quadrants, while winds from the north and southeast quadrants may be the least frequent.

5.1.3 Site Visits – Odour and Dust Observations

A site visit was conducted to the area on May 9, 2023 by SLR personnel to identify significant sources of air quality emissions and to identify any significant sources of noise, vibration, odour, or dust in the area surrounding the Project site. During the site visit, the staff members observed existing industries from the sidewalks and other publicly accessible areas. Wind conditions during the site visit were noted as:

- May 9, 2023 north winds,11 km/h, 15 °C, 34 %RH

No odours or fugitive dust emissions were detected at the Project site during the site visit. Faint, intermittent asphalt-type odours were detected along Beaverdams Road, approximately 150 m south of the Rankin Asphalt facility. The odours were too infrequent to obtain a measurement using an olfactometer. Visible dust was not observed in the vicinity of the facility.

5.1.4 Ministry of Environment, Conservation and Park Facility Information

SLR recognizes that complaint history can be useful in evaluating land use compatibility. SLR typically requests potential complaints information for facilities located within the potential Area of Influence or where an industry is known to have the potential to generate significant air emissions.

SLR submitted a request related to neighbourhood complaint history with MECP through their Environmental Property Information (EPI) Program. The results are provided in **Appendix C**.

[3] https://www.ontario.ca/page/map-regional-meteorological-and-terrain-data-air-dispersion-modelling

Based on a review of the EPI results, incident reports are on record for the Rankin Asphalt property at 3299 Townline Road.

SLR advanced an FOI request for the property to review the incident reports to determine if they are related to air or noise emissions. A review of the EPI results for the property indicated that there are a variety of reports of interest related to the property. These documents include air permits, noise permits, incident reports, and abatement and occurrence reports. SLR advanced an FOI request to review relevant reports from 2016 to Present. At the time of preparation of this report a response from the FOI requests has not been received.

Although follow-up information has not been received, the results of these reports are not anticipated to change the findings of this report.

5.1.5 Assessment of Potential Air Emissions

The following facilities were identified as being within the Potential Area of Influence for their industrial classification and were identified to require additional review from an air quality perspective:

- Uppers Quarry; and
- Rankin Asphalt.

Further discussion regarding each of these facilities and potential air emissions is provided below.

All the other industries surrounding the Project site were outside of the Potential Area of Influence. Therefore, the development of the Project site is anticipated to be compatible with these facilities from an air quality perspective. In addition, emissions of dust, and/or odour at the Project are not anticipated. Furthermore, the Project site is not anticipated to limit the ability of these industries to obtain or maintain required MECP permits and approvals.

5.1.5.1 Proposed Upper's Quarry

The proposed Upper's Quarry will be located on Part of Lots 119, 120, 136 and 137 in the City of Niagara Falls. The proposed facility is located approximately 260 m east of the Project site. The facility will produce and distribute materials such as aggregate, sand, stone, and gravel. SLR received a copy of the report entitled *Air Quality Assessment For the Proposed Upper's Quarry*, completed by RWDI and dated October 26, 2021, submitted as part of the quarry application.

In addition to aggregate extraction and processing, the site will also include a hot mix asphalt batch plant capable of producing 4,900 tonnes per day.

Consideration of Contaminants and Particulates

The Project site is located approximately 260 m from the Proposed Upper's Quarry. A detailed assessment of air quality impacts from the proposed quarry operations was conducted and detailed in the report completed by RWDI. SLR reviewed the analysis and conclusions of this report. The assessment considered the maximum operating scenario reflecting maximum production and shipping operations during the multiple phases proposed for the quarry. The primary contaminants assessed were associated with airborne dust generated by the site and included total suspended particulate matter (TSP), inhalable particulate matter (PM_{10}), respirable particulate matter ($PM_{2.5}$) and crystalline silica.

Additional contaminants were also considered due to operation of on-site vehicles and heavy equipment, and operation of the asphalt plant. Sources of emissions considered in the assessment included:

- Drilling and blasting operations;
- Material crushing, screening, conveying, and stockpiling;
- Material handing operations (loaders loading haul trucks and highway trucks);
- Equipment travel over unpaved surfaces (haul trucks, loader, and highway trucks);
- Tailpipe emissions from on-site vehicles and heavy equipment; and
- Asphalt plant operations.

In determining emission rates for the above activities, an additional control efficiency of 95% was applied, considering implementation of a Best Management Practices Plan (BMPP) for dust. A dispersion modelling assessment was completed in accordance with the MECP guidelines to predict impacts at the identified sensitive receptors, which included a potential receptor approximately 240 m west of Thorold Townline Road, and just east of the Project site (Receptor 8). The maximum predicted modelled results at each sensitive receptor were added to 90th percentile background concentrations for a cumulative assessment.

The worst-case cumulative impacts at the potential receptor (R8) were 80%, 85%, 79% for TSP, PM_{10} and PM_{25} respectively. As this receptor is located just east of the Project site, it is considered representative of potential impacts at the Project site. However, the quarry assessment focused on emission sources within the facility property boundary only. Section B1.8.12.3 Aggregate Resources protection Policies of the Official Plan of the City of Thorold also requires that Thorold Townline Road be considered as a haul road for the quarry. To consider these potential impacts, SLR completed a quantitative study of road dust from Thorold Townline Road, including heavy-duty vehicle activity associated with the proposed Upper's Quarry.

Dispersion Modelling of Thorold Townline Road

Screening-level dispersion modelling was conducted to predict the additional particulate concentrations from the paved road traffic combined with the results from the proposed Upper's Quarry. Data from the air quality assessment for the quarry was used and a cumulative assessment was performed to determine the overall impacts from the quarry operations and road dust on Thorold Townline Road.

Emission rates from Thorold Townline Road, considering use as a haul road for the quarry, were calculated using US AP-42 Chapter 13.2.1 Paved Roads emission factors, traffic data for Thorold Townline Road plus the added haul truck frequency from the air quality assessment of the quarry. The future Annual Average Daily Traffic (AADT) for Thorold Townline Road between Beaverdams and Lundy's Lane, including the truck traffic from the proposed quarry is estimated to be 7,383 (based on provided traffic data, growth rates, and the Upper's Quarry assessments). Based on the information provided in the air and noise assessments for the quarry, a maximum of 56 haul trucks per hour was considered in this total AADT. A mean vehicle weight of 3.1 tonnes was used in the calculation.

The assessment was carried out using the U.S. EPA's AERMOD atmospheric dispersion model, as per Provincial guidance. Version 22112 of US EPA's AERMOD dispersion model was applied. Dispersion modelling was completed in accordance with the MECP's *Air Dispersion Modelling Guideline for Ontario, Version 4.0*, dated February 2017 (the "*ADMGO*").

The AERMOD modelling system is made up of the AERMOD dispersion model, the BPIP downwash model, and the AERMAP terrain pre-processor. Specifically, the following approved dispersion model and pre-processors were used in the assessment:

- AERMOD dispersion model (v. 22112);
- AERMAP surface pre-processor (v. 11103); and
- AERMET meteorological preprocessor (v. 22112).

The haul road was modelled as a line volume source with a total length of 1.06 km, including portions of both Upper's Lane and Thorold Townline Road.

The AERMOD input file is provided for reference in **Appendix D**.

Coordinate System

The Universal Transverse Mercator (UTM) coordinate system, as per Section 5.2.2 of the ADMGO was used to specify model object sources, buildings, and receptors. All coordinates were defined in the North American Datum of 1983 (NAD83).

Meteorology and Terrain

The AERMOD model was run using MECP pre-processed meteorological data collected from the London station between 1996 and 2000. The "RURAL" dataset was selected because the proposed development is surrounded by agricultural land. Five years were modelled to capture the worst-case meteorological conditions.

Available Canadian Digital Elevation Model terrain data in GeoTIFF format used in this assessment was obtained from the MECP online repository and parsed using the built-in processor with the Lakes Environmental AERMOD software package.[4]

Receptors

A grid of receptors were placed within the Project site, approximately every 20 m. One discrete receptor was also included to match Receptor 8 from the quarry air quality assessment. The discrete receptor from the air quality report for the quarry is east of the proposed development and closer to the roadway and quarry than the Project site, therefore the results are higher at the discrete receptor.

Results

The maximum model results occurred at the Receptor 8 location and are provided in **Table 7**. The results from the paved road model were added to the maximum results for Receptor 8 from the Upper's Quarry Air Quality Assessment (including background concentrations). This is a conservative estimate since all sources were not added into one model. The results show that the concentration of total particulate matter would meet the MECP limit at Receptor 8 (maximum predicted haul road model concentration) and would, therefore, also meet at the Project site. **Figure 5** shows the 24-hour POI Contour Plot for Particulate Matter.

[4] The files used were: cdem_dem_030M.tif

Table 7: AERMOD Modelling Results

Contaminant	Paved Road Emission Rate (g/s)	Max POI Concentration from paved road model (ug/m^3)	Averaging Period	MECP Limit (ug/m^3)	Maximum Cumulative Concentration from Quarry Operations (ug/m^3)	Total Concentration (ug/m^3)	Percentage of MECP Limit
Total Particulate Matter	0.0660 g/s	8.8	24-hr	120	96.3	105.2	88 %

Based on the results of air quality assessment completed for the proposed Upper's Quarry, and the additional assessment conducted by SLR to consider total particulate matter concentrations from Thorold Townline Road used as a haul road, the applicable MECP limits are anticipated to be met at the project site and mitigation measures are not anticipated to be required. Note that the assessments consider implementation of a Best Management Practices Plan for dust at the quarry, which is expected to be required as part of the quarry's environmental approval. It is recommended that a warning clause be included in agreements registered on Title for the residential units and included in all agreements of purchase and sale or lease and all rental agreements, noting the proximity of the Upper's Quarry and potential for dust to be visible at times.

Consideration of Odours

The asphalt plant is to become operational once Phases 1A and 1B have been extracted to the extent to allow for space for the plant. The asphalt plant location is proposed in the northeast corner of Phase 1, per the 2021 air quality study. Operation of the asphalt plant would require obtaining an ECA from the MECP, for which the Facility will need to show compliance at the property line for all contaminants. Emissions associated with the asphalt plant may include NO_2, PM, silica, benzene, benzo(a)pyrene (BaP), naphthalene, arsenic, lead, nickel. Odourous emissions are also associated with asphalt plants. In obtaining the ECA, the facility will be required to consider odour impacts at any existing sensitive receptor locations at the time of application.

The Project site will be located greater than 600 m from the proposed Asphalt Plant. Given this distance, and assuming the new asphalt plant is built in accordance with the latest industry standards, as per the MECP Sector Specific Requirements for Asphalt-Related Facilities described below, the asphalt plant is anticipated to be compatible with the Project site.

MECP Sector Specific Requirements for Asphalt-Related Facilities

The Asphalt Mix, Industry Standard[5] is a technical standard for the purposes of O. Reg. 419/05 (Air Pollution – Local Air Quality) made under the Environmental Protection Act, R.S.O. 1990, c. E.19.

The MECP implemented this standard October 27, 2020, with the purpose to regulate best practices at these facilities and minimize air, odour and dust emissions. The draft standard includes:

[5] Technical Standards to Manage Air Pollution: Asphalt mix - Industry standard | Ontario.ca

- performance limits (such as asphalt mix temperature limits);
- requirements for emissions control technology for Volatile Organic Compounds (VOC) and metal emissions;
- requirements to enclose certain operations within the facility;
- requirements for baghouse or wet scrubbers for drum-mix and batch-mix processes;
- reporting requirements;
- measurement and monitoring requirements of control equipment and their operating parameters;
- maintenance and inspection requirements; and
- requirements for a BMPP for odour and particulate matter.

The Project site is more than 500 m from the asphalt facility and, therefore, would not trigger the requirement of an Odour Management Plan under the Guideline. The 500 m requirement in the standard suggests that odour impacts outside of 500 m are low. Nonetheless, the industry standard will require more stringent emission controls and operating procedures at the facility to minimize potential air, odour, and dust emissions.

Should the plans for the proposed Upper's Quarry change, and the asphalt plant be located closer to the Project site, the need for odour mitigation measures may be warranted.

5.1.5.2 Rankin Asphalt

The Rankin Asphalt facility is a hot mix asphalt plant that is permitted to produce a maximum of 300 tonnes of asphalt per hour. The facility is located approximately 750 m north of the Project site. The facility operates under MECP ECA number 6254-7F3NWM, dated June 11, 2008. The permit is issued to Rankin Construction Inc. A copy of the MECP permit can be found in **Appendix B**.

Based on a review of the permit, air emission sources related to Rankin Asphalt include:

- Flow drum mixer;
- Batch tower with vibrating screen;
- Two hot mix asphalt storage silos;
- Two liquid asphalt cement storage tanks;
- Scavenger exhaust fan;
- Natural gas fired hot oil heaters;
- No. 2 Fuel oil heater; and
- Fugitive emissions resulting from delivery, storage, and transfer of materials.

Rankin Asphalt holds an ECA and is required to meet the applicable guidelines for air and noise emissions.

The facility has the potential for fugitive emissions of dust, odour and noise and is considered a Class III Heavy Industry. The Rankin Asphalt facility is located approximately 750 m north of the Project site. Therefore, the Project site is within the potential Area of Influence (1000m) however it is outside of the Recommended Minimum Separation Distance (300m).

Particulate emissions from the mixing operation are controlled by a baghouse dust collector equipped with 64 square meters of filter material.

During the site visit, no odours or fugitive dust emissions were detected at the Project site. Faint, intermittent asphalt-type odours were detected along Beaverdams Road, approximately 150 m south of the Rankin Asphalt facility. The odours were too infrequent to obtain a measurement using an olfactometer. Visible dust was not observed in the vicinity of the facility.

According to the ECA the facility is to “ensure that the Plant is operated and maintained at all times according to the Environmental Practices Guide for Ontario Hot Mix Asphalt Plants, published by the Ontario Hot Mix Producers Association, dated February 2002, or as amended.”

Based on these commitments in the ECA, it is expected that the Facility considers the 2020 MECP Sector Specific Requirements for Asphalt-Related Facilities (detailed above) for their operations. The Project site is more than 500 m from the asphalt facility and, therefore, would not trigger the requirement of an Odour Management Plan under the Guideline. The 500 m requirement in the standard suggests that odour impacts outside of 500 m are low. Nonetheless, the industry standard will require more stringent emission controls and operating procedures at the facility to minimize potential air, odour, and dust emissions.

There are existing residences along Thorold Towline Road to the east of the facility, the nearest residence being approximately 375 m east of the facility. If fugitive air emission levels from the Rankin Asphalt operations are not a concern at the existing residences, it is expected they will not be a concern at the Project site (750 m). In addition, the majority of air emissions emitted from this site will be fugitive in nature and anticipated to be at a relatively low elevation when dispersed off site.

Based on the use of emissions treatment measures at the facility, site-visit observations, MECP sector specific requirements for Asphalt facilities and that there are existing sensitive receptors located closer to the Rankin facility than the Project site; the development of the Project site is anticipated to be compatible with the Rankin facility from an air quality perspective. In addition, emissions of dust, and/or odour at the Project site are not anticipated. The Project site is not anticipated to limit the ability of Rankin Asphalt to obtain or maintain required MECP permits and approvals.

5.1.5.3 Future Uses

Though the existing zoning does not permit employment uses on the lands to the east of the Project site, the Official Plan envisions employment uses including Prestige Industrial and Light Industrial. Therefore, SLR completed a review of the permitted land uses under Employment Zones within the City of Thorold Comprehensive Zoning By-law No. 60-2019. It is expected that the lands identified as Prestige Industrial and Light Industrial would fall into the Employment Zone categories Prestige Employment (M1) and General Industrial (M2). The permitted uses have been classified in accordance with the MECP D-6 Guidelines in the following tables.

Table 8: D-6 Classification of the City of Thorold Zoning By-law No. 60-2019 – Prestige Employment

Land Use	Type of Operation	Industry Class	Area of Influence Distance (m)	Recommended Minimum Separation Distance (m)
Laboratory	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Light Manufacturing Establishment	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Light Service Shop	Self-contained minimal air/noise emissions	I	70	20
Office	N/A	N/A	N/A	N/A
Public Service Facilities	MECP Permits required for emissions to atmosphere	II	300	70
Research and Development	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70

Table 9: D-6 Classification of the City of Thorold Zoning By-law No. 60-2019 – General Industrial

Land Use	Type of Operation	Industry Class	Area of Influence Distance (m)	Recommended Minimum Separation Distance (m)
Bakery	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Building Supply Outlet	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Contractor's Facility	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Custom Workshop	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70

Land Use	Type of Operation	Industry Class	Area of Influence Distance (m)	Recommended Minimum Separation Distance (m)
Dry Cleaning Plant	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Equipment sales and rental establishment	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Farm Implement Dealer	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Heavy Manufacturing Establishment	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Heavy Service Shop	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Industrial Mall	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Industrial Use	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Laboratory	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Light Equipment/Machinery Rental Establishment	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Light Service Shop	Self-contained minimal air/noise emissions	I	70	20
Office	N/A	N/A	N/A	N/A
Public Service Facilities	MECP Permits required for emissions to atmosphere	II	300	70

Land Use	Type of Operation	Industry Class	Area of Influence Distance (m)	Recommended Minimum Separation Distance (m)
Research and Development	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Self-storage Establishment	Self-contained minimal air/noise emissions	I	70	20
Warehouse	Self-contained minimal air/noise emissions	I	70	20
Wholesale Establishment	Self-contained minimal air/noise emissions	I	70	20
Open/Outside Storage	Classification depends on intensity. Given surrounding land uses expected to be a Class I industry. MECP Permits required for emissions to atmosphere	I or II	70 or 300	20 or 70
Outside Display and Sales Area	Self-contained minimal air/noise emissions	I	70	20
Retail Uses Accessory to Industrial Uses	Self-contained minimal air/noise emissions	I	70	20
Storage Container	Self-contained minimal air/noise emissions	I	70	20
Showroom	Self-contained minimal air/noise emissions	I	70	20

The **Table 8** and **Table 9** employment uses have the following characteristics:

- Outputs: Sound, not audible off-property; low potential for fugitive emissions of dust or odour;
- Scale: limited outside storage;
- Process: Self-contained within buildings; and
- Operations/ Intensity: Infrequent movements of equipment and personnel.

Based on the above employment characteristics, existing surrounding zoning and residential uses envisioned in the Official Plan, size, and nature of the possible employment land uses, the majority of the possible uses are expected to be considered a Class I Light Industries under MECP Guideline D-6, with a 70 m Area of Influence and a Recommended Minimum Separation Distance of 20 m. Depending on the intensity of the employment uses, Class II Medium Industries may also occur. Under MECP Guideline D-6, Class II industries have a 300 m Area of Influence and a Recommended Minimum Separation Distance of 70 m.

A review of the wind frequency distribution for Welland, provided in **Figure 4**, identifies that the lands designated, and zoned Employment Areas are located predominantly downwind of the Project site. The winds which might direct potential emissions towards the Project site are predicted to occur less than 10 percent of the time.

Facilities with significant emissions to atmosphere are required, under the Environmental Protection Act, to ensure compliance with the applicable Provincial air quality regulations and standards and noise guidelines at the property boundary line and at all existing sensitive receptors and any elevated receptor locations.

Based on the above, the Project site development is anticipated to be compatible with future employment uses from an air quality perspective. Emissions of dust, or odour at the Project site are not anticipated. Further, the Project site is not anticipated to limit the ability of future industries to obtain or maintain required MECP permits or approvals.

5.2 Summary of Air Quality, Dust and Odour Conclusions and Recommendations

The potential for air quality emissions at the Project site including dust and odour have been assessed. Based on the information provided in the proposed Upper's Quarry air quality assessment, the Project site is anticipated to be compatible with this facility and the existing surrounding industries.

It is recommended that a warning clause be included in agreements registered on Title for the residential units and included in all agreements of purchase and sale or lease and all rental agreements, noting the proximity of the proposed Upper's Quarry and potential for dust to be visible at times. The recommended warning clause is provided in **Appendix E**.

6.0 Environmental Noise and Vibration Assessment

6.1 Stationary Sources

6.1.1 Environmental Noise Guidelines

6.1.1.1 MECP Publication NPC-300

The applicable MECP noise guidelines for new industrial land uses adjacent to residential/noise sensitive uses are provided in MECP Publication NPC-300. The guidelines set sound level limits for two main types of noise sources:

- Non-impulsive, "continuous" noise source such as from ventilation fans, mechanical equipment, and vehicles moving within the property boundary of an industry. Continuous noise is measured using 1-hour average sound levels (L_{eq} (1-hr) values), in dBA; and
- Impulsive noise, which is a "banging" type noise characterized by rapid rise time and decay. Impulsive noise is measured using a logarithmic mean (average) level (L_{LM}) of the impulses in a one-hour period, in dBAI.

Furthermore, the guideline requires an assessment at, and provides separate guideline limits for:

- Outdoor points of reception (e.g., back yards, communal outdoor amenity areas); and

- Façade points of reception, such as planes of windows on outdoor façades which connect to noise sensitive spaces such as living rooms, dens, eat-in kitchens, dining rooms and bedrooms.

The applicable sound level limits at a point of reception (POR) are the higher of:

- The existing ambient sound level due to road traffic, or
- The exclusion limits set out in the guideline.

Table 10 summarizes the exclusion limits from the guideline for continuous, non-impulsive sounds in a Class 2 area. Exclusion limits for impulsive sounds in a Class 2 area are summarized in **Table 11**.

Table 10:Minimum Exclusion Limits for Class 2 Areas – Continuous (Non-Impulsive) Sources

Time of Day	Hourly Sound Level Limit – Class 2 Area	
	Continuous Sources (Non-Impulsive)	
	Plane of Window of Noise-Sensitive Space	Outdoor Point of Reception
Daytime (0700-1900h)	50	50
Evening (1900-2300h)	50	45
Night-time (2300-0700h)	45	n/a[1]
Notes: [1] Sound level limits are not applicable during night-time hours at outdoor points of reception.		

As noted in **Table 10**, the guideline limits for infrequency generator testing are +5 dB higher than the exclusion limits. Limits for emergency generators apply only during routine testing; limits do not apply to emergency sources operating during emergency conditions.

Table 11:Minimum Exclusion Limits for Class 2 Areas – Impulsive Sources

Time of Day	Number of Impulses in a 1-hour Period	Hourly Sound Level Limit – Class 2 Area	
		Plane of Window of Noise-Sensitive Space	Outdoor Point of Reception
Daytime/Evening (0700-1900h)	9 or more	50	50
	7 to 8	55	55
	5 to 6	60	60
	4	65	65
	3	70	70
	2	75	75
	1	80	80
Night-time (2300-0700h)	9 or more	45	n/a[1]
	7 to 8	50	n/a[1]
	5 to 6	55	n/a[1]
	4	60	n/a[1]
	3	65	n/a[1]
	2	70	n/a[1]
	1	75	n/a[1]
Notes: [1] Sound level limits are not applicable during night-time hours at outdoor points of reception.			

6.1.1.2 Application of NPC-300 Guidelines

The stationary source guidelines apply only to residential land uses and to noise-sensitive commercial and institutional uses, as defined in NPC-300 (e.g., schools, daycares, hotels). For areas within the Project site, the stationary noise guidelines apply to:

- Individual residences;
- Communal indoor amenity areas; and
- Communal outdoor amenity areas.

All of the above have been considered as noise-sensitive PORs in the analysis.

The acoustic environment surrounding the proposed development is considered a Class 2 area, as roadway noise and industrial/commercial activities are expected to be audible during the daytime and evening, with lower sound levels at night-time.

6.1.1.3 City of Thorold Noise By-Law No. 37-2014

The City of Thorold Noise By-Law No. 37-2014 outlines General Prohibitions and Prohibitions by Time for sources of noise. The By-Law does not contain any quantitative sound level limits but does specify prohibitions by time for activities that could occur at existing or future facilities in proximity to the proposed development. Notably, the by-law specifies the following:

- 2.2 Prohibitions by Time

- 2.2.1 No Person shall, within the limits of the Municipality, cause or permit to be cause any noise resulting from any of the acts set out below, which noise is clearly audible at a point of reception:
- (3) the sound or Noise produced by an industrial property, not otherwise exempt from this by- law, between 11:00 pm of one day and 7:00 am of the following day.

Note, if industries have been granted approval by the MECP or the Ministry of Natural Resources (MNR), such as an ECA/EASR, they are exempt from the By-law provided they comply with the conditions of said approval.

6.1.1.4 Stationary Noise Guidelines Summary and Interpretation

The following presents a summary of the guidelines presented above.

- The applicable MECP guideline for assessing stationary source noise on new residential developments is Publication NPC-300.
- Class 2 limits from NPC-300 have been adopted for this study. A Class 2 area is defined as one where the acoustic environment during daytime hours is dominated by activities of people, usually road traffic (often referred to as urban hum). Evening and night-time background sound levels are defined by the natural environment and infrequent human activity.

It is assumed that by meeting night-time limits in NPC-300, the Prohibitions by Time noted in City of Thorold Noise By-Law No. 37-2014 with respect to nearby industries not holding an MECP or MNR approval would be met.

6.1.2 Site Visit and Observations

A site visit to the Project site and surrounding area related specifically to noise and vibration was completed by SLR staff on May 5, 2023 during daytime hours. The focus of the site visit was to identify nearby existing facilities with the potential to create stationary source noise at the proposed Project site.

SLR also reviewed aerial imagery and the MECP Access Environment database to identify nearby industries holding ECAs or EASR permits.

No stationary sources of noise were audible from the northern or eastern edges of the Project site during the site visit. Occasional vehicle pass-by events from Davis Road (Regional Road 58) and Thorold Townline Road (Regional Road 70) were audible at the Project site.

Discussion of stationary sources of interest is provided in the following subsection.

6.1.3 Stationary Noise Source of Interest

6.1.3.1 Proposed Upper's Quarry

Background

Walker Aggregate Inc. has submitted a Class 'A' License Application for a proposed quarry (herein referred to as "Upper's Quarry"), planned for Part Lots 119, 120, 136 and 137 in the City of Niagara Falls, Region of Niagara. Specifically, an application has been submitted for an Aggregate Resources Act (ARA) License, Niagara Region Official Plan Amendment, City of Niagara Falls Official Plan Amendment and Zoning By-law Amendment to permit the new quarry.

The status of the applications is not known at this time, but it is understood that the applications have not yet been approved as of the completion of this report.

An acoustic assessment was completed to support the applications, entitled “Walker Aggregates Inc. – Upper’s Quarry: Acoustic Assessment Report”, dated August 3, 2023 by RWDI Air Inc. (herein referred to as the “RWDI Quarry Noise Report”).

The proposed Upper’s Quarry is to be located on lands shown in **Figure 6**, approximately 260 m east of the proposed development. The quarry site is approximately 103.6 hectares (263 acres) in area.

Policy Considerations

The City of Thorold Official Plan includes a section related to the proposed quarry lands, Section B1.8.12.3 – Aggregate Resources Protection Policies. An excerpt of the Official Plan is included in **Appendix F**.

As the proposed development includes lands within the 500 m setback area from the potential bedrock resources area, in accordance with the City of Thorold Official Plan Section B1.8.12.3, the proposed Upper’s Quarry requires further assessment with respect to noise and assessment of land use compatibility with the proposed Upper’s Lane residential subdivision development.

6.1.3.2 Rankin Asphalt

Rankin Asphalt is an asphalt mixing plant located at 3299 Thorold Townline Road, more than 700 m north of the proposed development. As previously noted, the facility is considered a Class III industry based on MECP D-6 guidelines, with a 1000 m potential area of influence, and a 300 m minimum recommended setback distance.

During a site visit to the Project site and surrounding area on May 5, 2023, the Rankin Asphalt facility was not audible at the north end of the Project site. Furthermore, the Rankin Asphalt facility is required to meet applicable sound level limits at closer and more exposed noise-sensitive locations (within 400 m of the facility) along Thorold Townline Road, Niagara Falls Road, and along Beaverdams Road/Ontario 7186 located between the Project site and the facility.

As applicable sound level limits must be met by the facility at the closer and more exposed receptors, and it is expected that sound level limits would be met at the proposed development. A detailed quantitative noise assessment of Rankin Asphalt was not completed.

6.1.3.3 DMZ Paintball and Airsoft – Field Location

DMZ Paintball and Airsoft – Field Location is an outdoor paintball centre located a 2711 Thorold Townline Road, located more than 80 m east of the Project site property line. It is located more than 150 m from the nearest residential blocks proposed at the southern portion of the proposed development, and more than 200 m from the nearest residential blocks to the north.

SLR staff visited the facility during late morning and early afternoon hours on May 5, 2023. The facility did not have any staff or customers present, and no mechanical equipment or other sources of noise were observed within the property. Upon further review, it is understood that the Field Location is used when reserved for paintball and airsoft activities, which are expected to occur during daytime hours.

Due to the setback distance from the facility to the nearest residences, noise from the facility is not expected to be of concern at the proposed development. A detailed quantitative analysis was not completed.

6.1.3.4 Niagara Cricket Center

The Niagara Cricket Center is an outdoor park/cricket ground area located a 5114 Thorold Townline Road, near the southeast portion of the Project site.

SLR staff visited the facility during late morning and early afternoon hours on May 5, 2023. There were activities or sources of noise were observed within the property; noise would only be expected during playing of cricket matches. No observer bleachers or sitting areas are currently present at the facility.

Under Part B and Part C of the NPC-300 guidelines, noise resulting from gathering of people are facilities such as restaurants, fairs and parks are not considered stationary sources requiring assessment. A detailed analysis was therefore not completed.

6.1.3.5 Future Uses (Adjacent Lands)

The lands containing the DMZ Paintball and Airsoft – Field Location facility and the Niagara Cricket Center are designated in the Official Plan at Employment – Light Industrial. The lands further north and south, along the west side of Thorold Townline Road, are designated as Employment – Prestige Industrial. All lands are zoned Future Development.

Based on the industry characteristics summarized in **Table 8** and **Table 9** and considering current existing land uses zoned for noise-sensitive uses in the surrounding, sound levels at the proposed development would be expected to meet applicable guideline limits.

Furthermore, facilities with significant emissions to the atmosphere (i.e., some Class II and most Class III Heavy Industries) are required under the Environmental Protection Act to demonstrate compliance with the applicable Provincial noise guidelines at all existing sensitive points of reception, and future locations zoned for noise-sensitive uses. It is expected that future industrial facilities in the adjacent light industrial and prestige industrial employment areas with the potential for off-site noise or vibration emissions would be required to obtain an ECA or EASR permit prior to operating. Feasible mitigation measures could be included in their design in order to achieve compliance with the applicable noise guidelines. Thus, the Project site is not anticipated to limit the ability of these future industries to obtain or maintain required MECP permits or approvals. Therefore, further analysis of potential future uses is not required.

6.1.4 Stationary Noise Source Modelling

As discussed above, the focus of the stationary noise assessment is potential noise impacts from the proposed Upper's Quarry.

6.1.4.1 Sources of Information and Limitations

Detailed assessment of operational noise impacts from the proposed Upper's Quarry was completed based on information included in the RWDI Quarry Noise Report. SLR also obtained the Blast Impact Analysis report by Explotech Engineering Ltd., dated October 2021, which contained important information related to quarry phasing, sources of noise, sequencing of operation, and topographic elevation details.

SLR and the Client contacted Walker Aggregates Inc. directly on April 27, 2023 to request the acoustic modelling files used to prepare the RWDI Quarry Noise Report. No information has

been provided as of the date of this report. This information was requested as off-site noise impacts are significantly impacted by topography. Detailed topographic details were not provided in the RWDI Quarry Noise Report or the Blast Impact Analysis.

The RWDI Quarry Noise Report included sufficient information to reasonably reproduce the acoustic model and estimate off-site sound level impacts from the proposed Upper's Quarry at the Project site. The report included modelled sources and source geometries, operating times for most sources, and explanation of predictable worst-case operating scenario details for quarry operations.

SLR understands that the proposed Upper's Quarry applications are currently under review and not yet approved. Nonetheless, in the absence of other available information, details in the publicly available RWDI Quarry Noise Report were used as the basis for detailed noise assessment. All analysis and recommendations within this report related to the Upper's Quarry should be reviewed and revised under the following circumstances:

- Should there be any changes to or resubmissions of the acoustic assessment for the Quarry (including but not limited to changes in phasing/sequencing, source locations/geometries, source sound levels, and/or operating scenarios); and/or
- Should Walker Aggregates Inc. provide detailed acoustic model files from RWDI used to prepare the RWDI Quarry Noise Report (including detailed topographic details).

6.1.4.2 Sources of Noise – Proposed Upper's Quarry

Sources of noise are discussed in detail in excerpts from the RWDI Quarry Noise Report, included for reference in **Appendix G**. They are discussed in general detail in the following subsections.

Continuous Sources

Continuous sources considered in the assessment include the following:

- Working face (WF) and primary crusher sources operating during daytime hours only (0700h to 1900h);
- Conveyor from working face primary crusher to processing plant operating during daytime hours only (0700h to 1900h);
- Processing Plant (PP) sources;
  - Secondary and tertiary crushers/screen operating during daytime hours only (0700h to 1900h);
  - Loader and idling shipping trucks operating 24 hours/day;
- Asphalt plant (AP) sources operating continuously, 24 hours/day;
  - **Note:** The RWDI Quarry Noise Report only considers AP sources operating starting in Phase 3A. However, the Blast Impact Analysis report notes the AP could be operational in Phase 2A. Further clarification is required from Walker Aggregate Inc. regarding this detail.
- Internal haul truck routes operating between the Processing Plant and Asphalt Plant, 24 hours/day; and

- Shipping Truck Routes (aggregates from PP stockpiles to off-site, hot mix asphalt from AP to off-site, and receiving of asphalt cement (AC)/reclaim asphalt pavement (RAP) at AP.

Impulsive Sources

The asphalt plant silo is expected to generate impulsive noise, with more than 9 impulses in an hour. It is understood these impulses could occur during any daytime, evening or night-time hours during all quarry phases when the asphalt plant is operational.

6.1.4.3 Operating Scenarios – Proposed Upper's Quarry

Operating scenarios for this assessment were selected based review of the potential extraction scenarios (see **Appendix G**), review of sound level contours in the RWDI Quarry Noise Report for all modelled operating scenarios, and reproduction by SLR of the acoustic model for the proposed quarry. The following scenarios were considered in assessment of potential worst-case impacts with respect to the proposed Upper's Lane residential development:

- Phase 1A Sinking Cut (sinking cuts in mid-extraction area);
- Phase 1A South Sinking Cut (sinking cut in south extraction area);
- Phase 2A Sinking Cut (sinking cut in north extraction area);
- Phase 3A Extraction Operation the Asphalt Plant (AP) operational; and
- Impulse Noise from Asphalt Plant (AP) silo;

The four continuous source phases considered in this assessment generally include operation of quarry noise sources at worst-case topographic elevations, as sources including the primary crushers/working face drills are at their maximum elevations and therefore most exposed to the surroundings.

Sources in the '1B' and '2B' phases are located closer to the proposed 3 m berm surrounding the quarry lands and are expected to benefit more from shielding offered by the berm. This is supported by sound level contours shown in Appendix D – Alternate Extraction Scenarios in the RWDI Quarry Noise Report.

Phases beyond Phase 3A are expected to have sources operating in locations further east than Phases 1A/2A/3A. For Phases 4 and 5, secondary/tertiary processing plant sources are also understood to be concentrated at the centre of Phase 4, more than 900 m from the Project site property line, and at lower topographic elevations where they will be shielded by the quarry walls. Finally, contours in the RWDI Quarry Noise Report indicate the 50 dBA sound level contours are not expected to encroach into the proposed Upper's Lane residential development lands for any phases beyond Phase 2A.

Therefore, the four phases discussed above are representative of potential worst-case operations with respect to the proposed Upper's Lane residential development and are the focus of this assessment.

6.1.4.4 Modelling and Analysis

Sound levels from stationary sources were modelled using Cadna/A, a software implementation of the internationally recognized ISO-9613-2 environmental noise propagation algorithms. Cadna/A / ISO-9613 is the preferred noise model of the MECP. The ISO-9613 equations account for:

- Source to receiver geometry;
- Distance attenuation;
- Atmospheric absorption;
- Reflections off of the ground and ground absorption;
- Reflections off of vertical walls; and
- Screening effects of buildings, terrain, and purpose-built noise barriers (noise walls, berms, etc.).

The following additional parameters were used in the modelling, which are consistent with the RWDI Quarry Noise Report:

- Temperature: 10°C;
- Relative Humidity: 70%;
- Ground Absorption G: G = 0.2 within extraction limit of quarry, G = 0.8 outside of extraction limit
- Reflection: One (1) order of reflection;
- Wall Absorption Coefficients: Set to 0.37 (37% of energy is absorbed, 63% reflected); and
- Terrain: 0.5 m contours from the Ontario Geohub used for the area surrounding the proposed quarry. Topographic contours/elevations within the quarry were estimated based on presented Source Height in RWDI Quarry Report Table 1 (Noise Source Summary Table) and information contained in the Blasting Impact Analysis report.

A summary of the sound levels used in the analysis and equipment operating conditions is included in **Appendix G** excerpts.

The modelling assessment was complete in two phases:

1 Model Validation and comparison with results in RWDI Quarry Noise Report (noise source locations were based on Table 1: Noise Source Summary Table and Figures 2a, 2b, 2c and 2d, all included for reference in Appendix G).

2 Modelling of worst-case source locations within each operating scenario with respect to the proposed Upper's Lane residential development.

Source locations are shown for reference in Figure 7a, Figure 7b, Figure 8a, Figure 8b, Figure 9a, Figure 9b, Figure 10a, and Figure 10b.

6.1.5 Stationary Source Assessment Results

6.1.5.1 Predicted Sound Levels – Model Validation

The nearest PORs to the proposed Upper's Lane residential development and considered in the RWDI Quarry Noise Report are R1f and R1o, the façade and outdoor points of reception for the residence located at 10148 Beaverdams Road (north of the proposed Upper's Quarry).

Table 12 presents the results from the RWDI Quarry Noise Report for R1o and R1f, compared to the predicted sound levels from the reproduced model.

Table 12:Summary of Model Validation Sound Level Predictions – Proposed Upper's Quarry

Scenario	POR[1]	RWDI Quarry Noise Report Sound Levels (L_{eq} (1hr), dBA) [1]			SLR Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)		
		Day	Eve	Night	Day	Eve	Night
Phase 1A Sinking Cut	R1f	49	32	32	47	31	31
	R1o	46	30	--- [2]	46	30	--- [2]
Phase 1AS South Sinking Cut	R1f	44	30	30	44	30	30
	R1o	43	29	--- [2]	43	29	--- [2]
Phase 2A Sinking Cut	R1f	50	35	35	50	35	35
	R1o	50	34	--- [2]	49	34	--- [2]
Phase 3A Extraction	R1f	47	38	38	47	38	38
	R1o	47	36	--- [2]	47	37	--- [2]
Impulse Noise – Asphalt Plant Silo	R1f	39	39	39	39	39	39
	R1o	39	39	39	39	39	39

Notes: [1] Receptor identification and sound levels as presented in the RWDI Quarry Noise Report.
[2] There are no sound level limits during night-time hours at outdoor PORs.

A comparison of 4.5 m relative height sound level contours for each of the four scenarios is presented in **Figure I1, Figure I2, Figure I3 and Figure I4**, **Appendix I**.

The modelling results showed reasonable agreement, with discrepancies likely due to limitations noted previously in **Section 6.1.4.2**. The predicted daytime sound level at R1f for Phase 1A Sinking Cut is 2 dB off from the RWDI Quarry Noise Report, but otherwise, predicted sound levels are within 1 dB of each other. Predicted sound level contours towards the west, in the direction of the Upper's Lane residential development, also show reasonable agreement.

Therefore, the model was used to predict worst-case sound levels for the proposed Upper's Lane residential development.

6.1.5.2 Predicted Sound Levels – Worst-Case Operations for Upper's Lane Residential Development

Predicted worst-case sound levels for select PORs within the proposed Upper's Lane residential development are presented for the five worst-case scenarios discussed in **Section 6.1.4.3**. The sources were iteratively moved to estimate the worst-case source locations to generate the highest predicted sound levels for PORs in the proposed Upper's Lane development. Results are presented for each operating scenario in the following subsections.

PORs were placed at second-floor window, 4.5 m above grade, representing dwelling façade locations based on the Draft Plan of Subdivision and accompanying Concept Plan (refer to **Appendix A**).

2nd-storey facade receptors along the east side of the proposed Upper's Lane residential development were predicted to be worst-case compared to 1.5 m high outdoor points of reception during daytime operating scenarios (as they are compared to the same 50 dBA sound level limit). Evening and night-time sound levels were all predicted to be well below applicable sound level limits. Therefore, it is expected outdoor POR sound levels will be lower than those presented herein.

PORs are identified based on Lot/Block numbers and relatively locations in accordance with the Draft Plan of Subdivision.

A sample calculation output from Cadna/A is provided for reference in **Appendix H,** for the Phase 1A South Sinking Cut scenario at Block 30.

Phase 1A Sinking Cut

Predicted sound levels from the worst-case Phase 1A Sinking Cut scenario are presented in **Table 13** for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 4.5 m) are shown in **Figure 7a** (daytime) and **Figure 7b** (evening/night-time).

Table 13: Predicted Worst-Case Sound Levels – Phase 1A Sinking Cut

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 35 - N	44	30	30	50	50	45	Y / Y / Y
Block 35 - NE	45	30	30	50	50	45	Y / Y / Y
Block 35 - E	46	31	31	50	50	45	Y / Y / Y
Block 35 - E2	45	31	31	50	50	45	Y / Y / Y
Block 35 - S	46	32	32	50	50	45	Y / Y / Y
Block 18	47	33	33	50	50	45	Y / Y / Y
Block 36 - NE	47	33	33	50	50	45	Y / Y / Y
Block 36 - SE	49	35	35	50	50	45	Y / Y / Y
Block 36 - S	48	33	33	50	50	45	Y / Y / Y
Block 36 - SE2	48	34	34	50	50	45	Y / Y / Y
Block 38 - E	50	34	34	50	50	45	Y / Y / Y
Lot 10	51	35	35	50	50	45	**N** / Y / Y
Lot 13	51	35	35	50	50	45	**N** / Y / Y
Block 27	50	34	34	50	50	45	Y / Y / Y
Block 28	52	35	35	50	50	45	**N** / Y / Y
Block 30	54	34	34	50	50	45	**N** / Y / Y
Block 32	50	33	33	50	50	45	Y / Y / Y
Block 39 - NE	50	34	34	50	50	45	Y / Y / Y

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 39 - E	50	33	33	50	50	45	Y / Y / Y
Block 39 - SE	49	33	33	50	50	45	Y / Y / Y
Notes: [1] Selected PORs representing possible 2nd storey planes of windows within the proposed Upper's Quarry residential development.							

Sound levels are predicted to exceed daytime sound level limits by up to 4 dB in the southern portion of the proposed development, within Lot 10, Lot 13, Block 28 and Block 30. During the evening and night-time, sound levels are predicted to be below applicable limits. Investigation of mitigation measures will be required to meet applicable daytime sound level limits at all locations during Phase 1A Sinking Cut quarry operations. Refer to **Section 6.1.6**.

Phase 1A South Sinking Cut

Predicted sound levels from the worst-case Phase 1AS South Sinking Cut scenario are presented in **Table 14** for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 4.5 m) are shown in **Figure 8a** (daytime) and **Figure 8b** (evening/night-time).

Table 14: Predicted Worst-Case Sound Levels – Phase 1A South Sinking Cut

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 35 - N	43	29	29	50	50	45	Y / Y / Y
Block 35 - NE	44	29	29	50	50	45	Y / Y / Y
Block 35 - E	44	30	30	50	50	45	Y / Y / Y
Block 35 - E2	44	30	30	50	50	45	Y / Y / Y
Block 35 - S	45	31	31	50	50	45	Y / Y / Y
Block 18	46	31	31	50	50	45	Y / Y / Y
Block 36 - NE	46	32	32	50	50	45	Y / Y / Y
Block 36 - SE	48	33	33	50	50	45	Y / Y / Y
Block 36 - S	47	32	32	50	50	45	Y / Y / Y
Block 36 - SE2	47	32	32	50	50	45	Y / Y / Y
Block 38 - E	51	34	34	50	50	45	**N** / Y / Y
Lot 10	52	35	35	50	50	45	**N** / Y / Y
Lot 13	53	35	35	50	50	45	**N** / Y / Y

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 27	52	34	34	50	50	45	**N** / Y / Y
Block 28	53	35	35	50	50	45	**N** / Y / Y
Block 30	53	35	35	50	50	45	**N** / Y / Y
Block 32	53	36	36	50	50	45	**N** / Y / Y
Block 39 - NE	52	34	34	50	50	45	**N** / Y / Y
Block 39 - E	52	34	34	50	50	45	**N** / Y / Y
Block 39 - SE	52	33	33	50	50	45	**N** / Y / Y
Notes: [1] Selected PORs representing possible 2nd storey planes of windows within the proposed Upper's Quarry residential development.							

Sound levels are predicted to exceed daytime sound level limits by up to 3 dB in many locations within the southern portion of the proposed development. During the evening and night-time, sound levels are predicted to be well below applicable limits. Investigation of mitigation measures will be required to meet applicable daytime sound level limits at all locations during Phase 1A South Sinking Cut quarry operations. Refer to **Section 6.1.6**.

Phase 2A Sinking Cut

Predicted sound levels from the worst-case Phase 2A Sinking Cut scenario are presented in **Table 15** for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 4.5 m) are shown in **Figure 9a** (daytime) and **Figure 9b** (evening/night-time).

Table 15: Predicted Worst-Case Sound Levels – Phase 2A Sinking Cut

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 35 - N	50	33	33	50	50	45	Y / Y / Y
Block 35 - NE	51	34	34	50	50	45	N / Y / Y
Block 35 - E	52	35	35	50	50	45	N / Y / Y
Block 35 - E2	51 $_{eq}$	34	34	50	50	45	**N** / Y / Y
Block 35 - S	52	35	35	50	50	45	**N** / Y / Y
Block 18	52	36	36	50	50	45	**N** / Y / Y
Block 36 - NE	53	36	36	50	50	45	**N** / Y / Y
Block 36 - SE	54	37	37	50	50	45	**N** / Y / Y
Block 36 - S	51	35	35	50	50	45	**N** / Y / Y

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 36 - SE2	52	36	36	50	50	45	**N** / Y / Y
Block 38 - E	48	32	32	50	50	45	Y / Y / Y
Lot 10	48	33	33	50	50	45	Y / Y / Y
Lot 13	48	33	33	50	50	45	Y / Y / Y
Block 27	48	32	32	50	50	45	Y / Y / Y
Block 28	48	33	33	50	50	45	Y / Y / Y
Block 30	47	32	32	50	50	45	Y / Y / Y
Block 32	46	31	31	50	50	45	Y / Y / Y
Block 39 - NE	47	32	32	50	50	45	Y / Y / Y
Block 39 - E	46	31	31	50	50	45	Y / Y / Y
Block 39 - SE	46	30	30	50	50	45	Y / Y / Y

Notes: [1] Selected PORs representing possible 2nd storey planes of windows within the proposed Upper's Quarry residential development.

Sound levels are predicted to exceed daytime sound level limits by up to 4 dB in the northern portion of the proposed development. During the evening and night-time, sound levels are predicted to be well below applicable limits. Investigation of mitigation measures will be required to meet applicable daytime sound level limits at all locations during Phase 2A Sinking Cut quarry operations. Refer to **Section 6.1.6**.

Phase 3A Operations

Predicted sound levels from the worst-case Phase 3A Extraction operation scenario are presented in **Table 16** for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 4.5 m) are shown in **Figure 10a** (daytime) and **Figure 10b** (evening/night-time).

Table 16: Predicted Worst-Case Sound Levels – Phase 3A Extraction Operations

POR[1]	Predicted Quarry Sound Levels (L_{eq} (1hr), dBA)			Applicable Sound Level Limit (L_{eq} (1hr), dBA)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 35 - N	46	38	38	50	50	45	Y / Y / Y
Block 35 - NE	47	38	38	50	50	45	Y / Y / Y
Block 35 - E	48	39	39	50	50	45	Y / Y / Y
Block 35 - E2	47	39	39	50	50	45	Y / Y / Y
Block 35 - S	48	40	40	50	50	45	Y / Y / Y
Block 18	48	40	40	50	50	45	Y / Y / Y
Block 36 - NE	49	41	41	50	50	45	Y / Y / Y
Block 36 - SE	49	42	42	50	50	45	Y / Y / Y
Block 36 - S	48	42	42	50	50	45	Y / Y / Y
Block 36 - SE2	48	42	42	50	50	45	Y / Y / Y
Block 38 - E	47	43	43	50	50	45	Y / Y / Y
Lot 10	48	44	44	50	50	45	Y / Y / Y
Lot 13	48	45	45	50	50	45	Y / Y / Y
Block 27	47	44	44	50	50	45	Y / Y / Y
Block 28	48	45	45	50	50	45	Y / Y / Y
Block 30	48	44	44	50	50	45	Y / Y / Y
Block 32	47	44	44	50	50	45	Y / Y / Y
Block 39 - NE	47	44	44	50	50	45	Y / Y / Y
Block 39 - E	47	43	43	50	50	45	Y / Y / Y
Block 39 - SE	46	43	43	50	50	45	Y / Y / Y

Notes: [1] Selected PORs representing possible 2nd storey planes of windows within the proposed Upper's Quarry residential development.

Sound levels are predicted to meet applicable sound level limits during daytime, evening and night-time hours. Additional mitigation to address quarry noise during Phase 3A and beyond is not predicted to be required.

Impulse Noise

Predicted sound levels from impulse noise associated with the asphalt plant silo are presented in **Table 17** for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 4.5 m) are shown in **Figure 11** (daytime/evening/night-time).

Table 17: Predicted Worst-Case Sound Levels – Impulse Noise

POR[1]	Predicted Quarry Sound Levels L_{LM},1hr (dBAI)			Applicable Sound Level Limit L_{LM},1hr (dBAI)			Compliance with Limit? Day / Eve / Night (Yes/No)
	Day	Eve	Night	Day	Eve	Night	
Block 35 - N	35	35	35	50	50	45	Y / Y / Y
Block 35 - NE	35	35	35	50	50	45	Y / Y / Y
Block 35 - E	35	35	35	50	50	45	Y / Y / Y
Block 35 - E2	36	36	36	50	50	45	Y / Y / Y
Block 35 - S	37	37	37	50	50	45	Y / Y / Y
Block 18	37	37	37	50	50	45	Y / Y / Y
Block 36 - NE	37	37	37	50	50	45	Y / Y / Y
Block 36 - SE	39	39	39	50	50	45	Y / Y / Y
Block 36 - S	39	39	39	50	50	45	Y / Y / Y
Block 36 - SE2	39	39	39	50	50	45	Y / Y / Y
Block 38 - E	41	41	41	50	50	45	Y / Y / Y
Lot 10	42	42	42	50	50	45	Y / Y / Y
Lot 13	43	43	43	50	50	45	Y / Y / Y
Block 27	42	42	42	50	50	45	Y / Y / Y
Block 28	43	43	43	50	50	45	Y / Y / Y
Block 30	42	42	42	50	50	45	Y / Y / Y
Block 32	41	41	41	50	50	45	Y / Y / Y
Block 39 - NE	42	42	42	50	50	45	Y / Y / Y
Block 39 - E	41	41	41	50	50	45	Y / Y / Y
Block 39 - SE	41	41	41	50	50	45	Y / Y / Y

Notes: [1] Selected PORs representing possible 2nd storey planes of windows within the proposed Upper's Quarry residential development.

Sound levels due to impulse noise are predicted to meet applicable sound level limits during daytime, evening and night-time hours. Additional mitigation to address impulse noise is not predicted to be required.

6.1.6 Mitigation Recommendations and Next Steps

Due to predicted excesses of daytime sound level limits during daytime hours in the Phase 1A Sinking Cut, Phase 1AS South Sinking Cut, and Phase 2A Sinking Cut operating scenarios, potential mitigation measures were investigated to show the proposed development can be compatible with the proposed Upper's Quarry.

Potential mitigation scenarios were investigated considering strategic design of the east side of the proposed development and/or physical mitigation measures potentially located on the proposed development lands, intervening lands owned by others, and on the proposed Upper's Quarry lands (owned by Walker Aggregates Inc.).

The option selected for presentation herein is currently considered feasible from an administrative, economic and technical perspective. The approach is intended to show the proposed development is compatible with the surrounding future environment with respect to noise.

6.1.6.1 Mitigation Measures at Proposed Development

The presented mitigation option (based on the current mitigation measures proposed for the Upper's Quarry) is to complete a partial build-out of the proposed development lands, excluding the eastern portions of the property, as shown in **Figure 12**. Earthen berms (or berm/barrier combinations) can be constructed to shield constructed dwellings from noise associated with the proposed quarry operations. Estimated berm heights are summarized below, and the locations are shown in **Figure 13**, **Figure 14** and **Figure 15**.

- South Portion of Site – Berm 6 m high from approximately the west edge of Lot 10 down to the south edge of Block 32;
- North Portion of Site – Berm 5 m high from north edge of Block 35 down to the south edge of Block 36;

Predicted mitigated sound levels within the proposed development are also shown on **Figure 13** (Phase 1A Sinking Cut), **Figure 14** (Phase 1A South Sinking Cut), and **Figure 15** (Phase 2A Sinking Cut).

It is recognized that this approach may result in a temporary zoning hold being place on these portions of the proposed development. The recommended timing of construction should consider actual construction and operation of the proposed Upper's Quarry, assuming it will be approved. Construction of the earthen berm (or berm/barrier combination) would not need to be completed until the first phase of the quarry is operational.

Once quarry operations have progressed sufficiently to the east in later phases where sound levels no longer exceeded applicable limits, the berms could be removed and the full build-out completed. The timing of this would be uncertain and would require information from and cooperation with Walker Aggregates Inc. and may include a combination of both modelling analysis and on-site measurements to establish appropriate timing.

The berm/barrier recommendations to achieve compliance are also heavily influenced by the topography of the proposed Upper's Lane residential development. Therefore, the analysis should be reviewed, and berm/barrier heights confirmed once final detailed grading of the proposed development lands has been established.

6.1.6.2 Recommended Next Steps

It has been shown that when considering worst-case off-site operational sound levels from the proposed Upper's Quarry at the proposed Upper's Lane residential development, it is feasible to achieve land use compatibility without hindering or precluding quarry operations.

Final selection of mitigation measures should be revisited under several circumstances.

Firstly, future discussions with Walker Aggregates Inc. the municipality/planning authorities or other nearby landowners may require investigation of other mitigation approaches.

Furthermore, any berm (or berm/barrier combination) heights would need to be re-evaluated once detailed grading of the proposed Upper's Lane residential development site is developed. The berm/barriers heights could be reduced through strategic grading of the site, to break the line of sight between quarry sources and residential dwellings along the eastern edge of the proposed development.

As noted in the Official Plan, Section B1.8.12.3, once necessary mitigation is incorporated into the proposed development, if necessary, the utilization of such mitigation measures does not relieve the new mineral aggregate operation from providing appropriate setbacks and mitigation measures in order to achieve land use compatibility. The mitigation approach must therefore be re-evaluated under the following circumstances:

- Should there by any changes to the acoustic model or assessment outlined in the RWDI Quarry Noise Report during or after review of the quarry-related applications (including but not limited to changes in phasing/sequencing, source locations/geometries, source sound levels, operating scenarios and/or mitigation measures); and/or
- Should Walker Aggregates Inc. provide detailed acoustic model files from RWDI used to prepare the RWDI Quarry Noise Report (including detailed topographic details).

6.2 Transportation Sources

Transportation sources of interest with the potential to produce road traffic noise at the proposed development include:

- Thorold Townline Road (Regional Road 70);
- Davis Road (Regional Road 58);
- Barker Parkway; and
- Upper's Lane.

Road traffic volumes on other internal roads within the Rolling Meadows residential development are low compared to the roadways noted above. Therefore, road traffic noise from internal roadways has not been assessed further.

There are no railways within 1000 m of the proposed development, and there are no aircraft related sources within 13 km of the Project site. Therefore, rail noise and aircraft noise have not been considered further in this assessment.

Road noise from Thorold Townline Road, Davis Road, Barker Parkway and Upper's Lane has been predicted, and this information has been used to identify façade, ventilation, and warning clause recommendations for the proposed development.

6.2.1 Transportation Noise Guidelines – MECP Publication NPC-300

6.2.1.1 Noise-Sensitive Development

Ministry of the Environment, Conservation and Parks (MECP) Publication NPC-300 provides sound level criteria for noise-sensitive developments. The applicable portions of NPC-300 are Part C – Land Use Planning and the associated definitions outlined in Part A – Background. **Tables 18** to **21** summarize the applicable surface transportation (road and rail) criteria.

6.2.1.2 Location-Specific Criteria

Table 18 summarizes criteria in terms of energy equivalent sound exposure (L_{eq}) levels for specific noise-sensitive locations. Both outdoor and indoor locations are identified, with the focus of outdoor areas being amenity spaces. Indoor criteria vary with sensitivity of the space. As a result, Sleeping Quarters have more stringent criteria than Living/Dining room spaces.

Table 18: NPC-300 Sound Level Criteria for Road and Rail Noise

Type of Space	Time Period	Energy Equivalent Sound Exposure Level L_{eq} [5] (dBA)		Assessment Location
		Road	Rail [1]	
Outdoor Amenity Area	Daytime (0700-2300h)	55	55	Outdoors [2]
Living/Dining Room [3]	Daytime (0700-2300h)	45	40	Indoors [4]
	Night-time (2300-0700h)	45	40	Indoors [4]
Sleeping Quarters	Daytime (0700-2300h)	45	40	Indoors [4]
	Night-time (2300-0700h)	40	35	Indoors [4]

Notes:
[1] Whistle noise is excluded for OLA noise assessments and included for Living/Dining Room and Sleeping Quarter assessments, where applicable.
[2] Road and Rail noise impacts are to be combined for assessment of OLA impacts.
[3] Residence area Dens, Hospitals, Nursing Homes, Schools, Daycares are also included. During the nighttime period, Schools and Daycares are excluded.
[4] An assessment of indoor noise levels is required only if the criteria in Table 21 are exceeded.
[5] L_{eq} – the energy equivalent sound exposure level, integrated over the time period shown.

6.2.1.3 Outdoor Living Areas

Table 19 summarizes the noise mitigation requirements for communal outdoor amenity areas ("Outdoor Living Areas" or "OLAs").

For the assessment of outdoor sound levels, total surface transportation noise is determined by combining road and rail traffic sound levels. Whistle noise from trains is not included in the determination of outdoor sound levels.

Table 19: NPC-300 OLA Sound Level Criteria for Road and Rail Noise

Time Period	OLA Energy Equivalent Sound Level L_{eq} (dBA)	Mitigation Requirements/Warning Clause Recommendations
Daytime (0700-2300h)	≤ 55	• None
	56 to 60 inc.	• Noise barrier OR Type A Warning Clause
	> 60	• Noise barrier to reduce noise to 55 dBA OR • Noise barrier to reduce noise to 60 dBA and Type B Warning Clause

6.2.1.4 Ventilation and Warning Clauses

Table 20 summarizes recommendations for ventilation where windows would potentially have to remain closed as a means of noise control. Despite implementation of ventilation measures where recommended, if sound levels exceed the guideline limits in **Table 18**, warning clauses advising future occupants of the potential excesses are also recommended. Warning clauses also apply to OLAs.

Table 20: NPC-300 Ventilation and Warning Clause Recommendations

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} (dBA)		Ventilation and Warning Clause Recommendations [2]
		Road	Rail [1]	
Outdoor Living Area	Daytime (0700-2300h)	56 to 60 incl.		Type A Warning Clause
Plane of Window	Daytime (0700-2300h)	≤ 55		None
		56 to 65 incl.		Forced Air Heating with provision to add air conditioning + Type C Warning Clause
		> 65		Central Air Conditioning + Type D Warning Clause
	Night-time (2300-0700h)	51 to 60 incl.		Forced Air Heating with provision to add air conditioning + Type C Warning Clause
		> 60		Central Air Conditioning + Type D Warning Clause

Notes: [1] Whistle noise is excluded from assessment.
[2] Road and Rail noise is combined for determining Ventilation and Warning Clause requirements

6.2.1.5 Building Component Requirements

Table 21 provides sound level thresholds which, if exceeded, trigger a requirement for the building shell components (i.e., exterior walls, windows) to be designed accordingly to meet the applicable indoor sound criteria.

Table 21: NPC-300 Building Components Assessment

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} (dBA)		Component Requirements
		Road	Rail [1]	
Plane of Window	Daytime (0700-2300h)	> 65	> 60	Designed/ Selected to Meet Indoor Requirements [2]
	Night-time (2300-0700h)	> 60	> 55	

Notes: [1] Whistle noise is included in assessment
[2] Building component requirements are assessed separately for Road and Rail, and then combined for a resultant sound isolation parameter.

6.2.2 Road Traffic Data

Year 2021 mid-block Automated Traffic Recorder (ATR) data for the northbound and southbound lanes of Thorold Townline Road (Regional Road 70), between Beaverdams Road (north) and Lundy's Lane (south) was obtained from Niagara Region Transportation Services Division. The data included classification of vehicles used to calculate automobile, medium and heavy truck percentages. The volumes were projected to future year 2044 (i.e., a 20-year projection as required by Niagara Region) at an annual growth rate of 2.0%, which was provided by the transportation consultant on the project. Worst-case hourly truck volumes from the proposed Upper's Quarry (based on the RWDI AAR), across a 16-hour daytime and 8-hour night-time period, were added as heavy trucks to the future year 2044 traffic volumes along Thorold Townline Road. The heavy truck percentage was recalculated to account for these additional trucks, assuming the Upper's Quarry will be fully operational. Day/night percentages were also calculated based on the ATR data and additional heavy truck traffic from the proposed Upper's Quarry.

Year 2019 AADT data from the Ontario Ministry of Transportation (MTO) was obtained for Davis Road (Regional Road 58), between Lundy's Lane (south) and Beaverdams Road (north). The volumes were projected to future year 2044 at an annual growth rate of 2.0% per year. Day/night splits of 90%/10% were applied, based on default MECP distributions from the ORNAMENT document. Medium and heavy truck percentages of 5.0% and 8.0%, respectively, were assumed based on typical percentages for municipal highways.

For internal roads within the Rolling Meadows subdivision area, TMC data collected in May 2023 by Spectrum was provided by the project transportation consultant (Crozier Consulting Engineers). The peak hour data were processed to estimate AADT volumes for the internal subdivision roadways, and to calculate the medium/heavy truck percentages. AADT volumes for Barker Parkway and Upper's Lane were projected to future year 2044 at an annual growth rate of 2.0% per year. Day/night splits of 90%/10% were applied, based on default MECP distribution from the ORNAMENT document.

Projected AADT volumes of other internal roadways were determined to be sufficiently low (less than 1,000 vehicles per day) that transportation sound levels were not modelled.

Copies of traffic data and calculations are provided for reference in **Appendix J**. **Table 22** summarizes the road traffic data used in the analysis.

Table 22: Summary of Road Traffic Data Used in Transportation Analysis

Roadway Link	Future Traffic Volume AADT	% Day/Night Volume Split		Commercial Vehicle Breakdown		Vehicle Speed (km/hr)
		Daytime	Night-time	% Medium Trucks	% Heavy Trucks	
Thorold Townline Road	7,503	88	12	4.0	21.6	80
Davis Road – South of Ontario 7186	8,777	90	10	5.0	8.0	80
Upper's Lane	5,382	90	10	4.7	0.7	40
Barker Parkway	4,484	90	10	5.6	0.0	40
Notes: [1] Future Year 2044 AADT volumes were calculated based on an annual growth rate of 2.0% from the base data year.						

6.2.3 Predicted Sound Levels

Future road traffic sound levels at the proposed development were predicted using STAMSON v5.04, which contains the ORNAMENT road traffic noise model. STAMSON v5.04 is the preferred road traffic noise model of the MECP.

Worst-case representative assessment locations were selected based on the Draft Plan of Subdivision and associated Concept Plan (**Appendix A**). Sound levels at building facades were predicted at heights of 4.5 m above grade, representing potential worst-case 2nd-storey bedrooms windows. Outdoor living area sound levels were assessed at heights of 1.5 m above grade, 3 m from the centre of approximated building façade locations, in accordance with guidance in the ORNAMENT document.

Intervening ground was considered to be absorptive. Self-screening from buildings was considered in the analysis.

Sample calculations from STAMSON v5.04 are provided for reference in **Appendix J**.

It is recommended that once detailed Block layouts are developed for the proposed development that all predicted sound levels and associated conclusions for Transportation Sources are reviewed by an acoustics consultant.

6.2.3.1 Façade Sound Levels

Predicted façade sound levels due to road traffic are presented in **Table 23** for select worst-case locations throughout the proposed development. Daytime and night-time sound levels for the locations in **Table 23** are shown on **Figure 16** (daytime) and **Figure 17** (night-time).

The highest daytime/night-time sound levels of 56 dBA/49 dBA are predicted to be at dwellings along Upper's Lane at the southeast end of the proposed development.

Table 23: Summary of Predicted Worst-Case Transportation Façade Sound Levels

Assessment Location	Facade	Roadways	Maximum Predicted Road Traffic Sound Levels	
			L_{eq} Daytime (dBA)	L_{eq} Night-time (dBA)
Block 32 – South	East	Upper's Lane, Thorold Townline Road	56	49
	South		57	50
Block 39 – Southeast	East	Upper's Lane, Thorold Townline Road	55	49
	South		56	50
Block 39 – Southwest	East	Upper's Lane, Barker Parkway	54	47
	South		54	48
Block 33 – Northwest	North	Davis Road	54	48
	West		51	45
Block 35 – Northeast	East	Thorold Townline Road	52	46
	South		49	43
Lot 6	West	Davis Road, Barker Parkway	47	41
	South		41	34
Notes: [1] Building façade roadway sound levels are shown in **Figure 16** (daytime) and **Figure 17** (night-time).				

The façade roadway sound levels are predicted to be below 65 dBA and 60 dBA during the daytime and night-time periods, respectively (i.e., the thresholds described in **Table 21**) at all locations within the proposed development. Therefore, an assessment of building components is not required.

6.2.3.2 Outdoor Living Area Sound Levels

Predicted outdoor sound levels due to road traffic are presented in **Table 24** and **Figure 18** for select worst-case locations throughout the proposed development. It was assumed that all dwellings could have a rear-yard outdoor living area (OLA).

The highest daytime sound level of 57 dBA is predicted at dwellings backing towards Upper's Lane at the south end of the proposed development.

Table 24: Summary of Predicted Worst-Case Transportation Façade Sound Levels

Project Location	Roadways	Maximum Predicted Road Traffic Sound Levels
		L_{eq} Daytime (dBA)
Block 32 – South	Upper's Lane, Thorold Townline Road	55
Block 39 – Southeast	Upper's Lane, Thorold Townline Road	57
Block 39 – Southwest	Upper's Lane, Barker Parkway	55
Block 33 – Northwest	Davis Road	50
Block 35 – Northeast	Thorold Townline Road	49
Lot 6	Davis Road, Barker Parkway	47

As the OLA sound levels at some locations are above 55 dBA, warning clauses are recommended. Refer to **Section 6.2.4.2**. No physical mitigation measures (e.g., barriers) are recommended.

6.2.4 Noise Control Measures

6.2.4.1 Façade Recommendations

An assessment of indoor noise levels is not required because façade sound levels due to road traffic do not exceed 65 dBA during daytime hours or 60 dBA during night-time hours at any project locations.

Exterior wall and window (glazing) assemblies meeting the minimum non-acoustical requirements of the Ontario Building Code (OBC) are expected to be sufficient to meet the indoor sound level guidelines of the MECP.

6.2.5 Ventilation and Warning Clause Recommendations

The triggers for warning clauses are summarized in **Table 20**. Where recommended, the warning clauses should be included in agreements registered on Title for the residential units and included in all agreements of purchase and sale or lease and all rental agreements.

Based on the predicted façade and outdoor road traffic sound levels, an MECP Type C warning clause and the provision for adding central air conditioning at a later date are recommended for the southmost unit of Block 32. There are no other ventilation recommendations for the proposed development.

As road traffic sound levels are predicted exceed 55 dBA at dwellings in Block 39 with backyards facing south towards Upper's Lane, an MECP Type A warning clause is recommended for these dwellings.

Furthermore, due to the proximity and predicted sound levels associated with the proposed Upper's Quarry, an MECP Type E warning clause is recommended for all Lots/Blocks within the Aggregate Impact Area (i.e., within 500 m of the proposed Upper's Quarry lands), should the Upper's Quarry be approved. The exact Lot/Block locations to which the warning clause should be applied should be confirmed when detailed Block plans are developed for the following:

- Blocks 18 to 21, Blocks 25 to 32, Block 38, Block 29, Blocks 34 to 36
- Lots 7 to 13, and Lots 14 to 17

All warning clause recommendations are summarized in **Appendix E**.

6.3 Environmental Vibration

6.3.1 Existing Industrial Vibration Sources

Based on the site visit completed by SLR staff on May 5, 2023, there are no existing industrial vibration sources (such as large stamping presses or forges) located in the surrounding area. Industrial vibration from existing sources is not a concern for the proposed development and an assessment of vibration impacts was not completed.

6.3.2 Transportation Vibration Sources

As the closest railway corridor is located greater than 75 m from the proposed development, a detailed vibration assessment is not required. Transportation-related vibration is not anticipated to be of concern for the proposed development, and a detailed assessment was not completed.

6.3.3 Blasting Activities – Proposed Upper's Quarry

A blast impact analysis was also completed to support the Walker Aggregates Inc. Upper's Quarry applications, entitled "Blast Impact Analysis – Uppers Quarry", dated August 2023 by Explotech Engineering Ltd. (herein referred to as the "Explotech Blast Impact Analysis").

As part of the analysis, vibration levels due to blasting were assessed in accordance with the MECP Model Municipal Noise Control By-Law with regards to guidelines for blasting in mines and quarries.

The closest distance from the proposed Upper's Lane development to the Upper's Quarry is approximately 260 m.

The Explotech Blast Impact Analysis considered several vibration-sensitive receptors at closer distances, down to 63 m from the Upper's Quarry license boundary. Other vibration-sensitive locations/structures such as a utility building, hydro corridor, a natural gas pipeline and active spawning bed were also identified.

The conclusion of the Explotech Blast Impact Analysis was that planned aggregate extraction at the Upper's Quarry can be carried out safely and within MECP guidelines as set out in MECP guideline NPC 119. Conditions were also recommended to be applied for all blasting operations.

These conclusions and recommendations apply to vibration sensitive locations closer to the Upper's Quarry than the proposed Upper's Lane residential development. Therefore, in accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan, the proposed development located further from the Upper's Quarry should not preclude or hinder future aggregate extraction.

6.4 Stationary Source Noise from the Development on Itself

If individual air conditioning systems are to be implemented for individual residential units within the proposed development, the sound levels from each unit should meet the requirements of MECP Publication NPC-216.

6.5 Stationary Source Noise from the Development on the Surrounding Area

In terms of the acoustic environment of the area, it is expected that the proposed development will have a negligible effect on the neighbouring properties.

The traffic related to the proposed development will be small relative to the existing traffic volumes within the area and is not of concern with respect to noise emissions.

Should air conditioning systems be installed for any locations within the proposed development, they should be selected and located to meet the requirements of MECP Publication NPC-216 – Residential Air Conditioning Devices (1993), namely:

- Having a maximum noise emission rating (sound power level) of 76 dBA or less, determined using AHRI Standard 270; and
- Producing a sound level less than 55 dBA at the sensitive point of reception (patio or plane of window).

Most modern air conditioning systems will meet these requirements at all off-site and on-site locations. Therefore, off-site sound levels are not anticipated to exceed applicable limits.

6.6 Environmental Noise and Vibration Conclusions and Recommendations

The potential for noise impacts on and from the proposed development have been assessed. Impacts of the environment on the development, the development on itself, and the development on the surrounding area have been considered. Based on the results of this assessment, the following conclusions have been reached:

6.6.1 Stationary Source Noise

- A review of the surrounding stationary noise sources was completed by SLR personnel during a site visit to the area and through available aerial photography. Noise from

existing stationary sources was not audible above background sound levels at the Project site during the site visit.

- An assessment of noise from the proposed Upper's Quarry was completed, based on information available in an acoustic assessment report prepared for Upper's Quarry approval applications. Refer to **Section 6.1**.
  - Mitigation is recommended as outlined in **Section 6.1.6**.
- In accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan, the proposed development should not preclude or hinder future aggregate extraction with respect to noise.
- An MECP Type E warning clause is recommended for all residential dwellings within the Aggregate Impact Area.
- The assessment of proposed Upper's Quarry noise should be reviewed and updated if the conditions outlined within **Section 6.1** are met.

6.6.2 Transportation Noise

- An assessment of transportation noise impacts from surrounding roadways has been completed.
- Based on transportation façade sound levels, warning clauses are recommended.
- Warning clauses should be included in agreements registered on Title for the residential units and included in agreements of purchase and sale/rental agreements.
  - Warning clause recommendations are summarized in **Appendix E**.
- The assessment should be updated once detailed Lot/Block plans are available for the proposed development.

6.6.3 Environmental Vibration

- There are no existing industrial or transportation sources of vibration of concern.
- Based on conclusions outlined in a blasting impact analysis for the proposed Upper's Quarry, the proposed development should not preclude or hinder future aggregate extraction.

7.0 Overall Conclusions and Recommendations

A compatibility/mitigation assessment has been completed, examining the potential for air quality, dust, odour, and noise and vibration impacts from surrounding roadways and nearby existing/proposed industrial land uses to affect the proposed Upper's Lane residential development.

Based on this assessment, the proposed development is anticipated to be compatible with the proposed Upper's Quarry and existing surrounding industries from an air quality perspective. It is recommended that a warning clause be included in agreements registered on Title for the residential units and included in all agreements of purchase and sale or lease and all rental agreements, noting the proximity of the Upper's Quarry and potential for dust to be visible at times.

Furthermore, Publication NPC-300 and the City of Thorold Noise By-Law requirements met with respect to noise/vibration with the following measures applied:

- Appropriate warning clauses in agreements registered on Title for residential units, in all agreements of purchase and sale or lease, and all rental agreements; and
- Quarry-related mitigation on the Project Site, outlined in **Section 6.1.6** and use of warning clauses,

With the above noted warning clause and mitigation, the Project site is anticipated to be compatible with the surrounding land uses from a noise and vibration perspective.

The requirements of MECP Guideline D-6 are met with respect to air quality, dust, odour, noise and vibration.

As the transportation noise assessment was based on generic Lot and Block layouts, the analysis should be revised once detailed site plans are available.

The proposed development will not affect the ability for industrial facilities to obtain or maintain compliance with applicable Provincial environmental policies, regulations, approvals, authorizations, and guidelines. The proposed development is:

- Unlikely to result in increased risk of complaint and nuisance claims;
- Unlikely to result in operational constraints for the major facilities; and
- Unlikely to result in constraints on major facilities to reasonably expand, intensify or introduce changes to their operations.

Finally, in accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan, the proposed development should not preclude or hinder future aggregate extraction at the proposed Upper's Quarry.

8.0 Closure

Should you have questions regarding this report, please contact the undersigned.

Sincerely,

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Figures

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

SITE AND CONTEXT PLAN

True North

Scale: 1:12,000

METRES

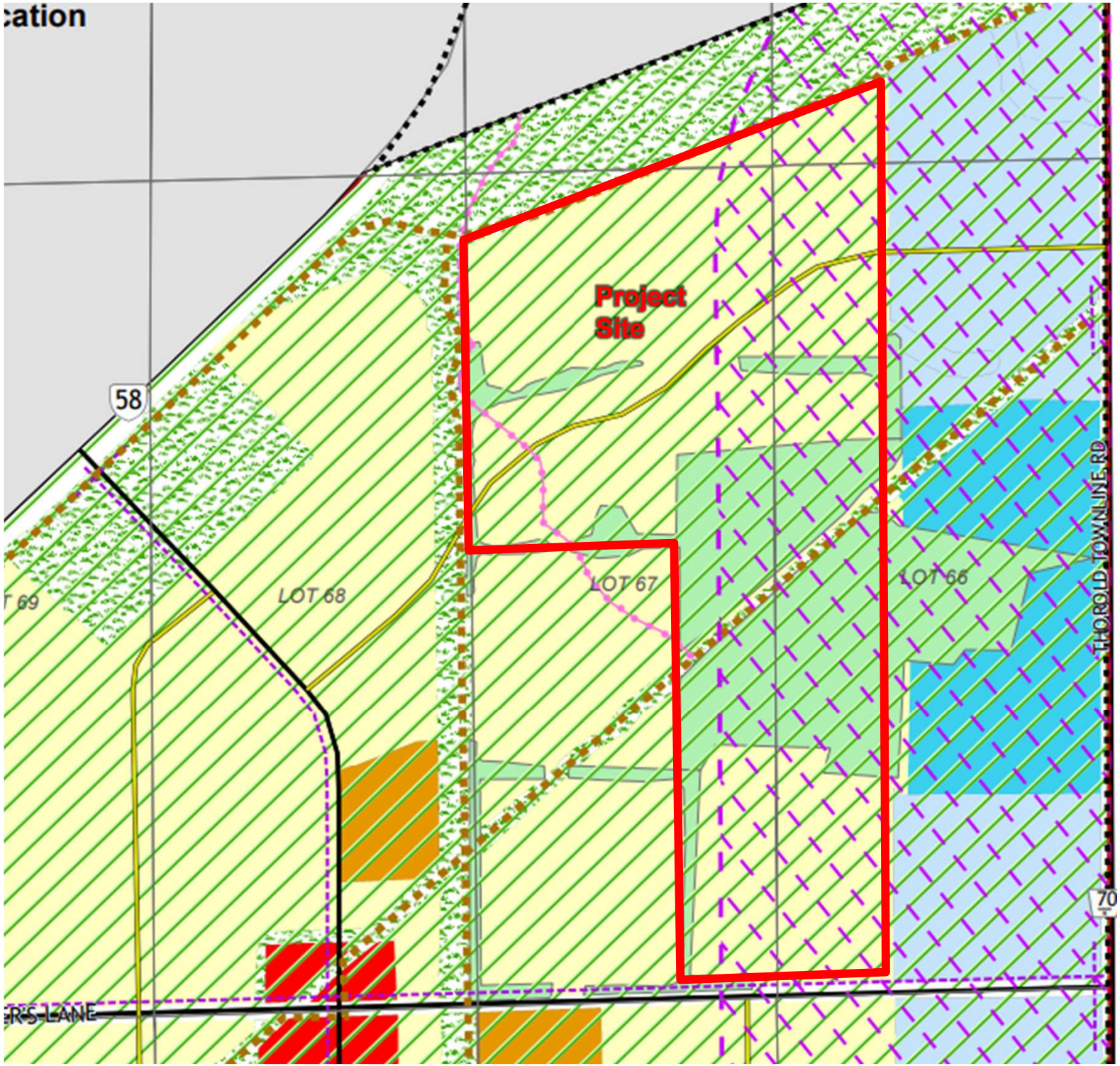
Date: Feb. 7, 2024

Rev 0

Project No. 241.030826.00001

Figure No. **1**

SLR



True North

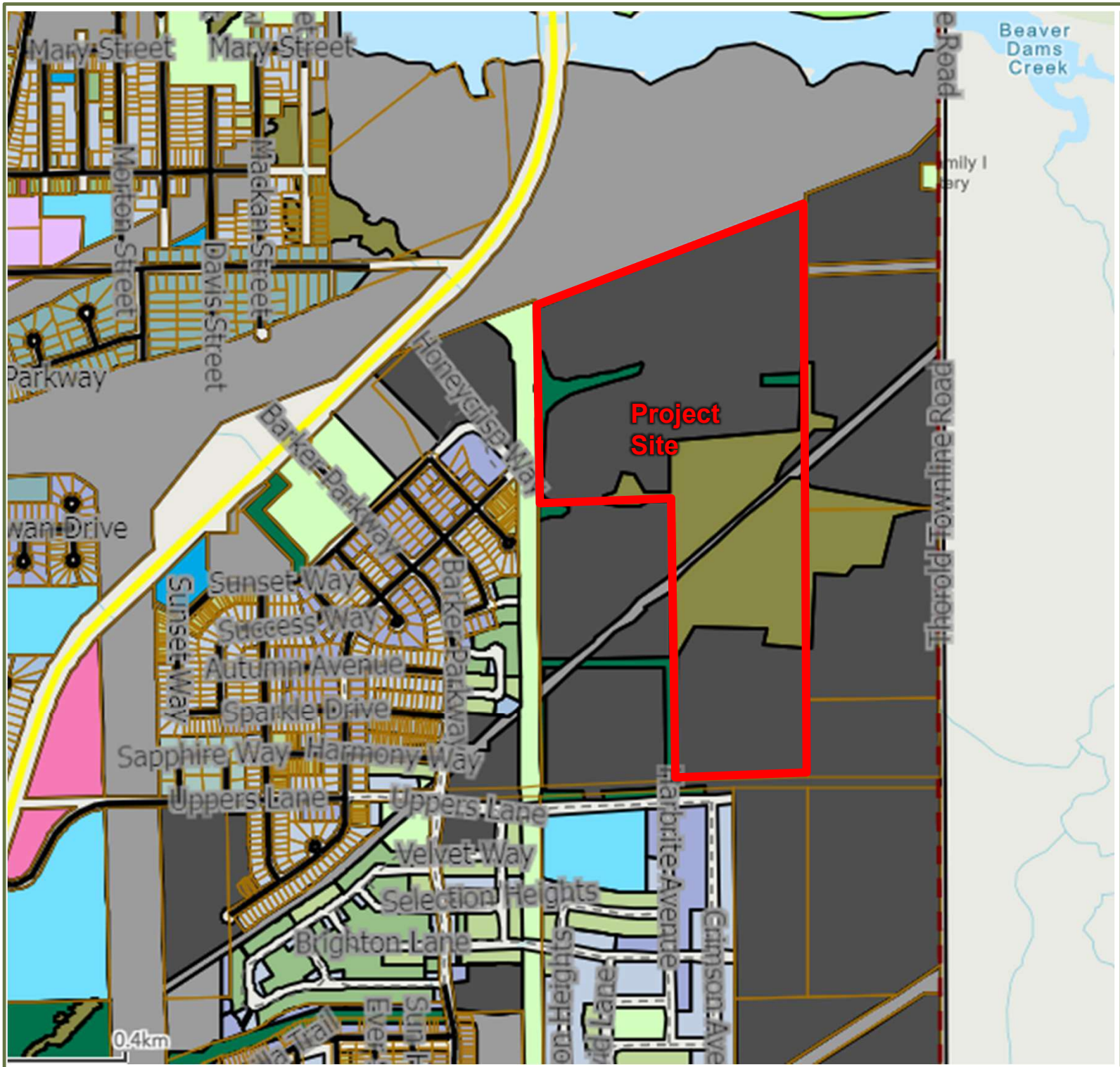
PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

CITY OF THOROLD OFFICIAL PLAN MAP

Scale:	N/A		METRES
Date: Feb. 7, 2024	Rev 0	Figure No.	**2a**
Project No. 241.030826.00001			

SLR



Legend

City of Thorold Boundary

Schedule B Railway

Roads
- Arterial
- Future/Planned Roads
- Highway
- Local
- Private
- Unimproved
- Welland Canal Crossing

Parcel Fabric Public

Zoning By_Law (60) 2019
- A - Agriculture
- AS - Specialty Crop
- C1 - Downtown Main Street
- C2 - Downtown Mixed Use
- C3 - General Commercial
- C4 - Neighbourhood Commercial
- C5 - Highway Commercial
- C6 - Mixed Use Commercial
- EP1 - Environmental Protection One
- EP2 - Environmental Protection Two
- EP3 - Environmental Protection Three
- FD - Future Development
- I1 - Major Institutional
- I2 - Minor Institutional
- M1 - Prestige Industrial
- M2 - General Industrial
- M3 - Employment Mixed Use
- M4 - Rural Industrial
- OS1 - Parks and Recreation
- OS2 - Open Space Conservation
- R1A - Single Detached
- R1B - Single Detached, Duplex
- R1C - Single Detached, Duplex
- R1D - Single Detached
- R2A, R2B - Semi Detached
- R3A, R3B, R3C, R3D - Townhouse (Street or Stacked), Triplex, Fourplex, and Private Street Development
- R4A, R4B - Apartment and Long Term Care Facility
- RU - Rural
- U - Utility

True North

PARKBRIDGE LIFESTYLE COMMUNITIES

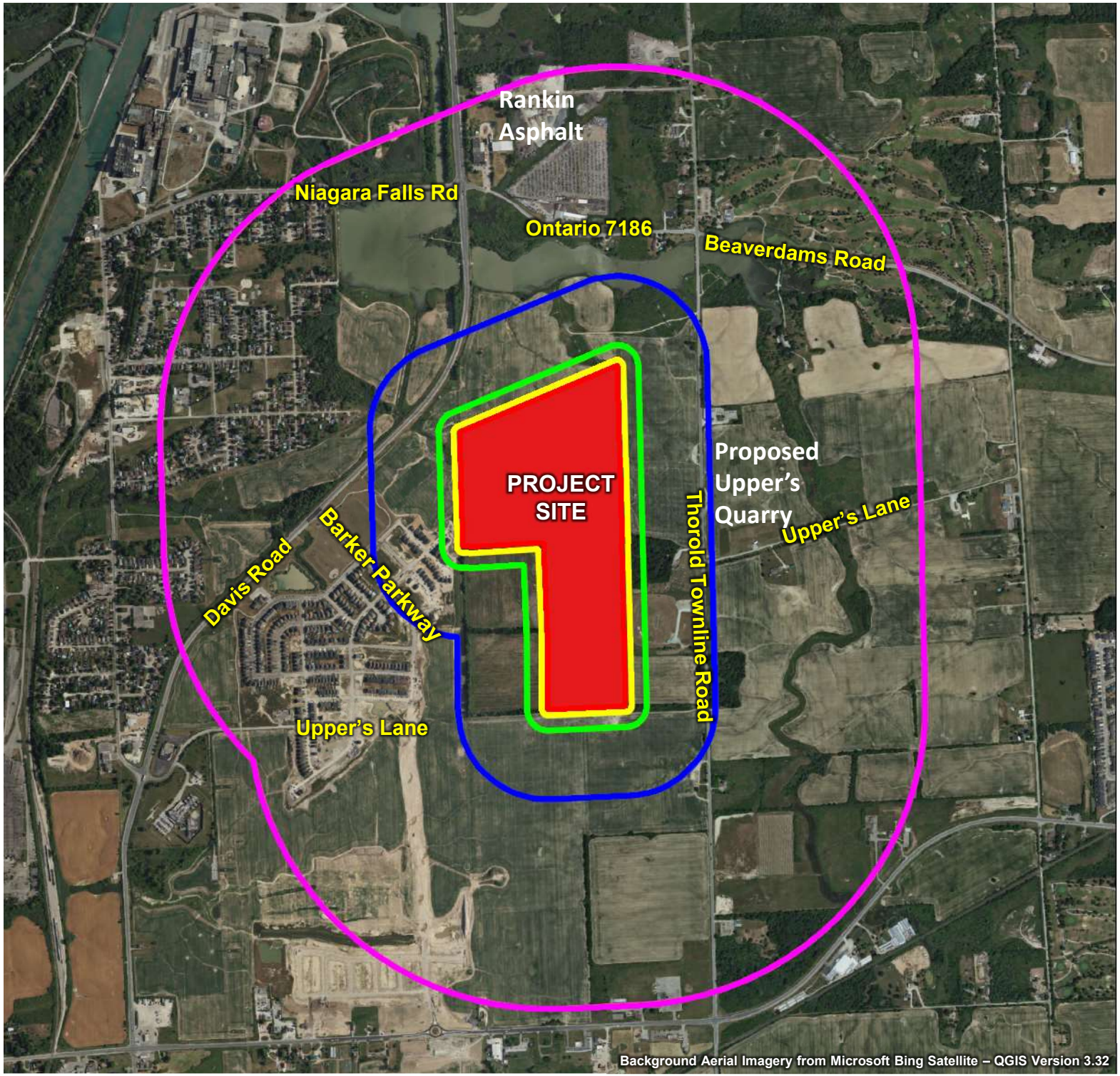
UPPER'S LANE, THOROLD, ONTARIO

AREA ZONING MAP

SOURCE:
https://www.thorold.ca/en/city-hall/comprehensive-zoning-by-law.aspx

Scale:	N/A		METRES
Date: Feb. 7, 2024		Rev 0	Figure No. **2b**
Project No. 241.030826.00001			

SLR



Facility with MECP Permit (ECA/EASR)

20 m

70 m

300 m

1000 m

True North

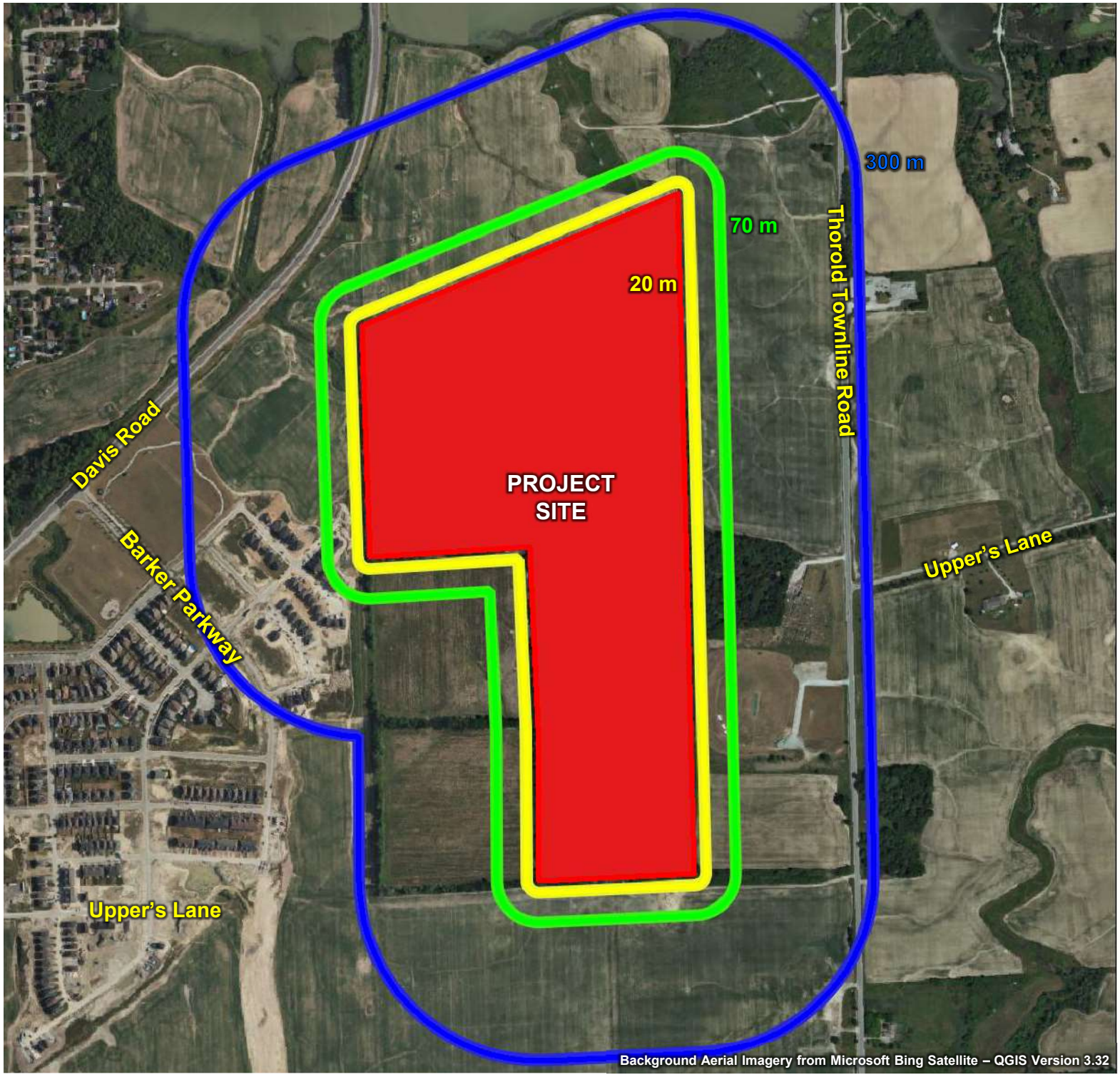
PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

GUIDELINE D-6 SEPARATION DISTANCES TO 1000 METRES

Scale:	1:18,000		METRES
Date: Feb. 7, 2024		Rev 0	Figure No. **3a**
Project No. 241.030826.00001			

SLR



Facility with MECP Permit (ECA/EASR)

20 m

70 m

300 m

1000 m

True North

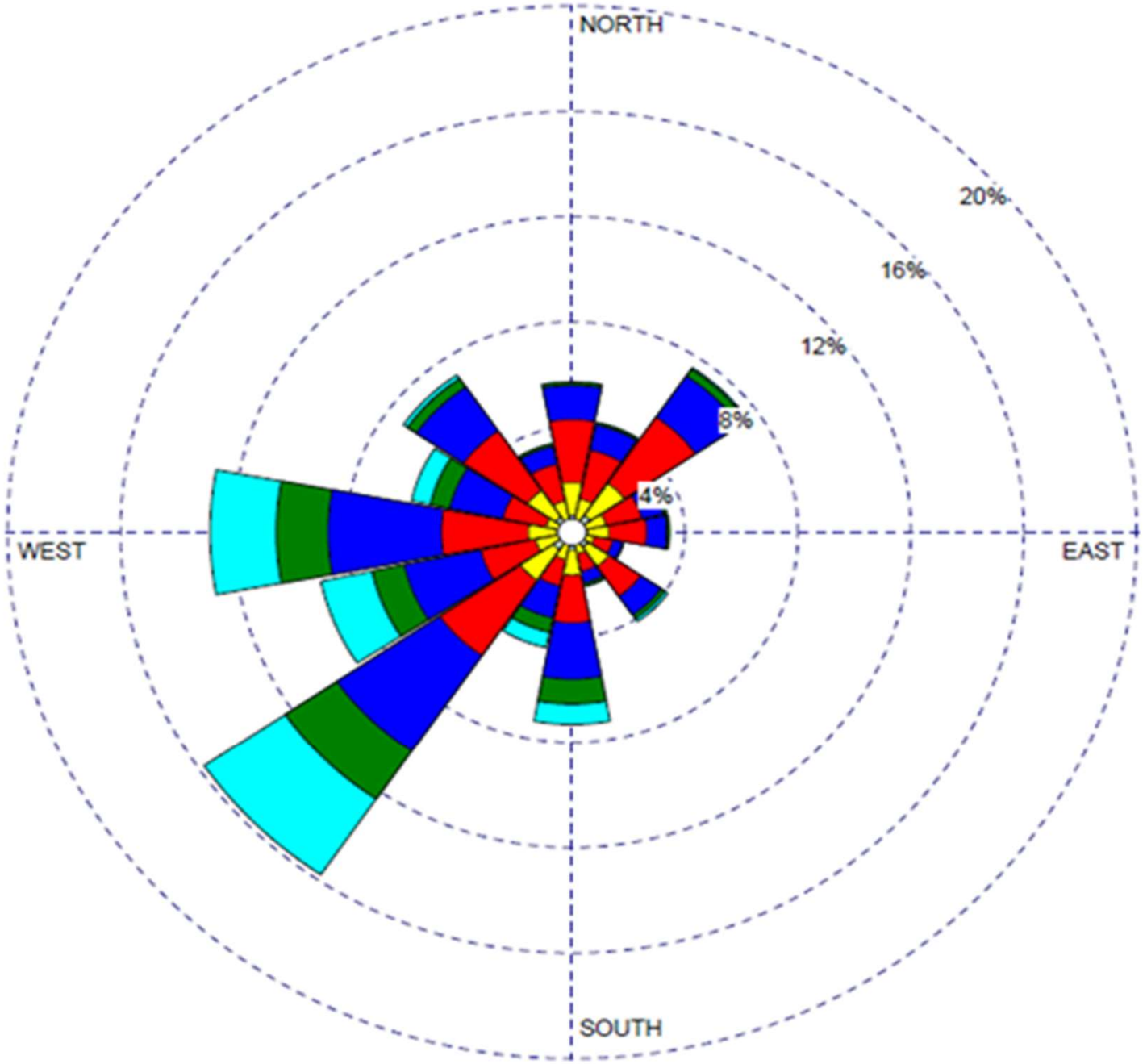
PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

GUIDELINE D-6 SEPARATION DISTANCES TO 300 METRES

Scale:	1:9,000		METRES
Date: Feb. 7, 2024		Rev 0	Figure No. **3b**
Project No. 241.030826.00001			

SLR



(Knots)

- >= 22
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4

True North

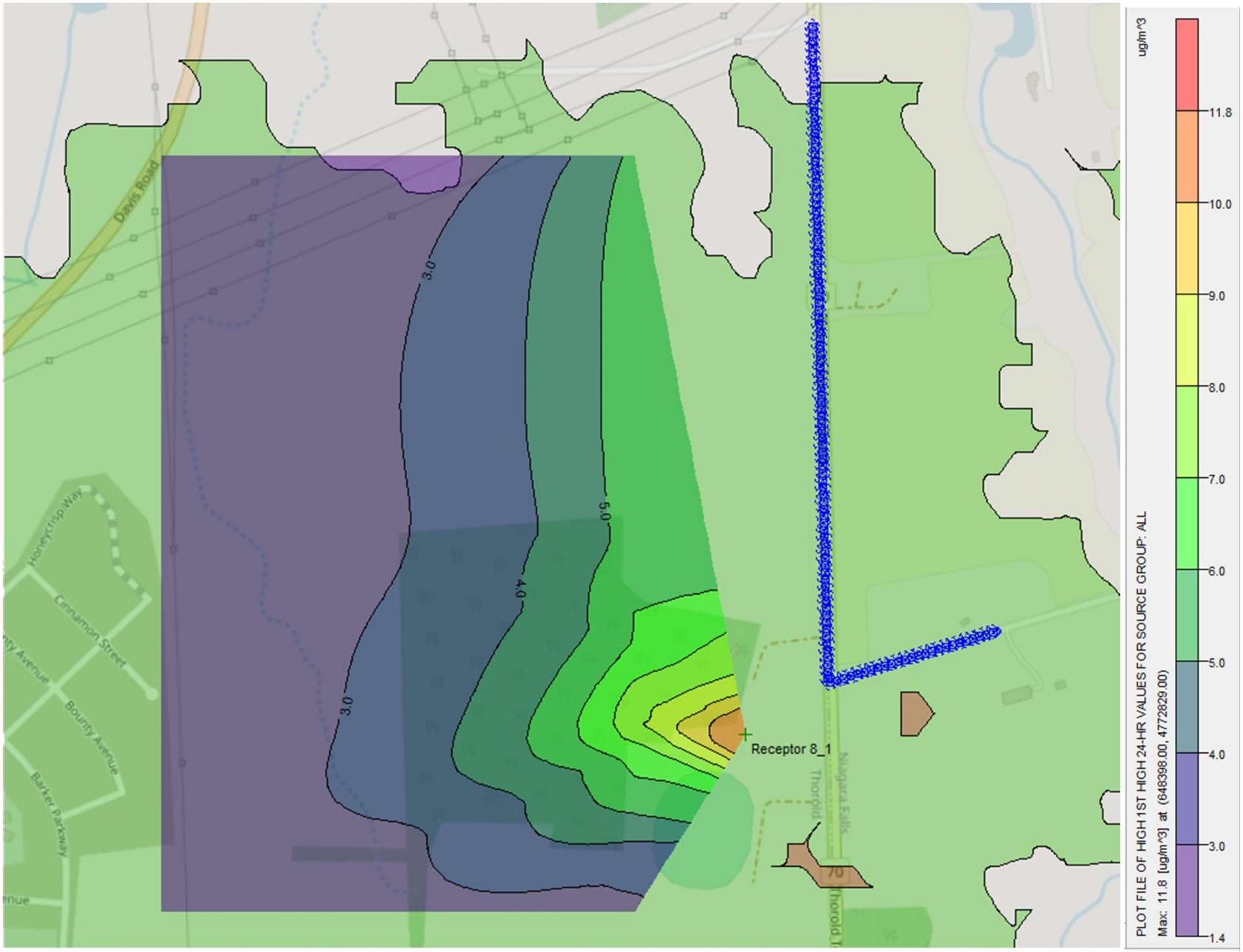
PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

WIND FREQUENCY DISTRIBUTION DIAGRAM (WIND ROSE) WELLAND, ONTARIO 1989-2018

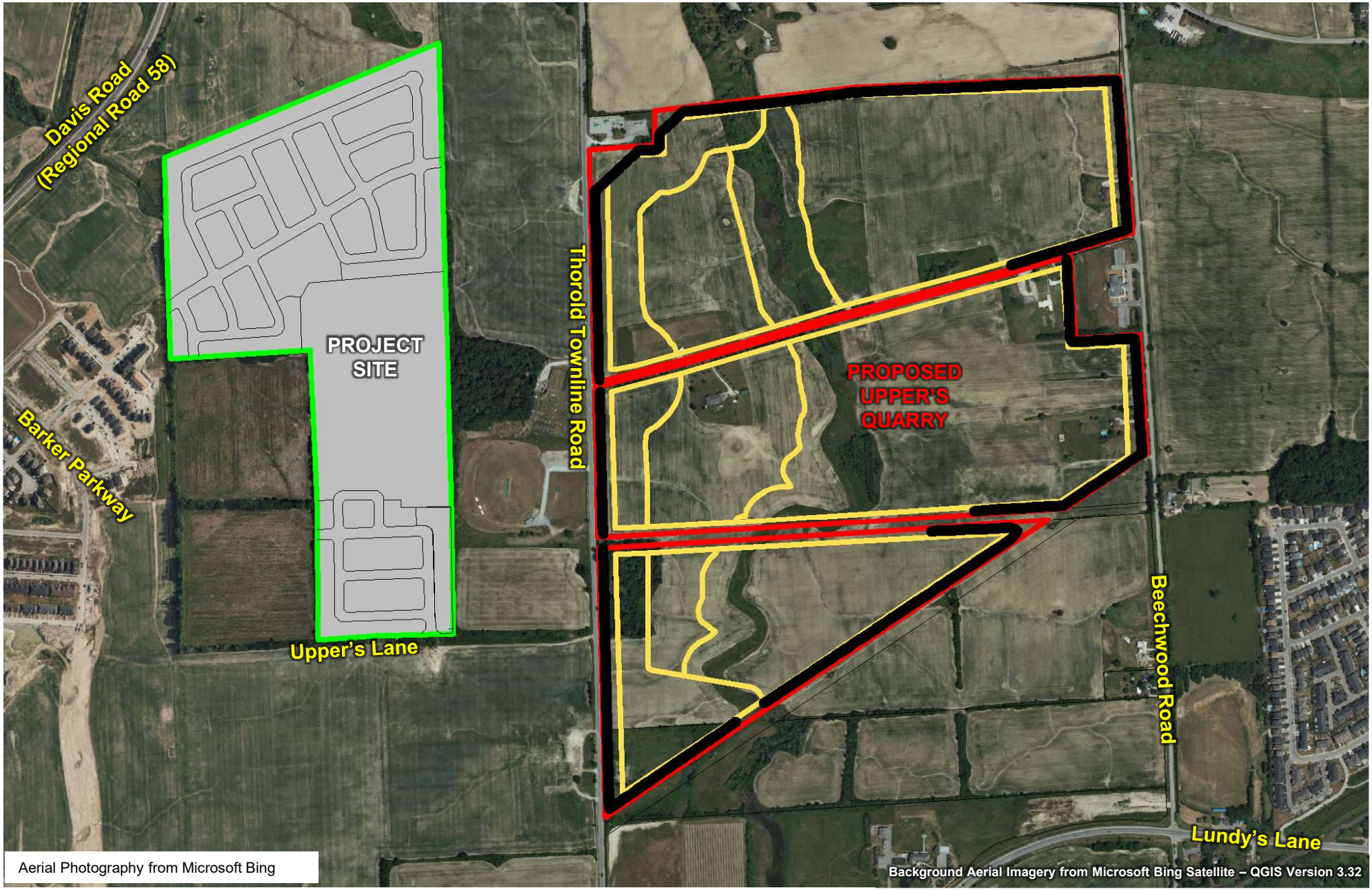
Scale:	N/A		METRES
Date: Feb. 7, 2024		Rev 0	Figure No. 4
Project No. 241.030826.00001			

SLR

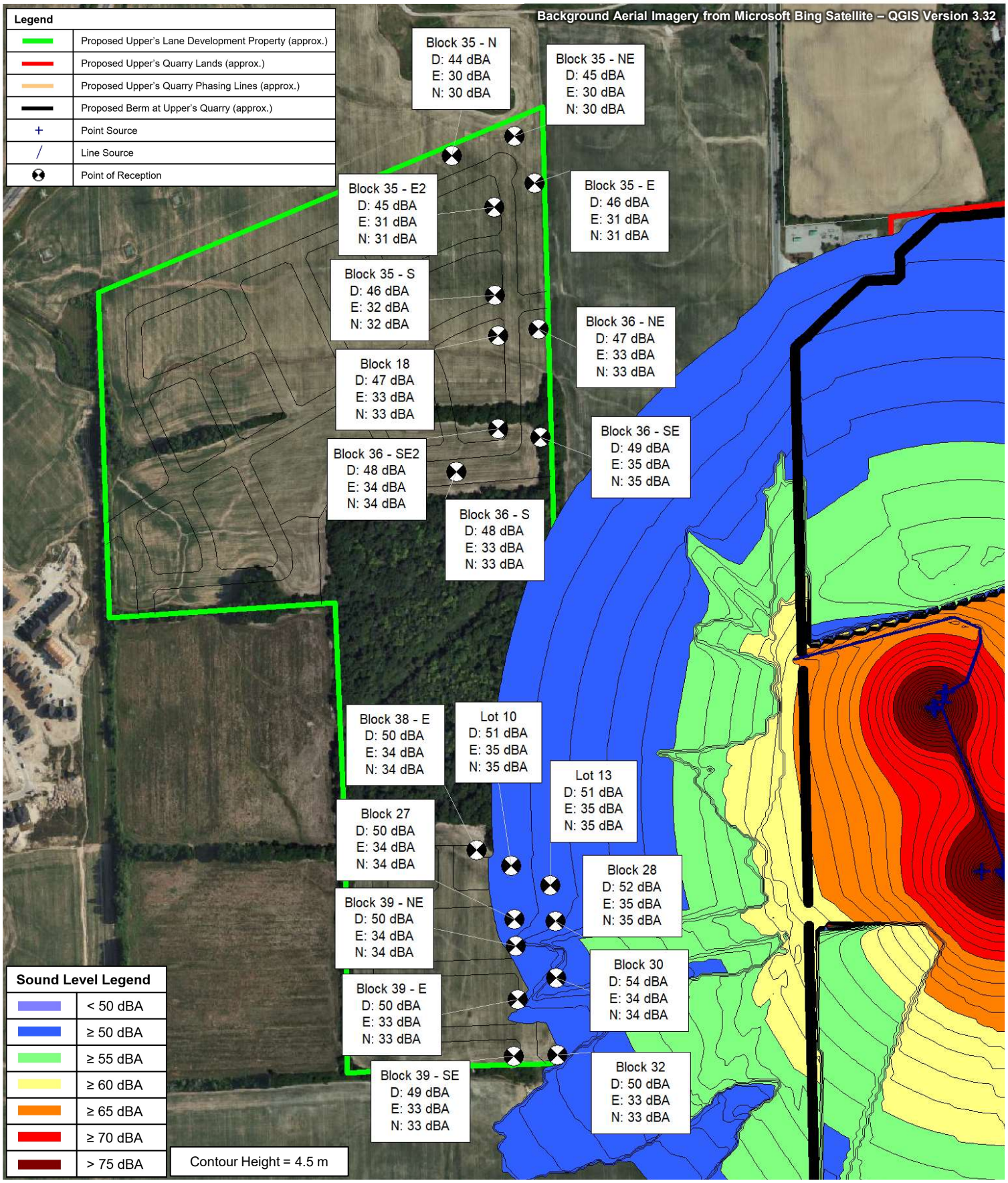


PARKBRIDGE LIFESTYLE COMMUNITIES	True North	Scale: 1:12,000	METRES
UPPER'S LANE, THOROLD, ONTARIO		Date: Feb. 7, 2024 Rev. 0	Figure No. **5**
POI CONTOUR PLOT, PARTICULATE MATTER – 24 HOUR		Project No.: 241.030826.00001	

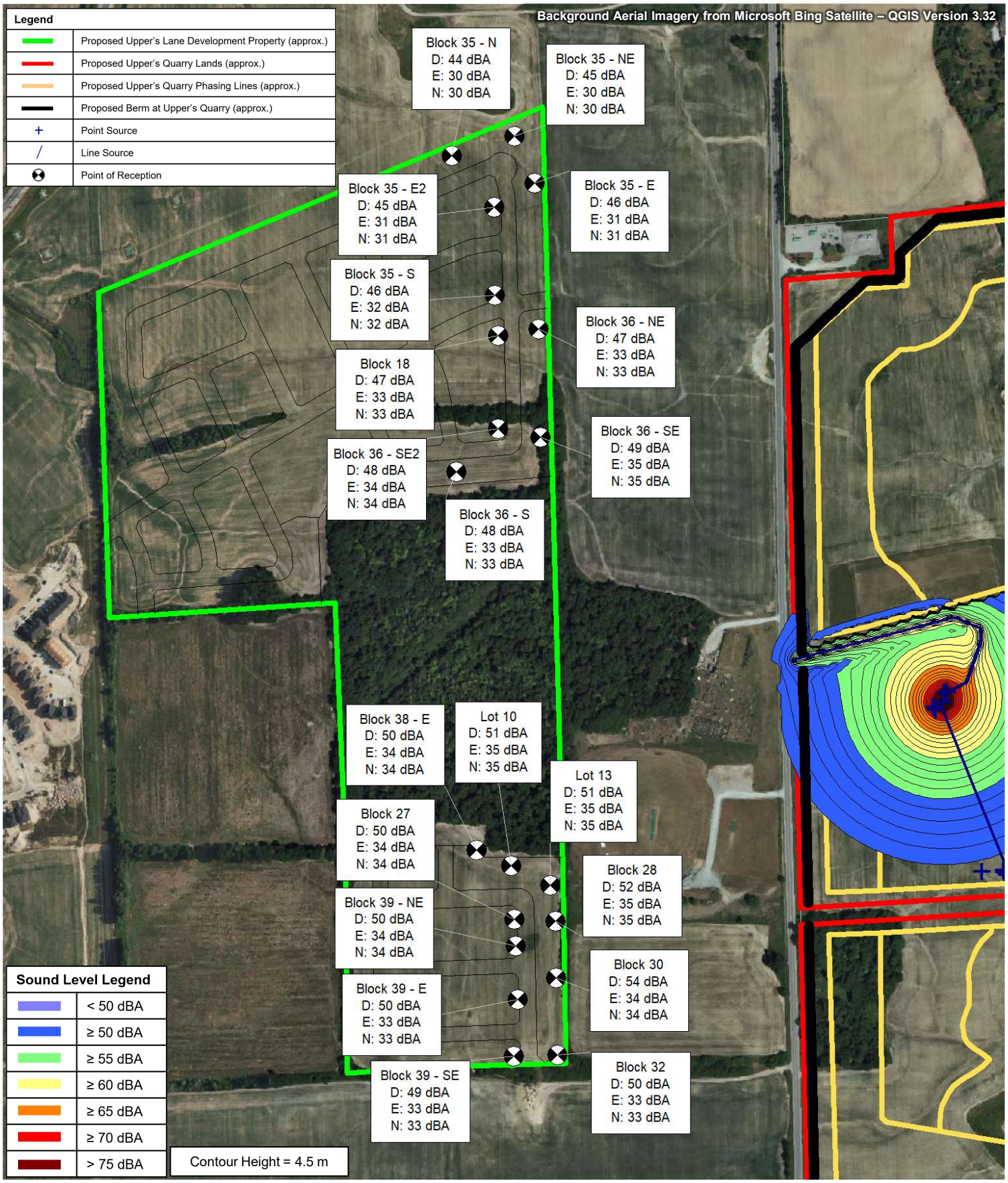
SLR



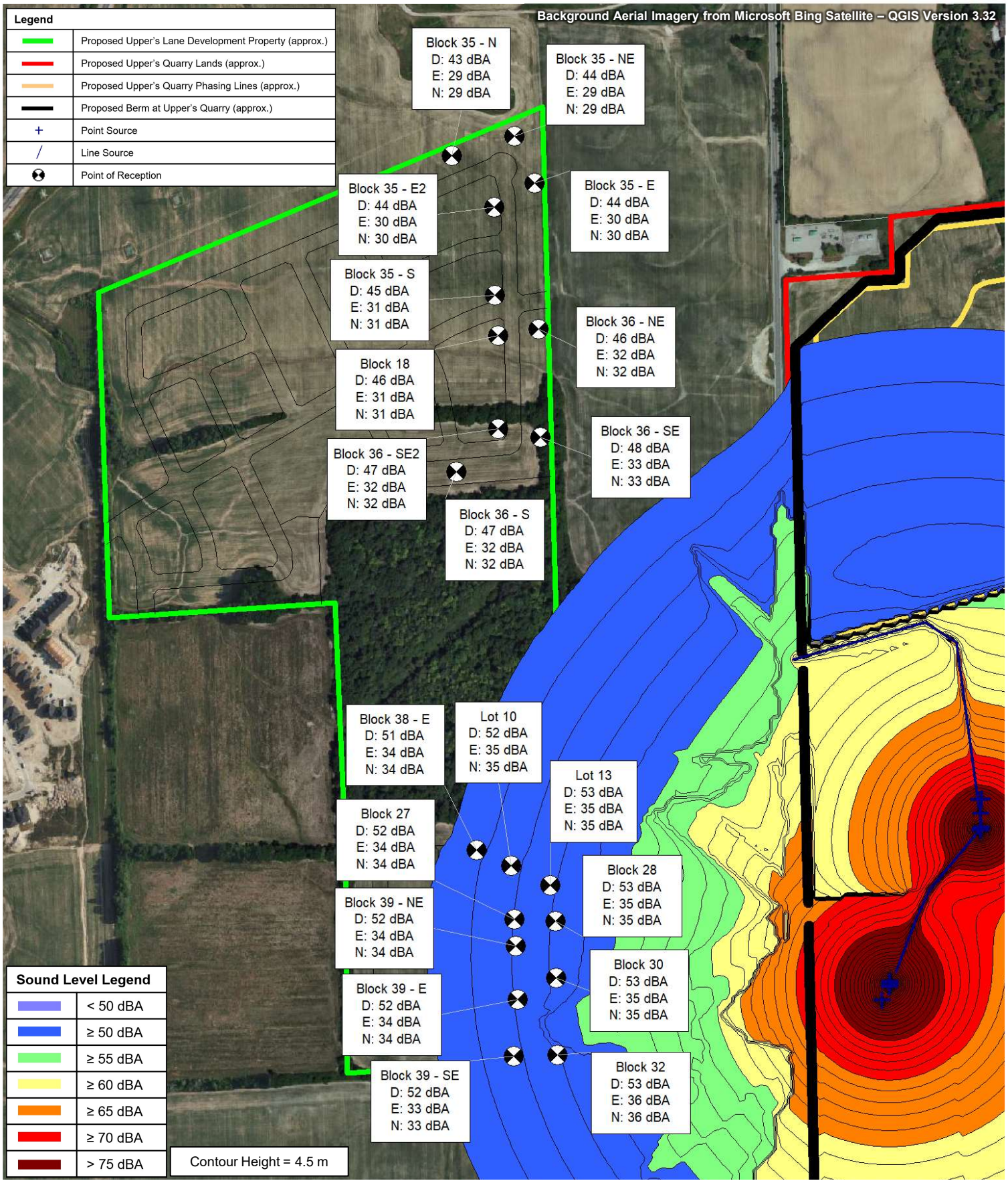
PARKBRIDGE LIFESTYLE COMMUNITIES	True North	Scale: 1:10,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO		Date: Feb. 7, 2024 Rev. 0	Figure No. **6**	
LOCATION OF PROPOSED UPPER'S QUARRY		Project No. 241.030826.00001		



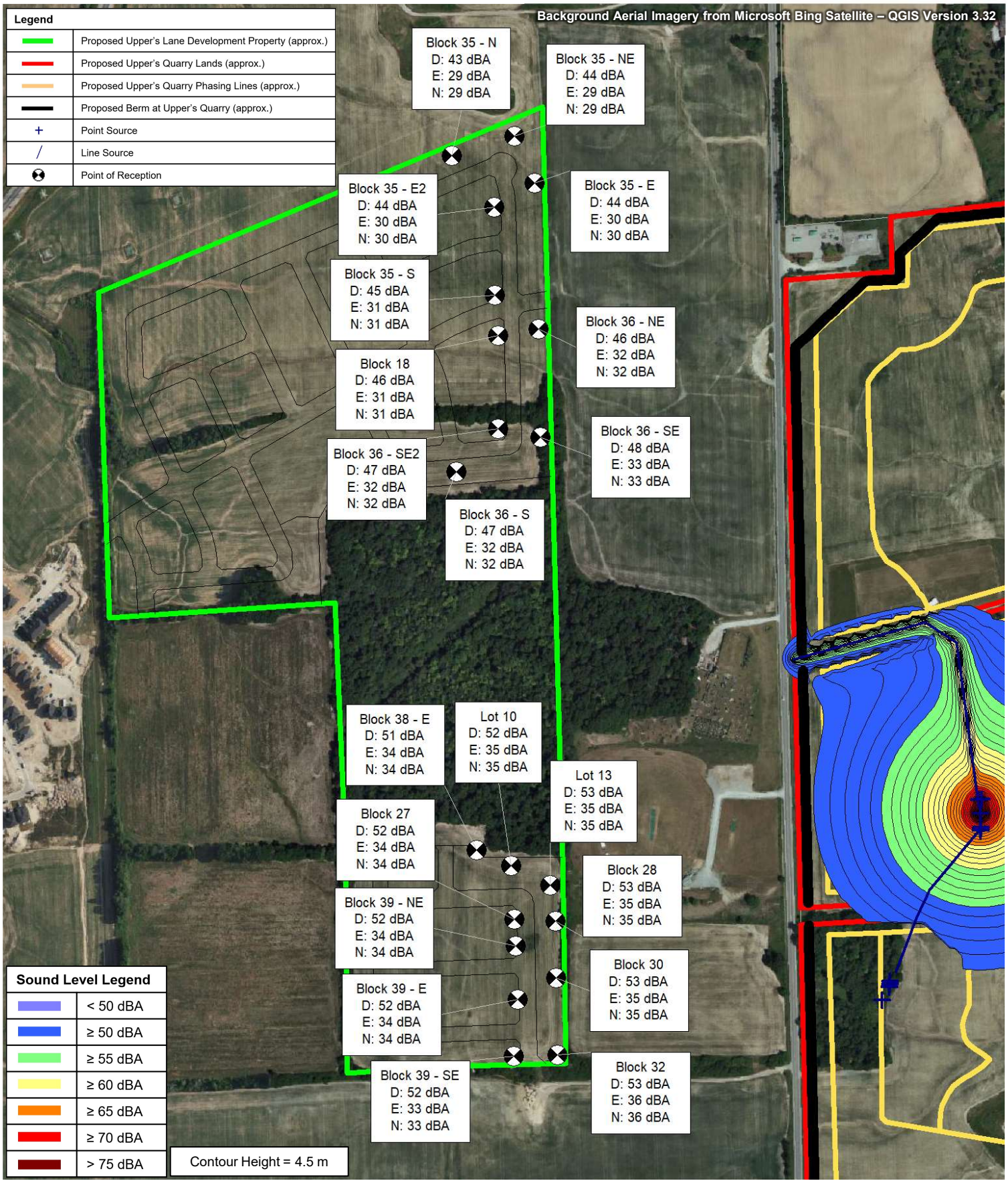
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **7a**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1A SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



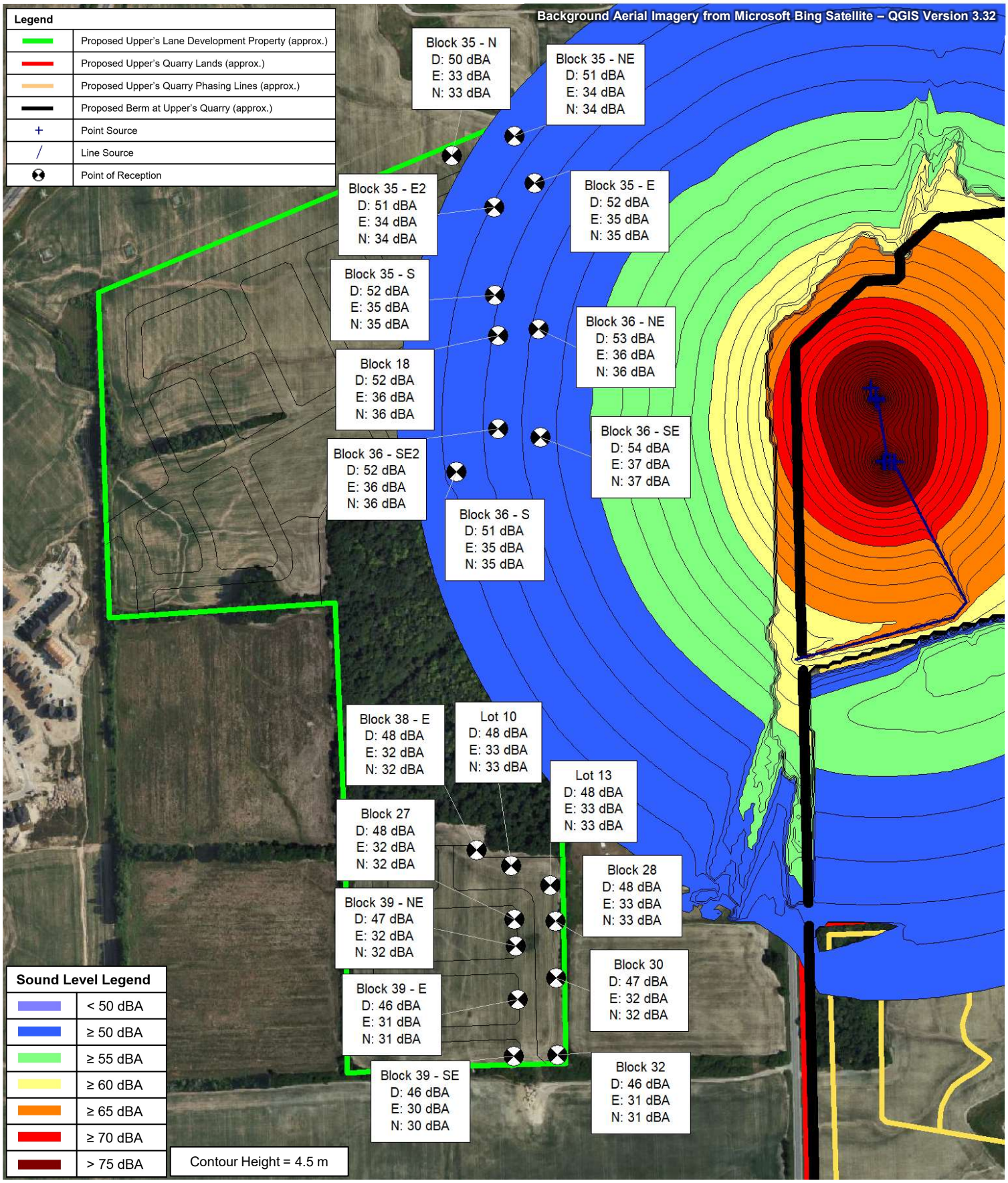
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **7b**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1A SINKING CUT – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



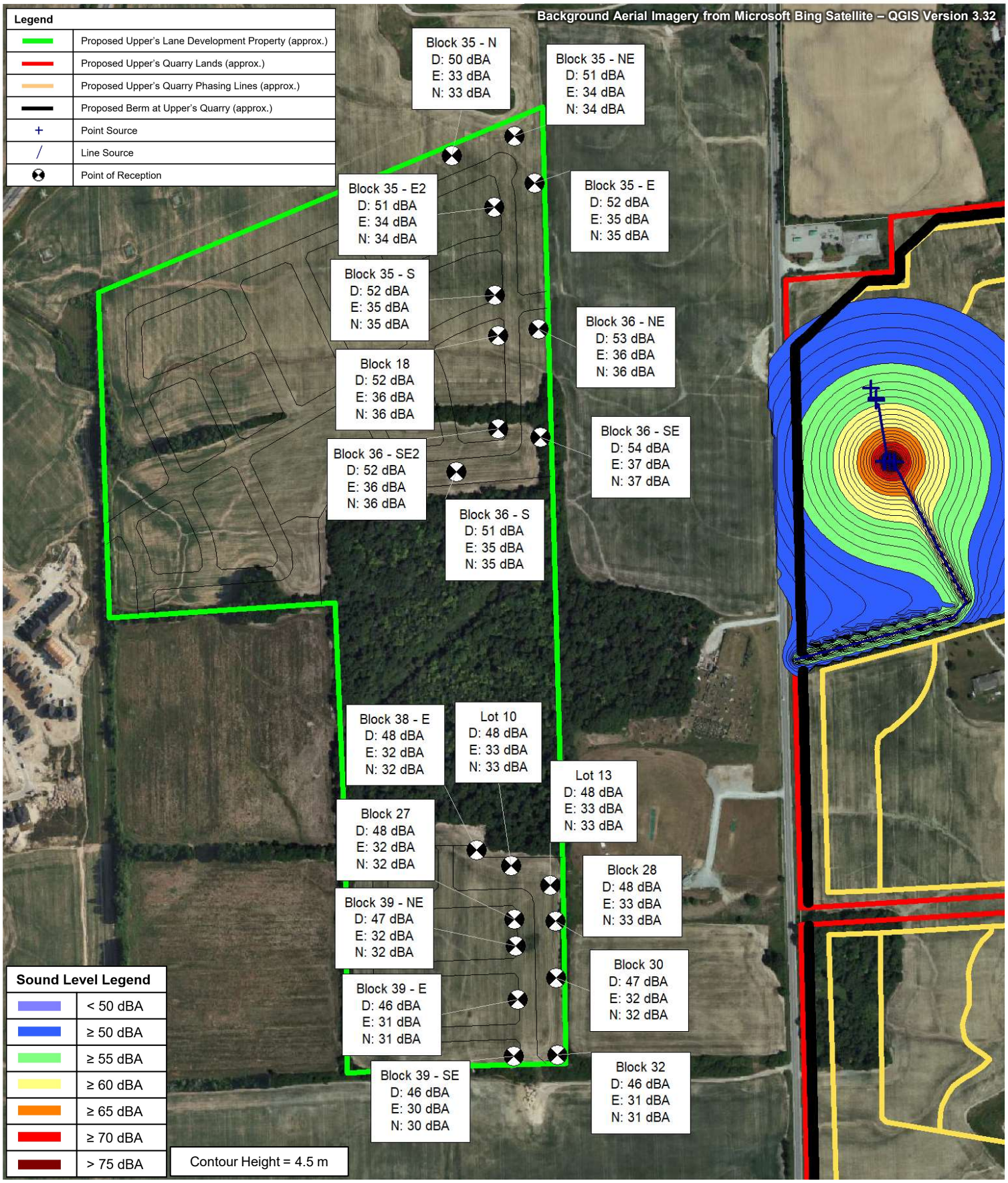
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024	Rev 0.0	Figure No. **8a**
PREDICTED QUARRY SOUND LEVELS – PHASE 1AS SOUTH SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



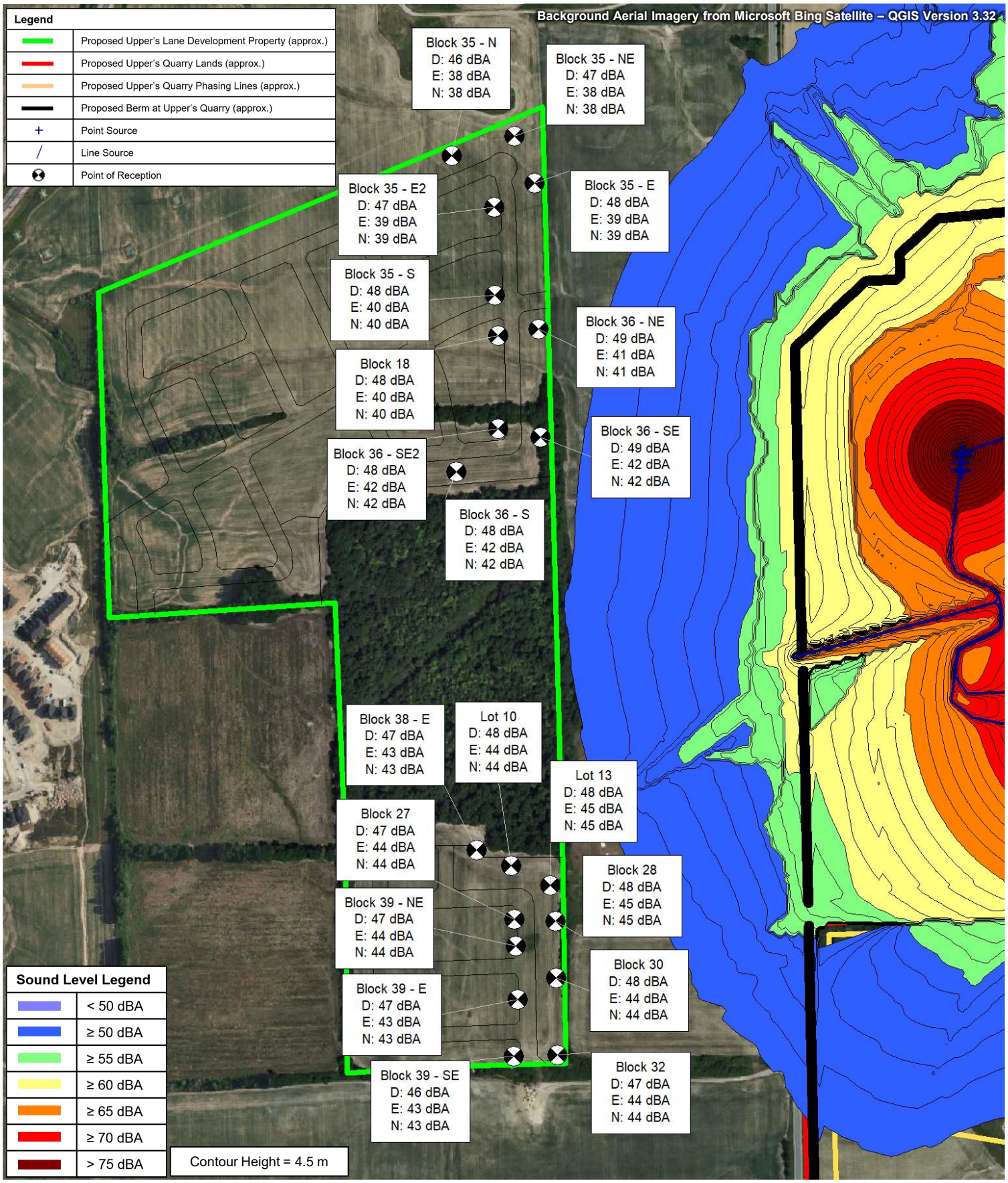
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **8b**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1AS SOUTH SINKING CUT – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



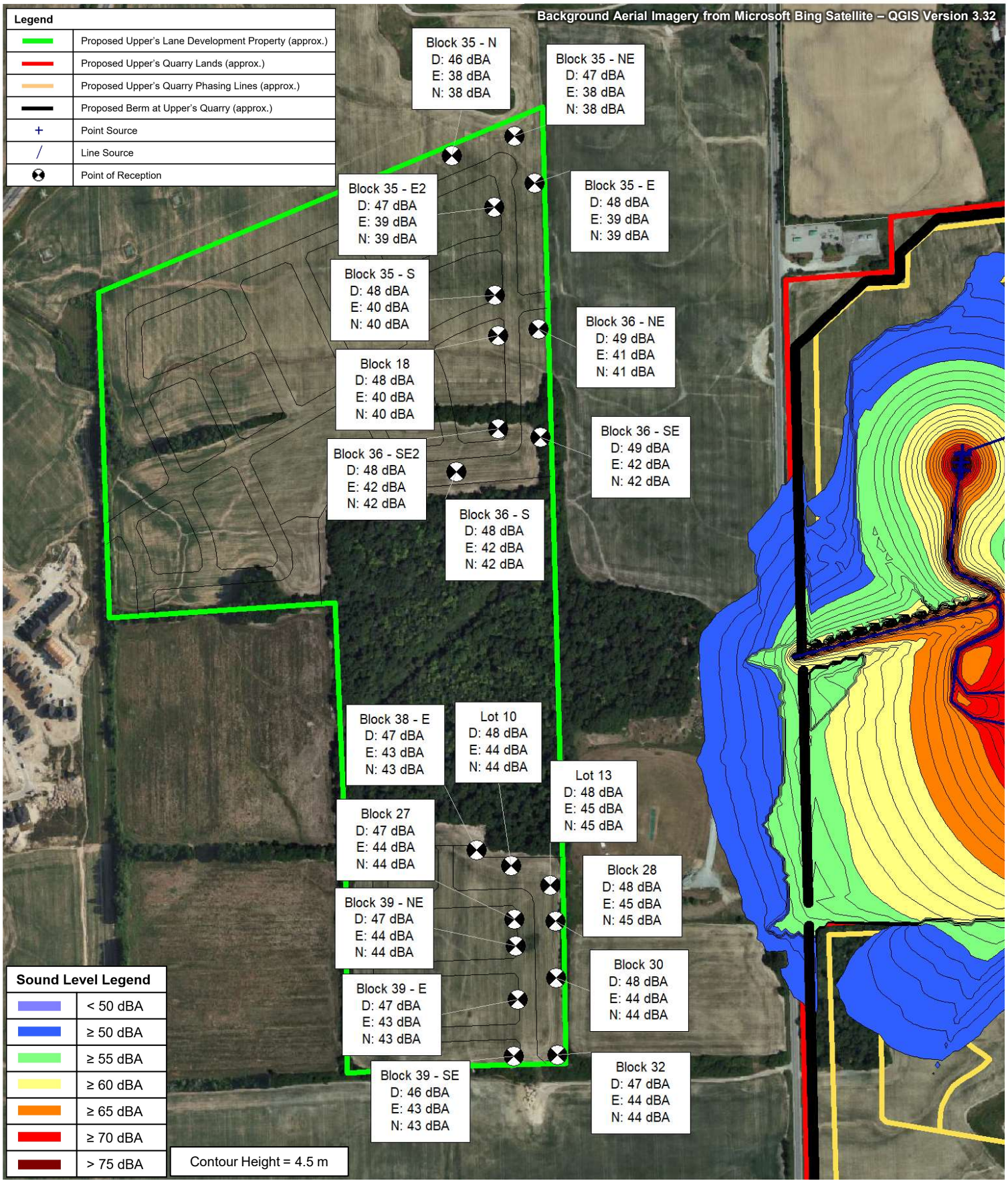
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024	Rev 0.0	Figure No. **9a**
PREDICTED QUARRY SOUND LEVELS – PHASE 2A SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



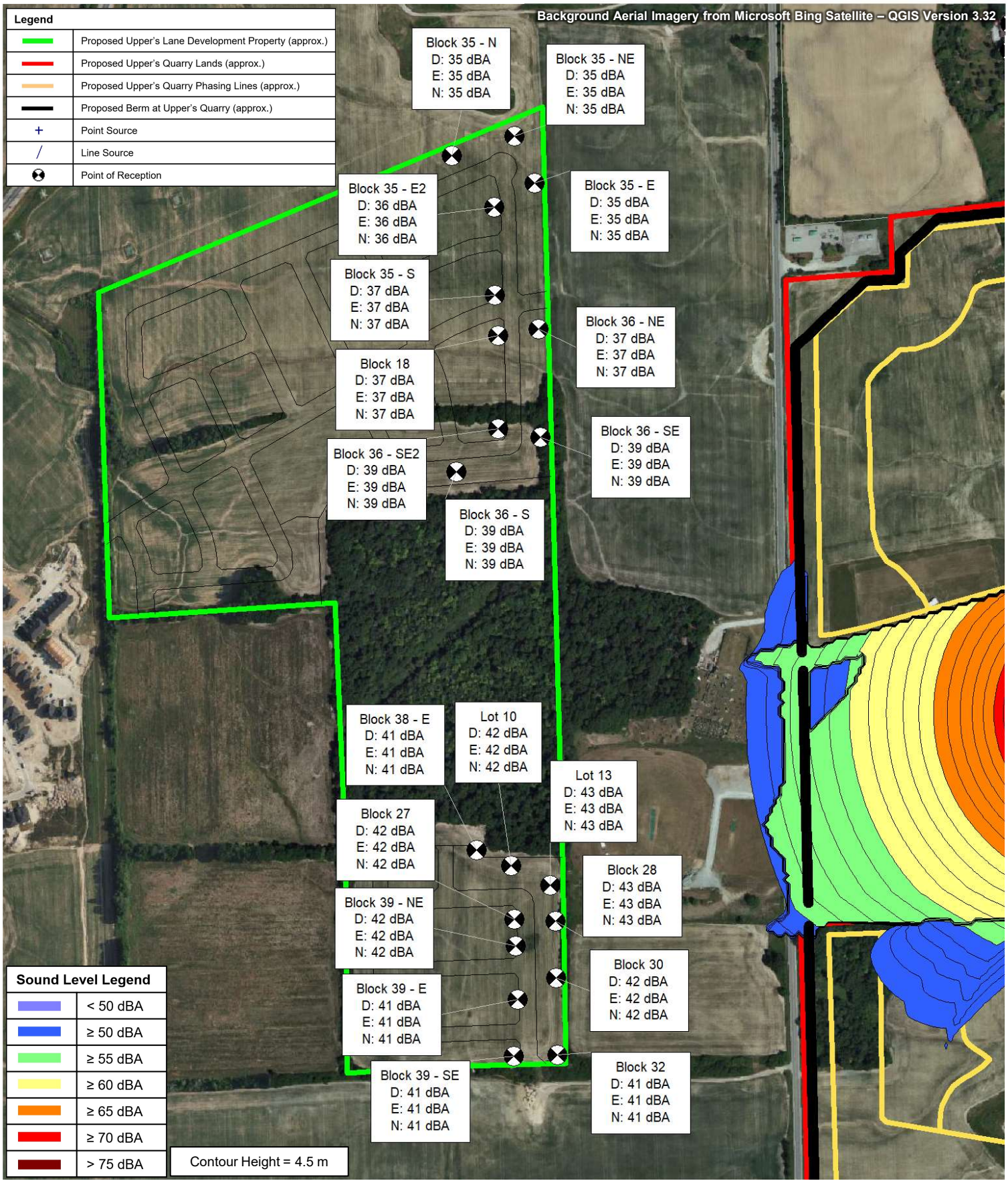
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **9b**	
PREDICTED QUARRY SOUND LEVELS – PHASE 2A SINKING CUT – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



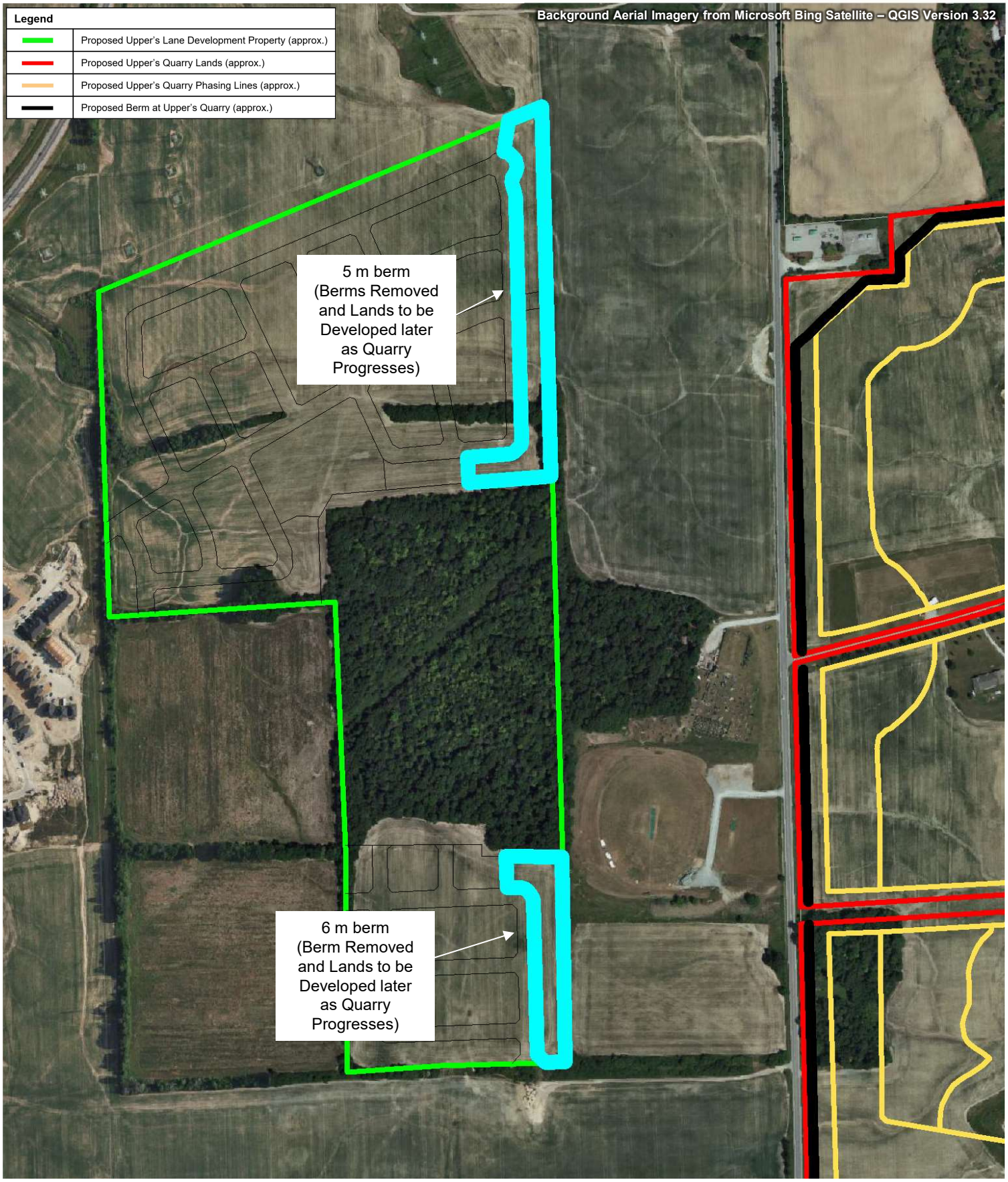
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024	Rev 0.0	Figure No. **10a**
PREDICTED QUARRY SOUND LEVELS – PHASE 3A EXTRACTION – DAYTIME	Project No.: 241.030826.00001		



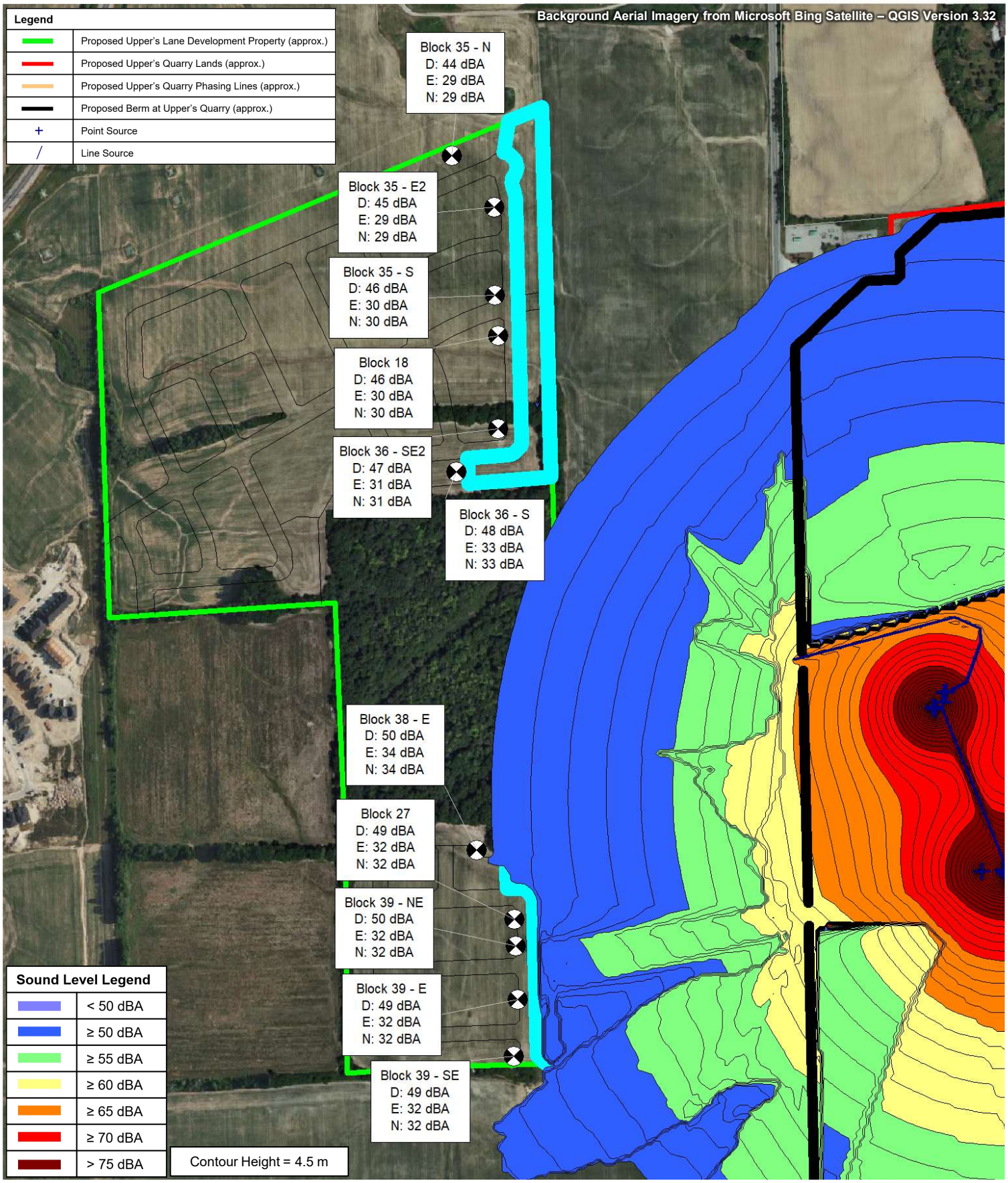
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024	Rev 0.0	Figure No. **10b**
PREDICTED QUARRY SOUND LEVELS – PHASE 3A EXTRACTION – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



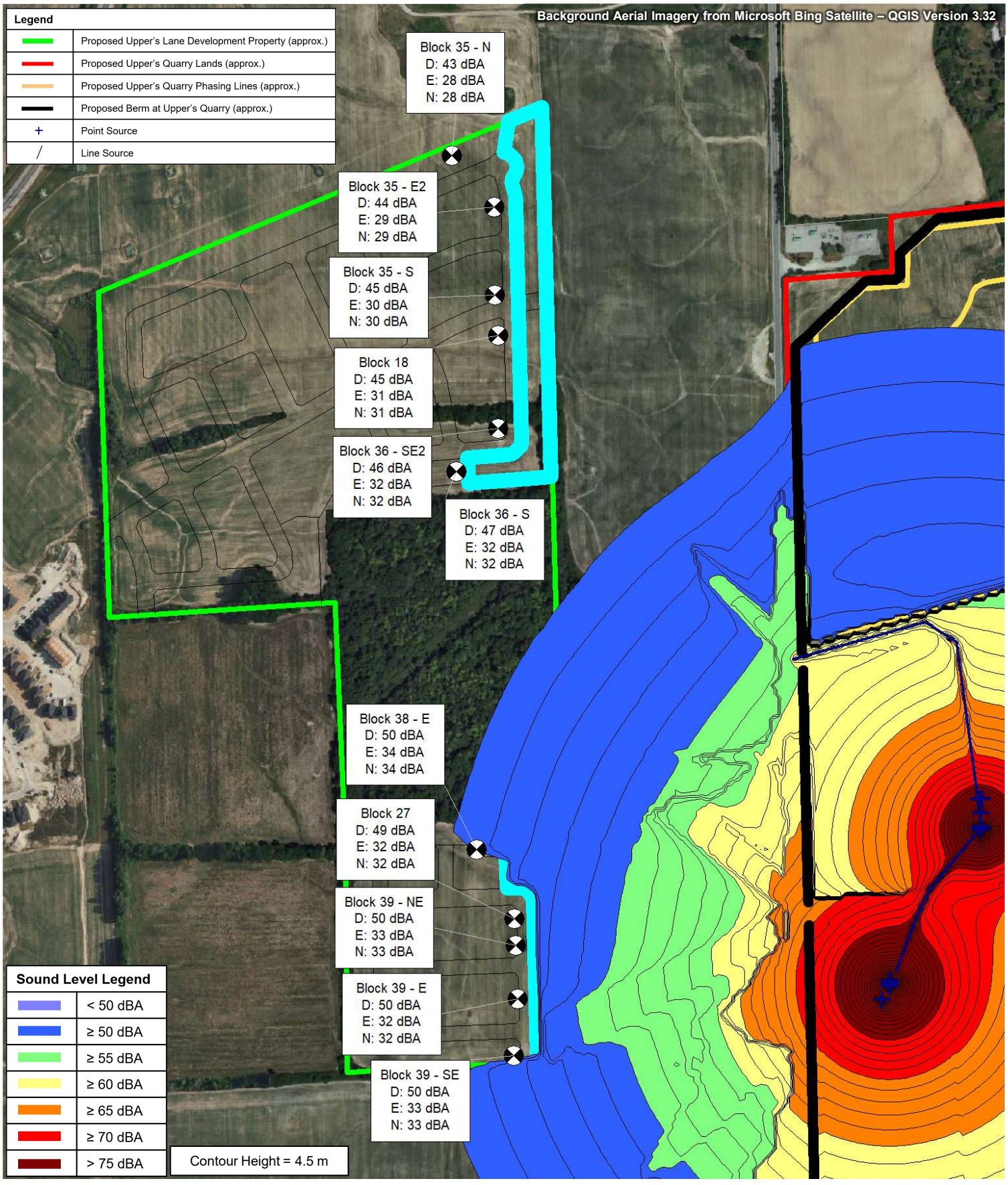
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **11**	
PREDICTED QUARRY SOUND LEVELS – IMPULSE – DAYTIME/EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



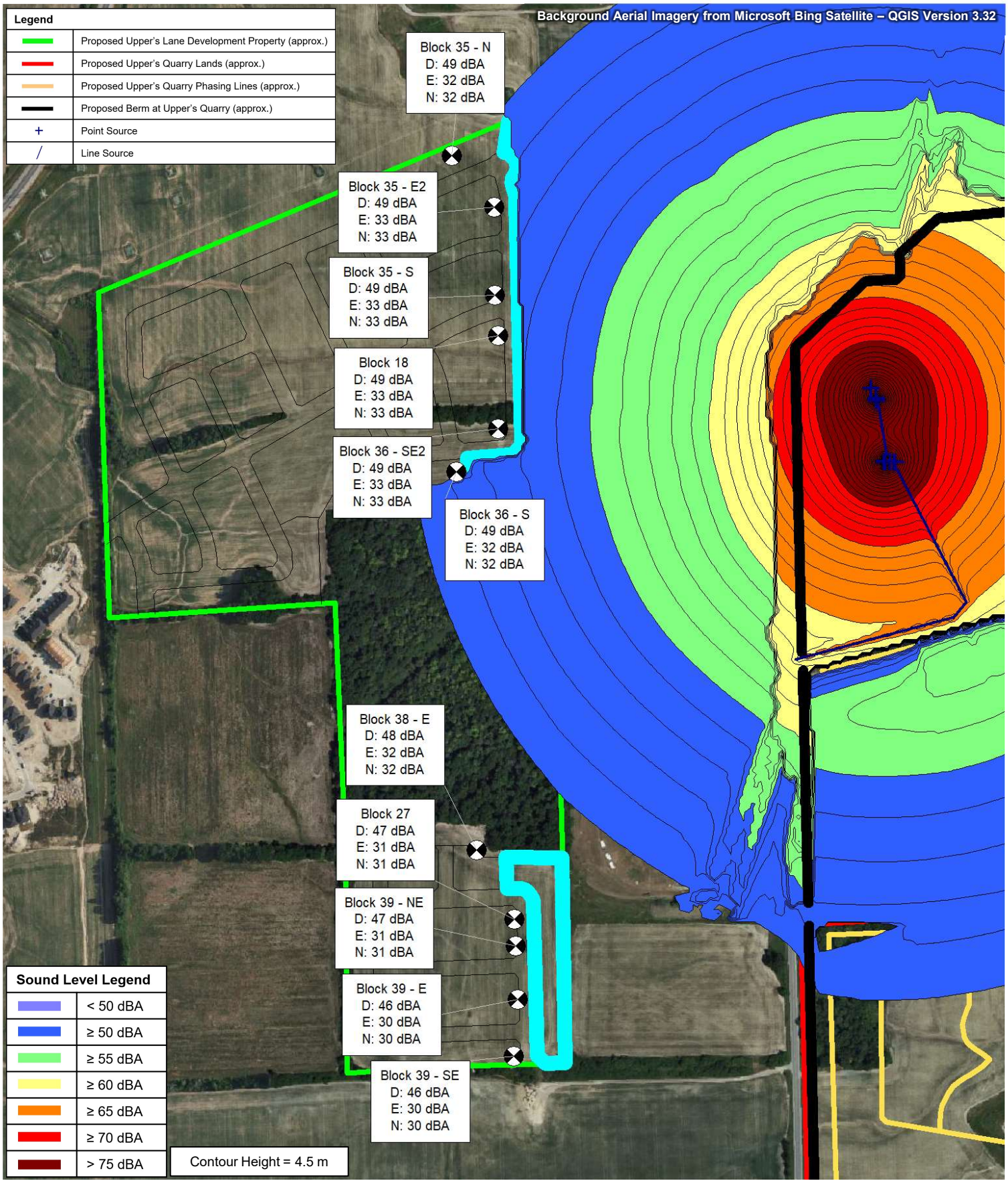
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **12**	
PROPOSED MITIGATION OF NOISE FROM UPPER'S QUARRY	Project No.: 241.030826.00001		



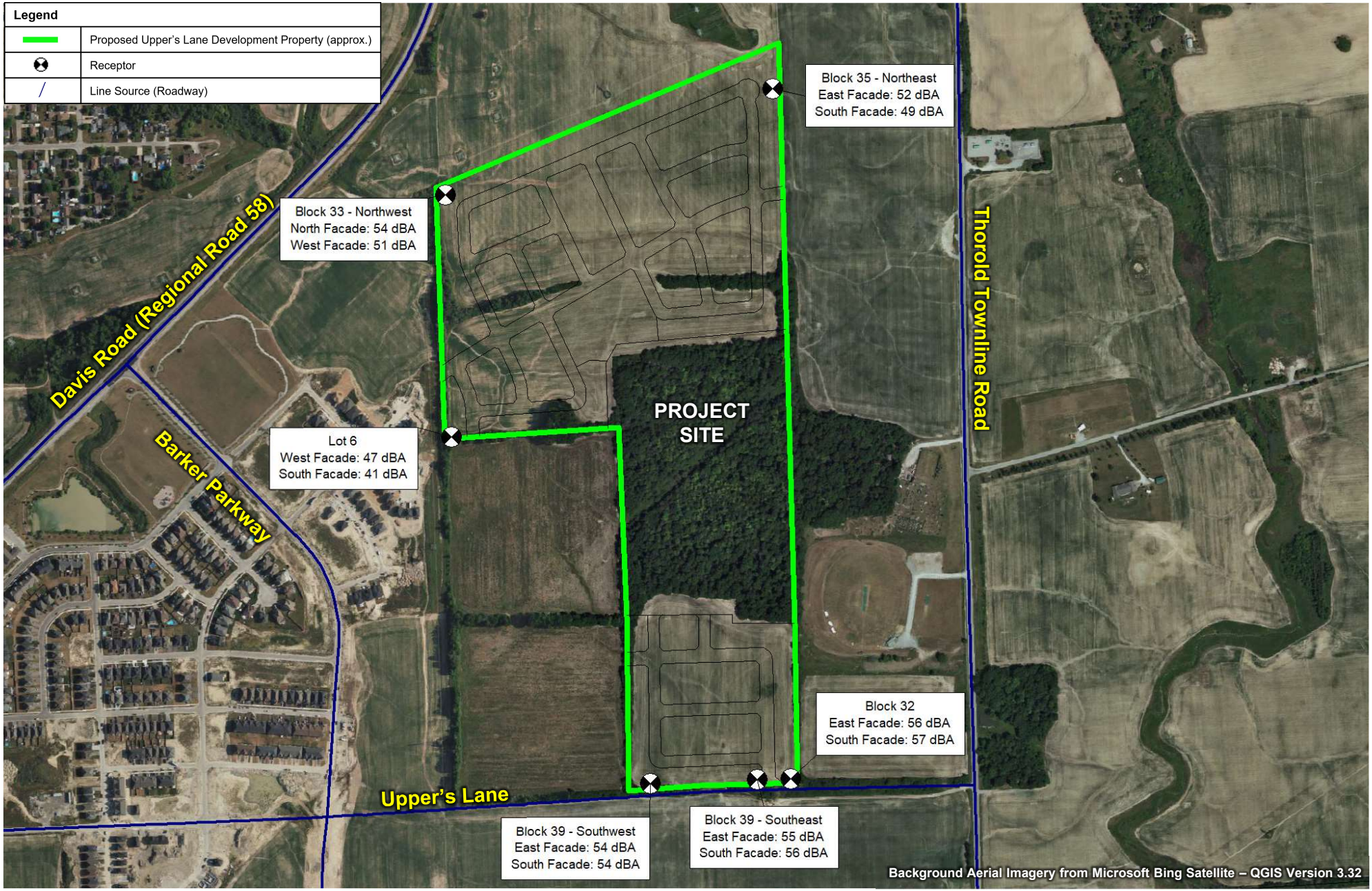
PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **13**	
PREDICTED QUARRY SOUND LEVELS – MITIGATED – PHASE 1A SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **14**	
PREDICTED QUARRY SOUND LEVELS – MITIGATED – PHASE 1AS SOUTH SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Feb. 7, 2024 Rev 0.0	Figure No. **15**	
PREDICTED QUARRY SOUND LEVELS – MITIGATED – PHASE 2A SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED FAÇADE SOUND LEVELS – ROAD TRAFFIC - DAYTIME

True North

Scale: 1:12,000

METRES

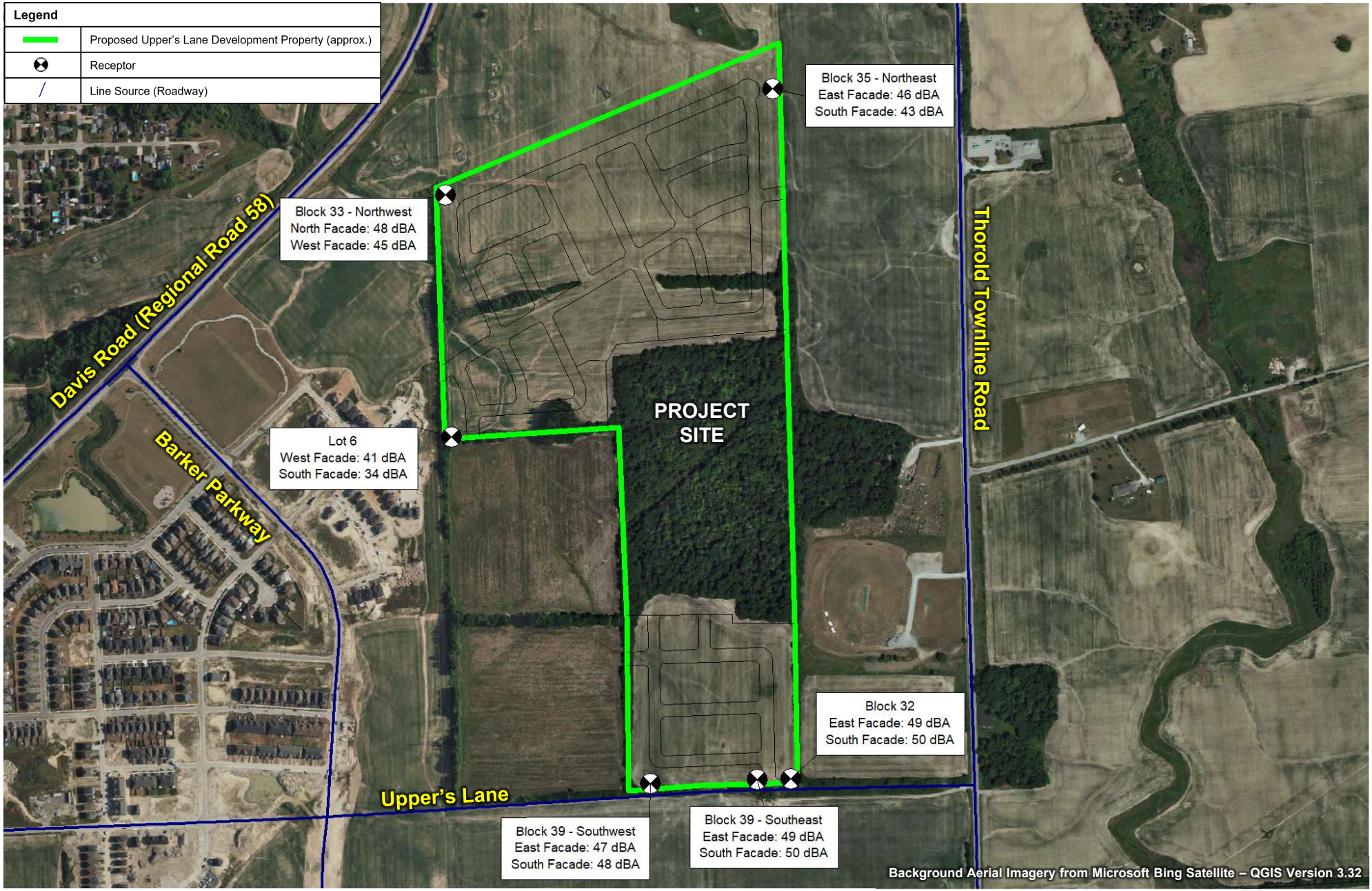
Date: Feb. 7, 2024

Rev. 0

Project No. 241.030826.00001

Figure No. **16**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED FAÇADE SOUND LEVELS – ROAD TRAFFIC – NIGHT-TIME

True North

Scale: 1:12,000

METRES

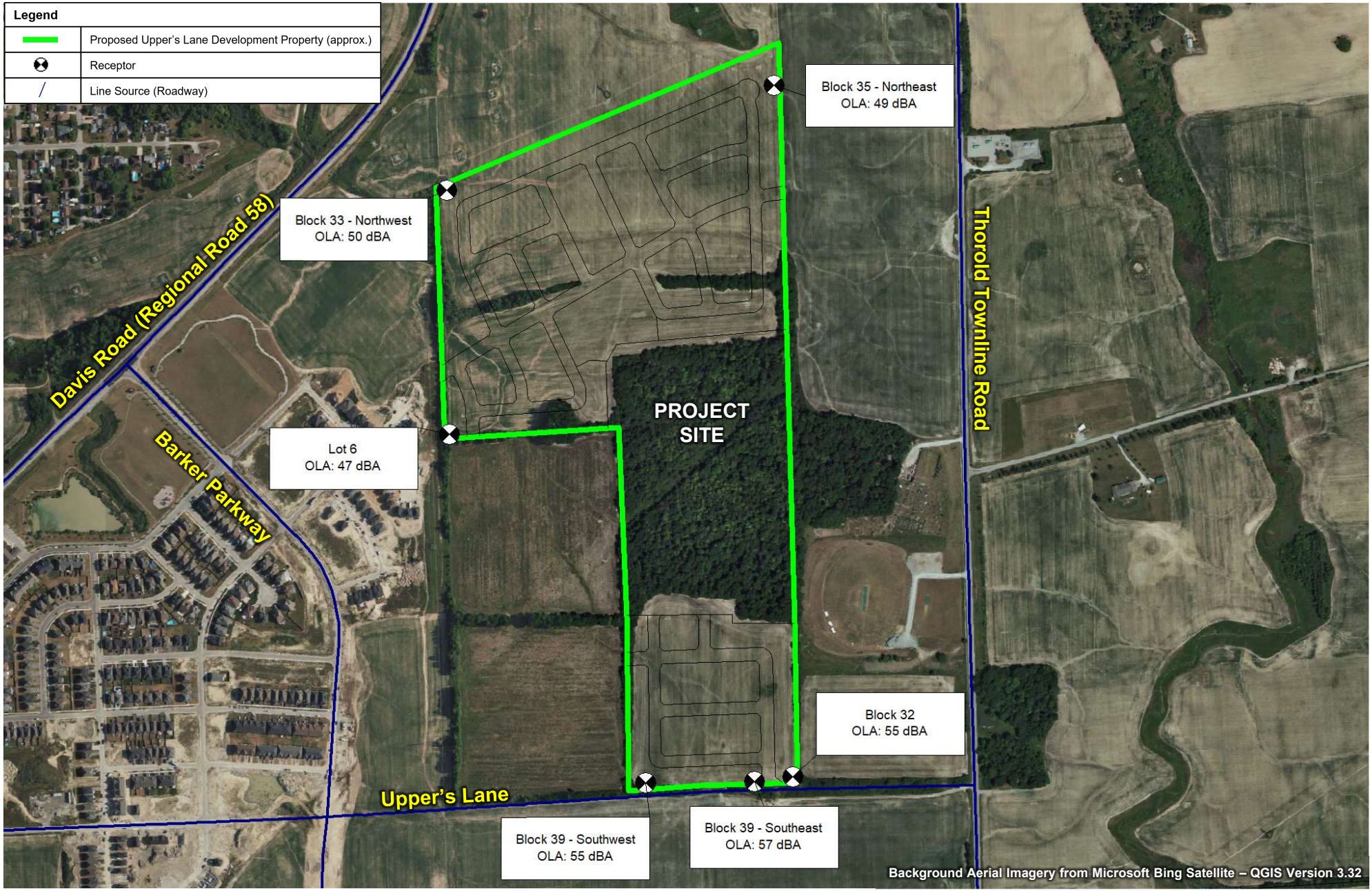
Date: Feb. 7, 2024

Rev. 0

Project No. 241.030826.00001

Figure No. **17**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED OUTDOOR LIVING AREA SOUND LEVELS – ROAD TRAFFIC - DAYTIME

True North

Scale: 1:12,000 METRES

Date: Feb. 7, 2024 Rev. 0

Project No. 241.030826.00001

Figure No. **18**

SLR

Appendix A Development Drawings

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

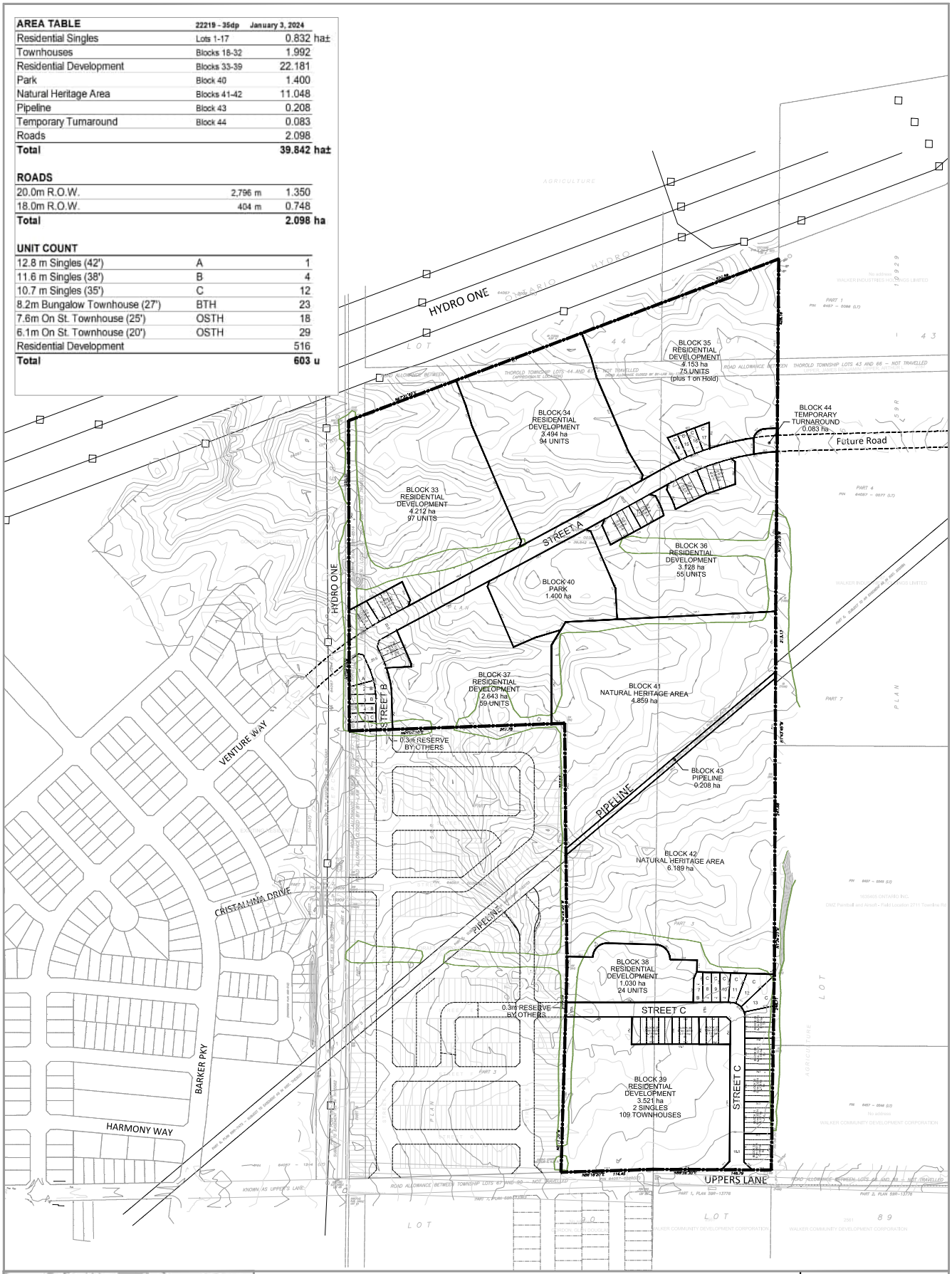
SLR Project No.: 241.030826.00001

February 7, 2024

AREA TABLE	22219 - 35dp	January 3, 2024	
Residential Singles	Lots 1-17		0.832 ha±
Townhouses	Blocks 18-32		1.992
Residential Development	Blocks 33-39		22.181
Park	Block 40		1.400
Natural Heritage Area	Blocks 41-42		11.048
Pipeline	Block 43		0.208
Temporary Turnaround	Block 44		0.083
Roads			2.098
Total			**39.842 ha±**

ROADS		
20.0m R.O.W.	2,796 m	1.350
18.0m R.O.W.	404 m	0.748
Total		**2.098 ha**

UNIT COUNT		
12.8 m Singles (42')	A	1
11.6 m Singles (38')	B	4
10.7 m Singles (35')	C	12
8.2m Bungalow Townhouse (27')	BTH	23
7.6m On St. Townhouse (25')	OSTH	18
6.1m On St. Townhouse (20')	OSTH	29
Residential Development		516
Total		**603 u**



KEYPLAN — Subject Property

LEGEND

Subject Property

NOTES

All dimensions are in metres.
All area measurements are computer generated.
All elevations refer to Geodetic Datum.

ADDITIONAL INFORMATION
REQUIRED UNDER SECTION 51(17)
OF THE PLANNING ACT

A, B, E, F, G, J, L - As Shown on Plan

C. This represents the Applicant's entire holding of undeveloped land in the vicinity.

D. Residential Singles, Bungalow Townhouses, On-Street Townhouses, Residential Development Blocks, Park, Natural Heritage Area, Pipeline Block, Future Road Block and Roads .

H. Piped water to be provided.

I. Clay loam soil.

K. Sanitary & storm sewers to be provided.

SURVEYOR'S CERTIFICATE

I certify that: the boundaries of the lands to be subdivided and their relationship to the adjacent lands are correctly shown.

Brad Barnett - O.L.S. — Stantec Geomatics Ltd. — Ontario Land Surveyors

31 01 2024
Day Month Year

OWNER'S AUTHORIZATION

I/we, 1000352619 Ontario Inc.
being the registered owner(s) of the subject lands hereby authorize BOUSFIELDs INC. to prepare and submit a draft plan of subdivision for approval.

Phil Beaky — Director, Development

31 01 2024
Day Month Year

DRAFT PLAN OF PROPOSED SUBDIVISION
PART OF LOTS 43, 44 & 67 AND
PART OF ROAD ALLOWANCE BETWEEN
LOTS 67 & 68, 43 & 66 AND 44 & 67
(Closed By Bylaw 1782, Inst. BL122)
(GEOGRAPHIC TOWNSHIP OF THOROLD)

CITY OF THOROLD
REGIONAL MUNICIPALITY OF NIAGARA

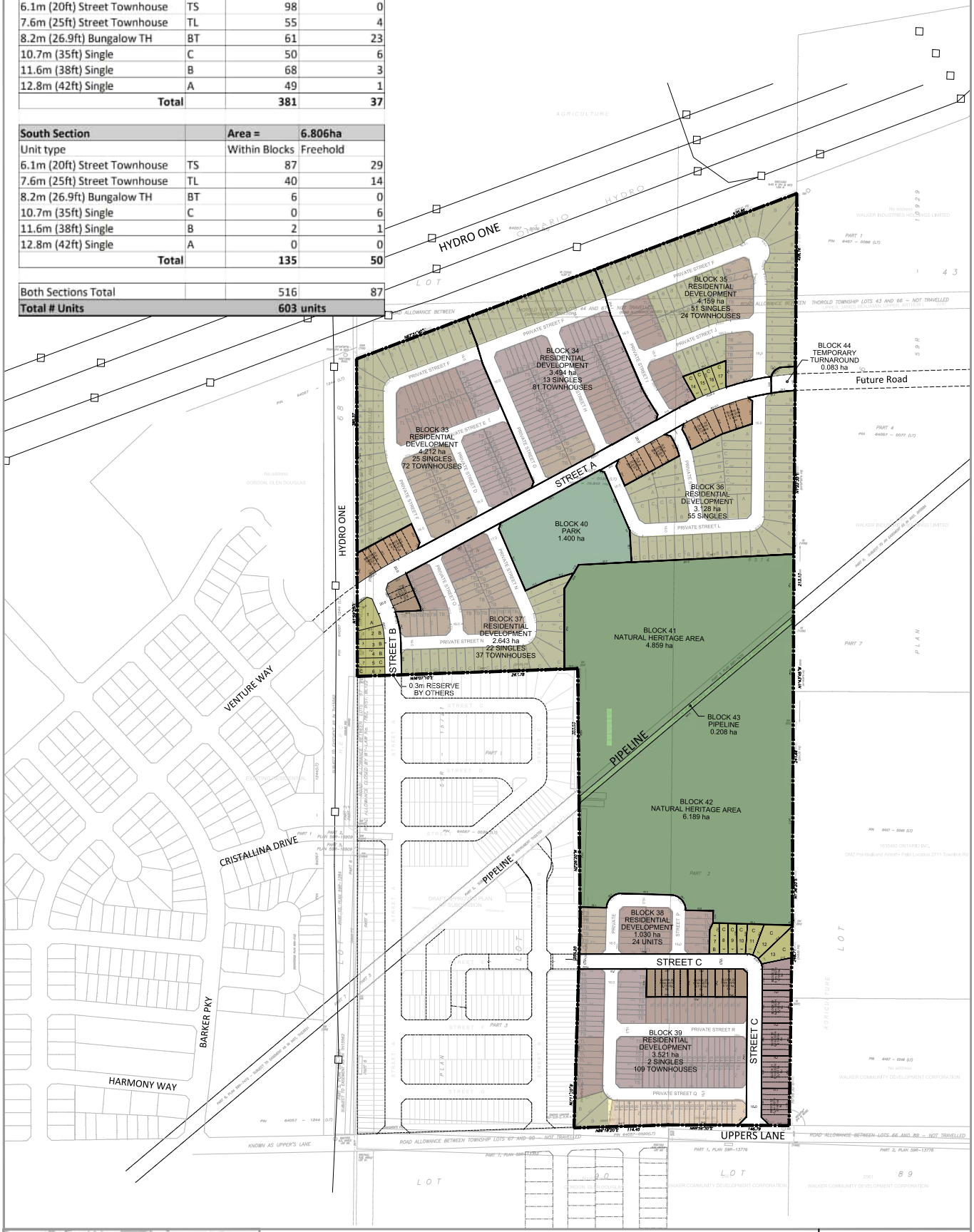
BOUSFIELDs INC.
3 Church Street, Suite 200
Toronto, Ontario M5E 1M2
P (416) 947-9744
F (416) 947-0781

Scale	Date	Drawing Number
1 : 2000	January 3, 2024 rev. January 31, 2024	22219 - 35dp

North Section		Area =	21.780ha
Unit type		Within Blocks	Freehold
6.1m (20ft) Street Townhouse	TS	98	0
7.6m (25ft) Street Townhouse	TL	55	4
8.2m (26.9ft) Bungalow TH	BT	61	23
10.7m (35ft) Single	C	50	6
11.6m (38ft) Single	B	68	3
12.8m (42ft) Single	A	49	1
Total		**381**	**37**

South Section		Area =	6.806ha
Unit type		Within Blocks	Freehold
6.1m (20ft) Street Townhouse	TS	87	29
7.6m (25ft) Street Townhouse	TL	40	14
8.2m (26.9ft) Bungalow TH	BT	6	0
10.7m (35ft) Single	C	0	6
11.6m (38ft) Single	B	2	1
12.8m (42ft) Single	A	0	0
Total		**135**	**50**

Both Sections Total		516	87
Total # Units		**603 units**	



KEYPLAN Subject Property

Demonstration Plan

Upper's Lane

LEGEND

Subject Property

NOTES

All dimensions are in metres.
All area measurements are computer generated.
All elevations refer to Geodetic Datum.

BOUSFIELDs INC.
3 Church Street, Suite 200
Toronto, Ontario M5E 1M2
P (416) 947-9744
F (416) 947-0781

1: 2000	January 3, 2024	22219 - 36cp
Scale	Date	Drawing Number

Appendix B Industry Information

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

Land Uses Surrounding the Upper's Lane - Thorold

Name	Address	Description	MECP ECA or EASR No. (Date)	MECP Guideline D-6					
				Class	A of I	R M S	Actual Dist.	Within A of I?	Within R M S?
Northland Power Thorold Cogen CP Inc.	90 Allanburg Road	Power Plant	8189-83LPJM (2012)	II	300	70	825	-	-
581917 Ontario Inc.	1108 Beaverdams Road	End of Life Vehicle Disposal Site	R-007-8656384824 (2016)	II	300	70	430	-	-
Rankin Construction Inc.	3299 Thorold Townline Rd	Hot Asphalt Plant	6254-7F3NWM (2008)	III	1000	300	730	Yes	-
Lafrate Machine Works	1150 Beaverdams Rd	Machine Shop	-	I	70	20	700	-	-
Upper's Quarry	Part Lots 119,120,136, 137 in City of Niagra Falls	Quarry	-	III	1000	300	260	Yes	Yes

Ontario

Ministry of the Environment **Ministère de l'Environnement**

CERTIFICATE OF APPROVAL
AIR
NUMBER 6254-7F3NWM
Issue Date: June 11, 2008

Rankin Construction Inc.
222 Martindale Rd
St. Catharines, Ontario
L2R 7A3

Site Location: 3299 Thorold Townline Road
3299 Thorold Townline Rd
Thorold City, Regional Municipality of Niagara

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

A permanent hot mix asphalt plant operating at a capacity of 300 tonnes of asphalt per hour, including the following equipment:

- one (1) counter flow drum mixer used to mix hot asphalt or to dry and heat aggregate, complete with a burner firing natural gas or No.2 fuel oil having a maximum heat input of 105,435,000 kilojoules per hour discharging into a baghouse dust collector complete with Nomex filter material, having a filtering area of 964 square metres, and a pulse-jet cleaning mechanism, venting to the atmosphere at a maximum volumetric flow rate of 14.55 actual cubic metres per second, at an approximative temperature of 130 degrees Celsius through a stack having exit dimensions of 0.92 by 1.36 metres, extending 25.6 metres above grade;

- one (1) batch tower complete with vibrating screen, four (4) aggregate bins and a double shaft mixer discharging into the baghouse dust collector described above;

- two (2) hot mix asphalt storage silos each having a maximum capacity of 255 tonnes, complete with a natural gas fired hot oil heater having a maximum heat input of 1,054,350 kilojoules per hour, exhausting to the atmosphere at a maximum volumetric flow rate of 0.1 actual cubic metres per second through a stack having exit dimensions of 0.2 by 0.31 metre, extending 3 metres above the roof and 6 metres above grade;

- two (2) liquid asphalt cement storage tanks each having a maximum capacity of 109,090 litres heated by the natural gas fired hot oil heater described above;

- one (1) scavenger exhaust fan complete with collection and connecting ducts to capture fume emissions from the batch mix tower, the conveyor that loads the hot mixed asphalt silos, the batch tower loading area and the silos filling, directing the fumes into the combustion chamber of the drum mixer;

all in accordance with the application for a Certificate of Approval (Air) dated March 28, 2008 submitted by Rankin Construction Inc., signed by John MacLellan, the additional documentation dated May 21, 2008 and all supporting information associated with the application.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

(1) *"Acoustical Consultant"* means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with *Ministry* noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a *Facility*.

(2) *"Acoustic Assessment Report*" means a report, prepared in accordance with *Publication NPC-233* and the *Acoustic Assessment Report Procedure* that documents all sources of noise emissions and *Noise Control Measures* present at the *Facility.*

(3) *"Act*" means the Environmental Protection Act;

(4) "*Best Management Practices Plan*" means a document or a set of documents which describe measures to minimize dust emissions from the Facility and/or Equipment;

(5) "*Certificate*" means this entire certificate of approval issued in accordance with Section 9 of the Act;

(6) "*Company*" means Rankin Construction Inc.;

(7) "*Director*" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Act;

(8) "*District Manager*" means the District Manager, Niagara District Office, West Central Region of the Ministry;

(9) " *Equipment*" means the dryer, the batch tower, the baghouse, the hot mix asphalt storage silos, the liquid asphalt storage tanks and ancillary equipment described in the Company's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate;

(10) "Independent Acoustical Consultant" means an Acoustical Consultant not representing the Company, and not involved in the noise impact assessment or the design/implementation of noise control measures for the Facility/Equipment.

> The Independent Acoustical Consultant shall not be retained by the consultant involved in the noise/vibration impact assessment or the design/implementation of noise/vibration control measures for the Facility/Equipment.

(11) "*Manual*" means a document or a set of documents that provides written instructions to staff of the Company;

(12) "*Ministry*" means the Ontario Ministry of the Environment;

(13) "*Plant*" means the permanent hot mix asphalt plant described in the Company's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate;

(14) "*Noise Abatement Action Plan*" means a noise abatement program developed by the *Company* to achieve compliance with the sound level limits set in *Publication NPC-205* and/or *Publication NPC-232*, as applicable;

(15) "Publication NPC-103" means Publication NPC-103, Measurement Procedures, August 1978;

(16) "*Publication NPC-205*" means the *Ministry* Publication NPC-205, “Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)”, October, 1995 ; and

(17) "*Publication NPC-233*" means the *Ministry* Publication NPC-233, “Information to be Submitted for Approval of Stationary Sources of Sound”, October, 1995.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

Operation and Maintenance Manual

1. The Company shall ensure that the Plant and the Equipment are properly operated and maintained at all times. The Company shall:

(1) prepare, before commencement of operation of the Equipment and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Plant and the Equipment, including:

(a) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

(b) emergency procedures;

(c) the frequency of inspection and replacement of filter bags;

(d) procedures for any record keeping activities relating to operation and maintenance of the Plant and the Equipment;

(e) procedures for recording and responding to environmental complaints relating to operation of the Plant; and

(f) all appropriate measures to minimize noise and odorous emissions from all potential sources; and

(2) implement the recommendations of the Manual.

Environmental Practices Guide

2. The Company shall ensure that the Plant is operated and maintained at all times according to the Environmental Practices Guide For Ontario Hot Mix Asphalt Plants, published by the Ontario Hot Mix Producers Association, dated February, 2002, or as amended.

FUGITIVE DUST CONTROL

3. The Company shall develop in consultation with the District Manager and acceptable to the Director, a Best Management Practices Plan for the control of fugitive dust emissions. This Best Management Practices Plan shall include, but not be limited to:

(1) identification of the main sources of fugitive dust emissions such as:

(a) on-site traffic;
(b) paved roads/areas;
(c) unpaved roads/areas;
(d) material stock piles;
(e) loading/unloading areas and loading/unloading techniques;
(f) material spills;
(g) material conveyance systems;
(h) exposed openings in process and storage buildings; and
(i) general work areas.

(2) potential causes for high dust emissions and opacity resulting from these sources;

(3) preventative and control measures in place or under development to minimize the likelihood of high dust emissions and opacity from the sources of fugitive dust emissions identified above. Details of the preventative and control measures shall

include:

(a) a description of the control equipment to be installed;
(b) a description of the preventative procedures to be implemented; and/or
(c) the frequency of occurrence of periodic preventative activities, including material application rates, as applicable.

(4) an implementation schedule for the Best Management Practices Plan, including training of facility personnel;

(5) inspection and maintenance procedures and monitoring initiatives to ensure effective implementation of the preventative and control measures; and

(6) a list of all Ministry comments received, if any, on the development of the Best Management Practices Plan, and a description of how each Ministry comment was addressed in the Best Management Practices Plan.

4. The Company shall submit the Best Management Practices Plan to the Director and the District Manager not later than six months after the date of this Certificate.

(1) The Director may not accept the Best Management Practices Plan if the minimum requirements described in Condition No. 3 were not included in the Best Management Practices Plan.

(2) If the Best Management Practices Plan is not accepted by the Director, the Company shall submit a Best Management Practices Plan acceptable to the Director not later than nine months after the date of this Certificate;

5. Upon acceptance of the Best Management Practices Plan by the Director, the Company shall immediately implement the Best Management Practices Plan for the control of fugitive dust emissions to provide effective dust suppression measures to any potential sources of fugitive dust emissions resulting from the operation of the Facility.

RECORD RETENTION

6. The Company shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the operation, maintenance and monitoring activities required by this Certificate, and make these records available for review by staff of the Ministry upon request. The Company shall retain:

(1) all records on the maintenance, repair and inspection of the Plant and the Equipment;

(2) all records on the daily operation of the Plant and the Equipment, including :

(a) daily production rate;

(b) daily start-up and shut-down times of the Plant;

(c) the weight percentage of recycle asphalt paving material loaded into the Plant;

(d) the weight percentage of rubberized material and asphaltic cement loaded into the Plant;

(e) where continuous temperature monitoring equipment is not available, record mixing and load-out temperatures at least on a daily basis and with every changes in mix types;

(3) all records of any upset conditions associated with the operation of the Equipment;

(4) all records on any environmental complaints, including:

(a) a description, time and date of the incident;

(b) operating conditions (e.g. temperatures of asphalt cement and hot mix material being discharged, any upset conditions, spills of hot mix material, etc.) at the time of the incident;

(c) wind direction at the time of the incident; and

(d) a description of the measures taken to address the cause of the incident and to prevent a similar occurrence in the future.

NOTIFICATION OF COMPLAINTS

7. The Company shall notify the District Manager, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:

(1) a description of the nature of the complaint; and

(2) the time and date of the incident.

PERFORMANCE

8. The Company shall ensure that the noise emissions from the Facility comply with the limits set in Publication NPC-205.

ACOUSTIC AUDIT REPORT

9. The Company shall carry out acoustic audit measurements on the actual noise emissions due to the operation of the Facility, in accordance with the measurement procedures in Publication NPC-103.

10. The Company shall submit an acoustic audit report, prepared by an Independent Acoustic Consultant, in accordance with Publication NPC-233, to the District Manager and the Director not later than seven (7) weeks after the date on his Certificate.

11. The Director may not accept the results of the acoustic audit if the requirements of Publication NPC-233 were not followed.

12. If the Director does not accept the results of the acoustic audit the Director may:
(1) require the Company to repeat the acoustic audit, and/or
(2) revoke this certificate, or
(3) in accordance with the Act, impose additional conditions to the Company's Certificate of Approval.

13. If the acoustic audit report indicates that the Facility is not in compliance with the noise limits stated in Ministry Publication NPC-205 then the Company shall submit an application to amend their current Certificate of Approval, such that it includes a Noise Abatement Action Plan.

The Noise Abatement Action Plan shall include a detailed timetable of scheduled mitigating measures, with the objective to ensure that the noise emissions from the Facility comply with limits in Publication NPC-205. The Noise Abatement Action Plan shall also be based upon the objective to complete the implementation of the required mitigating measures by a date not exceeding six (6) months after the date noted on this Certificate.
If applicable, the new application must be sent to the District Manager and the Director, by a date not exceeding three (3) months, after the date noted on this Certificate.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition Nos. 1, 2, 3, 4 and 5 are included to emphasize that the Plant and the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate.

2. Condition No. 6 is included to require the Company to keep records and to provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

3. Condition No. 7 is included to require the Company to notify staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

4. Condition No. 8 is included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Facility.

5. Conditions Nos. 9 and 10 are included to require the Company to gather accurate information so that the environmental impact and subsequent compliance with the Act, the regulations and this Certificate can be verified.

6. Conditions Nos. 11 and 12 are included to ensure that the acoustic audit is carried out in accordance with procedures set in the Ministry's Noise Guidelines.

7. Condition No. 13 is included to require the Company to develop a Noise Abatement Action Plan (if necessary) designed to ensure that the noise emissions from the Facility are in compliance with applicable limits set in the Ministry's Noise Guidelines.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, S.O. 1993, Chapter 28, the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Environmental Commissioner
1075 Bay Street, 6th Floor
Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director
Section 9, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ene.gov.on.ca, you can determine when the leave to appeal period ends.

The above noted works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 11th day of June, 2008

Victor Low, P.Eng.
Director
Section 9, *Environmental Protection Act*

MC/
c: District Manager, MOE Niagara
Peter Piersol, ORTECH Environmental

Appendix C MECP EPI Details

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

Ontario

Ministry of the Environment, Conservation and Parks

Corporate Management Division

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Division de la gestion ministérielle

April 24, 2023

Alice Najjar
SLR Consulting Ltd.

Dear Alice Najjar
RE: Request #: EPI-2023-2000002327
Requestor provided Client Reference: 241.030826.00001
Site address: 3299 Thorold Townline Road, Thorold

This letter confirms that, after conducting a thorough search of its source system applications, the ministry has identified potential records related to your property request. Our search indicates that the ministry may hold the following records:

- Waste Generator number/classes
- Air Approval[1]
- Sewage Approval[1]
- Correspondence, Abatement, Occurrence reports
- Incident Reporting
- Inspections
- Facility Air Profile
- Technical Support
- Waste System Approval[1]
- Noise Approval[1]

If you would like to submit a Freedom of Information (FOI) request to the ministry, please return to the table on the Requests tab of the EPI application and select “Submit FOI” under the Actions column in the row identified by EPI-2023-2000002327.

If you have any questions regarding the matter, please contact the ministry at eproperty@ontario.ca.

Sincerely,

Environmental Property Information (EPI) Program

Disclaimer

This search result is provided for informational purposes only and is not intended to provide specific advice or recommendations. The Ministry of the Environment, Conservation and Parks (MECP) cannot and does not guarantee that the information provided is current, accurate, complete, or free of errors. Any reliance upon this information is solely at the risk of the user.

[1] In addition to the core reports (e.g Environmental Compliance Approval), there may be extensive supporting documentation associated with this record type. When transferring your request over to FOI, we encourage you to refine the scope of your request to only the supporting documentation required for your purposes, as the inclusion of this additional documentation can add significant processing time.

Ontario

Ministry of the Environment, Conservation and Parks

Corporate Management Division

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Division de la gestion ministérielle

Le 24 avril 2023

Alice Najjar
SLR Consulting Ltd.

Madame,
Monsieur, Alice Najjar
Objet : No de demande : EPI-2023-2000002327
Le demandeur a fourni une référence client: 241.030826.00001
Adresse du site: 3299 Thorold Townline Road, Thorold

La présente lettre confirme que, après avoir effectué une recherche exhaustive dans ses applications de système source, le ministère a circonscrit des dossiers potentiels reliés à votre demande concernant des biens immobiliers. Notre recherche indique que les dossiers suivants peuvent être en possession du ministère:

- Waste Generator number/classes
- Air Approval[1]
- Sewage Approval[1]
- Correspondence, Abatement, Occurrence reports
- Incident Reporting
- Inspections
- Facility Air Profile
- Technical Support
- Waste System Approval[1]
- Noise Approval[1]

Si vous souhaitez soumettre une demande de liberté d'information (FOI) au ministère, veuillez retourner au tableau de l'onglet Requêtes de l'application EPI et sélectionner "Soumettre FOI" dans la colonne Actions de la ligne identifiée par EPI-2023-2000002327.

Si vous avez des questions concernant votre demande, nous vous invitons à communiquer avec le ministère à l’adresse électronique suivante : eproperty@ontario.ca.

Veuillez recevoir mes salutations les plus sincères,

Programme d’Information Environnementale de la propriété

Avertissement

Ce résultat de recherche est fourni uniquement à titre informatif et n’a aucunement pour but de donner des conseils particuliers ou des recommandations. Le ministère de l’Environnement de la Protection de la nature et des Parcs (MEPP) ne peut pas garantir que les renseignements fournis sont à jour, exacts, complets et exempts d’erreurs. L’utilisateur qui se fie à ces renseignements le fait à ses seuls risques.

[1] En plus des rapports de base (par exemple, l'approbation de conformité environnementale), il peut y avoir de nombreux documents justificatifs associés à ce type d'enregistrement. Lors du transfert de votre demande vers FOI, nous vous encourageons à affiner la portée de votre demande en ne tenant compte que des pièces justificatives requises pour vos besoins, car l'inclusion de ces documents supplémentaires peut ajouter un temps de traitement important.

Appendix D AERMOD Input

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

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** AERMOD View Ver. 11.0.0
** Lakes Environmental Software Inc.
** Date: 5/31/2023
** File: C:\Users\sludwig\Desktop\Uppers Lane\Model Runs\Uppers Lane TPM-2\Uppers
Lane TPM-2.ADI
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** AERMOD Control Pathway
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   MODELOPT DFAULT CONC
   AVERTIME 24 ANNUAL
   POLLUTID OTHER
   RUNORNOT RUN
   ERRORFIL "Uppers Lane TPM-2.err"
CO FINISHED
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** AERMOD Source Pathway
**************************************
**
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** Source ID - Type - X Coord. - Y Coord. **
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** PREFIX
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Appendix E Warning Clause and Mitigation Summary

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

Appendix E Ventilation, Warning Clause and Mitigation Summary

Warning clauses may be used individually or in combination.

The following warning clauses are recommended for inclusion in agreements registered on Title for the residential units, and included in all agreements of purchase and sale or lease, and all rental agreements.

A summary of warning clause, ventilation and mitigation recommendations is included in **Table E.1**.

E.1 Air-Quality, Dust & Odour Warning Clauses

AQ: “Purchasers/tenants are advised that due to the proximity of adjacent industries, dust and odours from these facilities may at times be perceptible.”

E.2 Noise and Vibration Warning Clauses and Mitigation

MECP Type A: “Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.”

MECP Type C: “This dwelling unit has been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.”

MECP Type E: "Purchasers/tenants are advised that due to the proximity of the adjacent Upper’s Quarry, noise from quarry operations may at times be audible."

Table E.1: Summary of Ventilation, Warning Clause and Mitigation Recommendations

Development Location	Barrier Recommendation	Ventilation Recommendation	Warning Clause Recommendation
Block 39 – Units with South-Facing Backyards towards Upper’s Lane	None	None	Type A, Type E, AQ
Block 32 – Southmost Unit	None	Provision for AC	Type C, Type E, AQ
Dwellings in Aggregate Impact Area identified in City of Thorold Official Plan[1]	None	None	Type E, AQ
All Other Dwellings	None	None	AQ

Notes: [1] This may include dwellings in Blocks 18 to 21, Blocks 25 to 32, Block 38, Block 29, Blocks 34 to 36, Lots 7 to 13, and Lots 14 to 17.

Appendix F City of Thorold – Official Plan Excerpt

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

When residential development is proposed adjacent to the natural gas metering facility a 20 metre separation distance is required measured from lot line to line.

a) The utilization of window streets abutting the industrial area and the dwelling units having flanking yards;

b) Sound proofing and construction techniques;

c) Acoustical barriers such as berms or walls; and

d) A forced air ventilation system with central air conditioning or some other form of mechanical ventilation.

B1.8.12.3 Aggregate Resource Protection Policies

The Ministry of Natural Resources and Forestry has identified lands east of Thorold Townline Road, north of the Hydro One corridor, as a potential bedrock resource area. Development applications within 500 metres of this potential bedrock resource area shall be reviewed having regard to this identified resource area and the need to demonstrate that future aggregate extraction will not be precluded or hindered and to achieve land use compatibility. Mitigation measures which shall be determined through appropriate studies prepared by the developer may be necessary and include but shall not be limited to the following:

a) Building orientation;

b) The utilization of window streets and dwelling units having flanking yards;

c) Sound proofing and construction techniques;

d) Increasing building setbacks or possibly the need for additional spatial separation; and

e) Landscape treatments.

In order to determine the necessary mitigation, the developer when proceeding before a quarry application shall be required to prepare the following studies assuming that a proposed quarry will be located on the east side of Thorold Townline Road:

a) Operational noise;

b) Blasting;

c) Traffic; and,

d) Any other technical report considered appropriate by Council.

The 500 metre study area is identified on Schedule A-3.

It shall also be recognized that Thorold Townline Road is a Regional arterial road and is the likely aggregate haul route required to serve any future aggregate extraction

operation to the east. Accordingly, all studies required by any policy of this Plan shall recognize that Thorold Townline Road is a future aggregate haul route. The haul route shall be restricted from the future extraction operation entrance southerly to Highway 20, a major arterial.

Once the proponent has prepared the appropriate studies and the necessary mitigation is incorporated into the proposed development, if necessary, the utilization of such mitigation measures does not relieve the new mineral aggregate operation from providing appropriate setbacks and mitigation measures in order to achieve land use compatibility.

B1.8.12.4 Residential Development Adjacent to Thorold Townline Road

When residential development is proposed to be located adjacent to the Townline Road and the easterly located agricultural lands in the City of Niagara Falls consideration shall be given to utilizing design elements of dwelling orientation, window streets, increased building setbacks, and landscape treatments to achieve land use compatibility.

B1.8.13 Servicing and Transportation

B1.8.13.1 General

a) All development within the Neighbourhoods of Rolling Meadows shall be developed with full municipal services in accordance with Municipal Policy.

b) Extension of municipal services into the Neighbourhoods of Rolling will be required to service development.

c) Easements to accommodate municipal services shall be granted as a condition of development approval.

d) Easements to accommodate utilities shall be granted as a condition of development approval.

e) The provision of a water distribution system, wastewater collection system, stormwater management facilities, road network, and other municipal services will be achieved with minimum costs to the City.

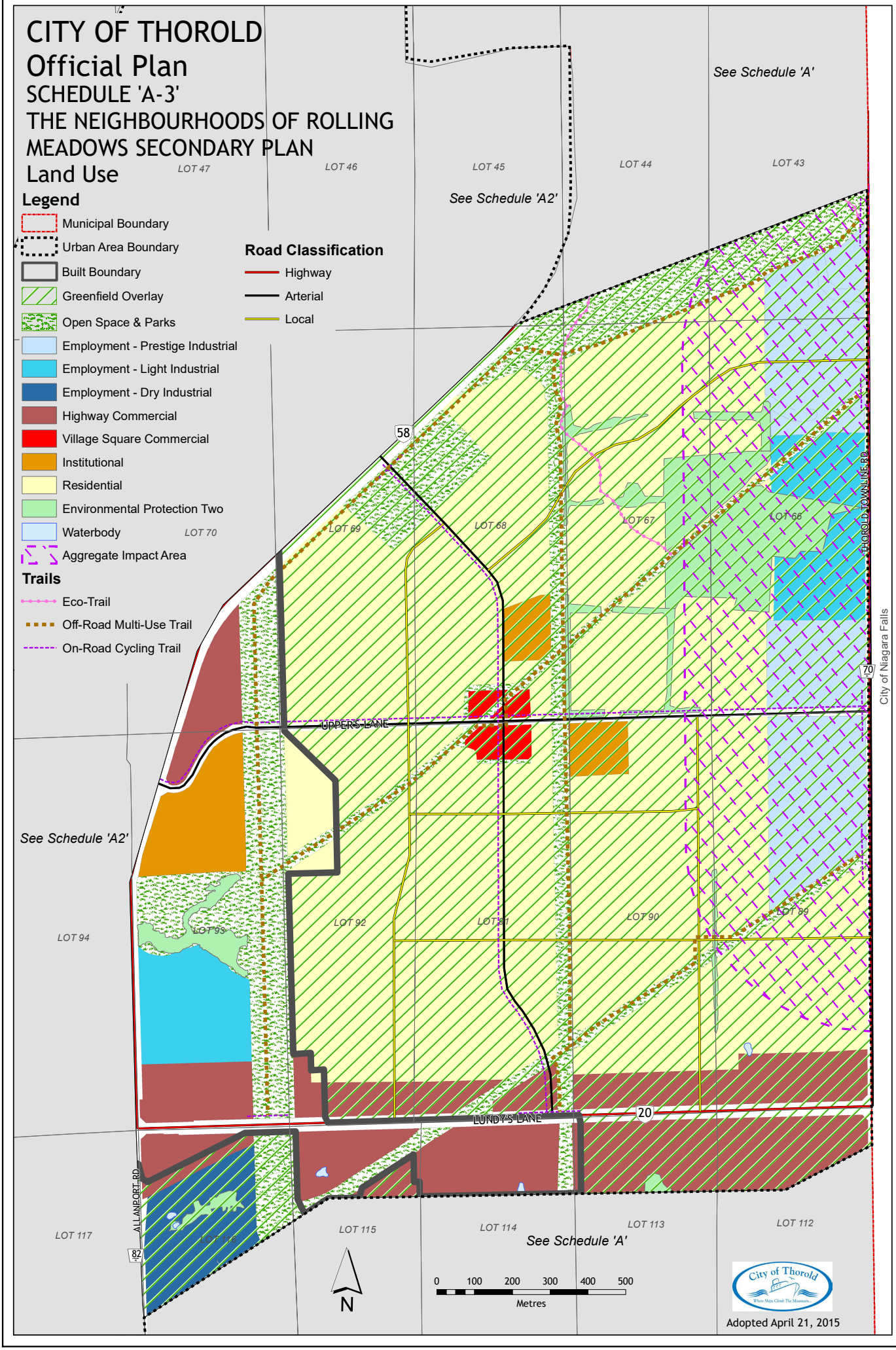
f) In order to achieve the proper co-ordination of services and consistence in development standards, the orderly development of land by way of plan of subdivision and site plan will be required throughout the neighbourhood. Consents to sever land to create development blocks will only be permitted when it is determined to the satisfaction of the City that the severance of land will not prejudice or jeopardize the subsequent development of the balance of the lands.

B1.8.13.2 Infrastructure Improvements

In order to accommodate development within the Neighbourhoods of Rolling Meadows, it will be necessary to address off-site upgrading or expansion of infrastructure such as:

a) The extension of the Allanburg Road trunk sanitary sewer easterly to the

CITY OF THOROLD
Official Plan
SCHEDULE 'A-3'
THE NEIGHBOURHOODS OF ROLLING MEADOWS SECONDARY PLAN
Land Use



Adopted April 21, 2015

Appendix G RWDI Quarry Noise Report Excerpts

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

2.2 Modelled Phases

The receptors surrounding the Quarry will experience the most impact from the Quarry during different phases. Therefore, the modelled scenarios are selected based on the worst-case extraction location for the different receptors.

The modelled phases for the Proposed Extraction Scenario are:

- **Phase 1A Sinking Cut** (P1A_Sinkcut*):
  - Sinking cut in Mid Extraction Area
- **Phase 1A South Sinking Cut** (P1AS_Sinkcut*):
  - Sinking cut in South Extraction Area
- **Phase 2A Sinking Cut** (P2A_Sinkcut*):
  - Sinking cut in North Extraction Area
- **Phase 3A** (P3A*):
  - Extraction in northern portion of Phase 3A, with AP operational
- **Phase 3B Northeast** (P3B_NE*):
  - Extraction in the northeastern corner of North Extraction Area, with AP operational
- **Phase 4 Southeast** (P4_SE*):
  - Extraction in southeastern corner of Mid Extraction Area, with AP operational
- **Phase 5 East** (P5_E*):
  - Extraction in eastern corner of South Extraction Area, with AP operational

Sinking cut in Phase 3A was also assessed but was deemed to be less impactful than Phase 2A sinking cut. Phase 3B sinking cut is expected to have similar impacts. Therefore sinking cuts in Phases 3A/3B were not evaluated further. The operation overviews of the modelled scenarios are shown in **Figures 2a** through **2g**.

3 NOISE SOURCE SUMMARY

A summary of significant sound sources is provided in **Table 1**, including sound power levels, location, sound characteristics, operating duration, and vehicle route assumptions. Sound power levels for the proposed sources are based on historical measurement data on file at RWDI. The overview of the locations of the modelled sources are shown in **Figures 2a** through **2g**. Detailed examples of the significant source locations are shown in **Figures 2h** and **2i**.

3.1 Continuous Sources

The continuous sources modelled are:

- Working Face (WF) and Primary Crusher (PC) sources (daytime only, 0700 to 1900h):
  - One (1) silenced drill working on the 1st bench;
  - One (1) loader working on the 2nd bench;
  - Dumping of rocks into primary crusher;
  - One (1) primary crusher; and
  - One (1) primary screen.
- Conveyor from Working Face Primary Crusher to Processing Plant (daytime only, 0700 to 1900h).
- Processing Plant (PP) sources:
  - Two (2) secondary crushers (daytime only, 0700 to 1900h);
  - Two (2) secondary & tertiary screens (daytime only, 0700 to 1900h);
  - Two (2) tertiary crushers (daytime only, 0700 to 1900h);
  - One (1) loader working at piles (24h/day); and
  - Two (2) idling shipping trucks (24h/day).
- Asphalt Plant (AP) sources (operating continuously, 24 hours per day):
  - Two (2) loaders working;
  - Two (2) idling trucks;
  - One (1) compressor vent;
  - One (1) dust collector blower motor;
  - One (1) dust collector blower stack;
  - One (1) elevator motor;
  - One (1) conveyor motor;
  - One (1) oven motor;
  - One (1) pug mill door (pressure relief noise through the door); and
  - One (1) pug mill motor.
- Internal Haul Truck Routes:
  - Haul roads between PP and AP for aggregates (24h/day).
- Shipping Truck Routes (24h/day):
  - Shipping of aggregate from PP stockpiles to offsite;
  - Shipping of HMA from AP to offsite; and
  - Receiving of AC and RAP at AP.

All continuous sources are assumed to be operating constantly in their respective operating periods. During the sinking cut, only one (1) secondary and one (1) tertiary crusher will be deployed. As the Quarry progresses to later phases, two (2) sets of secondary and tertiary crushers will be deployed at the processing plant. Asphalt plant noise sources were based on the existing asphalt plant at Walker Brothers Quarry and Asphalt Plant in Niagara Falls.

Shipping truck traffic modelled using moving point source calculation method. Shipping trucks on site are expected to travel at a mean speed of approximately 20 km/h. The number of vehicle trips per hour are calculated based on peak daily production rate and typical vehicle payload and are shown in **Table 1**.

3.2 Impulsive Sources

The only impulsive source considered in this study is the impulses associated with the asphalt plant silos (ASPH_imp_silo), which could operate up to 24 hours a day. As per NPC-300, the sound limits are based on the number of impulses per hour. Nine (9) or more impulses are anticipated to occur at a worst-case hour during daytime, evening, and nighttime.

3.3 Construction Sources

Temporary construction noise from the Quarry is anticipated for short periods throughout its lifespan. Activities considered to be construction noise include overburden removal and berm creation. Details on construction noise assessment are provided in **Section 5**.

3.4 Identifiable Source Characteristics

Continuous sources that warrant adjustment due to tonal, cyclically varying, quasi-steady impulsive or beating sound characteristics receive additional consideration in accordance with MOECC NPC-104 guidelines (MOECC, 1978). These guidelines specify that a penalty is applicable for tonal, cyclically varying, or quasi-steady impulsive sound characteristics. No sources were identified to exhibit tonal, cyclically varying, quasi-steady impulsive or beating sound characteristics per NPC-103.

4 POINTS OF RECEPTION

Sound levels from sources at the Quarry were determined at points of reception (PORs) located on noise sensitive land uses. Noise sensitive land uses are defined in the MOECC's environmental guideline, Publication NPC-300 (MOECC, 2013), as the property of a person that accommodates a dwelling, a noise sensitive commercial building or a noise sensitive institutional building. In some cases, a vacant lot may be considered noise sensitive provided it is zoned to allow a sensitive use.

A noise sensitive land use may have one or more POR. PORs for an acoustic assessment are those locations where sound from the facility is received and assessed against the applicable limits. Sound levels may be assessed at the façade of the building and/or outdoor areas, depending on the type of sensitive land use assessed. Outdoor PORs are only assessed for dwellings and are not assessed for commercial and institutional noise sensitive land uses.

Table 1: Noise Source Summary - Proposed Extraction Scenario

Upper's Quarry, 1603157

Notes to Table:

1. Wherever possible, the Source ID matches the identifiers used in the ESDM report.
2. Sound Power Level of Source, in dBA, not including sound characteristic adjustments per NPC-104.
3. Source Location: O = Outside of building, including the roof, I = Inside of building.
4. Sound Characteristic, per NPC-104:
   - S = Steady
   - I = Impulsive
   - T = Tonal
   - Q = Quasi-Steady Impulsive
   - B = Buzzing
   - C = Cyclic
5. Noise control measures currently in place or specified in construction drawings:
   - S = Silencer/Muffler
   - L = Lagging
   - O = Other
   - A = Acoustic lining, plenum
   - E = Acoustic enclosure
   - U = Uncontrolled
   - B = Barrier/Berm

   Where noise control measures are specified in construction drawings or were found on existing equipment, octave band sound power levels include the effects of the noise control measures. Noise control measures recommended in the mitigation section of this report are not included in this table.

Table 1: Additional Data

Upper's Quarry, 1603157

6. Source type indicates Cadna/A modelling methodology. For Point, Line, and Area sources, PWLs represent the overall level for the entire source. Where source type is Mobile Equipment, the source is modelled as a moving point source, and PWL is calculated from a single-vehicle passby.
7. Sound Power Level Data Source:
   - Man = Manufacturer's Data
   - EC = Engineering Calc based on specifications
   - Mea = Measured Directly
   - Same ### = same type as source no. ###
   - Hist = Historical Data on File at RWDI
8. For loader dumping into primary crusher, it is assumed each dump takes approximately 10s

Source ID [1]	Source Description	Sound Power Level [2]	Source Location [3]	Sound Characteristics [4]	Noise Control Measures [5]	1/1 Octave Band Sound Power Level Data if available (dB)									Source Type [6]	PWL Data Source [7]	Height Above Roof	Local Roof Height Ab. Grade	Height Above Grade	Source Co-ordinates for point sources (m)			Operating Time during Worst-case hour for Point Sources, [8] OR Vehicle Passby per Hour & Speed for Line Sources		
		(dBA)	(I or O)	(S,Q,I,B,T,C)	(S,A,B,L,E,O,U)	31.5	63	125	250	500	1000	2000	4000	8000			(m)	(m)	(m)	X	Y	Z	Daytime	Evening	Nighttime
Point Sources																									
P1A_Sinkcut_PC_CrusherDump	P1A_Sinkcut, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	648673	4772848	180.0	30 dumps/hr	-	-
P1A_Sinkcut_PC_Ldr	P1A_Sinkcut, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648672	4772850	179.5	60 min	-	-
P1A_Sinkcut_PC_PrimaryCrush	P1A_Sinkcut, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	648675	4772847	180.0	60 min	-	-
P1A_Sinkcut_PC_PrimaryScreen	P1A_Sinkcut, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648676	4772845	180.0	60 min	-	-
P1A_Sinkcut_PP_Ldr	P1A_Sinkcut, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648802	4772799	179.5	60 min	60 min	60 min
P1A_Sinkcut_PP_SecondaryCrush	P1A_Sinkcut, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648791	4772793	180.0	60 min	-	-
P1A_Sinkcut_PP_SecondaryTertiaryScreen	P1A_Sinkcut, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648793	4772792	180.0	60 min	-	-
P1A_Sinkcut_PP_TertiaryCrush	P1A_Sinkcut, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648794	4772790	180.0	60 min	-	-
P1A_Sinkcut_PP_Trk1	P1A_Sinkcut, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648804	4772810	180.0	60 min	60 min	60 min
P1A_Sinkcut_PP_Trk2	P1A_Sinkcut, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648807	4772811	180.0	60 min	60 min	60 min
P1A_Sinkcut_WF_Drill	P1A_Sinkcut, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	648631	4772870	179.5	60 min	-	-
P1AS_Sinkcut_PC_CrusherDump	P1AS_Sinkcut, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	648618	4772517	180.0	30 dumps/hr	-	-
P1AS_Sinkcut_PC_Ldr	P1AS_Sinkcut, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648618	4772516	179.5	60 min	-	-
P1AS_Sinkcut_PC_PrimaryCrush	P1AS_Sinkcut, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	648619	4772520	180.0	60 min	-	-
P1AS_Sinkcut_PC_PrimaryScreen	P1AS_Sinkcut, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648619	4772523	180.0	60 min	-	-
P1AS_Sinkcut_PP_Ldr	P1AS_Sinkcut, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648705	4772726	179.5	60 min	60 min	60 min
P1AS_Sinkcut_PP_SecondaryCrush	P1AS_Sinkcut, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648705	4772706	180.0	60 min	-	-
P1AS_Sinkcut_PP_SecondaryTertiaryScreen	P1AS_Sinkcut, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648705	4772708	180.0	60 min	-	-
P1AS_Sinkcut_PP_TertiaryCrush	P1AS_Sinkcut, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648706	4772710	180.0	60 min	-	-
P1AS_Sinkcut_PP_Trk1	P1AS_Sinkcut, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648703	4772742	180.0	60 min	60 min	60 min
P1AS_Sinkcut_PP_Trk2	P1AS_Sinkcut, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648707	4772743	180.0	60 min	60 min	60 min
P1AS_Sinkcut_WF_Drill	P1AS_Sinkcut, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	648633	4772485	179.5	60 min	-	-
P2A_Sinkcut_PC_CrusherDump	P2A_Sinkcut, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	648657	4773006	180.0	30 dumps/hr	-	-
P2A_Sinkcut_PC_Ldr	P2A_Sinkcut, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648657	4773005	179.5	60 min	-	-
P2A_Sinkcut_PC_PrimaryCrush	P2A_Sinkcut, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	648657	4773007	180.0	60 min	-	-
P2A_Sinkcut_PC_PrimaryScreen	P2A_Sinkcut, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648657	4773008	180.0	60 min	-	-
P2A_Sinkcut_PP_Ldr	P2A_Sinkcut, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648692	4773095	179.5	60 min	60 min	60 min
P2A_Sinkcut_PP_SecondaryCrush	P2A_Sinkcut, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648685	4773094	180.0	60 min	-	-
P2A_Sinkcut_PP_SecondaryTertiaryScreen	P2A_Sinkcut, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648685	4773095	180.0	60 min	-	-
P2A_Sinkcut_PP_TertiaryCrush	P2A_Sinkcut, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648686	4773095	180.0	60 min	-	-
P2A_Sinkcut_PP_Trk1	P2A_Sinkcut, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648698	4773094	180.0	60 min	60 min	60 min
P2A_Sinkcut_PP_Trk2	P2A_Sinkcut, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648696	4773094	180.0	60 min	60 min	60 min
P2A_Sinkcut_WF_Drill	P2A_Sinkcut, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	648630	4773018	179.5	60 min	-	-
P3A_PC_CrusherDump	P3A, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	648874	4773392	164.0	60 dumps/hr	-	-
P3A_PC_Ldr	P3A, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648872	4773395	163.5	60 min	-	-
P3A_PC_PrimaryCrush	P3A, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	648875	4773391	164.0	60 min	-	-
P3A_PC_PrimaryScreen	P3A, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648875	4773391	164.0	60 min	-	-
P3A_PP_Ldr	P3A, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648708	4773140	147.5	60 min	60 min	60 min
P3A_PP_SecondaryCrush1	P3A, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648709	4773151	148.0	60 min	-	-
P3A_PP_SecondaryCrush2	P3A, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648710	4773151	148.0	60 min	-	-
P3A_PP_SecondaryTertiaryScreen1	P3A, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648710	4773149	148.0	60 min	-	-
P3A_PP_SecondaryTertiaryScreen2	P3A, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648710	4773149	148.0	60 min	-	-

Table 1: Noise Source Summary - Proposed Extraction Scenario

Upper's Quarry, 1603157

Notes to Table:

1. Wherever possible, the Source ID matches the identifiers used in the ESDM report.

2. Sound Power Level of Source, in dBA, not including sound characteristic adjustments per NPC-104.

3. Source Location: O = Outside of building, including the roof, I = Inside of building.

4. Sound Characteristic, per NPC-104:
   - S = Steady
   - I = Impulsive
   - T = Tonal
   - Q = Quasi-Steady Impulsive
   - B = Buzzing
   - C = Cyclic

5. Noise control measures currently in place or specified in construction drawings:
   - S = Silencer/Muffler
   - L = Lagging
   - O = Other
   - A = Acoustic lining, plenum
   - E = Acoustic enclosure
   - U = Uncontrolled
   - B = Barrier/Berm

   Where noise control measures are specified in construction drawings or were found on existing equipment, octave band sound power levels include the effects of the noise control measures. Noise control measures recommended in the mitigation section of this report are not included in this table.

Table 1: Additional Data

Upper's Quarry, 1603157

6. Source type indicates Cadna/A modelling methodology. For Point, Line, and Area sources, PWLs represent the overall level for the entire source. Where source type is Mobile Equipment, the source is modelled as a moving point source, and PWL is calculated from a single-vehicle passby.

7. Sound Power Level Data Source:
   - Man = Manufacturer's Data
   - EC = Engineering Calc based on specifications
   - Mea = Measured Directly
   - Same ### = same type as source no. ###
   - Hist = Historical Data on File at RWDI

8 For loader dumping into primary crusher, it is assumed each dump takes approximately 10s

Source ID [1]	Source Description	Sound Power Level [2]	Source Location [3]	Sound Characteristics [4]	Noise Control Measures [5]	1/1 Octave Band Sound Power Level Data if available (dB)									Source Type [6]	PWL Data Source [7]	Height Above Roof	Local Roof Height Ab. Grade	Height Above Grade	Source Co-ordinates for point sources (m)			Operating Time during Worst-case hour for Point Sources, [8] OR Vehicle Passby per Hour & Speed for Line Sources		
		(dBA)	(I or O)	(S,Q,I,B,T,C)	(S,A,B,L,E,O,U)	31.5	63	125	250	500	1000	2000	4000	8000			(m)	(m)	(m)	X	Y	Z	Daytime	Evening	Nighttime
P3A_PP_TertiaryCrush1	P3A, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648709	4773148	148.0	60 min	-	-
P3A_PP_TertiaryCrush2	P3A, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648710	4773148	148.0	60 min	-	-
P3A_PP_Trk1	P3A, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648709	4773130	148.0	60 min	60 min	60 min
P3A_PP_Trk2	P3A, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648706	4773131	148.0	60 min	60 min	60 min
P3A_WF_Drill	P3A, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	648850	4773416	177.5	60 min	-	-
P3B_NE_PC_CrusherDump	P3B_NE, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	649442	4773420	164.5	60 dumps/hr	-	-
P3B_NE_PC_Ldr	P3B_NE, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	649443	4773421	164.0	60 min	-	-
P3B_NE_PC_PrimaryCrush	P3B_NE, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	649441	4773419	164.5	60 min	-	-
P3B_NE_PC_PrimaryScreen	P3B_NE, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649440	4773419	164.5	60 min	-	-
P3B_NE_PP_Ldr	P3B_NE, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	648896	4773262	150.5	60 min	60 min	60 min
P3B_NE_PP_SecondaryCrush1	P3B_NE, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648908	4773261	151.0	60 min	-	-
P3B_NE_PP_SecondaryCrush2	P3B_NE, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	648908	4773260	151.0	60 min	-	-
P3B_NE_PP_SecondaryTertiaryScreen1	P3B_NE, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648907	4773261	151.0	60 min	-	-
P3B_NE_PP_SecondaryTertiaryScreen2	P3B_NE, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	648907	4773260	151.0	60 min	-	-
P3B_NE_PP_TertiaryCrush1	P3B_NE, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648906	4773261	151.0	60 min	-	-
P3B_NE_PP_TertiaryCrush2	P3B_NE, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	648906	4773260	151.0	60 min	-	-
P3B_NE_PP_Trk1	P3B_NE, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648884	4773262	151.0	60 min	60 min	60 min
P3B_NE_PP_Trk2	P3B_NE, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	648884	4773264	151.0	60 min	60 min	60 min
P3B_NE_WF_Drill	P3B_NE, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	649462	4773462	177.5	60 min	-	-
P4_SE_PC_CrusherDump	P4_SE, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	649481	4772802	164.5	60 dumps/hr	-	-
P4_SE_PC_Ldr	P4_SE, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	649484	4772801	164.0	60 min	-	-
P4_SE_PC_PrimaryCrush	P4_SE, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	649480	4772803	164.5	60 min	-	-
P4_SE_PC_PrimaryScreen	P4_SE, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649479	4772804	164.5	60 min	-	-
P4_SE_PP_Ldr	P4_SE, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	649152	4772897	148.5	60 min	60 min	60 min
P4_SE_PP_SecondaryCrush1	P4_SE, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	649166	4772899	149.0	60 min	-	-
P4_SE_PP_SecondaryCrush2	P4_SE, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	649166	4772898	149.0	60 min	-	-
P4_SE_PP_SecondaryTertiaryScreen1	P4_SE, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649165	4772899	149.0	60 min	-	-
P4_SE_PP_SecondaryTertiaryScreen2	P4_SE, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649165	4772898	149.0	60 min	-	-
P4_SE_PP_TertiaryCrush1	P4_SE, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	649163	4772898	149.0	60 min	-	-
P4_SE_PP_TertiaryCrush2	P4_SE, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	649164	4772897	149.0	60 min	-	-
P4_SE_PP_Trk1	P4_SE, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	649143	4772895	149.0	60 min	60 min	60 min
P4_SE_PP_Trk2	P4_SE, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	649142	4772897	149.0	60 min	60 min	60 min
P4_SE_WF_Drill	P4_SE, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	649523	4772782	180.5	60 min	-	-
P5_E_PC_CrusherDump	P5_E, PC loader dumping into crusher	123	O	S	U	115.4	120.3	122.2	120.0	118.3	118.5	116.6	111.1	102.3	Point	Hist	-	-	3.0	649208	4772601	163.0	60 dumps/hr	-	-
P5_E_PC_Ldr	P5_E, PC Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	649211	4772602	162.5	60 min	-	-
P5_E_PC_PrimaryCrush	P5_E, PC Primary Crusher	118	O	S	U	108.9	119.8	115.0	118.7	114.6	112.2	109.6	104.4	99.6	Point	Hist	-	-	3.0	649204	4772601	163.0	60 min	-	-
P5_E_PC_PrimaryScreen	P5_E, PC Primary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649200	4772601	163.0	60 min	-	-
P5_E_PP_Ldr	P5_E, PP Loader	106	O	S	U	102.4	111.2	104.7	101.4	99.9	99.2	97.5	97.7	98.5	Point	Hist	-	-	2.5	649153	4772896	148.5	60 min	60 min	60 min
P5_E_PP_SecondaryCrush1	P5_E, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	649170	4772897	149.0	60 min	-	-
P5_E_PP_SecondaryCrush2	P5_E, PP Secondary Crusher	115	O	S	U	102.3	108.9	111.7	110.8	109.6	110.5	107.4	104.6	99.0	Point	Hist	-	-	3.0	649170	4772896	149.0	60 min	-	-
P5_E_PP_SecondaryTertiaryScreen1	P5_E, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649168	4772897	149.0	60 min	-	-
P5_E_PP_SecondaryTertiaryScreen2	P5_E, PP Secondary & Tertiary Screen	114	O	S	U	111.4	113.6	111.5	111.1	110.9	106.9	106.5	105.2	101.7	Point	Hist	-	-	3.0	649168	4772896	149.0	60 min	-	-
P5_E_PP_TertiaryCrush1	P5_E, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	649166	4772897	149.0	60 min	-	-
P5_E_PP_TertiaryCrush2	P5_E, PP Tertiary Crusher	99	O	S	U	103.4	106.7	97.1	99.9	96.0	92.8	91.3	88.6	83.9	Point	Hist	-	-	3.0	649166	4772896	149.0	60 min	-	-
P5_E_PP_Trk1	P5_E, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	649137	4772894	149.0	60 min	60 min	60 min
P5_E_PP_Trk2	P5_E, PP Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.0	649137	4772897	149.0	60 min	60 min	60 min
P5_E_WF_Drill	P5_E, WF Drill	110	O	S	U	96.8	101.2	99.3	96.9	102.5	104.3	104.4	102.0	99.5	Point	Hist	-	-	2.5	649269	4772608	177.5	60 min	-	-

Table 1: Noise Source Summary - Proposed Extraction Scenario

Upper's Quarry, 1603157

Notes to Table:

1. Wherever possible, the Source ID matches the identifiers used in the ESDM report.
2. Sound Power Level of Source, in dBA, not including sound characteristic adjustments per NPC-104.
3. Source Location: O = Outside of building, including the roof, I = Inside of building.
4. Sound Characteristic, per NPC-104:
   - S = Steady
   - I = Impulsive
   - T = Tonal
   - Q = Quasi-Steady Impulsive
   - B = Buzzing
   - C = Cyclic
5. Noise control measures currently in place or specified in construction drawings:
   - S = Silencer/Muffler
   - L = Lagging
   - O = Other
   - A = Acoustic lining, plenum
   - E = Acoustic enclosure
   - U = Uncontrolled
   - B = Barrier/Berm

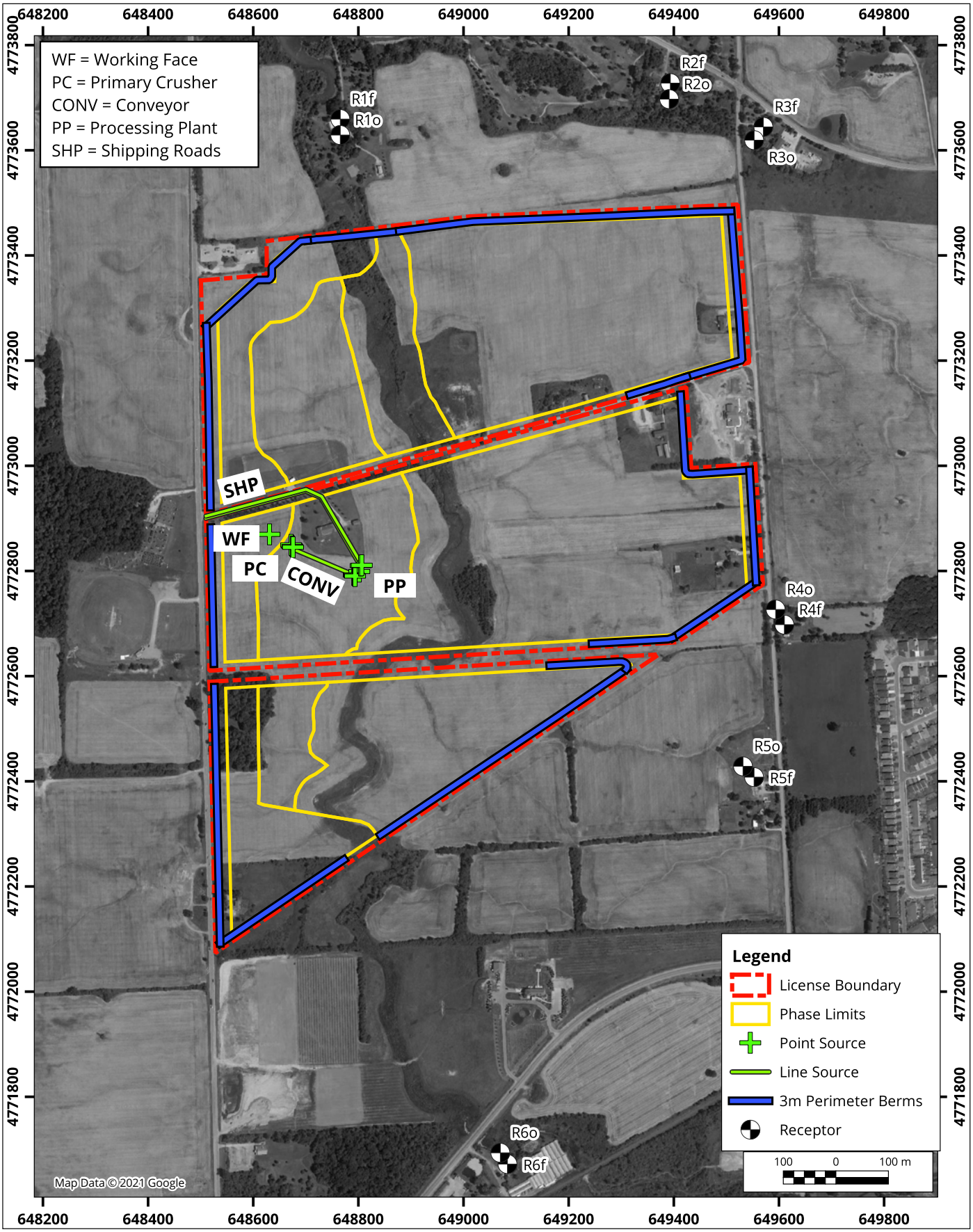
   Where noise control measures are specified in construction drawings or were found on existing equipment, octave band sound power levels include the effects of the noise control measures. Noise control measures recommended in the mitigation section of this report are not included in this table.

Table 1: Additional Data

Upper's Quarry, 1603157

6. Source type indicates Cadna/A modelling methodology. For Point, Line, and Area sources, PWLs represent the overall level for the entire source. Where source type is Mobile Equipment, the source is modelled as a moving point source, and PWL is calculated from a single-vehicle passby.
7. Sound Power Level Data Source:
   - Man = Manufacturer's Data
   - EC = Engineering Calc based on specifications
   - Mea = Measured Directly
   - Same ### = same type as source no. ###
   - Hist = Historical Data on File at RWDI
8. For loader dumping into primary crusher, it is assumed each dump takes approximately 10s

Source ID [1]	Source Description	Sound Power Level [2]	Source Location [3]	Sound Characteristics [4]	Noise Control Measures [5]	1/1 Octave Band Sound Power Level Data if available (dB)									Source Type [6]	PWL Data Source [7]	Height Above Roof	Local Roof Height Ab. Grade	Height Above Grade	Source Co-ordinates for point sources (m)			Operating Time during Worst-case hour for Point Sources, [8] OR Vehicle Passby per Hour & Speed for Line Sources		
		(dBA)	(I or O)	(S,Q,I,B,T,C)	(S,A,B,L,E,O,U)	31.5	63	125	250	500	1000	2000	4000	8000			(m)	(m)	(m)	X	Y	Z	Daytime	Evening	Nighttime
ASPH_comp	Asphalt Plant - Compressor Vent	96	O	S	U	91.4	88.5	99.4	96.2	93.0	90.2	87.4	84.9	81.3	Point	Hist	-	-	0.6	648875	4772829	143.6	60 min	60 min	60 min
ASPH_DC_m	Asphalt Plant - Dust Collector Blower (motor)	105	O	S	U	110.8	113.6	105.4	104.1	102.2	99.8	94.9	93.4	91.5	Point	Hist	-	-	2.0	648856	4772826	145.0	60 min	60 min	60 min
ASPH_DC_s	Asphalt Plant - Dust Collector Blower (stack)	110	O	S	U	125.3	126.2	117.0	110.0	105.8	103.5	98.5	93.6	86.1	Point	Hist	0.1	20.0	20.1	648855	4772826	163.1	60 min	60 min	60 min
ASPH_elev	Asphalt Plant - Elevator Motor	100	O	S	U	95.7	97.7	95.1	95.2	97.8	95.5	91.5	87.3	77.2	Point	Hist	-	-	19.0	648861	4772835	162.0	60 min	60 min	60 min
ASPH_IDLE_TRK1	Asphalt Plant - Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.5	648880	4772826	146.5	60 min	60 min	60 min
ASPH_IDLE_TRK2	Asphalt Plant - Idling Truck	96	O	S	U	101.7	98.9	94.6	90.2	90.5	92.8	90.1	81.6	73.8	Point	Hist	-	-	3.5	648880	4772825	146.5	60 min	60 min	60 min
ASPH_imp_silo	Asphalt Plant - Silo - Impulsive	127	O	I	U	122.0	127.9	114.5	107.6	106.6	108.5	117.9	122.3	123.2	Point	Hist	1.0	21.0	22.0	648888	4772842	165.0	60 min	60 min	60 min
ASPH_Ldr_Act1	Asphalt Plant - Loader Activity	102	O	S	U	103.6	109.2	104.1	99.2	97.3	95.8	94.2	93.1	88.0	Point	Hist	-	-	2.5	648870	4772830	145.5	60 min	60 min	60 min
ASPH_Ldr_Act2	Asphalt Plant - Loader Activity	102	O	S	U	103.6	109.2	104.1	99.2	97.3	95.8	94.2	93.1	88.0	Point	Hist	-	-	2.5	648864	4772827	145.5	60 min	60 min	60 min
ASPH_motor	Asphalt Plant - Conveyor motor, gravel hitting metal plate	107	O	S	U	100.5	102.5	94.2	95.5	98.9	103.0	102.0	95.1	91.4	Point	Hist	-	-	4.0	648854	4772834	147.0	60 min	60 min	60 min
ASPH_oven	Asphalt Plant - Oven Motor	102	O	S	U	111.4	110.7	104.0	100.1	98.3	97.8	93.9	91.9	89.9	Point	Hist	-	-	5.8	648858	4772832	148.8	60 min	60 min	60 min
ASPH_pugdoor	Asphalt Plant - Pug Mill door (pressure relief noise)	107	O	S	U	114.6	112.8	109.9	106.3	105.2	101.2	96.8	94.9	93.4	Point	Hist	-	-	4.0	648863	4772834	147.0	60 min	60 min	60 min
ASPH_pugmill	Asphalt Plant - Pug Mill Motor	105	O	S	U	0.0	105.0	104.6	100.8	94.8	94.7	96.6	99.5	99.3	Point	Hist	-	-	5.0	648870	4772837	148.0	60 min	60 min	60 min
Line Sources																									
P1A_Sinkcut_Conveyor	P1A_Sinkcut, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P1A_Sinkcut_RD_SHP_Aggr_Em	P1A_Sinkcut, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	4/hr, 20kph	4/hr, 20kph	4/hr, 20kph
P1A_Sinkcut_RD_SHP_Aggr_Fu	P1A_Sinkcut, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	4/hr, 20kph	4/hr, 20kph	4/hr, 20kph
P1AS_Sinkcut_Conveyor	P1AS_Sinkcut, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P1AS_Sinkcut_RD_SHP_Aggr_Em	P1AS_Sinkcut, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	4/hr, 20kph	4/hr, 20kph	4/hr, 20kph
P1AS_Sinkcut_RD_SHP_Aggr_Fu	P1AS_Sinkcut, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	4/hr, 20kph	4/hr, 20kph	4/hr, 20kph
P2A_Sinkcut_Conveyor	P2A_Sinkcut, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P2A_Sinkcut_RD_SHP_Aggr_Em	P2A_Sinkcut, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	4/hr, 20kph	4/hr, 20kph	4/hr, 20kph
P2A_Sinkcut_RD_SHP_Aggr_Fu	P2A_Sinkcut, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	4/hr, 20kph	4/hr, 20kph	4/hr, 20kph
P3A_Conveyor	P3A, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P3A_RD_Haul_PP_AP_Em	P3A, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U	110.2	113.9	109.7	105.1	104.6	102.7	101.6	92.5	89.4	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P3A_RD_Haul_PP_AP_Fu	P3A, Aggregate Haul road b/w PP and AP, Full	112	O	S	U	108.8	108.3	109.9	109.0	106.2	108.2	104.3	98.4	94.8	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P3A_RD_SHP_Aggr_Em	P3A, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P3A_RD_SHP_Aggr_Fu	P3A, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P3B_NE_Conveyor	P3B_NE, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P3B_NE_RD_Haul_PP_AP_Em	P3B NE, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U	110.2	113.9	109.7	105.1	104.6	102.7	101.6	92.5	89.4	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P3B_NE_RD_Haul_PP_AP_Fu	P3B NE, Aggregate Haul road b/w PP and AP, Full	112	O	S	U	108.8	108.3	109.9	109.0	106.2	108.2	104.3	98.4	94.8	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P3B_NE_RD_SHP_Aggr_Em	P3B_NE, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P3B_NE_RD_SHP_Aggr_Fu	P3B_NE, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P4_SE_Conveyor	P4_SE, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P4_SE_RD_Haul_PP_AP_Em	P4 SE, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U	110.2	113.9	109.7	105.1	104.6	102.7	101.6	92.5	89.4	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P4_SE_RD_Haul_PP_AP_Fu	P4 SE, Aggregate Haul road b/w PP and AP, Full	112	O	S	U	108.8	108.3	109.9	109.0	106.2	108.2	104.3	98.4	94.8	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P4_SE_RD_SHP_Aggr_Em	P4_SE, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P4_SE_RD_SHP_Aggr_Fu	P4_SE, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P5_E_Conveyor	P5_E, Conveyor	83	O	S	U	74.5	75.5	79.0	77.3	78.8	79.2	75.6	69.1	58.5	Line	Hist	-	-	3.5	-	-	-	60 min	-	-
P5_E_RD_Haul_PP_AP_Em	P5 E, Aggregate Haul road b/w PP and AP, Empty	108	O	S	U	110.2	113.9	109.7	105.1	104.6	102.7	101.6	92.5	89.4	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P5_E_RD_Haul_PP_AP_Fu	P5 E, Aggregate Haul road b/w PP and AP, Full	112	O	S	U	108.8	108.3	109.9	109.0	106.2	108.2	104.3	98.4	94.8	Line	Hist	-	-	3.5	-	-	-	3/hr, 20kph	3/hr, 20kph	3/hr, 20kph
P5_E_RD_SHP_Aggr_Em	P5_E, Aggregate Shipping from PP, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
P5_E_RD_SHP_Aggr_Fu	P5_E, Aggregate Shipping from PP, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	12/hr, 20kph	12/hr, 20kph	12/hr, 20kph
AP_RD_SHP_AC_RAP_Em	AP, AC and RAP shipped from Offsite, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph
AP_RD_SHP_AC_RAP_Fu	AP, AC and RAP shipped from Offsite, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph
AP_RD_SHP_HMA_Em	AP, HMA product shipping, Empty	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph
AP_RD_SHP_HMA_Fu	AP, HMA product shipping, Full	104	O	S	U	107.7	110.2	108.3	99.9	99.4	98.6	96.7	93.6	91.6	Line	Hist	-	-	3.5	-	-	-	6/hr, 20kph	6/hr, 20kph	6/hr, 20kph



Proposed Phase 1A Sinking Cut Operation Overview

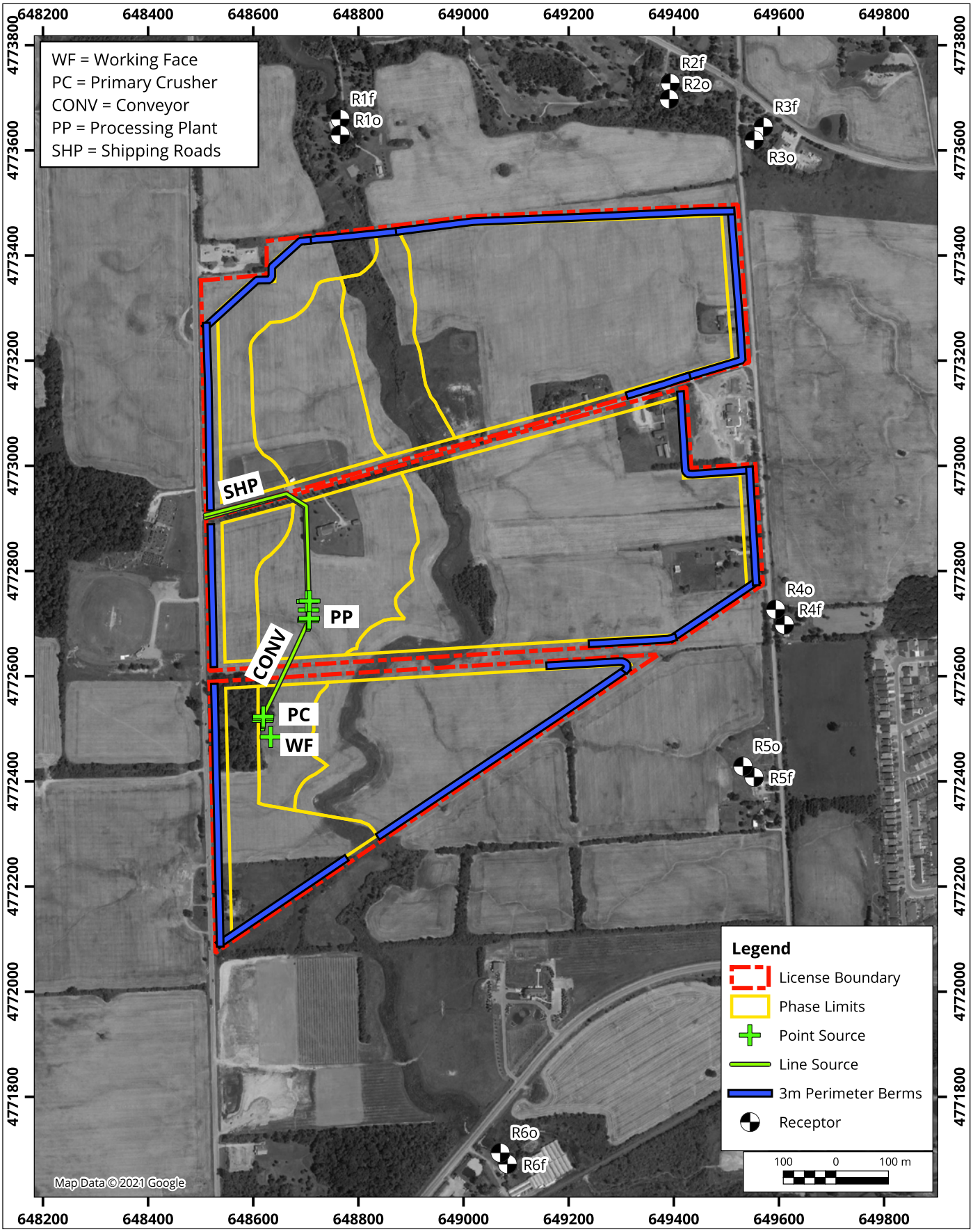
True North

Drawn by: DJK	Figure: 2a
Approx. Scale:	1:10,000
Date Revised:	Jul 13, 2023

Map Projection: NAD 1983 UTM Zone 17N

Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157



Proposed Phase 1A South Sinking Cut Operation Overview

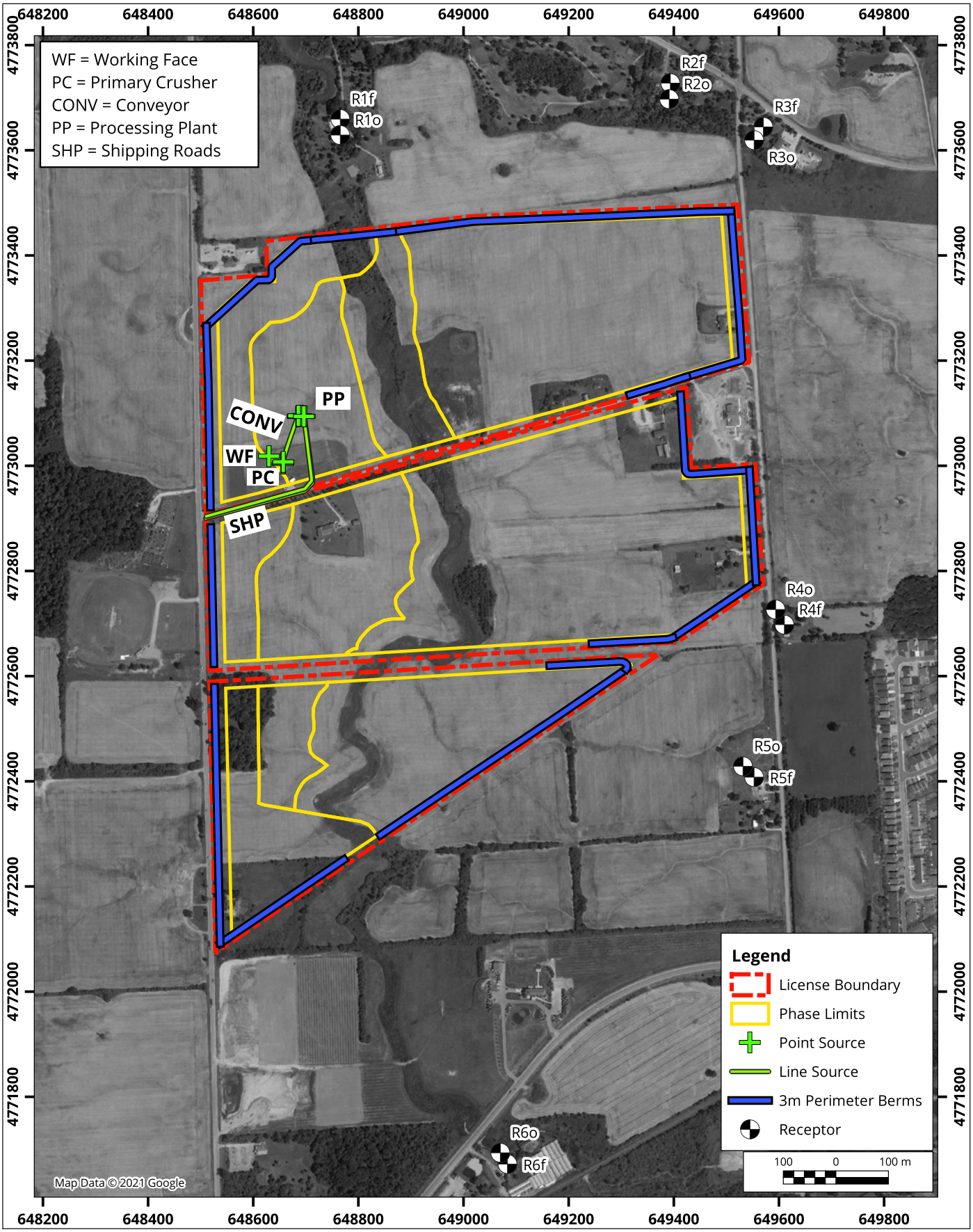
True North

Drawn by: DJK	Figure: 2b
Approx. Scale:	1:10,000
Date Revised:	Jul 13, 2023

Map Projection: NAD 1983 UTM Zone 17N

Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157



Proposed Phase 2A Sinking Cut Operation Overview

True North

Drawn by: DJK	Figure: 2c
Approx. Scale:	1:10,000
Date Revised:	Jul 13, 2023

Map Projection: NAD 1983 UTM Zone 17N

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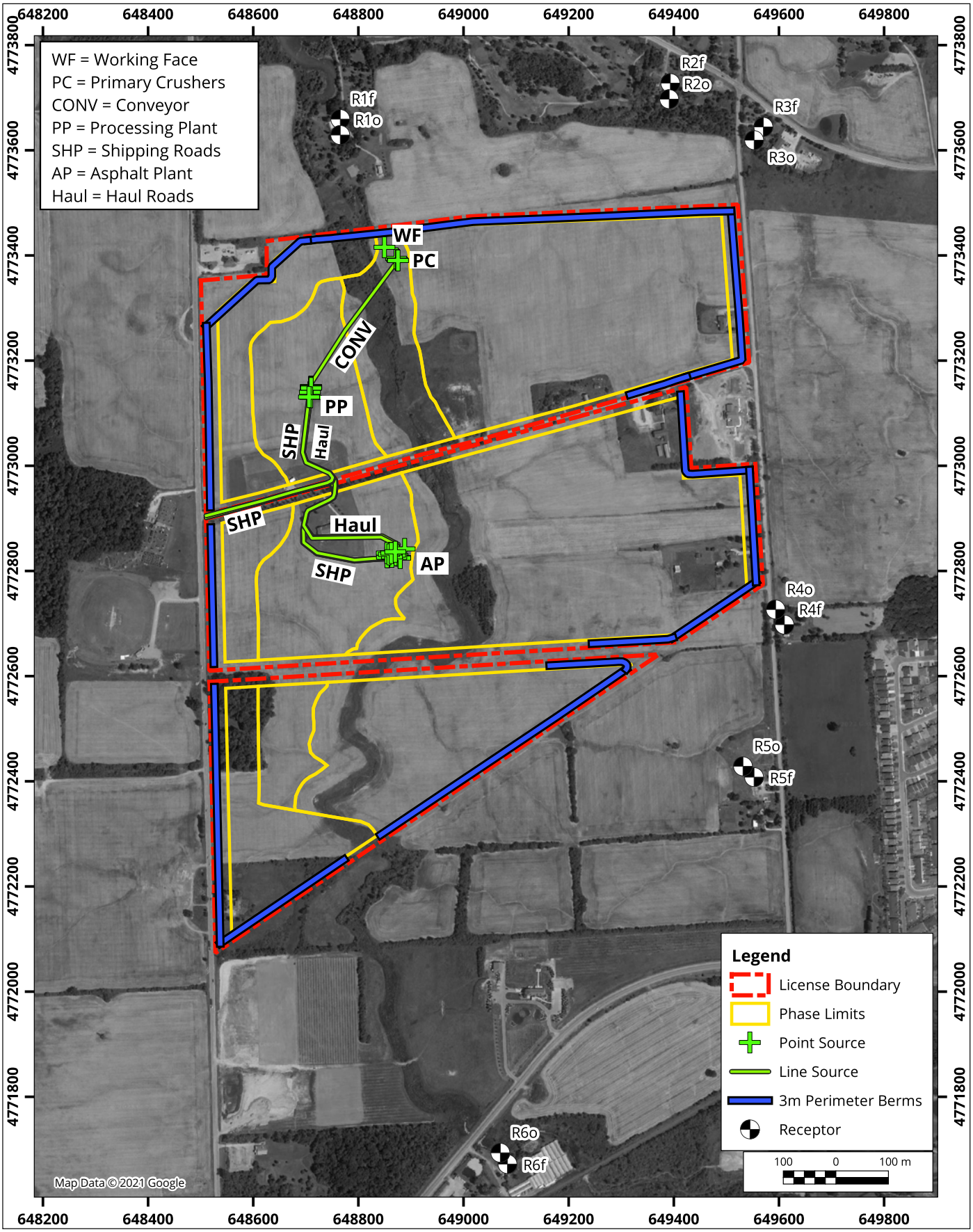


Proposed Phase 3A Operation Overview

Map Projection: NAD 1983 UTM Zone 17N

Walker Aggregates Inc., Upper's Quarry - Niagara Region, Ontario

Project #: 1603157

True North

Drawn by: DJK	Figure: 2d
Approx. Scale:	1:10,000
Date Revised:	Jul 13, 2023

Appendix H Stationary Source Modelling Data

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

SLR

Appendix H - Sample Calculation - Ph1A South Sinking Cut - Block 30

Receiver
Name: Block 30
ID: Block30
X: 648227.41 m
Y: 4772528.69 m
Z: 193.41 m

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Loader", ID: "P1ASWC_Sinkcut_PP_Ldr"																				
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)
1152	648730.80	4772723.43	179.50	0	D	A	105.6	0.0	0.0	0.0	0.0	65.6	4.1	-2.0	0.0	0.0	4.7	0.0	0.0	33.1
1152	648730.80	4772723.43	179.50	0	N	A	105.6	0.0	0.0	0.0	0.0	65.6	4.1	-2.0	0.0	0.0	4.7	0.0	0.0	33.1
1152	648730.80	4772723.43	179.50	0	E	A	105.6	0.0	0.0	0.0	0.0	65.6	4.1	-2.0	0.0	0.0	4.7	0.0	0.0	33.1

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC Primary Crusher", ID: "P1ASWC_Sinkcut_PC_PrimaryCrush"																				
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)
1157	648623.67	4772521.75	180.00	0	D	A	117.6	0.0	0.0	0.0	0.0	63.0	1.7	-1.3	0.0	0.0	4.7	0.0	0.0	49.5
1157	648623.67	4772521.75	180.00	0	N	A	117.6	0.0	-188.0	0.0	0.0	63.0	1.7	-1.3	0.0	0.0	4.7	0.0	0.0	-138.5
1157	648623.67	4772521.75	180.00	0	E	A	117.6	0.0	-188.0	0.0	0.0	63.0	1.7	-1.3	0.0	0.0	4.7	0.0	0.0	-138.5

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Idling Truck", ID: "P1ASWC_Sinkcut_PP_Trk1"																				
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)
1163	648728.80	4772739.43	180.00	0	D	A	96.3	0.0	0.0	0.0	0.0	65.7	2.7	-2.1	0.0	0.0	4.8	0.0	0.0	25.2
1163	648728.80	4772739.43	180.00	0	N	A	96.3	0.0	0.0	0.0	0.0	65.7	2.7	-2.1	0.0	0.0	4.8	0.0	0.0	25.2
1163	648728.80	4772739.43	180.00	0	E	A	96.3	0.0	0.0	0.0	0.0	65.7	2.7	-2.1	0.0	0.0	4.8	0.0	0.0	25.2

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Idling Truck", ID: "P1ASWC_Sinkcut_PP_Trk2"																				
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)
1167	648732.80	4772740.43	180.00	0	D	A	96.3	0.0	0.0	0.0	0.0	65.8	2.8	-2.1	0.0	0.0	4.8	0.0	0.0	25.1
1167	648732.80	4772740.43	180.00	0	N	A	96.3	0.0	0.0	0.0	0.0	65.8	2.8	-2.1	0.0	0.0	4.8	0.0	0.0	25.1
1167	648732.80	4772740.43	180.00	0	E	A	96.3	0.0	0.0	0.0	0.0	65.8	2.8	-2.1	0.0	0.0	4.8	0.0	0.0	25.1

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC Primary Screen", ID: "P1ASWC_Sinkcut_PC_PrimaryScreen"																				
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)
1173	648623.67	4772524.75	180.00	0	D	A	113.8	0.0	0.0	0.0	0.0	63.0	2.7	-1.4	0.0	0.0	4.7	0.0	0.0	44.9
1173	648623.67	4772524.75	180.00	0	N	A	113.8	0.0	-188.0	0.0	0.0	63.0	2.7	-1.4	0.0	0.0	4.7	0.0	0.0	-143.1
1173	648623.67	4772524.75	180.00	0	E	A	113.8	0.0	-188.0	0.0	0.0	63.0	2.7	-1.4	0.0	0.0	4.7	0.0	0.0	-143.1

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC loader dumping into crusher", ID: "P1ASWC_Sinkcut_PC_CrusherDump"																				
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)
1177	648622.67	4772518.75	180.00	0	D	A	123.0	0.0	-10.8	0.0	0.0	62.9	2.2	-1.4	0.0	0.0	4.7	0.0	0.0	43.8
1177	648622.67	4772518.75	180.00	0	N	A	123.0	0.0	-188.0	0.0	0.0	62.9	2.2	-1.4	0.0	0.0	4.7	0.0	0.0	-133.4
1177	648622.67	4772518.75	180.00	0	E	A	123.0	0.0	-188.0	0.0	0.0	62.9	2.2	-1.4	0.0	0.0	4.7	0.0	0.0	-133.4

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Secondary Crusher", ID: "P1ASWC_Sinkcut_PP_SecondaryCrush"																				
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)
1183	648730.80	4772703.43	180.00	0	D	A	114.6	0.0	0.0	0.0	0.0	65.5	3.0	-2.0	0.0	0.0	4.8	0.0	0.0	43.4
1183	648730.80	4772703.43	180.00	0	N	A	114.6	0.0	-188.0	0.0	0.0	65.5	3.0	-2.0	0.0	0.0	4.8	0.0	0.0	-144.6
1183	648730.80	4772703.43	180.00	0	E	A	114.6	0.0	-188.0	0.0	0.0	65.5	3.0	-2.0	0.0	0.0	4.8	0.0	0.0	-144.6

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Secondary & Tertiary Screen", ID: "P1ASWC_Sinkcut_PP_SecondaryTertiaryScreen"																				
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)
1189	648730.80	4772705.43	180.00	0	D	A	113.8	0.0	0.0	0.0	0.0	65.5	3.2	-2.0	0.0	0.0	4.8	0.0	0.0	42.3
1189	648730.80	4772705.43	180.00	0	N	A	113.8	0.0	-188.0	0.0	0.0	65.5	3.2	-2.0	0.0	0.0	4.8	0.0	0.0	-145.7
1189	648730.80	4772705.43	180.00	0	E	A	113.8	0.0	-188.0	0.0	0.0	65.5	3.2	-2.0	0.0	0.0	4.8	0.0	0.0	-145.7

Point Source, ISO 9613, Name: "P1AS_Sinkcut, WF Drill", ID: "P1ASWC_Sinkcut_WF_Drill"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
1195	648614.26	4772502.64	179.50	0	D	A	110.0	0.0	0.0	0.0	0.0	62.8	3.6	-1.7	0.0	0.0	4.8	0.0	0.0	40.6
1195	648614.26	4772502.64	179.50	0	N	A	110.0	0.0	-188.0	0.0	0.0	62.8	3.6	-1.7	0.0	0.0	4.8	0.0	0.0	-147.4
1195	648614.26	4772502.64	179.50	0	E	A	110.0	0.0	-188.0	0.0	0.0	62.8	3.6	-1.7	0.0	0.0	4.8	0.0	0.0	-147.4

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Aggregate Shipping from PP, Empty", ID: "P1ASWC_Sinkcut_RD_SHP_Aggr_Em"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
1199	648523.07	4772910.37	187.72	0	DEN	A	67.0	14.7	0.0	0.0	0.0	64.7	2.7	-0.4	0.0	0.0	0.0	0.0	0.0	14.7
1204	648567.95	4772922.92	187.33	0	DEN	A	67.0	18.0	0.0	0.0	0.0	65.3	2.8	-0.7	0.0	0.0	0.0	0.0	0.0	17.5
1209	648631.87	4772940.78	186.78	0	DEN	A	67.0	18.4	0.0	0.0	0.0	66.2	3.0	-1.2	0.0	0.0	4.6	0.0	0.0	12.8
1227	648714.78	4772835.03	180.50	0	DEN	A	67.0	22.6	0.0	0.0	0.0	66.2	3.0	-1.8	0.0	0.0	4.7	0.0	0.0	17.5
1253	648683.63	4772937.98	183.50	0	DEN	A	67.0	16.5	0.0	0.0	0.0	66.7	3.1	-1.8	0.0	0.0	4.7	0.0	0.0	10.7

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Aggregate Shipping from PP, Full", ID: "P1ASWC_Sinkcut_RD_SHP_Aggr_Fu"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
1215	648523.07	4772910.37	187.72	0	DEN	A	67.0	14.7	0.0	0.0	0.0	64.7	2.7	-0.4	0.0	0.0	0.0	0.0	0.0	14.7
1217	648567.95	4772922.92	187.33	0	DEN	A	67.0	18.0	0.0	0.0	0.0	65.3	2.8	-0.7	0.0	0.0	0.0	0.0	0.0	17.5
1221	648631.87	4772940.78	186.78	0	DEN	A	67.0	18.4	0.0	0.0	0.0	66.2	3.0	-1.2	0.0	0.0	4.6	0.0	0.0	12.8
1232	648714.78	4772835.16	180.50	0	DEN	A	67.0	22.6	0.0	0.0	0.0	66.2	3.0	-1.8	0.0	0.0	4.7	0.0	0.0	17.5
1257	648683.63	4772937.98	183.50	0	DEN	A	67.0	16.5	0.0	0.0	0.0	66.7	3.1	-1.8	0.0	0.0	4.7	0.0	0.0	10.7

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC Loader", ID: "P1ASWC_Sinkcut_PC_Ldr"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
1238	648622.67	4772517.75	179.50	0	D	A	105.6	0.0	0.0	0.0	0.0	62.9	3.5	-1.6	0.0	0.0	4.7	0.0	0.0	36.0
1238	648622.67	4772517.75	179.50	0	N	A	105.6	0.0	-188.0	0.0	0.0	62.9	3.5	-1.6	0.0	0.0	4.7	0.0	0.0	-152.0
1238	648622.67	4772517.75	179.50	0	E	A	105.6	0.0	-188.0	0.0	0.0	62.9	3.5	-1.6	0.0	0.0	4.7	0.0	0.0	-152.0

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1ASWC_Sinkcut_Conveyor"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/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)
1244	648699.06	4772666.80	180.50	0	D	A	82.7	19.6	0.0	0.0	0.0	64.8	2.4	-1.8	0.0	0.0	4.8	0.0	0.0	32.2
1244	648699.06	4772666.80	180.50	0	N	A	82.7	19.6	-188.0	0.0	0.0	64.8	2.4	-1.8	0.0	0.0	4.8	0.0	0.0	-155.8
1244	648699.06	4772666.80	180.50	0	E	A	82.7	19.6	-188.0	0.0	0.0	64.8	2.4	-1.8	0.0	0.0	4.8	0.0	0.0	-155.8
1248	648641.52	4772564.84	180.50	0	D	A	82.7	18.0	0.0	0.0	0.0	63.4	2.1	-1.6	0.0	0.0	4.8	0.0	0.0	32.2
1248	648641.52	4772564.84	180.50	0	N	A	82.7	18.0	-188.0	0.0	0.0	63.4	2.1	-1.6	0.0	0.0	4.8	0.0	0.0	-155.8
1248	648641.52	4772564.84	180.50	0	E	A	82.7	18.0	-188.0	0.0	0.0	63.4	2.1	-1.6	0.0	0.0	4.8	0.0	0.0	-155.8
1266	648656.97	4772604.02	184.82	0	D	A	82.7	9.3	0.0	0.0	0.0	63.8	2.1	-1.0	0.0	0.0	0.0	0.0	0.0	27.2
1266	648656.97	4772604.02	184.82	0	N	A	82.7	9.3	-188.0	0.0	0.0	63.8	2.1	-1.0	0.0	0.0	0.0	0.0	0.0	-160.8
1266	648656.97	4772604.02	184.82	0	E	A	82.7	9.3	-188.0	0.0	0.0	63.8	2.1	-1.0	0.0	0.0	0.0	0.0	0.0	-160.8
1272	648667.14	4772625.78	184.06	0	D	A	82.7	9.5	0.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	26.6
1272	648667.14	4772625.78	184.06	0	N	A	82.7	9.5	-188.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-161.4
1272	648667.14	4772625.78	184.06	0	E	A	82.7	9.5	-188.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-161.4
1278	648663.81	4772618.66	184.19	0	D	A	82.7	8.4	0.0	0.0	0.0	64.0	2.2	-0.7	0.0	0.0	1.7	0.0	0.0	23.9
1278	648663.81	4772618.66	184.19	0	N	A	82.7	8.4	-188.0	0.0	0.0	64.0	2.2	-0.7	0.0	0.0	1.7	0.0	0.0	-164.1
1278	648663.81	4772618.66	184.19	0	E	A	82.7	8.4	-188.0	0.0	0.0	64.0	2.2	-0.7	0.0	0.0	1.7	0.0	0.0	-164.1
1285	648653.84	4772597.33	185.00	0	D	A	82.7	8.0	0.0	0.0	0.0	63.7	2.1	-1.5	0.0	0.0	0.0	0.0	0.0	26.3
1285	648653.84	4772597.33	185.00	0	N	A	82.7	8.0	-188.0	0.0	0.0	63.7	2.1	-1.5	0.0	0.0	0.0	0.0	0.0	-161.7
1285	648653.84	4772597.33	185.00	0	E	A	82.7	8.0	-188.0	0.0	0.0	63.7	2.1	-1.5	0.0	0.0	0.0	0.0	0.0	-161.7
1292	648661.22	4772613.12	184.38	0	D	A	82.7	7.3	0.0	0.0	0.0	63.9	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	24.6
1292	648661.22	4772613.12	184.38	0	N	A	82.7	7.3	-188.0	0.0	0.0	63.9	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-163.4
1292	648661.22	4772613.12	184.38	0	E	A	82.7	7.3	-188.0	0.0	0.0	63.9	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-163.4
1300	648659.43	4772609.28	184.57	0	D	A	82.7	4.9	0.0	0.0	0.0	63.9	2.2	-0.8	0.0	0.0	0.0	0.0	0.0	22.4
1300	648659.43	4772609.28	184.57	0	N	A	82.7	4.9	-188.0	0.0	0.0	63.9	2.2	-0.8	0.0	0.0	0.0	0.0	0.0	-165.6
1300	648659.43	4772609.28	184.57	0	E	A	82.7	4.9	-188.0	0.0	0.0	63.9	2.2	-0.8	0.0	0.0	0.0	0.0	0.0	-165.6
1307	648669.38	4772630.60	183.99	0	D	A	82.7	2.5	0.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	19.6
1307	648669.38	4772630.60	183.99	0	N	A	82.7	2.5	-188.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-168.4
1307	648669.38	4772630.60	183.99	0	E	A	82.7	2.5	-188.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-168.4
1314	648652.52	4772594.49	183.94	0	D	A	82.7	1.8	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	0.0	0.0	0.0	20.5
1314	648652.52	4772594.49	183.94	0	N	A	82.7	1.8	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	0.0	0.0	0.0	-167.5
1314	648652.52	4772594.49	183.94	0	E	A	82.7	1.8	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	0.0	0.0	0.0	-167.5
1321	648669.98	4772631.88	181.10	0	D	A	82.7	-0.0	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	12.4

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1ASWC_Sinkcut_Conveyor"																				
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)
1321	648669.98	4772631.88	181.10	0	N	A	82.7	-0.0	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-175.6
1321	648669.98	4772631.88	181.10	0	E	A	82.7	-0.0	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-175.6
1328	648652.52	4772594.49	181.02	0	D	A	82.7	-0.8	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	13.3
1328	648652.52	4772594.49	181.02	0	N	A	82.7	-0.8	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-174.7
1328	648652.52	4772594.49	181.02	0	E	A	82.7	-0.8	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-174.7
1335	648669.98	4772631.88	182.92	0	D	A	82.7	-1.5	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	15.5
1335	648669.98	4772631.88	182.92	0	N	A	82.7	-1.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-172.5
1335	648669.98	4772631.88	182.92	0	E	A	82.7	-1.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-172.5
1342	648669.98	4772631.88	183.62	0	D	A	82.7	-1.6	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	15.5
1342	648669.98	4772631.88	183.62	0	N	A	82.7	-1.6	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-172.5
1342	648669.98	4772631.88	183.62	0	E	A	82.7	-1.6	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-172.5
1348	648669.98	4772631.88	182.28	0	D	A	82.7	-2.4	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	14.6
1348	648669.98	4772631.88	182.28	0	N	A	82.7	-2.4	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-173.4
1348	648669.98	4772631.88	182.28	0	E	A	82.7	-2.4	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-173.4
1354	648652.52	4772594.49	182.49	0	D	A	82.7	-3.2	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	10.7
1354	648652.52	4772594.49	182.49	0	N	A	82.7	-3.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-177.3
1354	648652.52	4772594.49	182.49	0	E	A	82.7	-3.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-177.3
1373	648669.87	4772631.65	183.98	0	D	A	82.7	-2.9	0.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	14.2
1373	648669.87	4772631.65	183.98	0	N	A	82.7	-2.9	-188.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-173.8
1373	648669.87	4772631.65	183.98	0	E	A	82.7	-2.9	-188.0	0.0	0.0	64.1	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-173.8
1381	648652.52	4772594.49	182.95	0	D	A	82.7	-3.5	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	10.3
1381	648652.52	4772594.49	182.95	0	N	A	82.7	-3.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-177.7
1381	648652.52	4772594.49	182.95	0	E	A	82.7	-3.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-177.7
1388	648652.52	4772594.49	182.03	0	D	A	82.7	-3.7	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	10.2
1388	648652.52	4772594.49	182.03	0	N	A	82.7	-3.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-177.8
1388	648652.52	4772594.49	182.03	0	E	A	82.7	-3.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-177.8
1397	648669.98	4772631.88	181.76	0	D	A	82.7	-3.3	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	13.8
1397	648669.98	4772631.88	181.76	0	N	A	82.7	-3.3	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-174.2
1397	648669.98	4772631.88	181.76	0	E	A	82.7	-3.3	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	0.0	0.0	0.0	-174.2
1405	648669.98	4772631.88	181.32	0	D	A	82.7	-3.8	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	8.6
1405	648669.98	4772631.88	181.32	0	N	A	82.7	-3.8	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-179.4
1405	648669.98	4772631.88	181.32	0	E	A	82.7	-3.8	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-179.4
1413	648652.52	4772594.49	181.67	0	D	A	82.7	-5.2	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	8.7
1413	648652.52	4772594.49	181.67	0	N	A	82.7	-5.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-179.3
1413	648652.52	4772594.49	181.67	0	E	A	82.7	-5.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-179.3
1421	648652.52	4772594.49	184.85	0	D	A	82.7	-5.3	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	0.0	0.0	0.0	13.3
1421	648652.52	4772594.49	184.85	0	N	A	82.7	-5.3	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	0.0	0.0	0.0	-174.7
1421	648652.52	4772594.49	184.85	0	E	A	82.7	-5.3	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	0.0	0.0	0.0	-174.7
1429	648669.98	4772631.88	180.95	0	D	A	82.7	-4.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	7.6
1429	648669.98	4772631.88	180.95	0	N	A	82.7	-4.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-180.4
1429	648669.98	4772631.88	180.95	0	E	A	82.7	-4.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-180.4
1437	648652.52	4772594.49	181.39	0	D	A	82.7	-6.0	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	7.9
1437	648652.52	4772594.49	181.39	0	N	A	82.7	-6.0	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-180.1
1437	648652.52	4772594.49	181.39	0	E	A	82.7	-6.0	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-180.1
1445	648652.52	4772594.49	181.14	0	D	A	82.7	-6.1	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	7.8
1445	648652.52	4772594.49	181.14	0	N	A	82.7	-6.1	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-180.2
1445	648652.52	4772594.49	181.14	0	E	A	82.7	-6.1	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-180.2
1460	648652.52	4772594.49	180.90	0	D	A	82.7	-6.3	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	7.8
1460	648652.52	4772594.49	180.90	0	N	A	82.7	-6.3	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.2
1460	648652.52	4772594.49	180.90	0	E	A	82.7	-6.3	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.2
1468	648652.52	4772594.49	180.67	0	D	A	82.7	-6.4	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	7.7
1468	648652.52	4772594.49	180.67	0	N	A	82.7	-6.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.3
1468	648652.52	4772594.49	180.67	0	E	A	82.7	-6.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.3
1475	648652.52	4772594.49	180.45	0	D	A	82.7	-6.8	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	7.3
1475	648652.52	4772594.49	180.45	0	N	A	82.7	-6.8	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.7
1475	648652.52	4772594.49	180.45	0	E	A	82.7	-6.8	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.7
1482	648669.98	4772631.88	180.67	0	D	A	82.7	-6.4	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	6.0
1482	648669.98	4772631.88	180.67	0	N	A	82.7	-6.4	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-182.0
1482	648669.98	4772631.88	180.67	0	E	A	82.7	-6.4	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-182.0
1489	648652.52	4772594.49	180.46	0	D	A	82.7	-6.9	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	7.2
1489	648652.52	4772594.49	180.46	0	N	A	82.7	-6.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.8
1489	648652.52	4772594.49	180.46	0	E	A	82.7	-6.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-180.8
1496	648669.98	4772631.88	180.45	0	D	A	82.7	-6.7	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	8.7	0.0	0.0	1.6

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1ASWC_Sinkcut_Conveyor"																				
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)
1496	648669.98	4772631.88	180.45	0	N	A	82.7	-6.7	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	8.7	0.0	0.0	-186.4
1496	648669.98	4772631.88	180.45	0	E	A	82.7	-6.7	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	8.7	0.0	0.0	-186.4
1503	648669.98	4772631.88	180.45	0	D	A	82.7	-6.7	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	9.0	0.0	0.0	1.3
1503	648669.98	4772631.88	180.45	0	N	A	82.7	-6.7	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	9.0	0.0	0.0	-186.7
1503	648669.98	4772631.88	180.45	0	E	A	82.7	-6.7	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	9.0	0.0	0.0	-186.7
1510	648652.52	4772594.49	180.65	0	D	A	82.7	-7.3	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	6.7
1510	648652.52	4772594.49	180.65	0	N	A	82.7	-7.3	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-181.3
1510	648652.52	4772594.49	180.65	0	E	A	82.7	-7.3	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-181.3
1517	648652.52	4772594.49	180.81	0	D	A	82.7	-7.4	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	6.6
1517	648652.52	4772594.49	180.81	0	N	A	82.7	-7.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-181.4
1517	648652.52	4772594.49	180.81	0	E	A	82.7	-7.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-181.4
1524	648652.52	4772594.49	180.83	0	D	A	82.7	-7.7	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	6.3
1524	648652.52	4772594.49	180.83	0	N	A	82.7	-7.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-181.7
1524	648652.52	4772594.49	180.83	0	E	A	82.7	-7.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-181.7
1531	648670.02	4772631.95	180.56	0	D	A	82.7	-7.6	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	4.8
1531	648670.02	4772631.95	180.56	0	N	A	82.7	-7.6	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-183.2
1531	648670.02	4772631.95	180.56	0	E	A	82.7	-7.6	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-183.2
1538	648669.98	4772631.88	180.50	0	D	A	82.7	-8.2	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	4.1
1538	648669.98	4772631.88	180.50	0	N	A	82.7	-8.2	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-183.9
1538	648669.98	4772631.88	180.50	0	E	A	82.7	-8.2	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-183.9
1545	648652.52	4772594.49	180.78	0	D	A	82.7	-8.9	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	5.2
1545	648652.52	4772594.49	180.78	0	N	A	82.7	-8.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-182.8
1545	648652.52	4772594.49	180.78	0	E	A	82.7	-8.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-182.8
1551	648669.98	4772631.88	180.49	0	D	A	82.7	-8.5	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	3.8
1551	648669.98	4772631.88	180.49	0	N	A	82.7	-8.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-184.2
1551	648669.98	4772631.88	180.49	0	E	A	82.7	-8.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-184.2
1557	648652.52	4772594.49	180.90	0	D	A	82.7	-9.0	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	5.0
1557	648652.52	4772594.49	180.90	0	N	A	82.7	-9.0	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-183.0
1557	648652.52	4772594.49	180.90	0	E	A	82.7	-9.0	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-183.0
1565	648669.98	4772631.88	180.64	0	D	A	82.7	-8.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	3.5
1565	648669.98	4772631.88	180.64	0	N	A	82.7	-8.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-184.5
1565	648669.98	4772631.88	180.64	0	E	A	82.7	-8.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-184.5
1570	648652.52	4772594.49	181.13	0	D	A	82.7	-9.4	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	4.5
1570	648652.52	4772594.49	181.13	0	N	A	82.7	-9.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-183.5
1570	648652.52	4772594.49	181.13	0	E	A	82.7	-9.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-183.5
1600	648669.98	4772631.88	180.76	0	D	A	82.7	-9.1	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	3.3
1600	648669.98	4772631.88	180.76	0	N	A	82.7	-9.1	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-184.7
1600	648669.98	4772631.88	180.76	0	E	A	82.7	-9.1	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-184.7
1605	648652.52	4772594.49	180.98	0	D	A	82.7	-9.6	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	4.5
1605	648652.52	4772594.49	180.98	0	N	A	82.7	-9.6	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-183.5
1605	648652.52	4772594.49	180.98	0	E	A	82.7	-9.6	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-183.5
1610	648652.52	4772594.49	181.09	0	D	A	82.7	-9.7	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	4.2
1610	648652.52	4772594.49	181.09	0	N	A	82.7	-9.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-183.8
1610	648652.52	4772594.49	181.09	0	E	A	82.7	-9.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-183.8
1615	648669.98	4772631.88	180.88	0	D	A	82.7	-9.5	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	2.9
1615	648669.98	4772631.88	180.88	0	N	A	82.7	-9.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-185.1
1615	648669.98	4772631.88	180.88	0	E	A	82.7	-9.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-185.1
1620	648669.98	4772631.88	180.97	0	D	A	82.7	-9.7	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	2.8
1620	648669.98	4772631.88	180.97	0	N	A	82.7	-9.7	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-185.2
1620	648669.98	4772631.88	180.97	0	E	A	82.7	-9.7	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-185.2
1626	648669.98	4772631.88	181.08	0	D	A	82.7	-9.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	2.5
1626	648669.98	4772631.88	181.08	0	N	A	82.7	-9.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-185.5
1626	648669.98	4772631.88	181.08	0	E	A	82.7	-9.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-185.5
1632	648652.52	4772594.49	181.19	0	D	A	82.7	-10.4	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	3.5
1632	648652.52	4772594.49	181.19	0	N	A	82.7	-10.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-184.5
1632	648652.52	4772594.49	181.19	0	E	A	82.7	-10.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-184.5
1638	648652.51	4772594.48	180.56	0	D	A	82.7	-10.5	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	3.6
1638	648652.51	4772594.48	180.56	0	N	A	82.7	-10.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-184.4
1638	648652.51	4772594.48	180.56	0	E	A	82.7	-10.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-184.4
1645	648652.52	4772594.49	181.11	0	D	A	82.7	-10.7	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	3.2
1645	648652.52	4772594.49	181.11	0	N	A	82.7	-10.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-184.8
1645	648652.52	4772594.49	181.11	0	E	A	82.7	-10.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-184.8
1651	648652.52	4772594.49	181.19	0	D	A	82.7	-10.9	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	3.0

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1ASWC_Sinkcut_Conveyor"																				
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)
1651	648652.52	4772594.49	181.19	0	N	A	82.7	-10.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-185.0
1651	648652.52	4772594.49	181.19	0	E	A	82.7	-10.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-185.0
1657	648669.98	4772631.88	181.14	0	D	A	82.7	-10.5	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	2.0
1657	648669.98	4772631.88	181.14	0	N	A	82.7	-10.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.0
1657	648669.98	4772631.88	181.14	0	E	A	82.7	-10.5	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.0
1663	648652.52	4772594.49	181.27	0	D	A	82.7	-11.0	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	2.9
1663	648652.52	4772594.49	181.27	0	N	A	82.7	-11.0	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-185.1
1663	648652.52	4772594.49	181.27	0	E	A	82.7	-11.0	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-185.1
1669	648669.98	4772631.88	181.45	0	D	A	82.7	-10.8	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	1.6
1669	648669.98	4772631.88	181.45	0	N	A	82.7	-10.8	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.4
1669	648669.98	4772631.88	181.45	0	E	A	82.7	-10.8	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.4
1675	648669.98	4772631.88	181.23	0	D	A	82.7	-10.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	1.5
1675	648669.98	4772631.88	181.23	0	N	A	82.7	-10.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.5
1675	648669.98	4772631.88	181.23	0	E	A	82.7	-10.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.5
1681	648669.98	4772631.88	181.37	0	D	A	82.7	-10.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	1.5
1681	648669.98	4772631.88	181.37	0	N	A	82.7	-10.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.5
1681	648669.98	4772631.88	181.37	0	E	A	82.7	-10.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-186.5
1687	648669.98	4772631.88	181.29	0	D	A	82.7	-11.4	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	1.0
1687	648669.98	4772631.88	181.29	0	N	A	82.7	-11.4	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-187.0
1687	648669.98	4772631.88	181.29	0	E	A	82.7	-11.4	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-187.0
1693	648652.52	4772594.49	181.21	0	D	A	82.7	-13.2	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	0.7
1693	648652.52	4772594.49	181.21	0	N	A	82.7	-13.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-187.3
1693	648652.52	4772594.49	181.21	0	E	A	82.7	-13.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-187.3
1699	648670.06	4772632.05	180.51	0	D	A	82.7	-12.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-0.5
1699	648670.06	4772632.05	180.51	0	N	A	82.7	-12.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-188.5
1699	648670.06	4772632.05	180.51	0	E	A	82.7	-12.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.7	0.0	0.0	-188.5
1705	648652.52	4772594.49	181.33	0	D	A	82.7	-13.4	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	0.4
1705	648652.52	4772594.49	181.33	0	N	A	82.7	-13.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-187.6
1705	648652.52	4772594.49	181.33	0	E	A	82.7	-13.4	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-187.6
1711	648669.98	4772631.88	181.52	0	D	A	82.7	-13.3	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-0.9
1711	648669.98	4772631.88	181.52	0	N	A	82.7	-13.3	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-188.9
1711	648669.98	4772631.88	181.52	0	E	A	82.7	-13.3	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-188.9
1716	648652.52	4772594.49	181.41	0	D	A	82.7	-14.2	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-0.3
1716	648652.52	4772594.49	181.41	0	N	A	82.7	-14.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-188.3
1716	648652.52	4772594.49	181.41	0	E	A	82.7	-14.2	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-188.3
1719	648652.52	4772594.49	181.37	0	D	A	82.7	-14.5	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-0.6
1719	648652.52	4772594.49	181.37	0	N	A	82.7	-14.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-188.6
1719	648652.52	4772594.49	181.37	0	E	A	82.7	-14.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.8	0.0	0.0	-188.6
1722	648669.98	4772631.88	181.56	0	D	A	82.7	-14.1	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-1.7
1722	648669.98	4772631.88	181.56	0	N	A	82.7	-14.1	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-189.7
1722	648669.98	4772631.88	181.56	0	E	A	82.7	-14.1	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-189.7
1725	648669.98	4772631.88	181.11	0	D	A	82.7	-15.9	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-3.5
1725	648669.98	4772631.88	181.11	0	N	A	82.7	-15.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-191.5
1725	648669.98	4772631.88	181.11	0	E	A	82.7	-15.9	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-191.5
1734	648652.52	4772594.49	180.95	0	D	A	82.7	-16.6	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-2.6
1734	648652.52	4772594.49	180.95	0	N	A	82.7	-16.6	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-190.6
1734	648652.52	4772594.49	180.95	0	E	A	82.7	-16.6	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-190.6
1739	648652.51	4772594.46	180.51	0	D	A	82.7	-17.7	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-3.7
1739	648652.51	4772594.46	180.51	0	N	A	82.7	-17.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-191.7
1739	648652.51	4772594.46	180.51	0	E	A	82.7	-17.7	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-191.7
1744	648669.98	4772631.88	181.59	0	D	A	82.7	-17.6	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-5.2
1744	648669.98	4772631.88	181.59	0	N	A	82.7	-17.6	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-193.2
1744	648669.98	4772631.88	181.59	0	E	A	82.7	-17.6	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-193.2
1750	648652.52	4772594.49	180.94	0	D	A	82.7	-18.9	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-4.8
1750	648652.52	4772594.49	180.94	0	N	A	82.7	-18.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-192.8
1750	648652.52	4772594.49	180.94	0	E	A	82.7	-18.9	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-192.8
1755	648669.98	4772631.88	180.93	0	D	A	82.7	-18.8	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-6.4
1755	648669.98	4772631.88	180.93	0	N	A	82.7	-18.8	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-194.4
1755	648669.98	4772631.88	180.93	0	E	A	82.7	-18.8	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-194.4
1760	648652.52	4772594.49	180.91	0	D	A	82.7	-19.5	0.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-5.4
1760	648652.52	4772594.49	180.91	0	N	A	82.7	-19.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-193.4
1760	648652.52	4772594.49	180.91	0	E	A	82.7	-19.5	-188.0	0.0	0.0	63.7	2.1	-1.7	0.0	0.0	4.6	0.0	0.0	-193.4
1765	648669.98	4772631.88	181.26	0	D	A	82.7	-19.2	0.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-6.8

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1ASWC_Sinkcut_Conveyor"																				
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)
1765	648669.98	4772631.88	181.26	0	N	A	82.7	-19.2	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-194.8
1765	648669.98	4772631.88	181.26	0	E	A	82.7	-19.2	-188.0	0.0	0.0	64.2	2.2	-0.7	0.0	0.0	4.6	0.0	0.0	-194.8

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Tertiary Crusher", ID: "P1ASWC_Sinkcut_PP_TertiaryCrush"																				
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)
1261	648731.80	4772707.43	180.00	0	D	A	99.2	0.0	0.0	0.0	0.0	65.6	2.5	-1.9	0.0	0.0	4.8	0.0	0.0	28.2
1261	648731.80	4772707.43	180.00	0	N	A	99.2	0.0	-188.0	0.0	0.0	65.6	2.5	-1.9	0.0	0.0	4.8	0.0	0.0	-159.8
1261	648731.80	4772707.43	180.00	0	E	A	99.2	0.0	-188.0	0.0	0.0	65.6	2.5	-1.9	0.0	0.0	4.8	0.0	0.0	-159.8

Appendix I Quarry Acoustic Model Validation

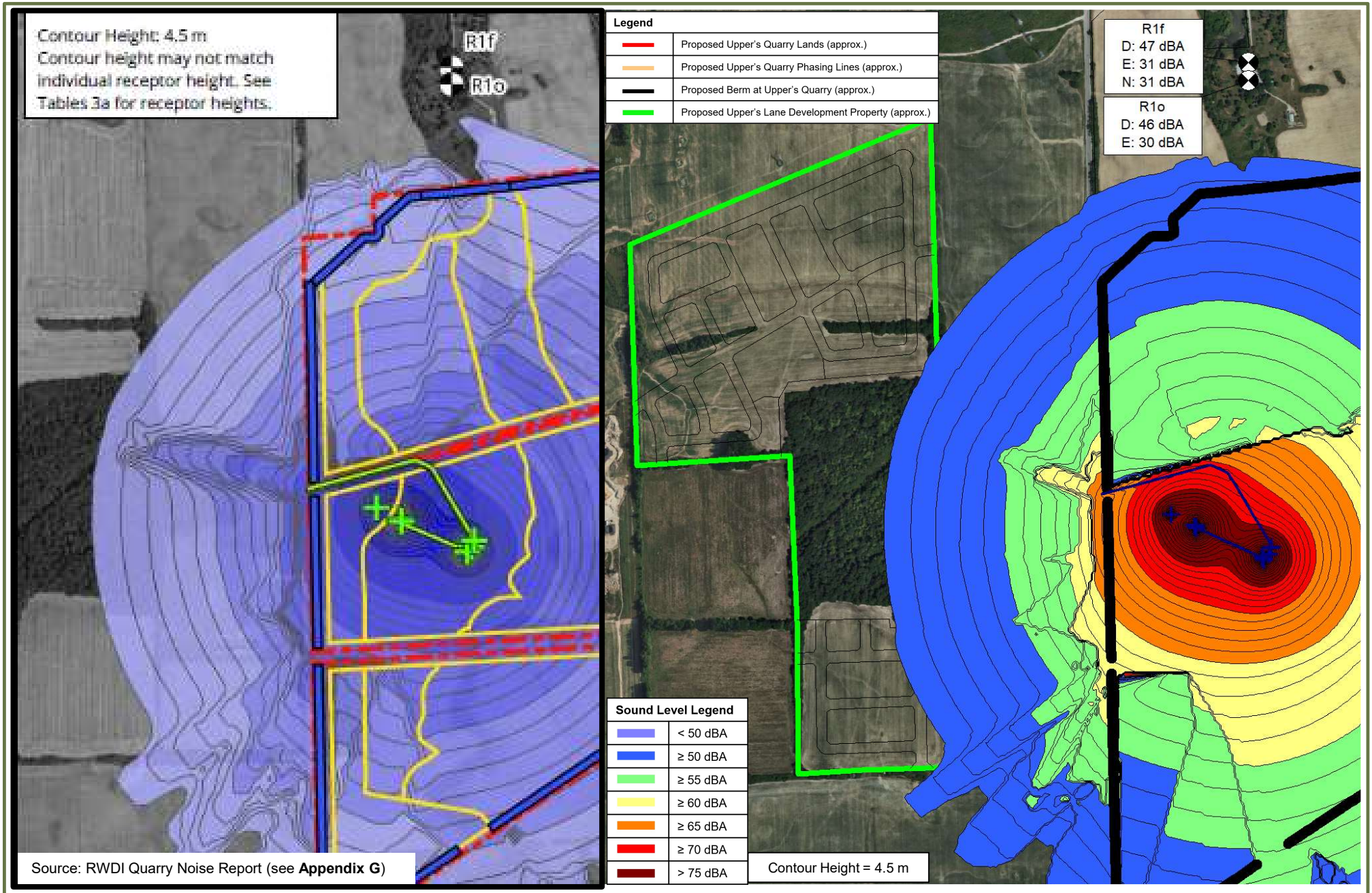
Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED SOUND LEVELS – PHASE 1A SINKING CUT – REPRODUCED MODEL (RIGHT) VS. QUARRY LICENSE APPLICATION MODEL (LEFT) – DAYTIME

True North

Scale: 1:9,000 (right)

METRES

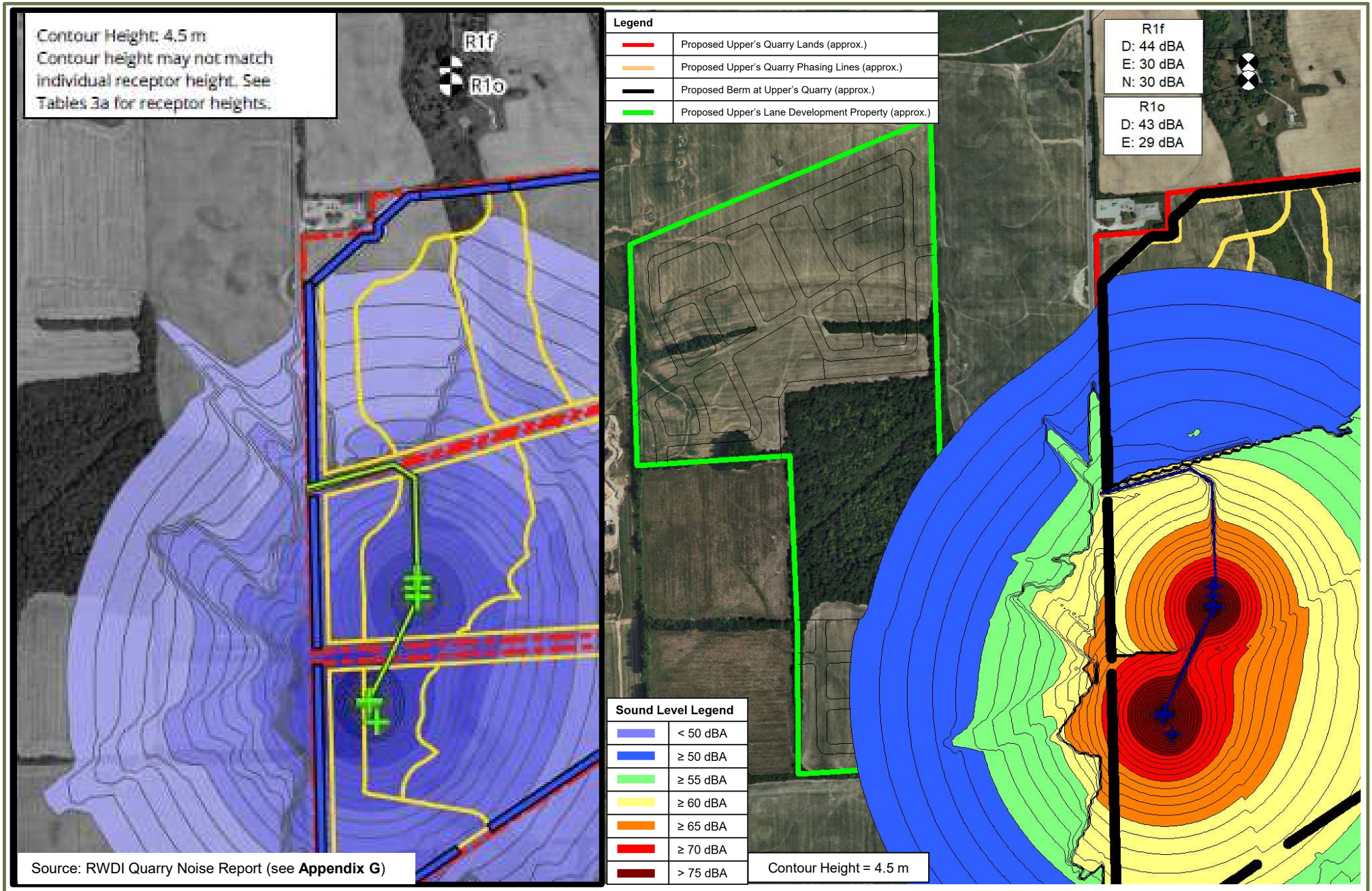
Date: Feb. 7, 2024

Rev 1.0

Project No. 241.030826.00001

Figure No. **I1**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED SOUND LEVELS – PHASE 1AS SOUTH SINKING CUT – REPRODUCED MODEL (RIGHT) VS. QUARRY LICENSE APPLICATION MODEL (LEFT) – DAYTIME

True North

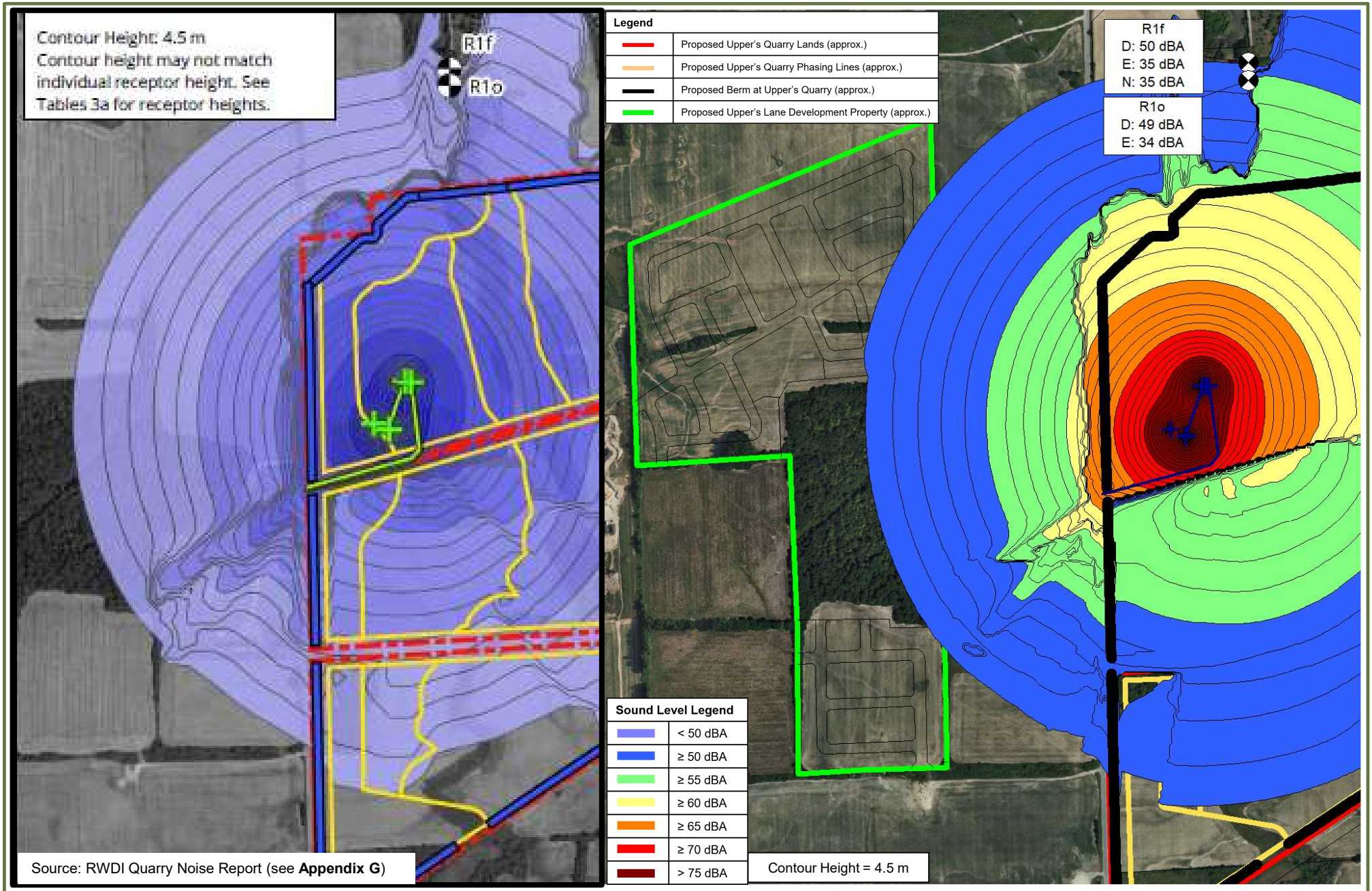
Scale: 1:9,000 (right) METRES

Date: Feb. 7, 2024 Rev 1.0

Project No. 241.030826.00001

Figure No. **I2**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED SOUND LEVELS – PHASE 2A SINKING CUT – REPRODUCED MODEL (RIGHT) VS. QUARRY LICENSE APPLICATION MODEL (LEFT) – DAYTIME

True North

Scale: 1:9,000 (right)

METRES

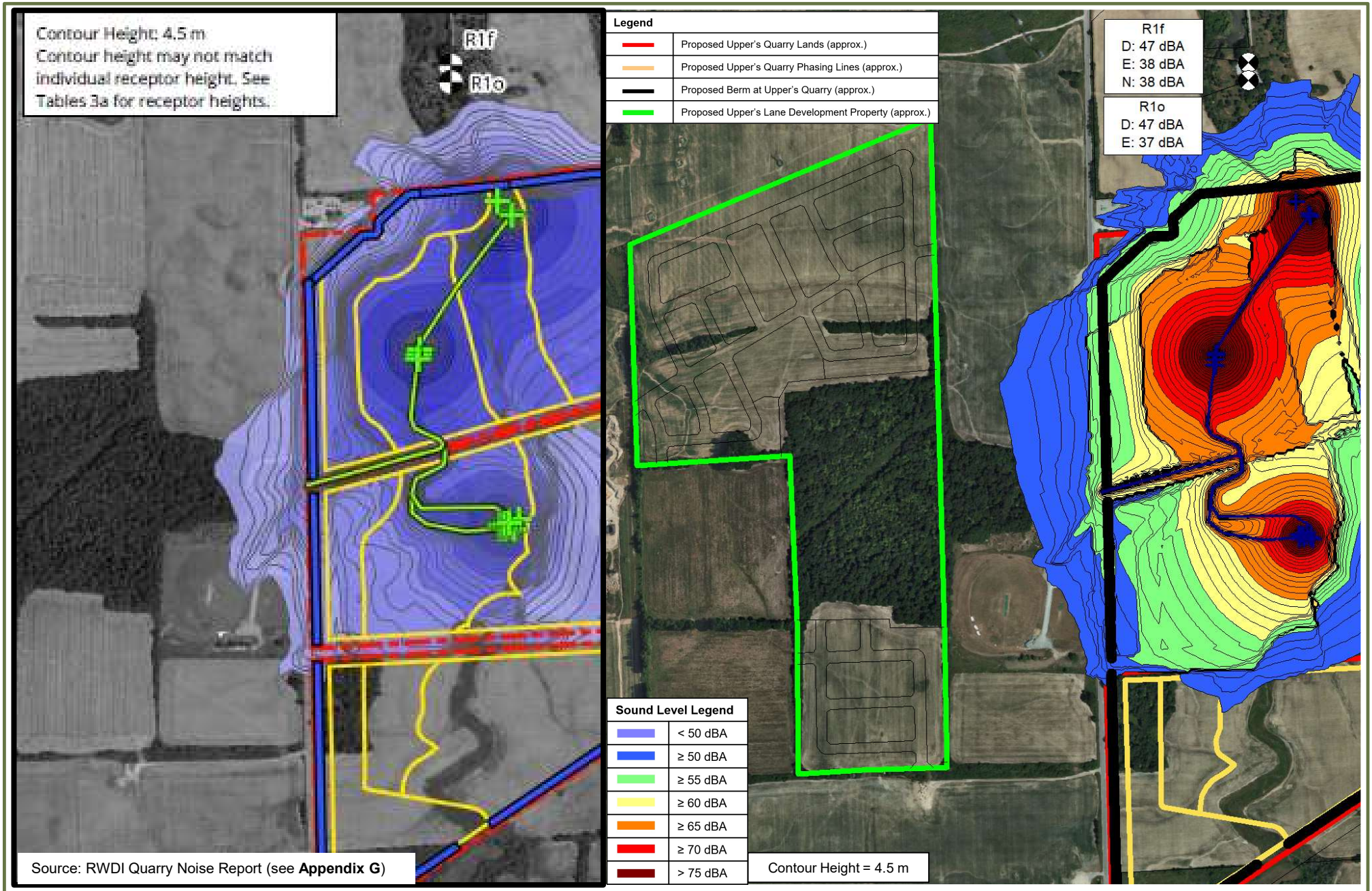
Date: Feb. 7, 2024

Rev 1.0

Project No. 241.030826.00001

Figure No. **I3**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED SOUND LEVELS – PHASE 3 EXTRACTION OPERATIONS – REPRODUCED MODEL (RIGHT) VS. QUARRY LICENSE APPLICATION MODEL (LEFT) – DAYTIME

True North	Scale: 1:9,000 (right)	METRES	SLR
	Date: Feb. 7, 2024 Rev 1.0	Figure No. **I4**	
	Project No. 241.030826.00001		

Appendix J Road Traffic Data and Sample Calculations

Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

Upper's Lane, Thorold

Parkbridge Lifestyle Communities

SLR Project No.: 241.030826.00001

February 7, 2024

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610140 - NB
Location: 610140

A study of vehicle traffic was conducted with the device having serial number 406310. The study was done in the NB lane at 610140 - NB in Niagara Region, ON in county. The study began on 2021-08-31 at 12:00 AM and concluded on 2021-09-01 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1,919 vehicles passed through the location with a peak volume of 51 on 2021-08-31 at [03:00 PM-03:15 PM] and a minimum volume of 0 on 2021-08-31 at [01:15 AM-01:30 AM]. The AADT count for this study was 1,919.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 95 - 100 KM/H range or lower. The average speed for all classifed vehicles was 87 KM/H with 73.84% vehicles exceeding the posted speed of 80 KM/H. 58.61% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 95KM/H and the 85th percentile was 99.79 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
4	2	4	6	13	29	83	138	219	290	274	276	292	104	170

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1687 which represents 89 percent of the total classified vehicles. The number of Small Trucks in the study was 56 which represents 3 percent of the total classified vehicles. The number of Trucks/Buses in the study was 86 which represents 5 percent of the total classified vehicles. The number of Tractor Trailers in the study was 75 which represents 4 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
579	1108	56	86	16	25	21	13							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-31 at [03:00 PM-03:15 PM] the average headway between vehicles was 17.308 seconds. During the slowest traffic period, on 2021-08-31 at [01:15 AM-01:30 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 23.00 and 47.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610140 - SB
Location: 610140

A study of vehicle traffic was conducted with the device having serial number 400175. The study was done in the SB lane at 610140 - SB in Niagara Region, ON in county. The study began on 2021-08-31 at 12:00 AM and concluded on 2021-09-01 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 2,013 vehicles passed through the location with a peak volume of 58 on 2021-08-31 at [04:15 PM-04:30 PM] and a minimum volume of 0 on 2021-08-31 at [12:45 AM-01:00 AM]. The AADT count for this study was 2,013.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 95 - 100 KM/H range or lower. The average speed for all classifed vehicles was 89 KM/H with 82.42% vehicles exceeding the posted speed of 80 KM/H. 67.33% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 95KM/H and the 85th percentile was 99.99 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
5	2	2	2	11	24	44	71	191	302	296	369	383	127	173

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1754 which represents 88 percent of the total classified vehicles. The number of Small Trucks in the study was 53 which represents 3 percent of the total classified vehicles. The number of Trucks/Buses in the study was 106 which represents 5 percent of the total classified vehicles. The number of Tractor Trailers in the study was 89 which represents 4 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
612	1142	53	106	40	15	16	18							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-31 at [04:15 PM-04:30 PM] the average headway between vehicles was 15.254 seconds. During the slowest traffic period, on 2021-08-31 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 23.00 and 45.00 degrees C.

Highway	Location Description From	Location Description To	Dist. (KM)	2019 AADT
48	YORK RD 13 MOUNT ALBERT	YORK RD 32 RAVENSHOE RD BROWN HILL	10.3	12200
48	YORK RD 32 RAVENSHOE RD BROWN HILL	YORK RD 9 HIGH ST (TO SUTTON)	8.7	9350
48	YORK RD 9 HIGH ST (TO SUTTON)	YORK RD 18 SIBBALD POINT RD	2.6	11200
48	YORK RD 18 SIBBALD POINT RD	HADDEN RD (N)	3.4	12000
48	HADDEN RD (N)	DUCLOS POINT RD GEORGINA TWP L 15 16 (N)	1.8	12400
48	DUCLOS POINT RD GEORGINA TWP L 15 16 (N)	YORK RD 21 RIVER DR MNR ACCESS RD	3.1	11000
48	YORK RD 21 RIVER DR MNR ACCESS RD	DURHAM RD 23/LAKE RIDGE RD	2.6	9050
48	DURHAM RD 23/LAKE RIDGE RD	BROCK TWP SDRD 17	5.9	5300
48	BROCK TWP SDRD 17	S JCT HWY 12 BEAVERTON BYPASS	2.6	6950
48	S JCT HWY 12 BEAVERTON BYPASS	HWY 35 COBOCONK END OF NA HWY END	12.7	
48	HWY 35 COBOCONK END OF NA HWY END	END OF HWY 48		
49	HWY 33 BRIDGE ST START OF NA	PRINCE EDWARD HASTINGS CTY BDY	20.2	
49	PRINCE EDWARD HASTINGS CTY BDY	YORK RD (W) COUNTY RD 2 (E)	2.4	6450
49	YORK RD (W) COUNTY RD 2 (E)	TYENDINAGA TWP RD L 31 START OF NA	3.4	6250
49	TYENDINAGA TWP RD L 31 START OF NA	HWY 401 END OF NA HWY END	2.1	
49	HWY 401 END OF NA HWY END	END OF HWY 49		
58	HWY 3 NIAGARA RD 3 MAIN ST PORT COLBORNE	S ENT PORT COLBORNE MALL (W)	0.8	10700
58	S ENT PORT COLBORNE MALL (W)	NIAGARA RD 23 FORKS RD WELLAND	4.7	8800
58	NIAGARA RD 23 FORKS RD WELLAND	HWY 58A NIAGARA RD 33 START OF NA	1.7	9350
58	HWY 58A NIAGARA RD 33 START OF NA	S JCT HWY 406 END OF NA	11.0	
58	S JCT HWY 406 END OF NA	W JCT HWY 20 & N JCT HWY 406 START OF NA	3.8	
58	W JCT HWY 20 & N JCT HWY 406 START OF NA	E JCT HWY 20 NIAGARA RD 82	3.3	
58	E JCT HWY 20 NIAGARA RD 82	BEAVERDAMS RD (E) NIAGARA FALLS RD (W)	3.3	5350
58	BEAVERDAMS RD (E) NIAGARA FALLS RD (W)	THOROLD STONE RD 7186 (E)	1.0	9500
58	THOROLD STONE RD 7186 (E)	PINE ST UP IC NIAGARA RD 67	1.4	19300
58	PINE ST UP IC NIAGARA RD 67	COLLIER ST OP IC NIAGARA RD 56	1.1	27900
58	COLLIER ST OP IC NIAGARA RD 56	HWY 406 IC ST DAVIDS RD HWY END	1.5	29200
58	HWY 406 IC ST DAVIDS RD HWY END	END OF HWY 58		
58A	HWY 140	NIAGARA RD 68 WELLAND ST	4.3	8000
58A	NIAGARA RD 68 WELLAND ST	HWY 58 WEST SIDE RD HWY END	0.8	5450
58A	HWY 58 WEST SIDE RD HWY END	END OF HWY 58A		

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (6 . BARKER PARKWAY & DAVIS ROAD (HIGHWAY 58))

Start Time	N Approach HIGHWAY 58					E Approach BARKER PARKWAY					S Approach HIGHWAY 58					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
06:00:00	20	1	0	0	21	8	2	0	0	10	2	24	0	0	26	57	
06:15:00	38	5	0	0	43	16	0	0	0	16	1	45	1	0	47	106	
06:30:00	65	6	1	0	72	16	1	0	0	17	1	61	0	0	62	151	
06:45:00	74	6	0	0	80	12	3	0	0	15	0	37	0	0	37	132	446
07:00:00	40	10	0	0	50	20	2	0	0	22	2	51	0	0	53	125	514
07:15:00	39	10	0	0	49	17	4	0	0	21	5	71	0	0	76	146	554
07:30:00	51	11	0	0	62	34	6	0	0	40	8	84	0	0	92	194	597
07:45:00	59	9	0	0	68	32	7	0	0	39	2	66	0	0	68	175	640
08:00:00	56	15	0	0	71	42	4	0	0	46	4	61	0	0	65	182	697
08:15:00	47	10	0	0	57	24	3	0	0	27	2	67	0	0	69	153	704
08:30:00	53	14	0	0	67	42	4	1	0	47	5	67	0	0	72	186	696
08:45:00	42	8	0	0	50	34	4	0	0	38	8	68	0	0	76	164	685
09:00:00	44	19	0	0	63	24	4	0	0	28	0	57	0	0	57	148	651
09:15:00	44	19	0	0	63	16	5	0	0	21	1	45	0	0	46	130	628
09:30:00	37	9	0	0	46	21	5	0	0	26	8	55	0	0	63	135	577
09:45:00	31	13	0	0	44	11	3	0	0	14	2	57	0	0	59	117	530
BREAK																	
15:00:00	54	26	0	0	80	16	7	1	0	24	3	45	0	0	48	152	
15:15:00	62	32	0	0	94	21	3	0	0	24	7	51	0	0	58	176	
15:30:00	61	24	0	0	85	18	3	0	0	21	6	80	0	0	86	192	
15:45:00	73	22	0	0	95	21	4	0	0	25	2	56	1	0	59	179	699
16:00:00	60	22	0	0	82	22	7	0	0	29	7	103	0	0	110	221	768
16:15:00	72	33	0	0	105	27	6	0	0	33	3	70	0	0	73	211	803
16:30:00	76	35	0	0	111	21	8	0	0	29	5	90	0	0	95	235	846
16:45:00	88	38	0	0	126	15	3	0	0	18	3	75	0	0	78	222	889
17:00:00	70	31	0	0	101	23	8	0	0	31	5	87	0	0	92	224	892
17:15:00	88	30	0	0	118	21	1	0	0	22	4	70	0	0	74	214	895
17:30:00	67	27	0	0	94	21	9	0	0	30	4	61	0	0	65	189	849
17:45:00	57	34	0	0	91	19	3	0	0	22	4	63	0	0	67	180	807
18:00:00	52	23	0	0	75	19	6	0	0	25	6	37	0	0	43	143	726
18:15:00	61	27	0	0	88	15	2	0	0	17	4	45	0	0	49	154	666
18:30:00	41	17	0	0	58	19	3	0	0	22	6	57	0	0	63	143	620
18:45:00	52	20	1	0	73	20	7	0	0	27	6	45	0	0	51	151	591

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CANADA

Grand Total	1774	606	2	0	2382	687	137	2	0	826	126	1951	2	0	2079	**5287**	-
Approach%	74.5%	25.4%	0.1%		-	83.2%	16.6%	0.2%		-	6.1%	93.8%	0.1%		-	**-**	-
Totals %	33.6%	11.5%	0%		45.1%	13%	2.6%	0%		15.6%	2.4%	36.9%	0%		39.3%	**-**	-
Heavy	119	27	0		-	34	8	0		-	20	110	0		-	**-**	-
Heavy %	6.7%	4.5%	0%		-	4.9%	5.8%	0%		-	15.9%	5.6%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Clear Sky (8.9 °C)

Start Time	N Approach HIGHWAY 58					E Approach BARKER PARKWAY					S Approach HIGHWAY 58					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:30:00	51	11	0	0	62	34	6	0	0	40	8	84	0	0	92	194
07:45:00	59	9	0	0	68	32	7	0	0	39	2	66	0	0	68	175
08:00:00	56	15	0	0	71	42	4	0	0	46	4	61	0	0	65	182
08:15:00	47	10	0	0	57	24	3	0	0	27	2	67	0	0	69	153
Grand Total	213	45	0	0	258	132	20	0	0	152	16	278	0	0	294	**704**
Approach%	82.6%	17.4%	0%		-	86.8%	13.2%	0%		-	5.4%	94.6%	0%		-	**-**
Totals %	30.3%	6.4%	0%		36.6%	18.8%	2.8%	0%		21.6%	2.3%	39.5%	0%		41.8%	**-**
PHF	0.9	0.75	0		0.91	0.79	0.71	0		0.83	0.5	0.83	0		0.8	**-**
Heavy	14	9	0		23	7	2	0		9	6	12	0		18	**-**
Heavy %	6.6%	20%	0%		8.9%	5.3%	10%	0%		5.9%	37.5%	4.3%	0%		6.1%	**-**
Lights	199	36	0		235	125	18	0		143	10	266	0		276	**-**
Lights %	93.4%	80%	0%		91.1%	94.7%	90%	0%		94.1%	62.5%	95.7%	0%		93.9%	**-**
Single-Unit Trucks	9	4	0		13	0	1	0		1	1	7	0		8	**-**
Single-Unit Trucks %	4.2%	8.9%	0%		5%	0%	5%	0%		0.7%	6.3%	2.5%	0%		2.7%	**-**
Buses	4	5	0		9	7	1	0		8	5	1	0		6	**-**
Buses %	1.9%	11.1%	0%		3.5%	5.3%	5%	0%		5.3%	31.3%	0.4%	0%		2%	**-**
Articulated Trucks	1	0	0		1	0	0	0		0	0	4	0		4	**-**
Articulated Trucks %	0.5%	0%	0%		0.4%	0%	0%	0%		0%	0%	1.4%	0%		1.4%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach HIGHWAY 58					E Approach BARKER PARKWAY					S Approach HIGHWAY 58					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:30:00	76	35	0	0	111	21	8	0	0	29	5	90	0	0	95	235
16:45:00	88	38	0	0	126	15	3	0	0	18	3	75	0	0	78	222
17:00:00	70	31	0	0	101	23	8	0	0	31	5	87	0	0	92	224
17:15:00	88	30	0	0	118	21	1	0	0	22	4	70	0	0	74	214
Grand Total	322	134	0	0	456	80	20	0	0	100	17	322	0	0	339	**895**
Approach%	70.6%	29.4%	0%		-	80%	20%	0%		-	5%	95%	0%		-	**-**
Totals %	36%	15%	0%		50.9%	8.9%	2.2%	0%		11.2%	1.9%	36%	0%		37.9%	**-**
PHF	0.91	0.88	0		0.9	0.87	0.63	0		0.81	0.85	0.89	0		0.89	**-**
Heavy	14	1	0		15	2	0	0		2	1	5	0		6	**-**
Heavy %	4.3%	0.7%	0%		3.3%	2.5%	0%	0%		2%	5.9%	1.6%	0%		1.8%	**-**
Lights	308	133	0		441	78	20	0		98	16	317	0		333	**-**
Lights %	95.7%	99.3%	0%		96.7%	97.5%	100%	0%		98%	94.1%	98.4%	0%		98.2%	**-**
Single-Unit Trucks	9	0	0		9	0	0	0		0	0	4	0		4	**-**
Single-Unit Trucks %	2.8%	0%	0%		2%	0%	0%	0%		0%	0%	1.2%	0%		1.2%	**-**
Buses	2	1	0		3	2	0	0		2	1	0	0		1	**-**
Buses %	0.6%	0.7%	0%		0.7%	2.5%	0%	0%		2%	5.9%	0%	0%		0.3%	**-**
Articulated Trucks	3	0	0		3	0	0	0		0	0	1	0		1	**-**
Articulated Trucks %	0.9%	0%	0%		0.7%	0%	0%	0%		0%	0%	0.3%	0%		0.3%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	**-**

Spectrum

Turning Movement Count
Location Name: BARKER PARKWAY & VENTURE WAY
Date: Thu, May 11, 2023 Deployment Lead: Walter Fugaj

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (7 . BARKER PARKWAY & VENTURE WAY)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	0	1	0	0	0	1	0	0	0	0	0	0	0	5	0	0	0	5	0	0	1	0	0	1	7	
06:15:00	1	1	1	0	0	3	1	0	0	0	0	1	0	5	0	0	0	5	0	0	3	0	0	3	12	
06:30:00	1	3	1	0	0	5	0	0	0	0	0	0	0	5	0	0	0	5	0	0	1	0	0	1	11	
06:45:00	0	2	1	0	0	3	1	0	0	0	0	1	0	3	0	0	1	3	0	0	3	0	0	3	10	40
07:00:00	0	7	1	0	0	8	3	1	0	0	0	4	0	5	0	0	0	5	0	0	2	0	0	2	19	52
07:15:00	6	6	0	0	0	12	0	0	1	0	0	1	0	4	0	0	0	4	0	1	5	0	0	6	23	63
07:30:00	3	2	4	0	1	9	0	0	0	0	2	0	0	9	1	0	0	10	1	0	5	0	2	6	25	77
07:45:00	1	5	1	0	0	7	1	0	0	0	0	1	0	5	0	0	1	5	0	2	5	0	1	7	20	87
08:00:00	3	1	2	0	0	6	7	0	0	0	0	7	0	9	0	0	3	9	0	0	4	0	0	4	26	94
08:15:00	0	3	0	0	0	3	0	1	0	0	0	1	1	7	0	0	0	8	0	1	4	0	0	5	17	88
08:30:00	2	3	3	0	0	8	2	0	0	0	0	2	1	10	0	0	1	11	0	2	2	0	0	4	25	88
08:45:00	0	4	1	0	0	5	1	0	0	0	0	1	0	6	0	0	0	6	0	0	6	0	0	6	18	86
09:00:00	4	2	1	0	0	7	0	0	1	0	0	1	0	9	0	0	0	9	0	1	2	0	0	3	20	80
09:15:00	2	5	0	0	0	7	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3	0	0	3	11	74
09:30:00	1	3	1	0	0	5	2	0	0	0	0	2	0	6	0	0	0	6	0	0	0	0	0	0	13	62
09:45:00	5	6	0	0	0	11	0	0	0	0	0	0	0	4	0	0	0	4	1	0	1	0	0	2	17	61
BREAK																										
15:00:00	0	9	4	0	0	13	2	0	1	0	0	3	0	11	0	0	0	11	0	0	3	0	0	3	30	
15:15:00	2	9	2	0	0	13	0	0	1	0	0	1	0	8	0	0	1	8	1	1	2	0	0	4	26	
15:30:00	7	4	1	0	0	12	2	0	0	0	0	2	1	3	1	0	0	5	0	1	3	0	0	4	23	
15:45:00	3	6	2	0	0	11	1	0	1	0	0	2	0	7	0	0	0	7	0	0	1	0	0	1	21	100
16:00:00	2	4	0	1	0	7	1	0	0	0	1	1	0	8	0	0	0	8	0	0	8	0	0	8	24	94
16:15:00	3	8	3	0	0	14	3	0	0	0	1	3	0	7	0	0	0	7	0	3	7	0	0	10	34	102
16:30:00	6	8	4	0	0	18	0	0	0	0	0	0	0	7	0	0	0	7	0	1	1	0	1	2	27	106
16:45:00	7	8	2	1	0	18	2	0	1	0	0	3	1	5	0	0	0	6	0	0	2	0	2	2	29	114
17:00:00	3	8	3	0	0	14	2	0	0	0	0	2	0	11	2	0	0	13	0	4	5	0	0	9	38	128
17:15:00	4	7	1	0	0	12	0	0	0	0	0	0	0	4	0	0	0	4	0	0	3	0	1	3	19	113
17:30:00	6	5	2	0	0	13	0	0	0	0	0	0	0	4	0	0	0	4	0	1	7	0	2	8	25	111
17:45:00	4	4	1	0	0	9	3	0	0	0	1	3	0	5	0	0	1	5	0	1	6	0	3	7	24	106
18:00:00	2	3	2	0	0	7	1	0	0	0	0	1	0	2	0	0	0	2	0	0	4	0	1	4	14	82
18:15:00	5	7	3	0	0	15	0	0	0	0	0	0	0	4	0	0	0	4	0	0	1	0	0	1	20	83
18:30:00	3	4	3	0	0	10	2	0	0	0	0	2	1	1	0	0	2	2	0	2	2	0	0	4	18	76
18:45:00	0	7	0	0	0	7	1	0	0	0	0	1	0	3	0	0	0	3	0	0	5	0	1	5	16	68
Grand Total	86	155	50	2	1	293	38	2	6	0	5	46	5	183	4	0	10	192	3	21	107	0	14	131	**662**	-
Approach%	29.4%	52.9%	17.1%	0.7%		-	82.6%	4.3%	13%	0%		-	2.6%	95.3%	2.1%	0%		-	2.3%	16%	81.7%	0%		-	**-**	-
Totals %	13%	23.4%	7.6%	0.3%		44.3%	5.7%	0.3%	0.9%	0%		6.9%	0.8%	27.6%	0.6%	0%		29%	0.5%	3.2%	16.2%	0%		19.8%	**-**	-
Heavy	3	6	3	0		-	2	1	1	0		-	1	7	0	0		-	0	1	7	0		-	**-**	-
Heavy %	3.5%	3.9%	6%	0%		-	5.3%	50%	16.7%	0%		-	20%	3.8%	0%	0%		-	0%	4.8%	6.5%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: BARKER PARKWAY & VENTURE WAY
Date: Thu, May 11, 2023 Deployment Lead: Walter Fugaj

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:15 AM - 08:15 AM Weather: Clear Sky (8.9 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:15:00	6	6	0	0	0	12	0	0	1	0	0	1	0	4	0	0	0	4	0	1	5	0	0	6	23
07:30:00	3	2	4	0	1	9	0	0	0	0	2	0	0	9	1	0	0	10	1	0	5	0	2	6	25
07:45:00	1	5	1	0	0	7	1	0	0	0	0	1	0	5	0	0	1	5	0	2	5	0	1	7	20
08:00:00	3	1	2	0	0	6	7	0	0	0	0	7	0	9	0	0	3	9	0	0	4	0	0	4	26
Grand Total	13	14	7	0	1	34	8	0	1	0	2	9	0	27	1	0	4	28	1	3	19	0	3	23	**94**
Approach%	38.2%	41.2%	20.6%	0%		-	88.9%	0%	11.1%	0%		-	0%	96.4%	3.6%	0%		-	4.3%	13%	82.6%	0%		-	**-**
Totals %	13.8%	14.9%	7.4%	0%		36.2%	8.5%	0%	1.1%	0%		9.6%	0%	28.7%	1.1%	0%		29.8%	1.1%	3.2%	20.2%	0%		24.5%	**-**
PHF	0.54	0.58	0.44	0		0.71	0.29	0	0.25	0		0.32	0	0.75	0.25	0		0.7	0.25	0.38	0.95	0		0.82	**-**
Heavy	1	2	2	0		5	0	0	0	0		0	0	2	0	0		2	0	1	2	0		3	**-**
Heavy %	7.7%	14.3%	28.6%	0%		14.7%	0%	0%	0%	0%		0%	0%	7.4%	0%	0%		7.1%	0%	33.3%	10.5%	0%		13%	**-**
Lights	12	12	5	0		29	8	0	1	0		9	0	25	1	0		26	1	2	17	0		20	**-**
Lights %	92.3%	85.7%	71.4%	0%		85.3%	100%	0%	100%	0%		100%	0%	92.6%	100%	0%		92.9%	100%	66.7%	89.5%	0%		87%	**-**
Single-Unit Trucks	1	2	0	0		3	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Single-Unit Trucks %	7.7%	14.3%	0%	0%		8.8%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Buses	0	0	2	0		2	0	0	0	0		0	0	2	0	0		2	0	1	2	0		3	**-**
Buses %	0%	0%	28.6%	0%		5.9%	0%	0%	0%	0%		0%	0%	7.4%	0%	0%		7.1%	0%	33.3%	10.5%	0%		13%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	10%		-	-	-	-	20%		-	-	-	-	40%		-	-	-	-	30%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:15 PM - 05:15 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach						E Approach						S Approach						W Approach						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	3	8	3	0	0	14	3	0	0	0	1	3	0	7	0	0	0	7	0	3	7	0	0	10	34
16:30:00	6	8	4	0	0	18	0	0	0	0	0	0	0	7	0	0	0	7	0	1	1	0	1	2	27
16:45:00	7	8	2	1	0	18	2	0	1	0	0	3	1	5	0	0	0	6	0	0	2	0	2	2	29
17:00:00	3	8	3	0	0	14	2	0	0	0	0	2	0	11	2	0	0	13	0	4	5	0	0	9	38
Grand Total	19	32	12	1	0	64	7	0	1	0	1	8	1	30	2	0	0	33	0	8	15	0	3	23	**128**
Approach%	29.7%	50%	18.8%	1.6%		-	87.5%	0%	12.5%	0%		-	3%	90.9%	6.1%	0%		-	0%	34.8%	65.2%	0%		-	**-**
Totals %	14.8%	25%	9.4%	0.8%		50%	5.5%	0%	0.8%	0%		6.3%	0.8%	23.4%	1.6%	0%		25.8%	0%	6.3%	11.7%	0%		18%	**-**
PHF	0.68	1	0.75	0.25		0.89	0.58	0	0.25	0		0.67	0.25	0.68	0.25	0		0.63	0	0.5	0.54	0		0.58	**-**
Heavy	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Heavy %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Lights	19	32	12	1		64	7	0	1	0		8	1	30	2	0		33	0	3	15	0		18	**-**
Lights %	100%	100%	100%	100%		100%	100%	0%	100%	0%		100%	100%	100%	100%	0%		100%	0%	37.5%	100%	0%		78.3%	**-**
Single-Unit Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	5	0	0		5	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	62.5%	0%	0%		21.7%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	25%		-	-	-	-	0%		-	-	-	-	75%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: UPPERS LANE & DAVIS RD (HWY 58)
Date: Thu, May 11, 2023 Deployment Lead: Walter Fugaj

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (2 . UPPERS LANE & DAVIS RD (HWY 58))

Start Time	N Approach HIGHWAY 58						E Approach UPPER'S LANE						S Approach HIGHWAY 58						W Approach UPPER'S LANE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	4	13	2	0	0	19	0	0	3	0	0	3	3	25	12	0	0	40	11	0	3	0	0	14	76	
06:15:00	6	31	4	0	0	41	2	0	2	0	0	4	6	36	16	0	0	58	21	0	7	0	0	28	131	
06:30:00	7	53	4	0	0	64	0	0	5	0	0	5	12	60	12	0	0	84	24	0	6	0	0	30	183	
06:45:00	8	67	6	0	0	81	1	1	11	0	0	13	8	32	9	0	0	49	19	0	5	0	0	24	167	557
07:00:00	2	39	5	0	0	46	5	0	9	0	0	14	12	38	15	0	0	65	14	0	9	0	0	23	148	629
07:15:00	2	35	6	0	0	43	3	1	10	0	0	14	7	57	22	0	0	86	22	1	16	0	0	39	182	680
07:30:00	5	45	4	0	0	54	1	2	11	0	0	14	7	70	14	0	0	91	12	1	24	0	0	37	196	693
07:45:00	13	41	10	0	0	64	3	0	8	0	0	11	15	51	13	0	0	79	20	1	10	0	0	31	185	711
08:00:00	9	46	6	0	0	61	1	2	4	0	0	7	7	54	14	1	0	76	16	0	13	0	0	29	173	736
08:15:00	7	38	6	0	0	51	1	2	14	0	0	17	11	62	17	0	0	90	25	3	6	0	0	34	192	746
08:30:00	10	41	6	0	0	57	3	2	16	0	0	21	7	55	12	0	0	74	16	2	15	0	0	33	185	735
08:45:00	10	30	4	0	0	44	7	7	7	0	0	21	12	51	17	0	0	80	29	6	14	0	0	49	194	744
09:00:00	7	38	4	0	0	49	1	6	12	0	0	19	12	44	12	0	0	68	16	8	14	0	0	38	174	745
09:15:00	8	38	6	0	0	52	2	3	6	0	0	11	4	39	6	0	0	49	10	2	6	0	0	18	130	683
09:30:00	3	35	1	0	0	39	8	0	7	0	0	15	8	36	16	0	0	60	14	0	14	0	0	28	142	640
09:45:00	4	27	4	0	0	35	2	1	4	0	0	7	11	48	6	0	0	65	11	0	10	0	0	21	128	574
BREAK																										
15:00:00	12	49	1	0	0	62	2	1	8	0	0	11	8	41	20	0	0	69	17	1	5	0	0	23	165	
15:15:00	12	49	1	0	0	62	4	3	5	0	0	12	7	45	24	0	0	76	25	1	9	0	0	35	185	
15:30:00	6	58	5	0	0	69	6	1	17	0	0	24	4	65	28	0	0	97	24	6	14	0	0	44	234	
15:45:00	16	52	7	0	0	75	5	3	10	0	0	18	11	45	18	0	0	74	17	1	11	0	0	29	196	780
16:00:00	10	49	6	0	0	65	17	1	16	0	0	34	21	83	18	0	0	122	31	3	11	0	0	45	266	881
16:15:00	10	62	10	0	0	82	12	0	13	0	0	25	5	59	18	0	0	82	23	2	5	0	0	30	219	915
16:30:00	13	63	5	0	0	81	7	4	12	0	0	23	7	79	18	0	0	104	37	3	5	0	0	45	253	934
16:45:00	21	61	8	0	0	90	5	2	15	0	0	22	22	67	22	0	0	111	20	1	8	0	0	29	252	990
17:00:00	13	56	12	0	0	81	9	2	17	0	0	28	6	67	27	0	0	100	25	1	15	0	0	41	250	974
17:15:00	19	62	7	0	0	88	2	0	12	0	0	14	21	68	34	0	0	123	25	0	7	0	0	32	257	1012
17:30:00	11	51	12	0	0	74	5	1	10	0	0	16	20	45	27	0	0	92	21	2	14	0	0	37	219	978
17:45:00	7	46	10	0	0	63	5	1	12	0	0	18	10	49	20	1	0	80	24	1	9	0	0	34	195	921
18:00:00	6	49	3	0	0	58	1	0	8	0	0	9	11	35	17	0	0	63	14	1	6	0	0	21	151	822
18:15:00	9	47	8	0	0	64	2	0	8	0	0	10	12	47	15	0	0	74	15	0	1	0	0	16	164	729
18:30:00	5	40	2	0	0	47	5	2	10	0	0	17	19	49	15	0	1	83	12	2	9	0	1	23	170	680
18:45:00	8	47	4	0	0	59	2	0	8	0	0	10	3	39	23	0	0	65	12	0	9	0	0	21	155	640
Grand Total	283	1458	179	0	0	1920	129	48	310	0	0	487	329	1641	557	2	1	2529	622	49	310	0	1	981	**5917**	-
Approach%	14.7%	75.9%	9.3%	0%		-	26.5%	9.9%	63.7%	0%		-	13%	64.9%	22%	0.1%		-	63.4%	5%	31.6%	0%		-	**-**	-
Totals %	4.8%	24.6%	3%	0%		32.4%	2.2%	0.8%	5.2%	0%		8.2%	5.6%	27.7%	9.4%	0%		42.7%	10.5%	0.8%	5.2%	0%		16.6%	**-**	-
Heavy	20	96	7	0		-	4	4	9	0		-	8	108	32	0		-	38	4	15	0		-	**-**	-
Heavy %	7.1%	6.6%	3.9%	0%		-	3.1%	8.3%	2.9%	0%		-	2.4%	6.6%	5.7%	0%		-	6.1%	8.2%	4.8%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:30 AM - 08:30 AM **Weather: Clear Sky (8.9 °C)**

Start Time	N Approach HIGHWAY 58						E Approach UPPER'S LANE						S Approach HIGHWAY 58						W Approach UPPER'S LANE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	5	45	4	0	0	54	1	2	11	0	0	14	7	70	14	0	0	91	12	1	24	0	0	37	196
07:45:00	13	41	10	0	0	64	3	0	8	0	0	11	15	51	13	0	0	79	20	1	10	0	0	31	185
08:00:00	9	46	6	0	0	61	1	2	4	0	0	7	7	54	14	1	0	76	16	0	13	0	0	29	173
08:15:00	7	38	6	0	0	51	1	2	14	0	0	17	11	62	17	0	0	90	25	3	6	0	0	34	192
Grand Total	34	170	26	0	0	230	6	6	37	0	0	49	40	237	58	1	0	336	73	5	53	0	0	131	**746**
Approach%	14.8%	73.9%	11.3%	0%		-	12.2%	12.2%	75.5%	0%		-	11.9%	70.5%	17.3%	0.3%		-	55.7%	3.8%	40.5%	0%		-	**-**
Totals %	4.6%	22.8%	3.5%	0%		30.8%	0.8%	0.8%	5%	0%		6.6%	5.4%	31.8%	7.8%	0.1%		45%	9.8%	0.7%	7.1%	0%		17.6%	**-**
PHF	0.65	0.92	0.65	0		0.9	0.5	0.75	0.66	0		0.72	0.67	0.85	0.85	0.25		0.92	0.73	0.42	0.55	0		0.89	**-**
Heavy	3	11	0	0		14	2	3	2	0		7	3	20	6	0		29	7	1	1	0		9	**-**
Heavy %	8.8%	6.5%	0%	0%		6.1%	33.3%	50%	5.4%	0%		14.3%	7.5%	8.4%	10.3%	0%		8.6%	9.6%	20%	1.9%	0%		6.9%	**-**
Lights	31	159	26	0		216	4	3	35	0		42	37	217	52	1		307	66	4	52	0		122	**-**
Lights %	91.2%	93.5%	100%	0%		93.9%	66.7%	50%	94.6%	0%		85.7%	92.5%	91.6%	89.7%	100%		91.4%	90.4%	80%	98.1%	0%		93.1%	**-**
Single-Unit Trucks	1	7	0	0		8	1	0	1	0		2	1	11	4	0		16	5	0	0	0		5	**-**
Single-Unit Trucks %	2.9%	4.1%	0%	0%		3.5%	16.7%	0%	2.7%	0%		4.1%	2.5%	4.6%	6.9%	0%		4.8%	6.8%	0%	0%	0%		3.8%	**-**
Buses	1	4	0	0		5	1	3	0	0		4	2	4	1	0		7	0	1	1	0		2	**-**
Buses %	2.9%	2.4%	0%	0%		2.2%	16.7%	50%	0%	0%		8.2%	5%	1.7%	1.7%	0%		2.1%	0%	20%	1.9%	0%		1.5%	**-**
Articulated Trucks	1	0	0	0		1	0	0	1	0		1	0	5	1	0		6	2	0	0	0		2	**-**
Articulated Trucks %	2.9%	0%	0%	0%		0.4%	0%	0%	2.7%	0%		2%	0%	2.1%	1.7%	0%		1.8%	2.7%	0%	0%	0%		1.5%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: UPPERS LANE & DAVIS RD (HWY 58)
Date: Thu, May 11, 2023 Deployment Lead: Walter Fugaj

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (21.96 °C)

Start Time	N Approach HIGHWAY 58						E Approach UPPER'S LANE						S Approach HIGHWAY 58						W Approach UPPER'S LANE						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	13	63	5	0	0	81	7	4	12	0	0	23	7	79	18	0	0	104	37	3	5	0	0	45	253
16:45:00	21	61	8	0	0	90	5	2	15	0	0	22	22	67	22	0	0	111	20	1	8	0	0	29	252
17:00:00	13	56	12	0	0	81	9	2	17	0	0	28	6	67	27	0	0	100	25	1	15	0	0	41	250
17:15:00	19	62	7	0	0	88	2	0	12	0	0	14	21	68	34	0	0	123	25	0	7	0	0	32	257
Grand Total	66	242	32	0	0	340	23	8	56	0	0	87	56	281	101	0	0	438	107	5	35	0	0	147	**1012**
Approach%	19.4%	71.2%	9.4%	0%		-	26.4%	9.2%	64.4%	0%		-	12.8%	64.2%	23.1%	0%		-	72.8%	3.4%	23.8%	0%		-	**-**
Totals %	6.5%	23.9%	3.2%	0%		33.6%	2.3%	0.8%	5.5%	0%		8.6%	5.5%	27.8%	10%	0%		43.3%	10.6%	0.5%	3.5%	0%		14.5%	**-**
PHF	0.79	0.96	0.67	0		0.94	0.64	0.5	0.82	0		0.78	0.64	0.89	0.74	0		0.89	0.72	0.42	0.58	0		0.82	**-**
Heavy	1	13	0	0		14	0	0	1	0		1	1	4	5	0		10	0	0	1	0		1	**-**
Heavy %	1.5%	5.4%	0%	0%		4.1%	0%	0%	1.8%	0%		1.1%	1.8%	1.4%	5%	0%		2.3%	0%	0%	2.9%	0%		0.7%	**-**
Lights	65	229	32	0		326	23	8	54	0		85	55	277	96	0		428	106	5	34	0		145	**-**
Lights %	98.5%	94.6%	100%	0%		95.9%	100%	100%	96.4%	0%		97.7%	98.2%	98.6%	95%	0%		97.7%	99.1%	100%	97.1%	0%		98.6%	**-**
Single-Unit Trucks	1	8	0	0		9	0	0	1	0		1	1	3	4	0		8	0	0	0	0		0	**-**
Single-Unit Trucks %	1.5%	3.3%	0%	0%		2.6%	0%	0%	1.8%	0%		1.1%	1.8%	1.1%	4%	0%		1.8%	0%	0%	0%	0%		0%	**-**
Buses	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	**-**
Buses %	0%	0.8%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	2.9%	0%		0.7%	**-**
Articulated Trucks	0	3	0	0		3	0	0	0	0		0	0	1	1	0		2	0	0	0	0		0	**-**
Articulated Trucks %	0%	1.2%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.4%	1%	0%		0.5%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	0	1	0		1	0	0	0	0		0	1	0	0	0		1	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	1.8%	0%		1.1%	0%	0%	0%	0%		0%	0.9%	0%	0%	0%		0.7%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

STAMSON 5.0 NORMAL REPORT Date: 24-01-2024 08:59:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b32_ef.te Time Period: Day/Night 16/8 hours
Description: Block 32, East Facade - Sample Calculation

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

Car traffic volume : 4582/509 veh/TimePeriod
Medium truck volume : 228/25 veh/TimePeriod
Heavy truck volume : 34/4 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Upper's (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 16.50 / 16.50 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 4921/677 veh/TimePeriod
Medium truck volume : 266/37 veh/TimePeriod
Heavy truck volume : 1409/194 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 282.00 / 282.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper's (day)

Source height = 0.92 m

ROAD (0.00 + 52.80 + 0.00) = 52.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.59	57.80	0.00	-0.66	-4.34	0.00	0.00	0.00	52.80

Segment Leq : 52.80 dBA

Results segment # 2: ThorTwnline (day)

Source height = 2.15 m

ROAD (0.00 + 52.17 + 0.00) = 52.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.55	73.19	0.00	-19.76	-1.27	0.00	0.00	0.00	52.17

Segment Leq : 52.17 dBA

Total Leq All Segments: 55.51 dBA

Results segment # 1: Upper's (night)

Source height = 0.93 m

ROAD (0.00 + 46.32 + 0.00) = 46.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.59	51.32	0.00	-0.66	-4.34	0.00	0.00	0.00	46.32

Segment Leq : 46.32 dBA

Results segment # 2: ThorTwnline (night)

Source height = 2.15 m

ROAD (0.00 + 46.57 + 0.00) = 46.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.55	67.59	0.00	-19.76	-1.27	0.00	0.00	0.00	46.57

Segment Leq : 46.57 dBA

Total Leq All Segments: 49.46 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.51
(NIGHT): 49.46

STAMSON 5.0 NORMAL REPORT Date: 24-01-2024 09:00:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b32_sf.te Time Period: Day/Night 16/8 hours
Description: Block 32, South Facade - Sample Calculation

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

Car traffic volume : 4582/509 veh/TimePeriod
Medium truck volume : 228/25 veh/TimePeriod
Heavy truck volume : 34/4 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Upper's (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 16.50 / 16.50 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 4921/677 veh/TimePeriod
Medium truck volume : 266/37 veh/TimePeriod
Heavy truck volume : 1409/194 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 282.00 / 282.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Upper's (day)

Source height = 0.92 m

ROAD (0.00 + 55.81 + 0.00) = 55.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.59	57.80	0.00	-0.66	-1.33	0.00	0.00	0.00	55.81

Segment Leq : 55.81 dBA

Results segment # 2: ThorTwnline (day)

Source height = 2.15 m

ROAD (0.00 + 49.16 + 0.00) = 49.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.55	73.19	0.00	-19.76	-4.28	0.00	0.00	0.00	49.16

Segment Leq : 49.16 dBA

Total Leq All Segments: 56.66 dBA

Results segment # 1: Upper's (night)

Source height = 0.93 m

ROAD (0.00 + 49.33 + 0.00) = 49.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.59	51.32	0.00	-0.66	-1.33	0.00	0.00	0.00	49.33

Segment Leq : 49.33 dBA

Results segment # 2: ThorTwnline (night)

Source height = 2.15 m

ROAD (0.00 + 43.56 + 0.00) = 43.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.55	67.59	0.00	-19.76	-4.28	0.00	0.00	0.00	43.56

Segment Leq : 43.56 dBA

Total Leq All Segments: 50.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.66
(NIGHT): 50.35

STAMSON 5.0 NORMAL REPORT Date: 24-01-2024 09:01:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b33_nf.te Time Period: Day/Night 16/8 hours
Description: Block 33, North Facade - Sample Calculation

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

Car traffic volume : 6873/764 veh/TimePeriod
Medium truck volume : 395/44 veh/TimePeriod
Heavy truck volume : 632/70 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Davis - S (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 169.20 / 169.20 m
Receiver height : 4.50 / 4.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 3.40 m
Reference angle : 0.00

Results segment # 1: Davis - S (day)

Source height = 1.68 m

ROAD (0.00 + 54.43 + 0.00) = 54.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.46	70.93	0.00	-15.39	-1.10	0.00	0.00	0.00	54.43

Segment Leq : 54.43 dBA

Total Leq All Segments: 54.43 dBA

Results segment # 1: Davis - S (night)

Source height = 1.68 m

ROAD (0.00 + 47.89 + 0.00) = 47.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.46	64.39	0.00	-15.39	-1.10	0.00	0.00	0.00	47.89

Segment Leq : 47.89 dBA

Total Leq All Segments: 47.89 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.43
(NIGHT): 47.89

STAMSON 5.0 NORMAL REPORT Date: 24-01-2024 09:09:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: l6_o.te Time Period: 16 hours
Description: Lot 6 OLA - Sample Calculation

Road data, segment # 1: Davis - S

Car traffic volume : 6873 veh/TimePeriod
Medium truck volume : 395 veh/TimePeriod
Heavy truck volume : 632 veh/TimePeriod
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Davis - S

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 431.10 m
Receiver height : 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 1.50 m
Reference angle : 0.00

Road data, segment # 2: Barker

Car traffic volume : 3810 veh/TimePeriod
Medium truck volume : 226 veh/TimePeriod
Heavy truck volume : 0 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Barker

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 279.60 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Davis - S

Source height = 1.68 m

ROAD (0.00 + 46.08 + 0.00) = 46.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.61	70.93	0.00	-23.48	-1.37	0.00	0.00	0.00	46.08

Segment Leq : 46.08 dBA

Results segment # 2: Barker

Source height = 0.50 m

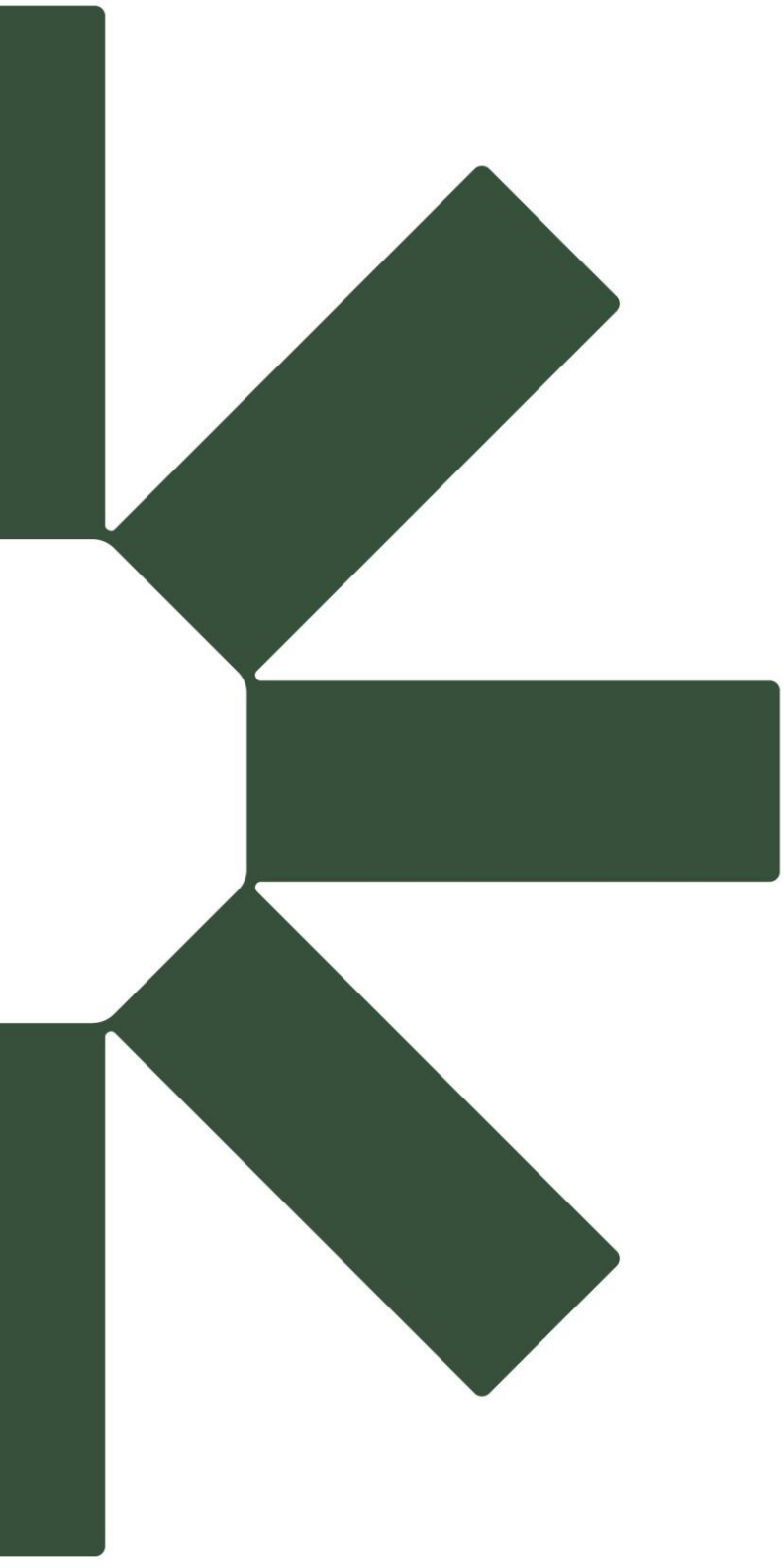
ROAD (0.00 + 33.51 + 0.00) = 33.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	56.06	0.00	-21.09	-1.46	0.00	0.00	0.00	33.51

Segment Leq : 33.51 dBA

Total Leq All Segments: 46.31 dBA

TOTAL Leq FROM ALL SOURCES: 46.31



Making Sustainability Happen