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

Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

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Prepared by:

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Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorized By
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1	April 27, 2026	Keni Mallinen Alice Najjar	Scott Penton (A&V) Jenny Graham (AQ)	Scott Penton (A&V) Jenny Graham (AQ)

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Executive Summary

SLR Consulting (Canada) Ltd. (SLR), was retained by Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group), herein referred to as “Parkbridge”, to conduct a Land Use Compatibility Study focusing on air quality, odour, dust, noise, and vibration. The Study is required as part of a development application to the City of Thorold. 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 of the lands east of 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, MECP Publication NPC-300 and the City of Thorold Noise By-Law requirements are met with respect to noise/vibration with the following measures applied:

- Class 4 designation for the Project site;
- Central air conditioning provided for all residential units; and
- Appropriate warning clauses in agreements registered on title for residential units, in all agreements of purchase and sale or lease, and all rental agreements.

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.

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 located in the neighbouring City of Niagara Falls.

Table of Contents

Tables in Text

Appended Figures

Appendices

Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
ARA	Aggregate Resources Act
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
dBA	Decibels (A-weighted)
dBAI	Decibels (A-weighted), Impulsive
dBL	Overpressure Level
EASR	Environmental Activity and Sector Registry
ECA	Environmental Compliance Approval
HVAC	Heating Ventilation and Air Conditioning
ISO	International Organization for Standardization
L_{eq}	Energy Equivalent Sound Level
L_{LM}	Logarithmic Mean Impulse Sound Level
MECP	Ministry of the Environment, Conservation and Parks
MTO	Ontario Ministry of Transportation
NPC-300	MECP Publication NPC-300
OPA	Official Plan Amendment
OBC	Ontario Building Code
OLT	Ontario Land Tribunal
ORNAMENT	Ontario Road Noise Analysis Method for Environment and Transportation
PPS	Provincial Planning Statement
PWL	Sound Power Level
RAC	Railway Association of Canada
SLM	Sound Level Meter
SLR	SLR Consulting (Canada) Ltd.
SPL	Sound Pressure Level
STC	Sound Transmission Class
TMC	Turning Movement Count
ToR	Terms of Reference
ZBA	Zoning By-law Amendment

1.0 Introduction

SLR Consulting (Canada) Ltd. (SLR), was retained by Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group), herein referred to as “Parkbridge”, to complete a Land Use Compatibility Study focusing on air quality, odour, dust, noise, and vibration. The Study is required as part of a Zoning By-Law Amendment development application resubmission. SLR previously prepared a Land Use Compatibility Study, submitted with the initial ZBA application, and outlined in the following report:

- Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration – Upper’s Lane, Thorold, dated February 7, 2024.

This report updates the analysis and recommendations of the previous assessment.

The proposed development is located near Upper’s Lane in Thorold, Ontario (the “Project site”). A portion of the Project site is located within 500 m of the lands east of 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 Upper's 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 dwellings that may include detached dwellings and townhouses up to 3-storey heights, along with a mid-rise block at the southwest corner of the Project site (Block 41) that may include buildings up to 10-storey heights. Park space, a stormwater management pond and natural heritage areas are also planned.

A context plan is provided in Figure 1. The Proposed Draft Plan of Subdivision and a Demonstration 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 beyond Beaverdams Road/Ontario 7186.

Parts of lands to the east of Thorold Townline Road are currently subject to planning applications submitted to Niagara Region and City of Niagara Falls, in addition to an application for a Class A license under the *Aggregates Resources Act* with the Ministry of Natural Resources.

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 the 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).

2.3.3 Walker Aggregates Inc. Upper's Quarry License Application

Walker Aggregates Inc. ("Walker") has applied for a "Class A" extraction license under the Aggregate Resources Act ("ARA") for a quarry operation to be located east of Thorold Townline Road, in the neighbouring City of Niagara Falls. The quarry license application is currently under review by the Ministry of Natural Resources and may be referred to Ontario Land Tribunal ("OLT"). The quarry location is shown in Figure 3.

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 Planning Statement (PPS) sets out goals – making sure adjacent land uses are compatible from a health and safety perspective and are appropriately buffered; 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 are minimized and mitigated.

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 Planning 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 Planning 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 Province of Ontario approved PPS came into effect on October 20, 2024. Policy direction concerning land use compatibility is provided in the following sections of the PPS.

> "Policy 2.8.3: *In addition to Policy 3.5, on lands within 300 metres of employment areas, development shall avoid, or where avoidance is not possible, minimize and mitigate potential impacts on the longterm economic viability of employment uses within existing or planned employment areas, in accordance with provincial guidelines.*
>
> *Policy 3.5.1: 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.*
>
> *Policy 3.5.2: Where avoidance is not possible in accordance with Policy 3.5.1, planning authorities shall protect the long-term viability of existing or planned industrial, manufacturing or other major facilities that are vulnerable to encroachment by ensuring that the planning and development of proposed adjacent sensitive land uses is only permitted if potential adverse affects to the proposed sensitive land use are minimized and mitigated, and potential impacts to industrial, manufacturing or other major facilities are minimized and mitigated in accordance with provincial guidelines, standards and procedures.*

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

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

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.

Sensitive Land Use is defined in the D-Series Guidelines as:

> “A building, 'amenity area' or outdoor space where routine or normal activities occurring at reasonably expected times would experience 1 or more 'adverse effect(s)' from contaminant discharges generated by a nearby 'facility'. The 'sensitive land use' may be a part of the natural or built environment. Depending upon the particular 'facility' involved, a sensitive land use and associated activities may include one or a combination of:
>
> I. residences or facilities where people sleep (e.g. single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.). These uses are considered to be sensitive 24 hours/day.
>
> II. a permanent structure for non-facility related use, particularly of an institutional nature (e.g. schools, churches, community centres, day care centres).
>
> III. certain outdoor recreational uses deemed by a municipality or other level of government to be sensitive (e.g. trailer park, picnic area, etc.).
>
> IV. certain agricultural operations (e.g. cattle raising, mink farming, cash crops and orchards).
>
> V. bird/wildlife habitats or sanctuaries.”

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
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
Continued…					

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 potential 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 (Ontario 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., Ontario Regulation 419/05).

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 4a and Figure 4b. 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 1,000 m of the Project site were reviewed on the MECP Access Environment website.

Table 3 lists the identified industries within 1,000 m of the Project site and provides details regarding their applicable Area of Influence. A detailed table of all industries within 1,000 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 Identified Within the Potential Area of Influence of the Project Site

Facility	Type of Operation	ECA No.	Industry Class	Area of Influence (m)	Approximate Distance to Project Site (m)	Additional Assessment Required?
Upper's Quarry (Proposed)	Proposed Quarry	-	Class III	1000	285	Yes
Rankin Asphalt	Asphalt Plant	0141-D2PS5Z (2024)	Class III	1000	730	Yes

The industries listed in Table 3 were identified to be 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 4a and Figure 4b, 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:	285 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 285 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 December 5, 2023 and January 11, 2024, 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.

Operations at the proposed quarry generally progress as follows:

- Overburden (soil and vegetation) will be stripped from the surface to reveal the rock layer. The overburden will be stockpiled for future use for reclamation, and will also be used to construct perimeter berms.
- A "sinking cut" will be made. During the sinking cut period, the primary and secondary crushers and associated equipment will be located "at grade" at the top of the excavation. A large area will be extracted down to the bottom of the first bench (the first level of extraction).

  As the equipment is at its highest point in the quarry, the worst-case noise and air quality impacts generally occur during at-grade sinking cuts. Each sinking cut would generally take a year to complete (estimated).
- After the sinking cut is completed, the primary and secondary crushers and associated equipment will be relocated to the bottom of the sinking cut (below grade). The

extraction will then proceed outward from the sinking cut following the quarry Operational Plan.

- There are 4 sinking cuts associated with the current Operational Plan:
  - Phase 1A North Sinking Cut (south of Upper's Lane);
  - Phase 1A South Sinking Cut (south of the unopened road allowance which crosses the middle of the Quarry property);
  - Phase 2A Sinking Cut (north of Upper's Lane); and
  - Phase 3B Sinking Cut (north of Upper's Lane)
- Once the first bench is complete, the second bench will be extracted in a similar manner.
- Once all extraction is complete, the perimeter berms and overburden stockpiles will be used for landscape reclamation to restore the area to natural conditions, in accordance with the Rehabilitation Plan.

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. As a conservative assumption, SLR has assumed this will be operational during or after Phase 2A Sinking Cut.

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 1,000 m. Portions of the Project site lie within the Recommended Minimum Separation distance, and the entire Project site is within the Potential Area of Influence. Therefore, additional assessment is warranted and is provided in subsequent sections of this report.

Note that the planning applications for the proposed Upper's Quarry are currently under review at the OLT, and the corresponding aggregate license application is still under review by the Ministry of Natural Resources. Accordingly, 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 dual mode (bath or drum) hot mix asphalt plant that is located approximately 750 m north of the Project site. It has a maximum production rate of 2,800 tonnes per day only from May through December. Production levels are lower during the remaining months, with no production occurring from January through February. The facility also operates two crushing plants: one for recycled concrete and one for reclaimed asphalt pavement. The facility operates under MECP ECA number 0141-D2PS5Z, dated March 27, 2024. The permit is issued to Rankin Construction Inc. and copy of the MECP permit is provided in Appendix B.

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

- Flow drum mixer;
- Baghouse dust collector;
- Batch tower with vibrating screen;
- Three hot mix asphalt storage silos;
- Two liquid asphalt storage tanks;
- Natural gas fired hot oil heaters;
- Fugitive emissions resulting from delivery, storage, and transfer of materials;
- Two primary crushers;
- One secondary crusher;
- Two screening units;
- Two stack conveyors; and
- Two diesel fired generators powering crusher and screening unit.

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, including at the Project site. 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 February 10, 2026:

Table 4: Development Applications in the Surrounding Area

Facility	Date	Development Application Information	Details
Rolling Meadows - 13030 Lundy's Lane	April 2021	D09-05-2023, D12-04-2023 D14-13-2023	The purpose of this application is to amend the Official Plan to a Special Policy Area that would allow for an increase in height, as well as change land use designations from "RM Highway Commercial", "RM – Employment – Prestige Industrial" and "RM -Residential" to "RM-Residential", "RM-Village Square Commercial" and "Open Spaces & Parks". The Zoning By-law Amendment application seeks to rezone the site from "Highway Commercial" and "Future Development" to various residential zones, as well as mixed use commercial, open space and utility, subject to site-specific provisions.

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 4.0, 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 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.

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)
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

Receptor Category	Examples	Exposure Type	Type of Assessment
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 Odorous 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
Tier 2	• Wastewater facilities with design capacity >25,0000 m^3/day and <100,000 m^3/day • Paper, newsprint, and Paperboard mills	• 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
	• 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)	• 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

O. Reg. 419/05 also provides limits for dust, including limits for suspended particulates and dust fall. Under O. 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 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. None of the PPS, the D-Series of guidelines, O. Reg. 419/05, or the current MECP odour assessment protocols require an assessment of cumulative impacts.

This is not to say that such cumulative effects assessments are never warranted; rather, the need to undertake such assessments 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 in this circumstance.

5.1.2.4 Local Meteorology

Pre-processed Regional Meteorological data was obtained from the MECP website[2] to generate a wind rose. The surface wind data collected for Welland is from 1989 through 2018. The wind rose, as shown in Figure 5, 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**.

[2] 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 the present date of the request. 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:

- the proposed Upper's 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 site 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 285 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 December 5, 2023, 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 285 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%, 88%, 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.[3]

Receptors

A grid of receptors were placed within the Project site, approximately every 20 m at grade-level. At the southwest corner of the Project site, elevated receptors were placed every 3 m in height up to 30 metres to represent 10-storey mid-rise buildings. 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

[3] The files used were: cdem_dem_030M.tif

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.

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	8.9	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 2023 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[4] 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 on October 27, 2020, with the purpose to regulate best practices at these facilities and minimize air, odour and dust emissions. The standard includes:

- 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 this 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 need to be reassessed.

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 0141-D2PS5Z, dated March 27, 2024. 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;
- Baghouse dust collector;
- Batch tower with vibrating screen;
- Three hot mix asphalt storage silos;

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

- Two liquid asphalt storage tanks;
- Natural gas fired hot oil heaters;
- Fugitive emissions resulting from delivery, storage, and transfer of materials;
- Two primary crushers;
- One secondary crusher;
- Two screening units;
- Two stack conveyors;
- Two diesel fired generators powering crusher and screening unit.

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 1,008 square meters of filter material. Particulate emissions from the crushing plants are controlled with a water spray system.

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 required 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, resulting in emission occurring at or near the facility property boundary.

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
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

Land Use	Type of Operation	Industry Class	Area of Influence Distance (m)	Recommended Minimum Separation Distance (m)
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
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

Employment uses outlined in Table 8 and Table 9 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 Class 2 and Class 4 areas. Exclusion limits for impulsive sounds in Class 2 and Class 4 areas are summarized in Table 11.

Table 10: Minimum Exclusion Limits for Class 2 and Class 4 Areas – Continuous (Non-Impulsive) Sources (L_{eq}(1-hr), dBA)

Time of Day	Class 2 Area		Class 4 Area	
	Planes of Windows of Noise Sensitive Spaces	Outdoor Points of Reception	Planes of Windows of Noise Sensitive Spaces	Outdoor Points of Reception
Daytime (0700-1900h)	50	50	60	55
Evening (1900-2300h)	50	45	60	55
Night (2300-0700h)	45	n/a	55	n/a

The guideline limits for infrequency generator testing are +5 dB higher than the exclusion limits noted in Table 10. 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 and Class 4 Areas – Impulsive Sources (L_{LM}, dBAI)

Time of Day	No. of Impulses in a 1-hour Period	Class 2 Area		Class 4 Area	
		Planes of Windows of Noise Sensitive Spaces	Outdoor Points of Reception	Planes of Windows of Noise Sensitive Spaces	Outdoor Points of Reception
Daytime/Evening (0700-1900h)	9 or more	50	50	60	55
	7 to 8	55	55	65	60
	5 to 6	60	60	70	65
	4	65	65	75	70
	3	70	70	80	75
	2	75	75	85	80
	1	80	80	90	85
Nighttime (2300-0700h)	9 or more	45	n/a	55	n/a
	7 to 8	50	n/a	60	n/a
	5 to 6	55	n/a	65	n/a
	4	60	n/a	70	n/a
	3	65	n/a	75	n/a
	2	70	n/a	80	n/a
	1	75	n/a	85	n/a
Notes: n/a = Not Applicable. Outdoor points of reception are not considered to be noise sensitive during the overnight period. Area classifications are: Class 2 – Sub-urban, Class 4 - Urban Redevelopment					

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:

- Facades of individual residences;
- Individual outdoor amenity areas for residences; and
- Communal outdoor amenity areas of multi-unit mid-rise buildings.

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

6.1.1.3 Proposed Area Classification

As discussed above, under MECP Publication NPC-300 noise guidelines, noise sensitive receptors are defined using area classifications. The receptor areas are classified as either:

- Class 1 – Urban areas;
- Class 2 – Suburban/semi-rural areas;
- Class 3 – Rural areas; and
- Class 4 – Infill/redevelopment areas.

Depending on the receptor area classification, different guideline limits apply. Classes 1, 2 and 3 were included in the predecessor guidelines to NPC-300, namely MECP Publications NPC-205, NPC-232, and LU-131. The Class 4 designation is a designation introduced in NPC-300, intended to allow for infill and redevelopment, whilst still protecting residences from undue noise.

Based on the nature of the area, the Class 2 area limits apply; however, the proposed development meets the definition and requirements for a Class 4 area. It is recommended and appropriate to issue a Class 4 designation for the Project site.

In NPC-300, a Class 4 area is defined as:

> *[…] an area or specific site that would otherwise be defined as Class 1 or 2 and which:*
>
> - *is an area intended for development with new noise sensitive land use(s) that are not yet built;*
> - *is in proximity to existing, lawfully established stationary source(s); and*
> - *has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process.*

Additionally, areas with existing noise sensitive land use(s) cannot be classified as Class 4 areas." Section C4.4.2 of Publication NPC-300 further discusses the use of Class 4 areas:

> *"Class 4 area classification is based on the principle of formal confirmation of the classification by the land use planning authority. Such confirmation would be issued at the discretion of the land use planning authority and under the procedures developed by the land use planning authority, in the exercise of its responsibility and authority under the Planning Act.*
>
> *The following considerations apply to new noise sensitive land uses proposed as a Class 4 area:*
>
> - *an appropriate noise impact assessment should be conducted for the land use planning authority as early as possible in the land use planning process that verifies that the applicable sound level limits will be met;*
> - *noise control measures may be required to ensure the stationary source complies with the applicable sound level limits at the new noise sensitive land use;*
> - *noise control measures may include receptor-based noise control measures and/or source-based noise control measures;*
> - *source based noise control measures may require an MECP approval;*

- *receptor based noise control measures may require agreements for noise mitigation, as described in Part A of this guideline;*
- *prospective purchasers should be informed that this dwelling is located in a Class 4 area through appropriate means and informed of the agreements for noise mitigation. Registration on title of the agreements for noise mitigation is recommended. Additionally, registration on title of an appropriate warning clause to notify purchasers that the applicable Class 4 area sound level limits for this dwelling are protective of indoor areas and are based on the assumption of closed windows, as indicated with an MECP Type F warning clause; and*
- *any final agreements for source-based mitigation as described in Part A of [the] guideline and all other relevant documentation are to be submitted to the MECP by the stationary source owner(s) when applying for an MECP approval. These agreements will be assessed during the review of the application for MECP approvals."*

The proposed development meets the definitions and requirements for a Class 4 area listed in Publication NPC-300:

- the Project site is within an area intended for new residential development, per the Official Plan.
- the Project site is in proximity lawfully established stationary sources that are expected to exist once residential units are occupied.
- an appropriate, detailed noise impact assessment has been conducted as part of the development application (i.e., this assessment and report).

It is therefore appropriate for the City of Thorold to designate the Project site as a Class 4 area under their role as the land use planning authority, in the exercise of its responsibility and authority under the Planning Act.

The City of Thorold has previously designated a property as a Class 4 Area, for the 75 Ormond Street South development project.

In addition, jurisdictions across Southern Ontario have issued Class 4 designations for other similar developments, including but not limited to:

- The Mimico-Judson Secondary Plan area (Judson Street, Newcastle Street, Buckingham Street), in Etobicoke;
- The Lower Yonge Precinct, in Toronto;
- The Stanley Greene District (80 Carl Hall Road), in Toronto;
- The Toronto Port Lands, in Toronto;
- 390 to 440 Dufferin Street, in Toronto;
- 815-845 Eglinton Ave E, in Toronto;
- 23 And 25 Glen Watford Drive , in Toronto;
- Highway 7, east of Keele Street, in Vaughan;
- Milton Meadows Precinct, in Milton;

- West Harbour District, in Hamilton; and
- Masonry Court, east of Waterdown Road, in Burlington.

It is important to note that the Class 4 designation only applies to the Project site. Existing noise-sensitive receptors in the area will remain as Class 1. The designation will not allow for industries to increase their noise impacts at existing noise sensitive land uses.

6.1.1.4 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, industries which have been granted approvals by the MECP or the Ministry of Natural Resources (MNR), such as an ECAs, EASRs or ARA Licenses, are exempt from the By-law provided they comply with the conditions of said approval.

6.1.1.5 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 and Class 4 limits from NPC-300 have been adopted for this study. Further information regarding Class 4 designation justification is provided in the following subsections.

It is assumed that by meeting the requirements of 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 Aggregates Inc. has submitted applications for planning approval and a Class 'A' License Application for a proposed quarry (herein referred to as "Upper's Quarry"), planned for Part of Lots 119, 120, 136 and 137 in the City of Niagara Falls, Region of Niagara. Specifically, applications have 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 latest acoustic assessment prepared in support of the Upper's Quarry applications is entitled "Walker Aggregates Inc. – Upper's Quarry: Acoustic Assessment Report", dated January 11, 2024 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 3, approximately 285 m east of the proposed development at the Project site.

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 of the Project site 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.

Engagement with Walker Aggregates Inc.

Parkbridge has been engaged in without prejudice and confidential OLT-led mediation with Walker Aggregates Inc. since September 2025. Mediation remains ongoing as of the date of this report.

The focus of mediation proceedings has been land use compatibility between Upper's Quarry and the proposed development, with an emphasis on potential noise impacts. As the proceedings are confidential and the proceedings are ongoing, information presented in this report does not include privileged information that would otherwise be unavailable. Publicly available information has been used to inform this assessment and conclusions. This assessment considers the scenarios included in the RWDI Quarry Noise Report, as this report is expected to contain the most conservative assumptions and scenarios with respect to potential off-site noise impacts. If the applicable noise guideline limits are met for these scenarios, they will be met for all other operations at the proposed quarry.

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 on the Project site. A detailed quantitative noise assessment of Rankin Asphalt was therefore 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 as Employment – Light Industrial. The lands further north and south, along the west side of Thorold Townline Road, are designated as Employment – Prestige Industrial. All such 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 modelling 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 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 April 2024, which contained information related to quarry phasing, sources of noise, sequencing of operations, and topographic elevation details.

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, and explanations of predictable worst-case operating scenarios.

SLR understands that the proposed Upper's Quarry applications are currently under review and not yet approved. Nonetheless, details in the publicly available RWDI Quarry Noise Report were used as the basis for this detailed noise assessment.

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 Sinking Cut. It was conservatively assumed that AP sources would be operational starting in Phase 2A Sinking Cut.
- 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 nighttime hour during all quarry phases when the asphalt plant is operational.

6.1.4.3 Operating Scenarios – Proposed Upper's Quarry

Operating scenarios for presentation in 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) with the Asphalt Plant (AP) operational;
- 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 during sinking cuts, and are 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, with operations one bench cut below grade or lower, thereby benefitting from shielding offered by the berm and/or working face of the quarry. This is supported by sound level contours shown in Appendix D – Alternate Extraction Scenarios in the RWDI Quarry Noise Report.

Phases after Phase 3A are expected to have sources operating in locations further east. Additionally, for Phases 4 and 5, secondary/tertiary processing plant sources are 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 within the quarry.

The four ‘continuous source phases’ discussed above are therefore representative of potential worst-case operations with respect to the proposed Upper’s Lane 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 (1996) 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 each operating scenario with respect to the proposed Upper's Lane residential development. Note, modelling considered addition of the Asphalt Plant operations to Phase 2A Sinking Cut.

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: Model Validation Sound Level Predictions – Proposed Upper's Quarry

Scenario	POR[1]	RWDI Quarry Noise Report Sound Levels (L_{eq}(1-hr), dBA) [1]			SLR Predicted Quarry Sound Levels (L_{eq}(1-hr), 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 1A 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. "f" indicates façade point of reception, and "o" an outdoor point of reception (e.g., amenity area).
[2] Limits do not apply during night-time hours at outdoor PORs.

A comparison of daytime-hour 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 levels are generally within 1 dB of those presented in the RWDI Quarry Noise Report. Furthermore, predicted sound level contours to the west in the direction of the Upper's Lane residential development also show reasonable agreement. Therefore, the model was used to predict sound levels of quarry operations at the proposed Upper's Lane residential development for this assessment.

6.1.5.2 Predicted Sound Levels – Upper's Quarry at Proposed Development

Predicted sound levels for select PORs within the proposed Upper's Lane residential development are presented in the following subsection for the five worst-case scenarios discussed in Section 6.1.4.3.

The selected PORs for all blocks (except for the mid-rise block) were placed at third-floor window height, 7.5 m above grade, representing dwelling façade locations based on the proposed Draft Plan of Subdivision and accompanying Demonstration Plan (refer to Appendix A). For the mid-rise block (Block 41), the assessment point represents a 10th-storey window height at the east side of a theoretical building location.

Upper-floor facade receptors at the proposed Upper's Lane residential development were predicted to be worst-case compared to 1.5 m high outdoor POR during daytime operating scenarios. 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 and Demonstration Plan.

A sample calculation output from Cadna/A is provided for reference in Appendix H**,** for the Phase 1A South Sinking Cut scenario at Block 22.

Phase 1A Sinking Cut

Predicted sound levels from the Phase 1A Sinking Cut operations are presented in Table 13 for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 7.5 m above grade) are shown in Figure 7a (daytime) and Figure 7b (evening/night-time).

Table 13: Predicted Upper's Quarry Sound Levels – Phase 1A Sinking Cut

POR ID[1]	Predicted Quarry Sound Levels (L_{eq}(1-hr), dBA)			Applicable Sound Level Limit (L_{eq}(1-hr), dBA)						Compliance with Limit? Day / Eve / Night (Yes/No)	
				Class 1			Class 4				
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Class 1	Class 4
Block33	48	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_NE	49	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE	50	33	33	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE2	49	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_S	49	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_NE	46	30	30	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E	47	30	30	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E2	47	30	30	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_S	48	31	31	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot14	**51**	34	34	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Lot17	**51**	36	36	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block18	**51**	35	35	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block20	**51**	34	34	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block23	49	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block22	50	34	34	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block25	50	33	33	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block26	50	35	35	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block39_E	50	33	33	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block40_NE	50	33	33	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block41_SE	**53**	36	36	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y

Notes: [1] Selected PORs representing possible 3rd-storey planes of windows within the proposed Upper's Quarry residential development. For Block 41, POR represents 10th-storey plane of window.

Sound levels are predicted to exceed Class 2 daytime sound level limits by up to 3 dB in the southern portion of the proposed development, but meet Class 4 limits at all locations (i.e., 7 dB or more below the daytime limit). During the evening and night-time period, sound levels are predicted to be below Class 2 and Class 4 limits at all locations within the proposed development.

Mitigation measures were investigated due to predicted excesses of Class 2 limits during daytime hours during Phase 1A Sinking Cut quarry operations. Refer to Section 6.1.6.

Phase 1A South Sinking Cut

Predicted sound levels from the Phase 1A South Sinking Cut operations are presented in Table 14 for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 7.5 m) are shown in Figure 8a (daytime) and Figure 8b (evening/night-time).

Table 14: Predicted Upper's Quarry Sound Levels – Phase 1A South Sinking Cut

POR ID[1]	Predicted Quarry Sound Levels (L_{eq}(1-hr), dBA)			Applicable Sound Level Limit (L_{eq}(1-hr), dBA)						Compliance with Limit? Day / Eve / Night (Yes/No)	
				Class 1			Class 4				
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Class 1	Class 4
Block33	46	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_NE	46	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE	48	33	33	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE2	47	33	33	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_S	47	32	32	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_NE	44	29	29	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E	44	30	30	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E2	44	30	30	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_S	45	31	31	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot14	**52**	35	35	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Lot17	**53**	36	36	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block18	**53**	36	36	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block20	**53**	35	35	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block23	**53**	35	35	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block22	**54**	38	38	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block25	**52**	34	34	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block26	**52**	35	35	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block39_E	**51**	34	34	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block40_NE	**52**	35	35	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block41_SE	**56**	37	37	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y

Notes: [1] Selected PORs representing possible 3rd-storey planes of windows within the proposed Upper's Quarry residential development. For Block 41, POR represents 10th-storey plane of window.

Sound levels are predicted to exceed Class 2 daytime sound level limits by up to 6 dB in the southern portion of the proposed development, but meet Class 4 limits at all locations (i.e., 4 dB or more below the daytime limit). During the evening and night-time period, sound levels are predicted to be below Class 2 and Class 4 limits at all locations within the proposed development.

Mitigation measures were investigated due to predicted excesses of Class 2 limits during daytime hours during Phase 1A South Sinking Cut quarry operations. Refer to Section 6.1.6.

Phase 2A Sinking Cut

Predicted sound levels from Phase 2A Sinking Cut operations are presented in Table 15 for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 7.5 m) are shown in Figure 9a (daytime) and Figure 9b (evening/night-time).

Table 15: Predicted Upper's Quarry Sound Levels – Phase 2A Sinking Cut

POR ID[1]	Predicted Quarry Sound Levels (L_{eq}(1-hr), dBA)			Applicable Sound Level Limit (L_{eq}(1-hr), dBA)						Compliance with Limit? Day / Eve / Night (Yes/No)	
				Class 1			Class 4				
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Class 1	Class 4
Block33	**51**	40	40	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block34_NE	**51**	40	40	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block34_SE	**52**	41	41	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block34_SE2	**51**	40	40	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block34_S	**51**	40	40	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block35_NE	49	38	38	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E	50	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E2	49	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_S	50	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot14	50	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot17	**51**	43	43	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block18	**52**	43	43	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block20	**51**	42	42	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block23	48	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block22	48	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block25	50	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block26	50	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block39_E	50	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block40_NE	**51**	42	42	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y
Block41_SE	**52**	41	41	50	50	45	60	60	55	**N** / Y / Y	Y / Y / Y

Notes: [1] Selected PORs representing possible 3rd-storey planes of windows within the proposed Upper's Quarry residential development. For Block 41, POR represents 10th-storey plane of window.

Sound levels are predicted to exceed Class 2 daytime sound level limits by up to 2 dB in both the southern and northern portion of the proposed development, but meet Class 4 limits at all

locations (i.e., 8 dB or more below the daytime limit). During the evening and night-time period, sound levels are predicted to be below Class 2 and Class 4 limits at all locations within the proposed development.

Mitigation measures were investigated due to predicted excesses of Class 2 limits during daytime hours during Phase 2A Sinking Cut quarry operations. Refer to Section 6.1.6.

Phase 3A Operations

Predicted sound levels from the Phase 3A Extraction operations are presented in Table 16 for daytime, evening and night-time hours at select PORs. Predicted sound level contours (h = 7.5 m) are shown in Figure 10a (daytime) and Figure 10b (evening/night-time).

Table 16: Predicted Upper's Quarry Sound Levels – Phase 3A Extraction Operations

POR ID[1]	Predicted Quarry Sound Levels (L_{eq}(1-hr), dBA)			Applicable Sound Level Limit (L_{eq}(1-hr), dBA)						Compliance with Limit? Day / Eve / Night (Yes/No)	
				Class 1			Class 4				
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Class 1	Class 4
Block33	43	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_NE	43	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE	47	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE2	43	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_S	47	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_NE	42	37	37	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E	42	38	38	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E2	42	38	38	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_S	43	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot14	46	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot17	46	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block18	46	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block20	46	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block23	45	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block22	45	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block25	45	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block26	46	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block39_E	45	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block40_NE	45	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block41_SE	48	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y

Notes: [1] Selected PORs representing possible 3rd-storey planes of windows within the proposed Upper's Quarry residential development. For Block 41, POR represents 10th-storey plane of window.

Sound levels during Phase 3A Extraction operations are predicted to meet Class 2 and Class 4 sound level limits during daytime, evening and night-time hours at all proposed development locations.

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 = 7.5 m) are shown in Figure 11 (daytime/evening/night-time).

Table 17: Predicted Upper's Quarry Sound Levels – Impulse Noise

POR ID[1]	Predicted Quarry Sound Levels (L_{LM}, dBAI)			Applicable Sound Level Limit (L_{LM}, dBAI)						Compliance with Limit? Day / Eve / Night (Yes/No)	
				Class 1			Class 4				
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Class 1	Class 4
Block33	40	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_NE	40	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE	40	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_SE2	40	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block34_S	40	40	40	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_NE	38	38	38	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E	38	38	38	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_E2	38	38	38	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block35_S	39	39	39	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot14	42	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Lot17	43	43	43	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block18	43	43	43	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block20	42	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block23	41	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block22	41	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block25	41	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block26	42	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block39_E	41	41	41	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block40_NE	42	42	42	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y
Block41_SE	45	45	45	50	50	45	60	60	55	Y / Y / Y	Y / Y / Y

Notes: [1] Selected PORs representing possible 3rd-storey planes of windows within the proposed Upper's Quarry residential development. For Block 41, POR represents 10th-storey plane of window.

Sound levels due to impulse noise are predicted to meet Class 2 and Class 4 sound level limits during daytime, evening and night-time hours at all proposed development locations.

Summary of Results

Excesses above Class 2 daytime sound level limits are predicted for the following proposed Upper's Quarry scenarios:

- Phase 1A Sinking Cut;
- Phase 1A South Sinking Cut; and
- Phase 2A Sinking Cut.

When assessed against Class 4 limits, predicted sound levels within the proposed development are below daytime, evening and night-time limits during all time periods and during all Phases of proposed Upper's Quarry operations.

Discussion of mitigation recommendations is provided in the following section.

6.1.6 Mitigation Recommendations

Due to predicted excesses of Class 2 daytime sound level limits during daytime hours in the Phase 1A Sinking Cut, Phase 1A South Sinking Cut, and Phase 2A Sinking Cut operating scenarios, potential at-source and at-receptor mitigation measures were investigated, as discussed in the following sub-sections. The discussion below also includes justification for designating the Project site a Class 4 Area per NPC-300, under which higher guideline limits apply.

6.1.6.1 At-Source Mitigation

The use of at-source noise mitigation is generally the preferred approach when such mitigation is feasible from a technical, economic and administrative perspective. At-source mitigation also requires the cooperation of all parties including the proponent of the proposed development, and the owner/operator of the facility/industry where the source is located.

Parkbridge first attempted to engage Walker Aggregates Inc. in April 2023 to request information related to the proposed Upper's Quarry. Since September 2025, Parkbridge has been engaged in without prejudice and confidential OLT-led mediation regarding noise related matters of compatibility between the proposed Upper's Quarry and the proposed Upper's Lane development. As of the date of this report, negotiations remain ongoing.

At-source mitigation at the proposed quarry would involve using permanent or portable noise barriers near the crushers and other equipment. Thus, any at-source mitigation would result in some costs and operational obligations for Walker to bear.

Despite extensive discussions, the feasibility of implementing at-source mitigation in the form of temporary barriers cannot be confirmed at this time. Therefore, at-source mitigation is not considered feasible.

6.1.6.2 At-Receptor Mitigation – Class 2 Areas

In general, under a Class 2 Area designation, extensive receptor-based noise mitigation measures are not permitted under NPC-300 for new proposed residential land uses. This

section includes a discussion of the allowable at-receptor mitigation measures that may be used to address Class 1 guideline limit excesses (i.e., those permitted without Class 4 designation).

1 Inclusion of Air Conditioning and Sealed (Inoperable) Windows

Under the Publication NPC-300 noise guidelines, air conditioning by itself is not considered to be a noise control measure for stationary noise. Similarly, sealed (inoperable) windows are not allowed as a noise control measure for residential units, and are only permitted as a noise control option for commercial and institutional uses under prescribed circumstances. Therefore, this option on its own is not considered appropriate or feasible for the proposed development.

2 Implementation of Blank Facades or Single Loaded Corridors

“Blank facades” are facades which either contain no windows, or which do not contain windows openable to noise sensitive spaces. For high-rise buildings, this could be a “single-loaded corridor” building design, with the corridor facing the noise source. Such buildings may be less cost-effective and may not meet the urban design objectives/guidelines for municipalities.

This approach is also not feasible for low-density dwellings such as those proposed for a majority of the Project site. Blank facades are therefore not a feasible or practical solution.

3 Use of Acoustic Barriers

Acoustic barriers are an acceptable noise control measure for outdoor amenity areas and private terraces, when required, but are not a feasible noise control option for protecting facades of multi-storey buildings.

The feasibility of earthen berms (or berm/barrier combinations) was investigated for the Project site and presented in the initial SLR Report dated February 7, 2024 and included the following:

- South Portion of Site, eastern edge – Berm 6 m high; and
- North Portion of Site, eastern edge – Berm 5 m high.

After further analysis by Parkbridge, and considering the new proposed built form of the Project site, the at-receptor mitigation is not considered feasible for the following reasons:

- Technically infeasible – with the proposed mid-rise Block 41, a berm/barrier of sufficient height is not feasible to protect windows up to the 10th-storey window.
- Administratively and economically infeasible – the timing of the berm/barrier removal would be tied to Upper’s Quarry operations and completions of specific Phases. Due to uncertainty and potential variability in timing of these operations and completions, there would be no certainty for coordinating earthen berm removal, construction, and ultimately sale of units. The costs of providing services to lands which would effectively be unsaleable for such an extended period would also drive the costs of the remaining units in the development higher. Parkbridge has indicated that from both an administrative and economic perspective, this is not feasible.

At-receptor mitigation is not feasible under a Class 2 designation for the Project site.

6.1.6.3 Class 4 Designation for the Project Site

A Class 4 Area designation is therefore recommended for the Project site, providing potential benefit both with respect to the proposed Upper’s Lane residential development, and protecting future operations of the proposed Upper’s Quarry.

By designating the Project site as a Class 4 area, there would be no need for potential at-source mitigation at the proposed Upper's Quarry. Thus, there would be no additional costs or burdens placed on the proposed quarry.

Of note, the maximum predicted sound levels at the development, which occur during the sinking cuts, are only 53 to 56 dBA. For normal operations with the crushers located below grade, the Class 2 limits of 50 dBA would be met.

Furthermore, as noted in Section 6.1.3.5, lands east of the Project site are designated as Employment – Light Industrial and Employment – Prestige Industrial under the Official Plan, and the lands are zoned Future Development. Class 4 designation of the Project site would provide additional benefit and flexibility for development of those Employment land use blocks in the future.

The following measures are therefore recommended for the proposed development with respect to stationary noise.

- A Class 4 Area designation should be requested, and it is recommended that the City of Thorold apply the Class 4 Area designation to the Project site.
- With Class 4 Area designation, residential units will require central air conditioning, along with an MECP Type F warning clause, to notify occupants that there may be times when outdoor noise levels will require windows to remain closed.
- An MECP Type E warning clauses is recommended for all residential units, to inform occupants of the proximity of the proposed development to surrounding commercial and industrial facilities including the proposed Upper's Quarry.
- If Class 4 designation is provided for the Project site, Walker Aggregates Inc. should be provided with a copy of the approved environmental noise assessment and formal confirmation of the area classification from the land use planning authority (City of Thorold).

See Appendix E for warning clause details. The warning clauses should be included in documents registered on Title and included in all agreements of purchase and sale or lease and all rental agreements.

With a Class 4 designation and restriction to the proposed building heights within the Project site, the proposed Upper's Lane development should not preclude or hinder future aggregate extraction at the proposed Upper's Quarry. The proposed development is feasible and can be compatible with the surroundings, including the proposed Upper's Quarry, in accordance with Section B1.8.12.3 Aggregate Resource Protection Policies of the City of Thorold Official Plan.

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 1,000 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 Requirements

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 2046 (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 Quarry Noise Report), across a 16-hour daytime and 8-hour night-time period, were added as heavy trucks to the future year 2046 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. Daytime/night-time 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 2046 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 2046 at an annual growth rate of 2.0% per year. Daytime/night-time 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	Nighttime	% Medium Trucks	% Heavy Trucks	
Thorold Townline Road	7,752	88	12	4.1	20.8	80
Davis Road – South of Ontario 7186	9,132	90	10	5.0	8.0	80
Upper's Lane	5,600	90	10	4.7	0.7	40
Barker Parkway	4,663	90	10	5.6	0.0	40
Notes: [1] Future Year 2046 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.

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 7.5 m above grade, representing potential worst-case 3rd-storey bedrooms windows, except for Block 41, where sound levels were predicted at a height of 28.5 m above grade (representing a 10th-storey plane of window). 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 and building footprints 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 12 (daytime) and Figure 13 (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 Transportation Façade Sound Levels

Assessment Location	Facade	Roadways	Maximum Predicted Road Traffic Sound Levels	
			L_{eq} Daytime (dBA)	L_{eq} Night-time (dBA)
Block 22 – South	East	Upper's Lane, Thorold Townline Road	56	50
	South		57	51
Block 23 – Southeast	East	Upper's Lane, Thorold Townline Road	56	50
	South		57	51
Block 41 – Southwest	West	Upper's Lane, Barker Parkway	54	47
	South		57	50
Block 41 – Southeast	East	Upper's Lane Thorold Townline Road	60	56
	South		60	54
Block 35 – Northeast	East	Thorold Townline Road	53	48
	South		50	45
Block 37 – Northwest	North	Davis Road – South	56	49
	West		53	46
Lot 6	West	Davis Road, Barker Parkway	49	42
	South		43	36
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 OLA Sound Levels

Predicted outdoor sound levels due to road traffic are presented in Table 24 and Figure 14 for select worst-case locations throughout the proposed development. It was assumed that all dwellings could have a rear-yard outdoor living area (OLA).

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

Project Location	Roadways	Maximum Predicted Road Traffic Sound Levels
		L_{eq} Daytime (dBA)
Block 22 – South	Upper's Lane, Thorold Townline Road	55
Block 23 – Southeast	Upper's Lane, Thorold Townline Road	57
Block 37 – Northwest	Davis Road	51
Block 35 – Northeast	Thorold Townline Road	50
Lot 6	Davis Road, Barker Parkway	46

The highest daytime sound level of 57 dBA is predicted at dwellings in Block 23, backing towards Upper's Lane at the south end of the proposed development. 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.

If a rooftop or other amenity terrace is included as part of the design of Block 41 in the future, based on predicted façade sound levels, it is anticipated that OLA sound levels will be below 60 dBA. This should be assessed at the time, once detailed building plans are available.

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 would be

recommended for Block 41, Block 22, Block 23, and Block 37. However, with Class 4 designation applied to the Project site, central air conditioning and an MECP Type F warning clause would be provided for all residential units. This would address the provision for adding central air conditioning at a later date and Type C warning clause requirement.

As road traffic sound levels are predicted to exceed 55 dBA within Block 23, an MECP Type A warning clause is recommended for residential units within he Block.

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, and review of recent aerial imagery as of February 2026, 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 April 2024 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.

6.3.3.1 Sensitive Receptors

The closest distance from the proposed development on the Project site to the proposed Upper's Quarry is approximately 285 m. The Explotech Blast Impact Analysis considered the following receptors that are located at similar or closer distances to the Upper's Quarry than the proposed Upper's Lane residential development, as outlined below in Table 25.

Table 25: Summary of Sensitive Receptors in Blast Analysis

Sensitive Receptor Address	Distance to Receptor from License Boundary
9582 Beaverdams Road	151 m
10148 Beaverdams Road	184 m
5329 Beechwood Road	63 m
5584 Beechwood Road	81 m
9457 Madison Crescent	260 m
5599 Osprey Avenue	251 m
5607 Osprey Avenue	259 m

The receptors in Table 25 are shown in Figure 15 along with the Project site, to show the relative comparison of distances. Several other receptors are also located at very similar setback distances to the proposed Upper's Quarry License Boundary (i.e., 260 m to 300 m away). The blast vibration and overpressure limits for sensitive receptors, including the proposed Upper's Lane development are as follows:

- 12.5 mm/s peak vector sum (vibration); and
- 128 dBL (peak sound pressure level).

Other locations/structures that require consideration with respect to blast design are also located in proximity to the proposed Upper's Quarry, such as a utility building, hydro corridor, a natural gas pipeline and active spawning bed, for which other limits apply (e.g., 13 mm/s maximum vibration intensity for active spawning beds).

6.3.3.2 Blasting Analysis Findings

The Explotech Blast Impact Analysis provided guidance on maximum explosive load per delay based on various separation distances, as noted in Table 26.

Table 26: Maximum Blast Loads per Delay to Meet 12.5 mm/s Limit at Various Distances

Separation Distance between Sensitive Receptor and Closest Borehole (m)	Maximum Recommended Explosive Load per Delay (kg)
500	290
450	235
400	185
350	140
300	105
250	70
200	45
150	25
100	11

As the proposed Upper's Lane development is located 285 m or more from the Upper's Quarry license boundary, and even further from a potential borehole, it is possible to meet the 12.5 mm/s vibration limit based on the separation distance and maximum recommended explosive load per delay as noted in Table 26. The Explotech Blast Impact Analysis also provides commentary on achieving applicable overpressure limits (128 dBL), and limits applied to the nearby pipeline infrastructure and spawning beds.

6.3.3.3 Blasting Recommendations and Conclusions

Explotech recommended that an attenuation study be undertaken for the Upper's Quarry to inform appropriate blast design to meet applicable limits. Blasting will also be monitored for both ground vibrations and overpressure at the closest privately owned sensitive receptors to the site (or closer).

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. This conclusion applies to vibration sensitive receptors significantly closer to the Upper's Quarry than the proposed Upper's Lane residential development. Blasting can also be carried out to meet other applicable limits for closer intervening structures between the blast locations and 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 on the Project site is located even 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.
    - A Class 4 Area designation is recommended for the Project site.
    - With a Class 4 Area designation, all residential units will require an MECP Type F warning clause, and central air conditioning must be provided.
    - An MECP Type E warning clause is recommended for all residential dwellings within the Aggregate Impact Area.

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, although some are addressed through warning clauses related to stationary source noise.
- 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.

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, blasts can be designed to meet the applicable limits at existing closer residences, and at the proposed development. Therefore, 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, MECP Publication NPC-300 and the City of Thorold Noise By-Law requirements met with respect to noise/vibration with the following measures applied:

- Class 4 designation for the Project site;
- Central air conditioning provided for all residential units; and
- Appropriate warning clauses in agreements registered on title for residential units, in all agreements of purchase and sale or lease, and all rental agreements.

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.

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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The Corporation of the City of Thorold, By-Law No. 37-2014.

Figures

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

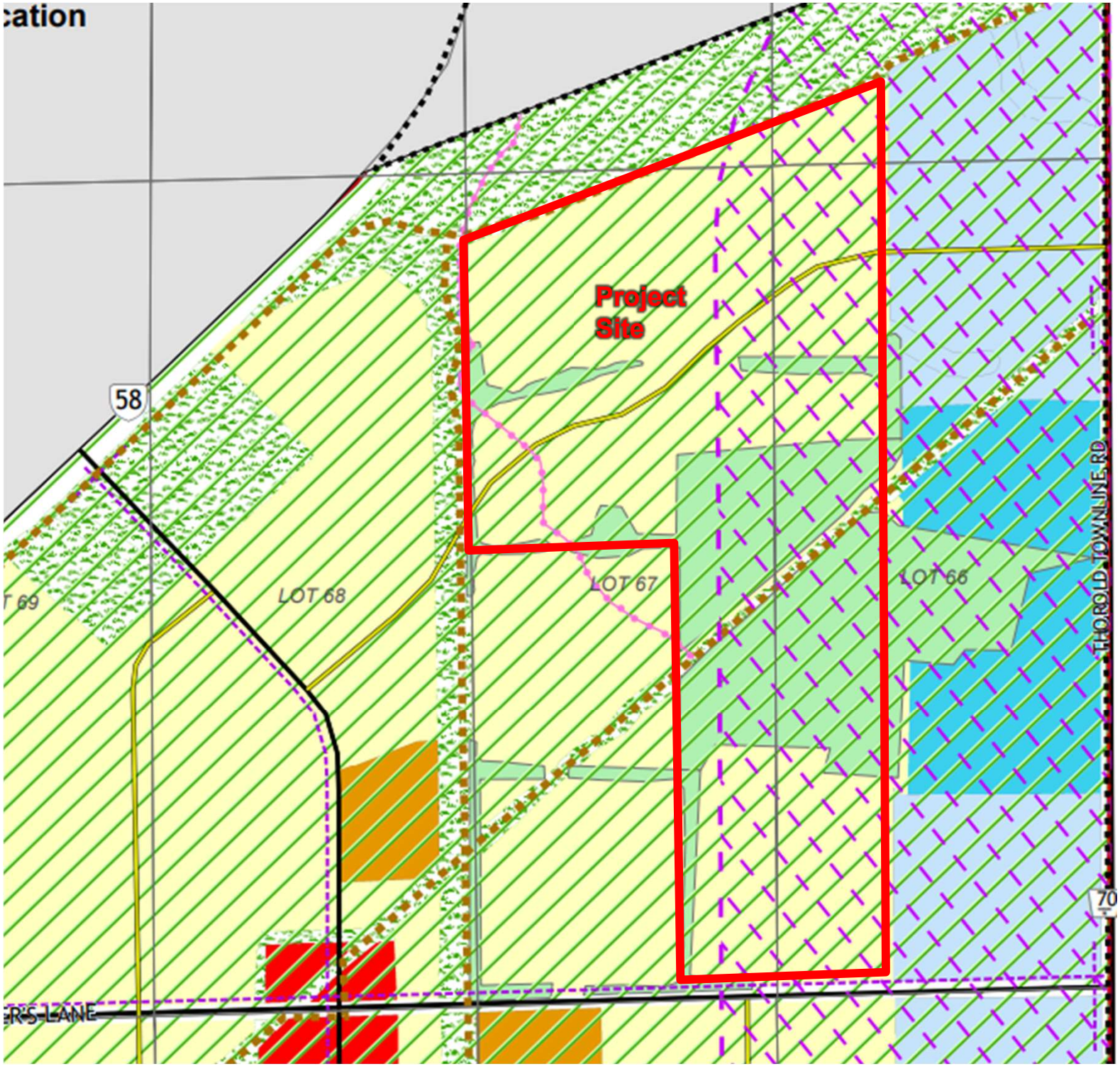
Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)	True North	Scale: 1:12,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO		Date: Apr. 27, 2026 Rev. 1	Figure No. **1**	
SITE AND CONTEXT PLAN		Project No.: 241.030826.00001		



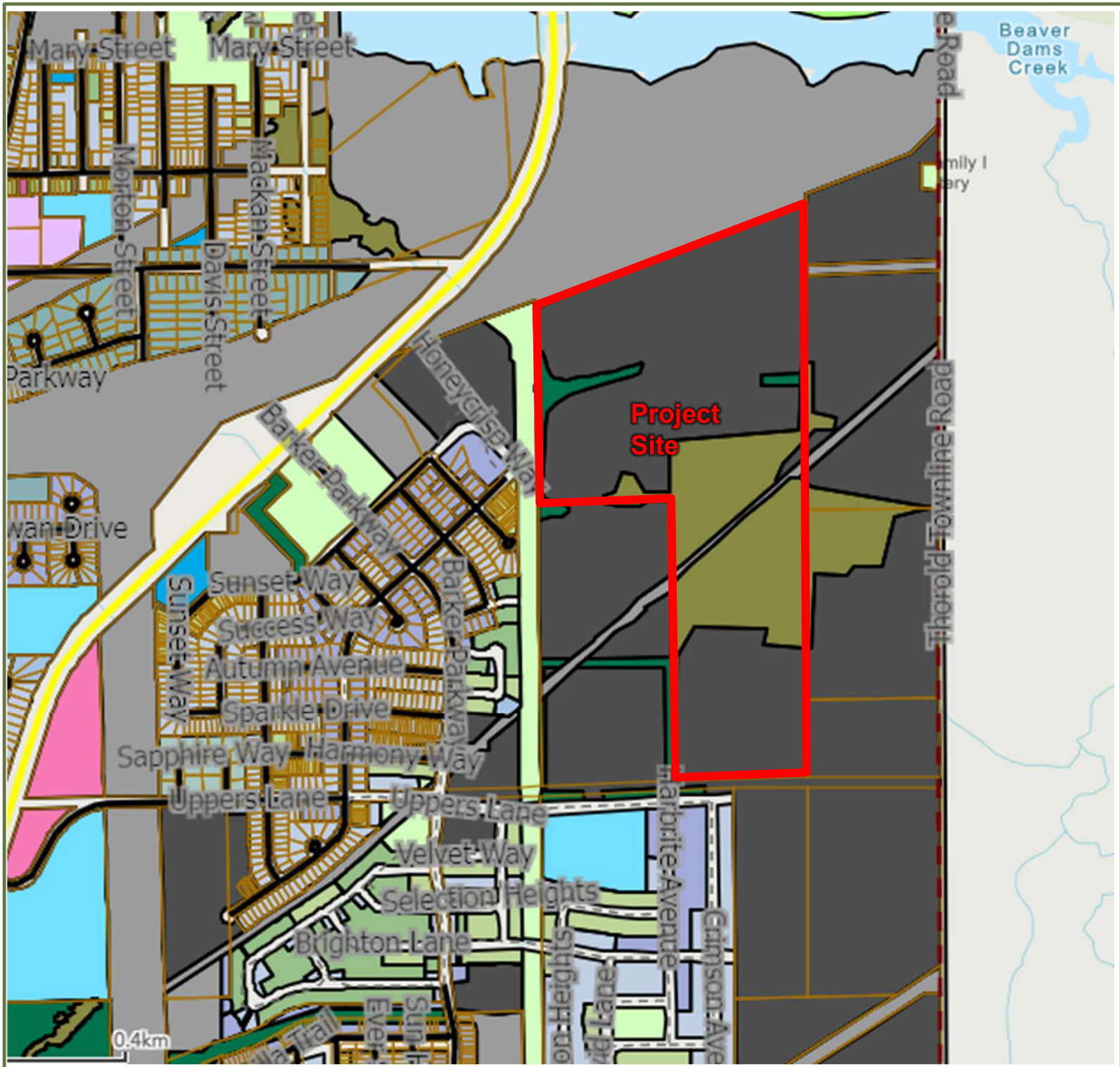
PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

CITY OF THOROLD OFFICIAL PLAN MAP

Scale:	N/A		METRES
Date: Apr. 27, 2026	Rev. 1		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 INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

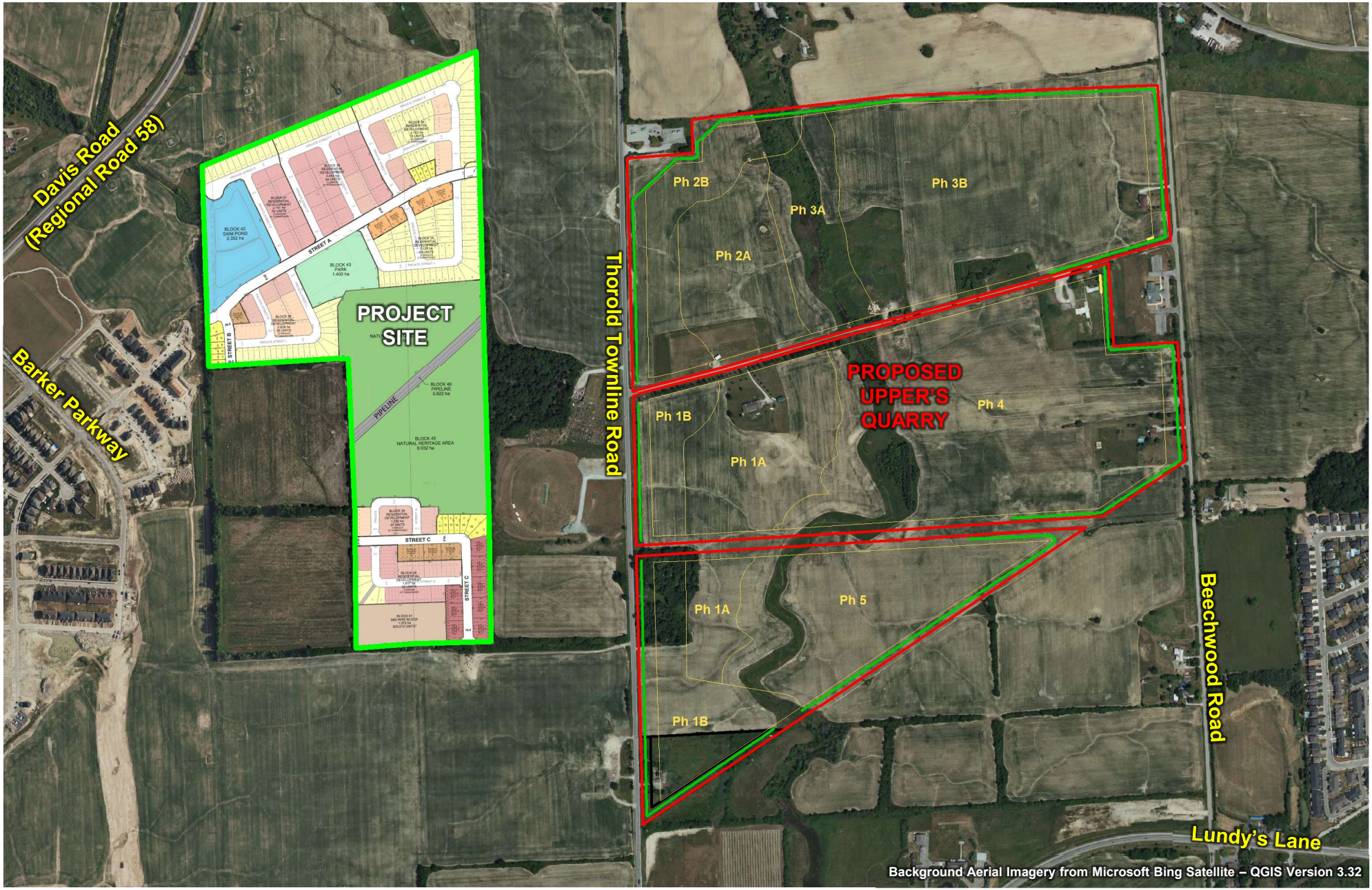
UPPER'S LANE, THOROLD, ONTARIO

AREA ZONING MAP

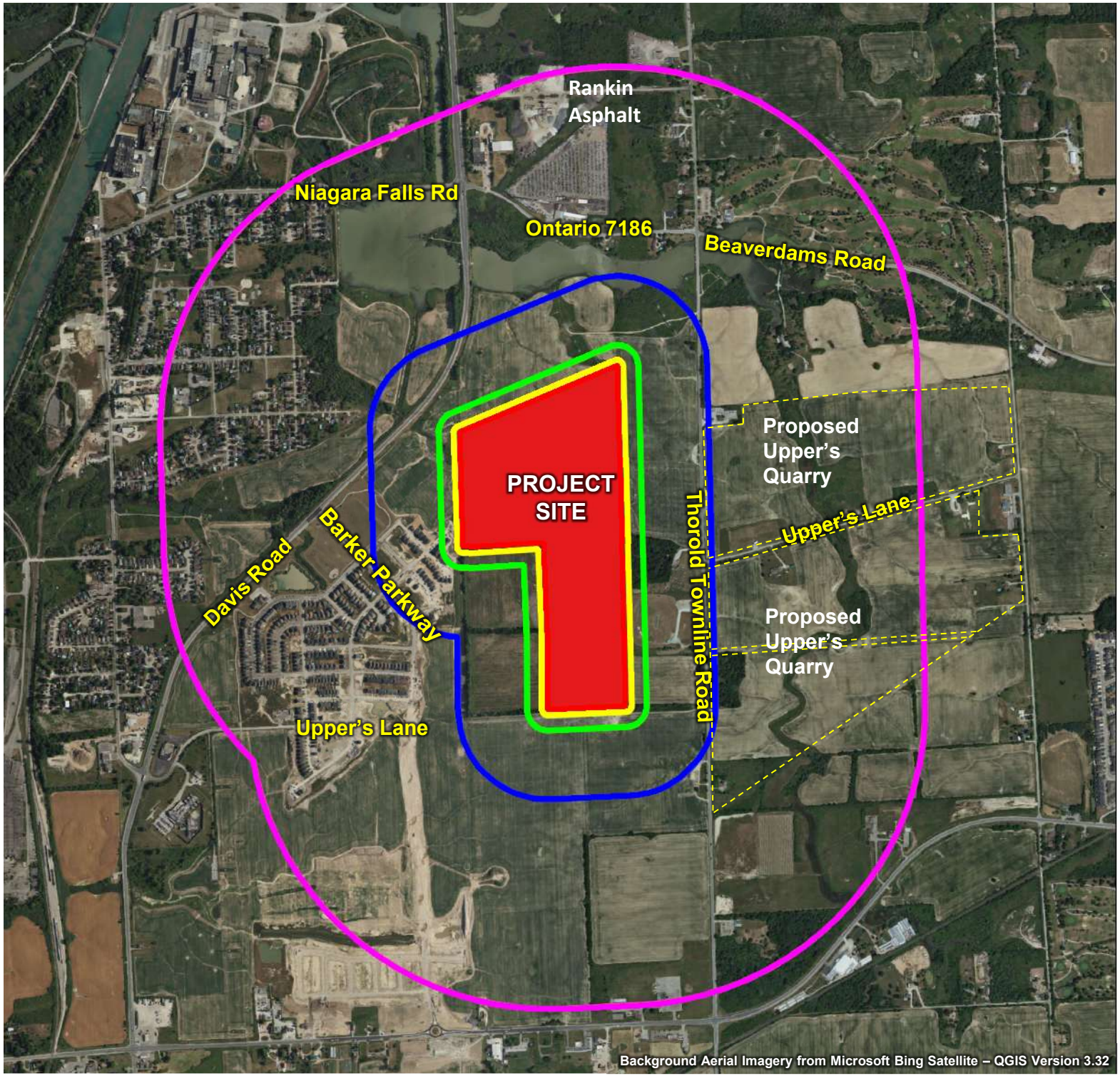
SOURCE: https://www.thorold.ca/en/city-hall/comprehensive-zoning-by-law.aspx

Scale:	N/A	METRES	
Date: Apr. 27, 2026	Rev. 1	Figure No. **2b**	
Project No.: 241.030826.00001			

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)	True North	Scale: 1:10,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO		Date: Apr. 27, 2026 Rev. 1	Figure No. **3**	
LOCATION OF PROPOSED UPPER'S QUARRY		Project No.: 241.030826.00001		



Facility with MECP Permit (ECA/EASR)

20 m

70 m

300 m

1000 m

True North

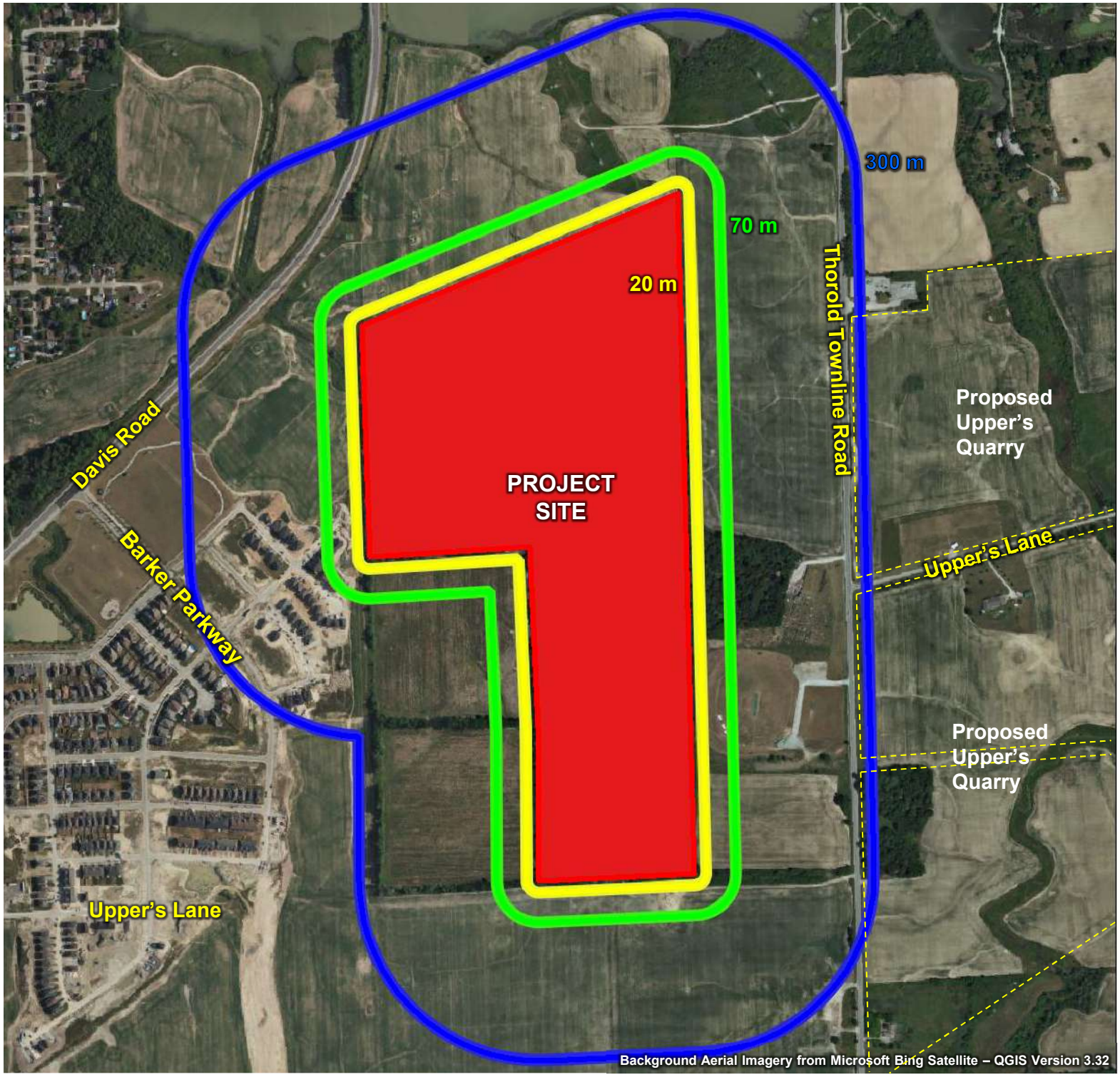
PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

GUIDELINE D-6 SEPARATION DISTANCES TO 1000 METRES

Scale:	1:18,000		METRES
Date: Apr. 27, 2026		Rev. 1	Figure No. **4a**
Project No.: 241.030826.00001			

SLR



Facility with MECP Permit (ECA/EASR)

20 m

70 m

300 m

True North

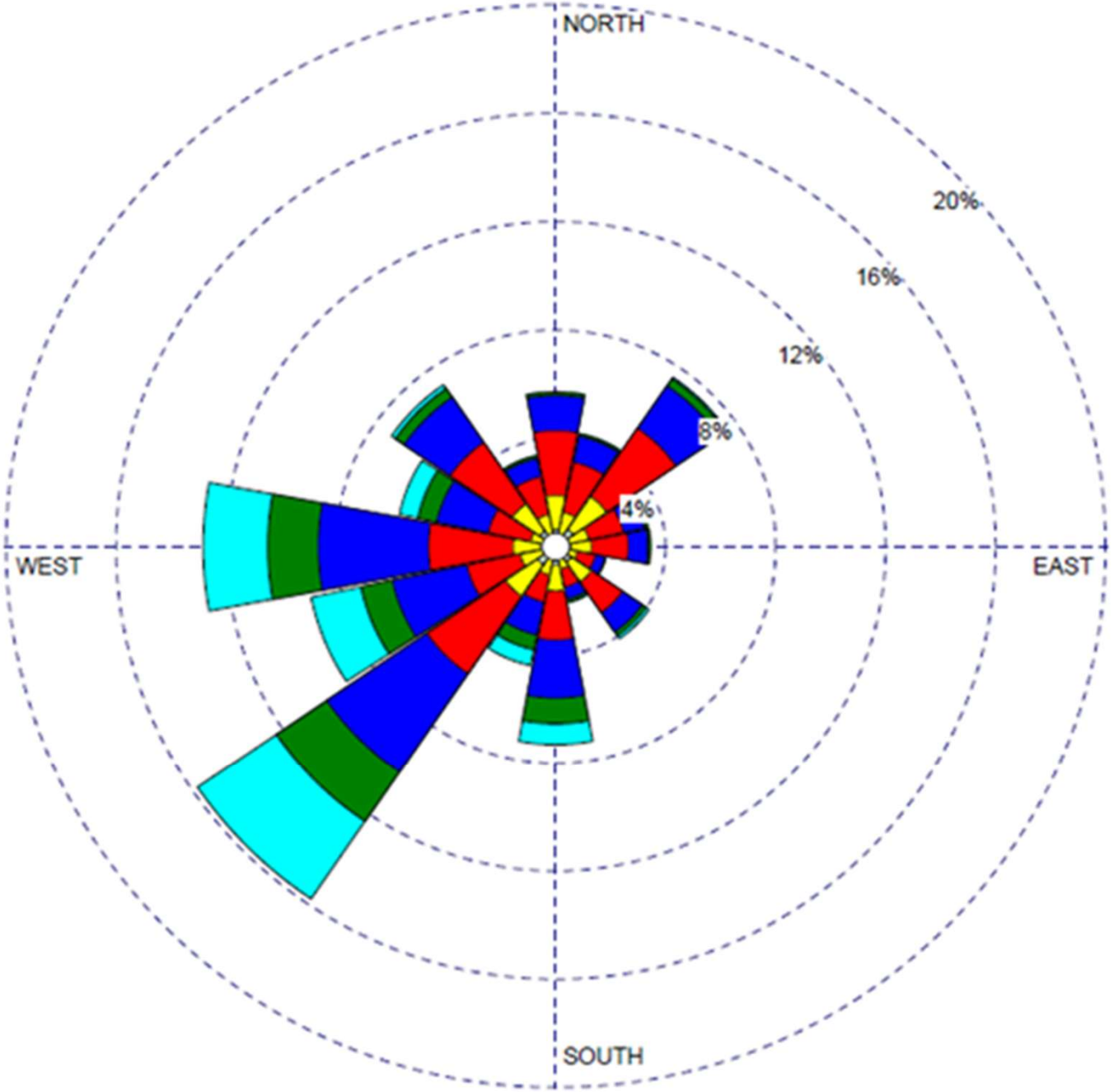
PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

GUIDELINE D-6 SEPARATION DISTANCES TO 300 METRES

Scale:	1:9,000		METRES
Date: Apr. 27, 2026		Rev. 1	Figure No. **4b**
Project No.: 241.030826.00001			

SLR



(Knots)

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

True North

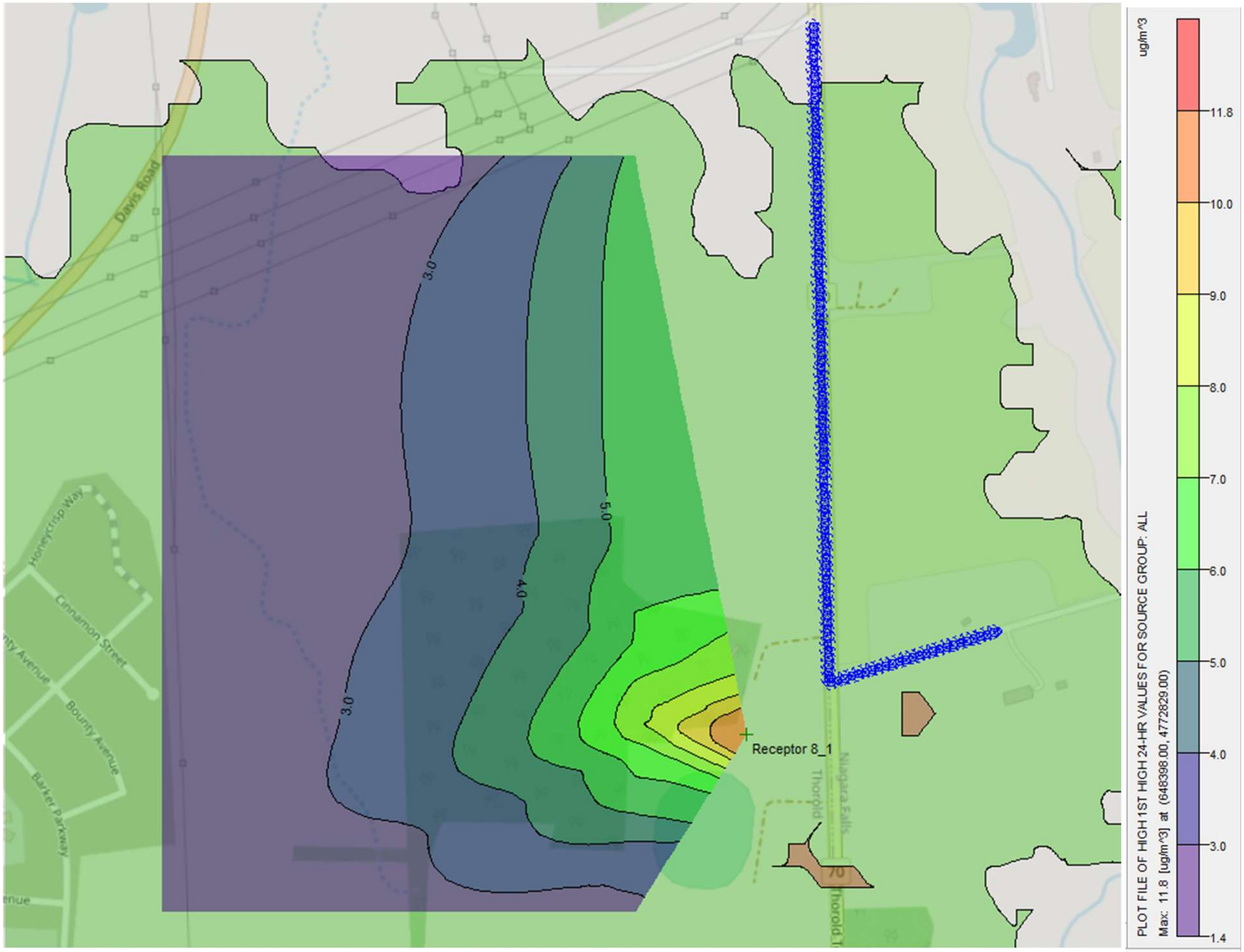
PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

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

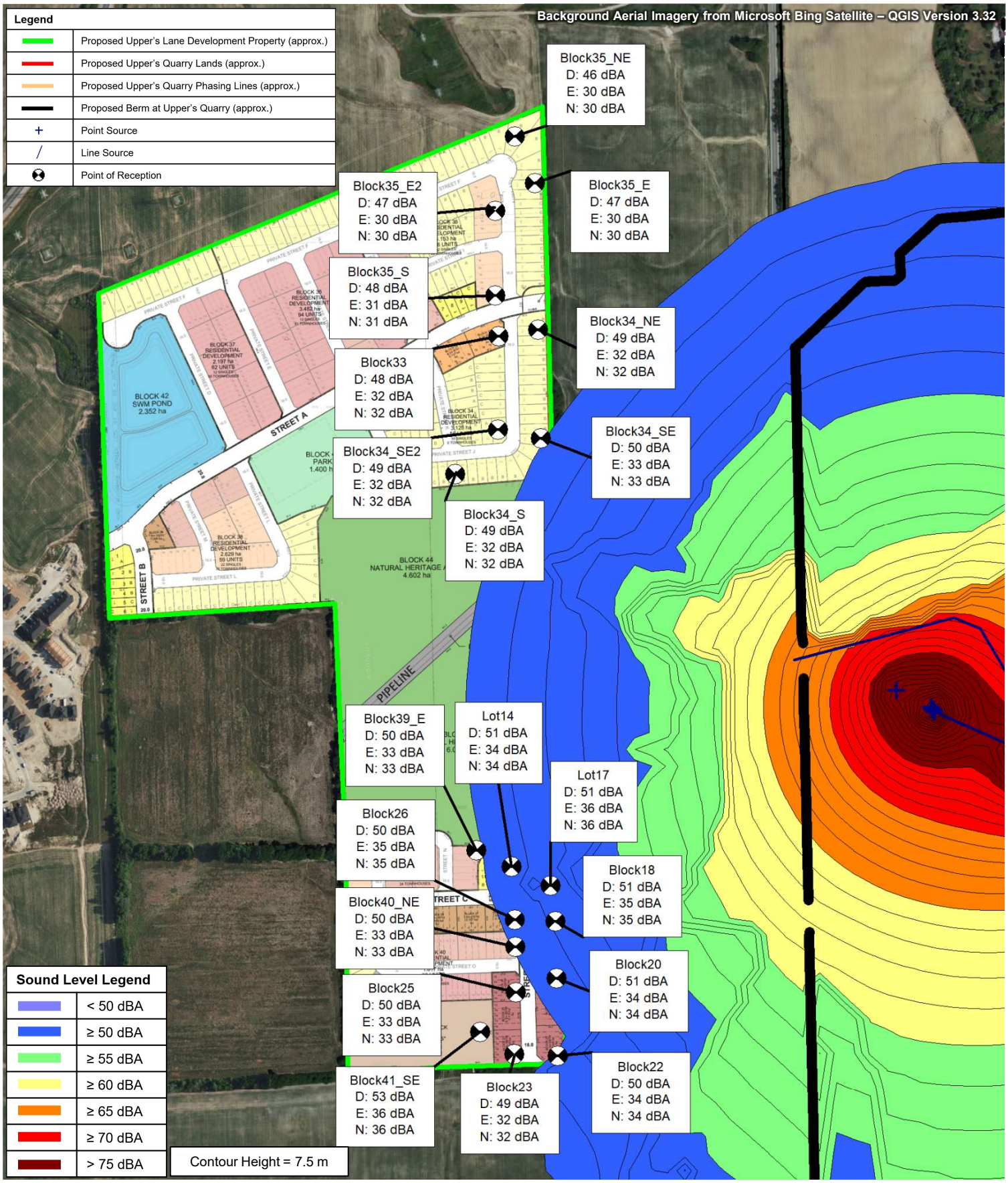
Scale:	N/A		METRES
Date: Apr. 27, 2026		Rev. 1	Figure No. **5**
Project No.: 241.030826.00001			

SLR

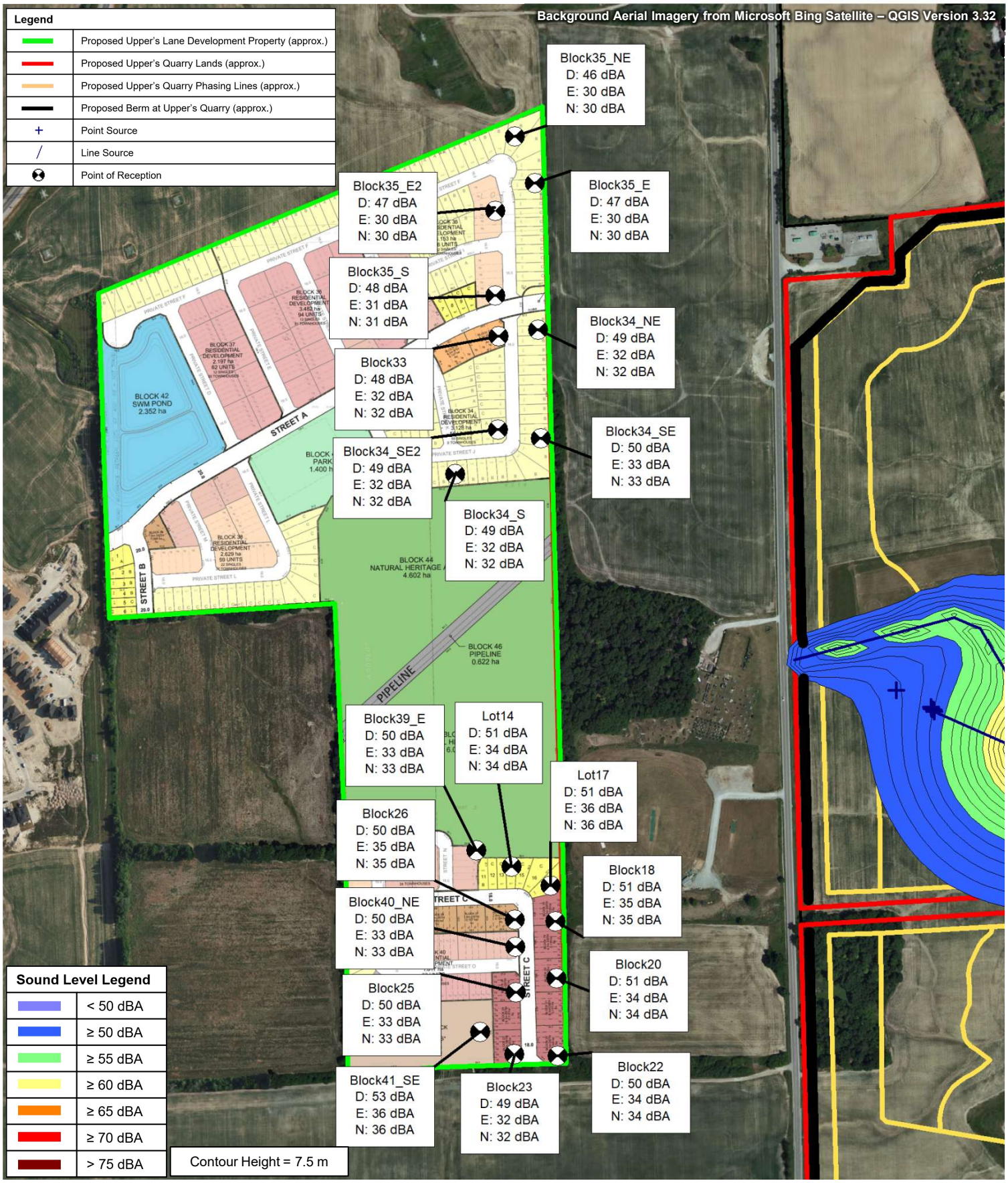


PARKBRIDGE LIFESTYLE COMMUNITIES	True North	Scale: 1:12,000	METRES
UPPER'S LANE, THOROLD, ONTARIO		Date: Apr. 27, 2026 Rev. 1	Figure No. **6**
POI CONTOUR PLOT, PARTICULATE MATTER – 24 HOUR		Project No.: 241.030826.00001	

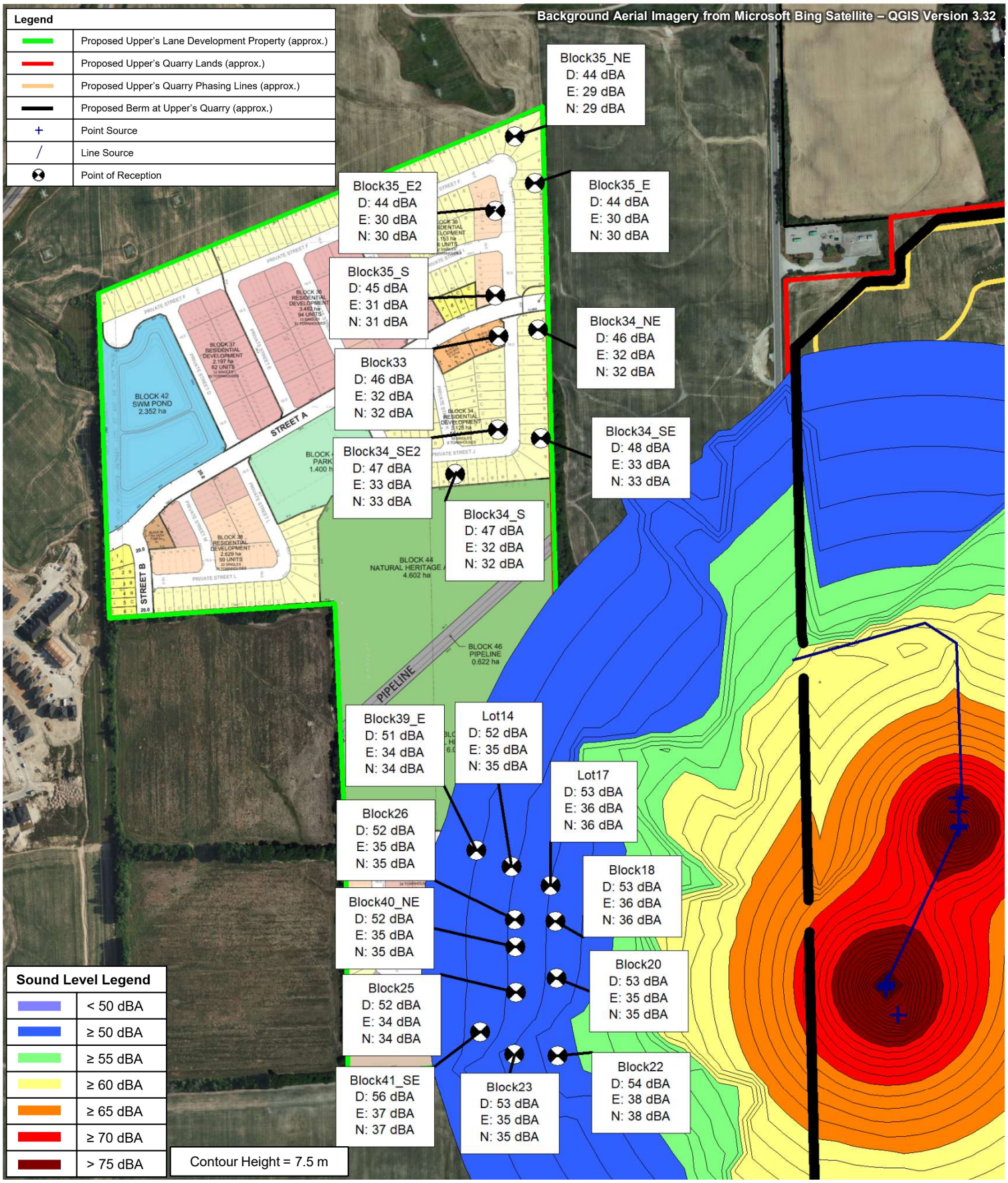
SLR



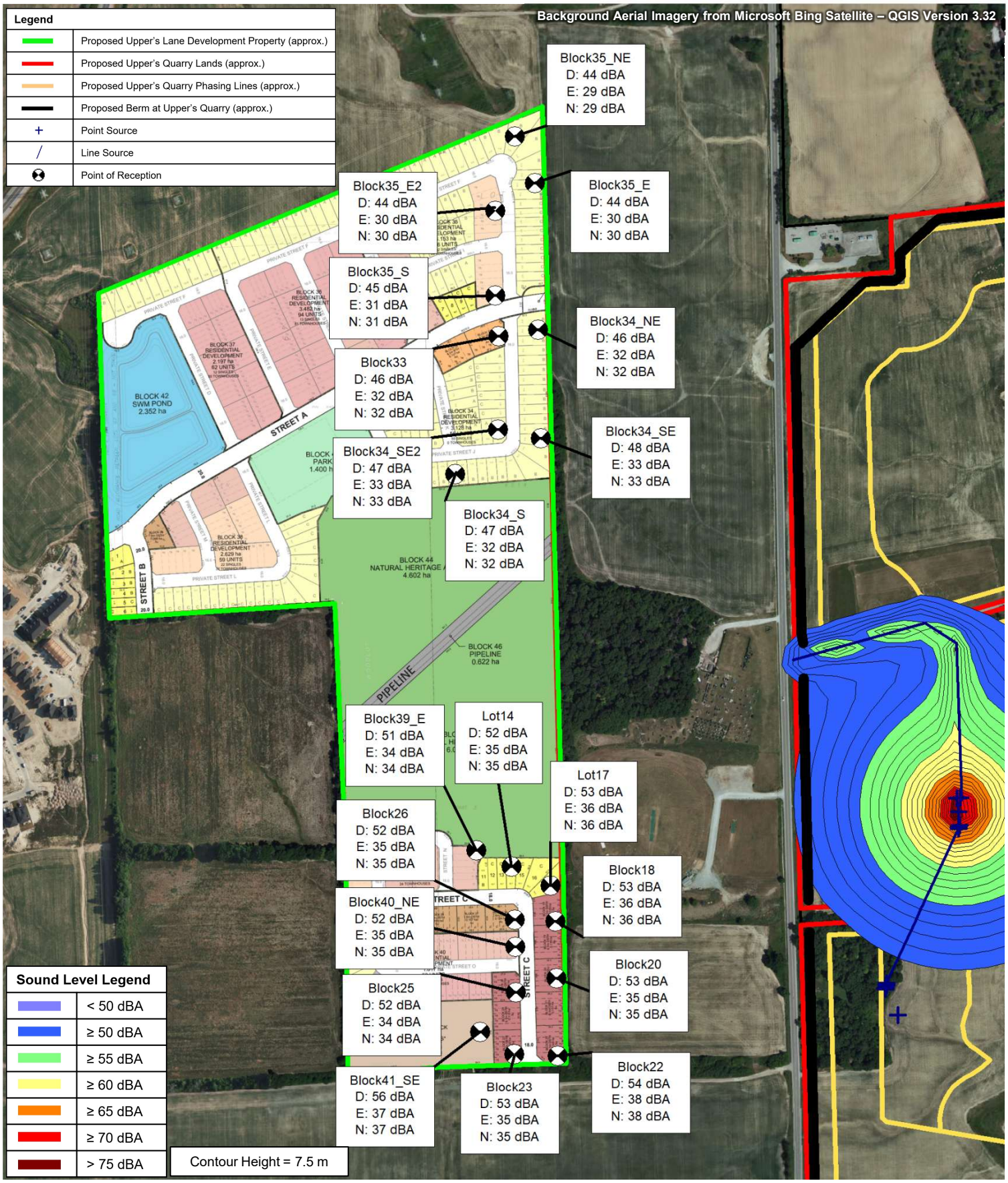
PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **7a**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1A SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



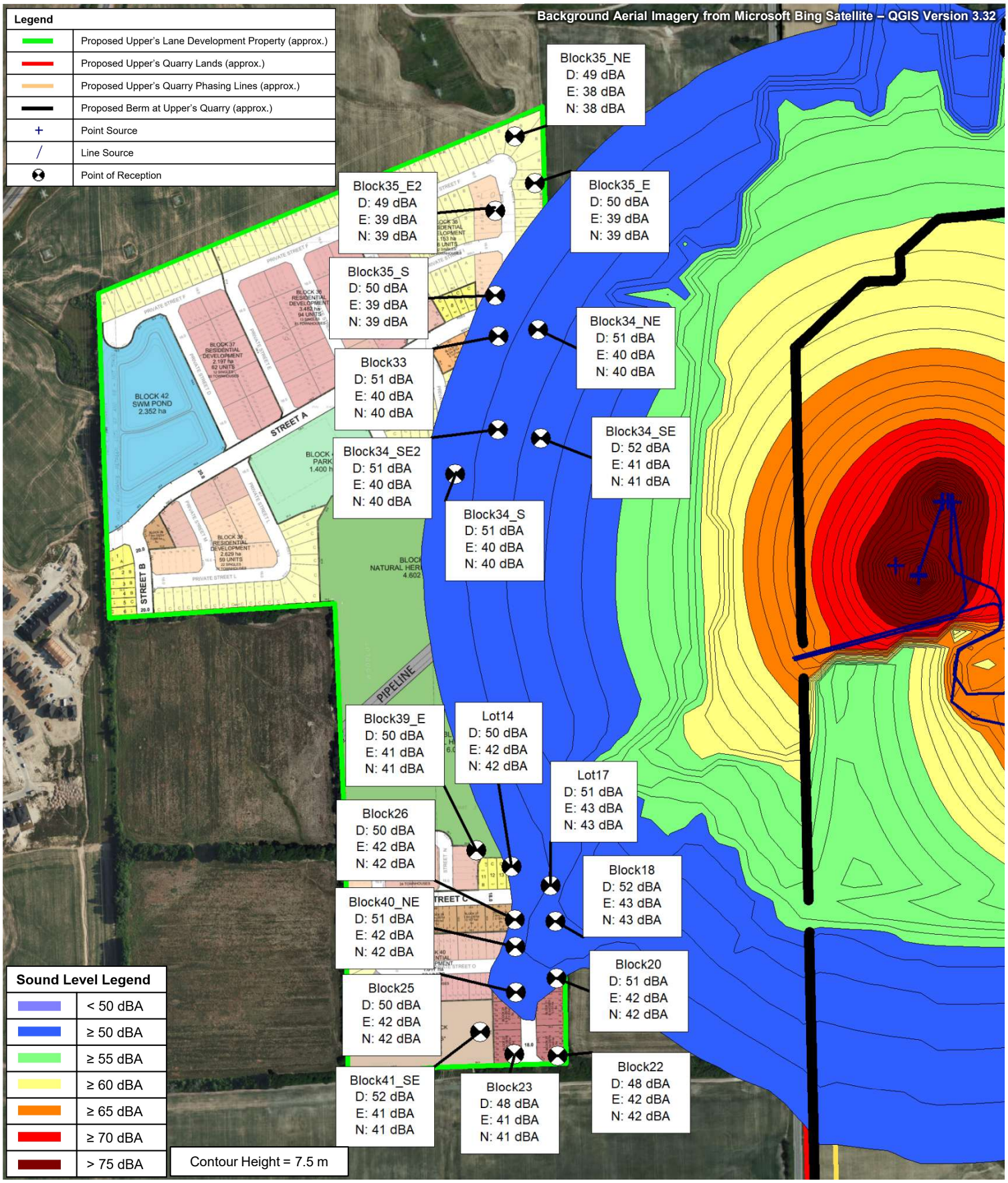
PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **7b**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1A SINKING CUT – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



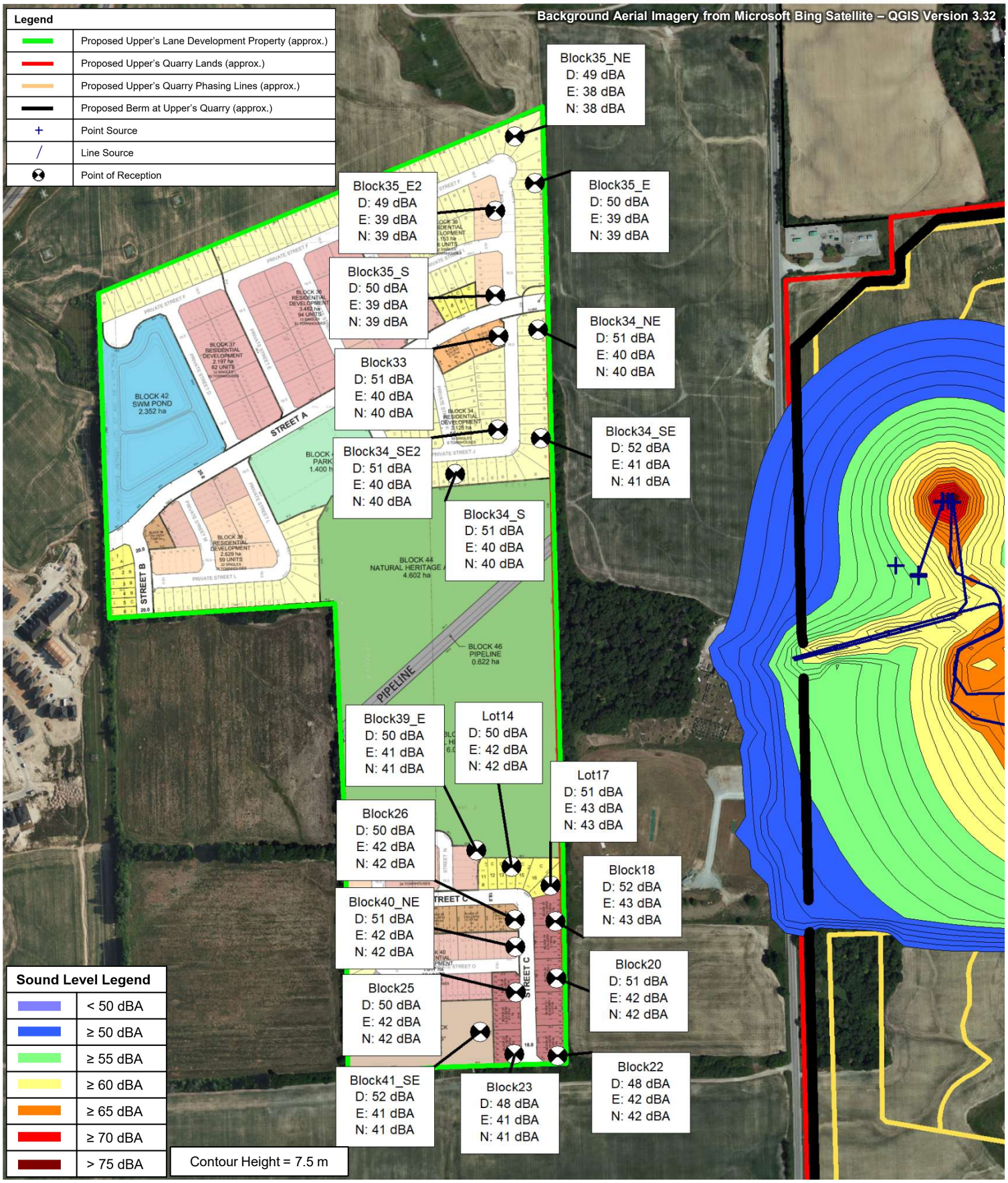
PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **8a**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1A SOUTH SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **8b**	
PREDICTED QUARRY SOUND LEVELS – PHASE 1A SOUTH SINKING CUT – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **9a**	
PREDICTED QUARRY SOUND LEVELS – PHASE 2A SINKING CUT – DAYTIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES INC.
(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED QUARRY SOUND LEVELS –
PHASE 2A SINKING CUT – EVENING/NIGHT-TIME

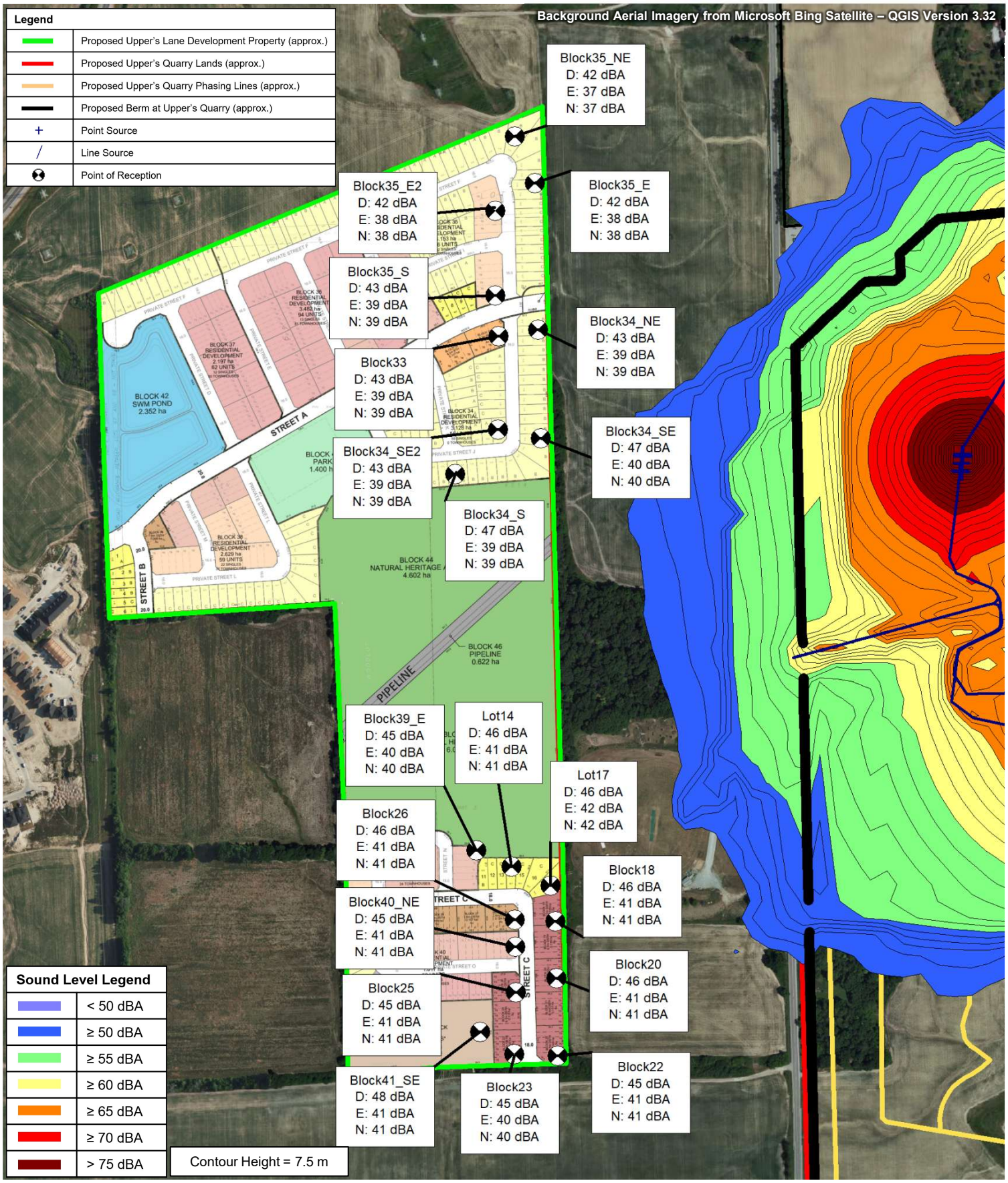
Scale: 1:6,000 METRES

Date: Apr. 27, 2026 Rev. 1

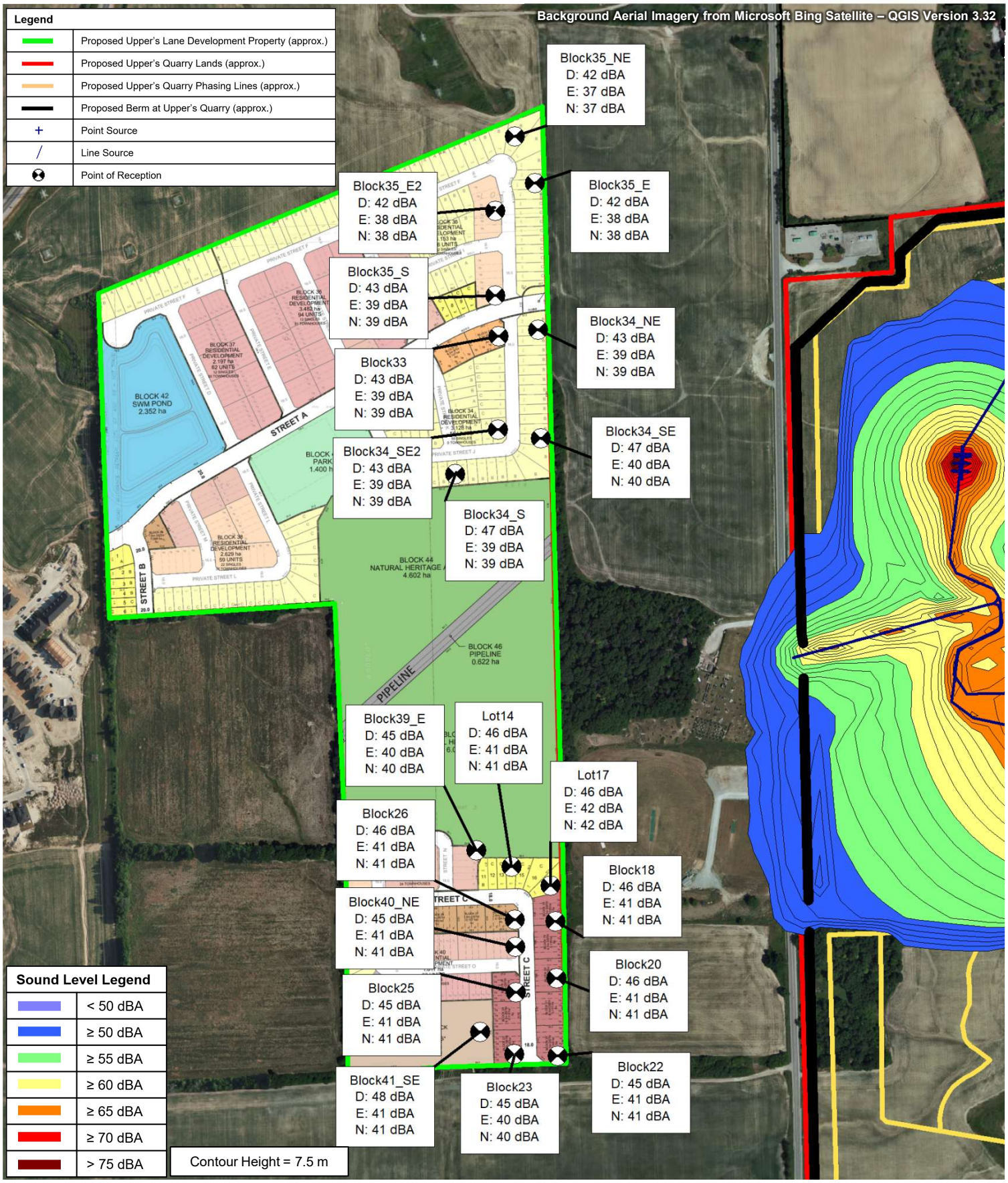
Project No.: 241.030826.00001

Figure No. **9b**

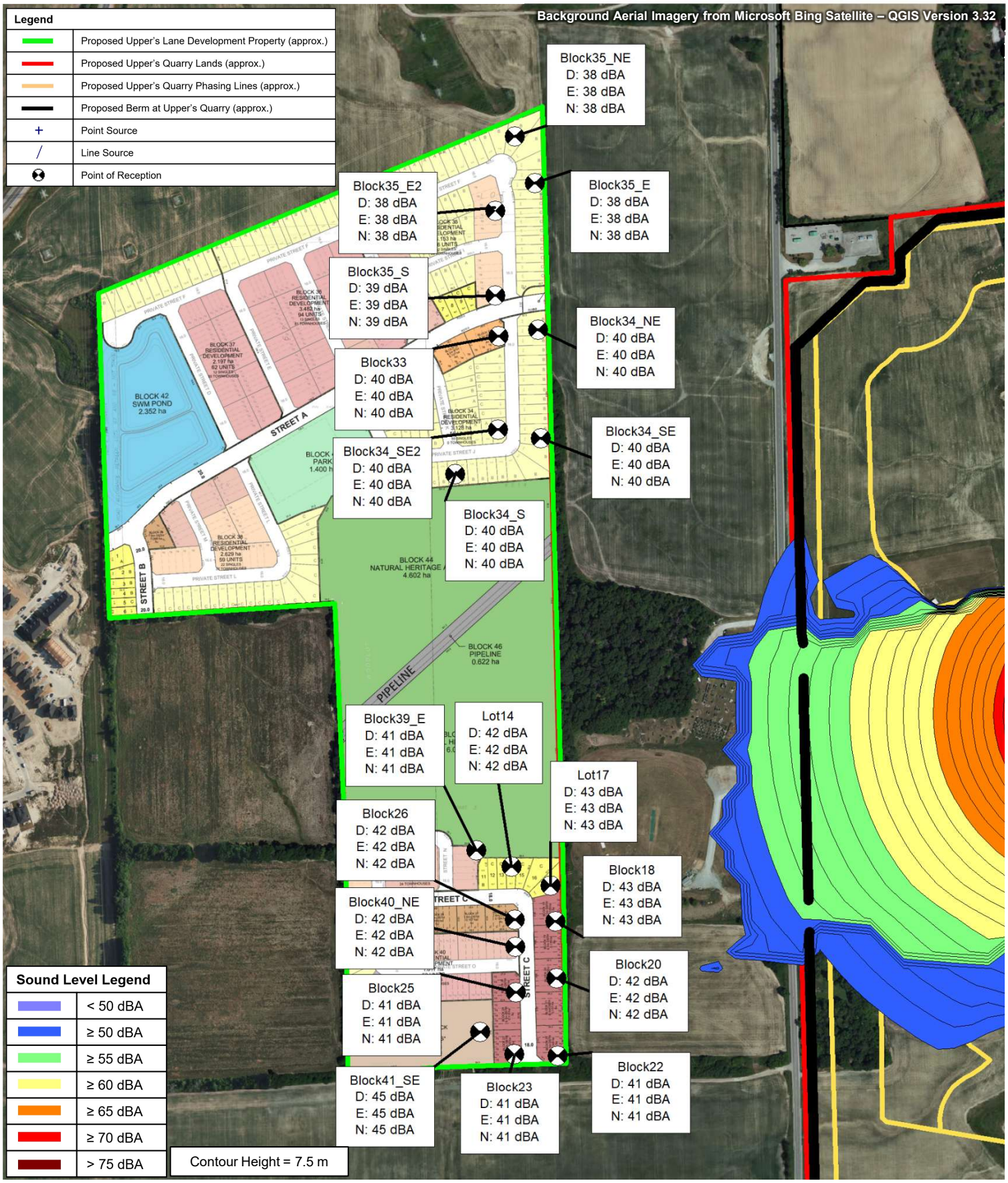
SLR



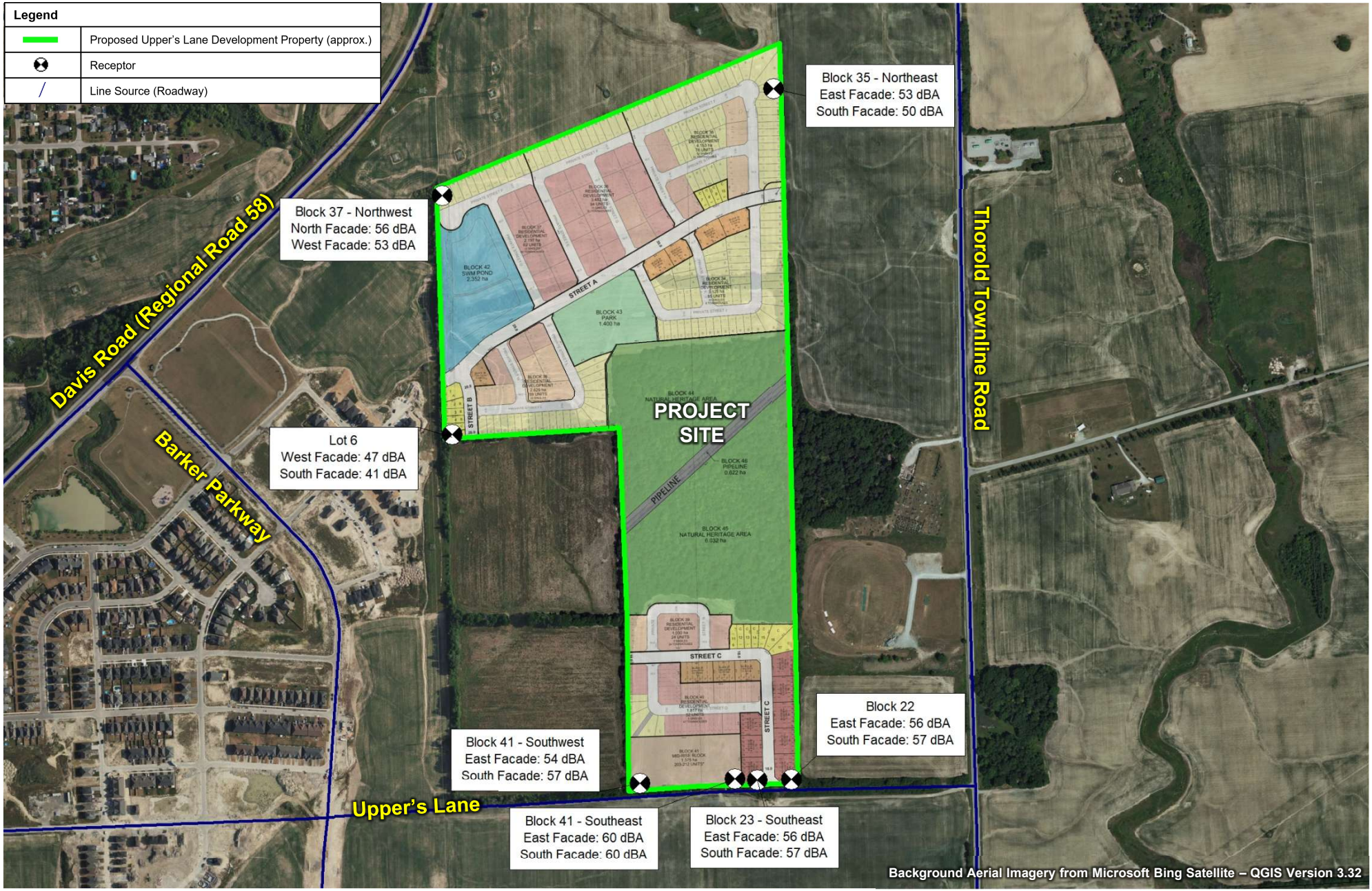
PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **10a**	
PREDICTED QUARRY SOUND LEVELS – PHASE 3A EXTRACTION – DAYTIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES INC. **(AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)**	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **10b**	
PREDICTED QUARRY SOUND LEVELS – PHASE 3A EXTRACTION – EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT FOR QUADREAL PROPERTY GROUP)	Scale: 1:6,000	METRES	SLR
UPPER'S LANE, THOROLD, ONTARIO	Date: Apr. 27, 2026 Rev. 1	Figure No. **11**	
PREDICTED QUARRY SOUND LEVELS – IMPULSE – DAYTIME/EVENING/NIGHT-TIME	Project No.: 241.030826.00001		



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED FAÇADE SOUND LEVELS – ROAD TRAFFIC - DAYTIME

True North

Scale: 1:12,000

METRES

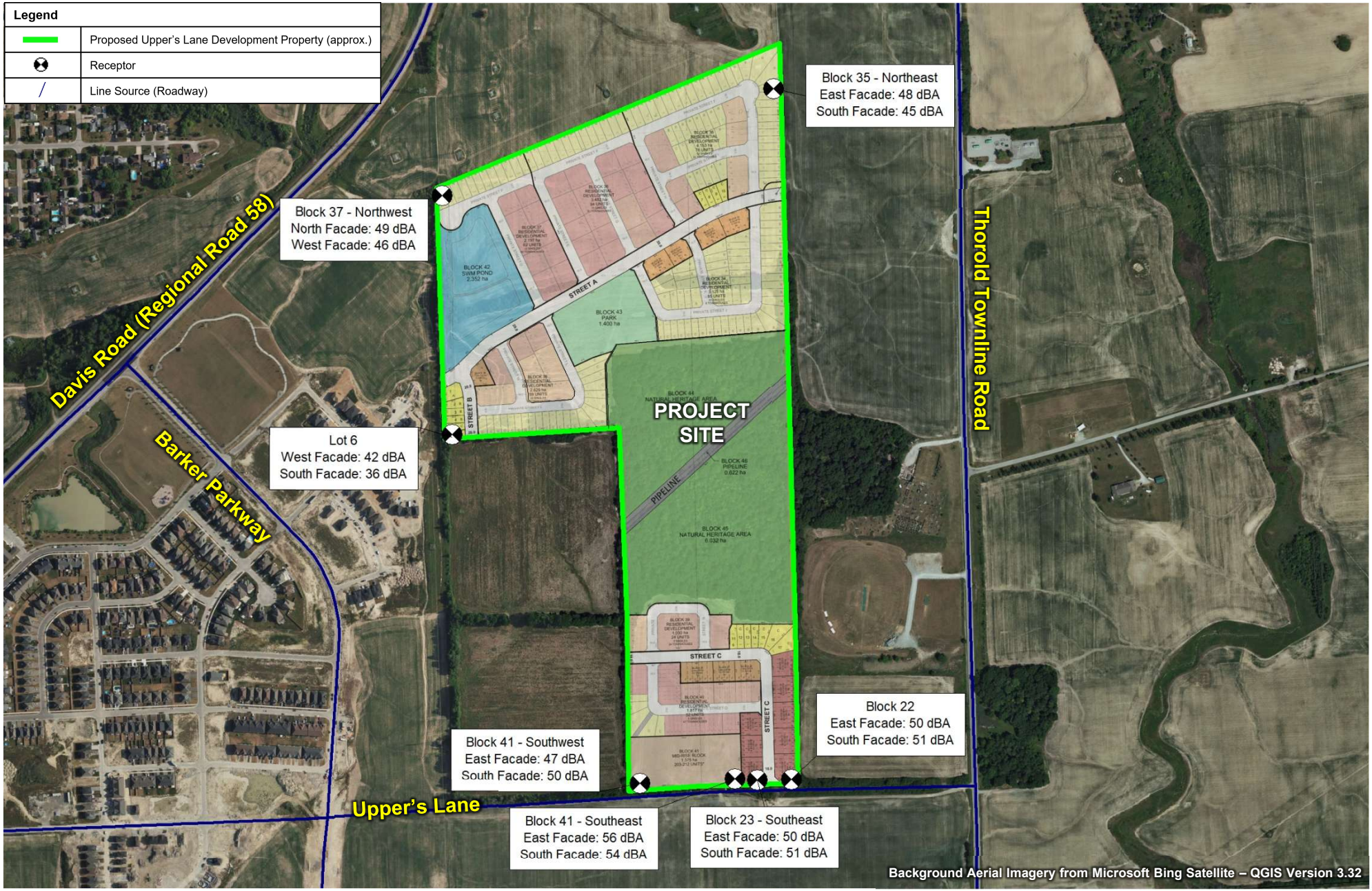
Date: Apr. 27, 2026

Rev. 1

Project No.: 241.030826.00001

Figure No. **12**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED FAÇADE SOUND LEVELS – ROAD TRAFFIC – NIGHT-TIME

True North

Scale: 1:12,000

METRES

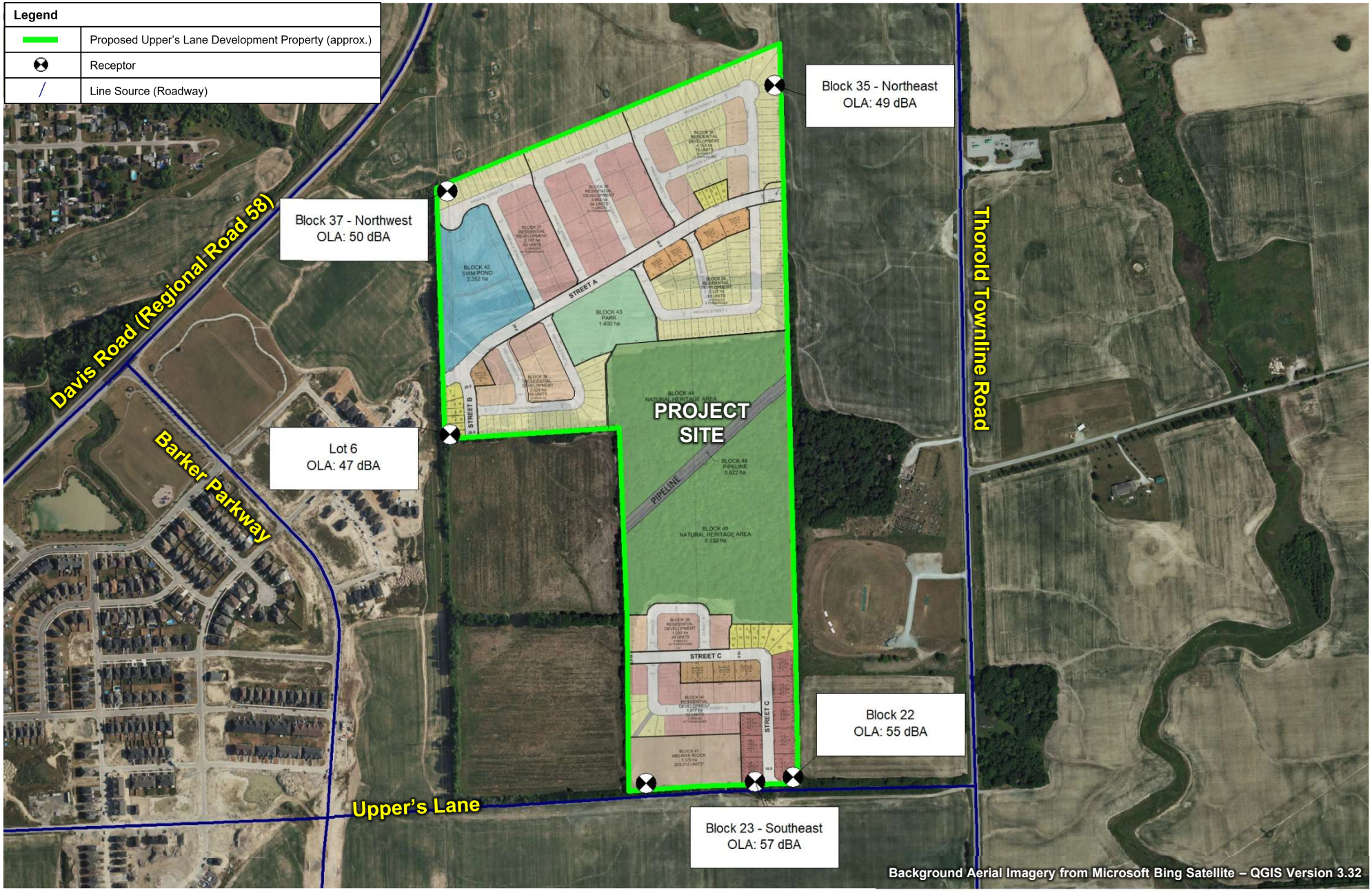
Date: Apr. 27, 2026

Rev. 1

Project No.: 241.030826.00001

Figure No. **13**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

UPPER'S LANE, THOROLD, ONTARIO

PREDICTED OUTDOOR LIVING AREA SOUND LEVELS – ROAD TRAFFIC - DAYTIME

True North

Scale: 1:12,000

METRES

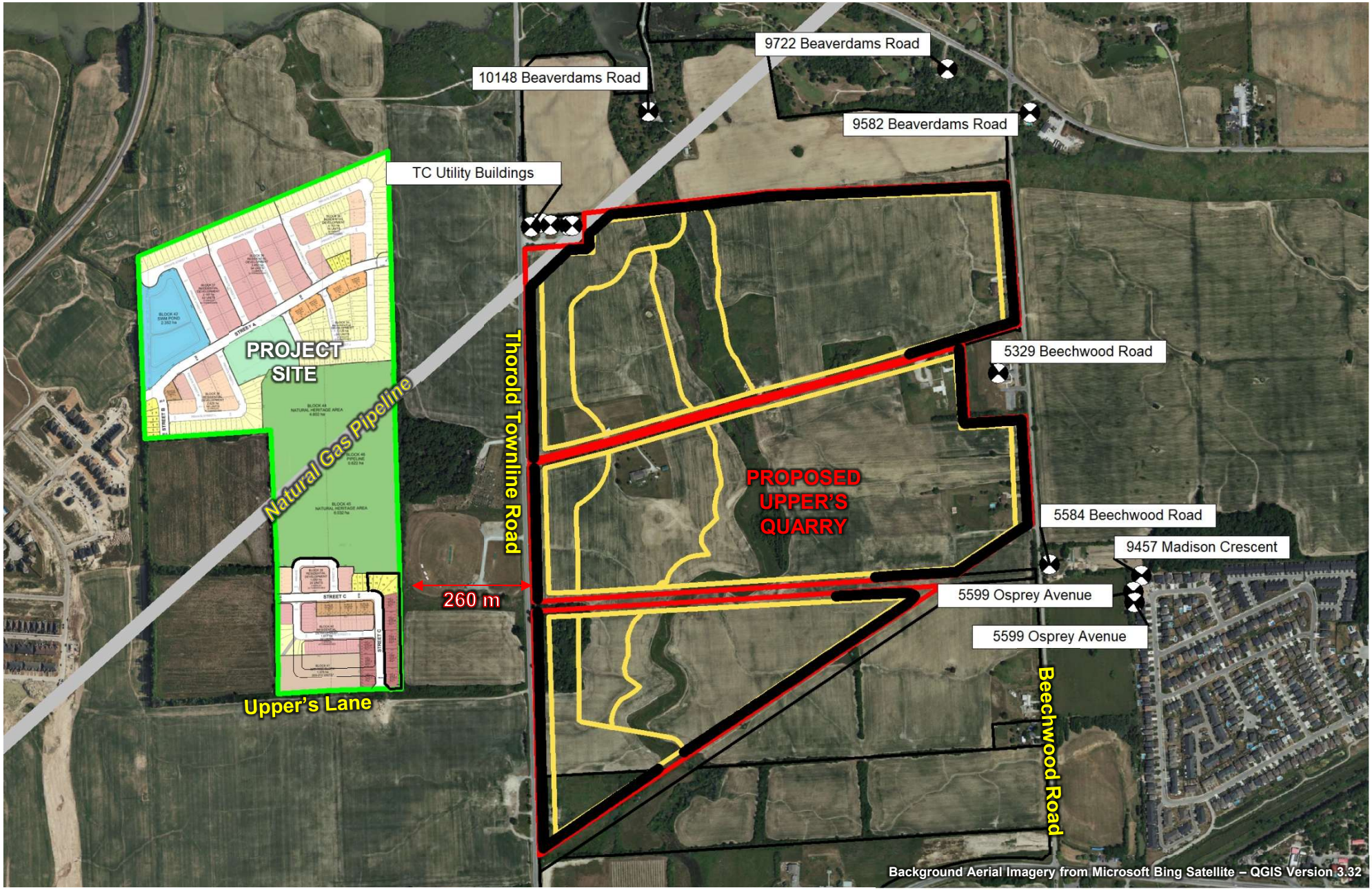
Date: Apr. 27, 2026

Rev. 1

Project No.: 241.030826.00001

Figure No. **14**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)	True North	Scale: 1:10,000	METRES
UPPER'S LANE, THOROLD, ONTARIO		Date: Apr. 27, 2026 Rev. 1	Figure No. **15**
PROPOSED UPPER'S QUARRY – SENSITIVE RECEPTORS AND OTHER INFRASTRUCTURE REQUIRING CONSIDERATION WITH RESPECT TO BLAST DESIGN		Project No.: 241.030826.00001	SLR

Appendix A Development Drawings

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

Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

AREA TABLE 22219 - 90dp February 5, 2026

Residential Singles	Lots 1-17	0.807 ha±
Townhouses	Blocks 18-33	2.047
Residential Development	Blocks 34-40	18.434
Mid-Rise Block	Block 41	1.375
SWM Pond	Block 42	2.352
Park	Block 43	1.400
Natural Heritage Area	Blocks 44-45	10.634
Pipeline	Block 46	0.622
Temporary Turnaround	Block 47	0.083
Roads		2.088
Total		**39.842 ha±**

ROADS

20.0m R.O.W.	2,796 m	1.341
18.0m R.O.W.	404 m	0.747
Total		**2.088 ha**

UNIT COUNT		MIN	MAX
12.8 m Singles (42')	A	1	1
11.6 m Singles (38')	B	4	4
10.7 m Singles (35')	C	12	12
8.2m Bungalow Townhouse (27')		15	15
7.6m On St. Townhouse (25')		17	17
6.1m On St. Townhouse (20')		45	45
Residential Development		422	422
Mid-Rise Residential*		203	212
Total *		**719**	**728 u**

* Final Unit Count to be determind through Site Plan application

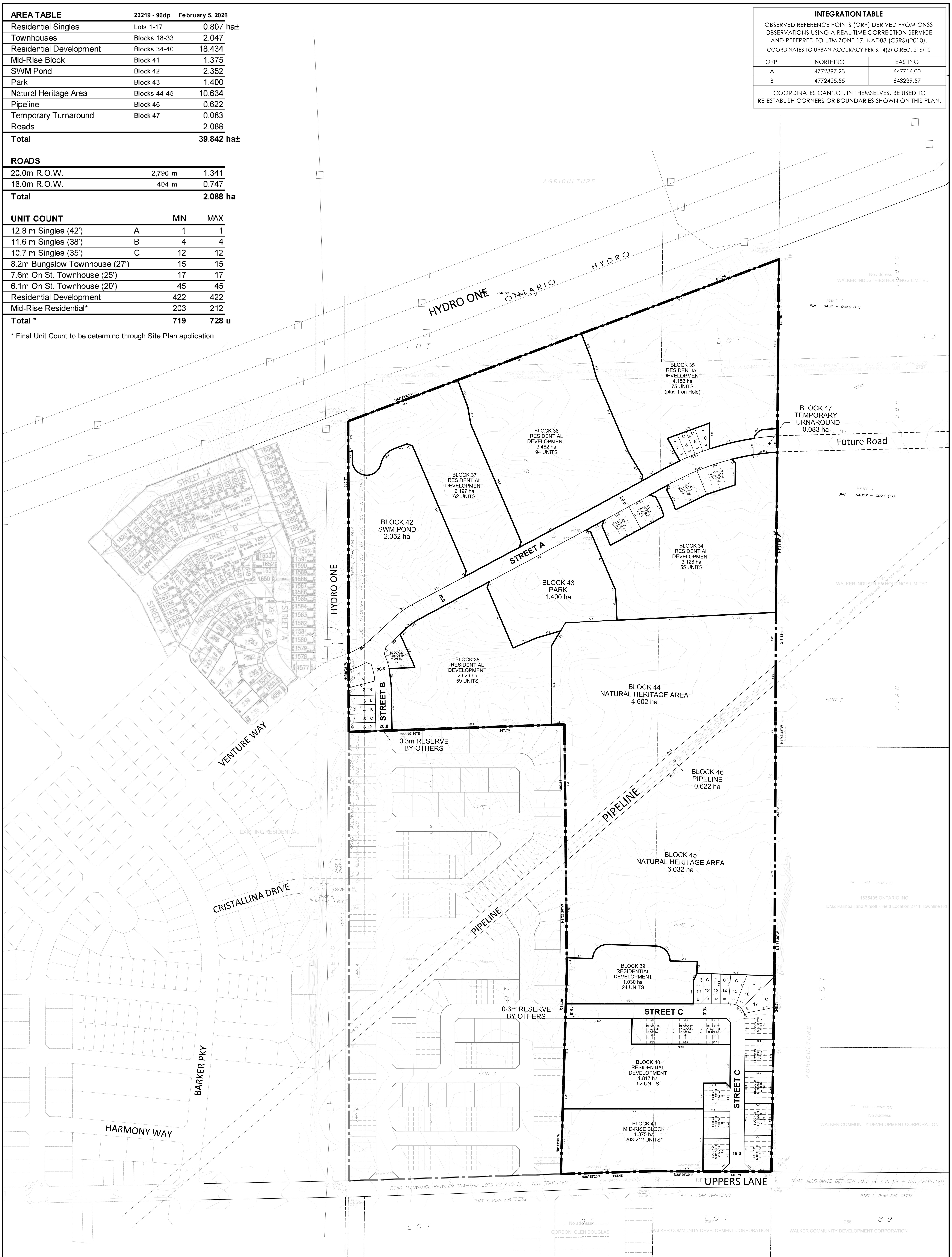
INTEGRATION TABLE

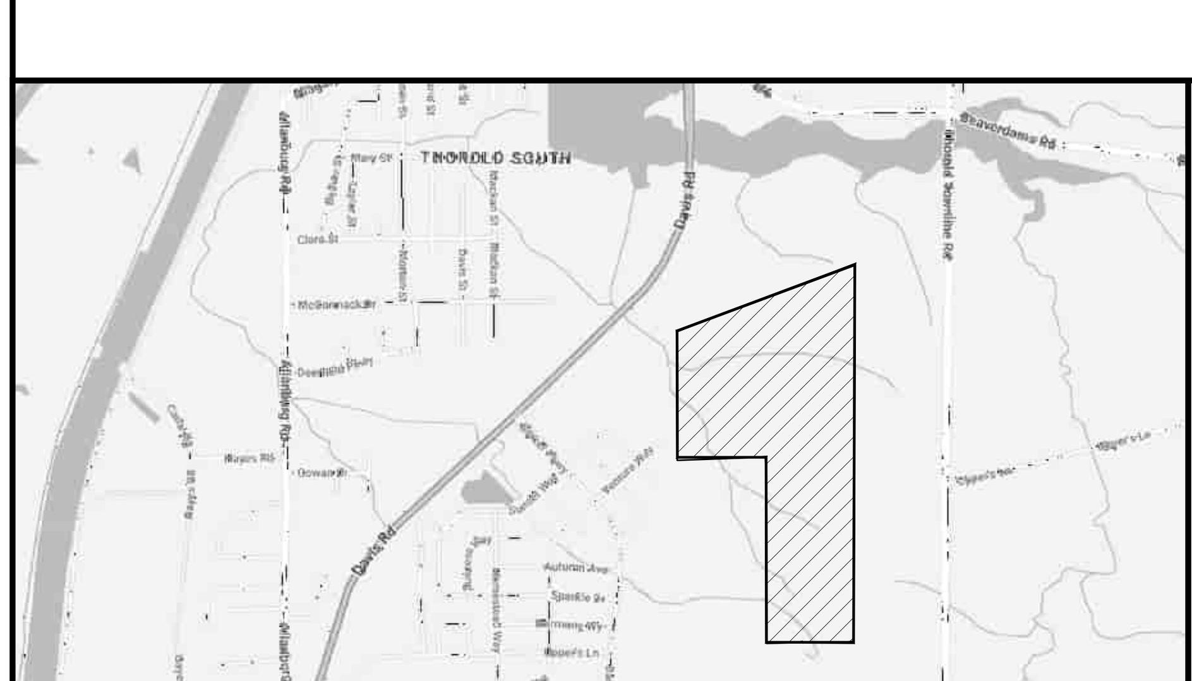
OBSERVED REFERENCE POINTS (ORP) DERIVED FROM GNSS OBSERVATIONS USING A REAL-TIME CORRECTION SERVICE AND REFERRED TO UTM ZONE 17, NAD83 (CSRS)(2010).

COORDINATES TO URBAN ACCURACY PER S.14(2) O.REG. 216/10

ORP	NORTHING	EASTING
A	4772397.23	647716.00
B	4772425.55	648239.57

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.





KEYPLAN — Subject Property

LEGEND

Subject Property

NOTES

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

0 10 25 50 100 m

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, Mid-Rise Residential, Park, Natural Heritage Area, Pipeline Block, Service 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.

"Please see the Original Submission" 31 01 2024
Day Month Year

Grant Bennett , O.L.S.
Stantec Geomatics Ltd.
Ontario Land Surveyors

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 Busby, QuadReal Property Group LP
Director, Development
Day Month Year

DRAFT PLAN OF PROPOSED SUBDIVISION
PART OF LOT 67 AND PART OF ROAD ALLOWANCE BETWEEN 67 AND 68
(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

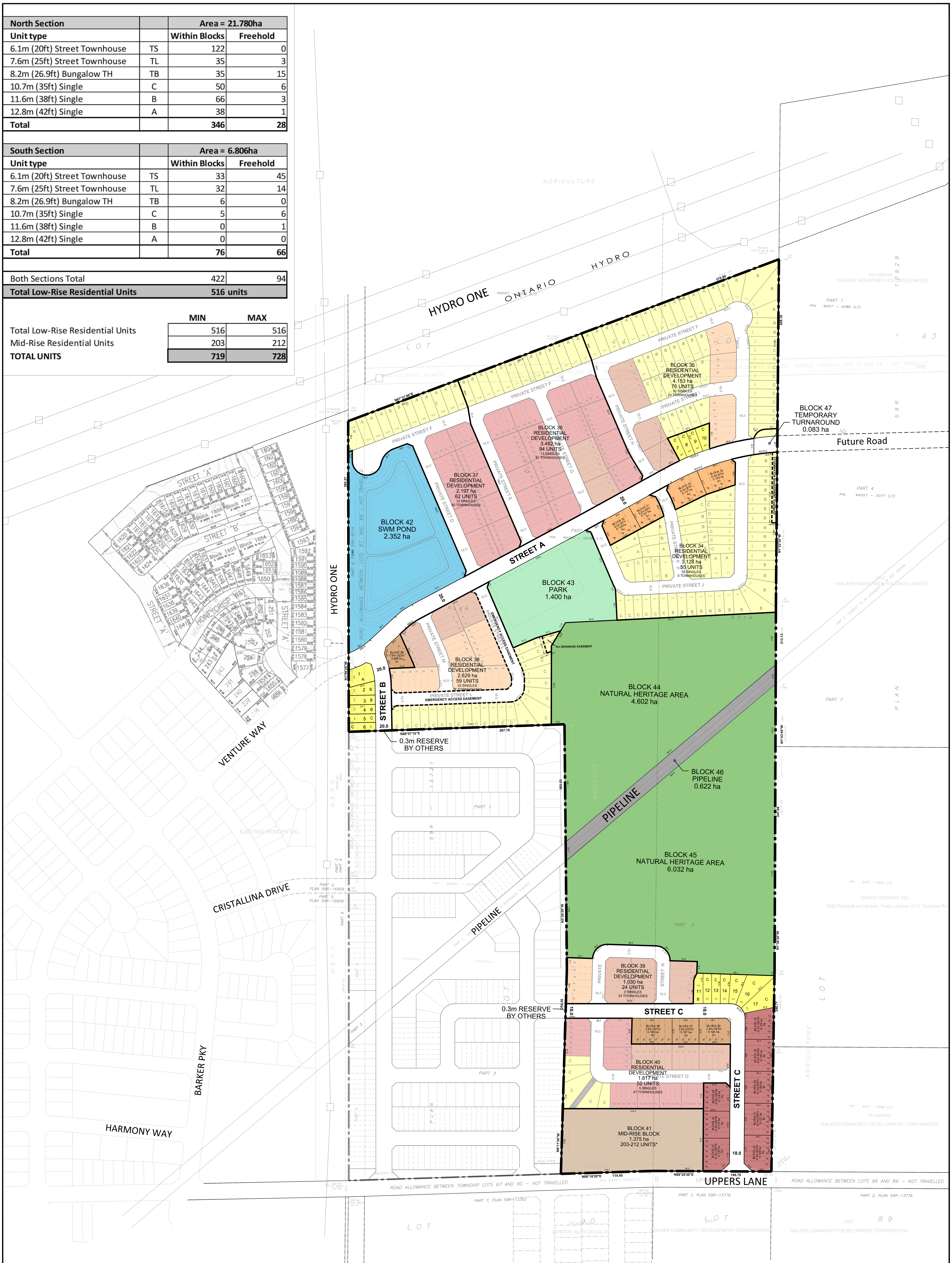
Scale	Date	Drawing Number
1 : 2000	February 5, 2026	22219 - 90dp

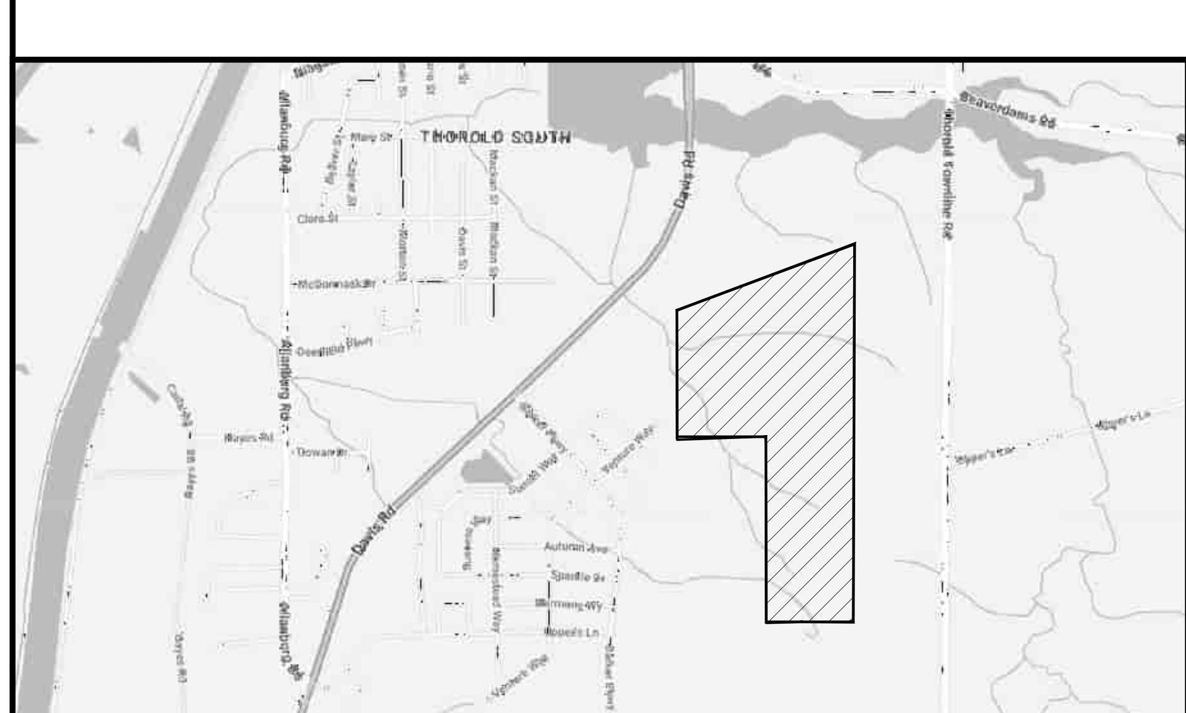
North Section		Area = 21.780ha	
Unit type		**Within Blocks**	**Freehold**
6.1m (20ft) Street Townhouse	TS	122	0
7.6m (25ft) Street Townhouse	TL	35	3
8.2m (26.9ft) Bungalow TH	TB	35	15
10.7m (35ft) Single	C	50	6
11.6m (38ft) Single	B	66	3
12.8m (42ft) Single	A	38	1
Total		**346**	**28**

South Section		Area = 6.806ha	
Unit type		**Within Blocks**	**Freehold**
6.1m (20ft) Street Townhouse	TS	33	45
7.6m (25ft) Street Townhouse	TL	32	14
8.2m (26.9ft) Bungalow TH	TB	6	0
10.7m (35ft) Single	C	5	6
11.6m (38ft) Single	B	0	1
12.8m (42ft) Single	A	0	0
Total		**76**	**66**

Both Sections Total	422	94
Total Low-Rise Residential Units	**516 units**	

	MIN	MAX
Total Low-Rise Residential Units	516	516
Mid-Rise Residential Units	203	212
TOTAL UNITS	**719**	**728**





KEYPLAN
Subject Property

DEMONSTRATION PLAN

0 10 25 50 100 m

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

Scale	Date	Drawing Number
1 : 2000	February 23, 2026	22219 - 98cp

Appendix B Industry Information

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

Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

Appendix B - Industry List

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 and Crushing Plant	0141-D2PS5Z (2024)	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

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 0141-D2PS5Z
Issue Date: March 27, 2024

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

Site Location: Rankin Construction Inc.
3299 Thorold Townline Rd
Thorold City, Regional Municipality of Niagara

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

one (1) dual mode (batch or drum) mix hot asphalt (HMA) plant, operating at the maximum production rates as listed in Schedule A, consisting of the following equipment and operations:

- one (1) counter flow drum mixer used to mix hot asphalt or to dry and heat aggregate, complete with a burner firing natural gas, having a maximum heat input of 105,4 gigajoules per hour discharging into a baghouse dust collector;
- one (1) baghouse dust collector, equipped with 1,008 square meters of Nomex filter material and a pulse-jet cleaning mechanism, venting to the atmosphere at a nominal volumetric flow rate of 28.2 actual cubic metres per second at an approximate temperature of 130 degrees Celsius through a stack, having exit diameter of 1.31 metres, extending 10.75 metres above grade;
- two (2) horizontal fully insulated liquid asphalt storage tanks, having a total nominal capacity of 217 tonnes and receiving up to five (5) full liquid asphalt tankers per day;
- three (3) hot mix asphalt storage silos, each having a nominal capacity of 255 tonnes;
- one (1) natural gas fired hot oil heater, to maintain liquid asphalt temperature, having a maximum thermal input of 2.1 gigajoules per hour;
- delivery, storage and transfer of raw materials to support daily HMA production rates;
- maintenance operations;

one (1) crushing plant, having a maximum recycled concrete (RC) processing rate of 1,400 tonnes per day, operating as described in the Operation Summary, consisting of the following equipment and operations;

- one (1) primary crusher, equipped with water spray system to control emissions from the crushing operations;
- one (1) secondary crusher, equipped with water spray system to control emissions from the secondary crushing operations;
- one (1) screening unit, equipped with water spray system to control emissions from screening operations;
- one (1) stacker conveyor, equipped with water spray system to control emissions from stacking operations;
- one (1) common diesel fired generator, alternatively powering RC or reclaimed asphalt pavement (RAP) primary crusher, equipped with Tier 2 (or higher) Engine (as per U.S. EPA Emission Standards) rated at 257 kilowatts, discharging into the atmosphere through a stack, having a nominal diameter 0.2 metre, extending 5.5 metres above grade;
- one (1) diesel fired generator,alternatively powering RC secondary crusher/screening unit or RAP screening unit, equipped with Tier 2 (or higher) Engine (as per U.S. EPA Emission Standards) rated at 295 kilowatts, discharging into the atmosphere through a stack, having a nominal diameter 0.2 metre, extending 5.5 metres above grade;
- one (1) common diesel fired generator, alternatively powering RC or RAP stacker, equipped with Tier 2 (or higher) Engine (as per U.S. EPA Emission Standards) rated at 38 kilowatts, discharging into the atmosphere through a stack, having a nominal diameter 0.1 metre, extending 2.7 metres above grade;
- maintenance and fueling operations of the equipment;

one (1) crushing plant, having a maximum RAP processing rate of 2,200 tonnes per day, operating as described in the Operation Summary, consisting of the following equipment and operations;

- one (1) primary crusher, equipped with water spray system to control emissions from the crushing operations; powered by the common primary crusher generator;
- one (1) screening unit, equipped with water spray system to control emissions from screening operations, powered by the common screening unit generator;;
- one (1) stacker conveyor, equipped with water spray system to control emissions from stacking operations, powered by the common stacker generator;
- maintenance and fueling operations of the equipment;

aggregate depot, operating as described in the Operation Summary, having the maximum receiving rate of uncrushed materials (RAP and RC) of 1,000 tonnes per day, and the maximum shipping rate of 1,000 tonnes per day of crushed RAP and RC;

- the aggregate depot is not operating during days when RAP or RC crushing is performed on the site;

all in accordance with the Application for Approval (Air & Noise) submitted by Rankin Construction Inc. dated October 20, 2020, and signed by Peter Jesik, Plant Manager, the Operation Summary dated March 4, 2024 and signed by Peter Jesik, Plant Manager, the updates to ESDM Report dated August 31, 2023 and prepared by Neil Chan; the letter dated March 25, 2024, signed by Brian Rankin providing details of the purchase of the southern vacant lot and all other supporting information associated.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Acoustic Assessment Report" means the report, prepared in accordance with Publication NPC-233 and Appendix A of the Basic Comprehensive User Guide, HGC Engineering Limited, entitled: Acoustic Assessment Report, Rankin Hot Mix Asphalt Plant, Thorold, Ontario dated November 29, 2020 submitted in support of the application, that documents all sources of noise emissions and present at the Facility;
2. "Approval" means this Environmental Compliance Approval, including the application and supporting documentation listed above;
3. Best Management Practices Plan" or "BMPP" means the document entitled "Dust Management Plan", dated January 18, 2024, prepared by Peter Jesik (updated to v2 on Feb 2024 and submitted by an email on March 8, 2024), as amended;
4. "Company" means Rankin Construction Inc. operating as Rankin Construction Inc. that is responsible for the construction or operation of the Facility and includes any successors and assigns in accordance with section 19 of the EPA;
5. "Director" means a person appointed for the purpose of section 20.3 of the EPA by the Minister pursuant to section 5 of the EPA;
6. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Facility is geographically located;
7. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19;
8. "Equipment" means the equipment described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;
9. "Facility" means the entire operation located on the property where the Equipment is located;

10. “Fugitive Dust” means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person;
11. "Method 22" means US EPA Method 22 - Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares;
12. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;
13. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;
14. "Noise Control Measures" means measures to reduce the noise emissions from the Facility and/or Equipment including, but not limited to, silencers, acoustic louvres, enclosures, absorptive treatment, plenums and barriers. It also means the noise control measures outlined in the Acoustic Assessment Report;
15. "Operation Summary" means the document entitled "Operation Summary" dated on March 4, 2024 and signed by Peter Jesik, Plant Manager;
16. “Point of Reception” is defined in Ministry Publication NPC-300, “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300”, August 2013, as amended;
17. "Publication NPC-300" means the Ministry Publication NPC-300, “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300”, August 2013, as amended.

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

TERMS AND CONDITIONS

1. **OPERATION AND MAINTENANCE**
    1. The Company shall ensure that the Equipment is properly operated and maintained at all times. The Company shall:
        a. prepare, not later than three (3) months after the date of this Approval,and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:
            i. routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers, including;

ii. frequency of the inspection and replacement of the filter bags in the baghouse;

iii. preseason start-up procedures and inspection of the equipment;

iv. emergency procedures, including spill clean-up procedures;

v. procedures for any record keeping activities relating to operation and maintenance of the Equipment;and

vi. all appropriate measures to minimize noise, fugitive dust and odorous emissions from all potential sources; and

b. implement the recommendations of the Manual;

c. prepare and implement procedures to monitor and keep records of the loss on heating (standard RTFOT test) of the received liquid asphalt cement to ensure that the annual average loss on heating for the received liquid asphalt cement is not greater than 0.5%;

d. prepare and implement procedures to monitor and keep records of the liquid asphalt cement storage tanks temperature, to ensure that liquid cement storage tanks do not operate above the 171 degrees Celsius;

e. prepare and implement procedures to determine and keep records of the HMA temperature (as it leaves the mixing process) to ensure that HMA will be not produced and storage above the 171 degrees Celsius;

f. the facility should not start operation unless;

i. the annual preseason start-up inspection have been conducted and all required repairs to the Equipment, and any other items related to environmental emissions have been made and;

ii. the District Manager has been notified about planned start-up date (annually, or as per agreement with District Manager);

2. Crushing operations and aggregate depot operations and shall be performed at the locations to ensure that the minimum separation distance to the property line will not shorter than presented in the ESDM Report

3. Raw materials storage piles and crushed RAP and RC piles shall be located on the site to ensure that the minimum separation distance to the property lines will be not shorter than presented in the ESDM Report.

2. **RECORD RETENTION**

1. 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 recording activities required by this Approval, and make these records

available for review by staff of the Ministry upon request. The Company shall retain:

a. all records on the maintenance, repair and inspection of the Equipment, including;
    i. record of the baghouse differential pressure monitoring system and the leak detection and a baghouse performance system;
    ii. records of shut-down of the dryer/mixer when the differential pressure reading or the leak detection and a baghouse performance system is not within the recommended range;
    iii. records of the annual preseason start-up inspections;
    iv. all production records;

b. all records of any environmental complaints, including:
    i. a description, time and date of each incident to which the complaint relates;
    ii. wind direction at the time of the incident to which the complaint relates; and
    iii. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

3. **NOTIFICATION REQUIREMENTS**
    1. 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:
        a. a description of the nature of the complaint; and
        b. the time and date of the incident to which the complaint relates.
    2. The Company shall notify the District Manager of the baghouse differential pressure system and the leak detection and a baghouse performance system installation schedule, commissioning, verification of performance and a start up of operations.

4. **Visible Fugitive Dust Emissions**
    1. The Facility operations shall be performed to ensure that visible fugitive dust plum from the activities where material is dropped (as described in the Operation Summary and BMPP);
        a. will not exceed more than 30 metres in any directions from the activities, excluding no more than 6 minutes in any hour; and

b. will not extend beyond the minimum separation distance lines at any time.

2. The Company shall determine visible dust emissions, referred in Condition 4.1.a and 4.1.b, as per Method 22, at the shortest practical observation distance as described in the Method 22.

5. **Fugitive Dust Control**
    1. The Company shall implement the BMPP for the control of fugitive dust from any potential sources of fugitive dust emissions resulting from the operations of the Plant at each operating site;
        a. The Company shall update the BMPP for each operating site as necessary or at the direction of the District Manager;
        b. The Company shall retain on each operating site the latest version of the BMPP and shall provide it to any employee or agent of the Ministry upon request.

6. **NOISE**
    1. The Company shall:
        a. Ensure that the noise emissions from the Facility comply with the limits set in Ministry Publication NPC-300; and
        b. Ensure that the Noise Control Measures specified in Schedule B are properly maintained and continue to provide the acoustical performance specified.

7. **CHANGE OF OWNERSHIP**
    1. The Company shall notify the Director in writing, and forward a copy of the notification to the District Manger, within thirty (30) days of the occurrence of any changes to Facility operations;
        a. the ownership of the Facility;
        b. the operator of the Facility;
        c. the address of the Company;
        d. the partners, where the Company is or any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act,* R.S.O. 1990, c. B.17, shall be included in the notification; and
        e. the name of the corporation where the Company is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the Corporations Information

Act, R.S.O. 1990, c. C.39, shall be included in the notification.

2. In the event of any change in ownership of the Facility, the Company shall notify the successor of the existence of this Approval and provide the successor with a copy of this Approval, and the Company shall provide a copy of the notification to the District Manager and the Director.

SCHEDULE A
HMA Production rates

Operation months	Maximum Production Rate
May through December	2,800 tonnes per day
January through February	No production
March through April	840 tonnes per day
March through December (Annual)	250,000 tonnes per year

SCHEDULE B
Noise Control Measure

- one (1) 6-metres high and approximately 60-metres long berm comprised of material with a minimum surface mass density of 20 kg/m^2 , without holes, gaps and other penetrations, maintained on the north and east side of the concrete crusher position, as shown in Figure 4a of the Acoustic Assessment Report.

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

1. Condition No. 1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the EPA, the Regulations and this Approval.
2. Condition No. 2 is included to require the Company to keep records and to provide information to staff of the Ministry so that compliance with the EPA, the Regulations and this Approval can be verified.
3. Condition No. 3 is included to require the Company to notify staff of the Ministry so as to assist the Ministry with the review of the site's compliance.
4. Condition Nos. 4 to 6 are included to provide the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Facility.

5. Condition No. 7 is included to require the Company to notify/report to the Ministry so that compliance with the EPA, the regulations and this Approval can be verified.
6.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 6254-7F3NWM issued on June 11, 2008.

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me, the Ontario Land Tribunal and in accordance with Section 47 of the *Environmental Bill of Rights,* 1993, the Minister of the Environment, Conservation and Parks, within 15 days after receipt of this notice, require a hearing by the Tribunal. The Minister of the Environment, Conservation and Parks will place notice of your appeal on the Environmental Registry. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

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

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;

2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

Registrar*
Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5
OLT.Registrar@ontario.ca

and

The Minister of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto, Ontario
M7A 2J3

and

The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or** www.olt.gov.on.ca

This instrument is subject to Section 38 of the *Environmental Bill of Rights,* 1993, 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 https://ero.ontario.ca/, you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 27th day of March, 2024

Nancy E Orpana, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

JK/
c: District Manager, MECP Niagara
Neil Chan, BCX Environmental Consulting

Appendix C MECP EPI Details

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

Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

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 Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

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** Lakes Environmental Software Inc.
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SRCPARAM L0000071     0.000559322      2.55      4.19      2.37
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SRCPARAM L0000074     0.000559322      2.55      4.19      2.37
SRCPARAM L0000075     0.000559322      2.55      4.19      2.37
SRCPARAM L0000076     0.000559322      2.55      4.19      2.37
SRCPARAM L0000077     0.000559322      2.55      4.19      2.37
SRCPARAM L0000078     0.000559322      2.55      4.19      2.37
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   SRCPARAM L0000111     0.000559322      2.55      4.19      2.37
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   SRCPARAM L0000114     0.000559322      2.55      4.19      2.37
   SRCPARAM L0000115     0.000559322      2.55      4.19      2.37
   SRCPARAM L0000116     0.000559322      2.55      4.19      2.37
   SRCPARAM L0000117     0.000559322      2.55      4.19      2.37
   SRCPARAM L0000118     0.000559322      2.55      4.19      2.37
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** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
```

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RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
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   PROFFILE "..\..\MET Data\London_crops_22112.PFL"
   SURFDATA 61444 1996 LONDON
   UAIRDATA 726320 1996 WHITE_LAKE
   PROFBASE 278.0 METERS
ME FINISHED
**
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** AERMOD Output Pathway
**************************************
**
**
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   RECTABLE 24 1ST
** Auto-Generated Plotfiles
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   PLOTFILE ANNUAL ALL "UPPERS LANE TPM-2.AD\AN00GALL.PLT" 32
   SUMMFILE "Uppers Lane TPM-2.sum"
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**
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**************************************
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** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    North American Datum 1983
** DTMRGN   CONUS
** UNITS    m
** ZONE     17
** ZONEINX  0
**
```

Appendix E Warning Clause and Mitigation Summary

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

Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

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. The recommended warning clauses assume a Class 4 designation for the Project site.

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 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."

MECP Type F: “Purchasers/tenants are advised that sound levels due to the adjacent industry are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed.”

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

Development Location	Barrier Recommendation	Ventilation Recommendation	Warning Clause Recommendation
Block 23	None	Central AC	MECP Type A, MECP Type E, MECP Type F, AQ
All Other Residential Units	None	Central AC	MECP Type E, MECP Type F, AQ

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 Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

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.

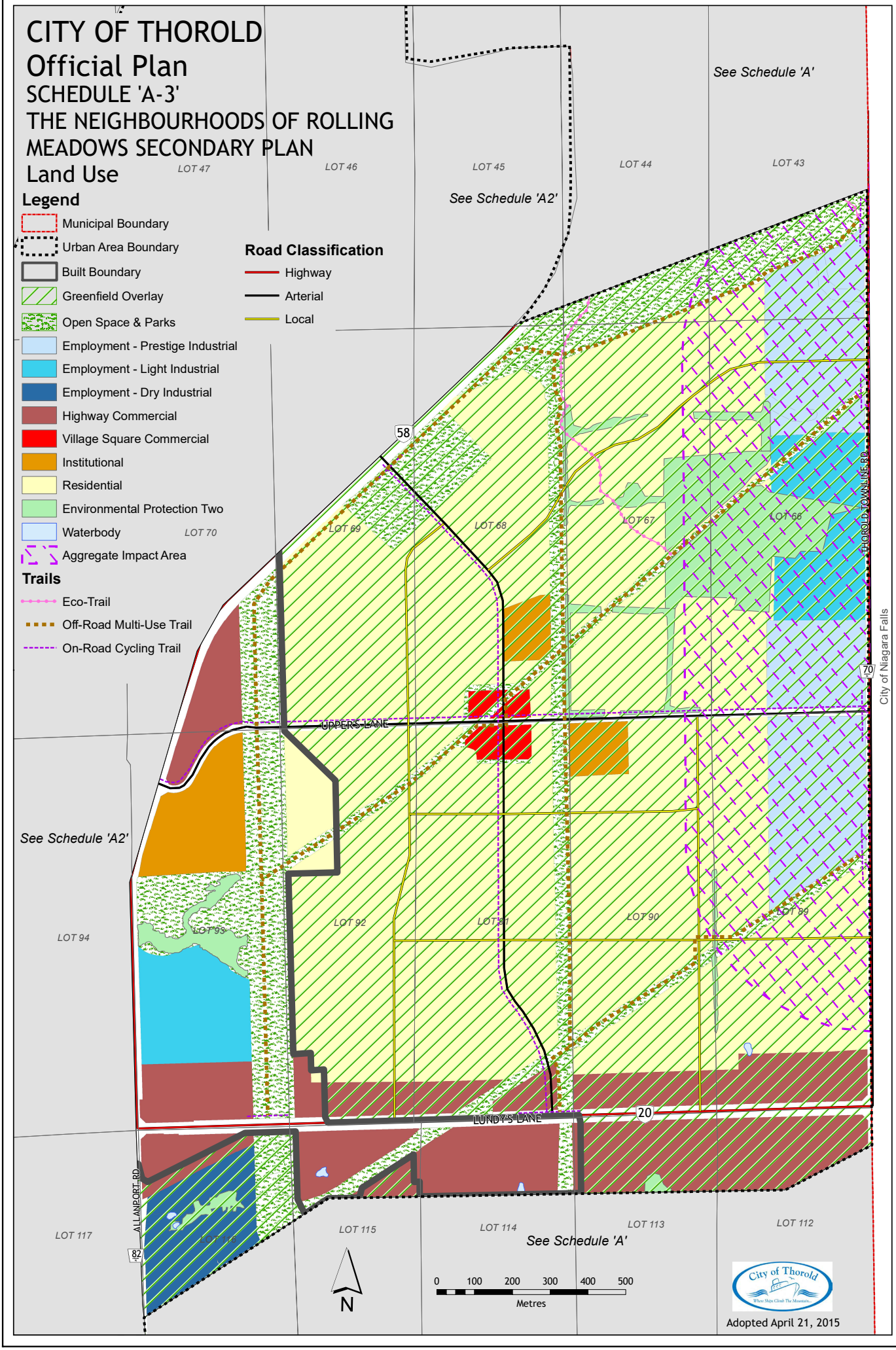
f) In order to achieve the proper co-ordination of services and consistence in development standards, the orderly development of land by way of plan of subdivision and site plan will be required throughout the neighbourhood. Consents to sever land to create development blocks will only be permitted when 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 Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

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.

Trucks with water spray system have an insignificant acoustical effect when compared to all other sources on site and thus were not included in the final list of notable sources of noise.

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

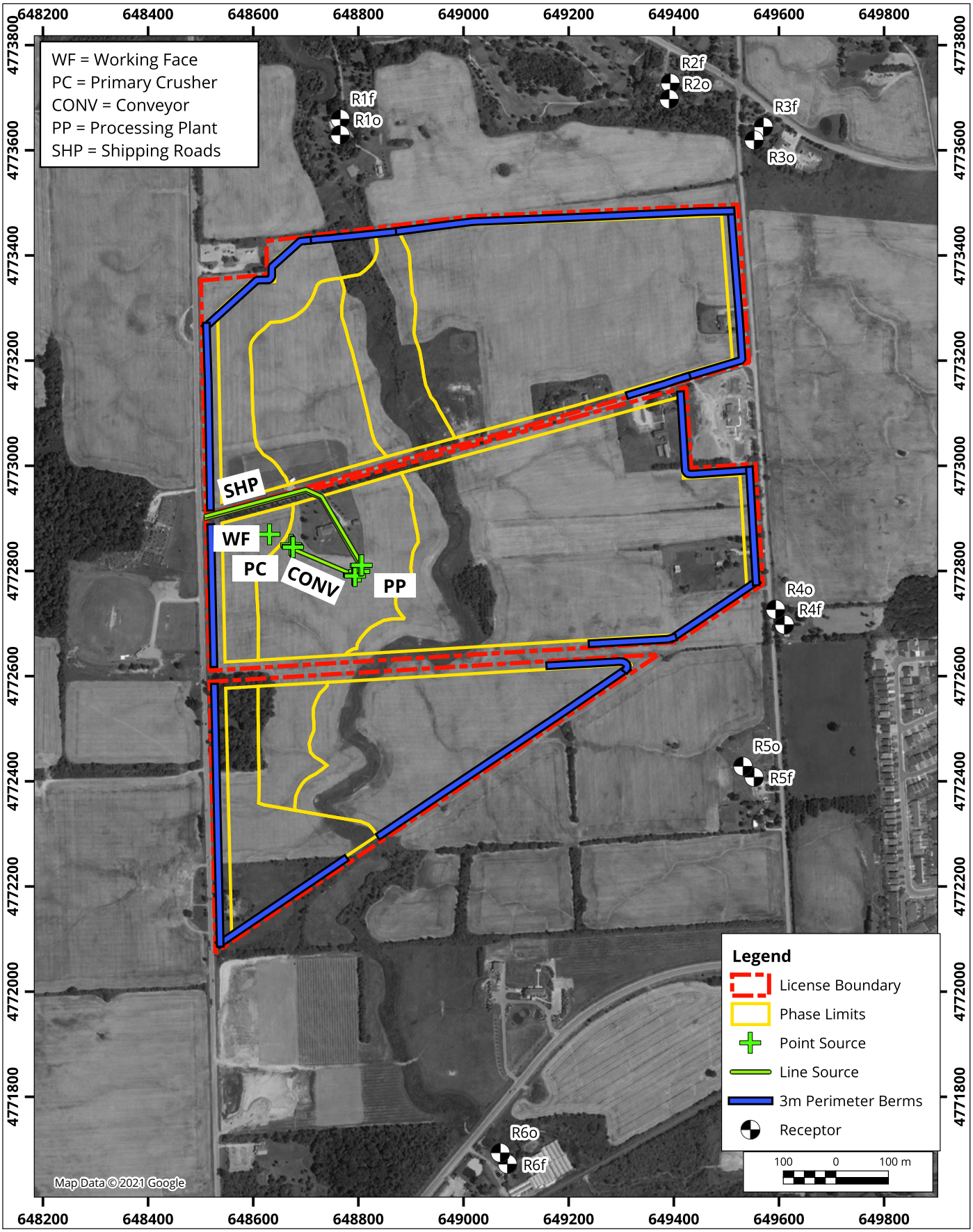
Upper's Quarry, 1603157

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

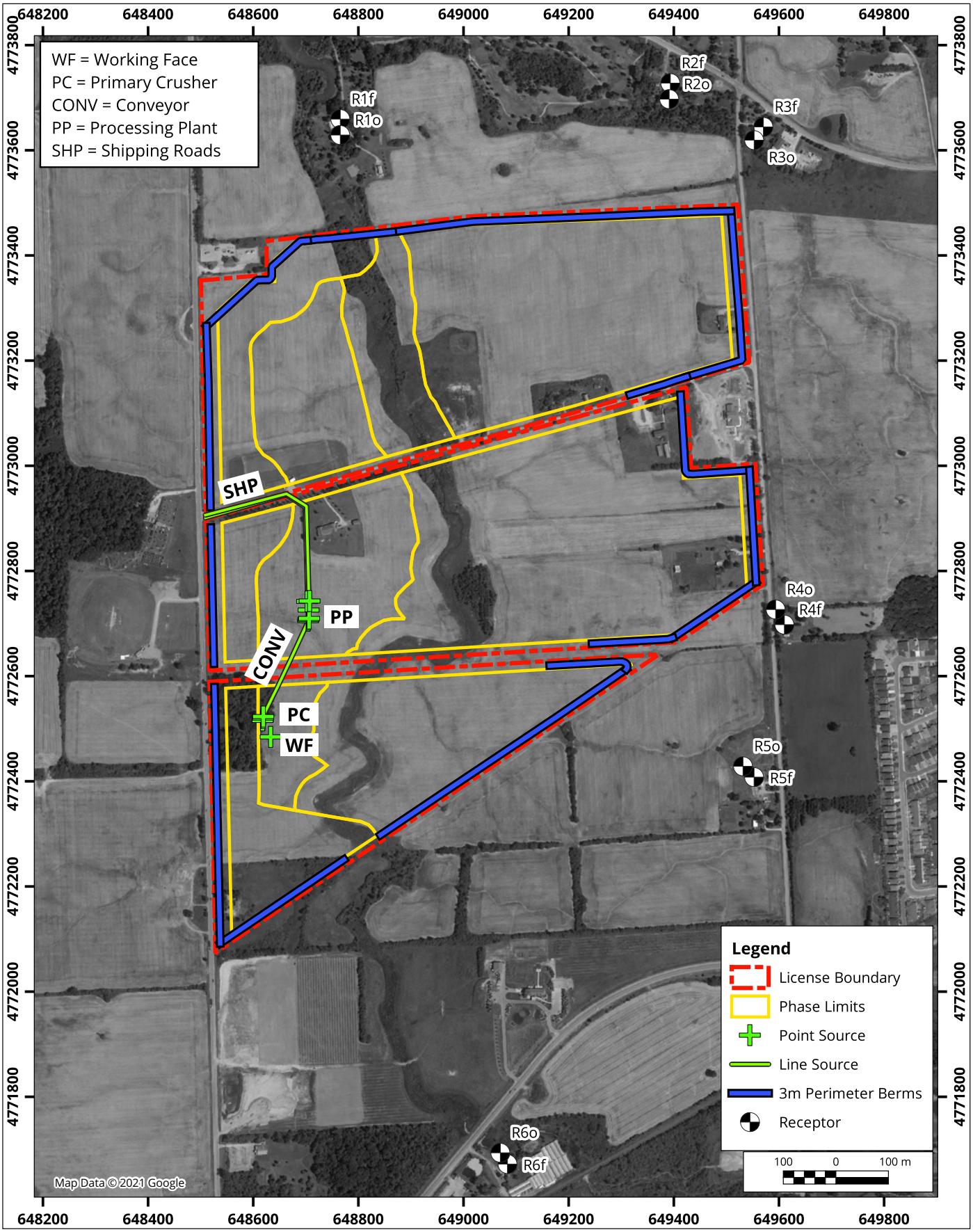
True North

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

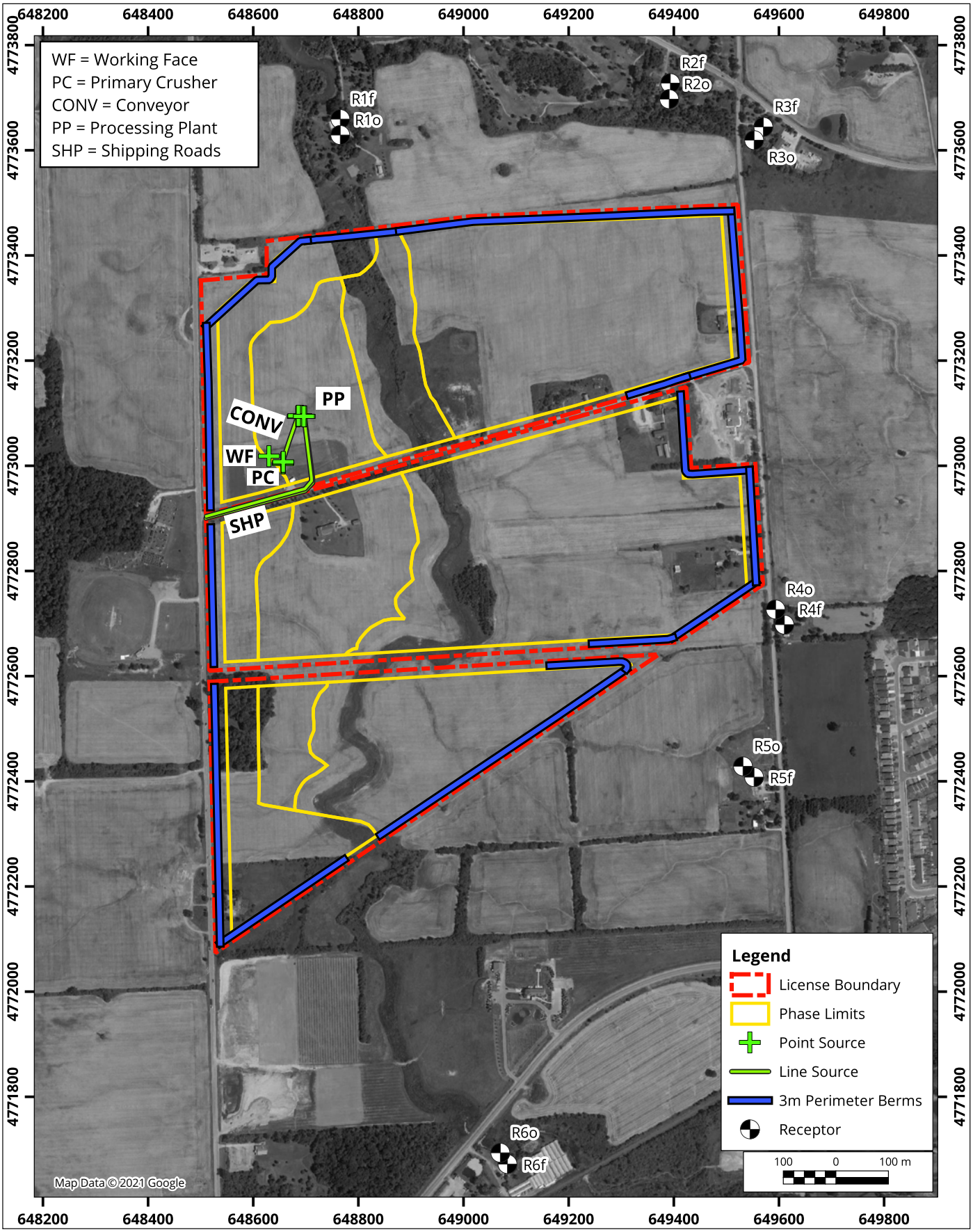
True North

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

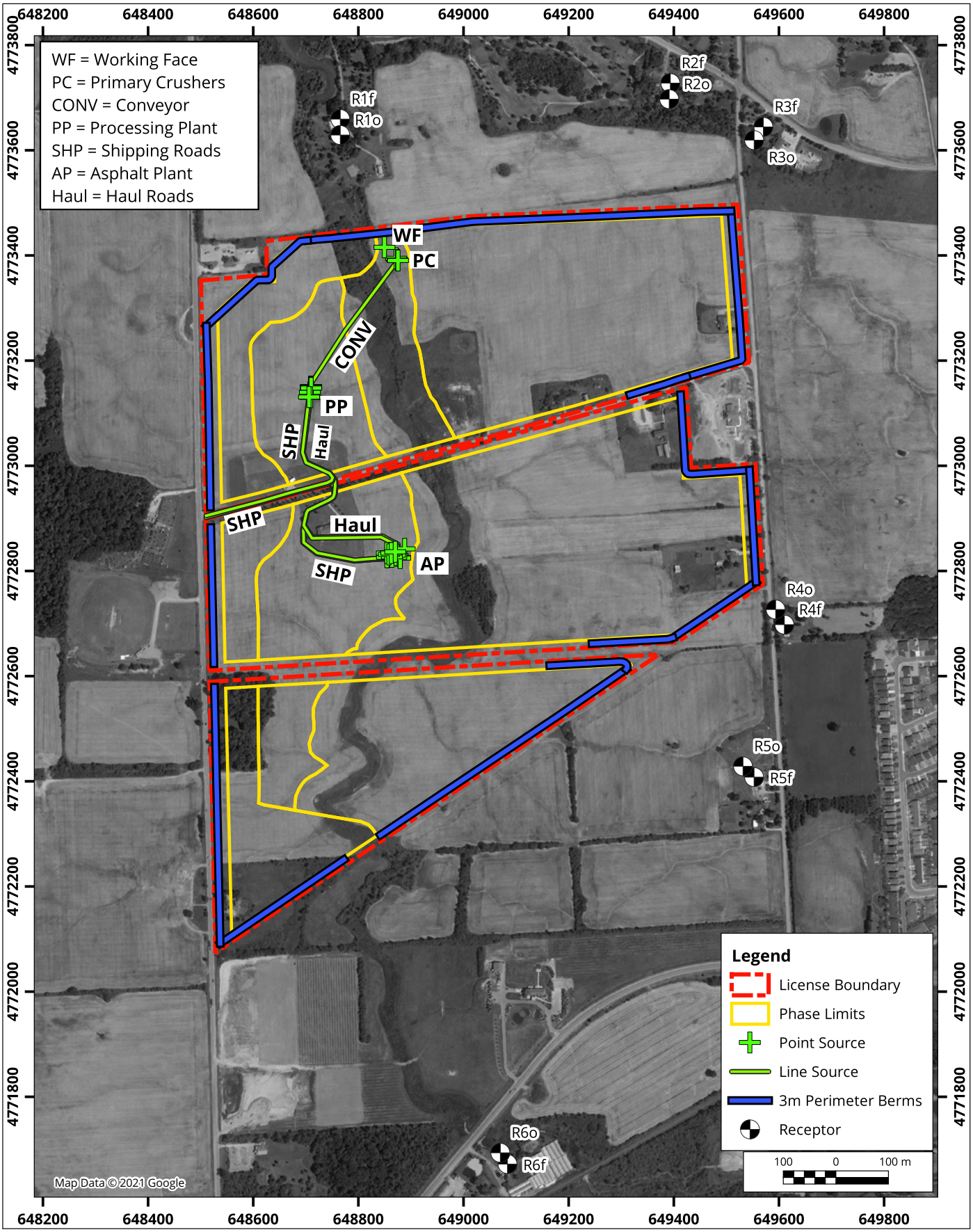
True North

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

Map Projection: NAD 1983 UTM Zone 17N

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

Project #: 1603157



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 Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

Appendix H - Sample Calculation - Ph1A South Sinking Cut - Block 22

Receiver
Name: South Lands - Block 22
ID: Block22
X: 648229.01 m
Y: 4772436.90 m
Z: 193.50 m

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Loader", ID: "P1AS_Sinkcut_PP_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)
1435	648705.00	4772726.00	179.50	0	D	A	105.6	0.0	0.0	0.0	0.0	65.9	4.2	-2.0	0.0	0.0	0.0	0.0	0.0	37.5
1435	648705.00	4772726.00	179.50	0	N	A	105.6	0.0	0.0	0.0	0.0	65.9	4.2	-2.0	0.0	0.0	0.0	0.0	0.0	37.5
1435	648705.00	4772726.00	179.50	0	E	A	105.6	0.0	0.0	0.0	0.0	65.9	4.2	-2.0	0.0	0.0	0.0	0.0	0.0	37.5

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC Primary Crusher", ID: "P1AS_Sinkcut_PC_PrimaryCrush"																				
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)
1451	648619.00	4772520.00	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	4.8	0.0	0.0	49.4
1451	648619.00	4772520.00	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	4.8	0.0	0.0	-138.6
1451	648619.00	4772520.00	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	4.8	0.0	0.0	-138.6

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Idling Truck", ID: "P1AS_Sinkcut_PP_Trk1"																				
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)
1466	648703.00	4772742.00	180.00	0	D	A	96.3	0.0	0.0	0.0	0.0	66.0	2.8	-2.0	0.0	0.0	3.7	0.0	0.0	25.8
1466	648703.00	4772742.00	180.00	0	N	A	96.3	0.0	0.0	0.0	0.0	66.0	2.8	-2.0	0.0	0.0	3.7	0.0	0.0	25.8
1466	648703.00	4772742.00	180.00	0	E	A	96.3	0.0	0.0	0.0	0.0	66.0	2.8	-2.0	0.0	0.0	3.7	0.0	0.0	25.8

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Idling Truck", ID: "P1AS_Sinkcut_PP_Trk2"																				
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)
1481	648707.00	4772743.00	180.00	0	D	A	96.3	0.0	0.0	0.0	0.0	66.1	2.8	-2.1	0.0	0.0	3.5	0.0	0.0	25.9
1481	648707.00	4772743.00	180.00	0	N	A	96.3	0.0	0.0	0.0	0.0	66.1	2.8	-2.1	0.0	0.0	3.5	0.0	0.0	25.9
1481	648707.00	4772743.00	180.00	0	E	A	96.3	0.0	0.0	0.0	0.0	66.1	2.8	-2.1	0.0	0.0	3.5	0.0	0.0	25.9

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC Primary Screen", ID: "P1AS_Sinkcut_PC_PrimaryScreen"																				
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)
1496	648619.00	4772523.00	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	4.8	0.0	0.0	44.7
1496	648619.00	4772523.00	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	4.8	0.0	0.0	-143.3
1496	648619.00	4772523.00	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	4.8	0.0	0.0	-143.3

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC loader dumping into crusher", ID: "P1AS_Sinkcut_PC_CrusherDump"																				
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)
1513	648618.00	4772517.00	180.00	0	D	A	123.0	0.0	-10.8	0.0	0.0	63.0	2.2	-1.4	0.0	0.0	4.8	0.0	0.0	43.6
1513	648618.00	4772517.00	180.00	0	N	A	123.0	0.0	-188.0	0.0	0.0	63.0	2.2	-1.4	0.0	0.0	4.8	0.0	0.0	-133.6
1513	648618.00	4772517.00	180.00	0	E	A	123.0	0.0	-188.0	0.0	0.0	63.0	2.2	-1.4	0.0	0.0	4.8	0.0	0.0	-133.6

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Secondary Crusher", ID: "P1AS_Sinkcut_PP_SecondaryCrush"																				
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)
1531	648705.00	4772706.00	180.00	0	D	A	114.6	0.0	0.0	0.0	0.0	65.8	3.0	-1.9	0.0	0.0	0.0	0.0	0.0	47.7
1531	648705.00	4772706.00	180.00	0	N	A	114.6	0.0	-188.0	0.0	0.0	65.8	3.0	-1.9	0.0	0.0	0.0	0.0	0.0	-140.3
1531	648705.00	4772706.00	180.00	0	E	A	114.6	0.0	-188.0	0.0	0.0	65.8	3.0	-1.9	0.0	0.0	0.0	0.0	0.0	-140.3

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Secondary & Tertiary Screen", ID: "P1AS_Sinkcut_PP_SecondaryTertiaryScreen"																				
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)
1546	648705.00	4772708.00	180.00	0	D	A	113.8	0.0	0.0	0.0	0.0	65.8	3.2	-1.9	0.0	0.0	0.0	0.0	0.0	46.7
1546	648705.00	4772708.00	180.00	0	N	A	113.8	0.0	-188.0	0.0	0.0	65.8	3.2	-1.9	0.0	0.0	0.0	0.0	0.0	-141.3
1546	648705.00	4772708.00	180.00	0	E	A	113.8	0.0	-188.0	0.0	0.0	65.8	3.2	-1.9	0.0	0.0	0.0	0.0	0.0	-141.3

Point Source, ISO 9613, Name: "P1AS_Sinkcut, WF Drill", ID: "P1AS_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)
1562	648633.00	4772485.00	179.50	0	D	A	110.0	0.0	0.0	0.0	0.0	63.2	3.7	-1.7	0.0	0.0	4.8	0.0	0.0	40.0
1562	648633.00	4772485.00	179.50	0	N	A	110.0	0.0	-188.0	0.0	0.0	63.2	3.7	-1.7	0.0	0.0	4.8	0.0	0.0	-148.0
1562	648633.00	4772485.00	179.50	0	E	A	110.0	0.0	-188.0	0.0	0.0	63.2	3.7	-1.7	0.0	0.0	4.8	0.0	0.0	-148.0

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Aggregate Shipping from PP, Full", ID: "P1AS_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)
1579	648705.56	4772833.03	180.50	0	DEN	A	67.0	22.7	0.0	0.0	0.0	66.8	3.2	-1.9	0.0	0.0	4.8	0.0	0.0	16.8
1642	648525.21	4772910.97	187.70	0	DEN	A	67.0	15.3	0.0	0.0	0.0	65.9	2.9	-0.4	0.0	0.0	0.0	0.0	0.0	13.8
1658	648603.37	4772932.82	187.03	0	DEN	A	67.0	21.1	0.0	0.0	0.0	66.9	3.2	-1.3	0.0	0.0	0.0	0.0	0.0	19.3
1754	648683.63	4772937.98	183.50	0	DEN	A	67.0	16.5	0.0	0.0	0.0	67.6	3.3	-1.9	0.0	0.0	4.8	0.0	0.0	9.7

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Aggregate Shipping from PP, Empty", ID: "P1AS_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)
1595	648705.56	4772833.03	180.50	0	DEN	A	67.0	22.7	0.0	0.0	0.0	66.8	3.2	-1.9	0.0	0.0	4.8	0.0	0.0	16.8
1611	648525.21	4772910.97	187.70	0	DEN	A	67.0	15.3	0.0	0.0	0.0	65.9	2.9	-0.4	0.0	0.0	0.0	0.0	0.0	13.8
1625	648603.37	4772932.82	187.03	0	DEN	A	67.0	21.1	0.0	0.0	0.0	66.9	3.2	-1.3	0.0	0.0	0.0	0.0	0.0	19.3
1770	648683.63	4772937.98	183.50	0	DEN	A	67.0	16.5	0.0	0.0	0.0	67.6	3.3	-1.9	0.0	0.0	4.8	0.0	0.0	9.7

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PC Loader", ID: "P1AS_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)
1676	648618.00	4772516.00	179.50	0	D	A	105.6	0.0	0.0	0.0	0.0	63.0	3.5	-1.5	0.0	0.0	4.8	0.0	0.0	35.8
1676	648618.00	4772516.00	179.50	0	N	A	105.6	0.0	-188.0	0.0	0.0	63.0	3.5	-1.5	0.0	0.0	4.8	0.0	0.0	-152.2
1676	648618.00	4772516.00	179.50	0	E	A	105.6	0.0	-188.0	0.0	0.0	63.0	3.5	-1.5	0.0	0.0	4.8	0.0	0.0	-152.2

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1AS_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)
1692	648630.83	4772548.05	180.50	0	D	A	82.7	16.9	0.0	0.0	0.0	63.4	2.1	-1.5	0.0	0.0	4.8	0.0	0.0	30.9
1692	648630.83	4772548.05	180.50	0	N	A	82.7	16.9	-188.0	0.0	0.0	63.4	2.1	-1.5	0.0	0.0	4.8	0.0	0.0	-157.1
1692	648630.83	4772548.05	180.50	0	E	A	82.7	16.9	-188.0	0.0	0.0	63.4	2.1	-1.5	0.0	0.0	4.8	0.0	0.0	-157.1
1707	648644.42	4772577.16	180.50	0	D	A	82.7	11.8	0.0	0.0	0.0	63.8	2.1	-1.6	0.0	0.0	0.0	0.0	0.0	30.2
1707	648644.42	4772577.16	180.50	0	N	A	82.7	11.8	-188.0	0.0	0.0	63.8	2.1	-1.6	0.0	0.0	0.0	0.0	0.0	-157.8
1707	648644.42	4772577.16	180.50	0	E	A	82.7	11.8	-188.0	0.0	0.0	63.8	2.1	-1.6	0.0	0.0	0.0	0.0	0.0	-157.8
1723	648650.06	4772589.23	180.50	0	D	A	82.7	10.6	0.0	0.0	0.0	64.0	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	24.0
1723	648650.06	4772589.23	180.50	0	N	A	82.7	10.6	-188.0	0.0	0.0	64.0	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-164.0
1723	648650.06	4772589.23	180.50	0	E	A	82.7	10.6	-188.0	0.0	0.0	64.0	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-164.0
1738	648687.79	4772670.01	180.50	0	D	A	82.7	19.2	0.0	0.0	0.0	65.2	2.4	-1.5	0.0	0.0	4.8	0.0	0.0	31.1
1738	648687.79	4772670.01	180.50	0	N	A	82.7	19.2	-188.0	0.0	0.0	65.2	2.4	-1.5	0.0	0.0	4.8	0.0	0.0	-156.9
1738	648687.79	4772670.01	180.50	0	E	A	82.7	19.2	-188.0	0.0	0.0	65.2	2.4	-1.5	0.0	0.0	4.8	0.0	0.0	-156.9
1802	648656.97	4772604.02	184.82	0	D	A	82.7	9.3	0.0	0.0	0.0	64.2	2.2	-1.4	0.0	0.0	0.0	0.0	0.0	27.0
1802	648656.97	4772604.02	184.82	0	N	A	82.7	9.3	-188.0	0.0	0.0	64.2	2.2	-1.4	0.0	0.0	0.0	0.0	0.0	-161.0
1802	648656.97	4772604.02	184.82	0	E	A	82.7	9.3	-188.0	0.0	0.0	64.2	2.2	-1.4	0.0	0.0	0.0	0.0	0.0	-161.0
1819	648667.14	4772625.78	184.06	0	D	A	82.7	9.5	0.0	0.0	0.0	64.6	2.3	-0.9	0.0	0.0	0.0	0.0	0.0	26.3
1819	648667.14	4772625.78	184.06	0	N	A	82.7	9.5	-188.0	0.0	0.0	64.6	2.3	-0.9	0.0	0.0	0.0	0.0	0.0	-161.7
1819	648667.14	4772625.78	184.06	0	E	A	82.7	9.5	-188.0	0.0	0.0	64.6	2.3	-0.9	0.0	0.0	0.0	0.0	0.0	-161.7
1836	648663.81	4772618.66	184.19	0	D	A	82.7	8.4	0.0	0.0	0.0	64.5	2.3	-1.1	0.0	0.0	0.0	0.0	0.0	25.5
1836	648663.81	4772618.66	184.19	0	N	A	82.7	8.4	-188.0	0.0	0.0	64.5	2.3	-1.1	0.0	0.0	0.0	0.0	0.0	-162.5
1836	648663.81	4772618.66	184.19	0	E	A	82.7	8.4	-188.0	0.0	0.0	64.5	2.3	-1.1	0.0	0.0	0.0	0.0	0.0	-162.5
1853	648653.84	4772597.33	185.00	0	D	A	82.7	8.0	0.0	0.0	0.0	64.1	2.2	-1.6	0.0	0.0	0.0	0.0	0.0	25.9
1853	648653.84	4772597.33	185.00	0	N	A	82.7	8.0	-188.0	0.0	0.0	64.1	2.2	-1.6	0.0	0.0	0.0	0.0	0.0	-162.1
1853	648653.84	4772597.33	185.00	0	E	A	82.7	8.0	-188.0	0.0	0.0	64.1	2.2	-1.6	0.0	0.0	0.0	0.0	0.0	-162.1
1870	648661.22	4772613.12	184.38	0	D	A	82.7	7.3	0.0	0.0	0.0	64.4	2.3	-1.2	0.0	0.0	0.0	0.0	0.0	24.6
1870	648661.22	4772613.12	184.38	0	N	A	82.7	7.3	-188.0	0.0	0.0	64.4	2.3	-1.2	0.0	0.0	0.0	0.0	0.0	-163.4
1870	648661.22	4772613.12	184.38	0	E	A	82.7	7.3	-188.0	0.0	0.0	64.4	2.3	-1.2	0.0	0.0	0.0	0.0	0.0	-163.4
1885	648659.43	4772609.28	184.57	0	D	A	82.7	4.9	0.0	0.0	0.0	64.3	2.2	-1.3	0.0	0.0	0.0	0.0	0.0	22.4
1885	648659.43	4772609.28	184.57	0	N	A	82.7	4.9	-188.0	0.0	0.0	64.3	2.2	-1.3	0.0	0.0	0.0	0.0	0.0	-165.6
1885	648659.43	4772609.28	184.57	0	E	A	82.7	4.9	-188.0	0.0	0.0	64.3	2.2	-1.3	0.0	0.0	0.0	0.0	0.0	-165.6
1900	648669.38	4772630.60	183.99	0	D	A	82.7	2.5	0.0	0.0	0.0	64.6	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	19.2
1900	648669.38	4772630.60	183.99	0	N	A	82.7	2.5	-188.0	0.0	0.0	64.6	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-168.8
1900	648669.38	4772630.60	183.99	0	E	A	82.7	2.5	-188.0	0.0	0.0	64.6	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-168.8

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1AS_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)
1916	648652.52	4772594.49	183.94	0	D	A	82.7	1.8	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	20.0
1916	648652.52	4772594.49	183.94	0	N	A	82.7	1.8	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-168.0
1916	648652.52	4772594.49	183.94	0	E	A	82.7	1.8	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-168.0
1934	648669.98	4772631.88	181.10	0	D	A	82.7	-0.0	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	11.9
1934	648669.98	4772631.88	181.10	0	N	A	82.7	-0.0	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-176.1
1934	648669.98	4772631.88	181.10	0	E	A	82.7	-0.0	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-176.1
1951	648652.52	4772594.49	181.02	0	D	A	82.7	-0.8	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	17.3
1951	648652.52	4772594.49	181.02	0	N	A	82.7	-0.8	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-170.7
1951	648652.52	4772594.49	181.02	0	E	A	82.7	-0.8	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-170.7
1968	648669.98	4772631.88	182.92	0	D	A	82.7	-1.5	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	15.0
1968	648669.98	4772631.88	182.92	0	N	A	82.7	-1.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-173.0
1968	648669.98	4772631.88	182.92	0	E	A	82.7	-1.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-173.0
1984	648669.98	4772631.88	183.62	0	D	A	82.7	-1.6	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	15.0
1984	648669.98	4772631.88	183.62	0	N	A	82.7	-1.6	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-173.0
1984	648669.98	4772631.88	183.62	0	E	A	82.7	-1.6	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-173.0
1999	648669.98	4772631.88	182.28	0	D	A	82.7	-2.4	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	14.1
1999	648669.98	4772631.88	182.28	0	N	A	82.7	-2.4	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-173.9
1999	648669.98	4772631.88	182.28	0	E	A	82.7	-2.4	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-173.9
2016	648652.52	4772594.49	182.49	0	D	A	82.7	-3.2	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	14.9
2016	648652.52	4772594.49	182.49	0	N	A	82.7	-3.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-173.1
2016	648652.52	4772594.49	182.49	0	E	A	82.7	-3.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-173.1
2031	648669.87	4772631.65	183.98	0	D	A	82.7	-2.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	13.7
2031	648669.87	4772631.65	183.98	0	N	A	82.7	-2.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-174.3
2031	648669.87	4772631.65	183.98	0	E	A	82.7	-2.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-174.3
2048	648652.52	4772594.49	182.95	0	D	A	82.7	-3.5	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	14.6
2048	648652.52	4772594.49	182.95	0	N	A	82.7	-3.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-173.4
2048	648652.52	4772594.49	182.95	0	E	A	82.7	-3.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-173.4
2064	648652.52	4772594.49	182.03	0	D	A	82.7	-3.7	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	14.4
2064	648652.52	4772594.49	182.03	0	N	A	82.7	-3.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-173.6
2064	648652.52	4772594.49	182.03	0	E	A	82.7	-3.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-173.6
2082	648669.98	4772631.88	181.76	0	D	A	82.7	-3.3	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	13.3
2082	648669.98	4772631.88	181.76	0	N	A	82.7	-3.3	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-174.7
2082	648669.98	4772631.88	181.76	0	E	A	82.7	-3.3	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-174.7
2098	648669.98	4772631.88	181.32	0	D	A	82.7	-3.8	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	8.0
2098	648669.98	4772631.88	181.32	0	N	A	82.7	-3.8	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-180.0
2098	648669.98	4772631.88	181.32	0	E	A	82.7	-3.8	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-180.0
2114	648652.52	4772594.49	181.67	0	D	A	82.7	-5.2	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	12.9
2114	648652.52	4772594.49	181.67	0	N	A	82.7	-5.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-175.1
2114	648652.52	4772594.49	181.67	0	E	A	82.7	-5.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-175.1
2131	648652.52	4772594.49	184.85	0	D	A	82.7	-5.3	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	12.8
2131	648652.52	4772594.49	184.85	0	N	A	82.7	-5.3	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-175.2
2131	648652.52	4772594.49	184.85	0	E	A	82.7	-5.3	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-175.2
2148	648669.98	4772631.88	180.95	0	D	A	82.7	-4.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	7.0
2148	648669.98	4772631.88	180.95	0	N	A	82.7	-4.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-181.0
2148	648669.98	4772631.88	180.95	0	E	A	82.7	-4.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-181.0
2162	648652.52	4772594.49	181.39	0	D	A	82.7	-6.0	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	12.1
2162	648652.52	4772594.49	181.39	0	N	A	82.7	-6.0	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-175.9
2162	648652.52	4772594.49	181.39	0	E	A	82.7	-6.0	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-175.9
2180	648652.52	4772594.49	181.14	0	D	A	82.7	-6.1	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	12.0
2180	648652.52	4772594.49	181.14	0	N	A	82.7	-6.1	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-176.0
2180	648652.52	4772594.49	181.14	0	E	A	82.7	-6.1	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-176.0
2197	648652.52	4772594.49	180.90	0	D	A	82.7	-6.3	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	11.8
2197	648652.52	4772594.49	180.90	0	N	A	82.7	-6.3	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-176.2
2197	648652.52	4772594.49	180.90	0	E	A	82.7	-6.3	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-176.2
2212	648652.52	4772594.49	180.67	0	D	A	82.7	-6.4	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	6.9
2212	648652.52	4772594.49	180.67	0	N	A	82.7	-6.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-181.1
2212	648652.52	4772594.49	180.67	0	E	A	82.7	-6.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-181.1
2229	648652.52	4772594.49	180.45	0	D	A	82.7	-6.8	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	6.5
2229	648652.52	4772594.49	180.45	0	N	A	82.7	-6.8	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-181.5
2229	648652.52	4772594.49	180.45	0	E	A	82.7	-6.8	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-181.5
2246	648652.52	4772594.49	180.46	0	D	A	82.7	-6.9	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	6.4
2246	648652.52	4772594.49	180.46	0	N	A	82.7	-6.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-181.6
2246	648652.52	4772594.49	180.46	0	E	A	82.7	-6.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-181.6

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1AS_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)
2263	648669.98	4772631.88	180.67	0	D	A	82.7	-6.4	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	5.5
2263	648669.98	4772631.88	180.67	0	N	A	82.7	-6.4	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-182.5
2263	648669.98	4772631.88	180.67	0	E	A	82.7	-6.4	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-182.5
2279	648669.98	4772631.88	180.45	0	D	A	82.7	-6.7	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	8.0	0.0	0.0	1.9
2279	648669.98	4772631.88	180.45	0	N	A	82.7	-6.7	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	8.0	0.0	0.0	-186.1
2279	648669.98	4772631.88	180.45	0	E	A	82.7	-6.7	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	8.0	0.0	0.0	-186.1
2297	648669.98	4772631.88	180.45	0	D	A	82.7	-6.7	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	8.3	0.0	0.0	1.5
2297	648669.98	4772631.88	180.45	0	N	A	82.7	-6.7	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	8.3	0.0	0.0	-186.5
2297	648669.98	4772631.88	180.45	0	E	A	82.7	-6.7	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	8.3	0.0	0.0	-186.5
2312	648652.52	4772594.49	180.65	0	D	A	82.7	-7.3	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	6.0
2312	648652.52	4772594.49	180.65	0	N	A	82.7	-7.3	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-182.0
2312	648652.52	4772594.49	180.65	0	E	A	82.7	-7.3	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-182.0
2327	648652.52	4772594.49	180.81	0	D	A	82.7	-7.4	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	10.7
2327	648652.52	4772594.49	180.81	0	N	A	82.7	-7.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-177.3
2327	648652.52	4772594.49	180.81	0	E	A	82.7	-7.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-177.3
2343	648652.52	4772594.49	180.83	0	D	A	82.7	-7.7	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	10.4
2343	648652.52	4772594.49	180.83	0	N	A	82.7	-7.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-177.6
2343	648652.52	4772594.49	180.83	0	E	A	82.7	-7.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-177.6
2360	648670.02	4772631.95	180.56	0	D	A	82.7	-7.6	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	4.3
2360	648670.02	4772631.95	180.56	0	N	A	82.7	-7.6	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-183.7
2360	648670.02	4772631.95	180.56	0	E	A	82.7	-7.6	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-183.7
2377	648669.98	4772631.88	180.50	0	D	A	82.7	-8.2	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	3.7
2377	648669.98	4772631.88	180.50	0	N	A	82.7	-8.2	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-184.3
2377	648669.98	4772631.88	180.50	0	E	A	82.7	-8.2	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-184.3
2393	648652.52	4772594.49	180.78	0	D	A	82.7	-8.9	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	9.2
2393	648652.52	4772594.49	180.78	0	N	A	82.7	-8.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-178.8
2393	648652.52	4772594.49	180.78	0	E	A	82.7	-8.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-178.8
2408	648652.52	4772594.49	180.90	0	D	A	82.7	-9.0	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	9.1
2408	648652.52	4772594.49	180.90	0	N	A	82.7	-9.0	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-178.9
2408	648652.52	4772594.49	180.90	0	E	A	82.7	-9.0	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-178.9
2425	648669.98	4772631.88	180.49	0	D	A	82.7	-8.5	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	3.4
2425	648669.98	4772631.88	180.49	0	N	A	82.7	-8.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-184.6
2425	648669.98	4772631.88	180.49	0	E	A	82.7	-8.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-184.6
2438	648652.52	4772594.49	181.13	0	D	A	82.7	-9.4	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	8.7
2438	648652.52	4772594.49	181.13	0	N	A	82.7	-9.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-179.3
2438	648652.52	4772594.49	181.13	0	E	A	82.7	-9.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-179.3
2455	648669.98	4772631.88	180.64	0	D	A	82.7	-8.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	3.0
2455	648669.98	4772631.88	180.64	0	N	A	82.7	-8.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.0
2455	648669.98	4772631.88	180.64	0	E	A	82.7	-8.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.0
2468	648652.52	4772594.49	180.98	0	D	A	82.7	-9.6	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	8.5
2468	648652.52	4772594.49	180.98	0	N	A	82.7	-9.6	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-179.5
2468	648652.52	4772594.49	180.98	0	E	A	82.7	-9.6	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-179.5
2483	648669.98	4772631.88	180.76	0	D	A	82.7	-9.1	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	2.8
2483	648669.98	4772631.88	180.76	0	N	A	82.7	-9.1	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.2
2483	648669.98	4772631.88	180.76	0	E	A	82.7	-9.1	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.2
2499	648652.52	4772594.49	181.09	0	D	A	82.7	-9.7	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	8.4
2499	648652.52	4772594.49	181.09	0	N	A	82.7	-9.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-179.6
2499	648652.52	4772594.49	181.09	0	E	A	82.7	-9.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-179.6
2515	648669.98	4772631.88	180.88	0	D	A	82.7	-9.5	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	2.4
2515	648669.98	4772631.88	180.88	0	N	A	82.7	-9.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.6
2515	648669.98	4772631.88	180.88	0	E	A	82.7	-9.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.6
2532	648669.98	4772631.88	180.97	0	D	A	82.7	-9.7	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	2.2
2532	648669.98	4772631.88	180.97	0	N	A	82.7	-9.7	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.8
2532	648669.98	4772631.88	180.97	0	E	A	82.7	-9.7	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-185.8
2548	648652.52	4772594.49	181.19	0	D	A	82.7	-10.4	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	7.7
2548	648652.52	4772594.49	181.19	0	N	A	82.7	-10.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.3
2548	648652.52	4772594.49	181.19	0	E	A	82.7	-10.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.3
2567	648669.98	4772631.88	181.08	0	D	A	82.7	-9.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	2.0
2567	648669.98	4772631.88	181.08	0	N	A	82.7	-9.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-186.0
2567	648669.98	4772631.88	181.08	0	E	A	82.7	-9.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-186.0
2581	648652.51	4772594.48	180.56	0	D	A	82.7	-10.5	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	2.9
2581	648652.51	4772594.48	180.56	0	N	A	82.7	-10.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-185.1
2581	648652.51	4772594.48	180.56	0	E	A	82.7	-10.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-185.1

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1AS_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)
2594	648652.52	4772594.49	181.11	0	D	A	82.7	-10.7	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	7.4
2594	648652.52	4772594.49	181.11	0	N	A	82.7	-10.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.6
2594	648652.52	4772594.49	181.11	0	E	A	82.7	-10.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.6
2606	648652.52	4772594.49	181.19	0	D	A	82.7	-10.9	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	7.2
2606	648652.52	4772594.49	181.19	0	N	A	82.7	-10.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.8
2606	648652.52	4772594.49	181.19	0	E	A	82.7	-10.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.8
2617	648652.52	4772594.49	181.27	0	D	A	82.7	-11.0	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	7.1
2617	648652.52	4772594.49	181.27	0	N	A	82.7	-11.0	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.9
2617	648652.52	4772594.49	181.27	0	E	A	82.7	-11.0	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-180.9
2631	648669.98	4772631.88	181.14	0	D	A	82.7	-10.5	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	1.4
2631	648669.98	4772631.88	181.14	0	N	A	82.7	-10.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-186.6
2631	648669.98	4772631.88	181.14	0	E	A	82.7	-10.5	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-186.6
2644	648669.98	4772631.88	181.45	0	D	A	82.7	-10.8	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	1.1
2644	648669.98	4772631.88	181.45	0	N	A	82.7	-10.8	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-186.9
2644	648669.98	4772631.88	181.45	0	E	A	82.7	-10.8	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-186.9
2655	648669.98	4772631.88	181.23	0	D	A	82.7	-10.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	1.0
2655	648669.98	4772631.88	181.23	0	N	A	82.7	-10.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-187.0
2655	648669.98	4772631.88	181.23	0	E	A	82.7	-10.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-187.0
2671	648669.98	4772631.88	181.37	0	D	A	82.7	-10.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	1.0
2671	648669.98	4772631.88	181.37	0	N	A	82.7	-10.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-187.0
2671	648669.98	4772631.88	181.37	0	E	A	82.7	-10.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-187.0
2686	648669.98	4772631.88	181.29	0	D	A	82.7	-11.4	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	0.5
2686	648669.98	4772631.88	181.29	0	N	A	82.7	-11.4	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-187.5
2686	648669.98	4772631.88	181.29	0	E	A	82.7	-11.4	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-187.5
2696	648652.52	4772594.49	181.21	0	D	A	82.7	-13.2	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	4.9
2696	648652.52	4772594.49	181.21	0	N	A	82.7	-13.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-183.1
2696	648652.52	4772594.49	181.21	0	E	A	82.7	-13.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-183.1
2706	648652.52	4772594.49	181.33	0	D	A	82.7	-13.4	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	4.7
2706	648652.52	4772594.49	181.33	0	N	A	82.7	-13.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-183.3
2706	648652.52	4772594.49	181.33	0	E	A	82.7	-13.4	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-183.3
2716	648670.06	4772632.05	180.51	0	D	A	82.7	-12.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-1.0
2716	648670.06	4772632.05	180.51	0	N	A	82.7	-12.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-189.0
2716	648670.06	4772632.05	180.51	0	E	A	82.7	-12.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-189.0
2726	648669.98	4772631.88	181.52	0	D	A	82.7	-13.3	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-1.4
2726	648669.98	4772631.88	181.52	0	N	A	82.7	-13.3	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-189.4
2726	648669.98	4772631.88	181.52	0	E	A	82.7	-13.3	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-189.4
2735	648652.52	4772594.49	181.41	0	D	A	82.7	-14.2	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	3.9
2735	648652.52	4772594.49	181.41	0	N	A	82.7	-14.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-184.1
2735	648652.52	4772594.49	181.41	0	E	A	82.7	-14.2	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-184.1
2743	648652.52	4772594.49	181.37	0	D	A	82.7	-14.5	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	3.6
2743	648652.52	4772594.49	181.37	0	N	A	82.7	-14.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-184.4
2743	648652.52	4772594.49	181.37	0	E	A	82.7	-14.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-184.4
2754	648669.98	4772631.88	181.56	0	D	A	82.7	-14.1	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	2.5
2754	648669.98	4772631.88	181.56	0	N	A	82.7	-14.1	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-185.5
2754	648669.98	4772631.88	181.56	0	E	A	82.7	-14.1	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-185.5
2765	648669.98	4772631.88	181.11	0	D	A	82.7	-15.9	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-4.0
2765	648669.98	4772631.88	181.11	0	N	A	82.7	-15.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-192.0
2765	648669.98	4772631.88	181.11	0	E	A	82.7	-15.9	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-192.0
2773	648652.52	4772594.49	180.95	0	D	A	82.7	-16.6	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	1.5
2773	648652.52	4772594.49	180.95	0	N	A	82.7	-16.6	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-186.5
2773	648652.52	4772594.49	180.95	0	E	A	82.7	-16.6	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-186.5
2782	648652.51	4772594.46	180.51	0	D	A	82.7	-17.7	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-4.4
2782	648652.51	4772594.46	180.51	0	N	A	82.7	-17.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-192.4
2782	648652.51	4772594.46	180.51	0	E	A	82.7	-17.7	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	4.8	0.0	0.0	-192.4
2791	648669.98	4772631.88	181.59	0	D	A	82.7	-17.6	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-1.1
2791	648669.98	4772631.88	181.59	0	N	A	82.7	-17.6	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-189.1
2791	648669.98	4772631.88	181.59	0	E	A	82.7	-17.6	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	-189.1
2799	648652.52	4772594.49	180.94	0	D	A	82.7	-18.9	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-0.8
2799	648652.52	4772594.49	180.94	0	N	A	82.7	-18.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-188.8
2799	648652.52	4772594.49	180.94	0	E	A	82.7	-18.9	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-188.8
2805	648669.98	4772631.88	180.93	0	D	A	82.7	-18.8	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-6.9
2805	648669.98	4772631.88	180.93	0	N	A	82.7	-18.8	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-194.9
2805	648669.98	4772631.88	180.93	0	E	A	82.7	-18.8	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-194.9

Line Source, ISO 9613, Name: "P1AS_Sinkcut, Conveyor", ID: "P1AS_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)
2810	648652.52	4772594.49	180.91	0	D	A	82.7	-19.5	0.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-1.4
2810	648652.52	4772594.49	180.91	0	N	A	82.7	-19.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-189.4
2810	648652.52	4772594.49	180.91	0	E	A	82.7	-19.5	-188.0	0.0	0.0	64.1	2.2	-1.7	0.0	0.0	0.0	0.0	0.0	-189.4
2817	648669.98	4772631.88	181.26	0	D	A	82.7	-19.2	0.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-7.4
2817	648669.98	4772631.88	181.26	0	N	A	82.7	-19.2	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-195.4
2817	648669.98	4772631.88	181.26	0	E	A	82.7	-19.2	-188.0	0.0	0.0	64.7	2.3	-0.8	0.0	0.0	4.7	0.0	0.0	-195.4

Point Source, ISO 9613, Name: "P1AS_Sinkcut, PP Tertiary Crusher", ID: "P1AS_Sinkcut_PP_TertiaryCrush"																				
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)
1786	648706.00	4772710.00	180.00	0	D	A	99.2	0.0	0.0	0.0	0.0	65.8	2.5	-1.9	0.0	0.0	0.0	0.0	0.0	32.7
1786	648706.00	4772710.00	180.00	0	N	A	99.2	0.0	-188.0	0.0	0.0	65.8	2.5	-1.9	0.0	0.0	0.0	0.0	0.0	-155.3
1786	648706.00	4772710.00	180.00	0	E	A	99.2	0.0	-188.0	0.0	0.0	65.8	2.5	-1.9	0.0	0.0	0.0	0.0	0.0	-155.3

Appendix I Quarry Acoustic Model Validation

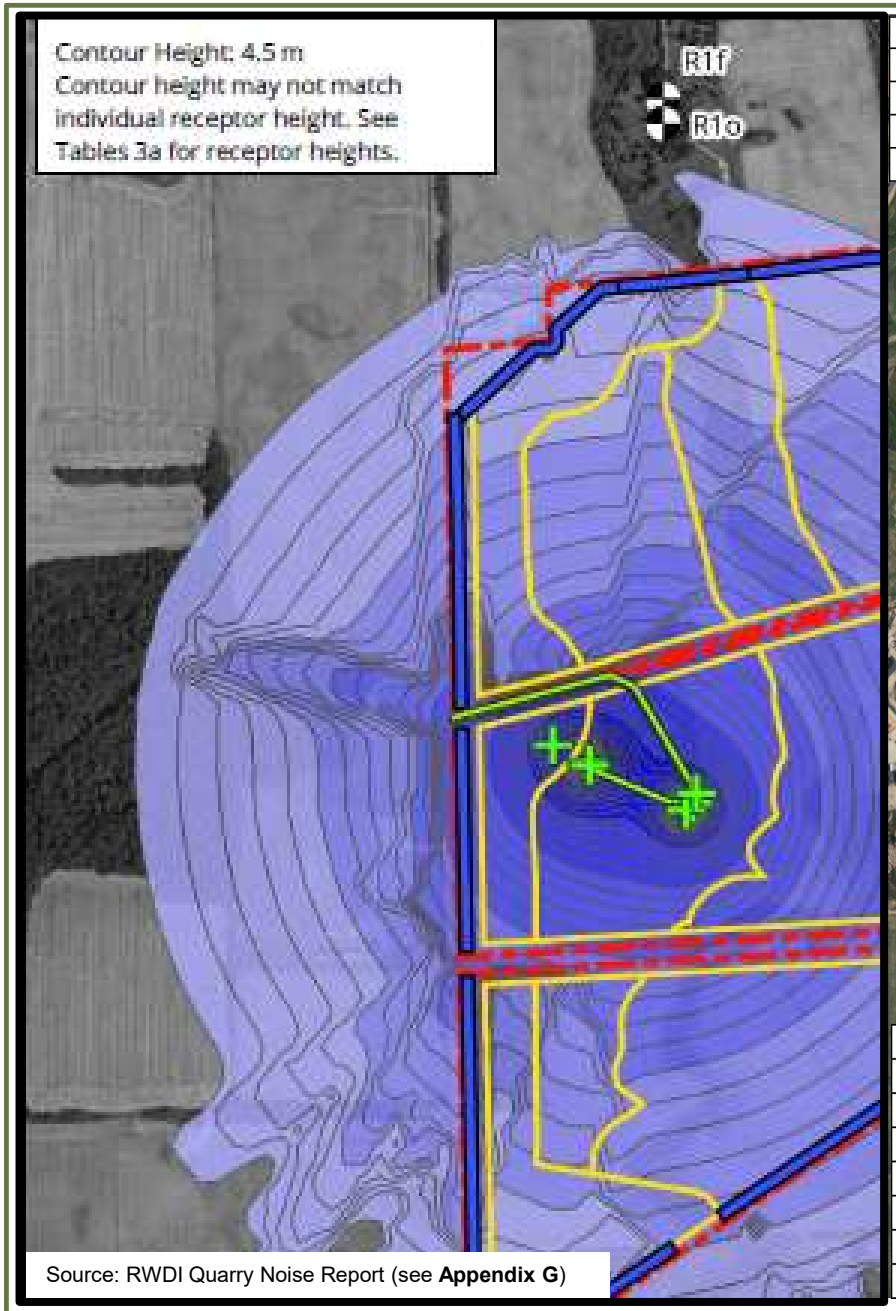
Land Use Compatibility Study – Air Quality, Dust, Odour, Noise & Vibration

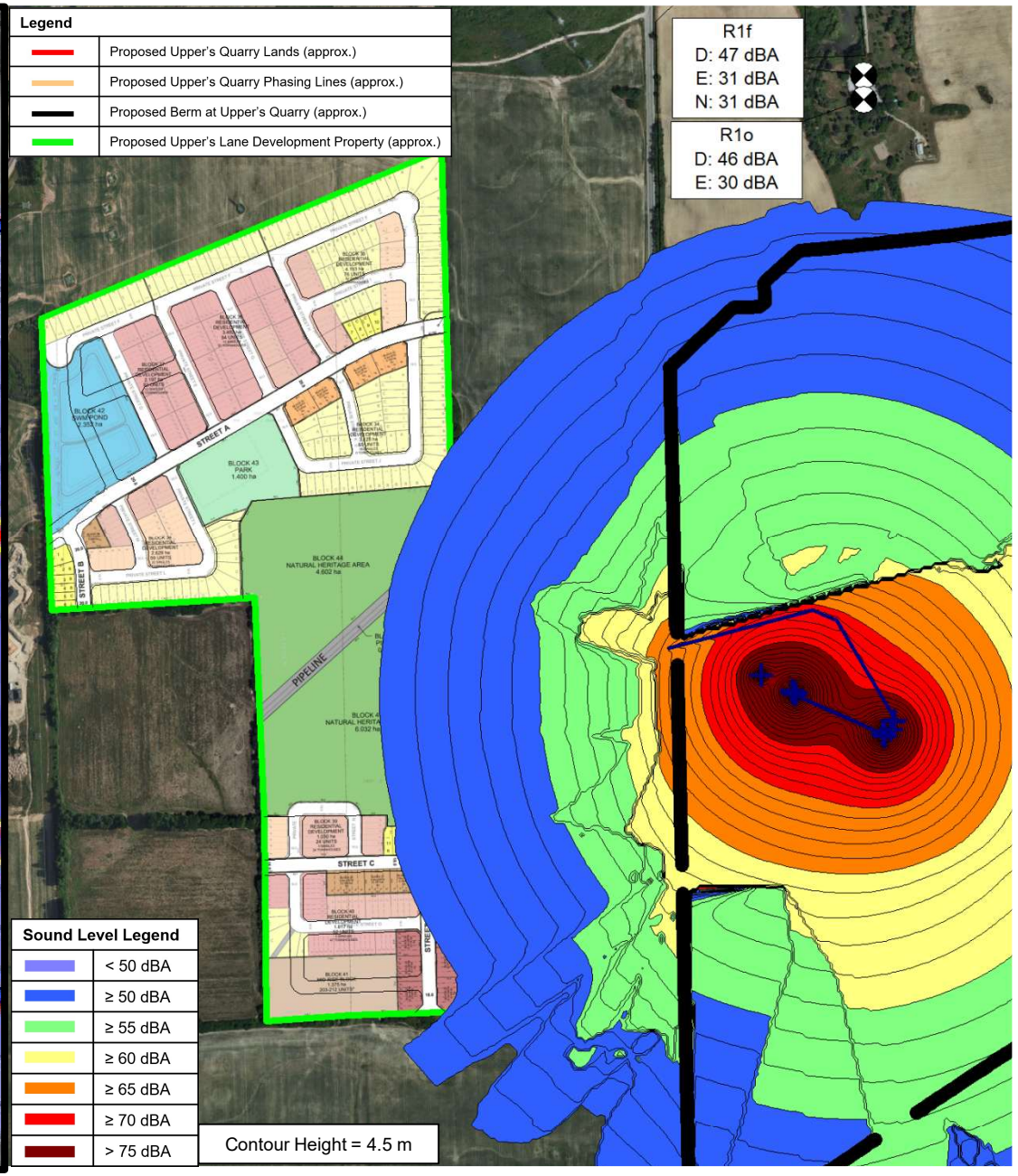
Upper's Lane, Thorold

Parkbridge Lifestyle Communities Inc. (authorized agent of QuadReal Property Group)

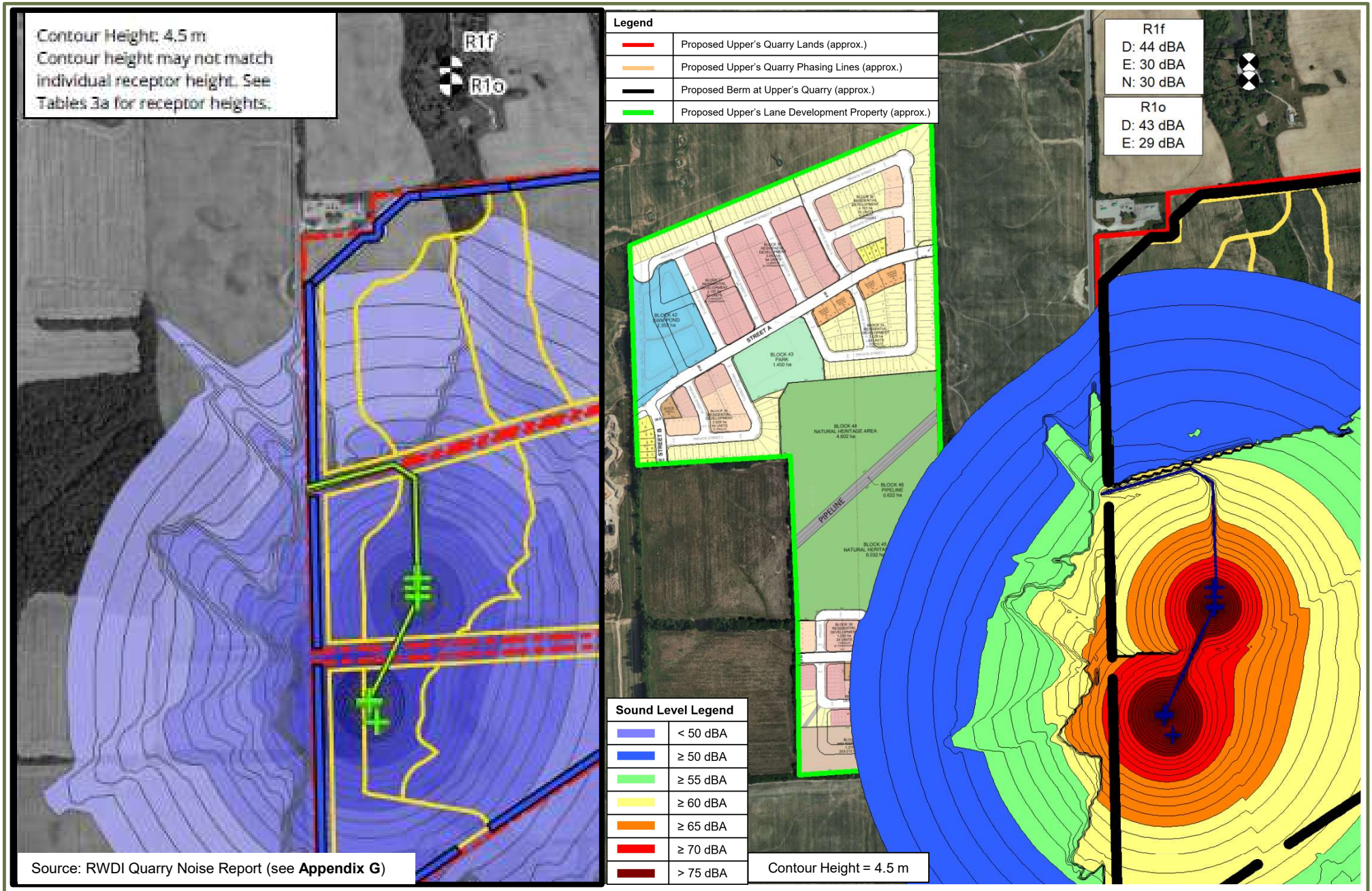
SLR Project No.: 241.030826.00001

April 27, 2026





PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)	True North	Scale: 1:9,000 (right)	METRES
UPPER'S LANE, THOROLD, ONTARIO		Date: Apr. 27, 2026 Rev. 1	Figure No. **I1**
PREDICTED SOUND LEVELS – PHASE 1A SINKING CUT – REPRODUCED MODEL (RIGHT) VS. QUARRY LICENSE APPLICATION MODEL (LEFT) – DAYTIME		Project No.: 241.030826.00001	SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

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

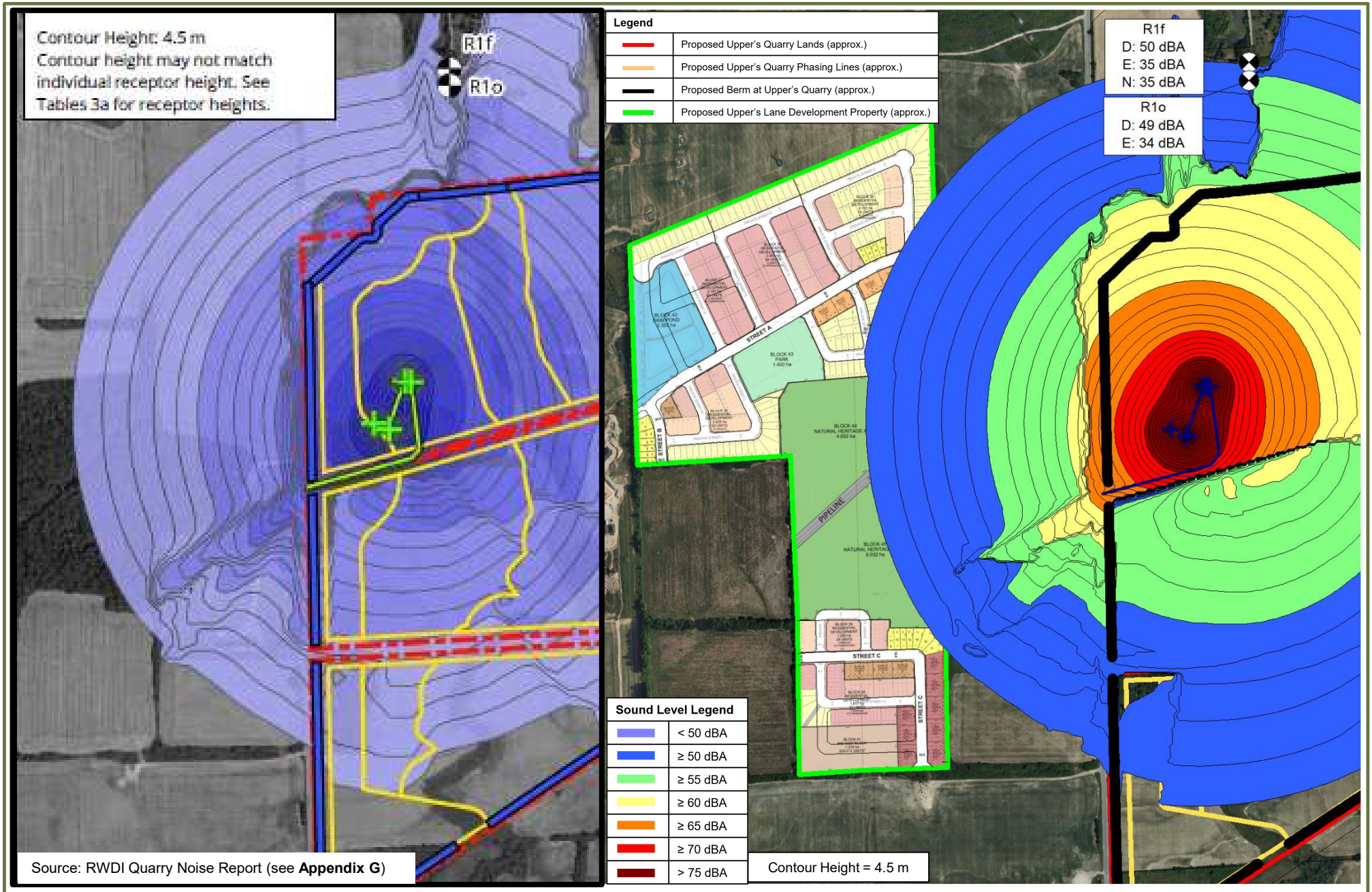
Date: Apr. 27, 2026

Rev. 1

Project No.: 241.030826.00001

Figure No. **I2**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

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

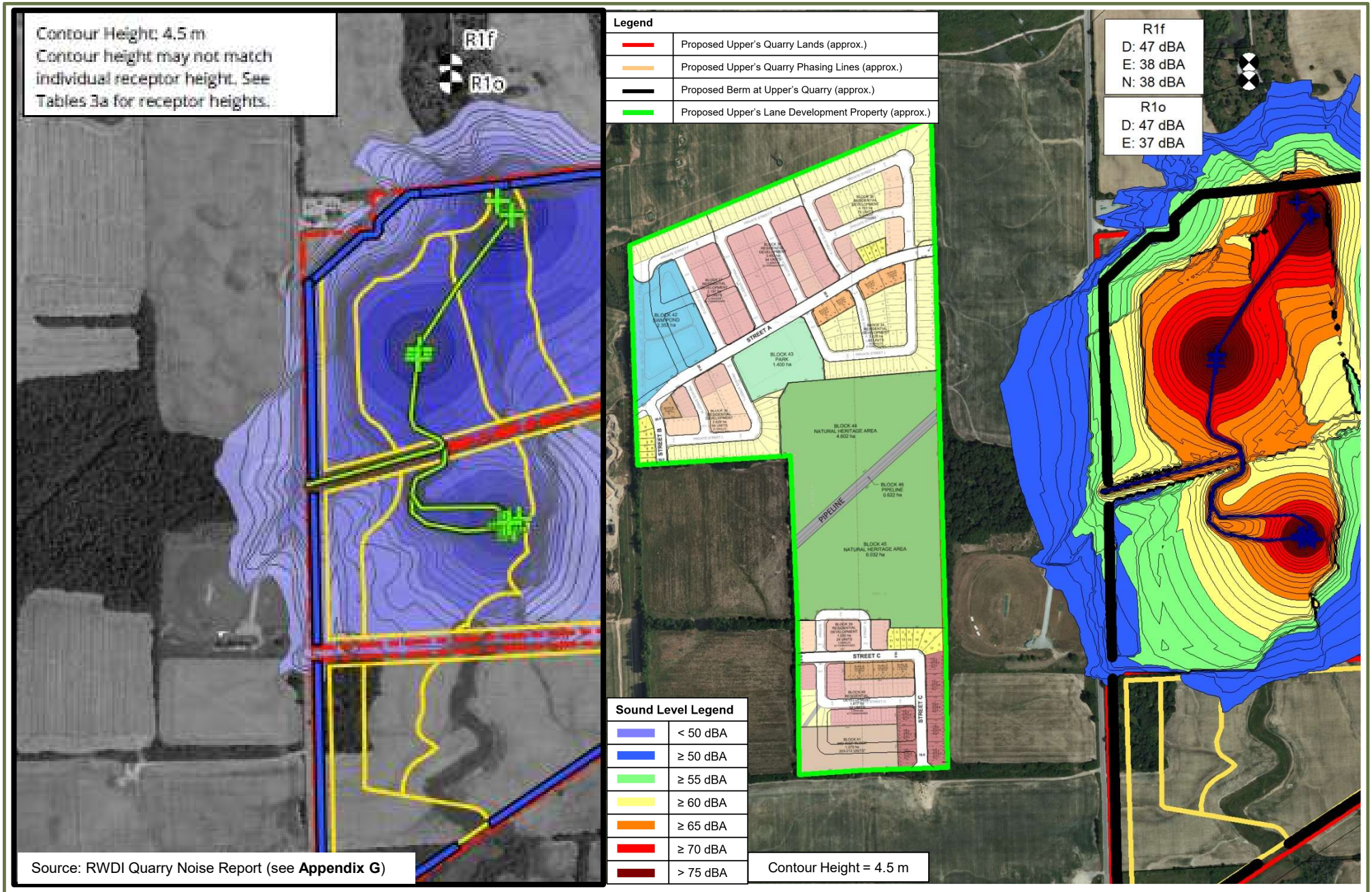
Date: Apr. 27, 2026

Rev. 1

Project No.: 241.030826.00001

Figure No. **I3**

SLR



PARKBRIDGE LIFESTYLE COMMUNITIES INC. (AUTHORIZED AGENT OF QUADREAL PROPERTY GROUP)

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

Date: Apr. 27, 2026

Rev. 1

Project No.: 241.030826.00001

Figure No. **I4**

SLR

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 Inc. (authorized agent of QuadReal Property Group)

SLR Project No.: 241.030826.00001

April 27, 2026

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		

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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%		**-**

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: 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 %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

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: 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: 20-02-2026 13:02:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b22_ef.te   Time Period: Day/Night 16/8 hours
Description: Sample Calculation - Block 22, East Facade

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

Car traffic volume : 4768/530   veh/TimePeriod
Medium truck volume :   237/26   veh/TimePeriod
Heavy truck volume :   35/4   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   :   7.50 / 7.50   m
Topography   :   1   (Flat/gentle slope; no barrier)
Reference angle   :   0.00

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

Car traffic volume : 5129/695   veh/TimePeriod
Medium truck volume :   277/38   veh/TimePeriod
Heavy truck volume : 1421/193   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   :   7.50 / 7.50   m
Topography   :   1   (Flat/gentle slope; no barrier)
Reference angle   :   0.00

↟
Results segment # 1: Upper's (day)

```
---------------------------------

Source height = 0.91 m

ROAD (0.00 + 53.16 + 0.00) = 53.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.50  57.96   0.00  -0.62  -4.18   0.00   0.00   0.00  53.16
-------------------------------------------------------------------------------

Segment Leq : 53.16 dBA

🠉
Results segment # 2: ThorTwnline (day)
-------------------------------------

Source height = 2.14 m

ROAD (0.00 + 53.53 + 0.00) = 53.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.46  73.25   0.00 -18.61  -1.10   0.00   0.00   0.00  53.53
-------------------------------------------------------------------------------

Segment Leq : 53.53 dBA

Total Leq All Segments: 56.36 dBA

🠉
Results segment # 1: Upper's (night)
-----------------------------------

Source height = 0.92 m

ROAD (0.00 + 46.64 + 0.00) = 46.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.50  51.44   0.00  -0.62  -4.18   0.00   0.00   0.00  46.64
-------------------------------------------------------------------------------

Segment Leq : 46.64 dBA

🠉
Results segment # 2: ThorTwnline (night)
---------------------------------------

Source height = 2.14 m

ROAD (0.00 + 47.87 + 0.00) = 47.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
```

```
-------------------------------------------------------------------------------
   -90     90   0.46  67.59   0.00 -18.61  -1.10   0.00   0.00   0.00  47.87
-------------------------------------------------------------------------------

Segment Leq : 47.87 dBA

Total Leq All Segments: 50.31 dBA

↑



TOTAL Leq FROM ALL SOURCES (DAY): 56.36
                           (NIGHT): 50.31
↑
↑
```

STAMSON 5.0   NORMAL REPORT   Date: 20-02-2026 13:07:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b22_sf.te   Time Period: Day/Night 16/8 hours
Description: Sample Calculation - Block 22, South Facade

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

Car traffic volume : 4768/509   veh/TimePeriod
Medium truck volume :   237/25   veh/TimePeriod
Heavy truck volume :   35/4   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   :   7.50 / 7.50   m
Topography   :   1   (Flat/gentle slope; no barrier)
Reference angle   :   0.00

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

Car traffic volume : 5129/695   veh/TimePeriod
Medium truck volume :   277/38   veh/TimePeriod
Heavy truck volume : 1421/193   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   :   7.50 / 7.50   m
Topography   :   1   (Flat/gentle slope; no barrier)
Reference angle   :   0.00

↟
Results segment # 1: Upper's (day)

Source height = 0.91 m

ROAD (0.00 + 56.17 + 0.00) = 56.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	57.96	0.00	-0.62	-1.17	0.00	0.00	0.00	56.17

Segment Leq : 56.17 dBA

↟

Results segment # 2: ThorTwnline (day)

Source height = 2.14 m

ROAD (0.00 + 50.52 + 0.00) = 50.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.46	73.25	0.00	-18.61	-4.11	0.00	0.00	0.00	50.52

Segment Leq : 50.52 dBA

Total Leq All Segments: 57.22 dBA

↟

Results segment # 1: Upper's (night)

Source height = 0.93 m

ROAD (0.00 + 49.53 + 0.00) = 49.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.50	51.32	0.00	-0.62	-1.17	0.00	0.00	0.00	49.53

Segment Leq : 49.53 dBA

↟

Results segment # 2: ThorTwnline (night)

Source height = 2.14 m

ROAD (0.00 + 44.86 + 0.00) = 44.86 dBA

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

```
-------------------------------------------------------------------------------
     0     90   0.46  67.59   0.00 -18.61  -4.11   0.00   0.00   0.00  44.86
-------------------------------------------------------------------------------

Segment Leq : 44.86 dBA

Total Leq All Segments: 50.80 dBA

♠



TOTAL Leq FROM ALL SOURCES (DAY): 57.22
                           (NIGHT): 50.80
♠
♠
```

STAMSON 5.0   NORMAL REPORT   Date: 20-02-2026 13:49:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b37_nf.te   Time Period: Day/Night 16/8 hours
Description: Sample Calculation - Block 37, North Facade

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

Car traffic volume : 7150/794   veh/TimePeriod
Medium truck volume :   411/46   veh/TimePeriod
Heavy truck volume :   657/73   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 : 165.28 / 165.28 m
Receiver height   :   7.50 / 7.50   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 + 55.87 + 0.00) = 55.87 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
----
   -90   90   0.37 71.10   0.00 -14.30 -0.92   0.00   0.00   0.00 55.87

Segment Leq : 55.87 dBA

Total Leq All Segments: 55.87 dBA

Results segment # 1: Davis - S (night)

Source height = 1.68 m

ROAD (0.00 + 49.34 + 0.00) = 49.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.37	64.57	0.00	-14.30	-0.92	0.00	0.00	0.00	49.34

Segment Leq : 49.34 dBA

Total Leq All Segments: 49.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.87
(NIGHT): 49.34

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

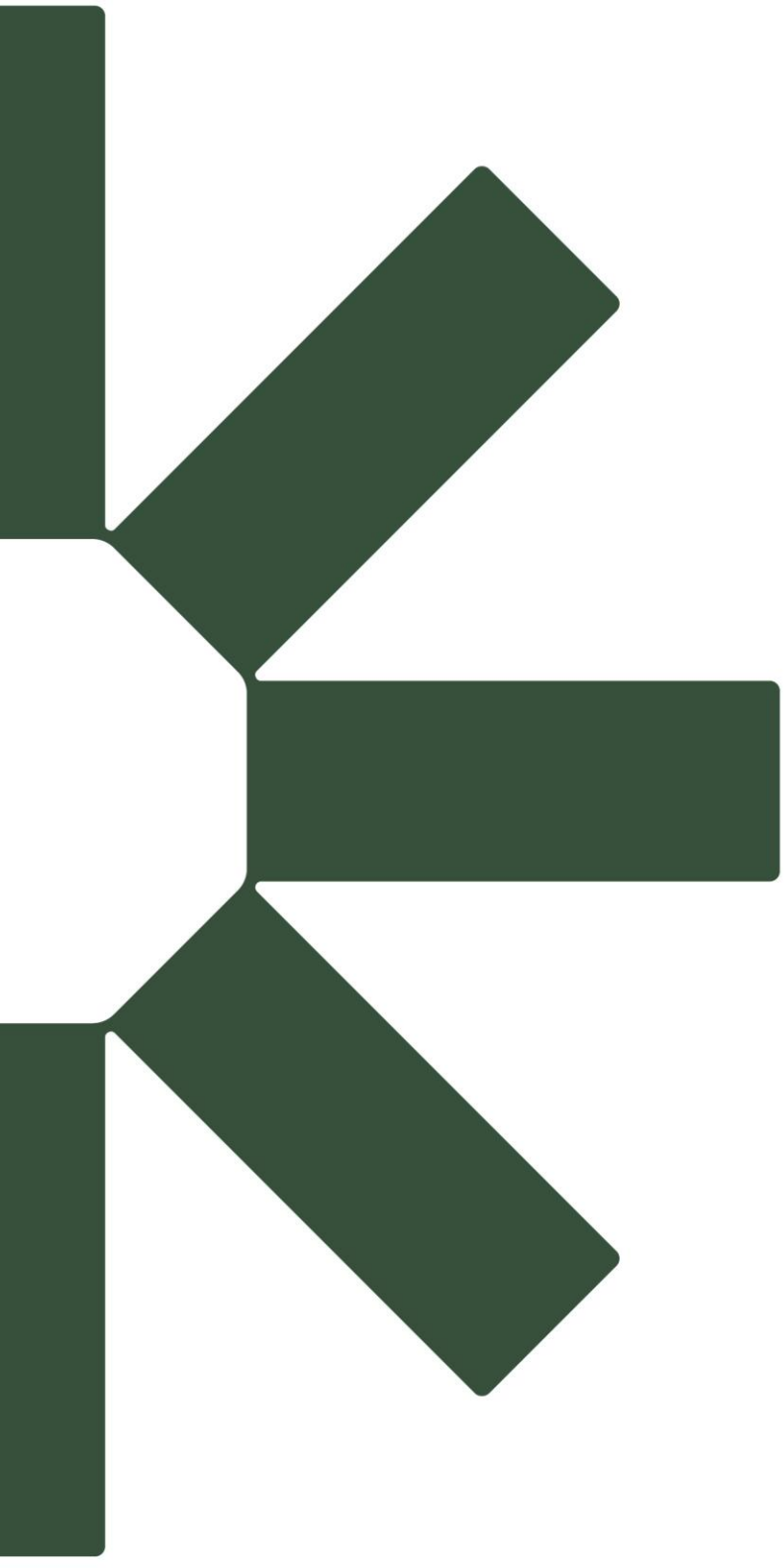
ROAD (0.00 + 33.51 + 0.00) = 33.51 dBA

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