



**REPORT**

# Noise and Vibration Feasibility Study - Rev 3

*Proposed Residential Development - Niagara Village, 6000 Marineland Parkway,  
Niagara Falls, Ontario*

Submitted to:

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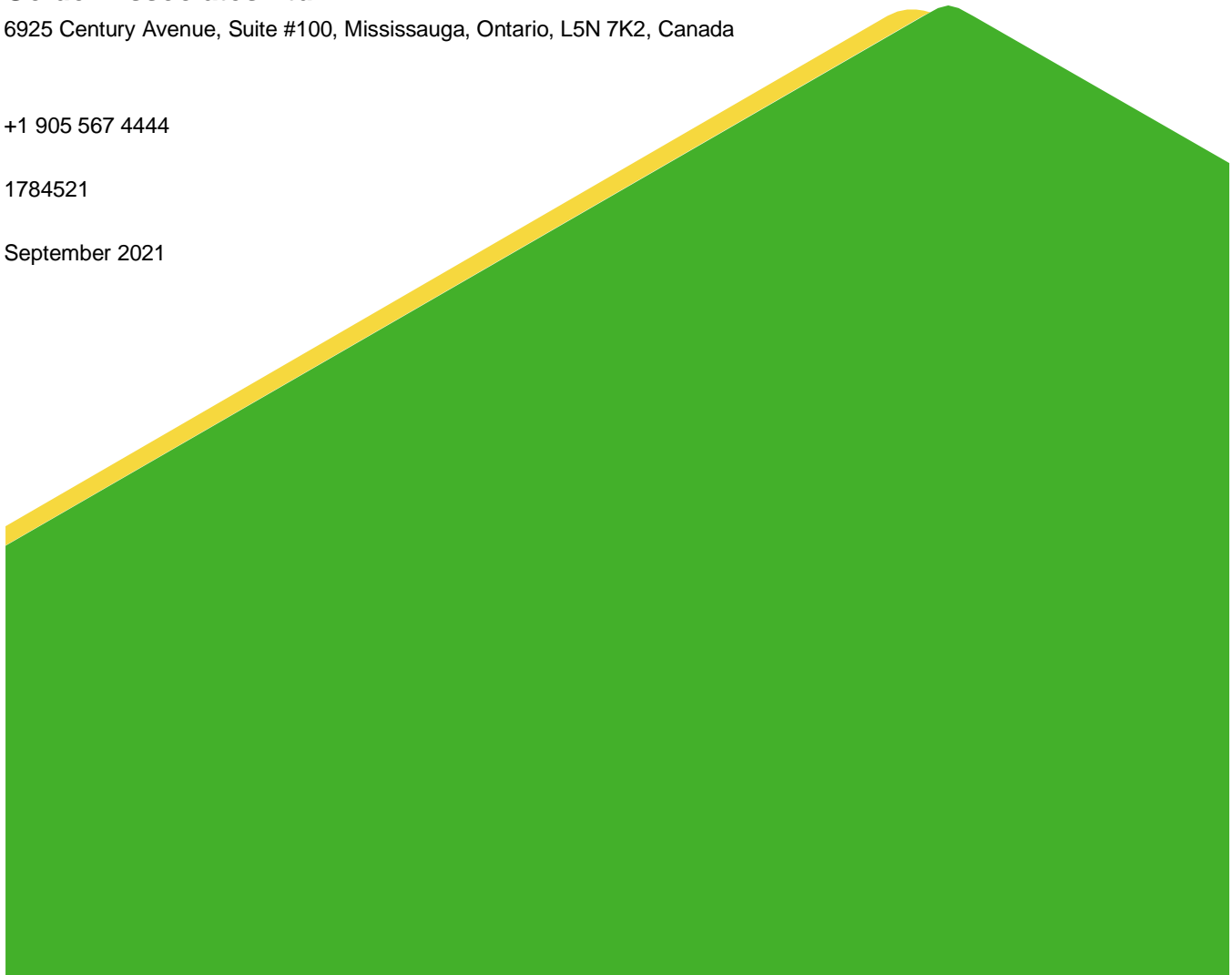
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## Executive Summary

Golder Associates Ltd. (Golder) was retained by 2592693 Ontario Inc. (the Client) to carry out a Noise and Vibration Feasibility Study (the Study) for the proposed Niagara Village residential development (the Project) located at the existing Thundering Waters Golf Course (the Site) at 6000 Marineland Parkway, City of Niagara Falls (the City), Ontario. The Client proposes to develop a residential subdivision within the Site, containing a mix of single-family dwellings, townhouses, low rise apartments and high density residential apartments, as well as a municipal road network and open and recreational spaces. The Project is currently in the planning stage and the purpose of this Study is to support an application for Official Plan and Zoning By-law Amendment proposing a mix of residential development and Draft Plan of Subdivision. This Study is multifaceted and considers the following:

- the potential impact of the environment on the Project;
- the potential impact of the Project on the environment; and
- the potential impact of the Project on itself.

The Study was completed in accordance with the Ontario Ministry of Environment, Conservation, and Parks (MECP) *NPC-300 Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning* (NPC-300). For this Study, the Railway Association of Canada's *Guidelines for New Development in Proximity to Railway Operations* (RAC Railway Guidelines) and Federal Transit Administration's *Transit Noise and Vibration Impact Assessment (FTA Report No. 0123)* (FTA Manual) were used to assess vibration due to rail traffic.

The impact of the environment on the Project Site addresses the potential noise and vibration impact from existing stationary sources from nearby industrial facilities and transportation sources. The assessment of the potential impact of the Project on the environment considered the potential impact of stationary noise sources associated with the Project and the increased road traffic due to the Project onto offsite sensitive receptors. The assessment of the potential impact of the Project onto itself considered the potential impact of stationary noise sources associated with the Project and the increased road traffic due to the Project onto onsite sensitive receptors.

This Study focused on the estimated influence areas on the noise sensitive land uses within the Project Site from surrounding industrial land uses using NPC-300. This assisted in better identifying potential conflicts that are likely to exist as opposed to limiting an assessment to the MECP's *Guideline D-6 Compatibility between Industrial Facilities and Sensitive Land Uses* (Guideline D6), which is considered more as a screening tool and does not represent definitive results. Golder reviewed the previous Guideline D-6 assessment findings completed by others and carried out a more detailed quantitative assessment in accordance with NPC 300. This will allow the Project team to design a more feasible Project and better develop and implement noise mitigation, if required. Sufficient detailed information regarding noise and vibration emissions from all of the surrounding industrial land uses was not readily available at this time of this Study and therefore additional detailed noise assessments are recommended.

The assessment of the potential impact of the environment on the Project Site included developing an understanding of the existing conditions within and surrounding the Project Site with the purpose of identifying key noise and vibration emission sources. The existing conditions were determined by reviewing relevant documentation, reviewing the City's online resources, and completing field reconnaissance surveys and measurements. A noise prediction model considering stationary sources, rail traffic and road traffic was developed to support the assessment of the potential noise impact of the environment on the Project Site.

A noise screening assessment was carried out, which identified the following as the most significant key industrial facilities which may exceed NPC-300 Class 2 exclusionary sound level limits within the Project Site:

- Chemtrade;
- Washington Mills;
- Dufferin Ready Mix;
- Salit Steel; and
- Lafarge Quality Ready Mix.

The results of the environment on the Project Site assessment includes the recommendation for receptor based mitigation measures such that predicted noise levels within the Project Site due to the most significant key industrial facilities comply with Class 1 or Class 2 and Class 4 exclusionary sound level limits. At the time of preparing this Study, it is considered that the Project Site is best classified as Class 1/Class 2 as per NPC-300, however certain areas of the Project Site could be considered to be designated as Class 4, including areas which directly abut industrial facilities. The option for certain areas within the Project Site to be designated a Class 4 area will require approval from the City. Receptor based mitigation measures include the following:

- Noise barriers along the backyards of certain homes facing certain key industrial facilities; and
- Designing a building such that no Points of Reception (PORs) exist (i.e., balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces) above the first storey along façades facing certain key industrial facilities.

Note, having an up-to-date ECA/EASR or complying with NPC-300 sound level limits may not prevent nuisance complaints associated with stationary or non-stationary sources related to industrial facilities. Golder recommends that the Project continues to pursue further discussion with the nearby industrial facilities regarding possible measures to reduce the potential for nuisance complaints.

The assessment of transportation sources for the assessment of the environment on the Project indicate that some building components will need to be designed such that indoor sound levels comply with the sound level limits due to rail traffic, the installation of air conditioning or forced air systems should be considered, and warning clauses may be required. Preliminary STC values of up to STC-34 were predicted to be required to meet NPC-300 indoor sound level limits. With the Project Site not having a finalized built form or suite layouts yet completed, Golder recommends that further investigation be completed during detailed design.

In addition, it is expected warning clauses may be required to address potential noise and vibration impacts from existing stationary sources from nearby industrial facilities and transportation sources.

The assessment of the potential impact of the Project on the environment considered noise emissions due to the increase in automobile traffic of the future residents on existing roads in the vicinity of the Project Site and noise from stationary sources such as Heating, Ventilation and Air Conditioning (HVAC) equipment associated with the Project. A semi-quantitative assessment was conducted to estimate the impacts of noise due to the increase in automobile traffic of the future residents on existing roads in the vicinity of the Project Site. The predicted noise levels were below the MOE/MTO Noise Protocol objective noise level of 55 dBA and the change was less than or equal to 5 dB. Therefore, it is expected that the other roads in the vicinity of the Project Site will meet the MOE/MTO Noise Protocol and not require mitigation but Golder recommends the assessment of traffic noise due to the Project be reviewed when the Project transportation study is finalized. At the time of this Study, no information regarding potential stationary sources related to the Project was available. The operation of certain types of equipment such as emergency generator testing may require an ECA or Air Emissions EASR (Air & Noise) in accordance with Section 9 of the Ontario Environmental Protection Act (EPA). This will need to be confirmed during detailed design.

The assessment of the potential impact of the Project onto itself considered the potential impact of stationary noise associated with the Project and the increased road traffic due to the Project onto onsite sensitive receptors. At the time of this Study, no built form or detailed suite layouts were available and therefore a qualitative discussion on best practices to be considered was presented however Golder recommends a quantitative assessment be carried out during detailed design.

The vibration assessment considered the active CP Montrose Subdivision industrial spur rail line that runs through the Project Site due to freight train pass-bys. Vibration measurements were carried out to establish existing vibration levels within the Project Site. A review of the *General Vibration Assessment* presented in the FTA Manual was also carried out as part of the vibration assessment. The preliminary vibration results indicate it is possible for the vibration levels to be below or above the FTA Manual and RAC Railway Guideline vibration limits. Based on the preliminary vibration results, Golder recommends an updated vibration assessment be completed during detail design when a built form is finalized. If vibration mitigation controls are determined to be required to assist in achieving compliance with applicable vibration guidelines, they will depend on the overall building design and building layout within the Project Site.

It is expected this Study will be used in future discussions with the City to review the feasibility of the Project with respect to noise and vibration, including deciding on the framework to be applied to support the land use planning process.

Based on the results of the Study, potential impacts on the proposed development can be mitigated during the site planning and detailed design phase of the development.

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## 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by 2592693 Ontario Inc. (the Client) to carry out a Noise and Vibration Feasibility Study (the Study) for the proposed Niagara Village residential development (the Project) located at the existing Thundering Waters Golf Course (the Site) at 6000 Marineland Parkway, City of Niagara Falls (the City), Ontario. The Project Site is currently used for the purposes of a golf course surrounded by various land uses including industrial, commercial, residential and tourism. A road network surrounds the Project Site and an active industrial spur rail line passes through the Site. Figure 1 shows the site location and the Study Area extending 1 km from the Project Site boundary. The Project is currently in the planning stage and the purpose of this Study is to support an application for Official Plan and Zoning By-law Amendment proposing a mix of residential development and Draft Plan of Subdivision. In November 2020, the Regional Municipality of Niagara Falls (the Region) provided comments, including a peer review carried out by their acoustical consultant, on the application for Official Plan and Zoning By-law Amendment and Draft Plan of Subdivision submitted for the Project in August 2020. This Study is a revision to the noise and vibration feasibility study prepared by Golder in June 2020 that supported the August 2020 submission. This Study has been updated to address; the peer review comments and discussions with the Region.

This Study is multifaceted and considers the following:

- the potential impact of the environment on the Project;
- the potential impact of the Project on the environment; and
- the potential impact of the Project on itself.

The impact of the environment on the Project Site addresses the potential noise and vibration impact from existing stationary sources from nearby industrial facilities and transportation sources. Residential land-use is recognized as a sensitive land-use by the applicable Ontario Ministry of the Environment, Conservation and Parks (MECP) standards, and therefore possible land-use compatibility concerns may arise between sensitive land uses and other surrounding land uses containing industrial or transportation activities. These possible land use compatibility concerns may include:

- Introducing compliance issues and limitations on expansion for adjacent industries, which could include potential increased mitigation requirements and could impact their operations.
- Limiting the enjoyment of outdoor living areas from elevated noise levels from transportation sources.
- Increased mitigation requirements on the proposed development.

To help prevent or minimize land use incompatibility between sensitive and industrial land uses, the MECP prepared a guidance document, considered in the industry for use as an initial screening tool, *Guideline D-6 Compatibility between Industrial Facilities and Sensitive Land Uses* (Guideline D6) which is often used to support the land use planning process for proposed future land uses. Guideline D6 considers potential influence areas and provides recommended minimum separation distances to minimize the potential conflict. Guideline D6 is a useful initial screening tool, but for some sites the MECP recommends a more detailed noise assessment be completed in accordance with MECP *NPC-300 Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning* (NPC-300). As D-Series Guideline assessment have been completed by others in the past (as discussed in Section 4.1.1), Golder reviewed the previous findings and completed a more detailed quantitative assessment in accordance with NPC-300. This will assist in better identifying potential conflicts that could exist, allowing the Project team to design a more feasible Project and better develop and implement noise mitigation that is more effective in the circumstances.

For assessing the potential impact of the environment on the Project, Golder considered existing industries in the Study Area and the existing and future transportation corridors. Based on available information, this Study considered only existing land uses and conditions within and surrounding the Project Site as identified by City datasets, information provided by the Project team and/or field campaigns carried out by Golder to support this Study. Noise data from industrial facilities surrounding the Project Site was obtained from readily available public sources and/or formally requested and received for limited industries. The preferred approach was to obtain information directly from the industrial facilities whenever possible. If any additional data is provided from the industrial facilities in the future, it may require this Study to be updated accordingly. The assessment of transportation corridors considered the investigation of noise control measures at outdoor living areas, ventilation requirements and preliminary acoustical performance requirements for the building components. Therefore, this Study primarily relied on the best available information obtained from readily available public sources, field campaigns and/or Golder's experience on past projects to assess the operations of the nearby industrial facilities and transportation corridors.

The assessment of the potential impact of the Project on the environment considered the potential impact of stationary noise sources associated with the Project and the increased road traffic due to the Project onto offsite sensitive receptors.

The assessment of the potential impact of the Project onto itself considered the potential impact of stationary noise sources associated with the Project and the increased road traffic due to the Project onto onsite sensitive receptors.

To meet the objectives of this Study, the following was carried out:

- review of applicable regulations and guidelines;
- review of existing site conditions, including document review, desktop analysis and field reconnaissance;
- completion of a preliminary noise and vibration assessment; and
- development of recommendations based on the information presented in this Study.

## 2.0 BACKGROUND

The Project Site is located in the City, southwest of the intersection of Marineland Parkway and Stanley Avenue. It was developed in 2005 as a golf course, covers approximately 150 hectares and consists of three one-storey buildings (clubhouse, half-way house, and catering building), a maintenance facility area, four ponds, pathways and access roads, parking lots, and grassed and forested areas. The Canadian Pacific (CP) Montrose Subdivision, an active industrial spur rail line, runs through the Project Site and it services the industrial facilities in the area.

The Project Site is currently within the City's Official Plan Special Policy Area 39 and designated as "Open Space". The Project Site is subject to the City's Zoning By-Law Number 79-200 and is zoned "Open Space" with some areas designated with a holding provision "OS-H". The zoning provisions identified in these by-laws describe all the possible permitted land uses. The Project Site is adjacent to a range of land uses, including light, general, and heavy industrial and residential. The Project Site is not associated with the proposed Riverfront Community located to the southwest but is directly adjacent to it.

Figure 2 illustrates the current zoning in accordance with the City's By-law 79-200 at the time of this Study. Figure 3 identifies the Project Site and the Study Area within 1 km of its boundary and also identifies existing industrial facilities considered in this Study.

The Client proposes to develop a residential subdivision within the Site, containing a mix of single-family dwellings, townhouses, low rise apartments and high density residential apartments which may extend up to six storeys in height (approximately 21.3 m above grade, including parapet), as well as a municipal road network and open and recreational spaces. It is estimated up to 1319 residential units will be constructed. Figure 4 shows the proposed development Draft Plan of Subdivision, provided by the Project team, last revised on July 7, 2021. Further details regarding aspects of the proposed development Draft Plan of Subdivision are provided in Appendix A. According to the Region, the land use planning authority for the Project is the City. This report identifies noise controls based on the best available information that can be implemented on the Project Site to allow for the residential use to proceed with the consideration of its location in proximity to existing adjacent industrial facilities and transportation corridors. It is expected other noise control options may exist if additional information regarding the industrial facilities becomes available. Over the years, several land use compatibility studies have been carried out for different developments surrounding the Project Site and at times have resulted in different conclusions. As noted above, the preferred approach was to obtain information directly from the industrial facilities whenever possible. It is expected this Study will be used in future discussions with the City to review the feasibility of the Project with respect to noise and vibration, including informing as to the framework to be applied to support the land use planning process.

## 3.0 APPLICABLE REGULATIONS AND GUIDELINES

The first step in completing this Study was to confirm the applicable regulations and guidelines. The following is a high-level summary of each regulation or guideline applicable for this Study.

### 3.1 D-Series Guidelines

During the land use planning process for proposed future land uses, the MECP has recommendations described in a set of D-Series Guidelines developed in July 1995. The D-Series Guidelines are intended to assist in minimizing potential conflicts due to encroachment of sensitive land uses and industrial land uses on one another.

#### 3.1.1 Guideline D-1 – Land Use Compatibility

##### 3.1.1.1 Application and Guideline

The MECP's Guideline D-1 – Land Use Compatibility (Guideline D1) provides recommended separation distances and other control measures for land use planning proposals which have the potential to involve encroachment of incompatible land uses. These recommendations seek to prevent or minimize potential adverse effects for an existing or proposed facility and apply only when a change in land use is proposed (i.e., future proposals). This guideline does not apply to situations where incompatible land use already exists. Adverse effects considered under Guideline D1 may include:

- noise and vibration;
- visual impact;
- odour and other air emissions;
- litter, dust and other particulates; and
- other contaminants.

The MECP suggests buffers (e.g., separation distance, berms, walls, fences, building orientation) are to be used to minimize or prevent people, properties, plants or animals from being exposed to potential adverse effects caused by land use changes.

Guideline D1 is applicable in the following situations:

- “a new sensitive land use is proposed within the influence area or potential influence area of an existing facility”; and/or
- “a new facility is proposed where an existing sensitive land use would be within the facility's influence area or potential influence area.”

A sensitive land use is defined as follows:

*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:*

- 1) *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.*
- 2) *A permanent structure for non-facility related use, particularly of an institutional nature (e.g. schools, churches, community centers, day care centers).*
- 3) *Certain outdoor recreational uses deemed by a municipality or other level of government to be sensitive (e.g. trailer park, picnic area, etc.).*
- 4) *Certain agricultural operations (e.g. cattle raising, mink farming, cash crops and orchards); and*
- 5) *Bird/wildlife habitats or sanctuaries.*

A Facility is defined as follows:

*A transportation, commercial, industrial, agricultural, intensive recreational or utilities/services building or structure and/or associated lands (e.g. abattoir, airport, railway, sewage treatment plant, landfill, manufacturing plant, generation stations, sports/concerts stadium, etc.) which produce(s) one or more 'adverse effect(s)' on a neighbouring property or properties*

An Industry, Industrial Land Use or Industrial Facility is defined as follows:

*A facility or activity relating to: the assemblage and storage of substances/goods/raw materials: their processing and manufacturing; and/or the packaging and shipping of finished products.*

Furthermore, the guideline is applicable when a change in land use occurs, or when the placement of a sensitive land use within the actual or potential influence area of a facility for the following possible scenarios:

- formulation and review of land use policies, guidelines or programs;
- review of municipal and other levels of government general plans and proposals; and
- review of site-specific development plans (including redevelopment and/or infill proposals).

Land use plans, proposals, policies and programs should be designed to protect incompatible land uses from each other by preventing or minimizing potential adverse effects. Often, the most effective buffer is distance. For this reason, a suitable separation distance based on a facility's potential or actual area of influence is considered the preferred mitigation approach for potential adverse effects. This distance should allow the functioning of the land uses under consideration without resulting in a potential adverse effect.

When a separation distance is used as a buffering approach and it extends into the property line of the sensitive land use, the MECP encourages the incorporation of intervening land uses or activities that are compatible with both the facility and sensitive land use.

According to Guideline D1, when mitigation efforts cannot resolve impacts of discharges and compatibility issues in order to prevent or minimize potential adverse effects, the development of a new facility or sensitive land use should not be permitted. There may be cases where new developments or redevelopments may be delayed until the mitigation of adverse effects occurs.



The process for implementing mitigation measures to reduce or minimize potential adverse effects is described. It is the proponent's responsibility to investigate impacts of existing surrounding land uses (presence and severity) and propose necessary measures for remediation. In cases where a sensitive land use is proposed, the proponent should provide evidence that there will be no potential compatibility issue. This should be done by examining the facilities surrounding the proposed sensitive land use in terms of potential impacts and nature of proposed land use.

When a sensitive land use is proposed, the investigation should include an evaluation of impacts followed by the identification/implementation of feasible mitigation. It is the proponent's responsibility to propose, design and implement mitigation measures, which may be located on the facility site (at emission sources or elsewhere), on the sensitive land use site, or on the intervening lands. Mitigation measures should depend on the scale and design of the facilities as well as the duration, frequency and type of discharges and/or impacts.

### 3.1.2 Guideline D-6 Compatibility between Industrial Facilities and Sensitive Land Uses

Guideline D6 discusses the applicability of Guideline D1 for industrial facilities. The purpose of Guideline D6 is to prevent or minimize land use incompatibility or potential adverse effects between sensitive and industrial land uses. This purpose is achieved by the suggestion of separation distances. However, it is Golder's understanding that Guideline D6 is primarily an initial screening tool and in Guideline D6, the MECP notes that detailed studies should be completed to determine site-specific separation distances for instances where the MECP's recommended separation distances will not be maintained.

Guideline D6 applies to proposed, committed and/or existing industrial land uses that have the potential to generate point and/or fugitive atmospheric emissions (noise, vibration, odour, dust and others) through normal operations, procedures, maintenance or storage activities, and/or from associated traffic/transportation. Guideline D6 does not apply to non-stationary industrial facilities (e.g., mobile asphalt plant), roadways and railways (except ancillary facilities), agricultural operations, airports, or pits and quarries.

If an actual influence area is not available, Guideline D6 provides potential influence areas (separation distances) for three different classes of industrial land uses. The three different classes of industrial land uses are:

*Class I – Small scale business that is a self-contained plant or building which produces/stores a product contained to a package and has a low probability of fugitive emissions. Infrequent movement of products and/or heavy trucks. No outside storage. The facility only operates during the daytime period.*

*Class II – Medium scale processing and manufacturing with occasional outputs of either point of fugitive emissions. Frequent movement of products and/or heavy trucks during the daytime hours. Outside storage of wastes or materials exists. The facility is permitted to have shift operations.*

*Class III – Large scale processing or manufacturing. Frequent outputs of major annoyance with a high probability of fugitive emissions. Continuous movement of products. Outside storage of raw and finished product exists. The facility is permitted to have shift operations.*

More details on the output, scale, process, operations or intensity, and examples for each designation is provided in Guideline D6.

The MECP has identified areas of influence and minimum separation distances for each of the industrial facility classes, which are presented in Table 1. Actual influence areas refer to overall ranges within which a potential adverse effect would occur or is experienced. These areas are site-specific for facilities. Guideline D6 recommends that there should not be incompatible land uses within the minimum separation distance unless a detailed study that focuses on the actual influence area (i.e., anticipated and actual site specific impacts) is carried out. The minimum separation distance is the distance between the designation, zoning or property lines of closest proposed or existing sensitive and industrial land uses.

**Table 1: Summary of MECP Identified Areas of Influence and Recommended Separation Distances**

Designation	Actual Influence Areas Separation Distance (m)	Potential Influence Areas Separation Distance (m)	Minimum Separation Distance (m)
Class I (Light Industrial)	Site Specific	70	20
Class II (Medium Industrial)	Site Specific	300	70
Class III (Heavy Industrial)	Site Specific	1000	300

It also should be noted that even where facilities meet the recommended separation distances specified in the Guideline D6, an air, odour, noise and/or vibration assessment may still be required to ensure that the facility meets the applicable guidelines and regulations. A detailed technical study may show that a different separation distance is more appropriate.

### 3.2 Ontario Environmental Protection Act and Environmental Compliance Approvals

The Ontario Environmental Protection Act, R.S.O 1990 Chapter E.19 (EPA) is legislation to provide for the protection and conservation of the natural environment. The EPA regulates the discharge of contaminants into the natural environment and is administered by the MECP.

Activities that fall under Section 9 of the EPA, in Section 20.2 of Part II.1 of the EPA, require that an approval must be obtained before installation or modification of all atmospheric emission sources (i.e., air, odour, noise and vibration). O.Reg.524/98 exempts some equipment and/or processes from Section 9 approval requirements. This regulation was amended in 2017 to include additional equipment and/or processes that can be considered exempt if specific criteria are met. However, the exempt sources must meet the specific operating requirements in O.Reg.524/98. In addition, the exempt sources may be required to show compliance with other regulatory requirements.

For equipment that is not exempt, the primary North American Industrial Classification System (NAICS) code that best describes a facility, the equipment on site as well as other eligibility criteria dictate the type of approval required. Approval is granted by either obtaining an Environmental Compliance Approval (ECA) for the equipment under Part II.1 of the EPA or by registering on the Air Emissions Environmental Activity and Sector Registry (EASR) under Part II.2 of the EPA. O.Reg.1/17 sets out the requirements and procedures for facilities with activities / equipment that are required to register on the Air Emissions EASR. Facilities that do not meet the requirements to register must obtain an ECA. When a facility requires an approval under Section 9 of the EPA, facilities are required to demonstrate compliance with the MECP's noise and vibration guidelines. The MECP's Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning Publication NPC-300 (August 2013) (NPC-300) is applied to noise emission sources while the specific vibration guideline depends on the type of vibration emission source.

### 3.3 Noise Guidelines

According to the Guideline D6, a feasibility study for noise should be carried out in accordance with MECP Publication LU-131 – Noise Assessment Criteria in Land Use Planning (October 1997) (LU-131). NPC-300 replaced LU-131 in August 2013. NPC-300 provides advice, sound level limits and guidance for the approval of stationary sources and for land use planning purposes. For the land use planning process, it is intended to provide a common framework to address noise to minimize the potential conflict between proposed noise sensitive land uses and sources of noise emissions. The MECP has no authority under the Planning Act regarding the land use planning approval process as one of its roles is to issue approvals required by the EPA. The following is a summary of NPC-300.

#### 3.3.1 Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning Publication NPC-300

##### *Land Use Planning*

As set out in NPC-300 Part C, the MECP has no authority under the Planning Act regarding the land use planning approval process as one of its roles is to issue approvals required by the EPA. The local land use planning authority is responsible for the land use planning process. In the effort of targeting consistency throughout the province, NPC-300 has been provided by the MECP as a tool for local planning authorities to consider. The MECP suggests feasibility and/or detailed noise impact studies be submitted to the land use planning authority. In addition, Part C of NPC-300 states the purpose of a noise study is to assess the impact of all noise sources affecting the proposed sensitive land use and provides guidance primarily on stationary and transportation sources of noise. The objectives of noise studies carried out as part of the land use planning approval process should be to support the following:

- 1) Creating a suitable acoustical environment for the protection of users/occupants/residents of the proposed noise sensitive land uses.
- 2) Protecting the lawful operation of any stationary sources(s) located close to a proposed noise sensitive land use. Legally operating stationary sources need to be able to maintain compliance with legal requirements of their MECP issued approval with the introduction of new noise sensitive land uses in proximity of their site.
- 3) Protecting existing and/or formally approved transportation corridors and transportation sources of noise with the introduction of new noise sensitive land uses in proximity of their site.
- 4) Creating compatible land uses and avoiding potential adverse effects due to noise.

According to NPC-300, the proponent of a new noise sensitive land use is identified as being responsible for ensuring compliance with the applicable sound level limits and the following:

- 1) Determining the feasibility of the project;
- 2) Assessing outdoor and indoor acoustical environments, as appropriate;
- 3) Investigation of feasible means of noise impact mitigation;
- 4) Ensuring that required noise control measures are incorporated in the development; and
- 5) Describing the technical details and clarifying the responsibility for the implementation and maintenance of required noise control measures.

### Area Classifications

Sound level limits are defined in NPC-300 Part B and C for various acoustical environment area classifications. A Class 1 area is defined as an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as the “urban hum”. A Class 3 area is defined as a rural area with an acoustical environment that is dominated by natural sounds having little or no traffic. A Class 2 area is defined as an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas. A Class 4 area is defined as an area or specific site that would otherwise be defined as Class 1 or 2 areas and:

- 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 to proceed with the Class 4 area classification, which is determined during the land use planning process.

### Stationary Sources

Stationary sources of noise refer to a sound (i.e., steady and varying sounds and impulsive sounds) that normally operates within the property line of a facility. NPC-300 provides several examples of stationary sources and how each one applies to Part B and/or Part C of NPC-300 (i.e., exemptions). NPC-300 states stationary sources will need to comply with the applicable sound level limit at the existing or potential (i.e., noise sensitive zoned and/or vacant lot) surrounding Point(s) of Reception (POR(s)) when an environmental application is submitted to the MECP for approval. For steady and varying sounds from a stationary source, the sound level limit at a POR, expressed in terms of the One-Hour Equivalent Sound Level ( $L_{eq}$ ) is the higher of the applicable exclusionary sound level limit given below in Tables 2 and 3, or the background sound level for that POR. The MECP defines exclusionary sound level limits for Plane of Window (POW) and Outdoor PORs, but exclusionary sound level limits for Outdoor PORs only apply to daytime and evening (07:00 to 23:00 hours) periods as identified in Table 3 below. An Outdoor POR includes locations outdoors within 30 m of a façade (within the property) of a dwelling at a height of 1.5 m above ground, typically in backyards, front yards, terraces or patios, or unenclosed balconies or elevated terraces with a minimum depth of 4 m if they are the only outdoor living area for an occupant. The location of the Outdoor POR in the assessment of stationary noise sources is to be considered at the predictable worst case location expected to be occupied by the tenants (i.e., usable area), which is not always at a prescribed location (i.e., not at the centre of the building and 3 m from the façade) as defined for an Outdoor Living Area (OLA) when assessing impacts due to transportation sources. It should be noted for POW noise assessments that in Class 1, 2 and 3 areas, it is assumed the window of the POR to be open whereas in a Class 4 area it is assumed that the window is closed.

**Table 2: Stationary Sources (Steady and Varying Sounds) - Exclusionary Sound Level Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) POW of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

**Table 3: Stationary Sources (Steady and Varying Sounds) - Exclusionary Sound Level Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor POR**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

For impulsive sounds from a stationary source, the sound level limit at a POR expressed in terms of the Logarithmic Mean Impulse Sound Level ( $L_{LM}$ ) is the higher of the applicable exclusionary level limit given below in Tables 4 and 5 for the POW and Outdoor POR or the background sound level for that POR.

**Table 4: Stationary Sources (Impulsive Sounds) - Exclusionary Sound Level Limit Values of Logarithmic Mean Impulse Sound Level ( $L_{LM}$ , dBA) POW of Noise Sensitive Spaces**

Actual Number of Impulses in Period of One-Hour	Class 1 Area (07:00-23:00)/ (23:00-07:00)	Class 2 Area (07:00-23:00)/ (23:00-07:00)	Class 3 Area (07:00-19:00)/ (19:00-07:00)	Class 4 Area (07:00-23:00)/ (23:00-07:00)
9 or more	50/45	50/45	45/40	60/55
7 to 8	55/50	55/50	50/45	65/60
5 to 6	60/55	60/55	55/50	70/65
4	65/60	65/60	60/55	75/70
3	70/65	70/65	65/60	80/75
2	75/70	75/70	70/65	85/80
1	80/75	80/75	75/70	90/85

**Table 5: Stationary Sources (Impulsive Sounds) - Exclusionary Sound Level Limit Values of Logarithmic Mean Impulse Sound Level ( $L_{LM}$ , dBAI) Outdoor POR**

Time of Day	Actual Number of Impulses in Period of One-Hour	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 - 23:00	9 or more	50	50	45	60
	7 to 8	55	55	50	65
	5 to 6	60	60	55	70
	4	65	65	60	75
	3	70	70	65	80
	2	75	75	70	85
	1	80	80	75	90

According to NPC-300, the proponent of a new noise sensitive land use and respective land use planning authority should ensure that an existing legally operating stationary sources of noise will be able to continue to comply with the applicable sound level limits. When noise levels exceed the applicable sound level limits, noise control measures are required to meet MECP approval requirements. The noise control measures may be implemented on the new noise sensitive lands or at the source but the preferred option is to implement noise controls measures at the stationary source itself and be completed through a joint effort between the proponent and owner of the stationary source. This includes executing the appropriate agreements regarding the implementation and maintenance of the noise control measures and the agreements should be submitted as part of an MECP approval application.

### **Emergency Equipment**

In assessing noise sources associated with emergency equipment, Section B7.3 of the NPC-300 guideline outlines the emergency equipment sound level limits as follows:

*The sound level limits for noise produced by emergency equipment operating in non-emergency situations, such as testing or maintenance of such equipment, are 5 dB greater than the sound level limits otherwise applicable to stationary sources.*

*The noise produced by emergency equipment operating in non-emergency situations should be assessed independently of all other stationary sources of noise. Specifically, the emissions are not required to be included with the overall noise assessment of a stationary source facility.*

### **Transportation Sources**

Transportation sources of noise include road, rail and aircraft traffic sources. These transportation noise sources are assessed as follows:

- 1) Outdoor noise levels due to aircraft should be established separately from the impact due to road and/or rail traffic.
- 2) Outdoor noise levels due to road and rail should be combined.
- 3) Indoor noise levels should be assessed separately for road, rail and aircraft traffic.

Road and rail traffic noise sources are evaluated using commonly used prediction methods within the industry which includes the assessment of projected traffic volume a minimum 10-years into the future. The MECP approved prediction method for road traffic noise is Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) and for rail traffic noise is Sound from Trains Environmental Analysis Method (STEAM). Other traffic noise prediction models have been and are being developed by various authorities and may be adopted from time-to-time for use in Ontario by the MECP and the land use planning authority. The road and rail traffic noise descriptors are the 16-hour daytime and the 8-hour nighttime equivalent sound level (i.e., Leq(16) and Leq(8)). The assessment of road traffic noise impact, if required by the land use planning authority, is evaluated through predictions using statistically averaged road traffic information, based on the higher of the AADT (Annual Average Daily Traffic) or SADT (Summer Average Daily Traffic).

NPC-300 specifically addresses the following for road and rail traffic noise sources:

- sound levels at the plane of residential windows to determine ventilation requirements;
- sound levels in indoor areas to determine exterior building component requirements;
- sound levels in the outdoor living areas for exterior noise control requirements; and
- noise warning clauses.

NPC-300 provides specific ventilation requirements for developments depending on the expected noise levels from road and rail traffic at the residential plane of windows, which are summarized in the Table 6 below. It should be noted that noise from train whistles are excluded for assessment of ventilation requirements.

**Table 6: Road and Rail Noise Ventilation Requirements**

Road and Rail Traffic Noise Level at Plane of Window		Ventilation Requirement
16-Hour Daytime Leq (07:00 – 23:00)	8-Hour Nighttime Leq (23:00 – 07:00)	
Less than 55 dBA	Less than 50 dBA	No special ventilation requirements
55 to 65 dBA	50 to 60 dBA	Forced air system with provisions for installation of air-conditioning. It is recommended that owners/tenants be warned about excessive noise via a warning clause (NPC-300 Type C).
Greater than 65 dBA	Greater than 60 dBA	Air-conditioning is mandatory to allow windows to remain closed. Owners/tenants must be warned about excessive noise via a warning clause (NPC-300 Type D).

Outdoor noise levels are predicted at OLAs. According to NPC-300, an OLA is a noise sensitive land use that is intended for the quiet enjoyment of the outdoor environment and is readily accessible from the building. An OLA includes backyards, gardens, terraces or patios, unenclosed balconies or elevated terraces with a minimum depth of 4 m (provided they are the only OLA for an occupant) and common OLAs associated with high-rise multi-unit buildings. As previously noted, the location of the OLA when assessing transportation sources may differ from the location of the Outdoor POR in the assessment of stationary noise sources (i.e., predictable worst case location, on the property, within the usable area and within 30 m of the building). Table 7 summarizes the sound level limits for OLAs and respective noise control requirements during the 16 hour daytime period.

**Table 7: Outdoor Living Area Noise Control Requirements**

Road and Rail Traffic Noise Level in OLA 16-Hour Daytime Leq (07:00 – 23:00)	Noise Control Requirement
Less than 55 dBA	No noise control required
55 to 60 dBA	Noise controls are required to reduce OLA noise levels to 55 dBA or less; OR Noise controls are not required but owners/tenants must be warned about excessive noise in OLAs via a warning clause (NPC-300 Type A)
Greater than 60 dBA	Noise controls are required to reduce OLA noise levels to 55 dBA or less; OR If noise controls are not feasible due to technical, economic or administrative reasons, no noise controls are required and owners/tenants must be warned about excessive noise in OLAs via a warning clause (NPC-300 Type B)

Indoor noise levels are predicted in commonly used types of noise sensitive indoor spaces such as a bedroom or living area. Depending on the predicted noise level at the POW of these noise sensitive spaces due to transportation sources, the building components (i.e., windows, walls and doors) should be designed to meet applicable indoor sound level limits. Table 8 summarizes the sound level limits for different types of noise sensitive indoor spaces during the applicable time periods. It should be noted that noise from train whistles is included in the assessment of indoor rail noise requirements.

For road traffic, if the outdoor daytime sound level at the POW exceeds 65 dBA or the outdoor nighttime sound level at the POW exceeds 60 dBA, building components should be designed so that the indoor sound levels comply with the sound level limits in Table 8.

For rail traffic, if the outdoor daytime sound level at the POW exceeds 60 dBA or the outdoor nighttime sound level at the POW exceeds 55 dBA, building components should be designed so that the indoor sound levels comply with the sound level limits in Table 8. Note that the exterior walls of the first row of dwellings being proposed next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters when 24 hour rail traffic noise is greater than 60 dBA, and when the first row of dwellings is within 100 metres of the tracks.



**Table 8: Indoor Sound Level Limits for Road and Rail Traffic Noise**

Space	Road (dBA)	Rail (dBA)
Living quarters - Living/dining areas of residences, libraries, daycare centres, etc. (Time period 16 hours; 07:00- 23:00) – Leq [16 hours]	45	40
Sleeping quarters - Bedrooms of residences and hotels (Time period 8 hours; 23:00- 07:00) – Leq [8 hours]	40	35

NPC-300 contains sample warning clauses to inform future owners/tenants of potential noise effects due to road and rail traffic (i.e., Type A through D). The suggested wording of the warning clauses varies with the degree of noise impact, the ventilation requirements, and the type of noise control features included.

Aircraft noise is assessed in a detailed noise study on current or future Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours, a metric and method implemented by Transport Canada. The 30 NEF/NEP contour is the outdoor sound level limit and indoor aircraft sound level limits are provided and compared to calculated noise levels generated from the predicted outdoor noise levels.

### **Noise Control Measures**

According to NPC-300, noise control measures can be used to achieve compatibility for the specific land use or activity with respect to noise from transportation and/or stationary sources. Noise control measures may include but are not limited to the following: 1) source based noise controls; 2) receptor based outdoor noise controls; 3) receptor based “on building” noise controls (Class 4 only); 4) receptor based site configuration noise controls; 5) receptor based site construction and architectural noise controls. The following are to be considered when establishing noise control measures for stationary sources:

- Proponent of a new noise sensitive land use and respective land use planning authority should ensure the legally operating stationary sources of noise will be able to continue to comply with the applicable sound level limits.
- If noise mitigation is required, the preferred option is to alter the stationary source itself (i.e., source-based mitigation), completed through a joint effort between the proponent (i.e., the developer) and owner of the stationary source. Typically, noise mitigation is most effective when implemented at either the noise source or at the POR. The feasibility of implementing and the responsibility, including maintenance, of any noise mitigation controls will need to be confirmed, typically in the detailed study. Agreements for noise mitigation between the stationary source owner, land use planning authority and the noise sensitive land use owner/developer may be required. These agreements should include details on the implementation and maintenance of the noise control measures and they should be provided to the MECP in support of any approval application.
- If receptor based noise control measures are to be used, the implementation and maintenance should be included in an agreement between the developer, the land use planning authority, and the owner of the stationary source.

- A warning clause is not acceptable in place of physical noise mitigation to identify an exceedance with MECP sound level limits. Warning clauses for stationary sources may identify a potential concern due to the proximity of a facility. In general, the effectiveness of warning clauses is unknown. They should be included and are important as part of the overall noise mitigation plan for any proposed development, but it does not ensure that noise complaints will not occur.

### 3.3.2 City of Niagara Falls Noise and/or Vibration By-Law

The City's *Noise Control By-Law No. 2004-105 as amended by: By-law 2005 - 73, By-law 2007-28 and By-law 2014-155 (By-Law)* outlines various prohibitions and time limitations on various noise sources, exempted activities, and procedures on obtaining an exemption. It does not provide specific sound level limits.

## 3.4 Vibration Guidelines

As identified in the EPA and Guideline D-1, vibration is a contaminant and facilities are not to emit vibration such that it results in an "adverse effect". Vibration is not permitted to be discharged into the natural environment without an approval under the EPA. The following are MECP publications applicable to stationary sources of vibration and/or transportation (i.e., ground-borne vibration):

- Publication NPC-207: Impulse Vibration in Residential Buildings (Draft). November 1983. MECP. (NPC-207).
- Guideline for Noise and Vibration Assessment of Transit Projects (Draft #9). January 1995. MECP.

It is Golder's understanding both of these publications have not received final MECP approval but have been referenced in many ECAs or other assessments. NPC-207 defines vibration level limits at a POR for frequent and infrequent vibration impulses during the daytime and nighttime hours.

In addition to the above MECP publications, the following may be considered relevant when assessing transportation sources of vibration, specifically due to rail traffic:

- Canadian National (CN) Principal Main Line Requirements.
- GO Transit Principal Main Line Requirements.
- ISO 2631-2 Evaluation of Human Exposure to Whole-Body Vibration.
- United States of America Department of Transportation. Federal Transit Administration (FTA). Transit Noise and Vibration Impact Assessment (FTA Report No. 0123, September 2018) (FTA Manual).
- Railway Association of Canada - Guidelines for New Development in Proximity to Railway Operations (May 2013) (RAC Railway Guidelines).

For this Study, the RAC Railway Guidelines and FTA Manual were used to assess vibration due to rail traffic. The RAC Railway Guidelines are similar to the CN Principal Main Line Requirements, GO Transit Principal Mainline Requirements and Guideline for Noise and Vibration Assessment of Transit Projects (Draft #9) but is considered a more comprehensive guideline that provides a common approach to the prevention and resolution of issues arising from development occurring in close proximity to railway corridors and other rail operations. In addition, the RAC Railway Guidelines were recently revised and developed by a team that included representation from CN, CP, Metrolinx and various cities/municipalities.

The RAC Railway Guidelines is meant to be used by municipalities and provincial governments, municipal staff, railways, developers and property owners when lands in proximity to railway operations are being developed. It was developed in cooperation between the Federation of Canadian Municipalities and the Railway Association of Canada. The RAC Railway Guidelines provides guidance for new developments, not existing ones, in proximity to railway operations understanding residential developments in proximity to railway operations will need to be planned appropriately. It identifies common issues and constraints, including the need to provide sufficient noise and vibration mitigation measures.

One desirable design condition considered a mitigation measure is the implementation of the following standard recommended building setbacks, for new residential development in proximity to railway operations, measured from the railway right-of-way:

- Freight Rail Yard - 300 metres;
- Principle Main Line - 30 metres;
- Secondary Main Line - 30 metres;
- Principle Branch Line - 15 metres;
- Secondary Branch Line - 15 metres;
- Spur Line - 15 metres.

These setback distances are applicable to residential uses and do not include certain uses and structures where these setback distances could be reduced. As stated in the RAC Railway Guidelines, noise and vibration from rail operations are two of the primary sources of complaints from residents living near railway corridors. Sources of rail noise are primarily from train pass-bys and rail yard activities. Noise due to train pass-bys is typically intermittent and primarily from the locomotive but also includes whistles and car wheels on the tracks. In addition, noise impacts will depend on the frequency of trains, speed and exposure (distance/shielding between the sensitive land use and railway operations). Ground borne vibration due to the wheel-rail interface travels from the railway tracks and into the ground, possibly eventually propagating to nearby buildings. Vibration is considered to be more difficult to predict and mitigate than noise. The RAC Railway Guidelines identifies a methodology to collect vibration measurements and the main points include:

- Vibration measurements will be conducted at the closest proposed residential receptor and/or the minimum building setback (i.e. 30 m for a main rail line, 15 m for a branch or spur line). If the proposed dwelling units are located more than 75 m from the railway right-of-way, vibration measurements are not required.
- A minimum of five (5) train pass bys will be recorded at each measurement location.
- The measurement equipment will be capable of measuring between 4 Hz and 200 Hz with an RMS averaging time constant of 1 second.
- A vibration limit of 0.14 mm/s will be used in the assessment.

The RAC Railway Guidelines identifies standard mitigation or alternative development solutions (i.e., crash walls) be considered for mitigation design, by both the developer and municipalities, when designing or assessing new residential development in proximity to a railway corridor. In the end, all mitigation measures should be designed to the highest possible urban design standards. Standard mitigation measures could include the following:

- apply standard recommended building setbacks (see above) from the mutual property line (i.e., Railway right-of-way) and the building façade;
- chain link security fencing, 1.83 m high, along the mutual property line;
- safety berm, 2.5 m high; and
- noise barrier at least 5.5 m above top of rail (i.e., 2.5 m berm and 3.0 m noise barrier). Terrain will either increase or decrease the overall height of the noise barrier.

The specific mitigation required depends on a number of factors including the designation of the line (i.e., Principle Main, Secondary Branch, Spur Line, etc.) Recommendations for the preparation of noise and vibration impact studies is provided in Appendix C of the RAC Railway Guideline which summarizes the requirements. The criteria presented in Appendix C of the RAC Railway Guideline was adapted from the MECP Publication LU-131 Noise Assessment Criteria in Land Use Planning (October 1997) Guideline, which was replaced by NPC-300.

When municipalities deem a site suitable for residential use, the Railway Guidelines recommends a *Model Review Process for New Residential Development, Infill and Conversions in Proximity to Railway Corridors* be carried out. Proponents are encouraged to consult with the railway early in the development process to discuss and determine the feasibility of a project (i.e. capacity of the site to accommodate standard building setbacks). Through this process for sites unable to accommodate standard mitigation measures, a Development Viability Assessment Report will be required. The RAC Railway Guidelines Appendix A describes the requirements of the Development Viability Assessment Report.

## 4.0 EXISTING CONDITIONS REVIEW

The second step in this Study was developing an understanding of the existing conditions within and surrounding the Project Site with the purpose of identifying key noise and vibration emission sources to be further assessed. The existing conditions were determined using the following methodology:

- review documents provided by the Project team, provided by the Region, or publicly readily available;
- search for ECA (Air Quality and Noise) or Air Emission EASR approvals using the MECP Access Environment online tool;
- review and apply the City's online resources (i.e., open data catalogue system);
- completion of field reconnaissance surveys and measurements; and
- review any ECA supporting documents and/or noise data provided by industrial facilities surrounding the Project Site. This information was requested and was received from some industries. If any additional data is provided in the future, it may require this Study be updated accordingly.

### 4.1 Document Review

Golder reviewed several documents either provided by the Project team or publicly readily available. This document review process enabled Golder to develop a better understanding of the Project and the lands surrounding the Project, and allowed Golder to focus subsequent efforts. The following documents were reviewed for this Study.

- Arcadis Canada Inc (Arcadis). *Sensitive Land Use Study (Air Quality) in Support of Planning Applications for Potential Residential Development – Thundering Waters Golf Course and Adjacent Lands*. October 2016. (Arcadis Report)
- RWDI Air Inc. (RWDI). *Thundering Waters Secondary Plan. Air Quality, Noise and Vibration Feasibility Assessment Version 2.0*. June 23, 2016. (RWDI Report)
- Urban and Environmental Management Inc (UEM). *Thunder Waters Golf Course Lands Report*. June 28, 2016. (UEM Report)
- Urban and Environmental Management Inc. (UEM). *Thundering Waters Golf Course Development Opportunities and Constraints Analysis*. December 9, 2016. (UEM Constraints Analysis)
  - Memo. *Thundering Waters Golf Course Development Meeting with City of Niagara Falls Staff*. May 26, 2016.
- R.J. Burnside & Associates Limited (Burnside). *Niagara Village Transportation Study*. January 2020. (Transportation Study)

Below is a summary of the sections in the above documents relevant for the purposes of this Study.

### 4.1.1 Arcadis Report

Arcadis carried out a land use compatibility assessment that verified the required separation distances between the proposed residential development within the Site and the nearby industrial facilities in accordance with the MECP Guideline D6. The assessment focused on Class II and Class III industrial land uses at that time and determined the Guideline D6 separation distance for certain industrial facilities.

The assessment concluded significant air quality and/or noise impacts are not expected on the proposed residential development within the Site and adjacent development lands, due to the industrial land uses at the time of the assessment. The Guideline D6 recommended separation distances impinge onto small sections of the proposed residential development.

The Arcadis Report Guideline D6 assessment formed the basis of Golder's list of industrial facilities surrounding the Project Site.

### 4.1.2 UEM Report

The UEM Report summarized the findings from a site visit, review of available information, discussion and meeting with municipal staff and input from others to identify potential constraints on the development of the Site and the implementation of reasonable mitigation measures. The minimum separation distances recommended in Guideline D6 would still need to be applied and a 15 m setback distance from the existing railway line would still be required. The rail line that travels through the centre is considered an industrial spur rail line and services the industrial facilities in the area. The City identified a setback distance of 300 m to be maintained from Salit Steel based on their Guideline D6 classification of this industrial facility to be Class III. Other nearby developments previously classified Salit Steel as Class II which the City disagreed with. The UEM Report identified setbacks as a mitigation measure and that the minimum setbacks could be possibly reduced through more detailed studies.

### 4.1.3 RWDI Report

RWDI conducted an Air Quality, Noise and Vibration Feasibility Assessment for the Thundering Waters Secondary Plan development that is currently known as the Riverfront Community situated immediately to the southwest of the Project Site. The noise and vibration emissions from nearby industry and the rail line that travels through its centre were both considered. Road traffic and aircraft flyovers were identified as distant and not expected to significantly influence sound levels at the development being assessed. The assessment of industry focused primarily on Class III industries while those identified as Class II were qualitatively reviewed. RWDI previously carried out a Guideline D6 assessment in November 2015 and the RWDI Report reviewed those results and reclassified some of the industry identified as Class III to Class II. The rail line vibration levels were predicted using FTA algorithms. Noise control measures consisting of noise barriers and administrative controls were presented for various industry surrounding the development.

#### 4.1.4 UEM Constraints Analysis

UEM was retained to review development options for the Site. This document appears to be similar and/or rely on the information presented in the UEM Report. UEM identified constraints on the Site and adjacent properties if the Project progressed and identified the potential to mitigate the constraints to increase the amount of lands that could be developed on the Site. A review of the RWDI and Arcadis Reports was carried out by UEM and they identified differences in the Guideline D6 classification of some industrial facilities. UEM concluded the Arcadis report to be more appropriate since it was specifically completed for the Site and their assessment included discussions with the MECP district office.

#### 4.1.5 Burnside Transportation Study

R.J. Burnside & Associates Limited (Burnside) prepared a draft existing condition study dated January 2020 (Transportation Study) that provides a preliminary assessment of the key transportation related issues, relevant background reports/studies, existing and future traffic data, existing and future travel demand characteristics and infrastructure deficiencies. The Transportation Study was used to support the assessment of noise due to road traffic for the purposes of this Study.

### 4.2 Existing Environmental Compliance Approvals

An online search through the MECP Access Environment tool in June 2018 was initially used to identify industrial facilities surrounding the Project Site that have ECAs (for Air and Noise) or Air Emissions EASRs. Table 9 outlines the status of the identified industrial facilities as of July 2021.

**Table 9: Summary of MECP ECA and EASR Search**

Item	Facility Name	Facility Address	Date of Approval	Approval Type	Status	Does it Include a Noise Assessment? <sup>1</sup>
1	Chemtrade	6300 Oldfield Road	September 18, 2019	EASR-Air	Registered	Yes
2	Laurcoat Inc.	8100 Dorchester Road Building B	April 17, 2012	ECA-AIR	Approved	No
3	CYRO Canada Inc.	8100 Dorchester Road Building B	June 29, 2000	ECA-AIR	Approved	No
4	Ingot Metal Company Limited	5868 Ramsey Road	July 12, 2004	ECA-AIR	Revoked and/or Replaced	Yes
5	Washington Mills Electro Minerals Corporation	7780 Stanley Avenue	January 6, 2016	ECA-AIR	Approved	Yes
6	H & L. Tool and Die Ltd.	5955 Don Murie Street	November 6, 2010	ECA-AIR	Approved	No
7	1683063 Ontario Inc. (Milestone Millwork)	6100 Progress Street	May 25, 2006	ECA-AIR	Revoked and/or Replaced	No

Item	Facility Name	Facility Address	Date of Approval	Approval Type	Status	Does it Include a Noise Assessment? <sup>1</sup>
8	Niagara Pattern Limited	6135 Don Murie Street	October 21, 2010	ECA-AIR	Approved	No
9	The Regional Municipality of Niagara	4414 Chippawa Parkway	May 31, 2018	ECA-AIR	Approved	Yes
10	Edscha North America Inc.	5795 Don Murie Street	January 10, 2007	ECA-AIR	Approved	No
11	Brunner Manufacturing & Sales Ltd.	5720 Don Murie Street	January 25, 2012	ECA-AIR	Approved	No
12	Tecna-Division of Brunner	5770 Don Murie Street	April 12, 2005	ECA-AIR	Approved	No
13	Laurcoat Inc.	8591 Earl Thomas Avenue	September 15, 2015	ECA-AIR	Approved	No
14	St. Lawrence Cement Inc. / Dufferin Concrete	5980 Don Murie Street	September 27, 2006	ECA-AIR	Approved	Yes
15	Pumpcrete Corporation	6000 Progress Street	April 30, 2004	ECA-AIR	Approved	No
16	Mancuso Chemicals Limited	5635 & 5725 Progress Street	May 11, 2017	ECA-AIR	Approved	Yes
17	Hoco Limited	5720 Progress Street	January 6, 2003	ECA-AIR	Approved	No
18	Niagara Industrial Finishes Inc.	5635 Progress Street	June 25, 2010	ECA-AIR	Approved	No
19	Specialty Cast Metals Ltd.	5635 Progress Street	December 20, 2002	ECA-AIR	Revoked and/or Replaced	Yes
20	Barbisan Allmetal Designs	5835 Progress Street	October 26, 2001	ECA-AIR	Approved	No
21	Can Mar Manufacturing Inc.	5869 Progress Street	October 8, 2004	ECA-AIR	Approved	No
22	Fencast Industries Ltd	6272 Kister Road	November 29, 2009	ECA-AIR	Approved	No
23	Salit Steel	7771 Stanley Avenue	January 30, 2020	EASR-Air	Registered	Yes



Item	Facility Name	Facility Address	Date of Approval	Approval Type	Status	Does it Include a Noise Assessment? <sup>1</sup>
24	Airwood Vents	6167 Don Murie Street	May 6, 2019	EASR-Air	Registered	No

<sup>1</sup> Noise Assessment includes one of the following: Primary Noise Screening, Secondary Noise Screening or Acoustic Assessment Report.

A facility is required to obtain and maintain an ECA/EASR and supporting documentation for its operations. Once an ECA/EASR has been issued by the MECP, it is expected that the facility is in compliance with the MECP standards and guidelines unless it is known they are implementing a Noise Abatement Action Plan (NAAP) in which case the industrial facility has committed to implementing a plan to mitigate noise levels to bring their operations into compliance with MECP guidelines.

The proposed introduction of sensitive land use (i.e. POR(s)) within the Project Site may introduce PORs that are more sensitive than PORs identified in the noise studies prepared for the respective industries. New PORs may affect the compliance status of facilities with existing ECAs, especially when located in closer proximity than existing PORs. In such cases, an ECA amendment or an update of supporting EASR documents may be required to incorporate an assessment of any new PORs.

## 4.3 City of Niagara Resources

### 4.3.1 City of Niagara Zoning By-Law Number 79-200

The City of Niagara Falls Zoning By-law Number 79-200 is one of four zoning by-laws within the City and regulates the lands in Chippawa and north of the Welland River. The zoning provisions identified in these by-laws describe all the possible permitted land uses. Zoning By-law Number 79-200 was made into law on November 5, 1979 and an online version, last updated in October 2018, is available at [www.niagarafalls.ca](http://www.niagarafalls.ca). The Project Site is subject to the Zoning By-Law Number 79-200 and is zoned "Open Space" and is adjacent to the following land uses:

- LI – Light Industrial;
- GI – General Industrial;
- HI – Heavy Industrial;
- PI – Prestige Industrial;
- NC-H – Neighbourhood Commercial Holding Zone;
- R1E – Residential Single Family 1E Density Zone;
- R5F – Residential Apartment 5F Density Zone;
- R3 – Residential Mixed Zone;
- OS – Open Space Zone.

An area zoned for Open Space has following permitted uses:

- Agricultural;
- Commercial forestry;
- Boating club;
- Cemetery;
- Hospital;
- Private club;
- Recreational uses;
- Religious institution;
- Riding stable;
- Sanatorium;
- School;
- Accessory buildings and accessory structures including not more than one dwelling unit which is on the same lot as and is accessory to a use listed above.

Note that some of the uses permitted by the existing “Open Space” zoning are considered by the MECP to be noise sensitive spaces as set out in NPC-300.

There are areas within the Project Site designated with a holding provision “OS-H”. Figure 2 illustrates the current zoning in accordance with the City’s By-law 79-200 at the time of this Study and the figure showing the Project Site and Study Area from By-law 79-200 is included in Appendix B.

#### **4.3.2 Region and City of Niagara Open Data Portal**

The Region and City have made available various datasets to the public through their Open Data Portal. Golder reviewed the various datasets and utilized the following data:

- Average Annual Daily Traffic (AADT) Data (2015);
- Road Centreline (2018);
- Zoning By-law 79-200 (2018);
- Property Parcels (2017); and
- Address Points (2018).

In addition to the datasets above, Golder utilized orthoimagery available from Bing webservice, Southwestern Ontario Orthophotography Project (SWOOP) 2015 Digital Terrain Model, terrain as provided by Burnside, and Ontario Railway Network (ORWN) datasets.

## 4.4 CP Montrose Subdivision Rail Line

According to the Railway Association of Canada's (RAC) Online Map (<https://rac.jmaponline.net/canadianrailatlas/>), the rail line that passes through the Project Sites centre is owned by CP and is the CP Montrose Subdivision rail line. Golder contacted CP in 2018 and CP identified this rail line as an industrial spur line and provided traffic data along this rail line for use in this Study. This is included in Appendix B.

CP also provided the following regarding warning clauses for developments near industrial spur lines:

*A clause should be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300m of the railway right-of-way, warning prospective purchasers or tenants of the existence of the Railway's operating right-of-way; the possibility of alterations including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or operations.*

## 4.5 Aircraft Noise

The airports surrounding the Project Site based on an online search include Niagara Falls International Airport, Buffalo International Airport and Niagara District Airport. The NEF/NEP 25 contours, which are required in NPC-300 for the purposes of land use compatibility, are not available for any of the airports. The Buffalo International Airport does have Noise Exposure Maps (NEMs) prepared in accordance with the Federal Aviation Administration (FAA) which differ from NEF/NEP contours but is also used for the purpose of assessing land use compatibility with respect to noise. The NEMs for Buffalo International Airport indicate the area which exceeds the applicable performance limit (i.e. 65 dB DNL) is limited to the lands surrounding it and do not intersect the Project Site. Therefore, aircraft noise from nearby airports was not further assessed in this Study.

Helicopter activity, likely due to the Niagara Falls tourist area, was observed during the field reconnaissance survey further discussed below. Golder recommends aircraft activity from the tourist area be further reviewed during detailed design and future noise studies to confirm whether it requires further assessment.

## 4.6 Noise Data from Surrounding Industrial Facilities

In trying to complete a thorough assessment, Golder prepared and distributed a letter requesting any noise data from nearby industrial facilities willing to share to support the preparation of this Study. This letter was hand delivered and emailed in June 2018 to the nearby industrial facilities. The letter indicated the Project would like to get a better understanding of the current noise and vibration emissions due to the surrounding industrial facilities to assist in identifying potential concerns. Information requested included any relevant noise and vibration studies, or information prepared for their facilities which includes but is not limited to AARs, ECAs, noise prediction modelling files, Noise Impact Studies and/or Vibration Impact Studies. A copy of the letter is provided in Appendix B.

To-date, the following industries contacted Golder and/or the Project team and either provided information or confirmed they are willing to participate:

- Salit Steel;
- Brunner Manufacturing & Sales Ltd.;

- Tecna-Division of Brunner;
- Washington Mills Electro Minerals Corporation; and
- Chemtrade.

## 4.7 Field Reconnaissance Survey

To assist in determining whether there is likely a potential for noise and vibration emissions to significantly impact the Project Site, Golder carried out a field reconnaissance survey (the Survey) on June 12 and 13, 2018. The Survey involved the collection of qualitative data based on observations from publicly accessible areas (i.e., sidewalks and roads) and the Project Site to verify and supplement the information identified in the sections above.

The Survey was conducted within 1 km of the Project Site. It is Golder's opinion that it is unlikely that there would be any potential impacts on the Project Site from any existing operations located beyond 1 km. The Survey focused on the following:

- verification (or update) of the names, addresses and land use of the industrial facilities in the vicinity of the Project Site;
- identification of the presence of noise and vibration sources;
- observations of facilities physical characteristics;
- observation of industrial facilities that could result in potential adverse effects; and
- observations regarding the type of emissions (e.g., fugitive or process-related) and source of emissions (e.g., exhaust stacks, ventilation equipment, process equipment).

## 4.8 Summary of Noise and Vibration Emission Sources for Further Assessment

Based on the information identified in Sections 4.1 to 4.7, the following are the noise and vibration emission sources that were further evaluated in this Study.

### 4.8.1 Noise

The table below lists the industrial facilities surrounding the Project Site that were carried forward for further assessment for noise due to stationary sources as of June 2018. If any changes to the list of industrial facilities surrounding the Project Site have occurred since June 2018, they have not been considered.

**Table 10: Industrial Facilities to be Further Assessed**

ID	Facility Name	Facility Address
IN01	Chemtrade	6300 Oldfield Road
IN02	Washington Mills Electro Minerals Corporation	7780 Stanley Avenue
IN03	H & L. Tool and Die Ltd.	5955 Don Murie Street
IN04	1683063 Ontario Inc. (Milestone Millwork)	6100 Progress Street

ID	Facility Name	Facility Address
IN05	Niagara Pattern Limited	6135 Don Murie Street
IN06	Edscha North America Inc.	5795 Don Murie Street
IN07	Brunner Manufacturing & Sales Ltd.	5720 Don Murie Street
IN08	Tecna-Division of Brunner	5770 Don Murie Street
IN09	Laurcoat Inc.	8591 Earl Thomas Avenue
IN10	St. Lawrence Cement Inc. / Dufferin Concrete	5980 Don Murie Street
IN11	Pumpcrete Corporation	6000 Progress Street
IN12	Mancuso Chemicals Limited	5635 & 5725 Progress Street
IN13	Hoco Limited	5720 Progress Street
IN14	Barbisan Allmetal Designs	5835 Progress Street
IN15	Can Mar Manufacturing Inc.	5869 Progress Street
IN16	Fencast Industries Ltd	6272 Kister Road
IN17	Marineland Canada	5680 Don Murie Street
IN18	Falls Contracting Inc.	5850 Unit D Don Murie Street
IN19	Dyaco Canada Inc.	5955 Don Murie Street
IN20	Niagara River Trading	6199 Don Murie Street
IN21	Gordon Wright Electrical Limited	6255 Don Murie Street
IN22	Air Liquide Canada Inc.	6090 Don Murie Street
IN23	Airwood Vents	6167 Don Murie Street
IN24	International Sew-Right	6190 Don Murie Street
IN25	Marine Clean Ltd.	6220 Don Murie Street
IN26	Niagara Commercial Coating & Insulation	6260 Don Murie Street
IN27	Deflecto Canada	8699 Stanley Avenue
IN28	Marineland Canada	8529-8559 Stanley Avenue
IN29	Marineland Canada	8455 Stanley Avenue
IN30	Batemans Tires	8407 Stanley Avenue
IN31	Peglow Tool & Die Inc.	8345 Stanley Avenue
IN32	Salit Steel	7771 Stanley Avenue

ID	Facility Name	Facility Address
IN33	L. Wallter & Sons Excavating Ltd.	7527 Stanley Avenue
IN34	Hangups Sportware	6537 Kister Road
IN35	Fastenal	6537 Kister Road
IN36	Micron Installations	6501 Kister Road
IN37	Niagara RV & Trailer Center	6471 Kister Road
IN38	Niagara Bus Wash	6441 Kister Road
IN39	T.Hodgson & Co. Ltd.	6411 Kister Road
IN40	Davert Tools	5676 Progress Street
IN41	Niagara Analytical Laboratories	5805 Progress Street
IN42	Louver-Lite	6015 Progress Street
IN43	Aztec Frames	6025 Progress Street
IN44	GC Customs Services Inc.	6045 Progress Street
IN45	Niagara Fence Supply	6065 Progress Street
IN46	Niagara Fastener Inc.	6095 Progress Street
IN47	Provincial Design & Fabrication Inc.	6159 Progress Street
IN48	Spencer ARL	6040 Progress Street
IN49	Unit 1 Advanced Cryogenic Services	6100 Progress Street
IN50	Lafarge Quality Ready Mix	6224 Progress Street
IN51	Collins Concessions Ltd.	8621 Earl Thomas Avenue
IN52	Factor Forms and Labels	8481 Earl Thomas Avenue
IN53	Stelfab Niagara Limited	8594 Earl Thomas Avenue
IN54	Food Roll Sales (Niagara) Ltd.	8464 Earl Thomas Avenue
IN55	Fred's Concrete	5806 Ramsey Road
IN56	Avid Growing Systems	8100 Dorchester Road
IN57	Palfinger Inc.	7942 Dorchester Road
IN58	Niagara Moving and Storage	7825 Dorchester Road

The following existing roads surrounding the Project Site were carried forward for further assessment for noise due to road traffic:

- Chippawa Creek
- Chippawa Parkway
- Don Murie Street
- Drummond Road
- Lyons Creek
- Marineland Parkway
- McLeod Road
- Montrose Road
- Progress Street
- Queen Elizabeth Way (QEW)
- Ramsey Road
- Stanley Avenue.

The CP Montrose Subdivision industrial spur rail line that runs through the Project Site was carried forward for further assessment for noise due to rail activities.

Noise due to aircraft was not further assessed in this Study, but helicopter activity, likely due to the Niagara Falls tourist area, was observed when on site. Golder recommends aircraft activity from the tourist area be further reviewed during detailed design and future noise studies to confirm whether further assessment is warranted.

#### **4.8.2 Vibration**

Based on the list of industrial facilities and observations during the Survey, no vibration levels were perceived from any identified facility or roads surrounding the Project Site. Therefore, vibration levels from stationary sources were not carried forward. The CP Montrose Subdivision industrial spur rail line that runs through the Project Site was carried forward for further assessment for vibration.

## 5.0 NOISE ASSESSMENT

The noise assessment for this Project considered the following:

- the potential noise impact of the environment on the Project Site;
- the potential noise impact of the Project Site on the environment; and
- the potential noise impact of the Project Site on itself.

The assessment of the potential impact of the environment on the Project Site considered the potential impact of noise from the surrounding existing industrial facilities' stationary sources, rail traffic and road traffic.

The assessment of the potential impact of the Project Site on the environment considered the potential impact of stationary noise associated within the Project Site and the road traffic due to the Project onto offsite sensitive receptors.

The assessment of the potential impact of the Project onto itself considered the potential impact of stationary noise associated with the Project and the road traffic due to the Project onto onsite sensitive receptors.

### 5.1 Impact of the Environment on the Project

Golder assessed the potential impact of the future noise environment on the entire Project Site using information and data as described in Section 4.0 in this Study. A noise prediction model considering stationary sources, rail traffic and road traffic was developed to support the assessment of the potential noise impact of the environment on the Project Site using the appropriate guidelines described in Section 3.0.

#### 5.1.1 Field Program

##### 5.1.1.1 Key Industrial Facilities Assessed

Industrial facilities surrounding the Project Site were identified for the assessment of stationary noise sources and are summarized in Section 4.8. To predict the noise levels within the Project Site, key industrial facilities were identified to be considered in the noise prediction modelling. To identify which industrial facilities were to be carried forward into the noise prediction model, industrial facilities were identified as either being or having the potential to be acoustically significant relative to the existing background noise levels surrounding and within the Project Site as established during site visits. Golder completed these site visits during the daytime period within the Project Site on May 23, 2018 and in the area surrounding the Project Site near the industrial facilities, from publicly accessible areas, on June 13 and 15, 2018. Both steady and impulsive stationary noise sources were considered, when applicable, for each of the industrial facilities based on Golder's experiences and observations from the site visits. Table 11 presents the industrial facilities identified in Section 4.8 and indicates which were specifically assessed in the noise prediction modelling.



**Table 11: Key Industrial Facilities to be Assessed**

ID	Facility Name	Facility Address	Assessed in Noise Prediction Modelling
IN01	Chemtrade	6300 Oldfield Road	Yes
IN02	Washington Mills Electro Minerals Corporation	7780 Stanley Avenue	Yes
IN03	H & L. Tool and Die Ltd.	5955 Don Murie Street	No
IN04	1683063 Ontario Inc. (Milestone Millwork)	6100 Progress Street	No
IN05	Niagara Pattern Limited	6135 Don Murie Street	Yes
IN06	Edscha North America Inc.	5795 Don Murie Street	No
IN07	Brunner Manufacturing & Sales Ltd.	5720 Don Murie Street	Yes
IN08	Tecna-Division of Brunner	5770 Don Murie Street	Yes
IN09	Laurcoat Inc.	8591 Earl Thomas Avenue	Yes
IN10	St. Lawrence Cement Inc. / Dufferin Concrete	5980 Don Murie Street	Yes
IN11	Pumpcrete Corporation	6000 Progress Street	Yes
IN12	Mancuso Chemicals Limited	5635 & 5725 Progress Street	Yes
IN13	Hoco Limited	5720 Progress Street	No
IN14	Barbisan Allmetal Designs	5835 Progress Street	Yes
IN15	Can Mar Manufacturing Inc.	5869 Progress Street	No
IN16	Fencast Industries Ltd	6272 Kister Road	Yes
IN17	Marineland Canada	5680 Don Murie Street	No
IN18	Falls Contracting Inc.	5850 Unit D Don Murie Street	No
IN19	Dyaco Canada Inc.	5955 Don Murie Street	Yes
IN20	Niagara River Trading	6199 Don Murie Street	No
IN21	Gordon Wright Electrical Limited	6255 Don Murie Street	Yes
IN22	Air Liquide Canada Inc.	6090 Don Murie Street	No
IN23	Airwood Vents	6167 Don Murie Street	Yes
IN24	International Sew-Right	6190 Don Murie Street	No
IN25	Marine Clean Ltd.	6220 Don Murie Street	No
IN26	Niagara Commercial Coating & Insulation	6260 Don Murie Street	No

ID	Facility Name	Facility Address	Assessed in Noise Prediction Modelling
IN27	Deflecto Canada	8699 Stanley Avenue	No
IN28	Marineland Canada	8529-8559 Stanley Avenue	No
IN29	Marineland Canada	8455 Stanley Avenue	No
IN30	Batemans Tires	8407 Stanley Avenue	Yes
IN31	Peglow Tool & Die Inc.	8345 Stanley Avenue	No
IN32	Salit Steel	7771 Stanley Avenue	Yes
IN33	L. Wallter & Sons Excavating Ltd.	7527 Stanley Avenue	Yes
IN34	Hangups Sportware	6537 Kister Road	No
IN35	Fastenal	6537 Kister Road	No
IN36	Micron Installations	6501 Kister Road	No
IN37	Niagara RV & Trailer Center	6471 Kister Road	No
IN38	Niagara Bus Wash	6441 Kister Road	No
IN39	T.Hodgson & Co. Ltd.	6411 Kister Road	No
IN40	Davert Tools	5676 Progress Street	Yes
IN41	Niagara Analytical Laboratories	5805 Progress Street	No
IN42	Louver-Lite	6015 Progress Street	No
IN43	Aztec Frames	6025 Progress Street	No
IN44	GC Customs Services Inc.	6045 Progress Street	No
IN45	Niagara Fence Supply	6065 Progress Street	No
IN46	Niagara Fastener Inc.	6095 Progress Street	Yes
IN47	Provincial Design & Fabrication Inc.	6159 Progress Street	No
IN48	Spencer ARL	6040 Progress Street	No
IN49	Unit 1 Advanced Cryogenic Services	6100 Progress Street	No
IN50	Lafarge Quality Ready Mix	6224 Progress Street	Yes
IN51	Collins Concessions Ltd.	8621 Earl Thomas Avenue	No
IN52	Factor Forms and Labels	8481 Earl Thomas Avenue	Yes
IN53	Stelfab Niagara Limited	8594 Earl Thomas Avenue	Yes

ID	Facility Name	Facility Address	Assessed in Noise Prediction Modelling
IN54	Food Roll Sales (Niagara) Ltd.	8464 Earl Thomas Avenue	Yes
IN55	Fred's Concrete	5806 Ramsey Road	No
IN56	Avid Growing Systems	8100 Dorchester Road	Yes
IN57	Palfinger Inc.	7942 Dorchester Road	Yes
IN58	Niagara Moving and Storage	7825 Dorchester Road	No

During the site visit within the Project Site on May 23, 2018, activity from both Chemtrade and Salit Steel were acoustically noticeable at times while the other industrial facilities were not perceived.

The Niagara Falls tourist area is located approximately 2 km northeast of the Project Site. As previously discussed, at times, helicopter activity likely associated with the Niagara Falls tourist area was acoustically noticeable within the Project Site. Other parts of the Niagara Falls tourist area were not acoustically noticeable from within or in the area surrounding the Project Site. The Marineland theme park is located approximately 300 m east of the Project Site and was not observed to be acoustically noticeable from within the Project Site. During one of the three site visits, activity from within Marineland was heard from Stanley Avenue. Based on the site visit observations and distance of Marineland to the Project Site, Marineland was not further assessed.

### 5.1.1.2 Noise Measurements

In order to help calibrate the predictive noise modelling, Golder carried out attended spot-check noise measurements at various locations within and proximate to the Project Site. Golder conducted these measurements during the daytime period within the Project Site on May 23, 2018 and in the area surrounding the Project Site near the industrial facilities, from publicly accessible areas, on June 15, 2018. The locations where noise measurements were taken are identified on Figure 5. The measured daytime noise levels within the Project Site ranged from 47 dBA to 52 dBA. The noise measurement results, calibration certificates and weather conditions are provided in Appendix C.

## 5.1.2 Assessment Methodology

Current industry practices involve an assessment of compliance with respect to NPC-300 and an assessment of the risks of potential nuisance. The Study focused on the assessment of compliance with respect to NPC-300, however potential nuisance from industrial facilities was also reviewed. The noise predictions for stationary sources, rail traffic and road traffic in the vicinity of the Project Site were carried out using CadnaA software according to ISO 9613 (stationary sources), RLS-90 (road traffic) and FTA/FRA (rail traffic) algorithms respectively. In selecting the CadnaA software, consideration was given to the capabilities of CadnaA in dealing with GIS data, complex topography and built forms and performance in generating noise contours. Noise contours provide a visual representation of the acoustical environment associated with the noise sources in the vicinity of and within the Project Site and are therefore useful in identifying potential noise concerns. Based on past experience, these modelling algorithms for the road and rail traffic sources provide prediction results consistent with actual noise levels and those predicted using the MECP's ORNAMENT, which is the basis of the DOS-based STAMSON modelling software provided by the MECP. The MECP's ORNAMENT was used to verify the CadnaA model with respect to the road traffic surrounding the Project Site. A comparison of the ORNAMENT and RLS-90 calculation results is provided in Appendix D. For the rail source, CadnaA can carry out noise predictions using modelling algorithms from the FTA Manual. The FTA Manual provides methods to be used when predicting railway noise and is a noise prediction model generally recommended by the Canadian Transportation Agency when assessing railway noise. For the purposes of this Study, the exclusionary sound level limits in NPC-300 were considered. It is possible that the consideration of existing background sound levels could result in higher sound level limits for industrial facilities at some receptor locations.

Due to the industrial facilities surrounding the Project Site and the definition of a Class 4 area presented in Section 3.3.1, it was further investigated whether Class 4 was appropriate and applicable for certain areas within the Project Site. It is understood at the onset of the official plan amendment and rezoning application process, a pre-consultation meeting with the City was held on August 2, 2018 where it was identified that the Study was to address that Salit Steel may operate as a Class 4 use. Golder assumes this was intended to say that areas within the Project Site impacted by noise from Salit Steel may be classified as Class 4 as per NPC-300. In addition, according to the City meeting minutes PBD-2018-71 from November 13, 2018 included in Appendix B, Salit Steel has committed to meet Class 4 sound level limits at a (then proposed) condominium development located at 7711 Green Vista Gate (Green Vista Gate development). In recent discussion with the Region, they indicated that designating the Project Site as a Class 4 area was not likely since they only consider a Class 4 designation for an area already zoned for the expected land uses of a proposed development. It is Golder's understanding a formal decision has not been made to-date on whether designating the Project Site as a Class 4 area is appropriate. Based on available information, it is Golder's opinion that certain areas of the Project Site could still be considered to be designated as Class 4, including areas which directly abut industrial facilities. This Study includes an assessment of areas within the Project Site designated as either a Class 1, Class 2 or Class 4 area for the City to consider. This should help the City decide if the Project Site should obtain a Class 4 area designation.

A review of the most recent permitting documentation carried out for Salit Steel, Chemtrade, and Washington Mills (further discussed in the bullets below) indicated that the areas surrounding these industrial facilities were classified as Class 1, with the exception of the Green Vista Gate development, for the purposes of MECP approval (i.e., ECA or EASR) by their acoustical consultants. While Golder believes Class 2, as defined in Section 3.3.1, may be more appropriate than Class 1 for the Project Site and surrounding areas, Class 1 sound level limits were considered in this Study when assessing the potential impacts of the environment on the Project Site, specifically these three industrial facilities' ability to maintain compliance with their MECP approval. As presented in Tables 2 through 5 in Section 3.3.1, Class 1 and 2 sound level limits are the same with the exception of the Outdoor POR location for steady stationary sources during the evening time period (19:00 to 23:00), with a Class 2 area sound level limit of 45 dBA as opposed to 50 dBA for a Class 1 area. Golder considered the exclusionary sound level limits for a Class 1 area when assessing Salit Steel, Chemtrade, and Washington Mills to remain consistent with their existing MECP approval requirements and a Class 2 area when assessing the remaining key industrial facilities.

Based on the assessment methodology described above, Golder considered two different scenarios with respect to exclusionary sound level limits within the entire Project Site and developed respective noise mitigation; 1) Class 1 and Class 2 area sound level limits, and 2) Class 4 area sound level limits. Note that although in Scenario 2, Class 4 area sound level limits were considered for the entire Project Site, this does not imply that the entire Project Site is suitable to be designated as a Class 4 area. It is a potential option in the event that the implementation of mitigation measures, as established through the assessment of Scenario 1, is not feasible. It is Golder's opinion that the north and east sections of the Project Site (i.e., adjacent to Salit Steel and the Green Vista Gate development) and in the area directly adjacent to Chemtrade (i.e., north of the rail line) are appropriate areas for the consideration of a Class 4 designation due to their proximity to these industrial facilities.

The following are key assumptions considered in the development of the noise prediction modelling for the purposes of this Study:

- Only existing land uses were considered, as observed during the June 2018 site visits.
- The proposed Project design provided by the Project team included land uses (i.e., low, medium and high density areas). Buildings within the Project Site that were considered in the Study were developed by the Project team and the noise team to assess a potential feasible built form. This conceptual built form included six-storey single-loaded buildings (i.e., no PORs along a given façade, such as a balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces) along the edge of the southeastern section of the Project Site directly west of the woodlot, facing Salit Steel, and at the southwestern edge of the Project Site, facing Quality Ready Mix. There were no Outdoor PORs on the sides of the buildings exposed to the industrial facilities. The detailed site layout plan for the area directly west of the woodlot is shown in Appendix A.
- For the purposes of the noise assessment, a terrain dataset within and outside the Project Site was developed based on the SWOOP 2015 elevation contours and terrain provided by Burnside.
- Unless otherwise specified below, all industrial facilities may operate continuously for 24 hours per day, seven days a week, and the existing operations are representative of future noise levels.

- Noise data was provided by Chemtrade, Salit Steel and Washington Mills Electro Minerals Corporation (Washington Mills) to further refine the noise emissions of these facilities in the Study. Appendix E summarizes the data incorporated into the noise prediction modelling for the stationary sources.
  - Salit Steel provided Golder with noise modelling contours resulting from their on-site activities in October 2018, including a steady source scenario and multiple impulsive source scenarios. These impulsive source scenarios carried forward in the Study involved nine or more impulses per hour and therefore were compared to the same sound level limits as those considered for steady sources. According to the MECP's Access Environment website, Salit Steel registered with Air Emissions EASR in January 2020. The publicly readily available information through Access Environment indicates that Salit Steel completed an AAR and a NAAP in 2019. Golder requested updated noise information from Salit Steel in April 2021, including their updated AAR, NAAP and updated noise contours in an effort to refine Golder's noise model. Golder was informed on April 27, 2021 that Salit Steel would not provide any additional information. Therefore, the noise modelling contours provided in October 2018 were carried forward in this Study. The noise modelling contour scenarios provided in October 2018 were considered in the Study only if they corresponded to the scenarios listed in their Acoustic Assessment Summary Table (AAST), which is publicly readily available supporting documentation of their Air Emissions EASR registration dated January 2020 and obtained through Access Environment. Golder developed noise prediction models to represent several scenarios of Salit Steel's operations, which approximated the noise modelling contours provided in October 2018.
  - Chemtrade provided Golder with an AAR prepared in July 2013 in support of their ECA application. According to Access Environment, Chemtrade registered with Air Emissions EASR in September 2019. Golder requested Chemtrade's 2019 AAR that was prepared in support of their Air Emissions EASR, but Chemtrade confirmed on June 24, 2021 that they would not provide any additional information. For the purposes of the Study, Golder considered the 2013 AAR as it provided more details regarding their operations than their AAST supporting their Air Emissions EASR. However, their AAST indicates that Chemtrade now only operates during the daytime and evening, and therefore Chemtrade's operations were only assessed for the daytime and evening periods in the Study. Golder developed a noise prediction model to represent Chemtrade, which approximate the noise contours that were presented in the 2013 AAR and the predicted noise levels shown in their AAST.
  - Washington Mills provided an AAST in April 2021 prepared in support of their ongoing compliance with their ECA dated January 6, 2016. The AAST included unmitigated and mitigated scenarios. Golder developed a noise prediction model to represent Washington Mills, which approximated the unmitigated noise modelling results that were provided in the AAST.

- The noise contours received from Salit Steel in October 2018 and the results presented in their AAST in January 2020 indicated that existing noise levels due to their operations exceed Class 4 sound level limits at the Green Vista Gate development and the Class 1 sound level limits at existing PORs that they identified as most sensitive for the scenarios considered in the Study. Although Salit Steel's EASR documentation indicates they have developed a NAAP to achieve compliance, it was not made available to Golder and therefore their planned noise mitigation measures are currently unknown and could not explicitly be considered in the Study. Therefore, the unmitigated Salit Steel noise sources were considered in the noise prediction model using the noise contours provided in October 2018 and Golder developed a potential mitigation scenario which considered source-based mitigation (a combination of noise barriers and a reduction in sound power level) which demonstrated compliance with MECP sound level limits at existing PORs, as legally required under the MECP EPA. With the understanding that a NAAP has been developed and in the absence of specific details regarding the mitigation measures, Golder deemed this approach appropriate until additional information is provided by Salit Steel. Note, the feasibility of this potential mitigation scenario was not considered at this time since Salit Steel indicated in April 2021 they would not be providing any additional information.
- When information was not provided by industrial facilities, their stationary sources noise emissions were estimated and primarily characterized with a single point source to represent the total noise emissions associated with all the steady noise sources on site. It was assumed these industrial facilities do not have significant impulsive noise sources. If it was deemed appropriate, based on Golder's experience with a similar type of facility, Golder considered multiple point sources at an industrial facility. The following are the industrial facilities that considered multiple noise sources, aside from Salit Steel, Chemtrade, and Washington Mills:
  - Dufferin Ready Mix; and
  - Lafarge Quality Ready Mix.

Noise emissions for the ready mix facilities were calibrated with the noise measurements described in Section 5.1.1 and with the assumption that they meet Class 2 area sound level limits at existing PORs (i.e., 50 dBA during the daytime, 45 dBA during the nighttime). This results in differing daytime and nighttime noise emissions from these industrial facilities for them to be able to comply with the Class 2 area sound level limits. Appendix E summarizes the data incorporated into the noise prediction modelling for the stationary sources for all the key industrial facilities assessed.

- On-site noise barriers (i.e., receptor based outdoor noise control measures) were considered in the modelling of the industrial facilities. The final noise barrier heights were established to meet the applicable MECP sound level limits at a height of 1.5 m (i.e., at an outdoor POR or first floor POW POR).
- Elevated sound level limits due to potential higher background sound levels were conservatively not considered.
- Localized shielding of the conceptual built form was considered. Various buildings and structures located in the areas surrounding the Project Site were also considered to provide acoustical attenuation.
- Various ground absorptions were considered within the Project Site, in the surrounding areas and at the industrial facilities.

- Road traffic predictions consider future noise levels in 2031, based on the Transportation Study, Ontario Ministry of Transportation (MTO) or Region’s datasets. When required, parameters were assumed and confirmed by Burnside.
- Rail traffic in the future will be similar to existing conditions. The rail line is an industrial spur line and will only consist of freight train activity to support the local industries. Rail traffic volumes were based on information received from CP and from site visit observations.
- Audible back-up beepers, which are not considered to be stationary sources by NPC-300, were qualitatively assessed for potential nuisance complaints.
- The potential impact on the environment (i.e., road traffic, rail traffic and stationary sources) of the Riverfront Community located southwest of the Project Site was not included in this Study.
- Building heights, the number of storeys and the corresponding storey heights of the conceptual built form were determined based on discussion with the Project team. The estimated overall building height represents the height from grade to a flat roof. If a peaked roof is considered in the design, the height to the peaked roof may need to be increased. This information is summarized in Table 12. Note that due to the varying topography within the Project Site, the absolute heights of the buildings vary within the noise model.

**Table 12: Conceptual Built Form Building Height Summary**

Land Uses	# of Storeys	Overall Height of Each Storey (m)	Estimated Overall Building Height <sup>1</sup> (m)
Low Density	2	3.0	6.0
Medium Density	3 to 3.5	3.0	9.0 to 10.5
High Density	6	3.0 to 4.5 <sup>2</sup>	19.5 <sup>3</sup>

<sup>1</sup> Height from grade to a flat roof. Due to the varying topography within the Project Site, the absolute heights of the buildings vary.

<sup>2</sup> First storey of the six-storey buildings were considered to be 4.5 m in height

<sup>3</sup> A 1.3 m rooftop parapet was incorporated into the design of the six-storey buildings

### 5.1.3 Industrial Facilities - Stationary Noise Sources

The following sections describe the assessment of steady and impulsive stationary noise sources.

#### 5.1.3.1 Screening Assessment

As described in Section 3.1.2, a Guideline D6 assessment can be carried out as an initial screening tool to define estimated influence areas and minimum separation distances between industrial facilities and potential noise-sensitive land uses, however detailed studies should be completed to determine site-specific separation distances for instances where the MECP’s recommended separation distances will not be maintained. Therefore, a more detailed assessment was carried out instead of a Guideline D6 assessment, however a screening level modelling assessment was completed to identify the most significant key industrial facilities to carry forward to the detailed assessment and to define estimated influence areas of the most significant key industrial facilities within the Project Site to assist in the planning review process.



The key industrial facilities assessed in the noise prediction model are identified in Table 11 in Section 5.1.1.1. A screening assessment was performed to identify which of these key industrial facilities to carry forward to a detailed modelling assessment due to their potential to exceed the applicable sound level limits on the Project Site and to determine estimated influence areas. Noise levels were predicted due to steady and/or impulsive, where applicable, stationary noise sources for the key industrial facilities along the entire perimeter of the Project Site. The assessment was completed at heights of 1.5 m, 4.5 m, and 7.5 m relative to grade along the perimeter of the Project Site, and at a grid height of 4.5 m throughout the Project Site. The off-site buildings, the conceptual built form within the Project Site and topography were not included in the screening assessment, hence localized shielding was not considered.

The daytime maximum predicted noise level at the perimeter of the Project Site due to each of the key industrial facilities are presented in Appendix F. The key industrial facilities resulting in a non-compliance status with the MECP's most stringent Class 2 area sound level limit along the perimeter of the Project Site (i.e., a predicted noise level greater than 45 dBA) were carried forward to a detailed noise prediction modelling assessment. These were considered the likely most significant key industrial facilities surrounding the Project Site for the purposes of this Study. The most significant key industrial facilities are as follows:

- Chemtrade (IN01);
- Washington Mills (IN02);
- Dufferin Ready Mix (IN10);
- Salit Steel (IN32); and
- Lafarge Quality Ready Mix (IN50).

Note that only Chemtrade and Salit Steel were predicted to result in non-compliance with the MECP Class 4 exclusionary sound level limits within the Project Site based on the methodology considered for the screening assessment.

The estimated influence areas for each of these most significant industrial facilities are presented in Figure 6. The estimated influence areas are based on the daytime and nighttime Class 2 area exclusionary sound level limits (i.e., 50 dBA during the daytime and 45 dBA during the nighttime). Figure 6 indicates that the majority of the Project Site is within the influence area of at least one of the most significant key industrial facilities. These results do not consider the impact of the mitigation measures that are part of the Project Site design (i.e., conceptual built form). The effectiveness of the Project Site design is considered in the following detailed assessment, as well as any additional receptor based mitigation measures that are required to meet applicable MECP exclusionary sound level limits.

### **5.1.3.2 Detailed Assessment**

Once the most significant key industrial facilities were established, noise levels were predicted and presented in the form of; noise contours and the building evaluation functionality in CadnaA, which provides predicted noise levels along each building façade at heights corresponding to each storey. Noise contours were generated at a height of 1.5 m relative to grade for steady and/or impulsive, where applicable, stationary noise sources for these industrial facilities. For the purposes of the detailed assessment, off-site buildings, the Project Site conceptual built form and topography were included, hence localized shielding was considered.

Based on the results of the detailed assessment, it was determined that noise mitigation measures would be required to meet Class 1 and Class 4 exclusionary sound level limits for Salit Steel and Chemtrade, and Class 2 exclusionary sound level limits for Quality Ready Mix. When completing the detailed noise prediction modelling, the following noise control measures were considered within the Project Site:

- Source based noise controls
  - Combination of noise barriers and reduction of sound power level
- Receptor based outdoor noise control measures
  - Noise barriers and/or berms
- Receptor based site configuration noise control measures
  - Orientation of buildings and OLAs with respect to noise sources
  - No noise sensitive spaces on specific façades
- Receptor based “on building” noise control measures (Class 4 areas only)
  - Enclosed noise buffers

The following sections summarize the detailed assessment noise prediction modelling results and the corresponding mitigation required to meet Class 1 or 2 and Class 4 sound level limits.

#### 5.1.3.2.1 Results – Class 1 or 2

The detailed assessment noise prediction modelling considered the estimated maximum sound levels produced by each of the five most significant key industrial facilities as discussed above. The following sections outline the mitigation required to meet the Class 1 or Class 2 exclusionary sound level limits for each of the five most significant key industrial facilities. As discussed in Section 5.1.2, a review of the MECP approval documentation for Salit Steel, Chemtrade, and Washington Mills indicated that the areas surrounding these industrial facilities were classified as Class 1, with the exception of the Green Vista Gate development for Salit Steel and Washington Mills, for the purposes of their MECP approvals. Therefore, Golder considered the exclusionary sound level limits for the Project Site for a Class 1 area when assessing Salit Steel, Chemtrade, and Washington Mills and a Class 2 area when assessing the two ready mix facilities.

Table 13 outlines the maximum predicted noise levels due to each of the five industrial facilities and compares them to the applicable MECP sound level limits. Predicted combined maximum noise level contours from the most significant key industrial facilities are shown in Figures 7 and 8 for the daytime and nighttime periods, respectively, at a grid height of 1.5 m above grade. These figures identify the receptor based mitigation required to meet Class 1 or Class 2 area sound level limits which were considered when predicting these contours, which are further discussed in the following sections. The predicted noise level contours are based on the maximum noise level from any one of the five industrial facilities at a given location (i.e., whichever industrial facility resulted in the greatest noise level for each given grid point). The noise contours displayed in the figures are based on the at-source mitigation scenario for Salit Steel discussed in Section 5.1.2.

Based on the results of the noise prediction modelling carried out for the most significant key industrial facilities, Chemtrade and Salit Steel are expected to result in the highest potential noise levels due to their operations onto the Project Site. A CadnaA sample calculation is provided in Appendix G.

As the methodology of this Study relied on estimates and assumptions, as well as older information from several industrial facilities, further discussion with these industrial facilities is recommended to ensure the actual site specific impacts are assessed allowing the Project team to better develop and implement noise mitigation that is effective and feasible, if required. This will include the sharing of noise emissions associated with the industrial facilities and the Project's design and possibly include agreements between all parties regarding the implemented noise mitigation, if required.

## Salit Steel

The noise modelling assessment of Salit Steel considered an unmitigated scenario and an at-source mitigation scenario. As previously discussed, the noise contours received from Salit Steel in October 2018 and the results presented in their AAST in January 2020 indicated that existing noise levels due to their operations exceed Class 4 sound level limits at the Green Vista Gate development and the Class 1 sound level limits at some existing PORs. Salit Steel has a NAAP that is being implemented as part of their Air Emissions EASR such that applicable MECP sound level limits are met at existing PORs. However, Golder did not receive the details of the NAAP and therefore developed a potential mitigation scenario (i.e., a combination of a noise barrier and a reduction in sound power level) to support the Study, but further discussions with Salit Steel are recommended to understand the planned mitigation measures proposed in their NAAP to be implemented on their site to allow them to operate in compliance with applicable sound level limits at existing PORs. Note, the feasibility of this potential at-source mitigation scenario was not considered at this time since Salit indicated in April 2021 they would not be providing any additional information.

The unmitigated noise levels from Salit Steel indicate the following additional receptor based mitigation beyond the current design is required on the Project Site to satisfy the daytime and evening Class 1 sound level limit (i.e., 50 dBA):

- A row of nine-storey single-loaded buildings (i.e., no PORs along the façades facing Salit Steel, such as a balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces) along the edge of the southeastern section of the Project Site directly west of the woodlot with no Outdoor PORs on the east side of the buildings. Note the current Project design has six-storey single-loaded buildings in this area.
- A 30 m tall structure providing acoustical shielding, such as a row of 10-storey single-loaded buildings along the eastern edge of the northern section of the Project Site.
- A 2.5 m tall noise barrier behind the five dwellings on Drummond Road which back onto the park adjacent to the conrail drain land, with no noise sensitive spaces on the second storey on the façade facing Salit Steel.

The mitigation described above also results in Salit Steel meeting Class 1 nighttime sound level limits (i.e., 45 dBA) for their nighttime operations.

As Salit Steel is required to comply with applicable sound level limits at existing PORs and has a NAAP, this receptor based mitigation scenario is not expected to be required. However, this potential mitigation scenario results in Salit Steel being able to comply with Class 1 sound level limits at outdoor and POW PORs within the Project Site, except for the small area bounded by John Daly Way, Thundering Waters Boulevard and Lionshead Avenue. Considering Salit Steel's unmitigated operations, development of noise-sensitive land uses in this small area is not currently feasible when only considering receptor based mitigation within the Project Site. Once Salit Steel has implemented their NAAP as required by applicable law and MECP guidelines, it is expected that development of sensitive land uses within this area will be possible and a number of the identified receptor based mitigation measures listed above will no longer be required.

As discussed in Section 5.1.2, the noise prediction modelling presented in Figures 7 and 8 considered at-source mitigation required for Salit Steel to be able to demonstrate compliance with Class 1 area sound level limits at existing PORs as required by their EASR. The modelling results indicate that if Salit Steel is compliant with the Class 1 sound level limits at existing PORs, the predicted noise levels due to Salit Steel on the Project Site meet the Class 1 sound level limits without any additional receptor based mitigation measures discussed above that are beyond the current design (i.e., the conceptual built form). Golder recommends further discussion with Salit Steel be carried out to assess the actual site-specific noise impacts associated with their operations and their planned at-source noise mitigation measures (i.e., NAAP). Depending on the noise levels resulting from the implementation of the NAAP on the Project Site, additional source-based mitigation may be required to maintain compliance with their MECP approval. As previously discussed, there is a precedence for developers to be involved with source-based mitigation of nearby industrial facilities.

## Chemtrade

Chemtrade's AAST indicates that they only operate during the daytime and evening periods. Therefore, the noise modelling assessment of Chemtrade considered the following additional receptor based mitigation measures beyond the current design within the Project Site to achieve the daytime and evening Class 1 sound level limit (i.e., 50 dBA):

- A 5 m tall noise barrier along the northwestern edge of the southern section of the Project Site (i.e., directly adjacent to Chemtrade) and no PORs along the façades (i.e., balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces) above the first storey facing Chemtrade.
- A 2.5 m tall noise barrier behind the row of dwellings south of the rail line where there are no intervening homes between them and Chemtrade.

These additional receptor based mitigation measures are shown in Figure 7. With the additional receptor based mitigation measures, the Class 1 daytime and evening sound level limits (i.e., 50 dBA) were met at a grid height of 1.5 m (i.e., at outdoor and ground-floor POW PORs), as shown in Table 13 and Figure 7. At subsequent heights (i.e., PORs on the second storeys of low density dwellings), as shown in Table 13, there were façades which exceeded Class 1 sound level limits, and therefore will require no noise sensitive spaces if other mitigation (i.e., at-source mitigation) is not feasible. These façades are indicated on Figure 7.

Golder recommends further discussion with Chemtrade be carried out to assess the current site-specific noise impacts associated with their operations and possible at-source noise mitigation options. Source-based mitigation could reduce the need for receptor based mitigation measures and should be further investigated. As previously discussed, there is a precedence for developers to be involved with source-based mitigation of nearby industrial facilities.

## Quality Ready Mix

The noise modelling assessment for Quality Ready Mix considered the following additional receptor based mitigation measures to meet Class 2 sound level limits (i.e., 50 dBA during the daytime and in the evening at POW PORs and 45 dBA in the evening at outdoor PORs and during the nighttime at POW PORs):

- A 3 m tall noise barrier behind the row of low density dwellings in the southern section of the Project Site facing Quality Ready Mix and no PORs along the façades above the first storey facing Quality Ready Mix (i.e., balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces).

These additional receptor based mitigation measures are shown in Figures 7 and 8. With additional receptor based mitigation measures, the Class 2 sound level limits were met at a grid height of 1.5 m (i.e., at outdoor and ground-floor POW PORs), as shown in Table 13 and Figures 7 and 8. At subsequent heights (i.e., PORs on the second storeys of low density dwellings), as shown in Table 13, there were areas which exceed Class 2 sound level limits, and therefore will require no noise sensitive spaces if other mitigation (i.e., at-source mitigation) is not feasible. These façades are indicated on Figures 7 and 8.

Based on Golder's experiences with ready mix facilities, it is expected that significant noise sources at Quality Ready Mix could reasonably be mitigated (i.e., at-source mitigation measures), if required, such that they could achieve compliance with Class 2 sound level limits at the Project Site and potentially reduce or eliminate the need for receptor based noise mitigation. Based on Golder's experience with ready mix facilities, typical at-source noise controls could include noise barriers, silencers, operational changes, replacing/upgrading process equipment with quieter units and improved building construction to increase noise attenuation. As previously discussed, there is a precedence for developers to be involved with source-based mitigation of nearby industrial facilities. Note that the noise emissions from the ready mix facilities considered for the Study were based on Golder's experience with similar facilities; if noise data or additional information is made available directly by the ready mix facilities, the noise emissions and operational parameters (i.e., daytime, evening, and nighttime operations, number of expected trucks per hour) could be refined and the need for noise barriers or other mitigation measures can be revisited.

## Dufferin Ready Mix

With consideration given to acoustic shielding from off-site buildings and the Project Site conceptual built form, no additional receptor based mitigation is required for Dufferin Ready Mix to meet Class 2 exclusionary sound level limits within the Project Site.

## Washington Mills

With consideration given to acoustic shielding from off-site buildings and the Project Site design (i.e., six-storey single-loaded buildings along the edge of the southeastern section of the Project Site directly west of the woodlot), no additional receptor based mitigation is required for Washington Mills to meet Class 1 exclusionary sound level limits within the Project Site.

**Table 13: Most Significant Industrial Facilities Noise Assessment Results Summary – Mitigation Designed to Meet Class 1 or Class 2 Limits**

Land Use	Building Storey	Salit Steel (No At- Source Mitigation) <sup>1</sup>			Salit Steel (With At- Source Mitigation)			Chemtrade <sup>2</sup>		Washington Mills			Quality Ready Mix <sup>2</sup>			Dufferin Ready Mix		
		D	E	N	D	E	N	D	E	D	E	N	D	E	N	D	E	N
<b>Applicable Sound Level Limit (dBA)</b>		<b>50</b>	<b>50</b>	<b>45</b>	<b>50</b>	<b>50</b>	<b>45</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>45</b>	<b>50</b>	<b>45<sup>3</sup></b>	<b>45</b>	<b>50</b>	<b>45<sup>3</sup></b>	<b>45</b>
Low Density	First	50	50	35	43	43	37	48	48	40	40	40	49	44	44	43	39	39
	Second <sup>4</sup>	<b>54</b>	<b>54</b>	36	44	44	39	<b>54</b>	<b>54</b>	43	43	43	<b>53</b>	<b>48</b>	<b>48</b>	45	40	40
Medium Density	First	49	49	34	40	40	38	45	45	42	42	42	46	42	42	43	39	39
	Second	50	50	34	43	43	42	46	46	45	45	45	50	45	45	44	40	40
	Third	50	50	35	46	46	42	47	47	45	45	45	50	44	44	44	40	40
High Density <sup>5</sup>	First	<b>62</b>	<b>62</b>	<b>53</b>	46	46	<b>48</b>	44	44	46	46	<b>46</b>	<b>52</b>	<b>47</b>	<b>47</b>	43	38	38
	Second	<b>64</b>	<b>64</b>	<b>54</b>	49	49	<b>49</b>	44	44	47	47	<b>47</b>	<b>52</b>	<b>47</b>	<b>47</b>	44	39	39
	Third	<b>65</b>	<b>65</b>	<b>55</b>	49	49	<b>49</b>	44	44	47	47	<b>47</b>	<b>52</b>	<b>47</b>	<b>47</b>	44	39	39
	Fourth	<b>65</b>	<b>65</b>	<b>55</b>	49	49	<b>49</b>	44	44	48	48	<b>48</b>	<b>52</b>	<b>47</b>	<b>47</b>	44	39	39
	Fifth	<b>65</b>	<b>65</b>	<b>55</b>	49	49	<b>49</b>	44	44	48	48	<b>48</b>	<b>52</b>	<b>47</b>	<b>47</b>	45	41	41
	Sixth	<b>65</b>	<b>65</b>	<b>55</b>	49	49	<b>49</b>	44	44	48	48	<b>48</b>	<b>52</b>	<b>47</b>	<b>47</b>	46	42	42

**Bold** indicates exceedance of applicable Class 1 or Class 2 sound level limit. D = Daytime, E = Evening, N = Nighttime.

<sup>1</sup> Project Site mitigation as described above was considered in the modelling

<sup>2</sup> Project Site mitigation as described above was considered in the modelling is shown in Figures 7 and 8

<sup>3</sup> Considering the most stringent limit between Class 2 POW and Outdoor POR sound level limits during the evening time (i.e., 45 dBA)

<sup>4</sup> Low Density second storey exceedances of applicable sound level limit are along façades which will require no noise sensitive spaces if other mitigation (i.e., at-source mitigation) is not feasible. These façades are indicated in Figures 7 and 8.

<sup>5</sup> High Density exceedances in applicable sound level limit are along façades that have no noise sensitive spaces as part of the Project design. These façades are indicated in Figures 7 and 8.

### 5.1.3.2.2 Results – Class 4

Noise prediction modelling was repeated for each of the five most significant key industrial facilities, considering steady and/or impulsive, when applicable, stationary noise sources, with consideration given to Class 4 area sound level limits. Note that although Class 4 area sound level limits were considered for the entire Project Site, this does not imply that the entire Project Site is required to be designated as a Class 4 area. A Class 4 designation is a potential option in the event that the implementation of mitigation measures in the assessment of Scenario 1 is determined not to be feasible. It is Golder's opinion that the north and east sections of the Project Site (i.e., adjacent to Salit Steel and the Green Vista Gate development) and in the area directly adjacent to Chemtrade (i.e., north of the rail line) are potential areas for Class 4 designation due to their proximity to these industrial facilities.

The following sections describe the required receptor based control measures to address Salit Steel and Chemtrade when considering Class 4 sound level limits within the Project Site.

Table 14 outlines the maximum predicted noise levels due to each of the five most significant key industrial facilities, considering the mitigation measures required to meet Class 4 exclusionary sound level limits. Predicted combined maximum noise level contours from the most significant industries are shown in Figures 9 and 10 for the daytime and nighttime periods, respectively. These figures identify the receptor based mitigation measures required to meet Class 4 area sound level limits which were considered when predicting these contours, which are further discussed in the sections below. The predicted noise level contours are based on the maximum noise level from any one of the five most significant key industrial facilities at a given location (i.e., whichever industrial facility resulted in the greatest noise level for each given grid point). The noise contours displayed in the figures are based on the at-source mitigation scenario for Salit Steel discussed in Section 5.1.2.

### Salit Steel

As discussed above, the noise modelling assessment of Salit Steel considered an unmitigated scenario and a potential at-source mitigation scenario. The unmitigated noise levels from Salit Steel indicate the following mitigation is required on the Project Site to satisfy daytime and evening Class 4 sound level limits (i.e., 60 dBA at POW PORs and 55 dBA at outdoor PORs):

- A row of six-storey single-loaded buildings (i.e., no PORs along the façades facing Salit Steel, such as a balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces) along the edge of the southeastern section of the Project Site directly west of the woodlot (i.e., current Project design)
- A 20 m tall structure providing acoustical shielding such as a row of six-storey single-loaded buildings along the eastern edge of the northeastern section of the Project Site

The mitigation described above results in Salit Steel being able to meet Class 4 nighttime sound level limits (i.e., 45 dBA) for their nighttime operations.

As previously discussed, the noise prediction modelling presented in Figures 9 and 10 considered at-source mitigation required for Salit Steel to be able to demonstrate compliance with Class 1 area sound level limits at existing PORs as required by their EASR. The modelling results indicate that if Salit Steel is compliant with the Class 1 sound level limits at existing PORs, the predicted noise levels due to Salit Steel meet the Class 4 sound level limits on the Project Site without any additional Project Site mitigation beyond the current design (i.e., the conceptual built form). Golder recommends further discussion with Salit Steel be carried out to assess the actual site-specific noise impacts associated with their operations and their planned at-source noise mitigation options (i.e., NAAP).

## Chemtrade

The noise modelling assessment of Chemtrade considered the following receptor based mitigation measures within the Project Site to achieve the daytime and evening Class 4 sound level limits (i.e., 60 dBA at POW PORs and 55 dBA at outdoor PORs):

- A 3 m tall noise barrier along the northwestern edge of the southern section of the Project Site (i.e., directly adjacent to Chemtrade)

This receptor based mitigation measure is shown in Figure 9. With this noise barrier, the Class 4 sound level limits were met within the Project Site, as shown in Table 14 and Figure 9.

Golder recommends further discussion with Chemtrade be carried out to assess the actual site-specific noise impacts associated with their operations and possible at-source noise mitigation options. At-source mitigation could reduce the need for receptor based mitigation measures and should be further investigated. As previously discussed, there is a precedence for developers to be involved with at-source mitigation of nearby industrial facilities.



**Table 14: Most Significant Industrial Facilities Noise Assessment Results Summary – Mitigation Designed to Meet Class 4 Limits**

Land Use	Storey	Salit Steel (No At Source Mitigation) <sup>1</sup>			Salit Steel (With At Source Mitigation)			Chemtrade <sup>2</sup>		Washington Mills			Quality Ready Mix			Dufferin Ready Mix		
		D	E	N	D	E	N	D	E	D	E	N	D	E	N	D	E	N
<b>Applicable Sound Level Limit (dBA)</b>		<b>60 (POW) 55 (Outdoor)</b>		<b>55</b>	<b>60 (POW) 55 (Outdoor)</b>		<b>55</b>	<b>60 (POW) 55 (Outdoor)</b>		<b>60 (POW) 55 (Outdoor)</b>		<b>55</b>	<b>60 (POW) 55 (Outdoor)</b>		<b>55</b>	<b>60 (POW) 55 (Outdoor)</b>		<b>55</b>
Low Density	First	52	52	42	43	43	37	52	52	40	40	40	51	46	46	43	39	39
	Second	54	54	45	44	44	39	59	59	43	43	43	53	48	48	45	40	40
Medium Density	First	52	52	44	40	40	38	45	45	42	42	42	46	42	42	43	39	39
	Second	53	53	48	43	43	42	46	46	45	45	45	50	45	45	44	40	40
	Third	55	55	47	46	46	42	47	47	45	45	45	50	44	44	44	40	40
High Density <sup>3</sup>	First	<b>62</b>	<b>62</b>	53	46	46	48	44	44	46	46	46	52	47	47	43	38	38
	Second	<b>64</b>	<b>64</b>	54	49	49	49	44	44	47	47	47	52	47	47	44	39	39
	Third	<b>65</b>	<b>65</b>	55	49	49	49	44	44	47	47	47	52	47	47	44	39	39
	Fourth	<b>65</b>	<b>65</b>	55	49	49	49	44	44	48	48	48	52	47	47	44	39	39
	Fifth	<b>65</b>	<b>65</b>	55	49	49	49	45	45	48	48	48	52	47	47	45	41	41
	Sixth	<b>65</b>	<b>65</b>	55	49	49	49	44	44	48	48	48	52	47	47	46	42	42

**Bold** indicates exceedance of Class 4 sound level limits. D = Daytime, E = Evening, N = Nighttime.

<sup>1</sup> Project Site mitigation as described above was considered in the modelling

<sup>2</sup> Project Site mitigation as described above was considered in the modelling is shown in Figures 9 and 10

<sup>3</sup> High Density exceedances of Class 4 sound level limits are along façades that have no noise sensitive spaces as part of the Project design. These façades are indicated in Figures 9 and 10.

### 5.1.3.3 Potential Nuisance Complaints

As previously mentioned, having an up-to-date ECA/EASR or complying with NPC-300 sound level limits may not prevent nuisance complaints associated with stationary or non-stationary sources related to industrial facilities. For example, NPC-300 does not consider back-up beepers as stationary sources. During the site visits, audible back-up beepers (emitting a constant, intermittent tone) were acoustically noticeable at both of the ready mix facilities. Back-up beepers were also acoustically noticeable near the midpoint of the southern edge of the Project Site, likely due to these ready mix facilities. Back-up beepers are not considered stationary sources according to NPC-300 but are known to result in nuisance noise complaints.

Options to minimize any nuisance complaints include the use of “broadband” alarms (i.e., multiple frequencies) and other technologies that are permitted by the regulating authorities, designing pathways to reduce reversing, relocating operations of mobile equipment to take advantage of localized shielding, and installing noise barriers. Golder has reached out to the industrial facilities to further discuss their operations and were hoping to further discuss the potential for nuisance complaints, but this has not occurred to-date. Golder recommends that the Project continues to pursue further discussion with the nearby industrial facilities regarding possible measures to reduce the potential for nuisance complaints.

### 5.1.4 Transportation Sources

The following section describes the assessment of transportation noise sources, road and rail.

#### 5.1.4.1 Methodology

The methodology in Section 5.1.2 was considered in the assessment of transportation sources. The future (2031) noise levels due to road traffic were established using projected 2031 peak hour turning count breakdowns from the Transportation Study or, for roads not included in the Transportation Study, existing traffic volumes provided as AADT values from the City or the MTO along various roads surrounding the Project Site. The raw traffic data considered in the Study are included in Appendix B. Where peak hour turning count breakdowns were provided, they were used to determine AADTs by assuming peak hour traffic was 10% of total AADT. The daytime and nighttime period percentages were assumed based on the ORNAMENT calculation methodology. To calculate the future AADT volumes when 2031 volumes were not available, a growth rate of 2% was assumed, based on the document “Niagara Falls Guidelines for the Preparation of Transportation Impact Studies and Site Plan Review”. The percentage of medium and heavy trucks was based on existing traffic data provided by Burnside, the MTO for the QEW, and the “Adaptation and Verification of AASHTO Pavement Design Guide for Ontario Conditions – Final Report” (AASHTO Guide) for all other roads, which provides medium and heavy truck percentages based on road classification. In this case, the roads not included in the Transportation Study fell under the category of Principal Arterial in the AASHTO Guide based on the AADTs (i.e., greater than 5000) and therefore the percentage of total trucks was taken to be 12% (4% medium truck and 8% heavy truck). These assumptions were confirmed by Burnside. A summary of the road traffic data is provided below in Table 15.

**Table 15: Summary of Existing and Future Road Traffic Data**

Road Segment	AADT (2031)	Speed Limit (km/hr)	% Automobile / Medium Truck / Heavy Truck	Daytime / Nighttime Breakdown
<b>Existing Roads</b>				
McLeod Rd from Montrose Rd to Oakwood Drive	36791	50	88 / 4 / 8	90 / 10
McLeod Rd from Oakwood Drive to Dorchester Road	33496	50	88 / 4 / 8	90 / 10
McLeod Rd from Dorchester Road to Drummond Rd	19440	50	98 / 1 / 1	90 / 10
Marineland Pkway from Drummond Rd to Stanley Ave N	14960	50	97 / 0 / 2	90 / 10
Marineland Pkway from Stanley Ave N to Stanley Ave S	19050	50	97 / 1 / 2	90 / 10
Marineland Pkway east of Stanley Ave S	11180	50	94 / 0 / 6	90 / 10
Drummond Rd N	12970	50	99 / 0 / 0	90 / 10
Drummond Rd S	9210	50	99 / 0 / 1	90 / 10
Stanley Ave N	8670	50	96 / 1 / 3	90 / 10
Stanley Ave S from Marineland Pkway to Ramsey Rd	9040	60	96 / 2 / 2	90 / 10
Stanley Ave S from Ramsey Rd to Progress St	9680	60	97 / 1 / 2	90 / 10
Stanley Ave S from Progress St to Don Murie St	9250	60	97 / 1 / 2	90 / 10
Stanley Ave S from Don Murie St to Chippawa Pkway	10180	60	93 / 1 / 5	90 / 10
Stanley Ave S from Chippawa Pkway to Lyons Creek	12440	60	95 / 1 / 4	90 / 10
Ramsey Rd from Oldfield Rd Extension to Stanley Ave	1580	50	91 / 4 / 4	90 / 10
Ramsey Rd from Drummond Rd Extension to Oldfield Rd Extension	1170	50	91 / 4 / 4	90 / 10
Progress St	1380	50	97 / 1 / 2	90 / 10
Don Murie St	1940	50	88 / 2 / 9	90 / 10
Chippawa Pkway W	11560	60	97 / 0 / 3	90 / 10
Chippawa Pkway E	730	60	98 / 0 / 2	90 / 10

Road Segment	AADT (2031)	Speed Limit (km/hr)	% Automobile / Medium Truck / Heavy Truck	Daytime / Nighttime Breakdown
Lyons Creek W	15560	70	96 / 1 / 3	90 / 10
Lyons Creek E	6890	60	97 / 2 / 1	90 / 10
Chippawa Creek Rd from Thorold Townline Rd to Montrose Rd	2471	80	94 / 5 / 1	90 / 10
Montrose Rd from Lundy's Lane to McLeod Road	12218	50	88 / 4 / 8	90 / 10
Montrose Rd from McLeod Road to Canadian Drive	6040	50	88 / 4 / 8	90 / 10
Montrose Rd from Canadian Drive to Chippawa Creek Rd	7962	60	88 / 4 / 8	90 / 10
Montrose Rd from Chippawa Creek Rd to Lyons Creek Rd	8511	80	88 / 4 / 8	90 / 10
QEW from McLeod Road to Lyons Creek Rd	49393	100	80 / 5 / 15	85 / 15
<b>Future Roads within the Project Site</b>				
Drummond Rd Extension from Oldfield Rd to Street F/C	4310	50	99 / 0 / 1	90 / 10
Drummond Rd Extension from Street F/C to Ramsey Rd	650	50	99 / 0 / 1	90 / 10
Street F	2270	50	99 / 0 / 1	90 / 10
Street C	1190	50	99 / 0 / 1	90 / 10
Oldfield Rd Extension from Drummond Rd to Street C	2010	50	99 / 0 / 1	90 / 10
Oldfield Rd Extension from Street C to Ramsey Rd	410	50	99 / 0 / 1	90 / 10

Daytime (07:00 – 23:00), Night-time (23:00 – 07:00)

The rail line is considered an active industrial spur rail line and consists of freight train activity to support the local industries. As previously discussed, existing rail traffic was based on information from CP and site observations. The information from CP indicated that rail traffic only occurs during the nighttime but based on site observations one daytime train trip has been conservatively included in the Study. The future rail traffic has been assumed to be the same as existing conditions. According to CP, whistle noise at existing grade crossings along the CP Montrose Subdivision rail line is prohibited. The Project is introducing two at-grade rail crossings (i.e., public crossing) and it is assumed that whistle noise will be prohibited at these crossings as well. A summary of the rail traffic data used for this Study is provided below in Table 16. A 5 dB penalty was added to the railway noise emissions as the track is constructed using jointed track versus continuously welded, in accordance with the FTA Manual.

**Table 16: Summary of Rail Traffic Data**

Type of Train	Number of Trains Day / Night <sup>1</sup>	Number of Locomotives per Train <sup>2</sup>	Number of Railcars per Train <sup>1</sup>	Maximum Speed (km/hr)
Freight along CP Montrose Subdivision	1 / 2	2	20	40

<sup>1</sup> The number of trains and locomotives were adjusted accordingly to match the reference times applied in CadnaA

<sup>2</sup> Locomotive Length = 23 m, Railcar length = 29 m

### 5.1.4.2 Results

The predicted maximum daytime and nighttime noise levels at the façades of the conceptual built form within the Project Site using the building evaluation functionality of CadnaA are summarized in Table 17. Predicted noise level contours for road and rail combined at a height of 1.5 m above grade are shown in Figures 11 and 12.

**Table 17: Transportation Noise Assessment Results Summary**

Land Use	Storey	Road Maximum Noise Level (dBA)		Rail Maximum Noise Level (dBA)		Road + Rail (POW) Maximum Noise Level (dBA)		Road + Rail (OLA) Maximum Noise Level (dBA)
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime
Low Density	First	59	52	60	66	60	66	60
	Second	60	54	60	66	61	66	—
Medium Density	First	56	49	47	53	56	54	56
	Second	56	49	48	54	56	55	—
	Third	55	48	48	54	55	55	—
High Density	First	55	49	59	65	59	65	59
	Second	56	49	59	65	59	65	—

Land Use	Storey	Road Maximum Noise Level (dBA)		Rail Maximum Noise Level (dBA)		Road + Rail (POW) Maximum Noise Level (dBA)		Road + Rail (OLA) Maximum Noise Level (dBA)
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime
	Third	55	49	59	65	59	65	—
	Fourth	55	49	58	64	59	64	—
	Fifth	55	48	58	64	59	64	—
	Sixth	54	48	58	64	59	64	—

Daytime (07:00 – 23:00), Night-time (23:00 – 07:00), POW – Plane of Window, POR – Point of Reception, OLA – Outdoor Living Area.

Figures 11 and 12 and Table 17 indicate the following:

- Predicted noise levels from road and rail traffic in some areas of the Project Site exceeded 55 dBA during the daytime and 60 dBA during the nighttime.
  - For daytime POW noise levels between 55 dBA and 65 dBA and for nighttime POW noise levels between 50 dBA and 60 dBA, it is recommended that there is a forced air system with provisions for installation of air-conditioning and owners/tenants be warned about excessive noise via a warning clause (NPC-300 Type C).
  - For nighttime POW noise levels above 60 dBA, air-conditioning is mandatory to allow windows to remain closed and owners/tenants must be warned about excessive noise via a warning clause (NPC-300 Type D).
  - For daytime noise levels predicted in OLAs between 55 dBA and 60 dBA, mitigation is not required but owners/tenants must be warned about excessive noise in OLAs via a warning clause (NPC-300 Type A).
- The maximum predicted noise levels due to road traffic during the daytime and nighttime were below 65 dBA and 60 dBA respectively for all buildings within the Project Site.
  - For road traffic, if the outdoor daytime and nighttime sound levels at the POW are below 65 dBA and 60 dBA respectively, NPC-300 does not require acoustical performance specifications of building components. It is Golder's experience that building components which satisfy the Ontario Building Code (OBC) are expected to provide a sufficient amount of attenuation that NPC-300 indoor sound level limits are met. This should be verified in the detailed design stage.
- The maximum predicted daytime noise levels due to rail traffic were below 60 dBA within the Project Site.
  - For rail traffic, if the outdoor daytime sound levels at the POW are below 60 dBA, NPC-300 does not require acoustical performance specifications of building components. It is Golder's experience that building components which satisfy the OBC are expected to provide a sufficient amount of attenuation that NPC-300 indoor sound level limits are met. This should be verified in the detailed design stage.

- The maximum predicted nighttime noise levels due to rail traffic exceeded 55 dBA during the nighttime period within the Project Site.
  - For rail traffic, if the outdoor nighttime sound level at the POW exceeds 55 dBA, building components should be designed so that the NPC-300 indoor sound levels comply with the sound level limits.
- The 24 hour rail traffic noise is greater than 60 dBA and the first row of dwellings is within 100 metres of the tracks, therefore exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters.
- As discussed in Section 4.4, a warning clause for developments near industrial spur lines should be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300 m of the railway right-of-way. This is a standard requirement imposed by CP.

Note that the use of warning clauses is not an unusual approach for the introduction of a new residential development. Note that for each building, the ventilation requirements will be based on the predicted worst-case impacts. Figure 13 demonstrates the approximate areas where ventilation is expected to be required for the Project Site considering predicted noise levels at a height of 1.5 m above grade. During detailed design using the final built form, the ventilation requirement should be confirmed and include an assessment at each building storey.

The results above indicate that some building components will need to be designed such that indoor sound levels comply with the sound level limits due to rail traffic. With the Project currently consisting of a conceptual built form, detailed suite layouts were not available. Therefore, Golder has assumed the following wall assembly scenario for the living room and bedroom areas to comply with the applicable NPC-300 indoor noise level limits and to demonstrate feasibility of the Project considering the maximum predicted sound levels above.

- Living Room consisted of two components;
  - Exterior wall with a minimum acoustical performance of STC-55 or better; and
  - Windows with a nominal window-to-floor area ratio of 80%.
- Bedroom consists of two components;
  - Exterior wall with a minimum acoustical performance of STC-55 or better; and
  - Windows with a nominal window-to-floor area ratio of 25%.

With the maximum predicted sound levels due to road and rail traffic and the above noted wall assembly, Table 18 summarizes the overall acoustical performance of the fixed window glazing associated with the living room and bedroom.

**Table 18: Preliminary Façade Element Acoustical Performance Requirements (STC Ratings)**

Land Use	Storey	Exterior Wall	Living Room Window <sup>1</sup>	Bedroom Window <sup>2</sup>
Low Density	First	55	28	34
	Second	55	28	34

Land Use	Storey	Exterior Wall	Living Room Window <sup>1</sup>	Bedroom Window <sup>2</sup>
Medium Density	First	55	18	21
	Second	55	18	22
	Third	55	17	22
High Density	First	55	27	33
	Second	55	27	33
	Third	55	27	33
	Fourth	55	26	32
	Fifth	55	26	32
	Sixth	55	26	32

<sup>1</sup> The window performance for living rooms is based on a nominal 80% window-to-floor area

<sup>2</sup> The window performance for bedrooms is based on a nominal 25% window-to-floor area

The selected wall assembly will need to be reviewed at a later stage once the design has moved into an advanced stage including suite layouts, elevation details indicating vision and spandrel glazing portions, window to floor areas and revise the window selection accordingly. Note, higher window-to-floor areas would require higher performance glazing requirements (i.e., increased STC rating).

## 5.2 Impact of the Project on the Environment

The Project Site could potentially impact the noise environment in two different manners:

- 1) Noise emission due to the increase in automobile traffic of the future residents; and
- 2) Noise from stationary sources such as HVAC equipment associated with the Project.

In addition, operation of certain types of equipment such as emergency generator testing may require an ECA or Air Emissions EASR (Air & Noise) in accordance with Section 9 of the EPA. At the time of this Study, no information regarding potential stationary sources related to the Project is available. Therefore, the following investigation considers the potential impact of the Project Site on the environment including applicable criteria and will need to be confirmed during detailed design.

### 5.2.1 Criteria

#### 5.2.1.1 Stationary Sources

For stationary sources associated with Project Site, MECP guideline publication NPC-300 is considered applicable. The areas surrounding the Project Site are best defined as Class 2 or Class 4 (i.e., Green Vista Gate development) as per NPC-300. As described in Section 3.3.1, in assessing stationary noise sources within the Project Site to nearby PORs, the MECP has established exclusionary POW and Outdoor sound level limits for Class 2 and Class 4 areas. At the time of preparing this Study, the exclusionary limits for a Class 2 and Class 4 area are considered appropriate for the Project Site.



### 5.2.1.2 Traffic Noise

NPC-300 does not provide specific noise related criteria for potential road traffic noise impacts of the Project on the environment. The MECP (formally the Ministry of Environment – MOE) and Ministry of Transportation (MTO) document 'A Protocol for Dealing with Noise Concerns During the Preparation, Review, and Evaluation of Provincial Highways Environmental Assessments' (MOE/MTO Noise Protocol) provides requirements for noise mitigation relating to the construction of new or the expansion of existing roadways in Ontario. The MOE/MTO Noise Protocol is considered here to provide context to potential future impacts of traffic due to the Project on the environment.

Noise assessments typically consider average noise levels over a given averaging period. An averaging period is not clearly stated in the MOE/MTO Noise Protocol but is generally considered over the daytime period. The averaging period considered was a 16-hour daytime average between 07:00 and 23:00 based on other guidance documents. The MOE/MTO Noise Protocol states that the objective for outdoor sound levels is either 55 dBA or the existing ambient. If noise increases above ambient by more than 5 dBA, mitigation should be investigated. If mitigation is required, it should achieve a minimum of 5 dBA of attenuation, if administratively, economically, and technically feasible.

## 5.2.2 Assessment

### 5.2.2.1 Stationary Noise Source

The stationary noise sources associated with the Project Site may include underground parking exhaust fans, air handling units, cooling towers, intake and discharge louvers of mechanical rooms and emergency generators. These stationary noise sources are typically steady and varying sounds. If these sources are installed on the Project Site, they will need to comply with NPC-300 sound level limits.

### 5.2.2.2 Road Traffic Noise

The Transportation Study outlines a potential future road network design as well as potential future impacts of the Project on road traffic volumes on existing roads in the vicinity of the Project Site. The AADTs on the roads in the vicinity of the Project Site are predicted to increase by up to 15%, with the exception of Drummond Road, north of Oldfield Road, and Ramsey Road. A semi-quantitative assessment was conducted to estimate the impacts of noise due to road traffic on these roads.

Along Drummond Road, the 2031 AADT values are expected to increase from 3,530 to 9,210 with the addition of the Project (i.e., a 161% increase). This results in a predicted change in noise level at existing dwellings along Drummond Road of approximately 4 dB, from 56 dBA to 60 dBA. Both of these predicted noise levels are above the MOE/MTO Noise Protocol objective noise level of 55 dBA, but the change is less than or equal to 5 dB and therefore mitigation would not be required.

Along Ramsey Road, the 2031 AADT values are expected to increase from 520 to 1,580 with the addition of the Project (i.e., a 204% increase). This results in a predicted change in noise level at existing dwellings along Ramsey Road of approximately 5 dB, from 45 dBA to 50 dBA. The predicted noise level is below the MOE/MTO Noise Protocol objective noise level of 55 dBA and the change is less than or equal to 5 dB and therefore mitigation would not be required.

Based on this assessment, it is expected that the other roads in the vicinity of the Project Site will meet the MOE/MTO Noise Protocol. Golder recommends the assessment of traffic noise due to the Project be reviewed when the Transportation Study is finalized.

### 5.3 Impact of the Project on Itself

The assessment of the potential impact of the Project onto itself considered the potential impact of stationary noise associated with the Project and the increased road traffic due to the Project onto onsite sensitive receptors. Since there is no built form or detailed suite layouts, the following provides a qualitative discussion of best practices to be considered. This includes noise and vibration transmission between suites, mechanical rooms and other areas such as indoor amenity areas.

The OBC requires that every dwelling unit within a residential building be separated by a partition with the following STC requirements:

- Suite/Suite – Wall or Floor STC-50
- Suite/Elevator Hoist-way or Refuse Chute STC-55

There are also some best practice guidelines for indoor sound levels from electro-mechanical equipment. American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) suggest the acceptable background levels in terms of Noise Criterion (NC) levels. It is suggested that the Project team follow these guidelines at a minimum, which are summarized below:

- Living Rooms, Dining Rooms NC-30 to NC-35
- Bedrooms NC-25 to NC-30

During detailed design, Golder recommends a quantitative assessment be carried out.

The following are some additional best practices that should be considered in view of increasing acoustical comfort to future residents within the Project Site but will need to be quantitatively assessed during detailed design:

- The outdoor noise emissions from electro-mechanical equipment at the nearest residential or amenity area shall not exceed applicable limits. Noise controls such as silencers/enclosures may be required in some cases to achieve this limit.
- For multi-tenant buildings
  - Positive door closers should be considered to minimize the impulse noise associated with slamming doors that are adjacent to residential dwellings and amenity areas.
  - A suspended drywall ceiling will likely be required for the mechanical spaces located below dwelling units.
  - Similarly, a suspended drywall ceiling will likely be required for suites that are located below mechanical rooms.
  - A floating floor may be required for elevated noise level mechanical rooms (e.g., a chiller room or generator room) that are located above dwelling units.
  - In order to minimize impact noise, the entire run of the garbage chute should be straight with a required thickness of insulation around its perimeter.
  - Pipe riser spaces should be separated from suites with a wall construction providing a minimum STC-50.

- All pipes greater than 3-inch in diameter should be vibration isolated from all walls and floors. Depending on the equipment to which they are connected to, first few supporting points of these pipes may also be required to support on resilient hangers with a neoprene element in series.
- An enlarged sleeve penetration should be considered to all pipe penetrations through the walls or floors. Mechanical contact between the structure and pipe generally transfer vibration to the structure and may produce audible noise in some cases. All pipes should also be centered in sleeves, filled with insulation and sealed on both sides with non-hardening acoustic caulking. Neoprene-metal-neoprene pads should be considered for the pipe anchors at the floor penetration.
- Vibration isolation should be considered for all mechanical equipment including but not limited to fans, pumps, chillers, standby generators and cooling towers.
- MECP ECAs may be required for stationary sources such as a standby generator or other mechanical/electrical equipment.

## 6.0 VIBRATION

### 6.1 Assessment Methodology

As noted in Section 4.8, based on this list of facility locations, available information, and observations during the Survey, vibration levels were not perceived from any of the industrial facilities. The RAC Railway Guidelines recommends a vibration assessment be carried out when the new residential development is 75 m from the rail line right-of-way (ROW). According to the proposed development Draft Plan of Subdivision provided by the Project team, a vibration assessment will be required. The vibration assessment consisted of the active CP Montrose Subdivision industrial spur rail line that runs through the Project Site due to freight train pass-bys. Once a built form is finalized during detailed design which is expected to satisfy the CP requirement of a 15 m setback distance between dwellings and the rail line ROW, an updated vibration assessment should be completed.

Vibration data associated with rail traffic was measured to establish existing vibration levels within the Project Site. Vibration measurements were collected for approximately one week at several locations along the rail line within the Project Site to determine the potential vibration impact and identify the need for mitigation if required. A review of the *General Vibration Assessment* presented in the FTA Manual was also carried out as part of the vibration assessment.

The vibration assessment for the purposes of this Study has not taken into consideration any potential rail traffic growth including other developments in the area (i.e., Riverfront Community).

#### *Applicable Vibration Limit*

As noted in Section 3.4, the RAC Railway Guidelines specify a vibration limit for a residential receptor, expressed in velocity, is 0.14 mm/s rms, with a 1 second time averaging constant, from 4 to 200 Hz.

#### *Vibration Measurements*

Golder personnel measured vibration levels at five locations along the rail line within the Project Site from June 14 to 26, 2018. The measurements were carried out using a RION DA-21, InstanTel Pro 4 or InstanTel Minimate, depending on the measurement location. The measurements were unattended, but audio and time-lapse video were recorded to identify when train pass-bys occurred since their schedule was unknown but understood to be intermittent. Ground borne vibration due to freight train pass-bys were taken on the surface at the ROW edge and 30 m or 60 m from the ROW, depending on the location. These locations were selected based on the information available at the time of the field program; buildings were expected to be located as close as approximately 30 m from the ROW. The locations of the vibration measurements are presented in Figure 5. An overall summary of the vibration measurement locations is presented in Table 19.

**Table 19: Overall Summary of Vibration Measurement Locations**

Vibration ID	Relative to Rail Line
Vib_Offsite01	ROW, Centre of Project Site
Vib_Offsite02	30 m from ROW, Centre of Project Site
Vib_Offsite03	60 m from ROW, Centre of Project Site
Vib_Offsite04	60 m from ROW, Northeast corner of Project Site
Vib_Offsite05	ROW, Southwest corner of Project Site

Vibration ID	Relative to Rail Line
Vib_Offsite06	30 m from ROW, Centre of Project Site
Vib_Offsite07	30 m from ROW, Southwest corner of Project Site

## 6.2 Results

During the one week measurement period, a total of eight freight train pass-bys were measured. However, measurements were not recorded during each event at all of the measurement locations. The measured vibration levels at 60 m were below 0.14 mm/s, at 30 m the measured levels approached and exceeded 0.14 mm/s. Therefore, preliminary results indicate the vibration levels could exceed the RAC Railway Guidelines vibration limit of 0.14 mm/s. The vibration measurement results are presented in Appendix H.

To supplement the vibration measurements, Golder carried out a review of the *General Vibration Assessment* presented in the FTA Manual. The FTA Manual vibration assessment methodology is primarily for rail transit projects but has been used for freight trains. According to the FTA Manual, a Category 2 designation (i.e., residences) best describes the Project Site with existing rail traffic events considered to be infrequent (i.e., fewer than 30 events per day) for both the locomotive and railcar, resulting in a Ground-Borne Vibration limit of 80 VdB. CP requires a 15 m setback distance between the rail line ROW and the nearest dwelling. The final built form will consider the setback distance of 15 m. According to Figure 6-4 in the FTA Manual and a speed adjustment (Equation 6-4) to 25 mph (i.e., 40 km/hr), the maximum allowable speed and 15 mph (i.e., 24 km/hr), the normal speed, the expected vibration levels due to freight train traffic at the 15 m setback will range approximately 78 to 83 VdB (re 1 micro-inch/second), which results in either exceeding the RAC Railway Guidelines (i.e., 0.14 mm/s  $\approx$  75 VdB) and meeting or exceeding the FTA Manual (i.e., 80 VdB). However, depending on how additional adjustments from the FTA Manual are applied (i.e., source, path or receiver adjustments), it is possible for the vibration levels to be below or above the FTA Manual vibration limit.

Based on the preliminary vibration results, Golder recommends an updated vibration assessment be completed during detail design when a built form is finalized. If vibration mitigation controls are determined to be required to assist in achieving compliance with applicable vibration guidelines they will depend on the overall building design and building layout within the Project Site, but may include:

- discussions with all stakeholders (i.e., industry, CP and existing residences) to identify and capture as many concerns and issues as possible;
- increase setback distances by locating and designing residential layouts that further increase the separation distance from vibration sources;
- isolating upper floors from the building foundation and/or columns using rubber/engineered pads;
- using hollow core concrete or concrete construction for the first floor;
- create a seam around the foundation wall that is water sealed and insulated; and
- lining the outside of the foundation walls with a resilient layer.

Typically, vibration mitigation is most effective when implemented at either the vibration source or at the POR. The feasibility of implementing and the responsibility, including maintenance, of any vibration mitigation controls will need to be confirmed, typically in the detailed vibration study. A detailed vibration study will be required as the Project progresses into detailed design.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Golder Associates Ltd. was retained by 2592693 Ontario Inc. to carry out a Noise and Vibration Feasibility Study (the Study) for the proposed Niagara Village residential development located at the existing Thundering Waters Golf Course (the Project) in the City of Niagara Falls. The Project Site is currently an active golf course zoned for open space, surrounded by various land uses that include industrial, commercial, residential and tourist. The Project is currently in the pre-planning visioning stage and the purpose of this Study is to support the Project's application for Official Plan and Zoning By-law Amendment proposing a mix of residential development and Draft Plan of Subdivision. This Study is multifaceted and considers the following:

- The potential impact of the environment on the Project;
- The potential impact of the Project on the environment; and
- The potential impact of the Project on itself.

Based upon the results presented in this Study, the following has been concluded:

- This Study focused on the estimated influence areas on the noise sensitive land uses within the Project Site from surrounding industrial land uses using NPC-300. This assisted in better identifying potential conflicts that are likely to exist as opposed to limiting an assessment to Guideline D6, which is considered more as a screening tool and does not represent definitive results. This will allow the Project team to design a more feasible Project and better develop and implement noise mitigation, if required. Sufficient detailed information regarding noise and vibration emissions from all of the surrounding industrial land uses was not readily available at this time of this Study and therefore additional detailed noise assessments are recommended. Based on the results of the Study, potential impacts on the proposed development can be mitigated during the site planning and detailed design phase of the development.
- It is expected this Study will be used in future discussions with the City to review the feasibility of the Project with respect to noise and vibration, including deciding on the framework to be applied to support the land use planning process.
- At the time of preparing this Study, it is considered that the Project Site is best classified as Class 1/Class 2 as per NPC-300, however certain areas of the Project Site could still be considered to be designated as Class 4, including areas which directly abut industrial facilities. The option for certain areas within the Project Site to be designated a Class 4 area will require approval from the City.
- This Study assessed the feasibility of introducing noise sensitive land uses in an area surrounded by existing industrial facilities, road traffic and rail traffic by applying NPC-300 guidelines. To minimize the potential noise and vibration impacts as identified in this Study, the recommendations further discussed in this section should be considered.
- Based upon the information used in this Study, observations during field reconnaissance and the prediction modelling results, there are several industrial facilities that may result in a non-compliance with MECP sound level limits with the introduction of this Project into the area. It is anticipated that this Project can be designed so that the industrial facilities can operate in compliance with relevant regulations at PORs within the Project, provided the recommendations further discussed below are implemented.

- It is expected, based on other residential developments in areas with higher road and rail traffic volumes, potential noise impacts due to road and rail traffic can be mitigated through effective acoustic design of the Project. However, in the absence of a final built form and specific design details of the buildings on the Project Site, the effectiveness of the acoustic design will need to be verified and confirmed through a detailed noise assessment.
- The Project Site is susceptible to vibration impacts due to the CP Montrose Subdivision rail line. Similar to noise, it is expected based on other developments adjacent to rail lines that vibration levels could be mitigated through effective design of the Project. This will need to be verified and confirmed through a detailed vibration assessment.

Based on the results of this Study, introducing the Project Site may be possible provided the following is considered:

- Discussions with the surrounding existing industrial facilities need to continue so detailed information regarding noise and vibration emissions associated with their operations is shared and considered to verify the Project does not impact their ability to operate in compliance with applicable limits. The Study estimated the noise emissions for key existing industrial facilities and it is best that the actual site-specific impacts be assessed.
- More detailed noise assessments of the Project and the surrounding existing industrial facilities will need to be carried out, and if required, include mitigation measures to address noise levels as required by NPC-300. The implementation and/or maintenance of the noise mitigation measures may result in the need of an agreement between the Project (i.e., proponent of the new noise sensitive land use), the owner of the noise source (i.e., existing industrial facility) and the City to deal with potential concerns and conflicts. These agreements may include arrangements to implement a combination of at-source mitigation measures at the industrial facilities, and receptor based mitigation measures on the Project Site.
- To address any potential noise complaints in the future including any perceived noise concerns, it is recommended that a noise complaint response protocol is developed. The development of the protocol may require discussions between the Project team, key existing industrial facilities and the City.
- More detailed noise and vibration assessments will need to be carried out during detailed design. This should include additional vibration measurements be taken, including below grade of the closest building façades to the CP Montrose Subdivision rail line. It is recommended the Project team continues to be in contact with CP as the Project design progresses.
- Golder recommends during detailed design and any updates to the Study, aircraft activity from the tourist area be reviewed and determined whether it requires further assessment.
- As information regarding the Riverfront Community becomes available, this Study should be reviewed and updated accordingly.

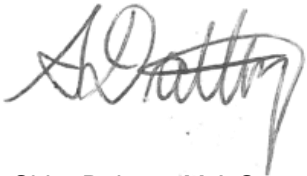
- Using the information currently provided by the Project team and nearby industrial facilities and assumptions described in this Study, the following describes the receptor based mitigation measures such that predicted noise levels of the Project Site comply with Class 1 or Class 2 exclusionary sound level limits:
  - For Salit Steel:
    - Salit Steel will be implementing at-source mitigation measures based on their NAAP to bring the facility into compliance with applicable law and MECP guidelines, which Golder did not receive. Based on an assumed at-source mitigation scenario, once Salit Steel is compliant with the Class 1 sound level limits at existing PORs, no additional receptor based mitigation is expected to be required beyond the current design. Golder recommends further discussion with Salit Steel be carried out to assess the actual site-specific noise impacts associated with their operations and their planned at-source noise mitigation measures.
  - For Chemtrade, the following receptor based mitigation is required if at-source mitigation measures are not feasible:
    - A 5 m tall noise barrier along the northwestern edge of the southern section of the Project Site (i.e., directly adjacent to Chemtrade) and no PORs along the façades (i.e., balcony/terrace that is more than 4 m deep, or windows or doors to noise sensitive spaces) above the first storey on the façades facing Chemtrade.
    - A 2.5 m tall noise barrier behind the row of dwellings south of the rail line where there are no intervening homes between them and Chemtrade.
  - For Quality Ready Mix, the following receptor based mitigation is required if at-source mitigation measures are not feasible:
    - A 3 m tall noise barrier behind the row of low density dwellings in the southern section of the Project Site facing Quality Ready Mix and no PORs along the façades above the first storey facing Quality Ready Mix.
- The following describes the receptor based mitigation measures such that predicted noise levels of the Project Site comply with Class 4 exclusionary sound level limits:
  - For Salit Steel:
    - Salit Steel will be implementing at-source mitigation measures based on their NAAP to bring the facility into compliance with MECP requirements, which Golder did not receive. Based on an assumed at-source mitigation scenario, once Salit Steel is compliant with the Class 1 sound level limits at existing PORs, no additional receptor based mitigation is expected to be required beyond the current design. Golder recommends further discussion with Salit Steel be carried out to assess the actual site-specific noise impacts associated with their operations and their planned at-source noise mitigation measures.
  - For Chemtrade, the following mitigation is required if at-source mitigation measures are not feasible:
    - A 3 m tall noise barrier along the northwestern edge of the southern section of the Project Site (i.e., directly adjacent to Chemtrade)



- The assessment of transportation sources indicate that some building components will need to be designed such that indoor sound levels comply with the sound level limits due to rail traffic, the installation of air-conditioning or forced air systems should be considered, and warning clauses may be required. Preliminary STC values of up to STC-34 were predicted to be required to meet NPC-300 indoor sound level limits. With the Project Site not having a finalized built form or suite layouts yet completed, Golder recommends that further investigation be completed during detailed design.
- For the first row of dwellings within 100 metres of the industrial spur line, exterior walls of the first row of dwellings next to railway tracks are to be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters.
- Warning clauses for stationary sources (NPC-300 Type E) may identify a potential concern due to the proximity of a facility. Golder recommends warning clauses be included in the sale/rental/lease agreements as they are an important factor of the overall noise mitigation plan for any proposed development, but it does not ensure that noise complaints will not occur.
- Warning clauses to notify a Class 4 area (NPC-300 Type F) are recommended if a Class 4 area designation is approved for certain areas of the Project Site. In addition, industrial facilities should be notified and provided formal documentation of the Class 4 area approval to supplement their ECA/EASR.
- Once the built form is finalized, the above receptor based mitigation and design of building components may be further refined.
- If additional information is received from the industrial facilities, the above receptor based mitigation may be further refined.
- Source-based mitigation could reduce the need for receptor based mitigation measures and should be further investigated.

## Signature Page

### Golder Associates Ltd.



Shira Daltrop, M.A.Sc.  
*Noise Specialist*



Stefan Cicak, P.Eng.  
*Acoustic, Noise and Vibration Engineer*



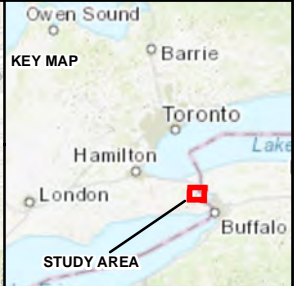
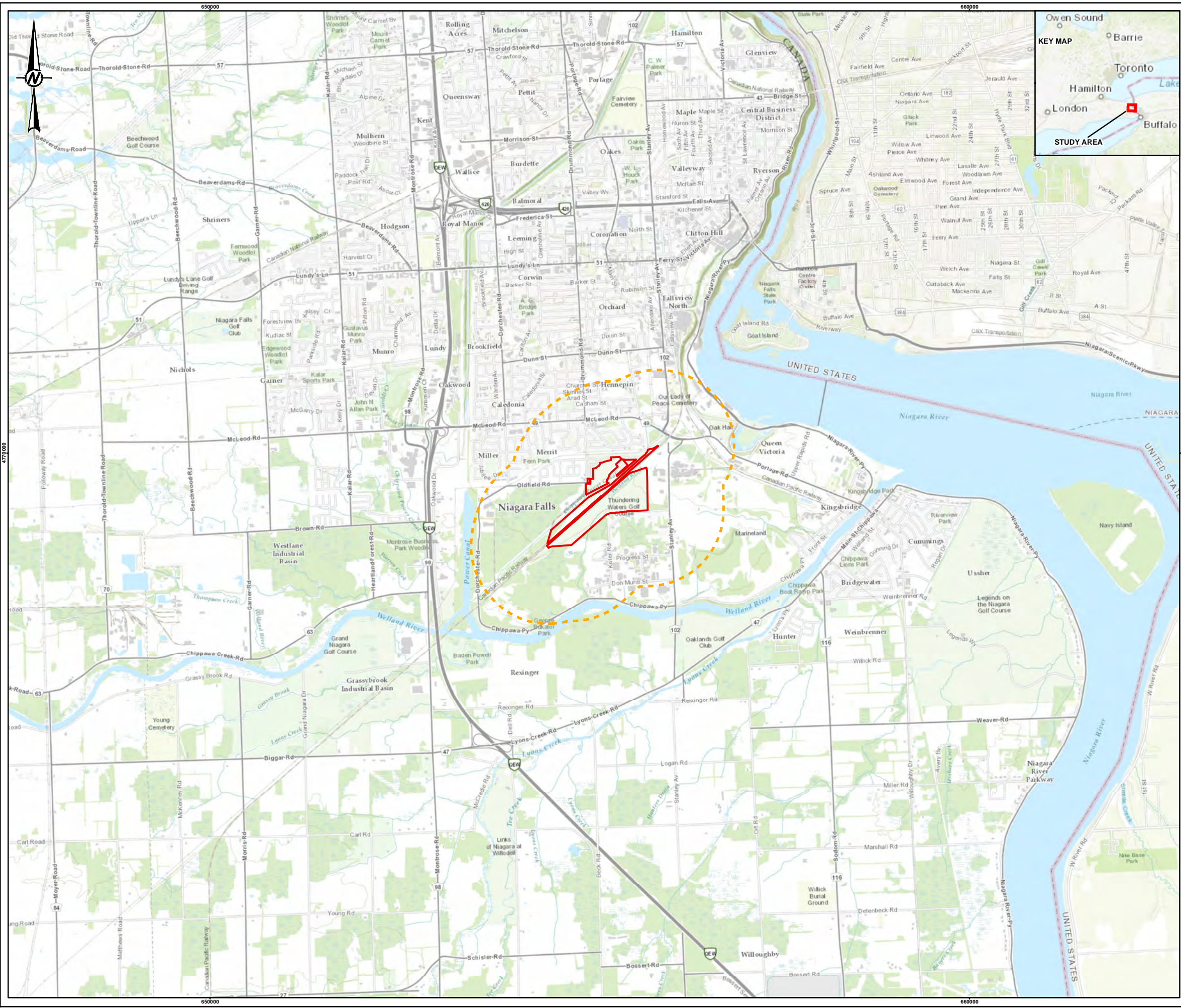
Joe Tomaselli, P.Eng.  
*Associate/Acoustic, Noise and Vibration Engineer*

SD/SC/JT/ng

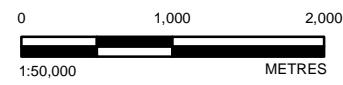
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**FIGURES**



**LEGEND**  
 [Red outline] PROPERTY BOUNDARY  
 [Dashed orange outline] STUDY AREA (1000 M)



**REFERENCE(S)**  
 1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NRCAN, GEOBASE, IGN, KADASTER NL, ORDANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY  
 2. BASE DATA: MRNF LIO 2017  
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CLIENT  
**THE INVEST GROUP**

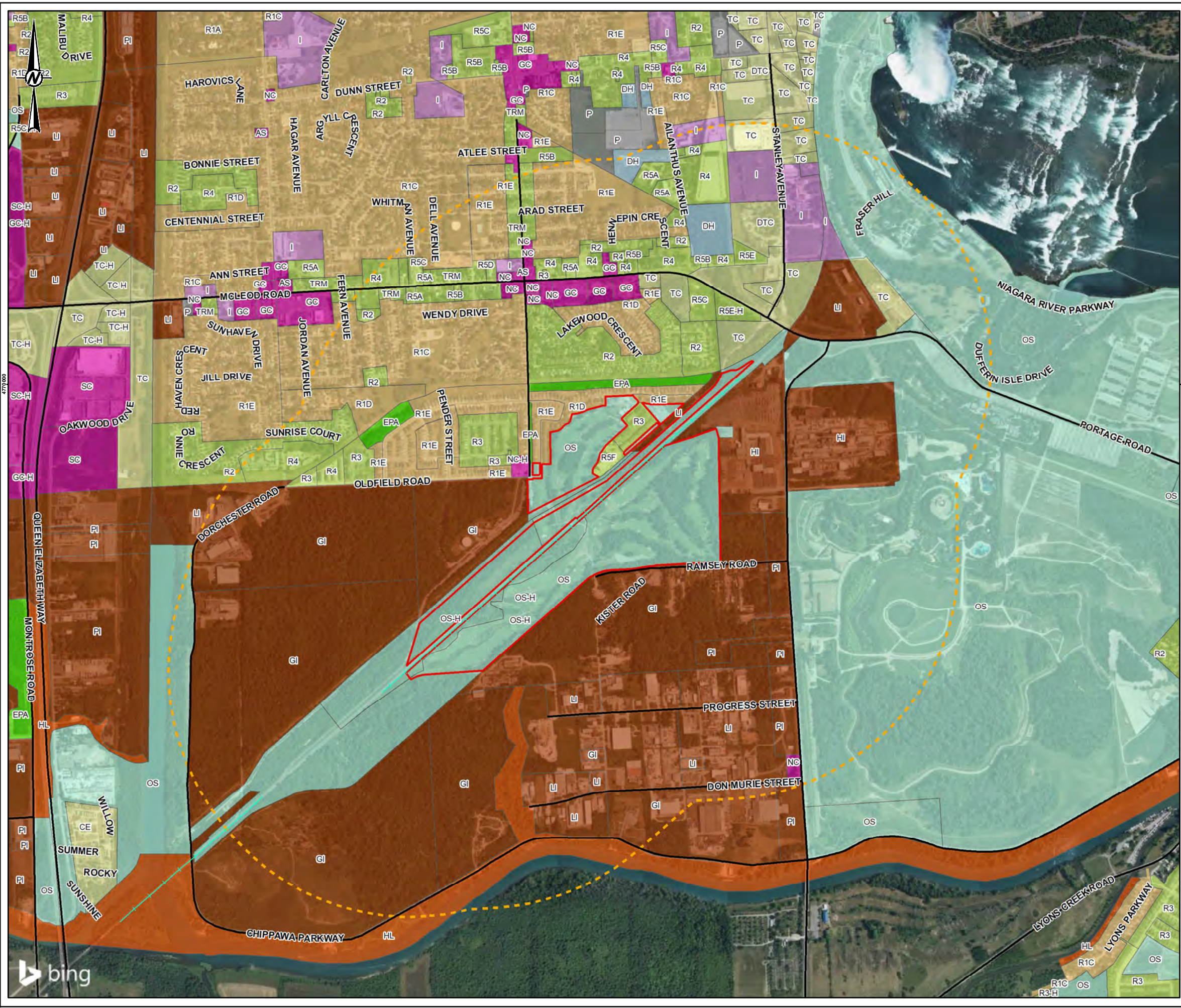
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**NOISE AND VIBRATION FEASIBILITY STUDY,  
 6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

TITLE  
**SITE LOCATION**

CONSULTANT	YYYY-MM-DD	7/21/2021
	DESIGNED	JMC
	PREPARED	SO/ST
	REVIEWED	SD
	APPROVED	SC

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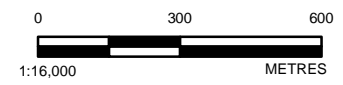


**LEGEND**

- PROPERTY BOUNDARY
- STUDY AREA (1000 M)
- ASSESSED EXISTING ROAD NETWORK
- ASSESSED RAIL LINE

**LAND USE**

- COMMERCIAL
- DEVELOPMENT HOLDING
- ENVIRONMENTAL PROTECTION AREA
- HAZARD LAND
- INDUSTRIAL
- INSTITUTIONAL
- MULTIPLE RESIDENTIAL
- OPEN SPACE
- PARKING
- RESIDENTIAL
- TOURIST COMMERCIAL



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. LANDUSE - ZONING BYLAW 79-200 CITY OF NIAGARA 2018
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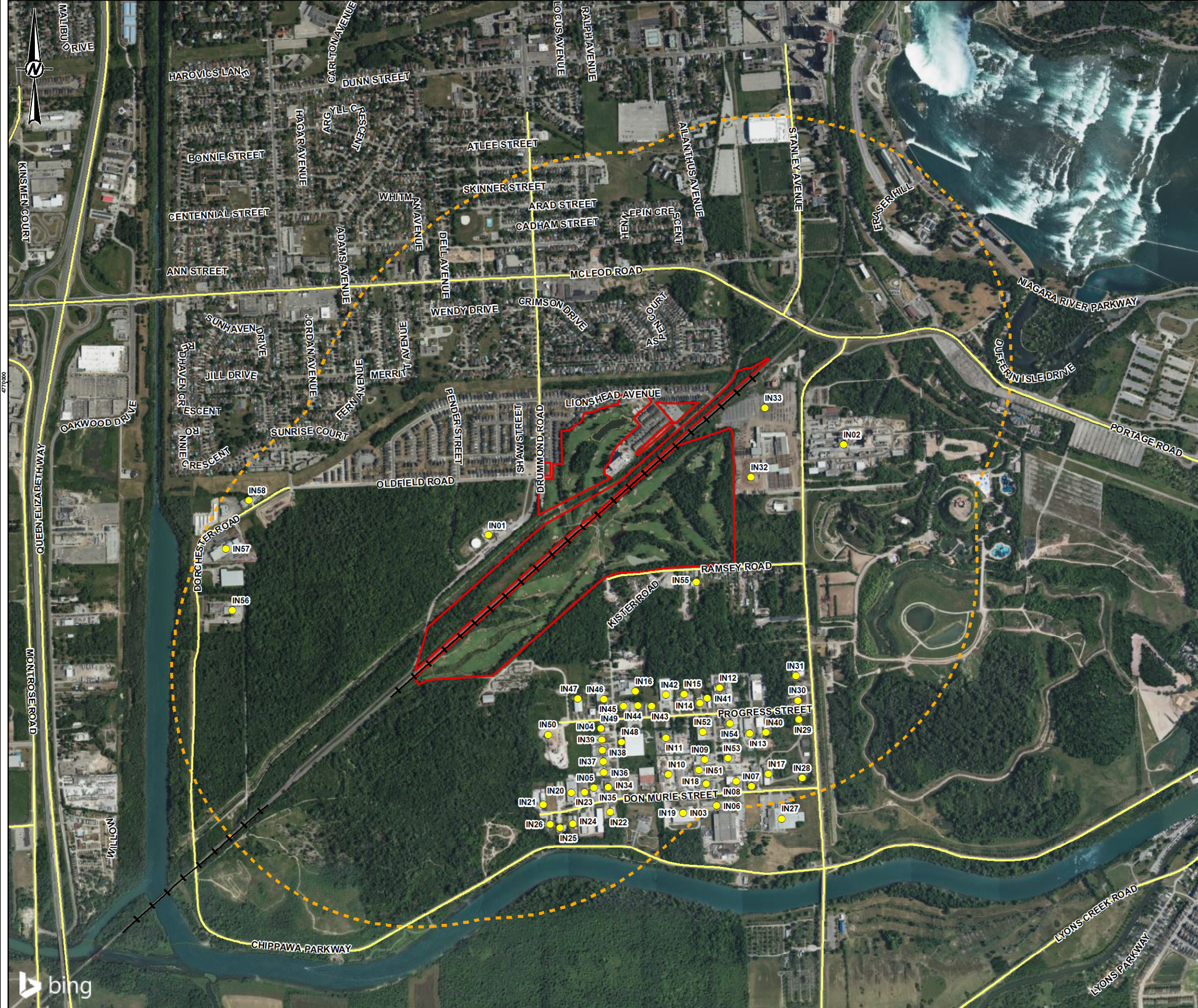
PROJECT  
**NOISE AND VIBRATION FEASIBILITY STUDY,  
 6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

TITLE  
**EXISTING LAND USE**

CONSULTANT	YYYY-MM-DD	7/21/2021
	DESIGNED	JMC
	PREPARED	SO/ST
	REVIEWED	SD
	APPROVED	SC

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- LEGEND**
- PROPERTY BOUNDARY
  - STUDY AREA (1000 M)
  - ASSESSED EXISTING ROAD NETWORK
  - + ASSESSED RAIL LINE
  - ASSESSED INDUSTRIAL FACILITY

ID	Facility Name	Facility Address
IN01	Chemtrade	6300 Oldfield Road
IN02	Washington Mills Electro Minerals Corporation	7780 Stanley Ave
IN03	H & L Tool and Die Ltd.	5955 Don Murie Street
IN04	1683063 Ontario Inc. (Milestone Millwork)	6100 Progress Street
IN05	Niagara Pattern Limited	6135 Don Murie Street
IN06	Edscha North America Inc.	5795 Don Murie Street
IN07	Brunner Manufacturing & Sales Ltd.	5720 Don Murie Street
IN08	Tecna-Division of Brunner	5770 Don Murie Street
IN09	Laurcoat Inc.	8591 Earl Thomas Ave
IN10	St. Lawrence Cement Inc. / Dufferin Concrete	5980 Don Murie Street
IN11	Pumprete Corporation	6000 Progress Street
IN12	Mancuso Chemicals Limited	5635 & 5725 Progress Street
IN13	Hoco Limited	5720 Progress Street
IN14	Barbisan Allmetal Designs	5835 Progress Street
IN15	Can Mar Manufacturing Inc.	5869 Progress Street
IN16	Fencast Industries Ltd	6272 Kister Road
IN17	Marineland Canada	5680 Don Murie Street
IN18	Falls Contracting Inc.	5850 Unit D Don Murie Street
IN19	Dyaco Canada Inc.	5955 Don Murie Street
IN20	Niagara River Trading	6199 Don Murie Street
IN21	Gordon Wright Electrical Limited	6255 Don Murie Street
IN22	Air Liquide Canada Inc.	6090 Don Murie Street
IN23	Airwood Vents	6167 Don Murie Street
IN24	International Sew-Right	6190 Don Murie Street
IN25	Marine Clean Ltd.	6220 Don Murie Street
IN26	Niagara Commercial Coating & Insulation	6260 Don Murie Street
IN27	Deflecto Canada	8699 Stanley Avenue
IN28	Marineland Canada	8525-8559 Stanley Avenue
IN29	Marineland Canada	8455 Stanley Avenue
IN30	Batemans Tires	8407 Stanley Avenue
IN31	Peglow Tool & Die Inc.	8345 Stanley Avenue
IN32	Salt Steel	7771 Stanley Avenue
IN33	L. Waller & Sons Excavating Ltd.	7527 Stanley Avenue
IN34	Hangups Sportware	6537 Kister Road
IN35	Fastenal	6537 Kister Road
IN36	Micron Installations	6501 Kister Road
IN37	Niagara RV & Trailer Center	6471 Kister Road
IN38	Niagara Bus Wash	6441 Kister Road
IN39	T.Hodgson & Co. Ltd.	6411 Kister Road
IN40	Davert Tools	5676 Progress Street
IN41	Niagara Analytical Laboratories	5805 Progress Street
IN42	Louwer-Lite	6015 Progress Street
IN43	Artec Frames	6025 Progress Street
IN44	GC Customs Services Inc.	6045 Progress Street
IN45	Niagara Fence Supply	6065 Progress Street
IN46	Niagara Fastener Inc.	6095 Progress Street
IN47	Provincial Design & Fabrication Inc.	6159 Progress Street
IN48	Spencer ARL	6040 Progress Street
IN49	Unit 1 Advanced Cryogenic Services	6100 Progress Street
IN50	Lafarge Quality Ready Mix	6224 Progress Street
IN51	Collins Concessions Ltd.	8621 Earl Thomas Avenue
IN52	Factor Forms and Labels	8481 Earl Thomas Avenue
IN53	Stellfab Niagara Limited	8594 Earl Thomas Avenue
IN54	Food Roll Sales (Niagara) Ltd.	8464 Earl Thomas Avenue
IN55	Fred's Concrete	5806 Ramsey Road
IN56	Avid Growing Systems	8100 Dorchester Road
IN57	Palfinger Inc.	7942 Dorchester Road
IN58	Niagara Moving and Storage	7825 Dorchester Road



**REFERENCE(S)**  
 1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS TOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY  
 2. BASE DATA: MRNF LIO 2017  
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CLIENT  
**THE INVEST GROUP**

PROJECT  
**NOISE AND VIBRATION FEASIBILITY STUDY,  
6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

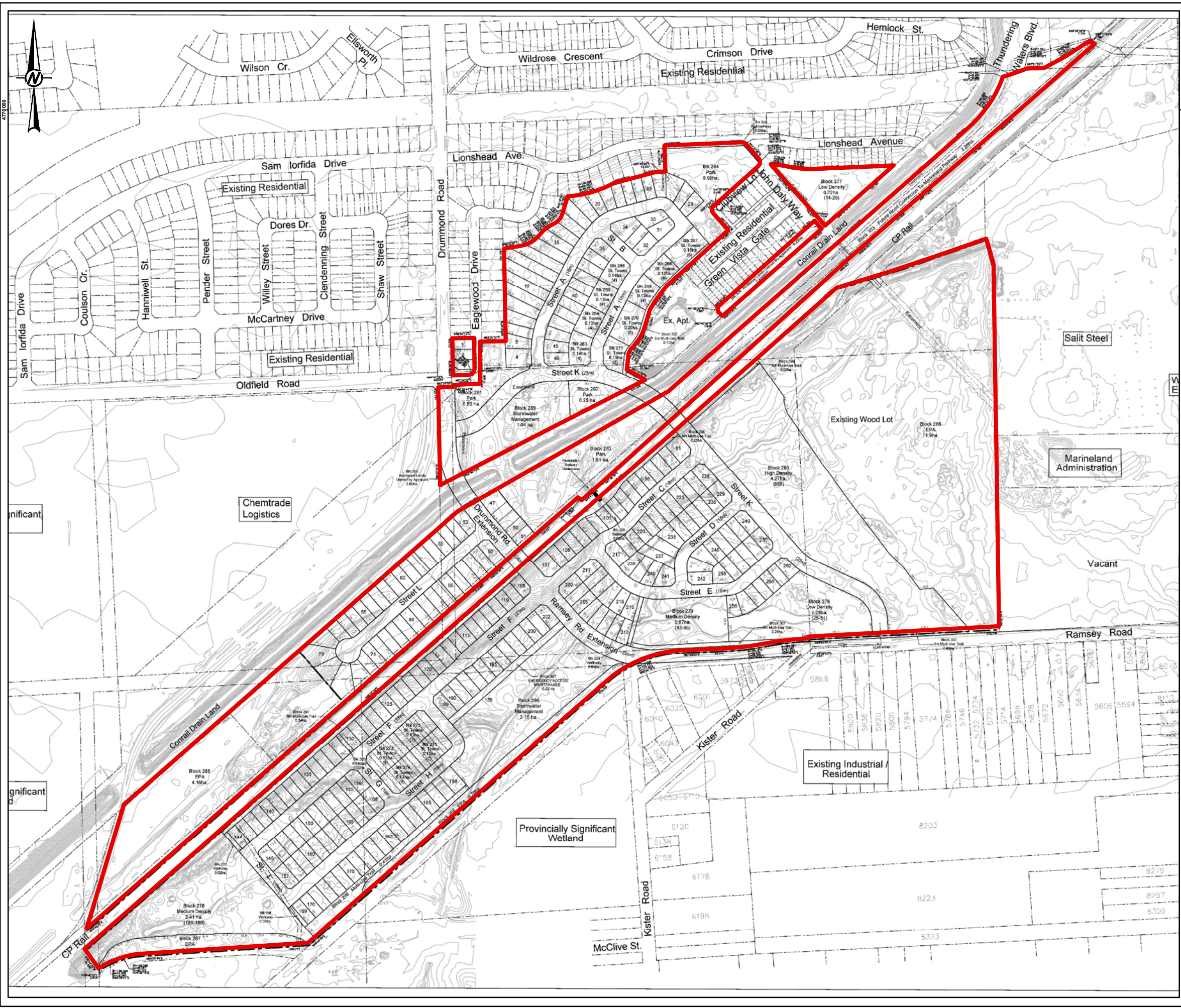
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	PREPARED	SO/ST
	REVIEWED	SD
	APPROVED	SC

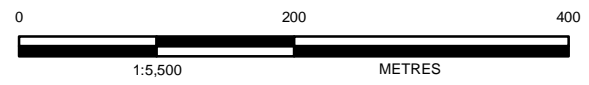
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**CLIENT**  
 THE INVEST GROUP

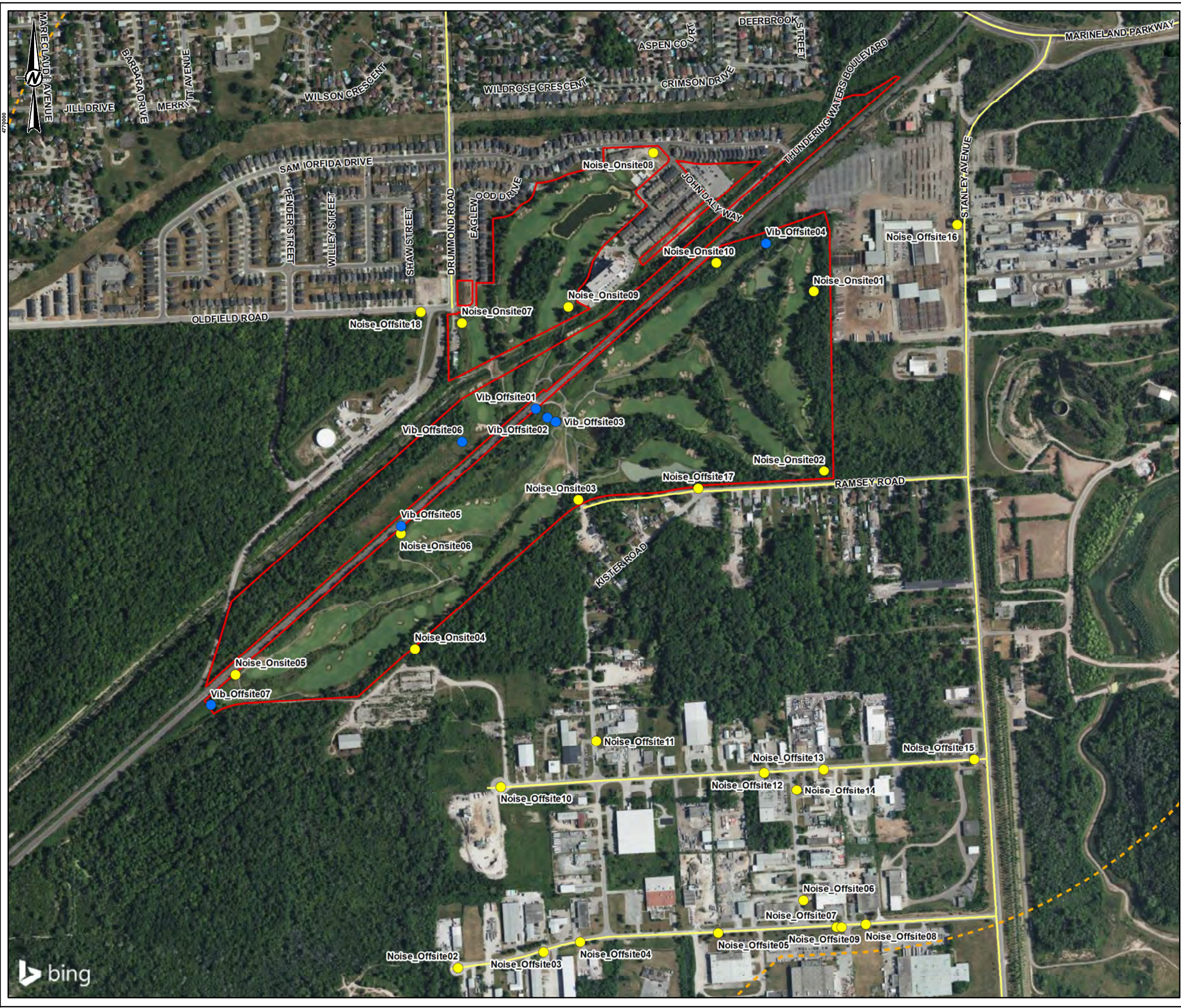
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**TITLE**  
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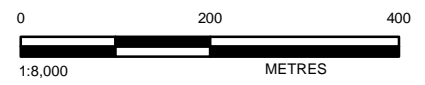
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	APPROVED	SC

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- LEGEND**
- PROPERTY BOUNDARY
  - STUDY AREA (1000 M)
  - ASSESSED EXISTING ROAD NETWORK
  - NOISE MEASUREMENT LOCATIONS
  - VIBRATION MEASUREMENT LOCATIONS



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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**THE INVEST GROUP**

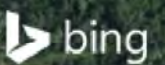
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**NOISE AND VIBRATION FEASIBILITY STUDY,**  
**6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

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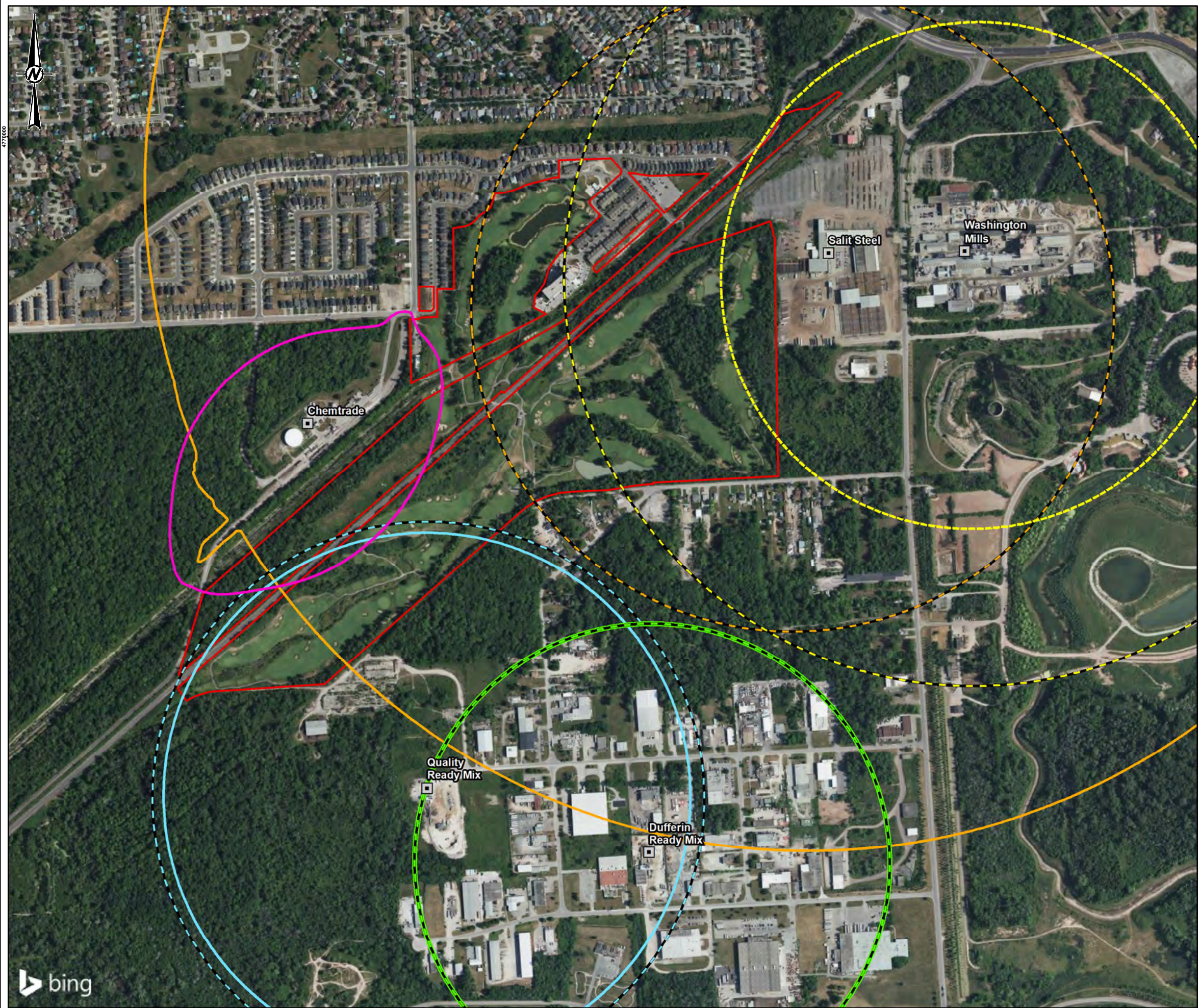
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	REVIEWED	SD
	APPROVED	SC

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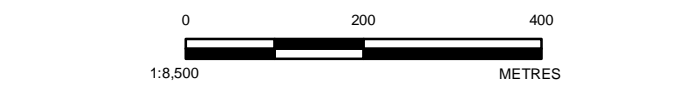
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  - WASHINGTON MILLS INFLUENCE AREA - DAY
  - CHEMTRADE INFLUENCE AREA - DAY
  - DUFFERIN READY MIX INFLUENCE AREA - NIGHT
  - DUFFERIN READY MIX INFLUENCE AREA - DAY
  - QUALITY READY MIX DUFFERIN READY MIX INFLUENCE AREA - NIGHT
  - QUALITY READY MIX DUFFERIN READY MIX INFLUENCE AREA - DAY
  - SALIT STEEL INFLUENCE AREA - NIGHT
  - SALIT STEEL INFLUENCE AREA - DAY
  - PROPERTY BOUNDARY



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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CLIENT  
**THE INVEST GROUP**

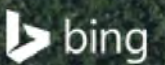
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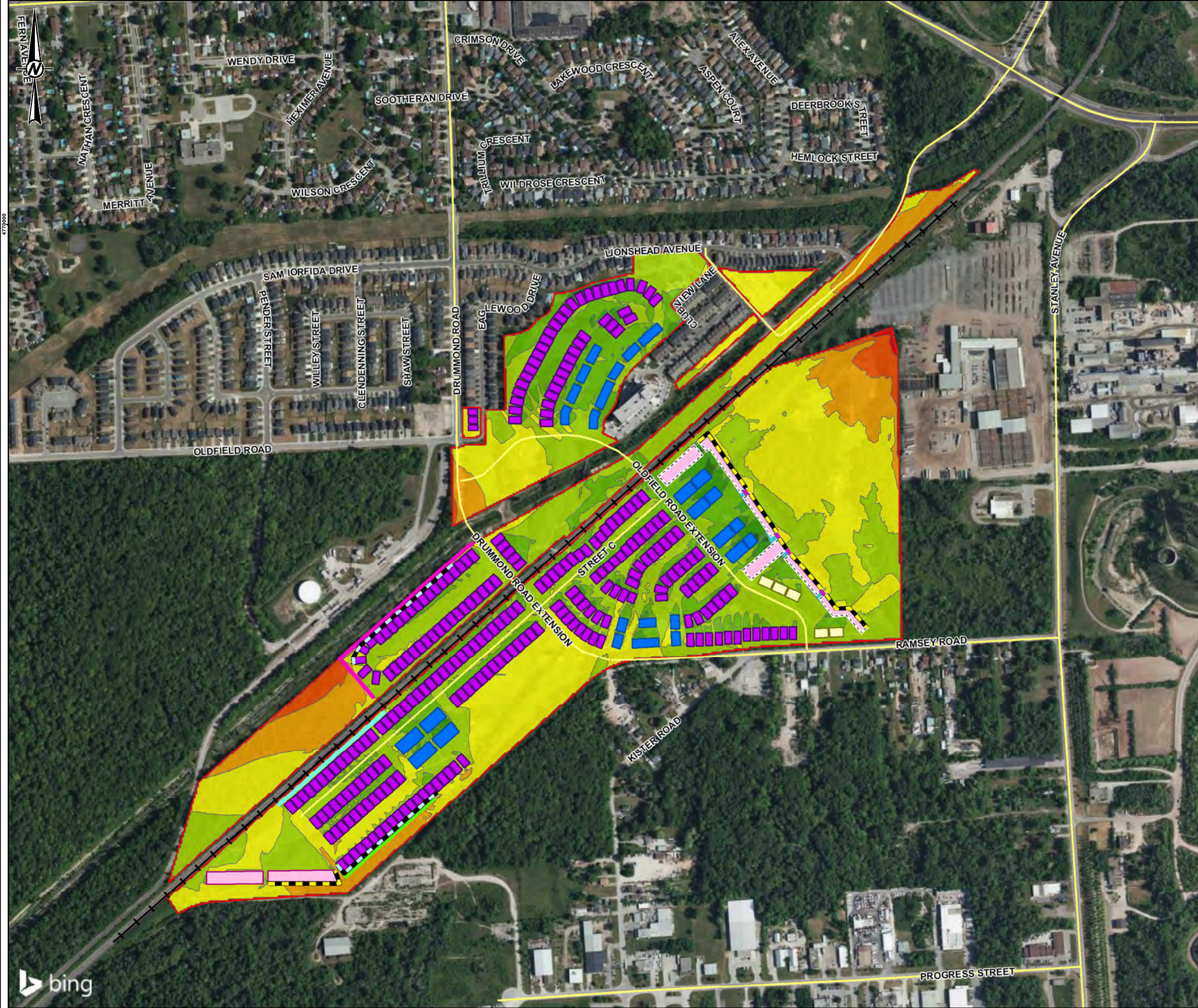
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	DESIGNED	JMC
	PREPARED	SO
	REVIEWED	SD
	APPROVED	SC

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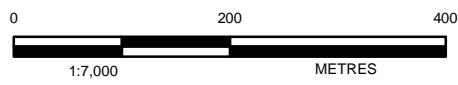
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- LEGEND**
- BARRIER - 2.5M
  - BARRIER - 3M
  - BARRIER - 5M
  - SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
  - 1.3 M HIGH PARAPET
  - FACADES WITH NO POINTS OF RECEPTION (PROJECT SITE DESIGN)
  - FACADES WITH NO POINTS OF RECEPTION (ADDITIONAL MITIGATION)
  - ASSESSED RAIL LINE
  - ASSESSED ROAD NETWORK
  - PROPERTY BOUNDARY
  - ONE STOREY BUILDING
  - TWO STOREY BUILDING
  - THREE STOREY BUILDING
  - THREE AND A HALF STOREY
  - SIX STOREY BUILDING

- NOISE LEVELS (DBA) @ 1.5 M**
- 20 - 25
  - 25 - 30
  - 30 - 35
  - 35 - 40
  - 40 - 45
  - 45 - 50
  - 50 - 55
  - 55 - 60
  - 60 - 65



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

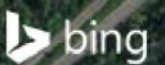
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**THE INVEST GROUP**

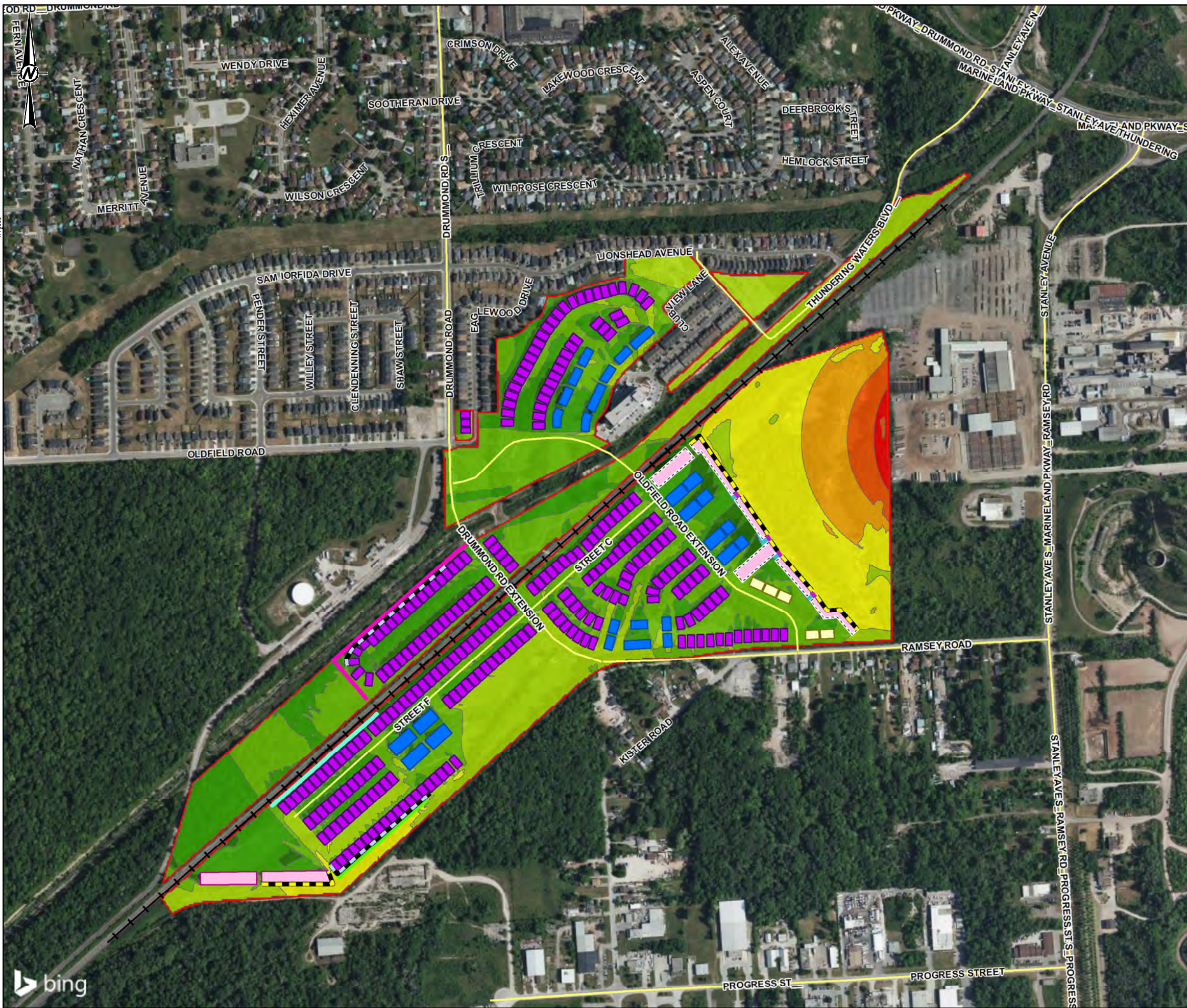
PROJECT  
**NOISE AND VIBRATION FEASIBILITY STUDY,  
6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

TITLE  
**MAXIMUM DAYTIME NOISE LEVELS RESULTING FROM MOST  
SIGNIFICANT INDUSTRIAL FACILITIES @ 1.5M (CLASS 1 AND 2)**

CONSULTANT	YYYY-MM-DD	7/21/2021
DESIGNED	JMC	
PREPARED	SO/ST	
REVIEWED	SD	
APPROVED	SC	

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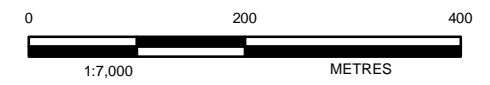


**LEGEND**

- BARRIER - 2.5M
- BARRIER - 3M
- BARRIER - 5M
- SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
- 1.3 M HIGH PARAPET
- FACADES WITH NO POINTS OF RECEPTION (PROJECT SITE DESIGN)
- FACADES WITH NO POINTS OF RECEPTION (ADDITIONAL MITIGATION)
- + ASSESSED RAIL LINE
- ASSESSED ROAD NETWORK
- PROPERTY BOUNDARY
- ONE STOREY BUILDING
- TWO STOREY BUILDING
- THREE STOREY BUILDING
- THREE AND A HALF STOREY
- SIX STOREY BUILDING

**NOISE LEVELS (DBA) @ 1.5 M**

- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

**CLIENT**  
THE INVEST GROUP

**PROJECT**  
NOISE AND VIBRATION FEASIBILITY STUDY,  
6000 MARINELAND PARKWAY, NIAGARA FALLS, ON

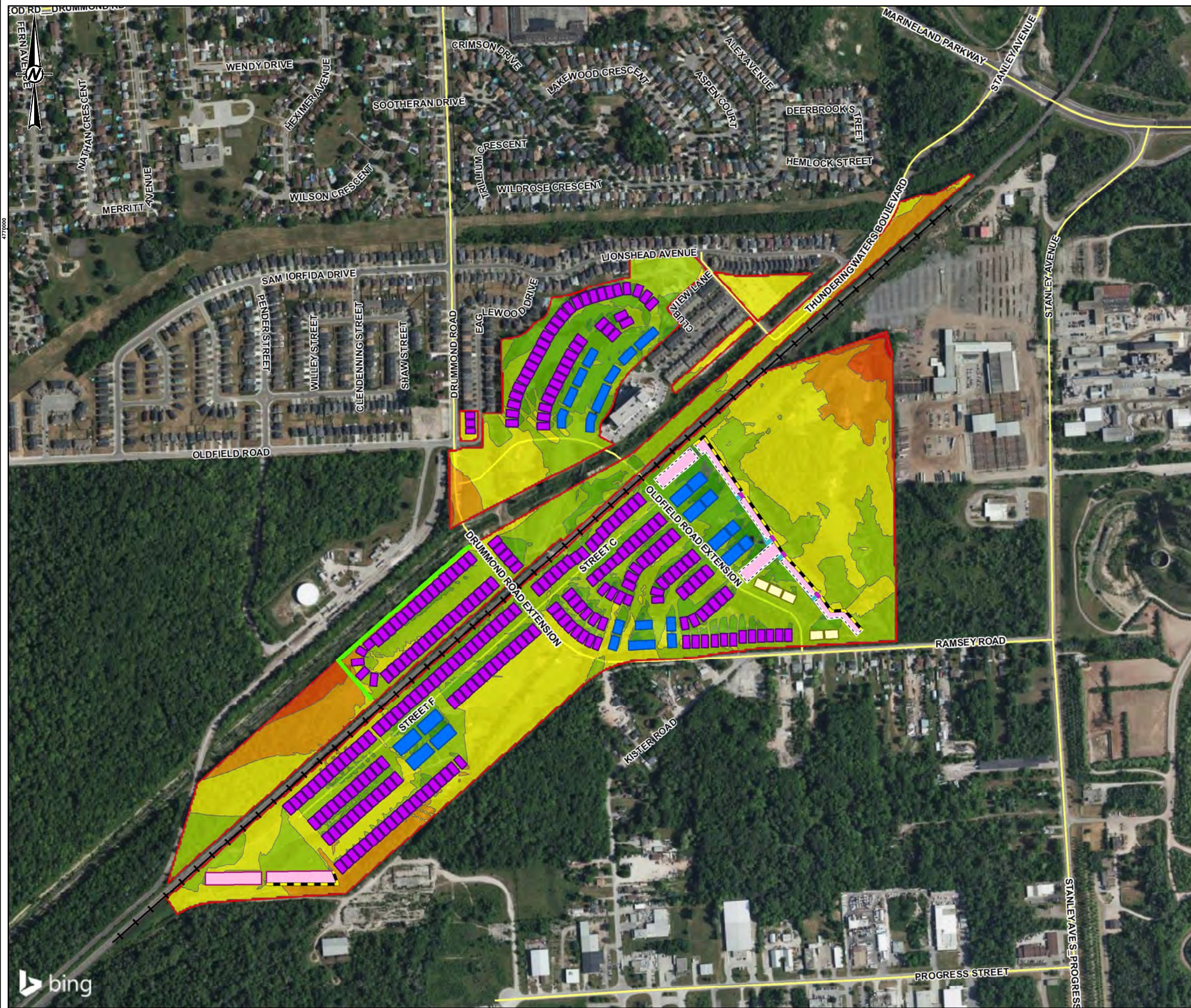
**TITLE**  
**MAXIMUM NIGHTTIME NOISE LEVELS RESULTING FROM MOST SIGNIFICANT INDUSTRIAL FACILITIES @ 1.5M (CLASS 1 AND 2)**

CONSULTANT	YYYY-MM-DD	7/21/2021
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	JMC
	PREPARED	SO/ST
	REVIEWED	SD
	APPROVED	SC

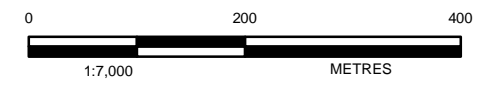
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B





- LEGEND**
- BARRIER - 3M
  - SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
  - 1.3 M HIGH PARAPET
  - FACADES WITH NO POINTS OF RECEPTION (PROJECT SITE DESIGN)
  - ASSESSED RAIL LINE
  - ASSESSED ROAD NETWORK
  - PROPERTY BOUNDARY
  - ONE STOREY BUILDING
  - TWO STOREY BUILDING
  - THREE STOREY BUILDING
  - THREE AND A HALF STOREY
  - SIX STOREY NOISE BARRIERS
- NOISE LEVELS (DBA) @ 1.5 M**
- 30 - 35
  - 35 - 40
  - 40 - 45
  - 45 - 50
  - 50 - 55
  - 55 - 60
  - 60 - 65



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

**CLIENT**  
**THE INVEST GROUP**

**PROJECT**  
**NOISE AND VIBRATION FEASIBILITY STUDY,**  
**6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

**TITLE**  
**MAXIMUM DAYTIME NOISE LEVELS RESULTING FROM MOST SIGNIFICANT INDUSTRIAL FACILITIES @ 1.5M (CLASS 4)**

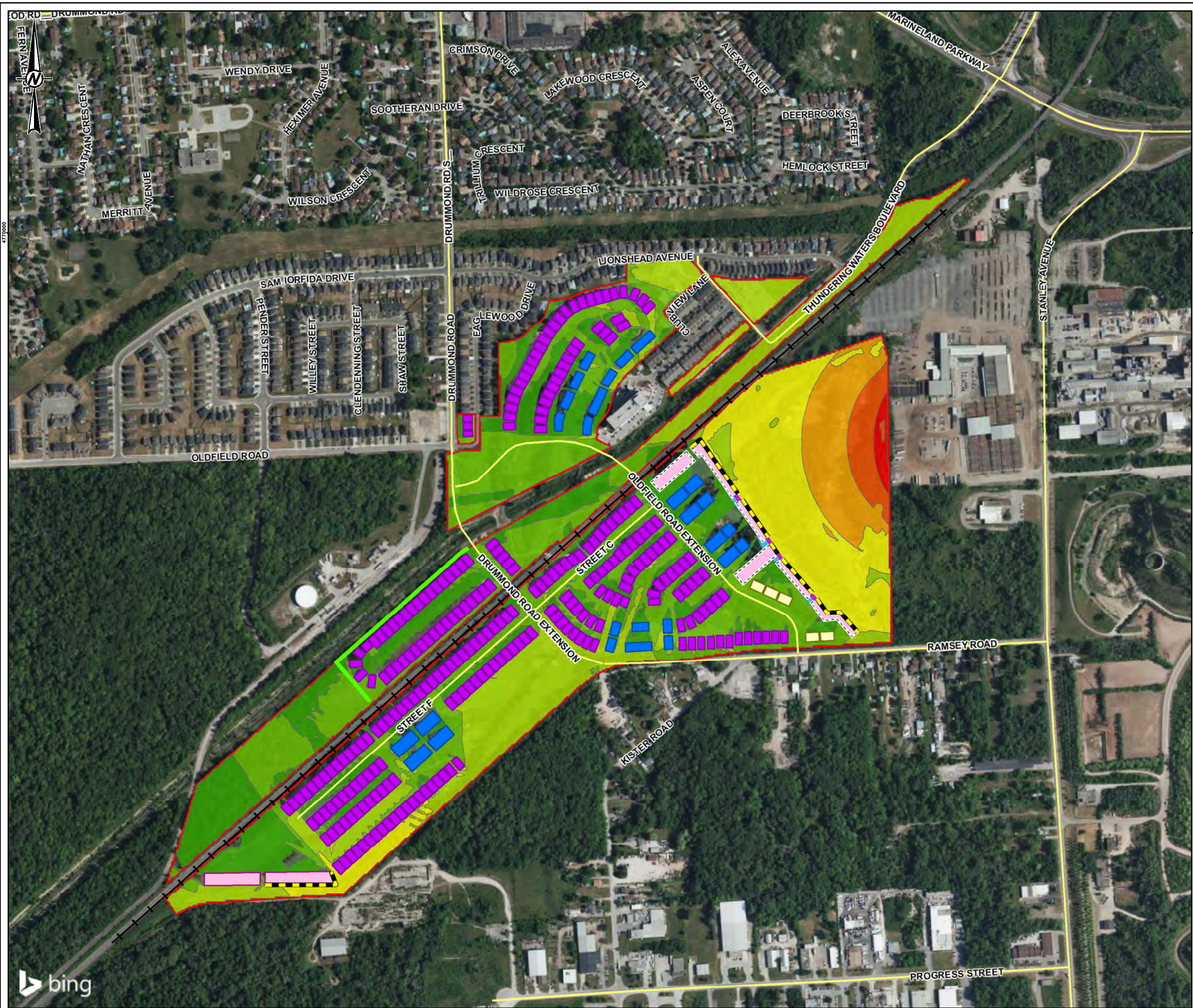
<b>CONSULTANT</b>	YYYY-MM-DD	7/21/2021
<b>DESIGNED</b>	JMC	
<b>PREPARED</b>	SO/ST	
<b>REVIEWED</b>	SD	
<b>APPROVED</b>	SC	

<b>PROJECT NO.</b>	<b>CONTROL</b>	<b>REV.</b>	<b>FIGURE</b>
1784521	0004	0	9

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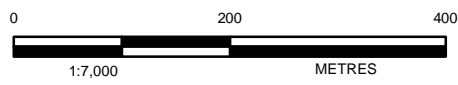


**LEGEND**

- BARRIER - 3M
- SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
- 1.3 M HIGH PARAPET
- FACADES WITH NO POINTS OF RECEPTION (PROJECT SITE DESIGN)
- ASSESSED RAIL LINE
- ASSESSED ROAD NETWORK
- PROPERTY BOUNDARY
- ONE STOREY BUILDING
- TWO STOREY BUILDING
- THREE STOREY BUILDING
- THREE AND A HALF STOREY
- SIX STOREY BUILDING

**NOISE LEVELS (DBA) @ 1.5 M**

- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

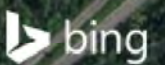
**CLIENT**  
**THE INVEST GROUP**

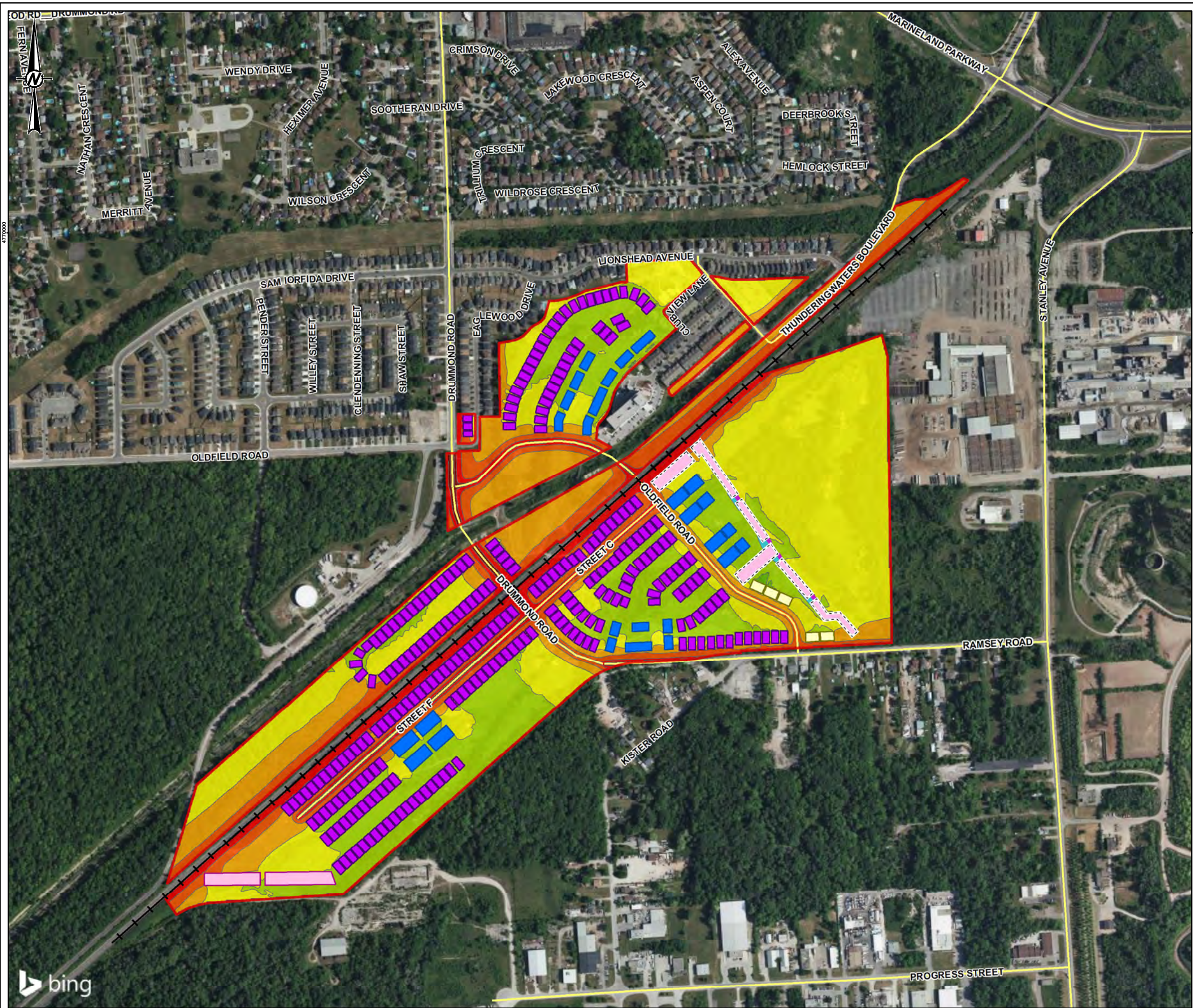
**PROJECT**  
**NOISE AND VIBRATION FEASIBILITY STUDY,**  
**6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

**TITLE**  
**MAXIMUM NIGHTTIME NOISE LEVELS RESULTING FROM MOST SIGNIFICANT INDUSTRIAL FACILITIES @ 1.5M (CLASS 4)**

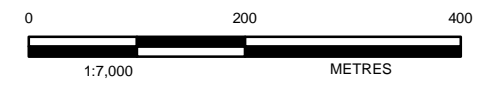
CONSULTANT	YYYY-MM-DD	7/21/2021
DESIGNED	JMC	
PREPARED	SO/ST	
REVIEWED	SD	
APPROVED	SC	

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 IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B





- LEGEND**
- PROPERTY BOUNDARY
  - SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
  - 1.3 M HIGH PARAPET
  - ASSESSED ROAD NETWORK
  - ASSESSED RAIL LINE
  - ONE STOREY BUILDING
  - TWO STOREY BUILDING
  - THREE STOREY BUILDING
  - THREE AND A HALF STOREY BUILDING
  - SIX STOREY BUILDING
- NOISE LEVELS (DBA) @ 1.5 M**
- 35 - 40
  - 40 - 45
  - 45 - 50
  - 50 - 55
  - 55 - 60
  - 60 - 65
  - 65 +



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

**CLIENT**  
**THE INVEST GROUP**

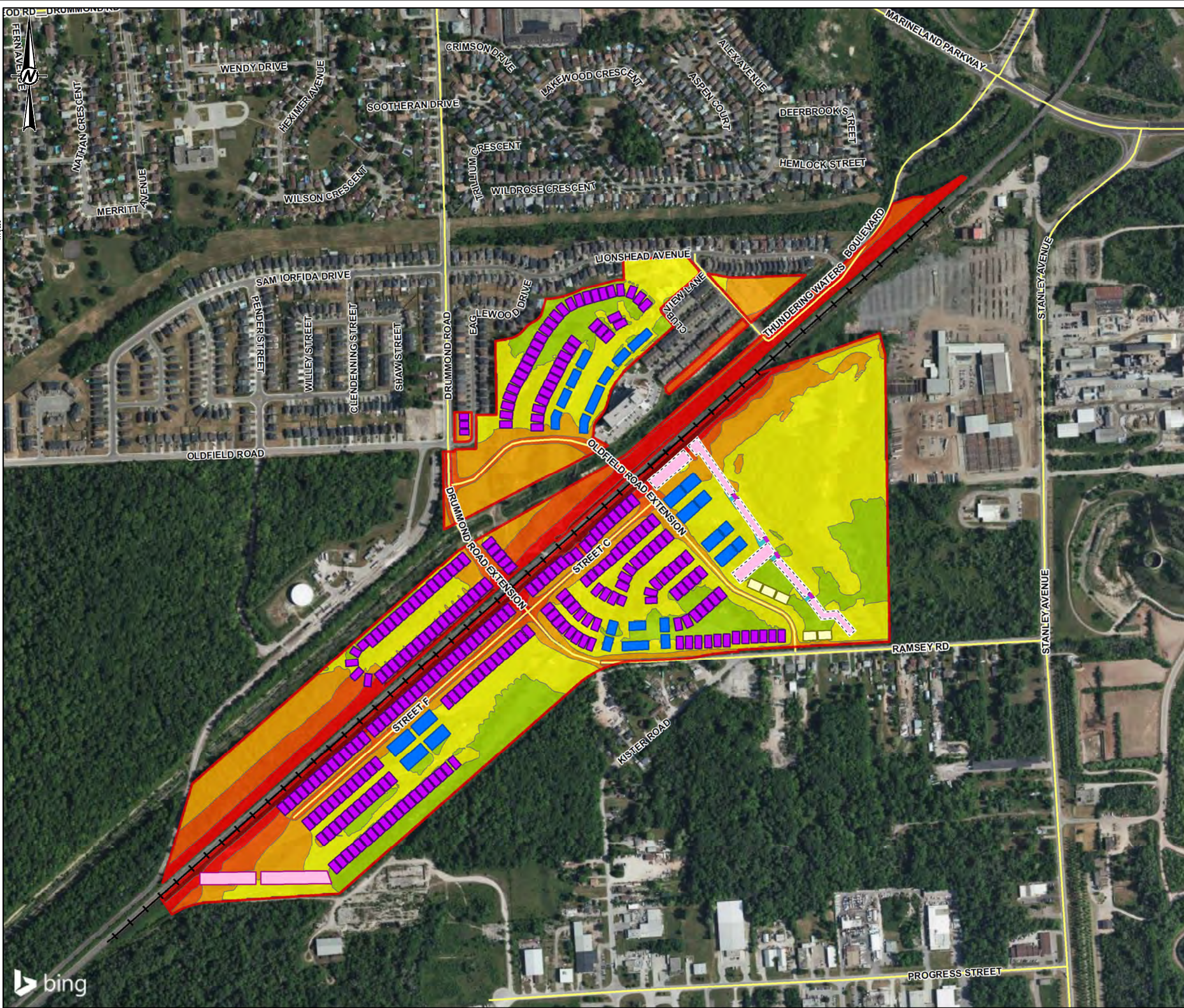
**PROJECT**  
**NOISE AND VIBRATION FEASIBILITY STUDY,**  
**6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

**TITLE**  
**ROAD AND RAIL DAYTIME NOISE LEVELS @ 1.5 M**

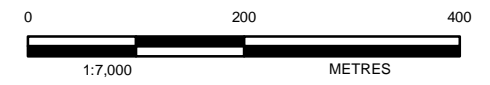
CONSULTANT	YYYY-MM-DD	7/21/2021
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	JMC
	PREPARED	SO/ST
	REVIEWED	SD
	APPROVED	SC

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



- LEGEND**
- PROPERTY BOUNDARY
  - SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
  - 1.3 M HIGH PARAPET
  - ASSESSED RAIL LINE
  - ASSESSED ROAD NETWORK
  - ONE STOREY BUILDING
  - TWO STOREY BUILDING
  - THREE STOREY BUILDING
  - THREE AND A HALF STOREY BUILDING
  - SIX STOREY BUILDING
- NOISE LEVELS (DBA) @ 1.5 M**
- 40 - 45
  - 45 - 50
  - 50 - 55
  - 55 - 60
  - 60 - 65
  - 65 +



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

CLIENT  
**THE INVEST GROUP**

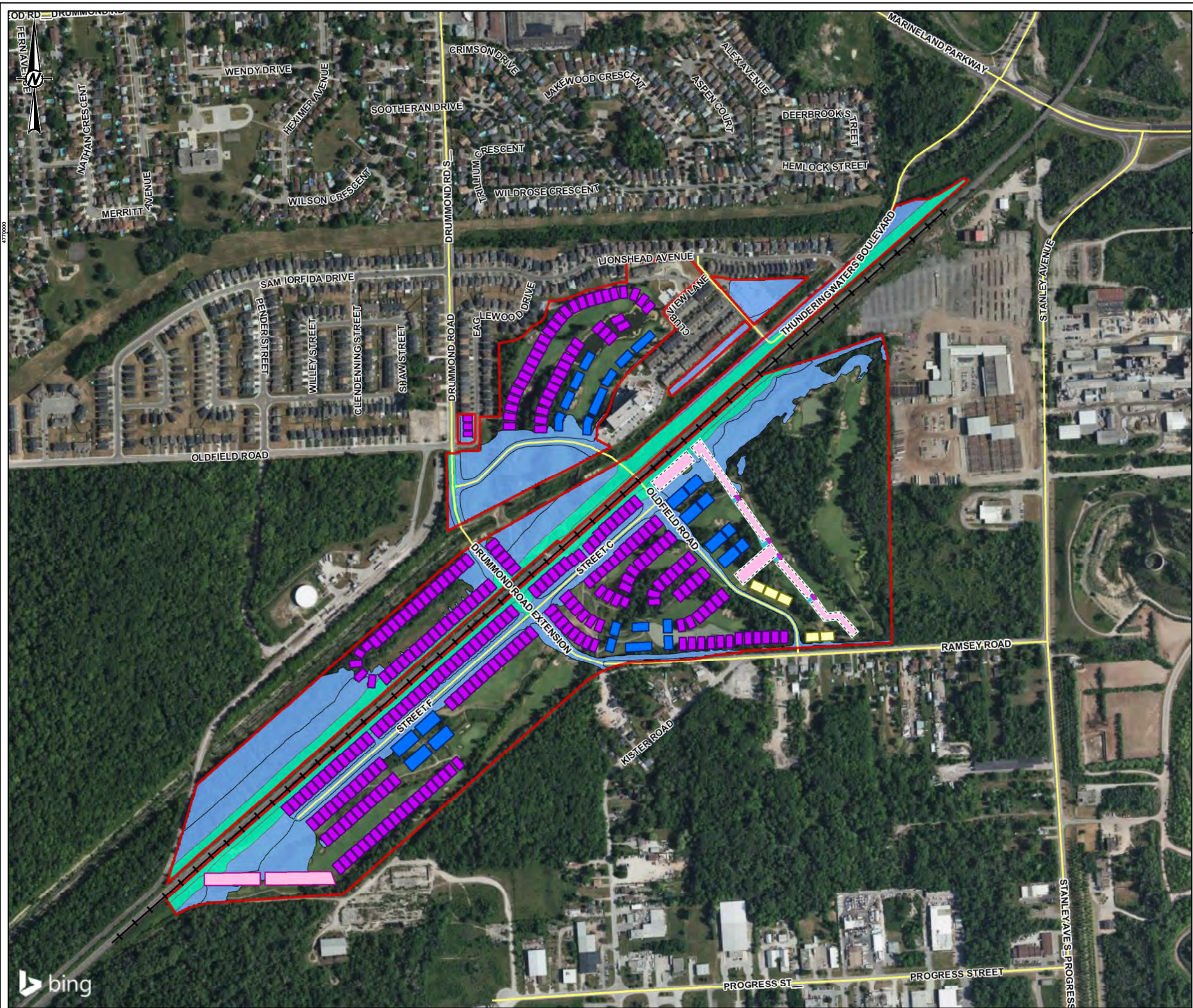
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**NOISE AND VIBRATION FEASIBILITY STUDY,  
6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

TITLE  
**ROAD AND RAIL NIGHTTIME NOISE LEVELS @ 1.5 M**

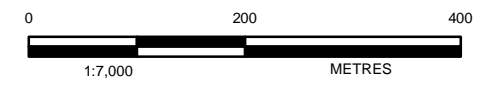
CONSULTANT	YYYY-MM-DD	7/28/2021
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	JMC
	PREPARED	SO
	REVIEWED	SD
	APPROVED	SC

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- LEGEND**
- PROPERTY BOUNDARY
  - SIX STOREY NOISE BARRIER (PROJECT SITE DESIGN)
  - 1.3 M HIGH PARAPET
  - ASSESSED ROAD NETWORK
  - ASSESSED RAIL LINE
  - ONE STOREY BUILDING
  - TWO STOREY BUILDING
  - THREE STOREY BUILDING
  - THREE AND A HALF STOREY
  - SIX STOREY BUILDING
  - MANDATORY AIR-CONDITIONING AND WARNING CLAUSE TYPE D
  - RECOMMENDED FORCED AIR SYSTEM AND WARNING CLAUSE TYPE C



**REFERENCE(S)**

1. BASE IMAGERY - TOPO MAP: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
2. BASE DATA: MRNF LIO 2017
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 CSRS COORDINATE SYSTEM: UTM ZONE 17N

CLIENT  
**THE INVEST GROUP**

PROJECT  
**NOISE AND VIBRATION FEASIBILITY STUDY,  
 6000 MARINELAND PARKWAY, NIAGARA FALLS, ON**

TITLE  
**BUILDING VENTILATION REQUIREMENTS**

CONSULTANT	YYYY-MM-DD	7/21/2021
	DESIGNED	JMC
	PREPARED	SO
	REVIEWED	SD
	APPROVED	SC

PROJECT NO.	CONTROL	REV.	FIGURE
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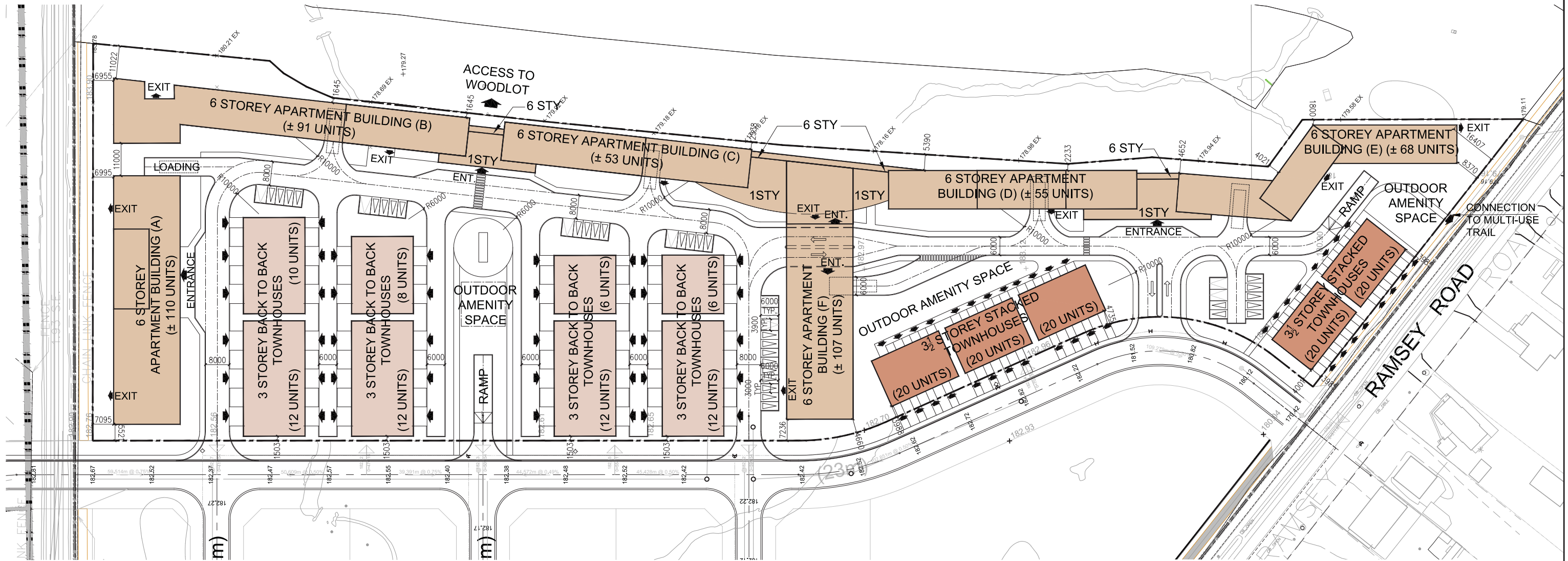


IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



**APPENDIX A**

# Project Information



SITE PLAN \_ SCALE: 1/600

PRELIMINARY STATS

		m2	ft2	hectare
Site Area		43,023.80	463,103.9	4.30
Density (units/hectare)	153.87			
Total Units	662			

Apartment Buildings - Unit Breakdown

	Units			Total Units
	1B/1B+D	2B/2B+D	3B/3B+D	
Building A	30	53	27	110
Building B	28	52	11	91
Building C	17	26	10	53
Building D	16	29	10	55
Building E	20	31	17	68
Building F	25	60	22	107
<b>Total</b>	<b>136</b>	<b>251</b>	<b>97</b>	<b>484</b>
<b>Proposed Unit Mix</b>	<b>28%</b>	<b>52%</b>	<b>20%</b>	
<b>Required Unit Mix</b>	<b>25%</b>	<b>50%</b>	<b>25%</b>	

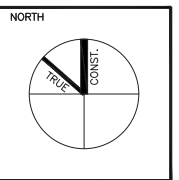
Townhouses

3 Storey Back To Back Townhouses	78
3 1/2 Storey Stacked Townhouses	100
<b>Total</b>	<b>178</b>

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NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO ARCHITECT BEFORE PROCEEDING WITH WORK. ALL PRINTS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. DRAWINGS SHOULD NOT BE SCALED.



**PROPOSED 6 STOREY RESIDENTIAL BUILDING NIAGARA, ON**

DRAWING TITLE  
**SITE PLAN & PROJECT STATS.**  
 Scale: 1/600  
 Date: JULY.07, 2021  
 Project No. 21109  
 Drawn by: RK  
 Checked by: RE  
 Drawing No. A101

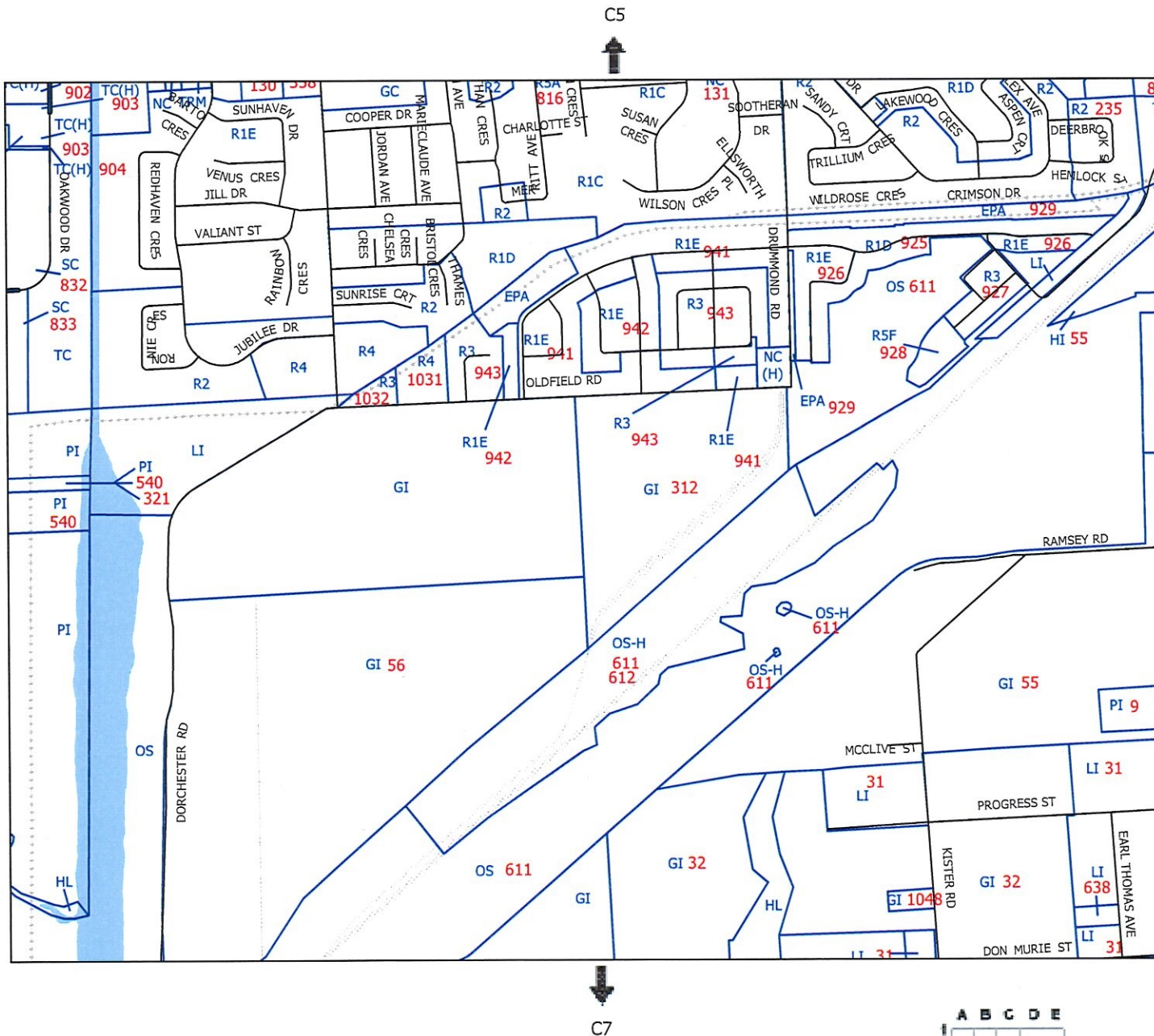


15 - 0719 YORKVILLE TORONTO ONT M5E 1G5 CANADA  
 T: 416-224-0905 F: 416-224-0904

**APPENDIX B**

# Existing Conditions Documents

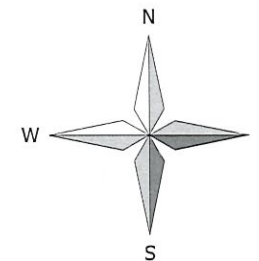
# ZONING BY-LAW 79-200



— ZONE LINES

EXCEPTIONS & SPECIAL PROVISION NO.  
SEE SECTION 19

03-046	10-105
03-186	10-106
04-159	11-003
07-236	11-068
08-107	14-162
08-108	16-112
10-058	17-083



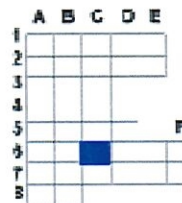
CONSOLIDATION  
JULY 2017

C7

CITY OF NIAGARA FALLS  
Planning & Development Department

0 500 m

Scale 1:13 000



**SHEET C6**

June 11, 2018

Project No. 1784521

Hello Operation / Environmental Manager,

Golder Associates Ltd. (Golder) has been retained by Prenix Associates International Limited (Prenix) to complete a Noise and Vibration Study (the Study) for a proposed development, which will include residential land uses, on the Thundering Waters Golf Course lands (Project). The Project is currently in the pre-planning visioning stage and various feasibility studies are currently under way. To support with the preparation of a thorough Study, we are respectfully requesting any noise data you may wish to share.

Golder is reaching out to nearby industries for input and support with existing studies. Golder will be carrying out site-specific studies that will include a land use compatibility review between the Project and nearby industrial facilities using publicly available information. This review will involve developing a better understanding of the current noise and vibration emissions due to the industrial facilities in the surrounding area and help identify potential concerns.

To facilitate this review, we are requesting you consider sharing, for the purposes of the Project, any relevant noise and vibration studies or information prepared for your facility which includes but is not limited to Acoustic Assessment Reports (AARs), Environmental Compliance Approvals (ECAs) (Air Quality and Noise), noise prediction modelling files, Noise Impact Studies and/or Vibration Impact Studies.

In addition, please be advised that Golder will be conducting noise measurements near the Project and nearby industries on publicly accessible property in the coming weeks.

If you have any noise and vibration information you would like to share, or require further clarification, please feel free to contact the undersigned.

Thank you in advance for your time and cooperation.

Sincerely yours,

**Golder Associates Ltd.**



Stefan Cicak, B.A.Sc., P.Eng.

*Golder Associates Ltd.*

6925 Century Avenue, Suite#100, Mississauga, ON L5V 2Y8

Email: [scicak@golder.com](mailto:scicak@golder.com)

Telephone: 1-905-567-6100 ext 1492

(On behalf of Prenix Associates International Limited)



## INDUSTRIAL SPUR LINE REQUIREMENTS

1. Setback of dwellings from the railway right-of-way to be a minimum of 15 metres. While no dwelling should be closer to the right-of-way than the specified setback, an unoccupied building, such as a garage, may be built closer.
  2. A clause should be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300m of the railway right-of-way, warning prospective purchasers or tenants of the existence of the Railway's operating right-of-way; the possibility of alterations including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or operations.
  3. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway, and be substantiated by a drainage report to be reviewed by the Railway.
  4. A 1.83 metre high chain link security fence be constructed and maintained along the common property line of the Railway and the development by the developer at his expense, and the developer is made aware of the necessity of including a covenant running with the lands, in all deeds, obliging the purchasers of the land to maintain the fence in a satisfactory condition at their expense.
  5. Any proposed utilities under or over railway property to serve the development must be approved prior to their installation and be covered by the Railway's standard agreement.
-



800 - 1290 Central Parkway  
West  
Mississauga, Ontario  
Canada L5C 4R3

T 905 803 3429  
E josie\_tomei@cpr.ca

November 6, 2018

Via email: scicak@golder.com

Stefan Cicak  
Golder Associates Ltd.  
6925 Century Avenue  
Suite 100  
Mississauga, ON L5N 7K2

Dear Sir/Madam:

*Re: Rail Traffic Volumes, CP Mileage 4.0, Montrose Subdivision,  
Marineland Parkway, Niagara Falls*

This is in reference to your request for rail traffic data in the vicinity of Marineland Parkway in the City of Niagara Falls. The study area is located in the vicinity of mile 4.0 of our Montrose Subdivision, which is classified as an Industrial Spur line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 0  
Number of freight trains between 2300 & 0700: 2
2. Maximum cars per train freight: 20
3. Number of locomotives per train: 2
4. Maximum permissible train speed: 25 mph (normal speed 15 mph)
5. Grade crossings are located at Biggar Road, Grassy Brook Road and Montrose Road, however whistling is prohibited at these locations. Please note, the whistle may be sounded if deemed necessary by the train crew for safety reasons at any time.
6. The Montrose Spur services industrial facilities in the area only. There is a main track and siding with additional leads into industrial facilities all with jointed track. There is also a cross-over switch in the study area.

The information provided is based on recent rail traffic. Variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer needs.

Yours truly,

Josie Tomei SR/WA  
Specialist Real Estate Sales & Acquisitions – Ontario

**REPORT TO:** Mayor James M. Diodati  
and Members of Municipal Council

**SUBMITTED BY:** Planning, Building & Development

**SUBJECT:** **PBD-2018-71**  
**26CD-11-2018-09, Proposed Plan of Condominium (Standard)**  
**7711 Green Vista Gate**  
**Applicant: Upper Vista Niagara Falls Development Corp. c/o Carol Han**  
**Agent: David Tang, Partner – Miller Thomson, LLP**

---

## **RECOMMENDATION**

1. That the Standard Plan of Condominium for 7711 Green Vista Gate be draft approved subject to the conditions in Appendix A;
2. That the Mayor or designate be authorized to sign the draft plan as “Approved” 20 days after notice of Council’s decision has been given as required by the *Planning Act*, provided no appeals of the decision have been lodged;
3. That draft approval be given for three years, after which approval will lapse unless an extension is requested by the developer and granted by Council; and
4. That the Mayor and City Clerk be authorized to execute the Condominium Agreement and any required documents to allow for the future registration of the condominium when all matters are addressed to the satisfaction of the City Solicitor.

## **EXECUTIVE SUMMARY**

Upper Vista Niagara Falls Development Corp. is constructing a 10 storey, 150 unit apartment building on the land known as 7711 Green Vista Gate. A Standard Plan of Condominium is proposed to divide the apartment building so that the units can be individually owned. The driveway, visitor parking, landscaping and amenity areas will be common elements to the condominium. A site plan agreement was registered for the development on May 9, 2018 which has enabled the applicant to obtain Building Permits and start construction. The condominium application is supported for the following reasons:

- The development complies with the Provincial Policy Statement and conforms to the Places to Grow Plan for the Greater Horseshoe which encourages the development of complete communities with a diverse mix of land uses and range of housing types;
- The development complies with the Regional Official Plan promoting higher densities within the Urban Area. The condominium will provide an alternative form of housing in the Thundering Waters neighbourhood;



- The development is in conformity with the City's Official Plan and Zoning By-law No. 79-200, as amended and varied and, will be compatible with the surrounding development;
- The Plan of Condominium will allow individual ownership of the dwelling units; and
- City and Regional interests will be addressed through the fulfillment of the conditions contained in Appendix A.

## **BACKGROUND**

### **Proposal**

The applicant is constructing a 10 storey, 150 unit apartment building on the land known as 7711 Green Vista Gate. Refer to Schedule 1 for the location of the parcel. The development is proceeding in accordance with a site plan agreement which was registered on the land on May 9, 2018. Refer to Schedule 2 for the site plan. The applicant has requested approval of a Standard Plan of Condominium to permit individual ownership of the dwelling units and common ownership of the amenities. The driveway, visitor parking area, amenity area and landscaped open space will be owned in common by the condominium. Schedules 3 and 4 illustrate the floor layout of the project.

### **Site Conditions and Surrounding Land Uses**

The 10 storey, 150 unit apartment building is under construction on the site. The abutting lands to the south, west and east contain the Thundering Waters Golf Course. A feeder railway line is located on the east side to service the Stanley Business Park. Properties to the northeast are developed with on-street townhomes followed by detached dwellings.

### **Circulation Comments**

- Canada Post
  - No objections, subject to meeting the condition listed in Appendix A.
- Enbridge Gas
  - No objections, subject to meeting the conditions listed in Appendix A.
- Canadian Pacific Railway
  - No objections, subject to meeting the condition listed in Appendix A.
- Regional Municipality of Niagara
  - No objections, subject to meeting the conditions listed in Appendix A.

## ANALYSIS/RATIONALE

### 1. Provincial Policy Statement and Regional Policy

The subject land is located within a Settlement Area under the Provincial Policy Statement (PPS) and within the Delineated Built-Up Area under the Places to Grow Plan for the Greater Golden Horseshoe (Growth Plan). The PPS directs growth to settlement areas, and encourages the efficient use of land, resources, infrastructure and public service facilities that are planned or available. The Growth Plan contains policies that encourage the development of complete communities with a diverse mix of land uses and range of housing types, taking into account affordable housing and densities.

The subject land is designated Urban Area in the Regional Official Plan (ROP). A full range of residential, commercial and industrial uses are permitted generally within the Urban Area designation, subject to the availability of adequate municipal services and infrastructure. The ROP promotes higher density development in Urban Areas and supports growth that contributes to the overall goal of providing a sufficient supply of housing that is affordable, accessible, and suited to the needs of a variety of households and income groups in Niagara. Once completed, the development will provide 150 new dwelling units within the Urban Area. The condominium apartment units will provide an alternative form of housing in this neighbourhood, which satisfies the policy directions from a Provincial and Regional Policy perspective.

### 2. Official Plan

The subject land is designated Residential and Special Policy Area "53" in the City's Official. The development conforms to the Official Plan as follows:

- A mix of townhouse and detached dwelling units and one apartment building are anticipated in this area to provide a maximum of 321 dwelling units.
- The proposed condominium is the anticipated apartment building.
- The construction of the apartment building was made subject to site plan control which addressed site grading, landscaping, lighting and storm water management.
- The surrounding area was developed as a vacant land condominium. The subject block is a parcel in the vacant land condominium. The proposed standard plan of condominium will allow individual ownership of the dwelling units in the apartment building.

### 3. Zoning By-law

The subject property is zoned Residential Apartment 5F Density (R5F) in accordance with Zoning By-law No. 79-200, as amended by By-law No. 2011-003, and further amended by Committee of Adjustment Application (A-2015-053). Minor variances were granted by the Committee of Adjustment on January 19, 2016 for a partial 11th

storey, including a party room, lounge/dining area, the provision of 1.25 parking spaces per unit and a minimum of 38.65 % of the parcel being landscaped.

The Committee of Adjustment required the owners of 7709 and 7714 Green Vista Gate and a spokesperson for the neighbourhood to be involved in the site plan review process. The development conforms to applicable zoning regulations and the site plan was approved with the acceptance of the neighbourhood.

#### **4. Noise, Condominium Design and Conditions of Approval**

A Noise Feasibility Study prepared by J.E Coulter Associated Limited (dated February 8, 2017) was submitted as part of the site plan approval application. The study found that sound levels in the area exceeded the Ministry of Environment, Conservation and Parks' (MECP) Noise Guidelines. The following mitigations measures were recommended by the Noise Feasibility Study:

- (a) Provision of central air conditioning for all units;
- (b) At the time of final design, the rooftop mechanical equipment be reviewed to ensure the building itself and the low-density housing to the north will not be impacted (NOTE: the preliminary review does not suggest there will be any impacts from the mechanical equipment, which is proposed to be shielded by a mechanical penthouse and roof parapet);
- (c) Inclusion of warning clauses in all Agreements of Purchase and Sale or Lease for all units.

The Niagara Region has included the above noted mitigating measures as conditions in Appendix A.

The Study also found a significant noise impact from the stationary noise sources (in excess of 27dB above MECP's Noise Guidelines), which is generated from scrap steel being disposed in waste bins (impulse noise) at Salit Steel. The Study recommended mitigation for noise generated by Salit Steel in the form of Salit Steel reviewing its scrap handling process and placement of a 3m high, acoustically lined, solid, 3 sided enclosures directly adjacent to the scrap bins.

A noise reduction agreement was completed in April 2018 by Evertrust Development Group Canada Inc. and Upper Canada Vista Niagara Falls Development Corp with Myer Salit Limited and Stanley-Zelco Limited. Salit Steel agreed to reduce the sound levels emanating from the processing plant and lands they use to the limits applicable to a Class 4 Area as set out in NPC-300. By agreement the subject property can be subjected to Class 4 noise levels and this agreement is binding on future owners of all affected properties. Warning clauses to this effect were included in the site plan agreement and are recommended to be included in the condominium agreement as well.

The plan of condominium will accommodate the intended division of the dwelling units in the apartment building which will allow for individual ownership. The plan includes above and below ground parking areas, landscape and amenity areas. The developer

will be required to enter into a condominium agreement with the City. The agreement will address any necessary works and warning clauses.

The City registered the site plan agreement and the applicant applied for the Building Permits. The City is holding a Letter of Credit (LOC) to ensure compliance with the Site Plan Agreement. The LOC will not be released until all the above ground site serving and landscape works are completed to the City's satisfaction. To ensure site works are completed when ownership is transferred to a condominium corporation, Staff recommend the inclusion of a condition requiring substantial completion and certification of these site works prior to final plan approval. The 5% cash-in-lieu of parkland dedication for the subject property was taken as part of the Thundering Waters Village Vacant Land Condominium.

The majority of the standard development issues, including above ground servicing and grading, transportation and landscaping have been addressed in the site plan agreement. Appendix A includes the recommended conditions of approval from Canada Post, Enbridge Gas, Canadian Pacific Railway, Niagara Region, and provision of any necessary easements with a final review to confirm zoning and site plan compliance prior to registration of the condominium.

Under Provincial regulations, public notice and the holding of a public meeting are not required prior to Council approving a Standard Plan of Condominium. Matters of public interest were addressed at the zoning approval stage and the site plan stage.

## **5. Waste Collection and Conditions of Approval**

### Waste Collection for the Proposed Building

Condominium Apartment Developments are able to receive waste collection through the local municipality. However, in order for this service to be provided, the developer and/or subsequent owner shall comply with The Regional Municipality of Niagara's Policy's for Collection of Material by Way of Entry on Private Property. The applicant is advised that a key element for garbage collection is that the site is to be adequate for waste collection vehicles to access the site and then leave the site without the need to back out of the driveway. This is not the case.

Therefore, it should be noted that private waste collection by the condominium corporation will be provided and appropriate clauses shall be included in the Draft Plan of Condominium Agreement and inserted in all Agreements of Purchase and Sale or Lease for each dwelling prior to closing. Appendix A includes a condition with regard to waste collection.

### Waste Collection for the Existing Townhouse Development

The subject property currently provides a cul-de-sac turnaround for waste collection vehicles to service the existing townhomes on the south leg of Green Vista Gate. A turnaround must be maintained on the subject property in order for these existing residents to continue to receive Regional waste collection service.

A review of the proposed development layout indicates a waste collection vehicle turnaround on the northwesterly end of the property by using the existing driveways. The developer and/or subsequent owner have designed the turnaround as per The Regional Municipality of Niagara's standards. In addition to the design, the condominium apartment developer/owner shall make arrangements with the neighbouring property for a turnaround on the current development property and any necessary agreements to continue waste service for the properties know as 7660-7714 Green Vista Drive. Any agreement should stipulate that the property owner agrees to the use of their lands for Regional waste collection vehicles (garbage and recycling) to turnaround on a weekly basis.

Additionally, it should be noted that a turnaround, whether a temporary cul-de-sac or the final paved turnaround as shown, must be maintained during all stages of construction for the existing residents without service disruption. Furthermore, the plans should indicate "No Parking" signs along the route in order for waste collection vehicles to move unencumbered. Appendix A includes conditions that address the above requirements with regard to waste collection for the neighbours.

#### **FINANCIAL/STAFFING/LEGAL IMPLICATIONS**

The proposed condominium will generate revenue through property taxes. There are no other financial implications.

#### **CITY'S STRATEGIC COMMITMENT**

The proposed condominium is part of a well-planned City as envisioned by the City's Official Plan and Zoning By-law 79-200, as amended.

#### **LIST OF ATTACHMENTS**

- Schedule 1 – Location Map
- Schedule 2 – Site Plan
- Schedule 3 and 4 - Floor Layout
- Appendix A - Conditions of Draft Approval

**Recommended by:**

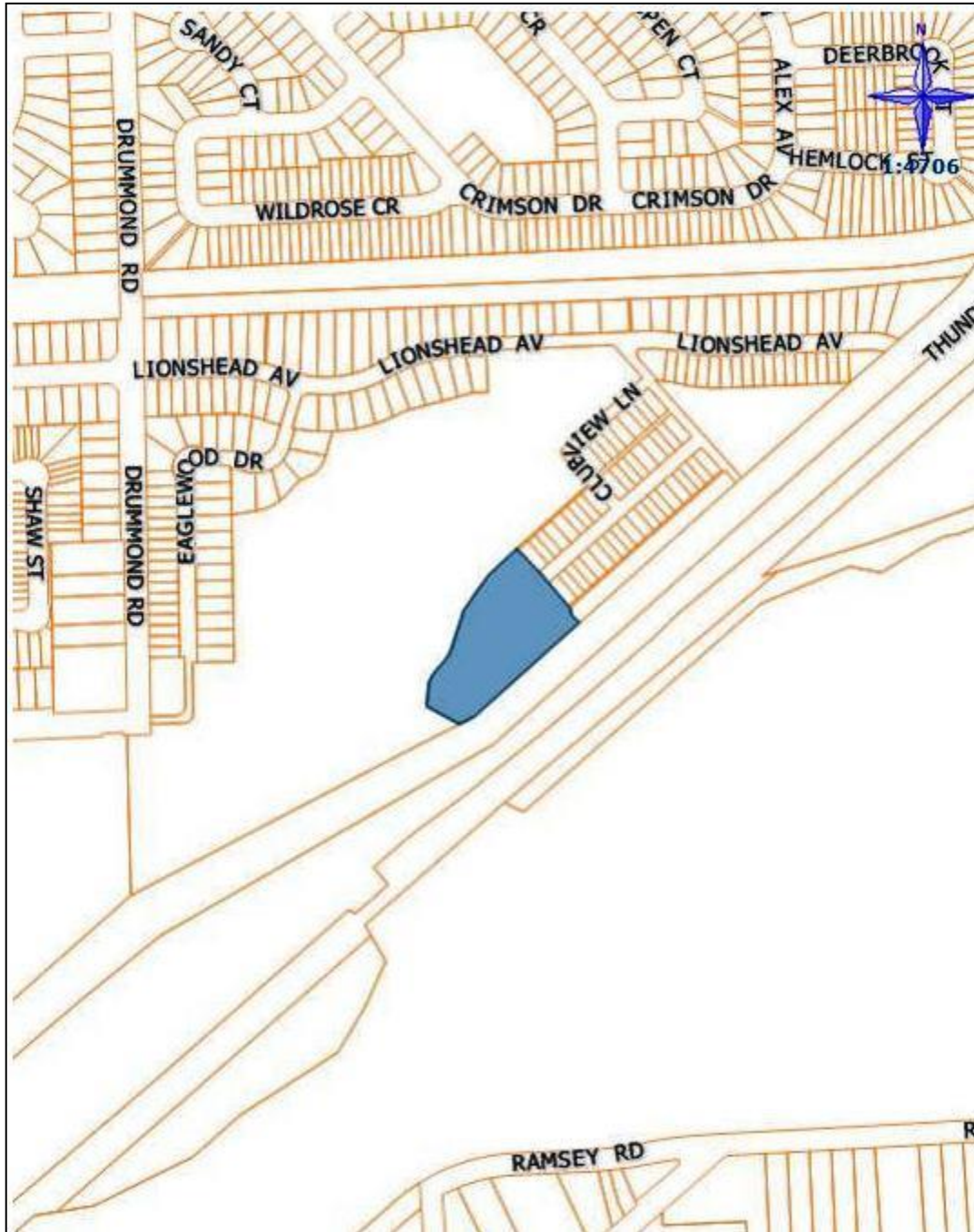
\_\_\_\_\_  
 Alex Herlovitch, Director of Planning, Building & Development

**Respectfully submitted:**

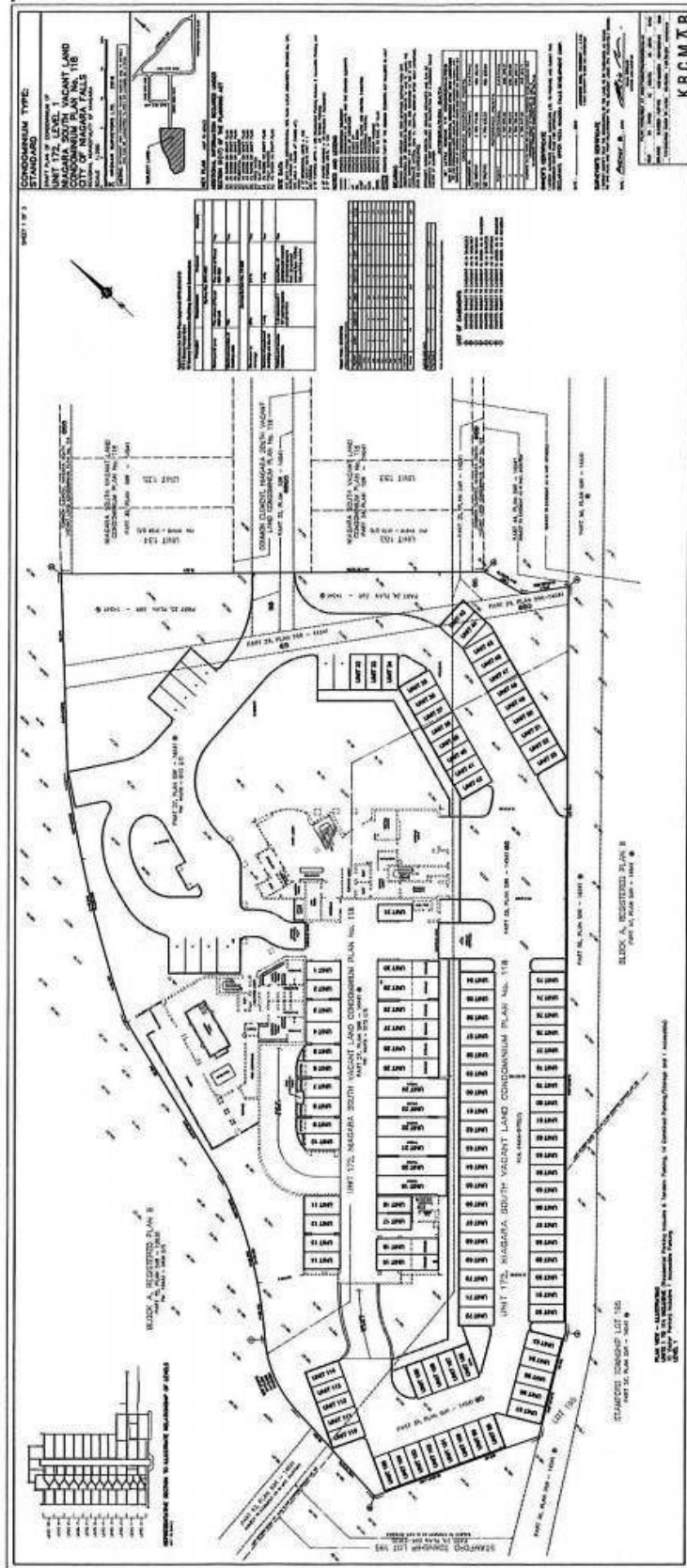
\_\_\_\_\_  
 Ken Todd, Chief Administrative Officer

N.DeBenedetti:mb  
 Attach.

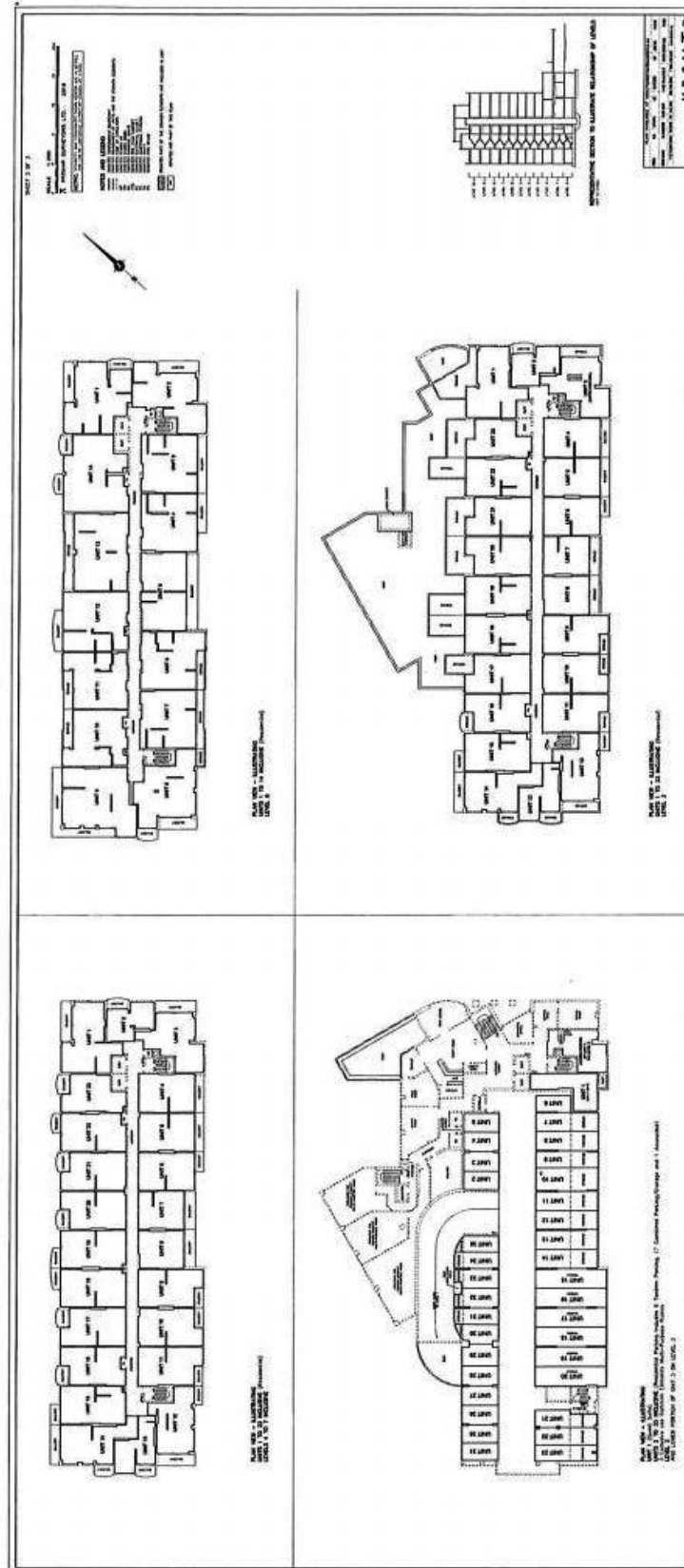
SCHEDULE 1



SCHEDULE 2

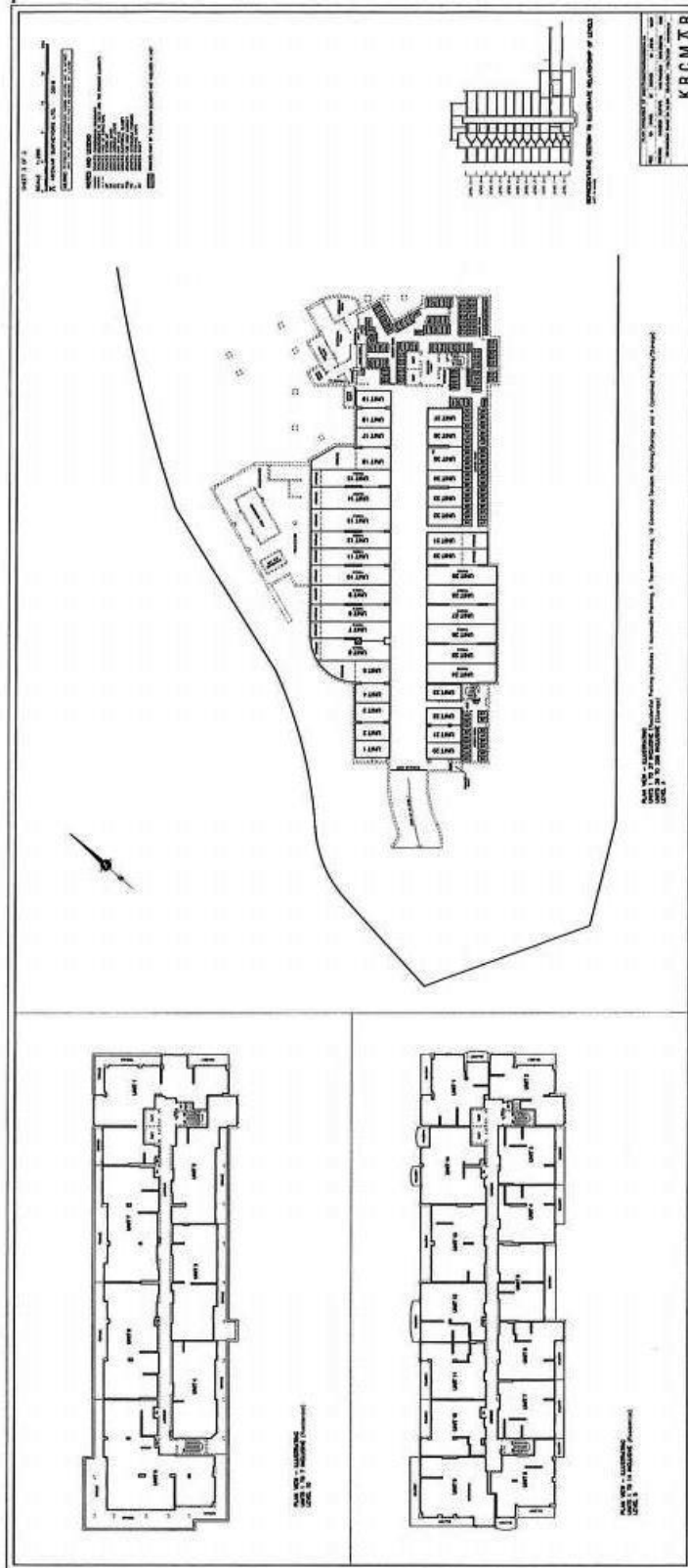


SCHEDULE 3





SCHEDULE 4



**APPENDIX A****Conditions for Draft Plan Approval**

1. Approval applies to the Draft Plan of Condominium (Standard) prepared by Maja Krcmar, dated August 8, 2018, showing the 150 unit apartment building as well as the common element areas for the driveway, visitor parking, landscape and amenity areas.
2. The developer enter into a condominium agreement with the City, to be registered on title, to satisfy all requirements, financial and otherwise, related to the division of the land.
3. The developer submits a Solicitor's Certificate of Ownership for the condominium land to the City Solicitor prior to the preparation of the condominium agreement.
4. The developer submits to the City all necessary drawings and information to confirm zoning and confirm substantial completion and certification of site works in accordance with the site plan agreement.
5. The developer supply, install and maintain a centralized mail facility (Lock Box Assembly) at their expense. The Lock Box Assembly must be installed within a common lobby, common indoor or sheltered space and the developer must advise Canada post of the installation date of the Lock Boxes Assembly and the assignment of the unit numbers.
6.
  - a) The applicant shall contact Enbridge Gas Distribution's Customer Connections department by emailing [SalesArea80@enbridge.com](mailto:SalesArea80@enbridge.com) for service and meter installation details and to ensure all gas piping is installed prior to the commencement of site landscaping (including, but not limited to: tree planting, silva cells, and/or soil trenches) and/or asphalt paving.
  - b) If the gas main needs to be relocated as a result of changes in the alignment or grade of the future road allowances or for temporary gas pipe installations pertaining to phase construction, all costs are the responsibility of the applicant.
  - c) Easement(s) are required to service this development and any future adjacent developments. The applicant will provide all easement(s) to Enbridge Gas Distribution at no cost.
  - d) In the event a pressure reducing regulator station is required, the applicant is to provide a 3 metre by 3 metre exclusive use location that cannot project into the municipal road allowance. The final size and location of the regulator station will be confirmed by Enbridge Gas Distribution's Customer Connections department. For more details contact [SalesArea80@enbridge.com](mailto:SalesArea80@enbridge.com).
7. The following clause required to be in all offers to purchase, agreements of purchase and sale or lease and in the title deed or lease of each dwelling:

Canadian Pacific Railway or its assigns or successors in interest has or have a railway right-of-way and yard located within 300 metres from the land subject hereof with operations conducted 24 hours a day, 7 days a week including the shunting of trains and the idling of locomotives. There may be alterations to or expansions of the railway facilities and/or operations in the future, which alterations or expansions may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. CPR will not be responsible for complaints or claims arising from the use of its facilities and/or its operations on, over or under the aforesaid right-of-way and yard.

8. That the Owner agrees to include the following warning clauses in all Agreements of Purchase and Sale or Lease for all units within the development:

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing rail traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality of the Niagara Region and the Ministry of the Environment, Conservation and Parks' noise criteria."

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality of the Niagara Region and the Ministry of the Environment and Climate Change's noise criteria."

"Purchasers are advised that due to the proximity of the adjacent industries (Salit Steel at 7711 Stanley Avenue and ChemTrade at 6300 Oldfield Road), noise from these industries may at time be audible."

"All persons intending to acquire an interest in the real property by purchase or lease are advised of the existence of the right-of-way of the Canadian Pacific Railway. In the future, it is possible that such rail facilities and operations may be altered or expanded, which expansion or alteration may affect the living environment of residents despite the inclusion of noise attenuating measures in the design of the site and individual units and that the Canadian Pacific Railway will not be responsible for complaints or claims arising from its use of its facilities and/or arising from its operations."

9. The owner agrees to insert in all offers and agreements of purchase and sale or lease for all dwelling units to survive closing, the following clauses:

"Purchasers/Tenants are advised that the property has an easement for the Regional 1050mm watermain and a Regional 600mm/1200mm sewage line and are advised that should any future maintenance, construction and/or emergency work be required, access to the parking lot and underground parking level may be restricted to the dwelling occupants. Niagara Region has no responsibility to accommodate temporary parking during any work and the owner/condominium corporation shall be solely responsible for arranging interim parking."

And

Purchasers/Tenants are advised that the property has an easement for the Regional 1050mm watermain and a Regional 600mm/1200mm sewage line and are advised that should any future maintenance, construction and/or emergency work be required and that it may generate noise and odour which may occasionally interfere with some activities of the dwelling occupants."

10. That the Owner agrees to include the following warning clauses in all Agreements of Purchase and Sale or Lease for all units within the development:  
  
"Purchasers/Tenants are advised that due to the site layout, waste collection for the building will be provided through a private waste collector arranged by the Condominium Corporation and not Niagara Region."
11. The owner/condominium corporation shall be responsible for any restoration work of the easement and any structures (i.e. landscaping, irrigation, etc.) beyond the standard restoration procedures (i.e. sod, asphalt) provided by Niagara Region, in the event that any future maintenance or repair of the Regional lines is required to service the Regional watermain and/or sanitary sewer on the easement.
12. That the owner/condominium corporation of the property acknowledges that the development does not comply with the Regional Municipality of Niagara Policy C3.C007, Requirements for Commencement of Collection for New and Redevelopments for Regional waste collection of the units at 7711 Green Vista Gate and that private waste collection will be provided for the site.
13. That the developer and/or subsequent owner shall enter into an agreement with the neighbouring owner/condominium management corporation (for Units 7660-7714 Green Vista Gate) acknowledging and permitting the use of the private property at 7711 Green Vista Gate to contain a turnaround for Regional waste collection vehicles to service the neighbouring residences. Any agreement for maintenance of the turnaround shall be between the two parties. The turnaround and any necessary maintenance, "No Parking" signage, shall comply with the Regional Municipality of Niagara Policy C3.C007, Requirements for Commencement of Collection for New and Redevelopments, to the satisfaction of the Regional Public Works Department.
14. That the owner/condominium corporation shall enter into an indemnity agreement with the Regional Municipality of Niagara Public Works Department to enter onto the lands at 7711 Green Vista Gate, with Regional waste collection vehicles servicing the residents 7660-7714 Green Vista Gate.
15. That developer/subsequent owner provide a temporary cul-de-sac or turnaround designed for waste collection vehicles during construction which must be maintained during all stages of construction of the 7711 Green Vista Gate for the existing residents (Units 7660-7714 Green Vista Gate) without service disruption.
16. That the owner provides a written acknowledgement to Niagara Region stating that draft approval of this condominium does not include a commitment of servicing allocation by Niagara Region as servicing allocation will not be assigned until the plan

is registered and that any pre-servicing will be at the sole risk and responsibility of the owner.

17. That the owner submits a written undertaking to Niagara Region that all offers and agreements of Purchase and Sale, which may be negotiated prior to registration of this condominium, shall contain a clause indicating that a servicing allocation for this development will not be assigned until the plan is registered, and a similar clause be inserted in the condominium agreement.

**Notes:**

1. Prior to granting final plan approval, the City must be in receipt of written confirmation that the requirements of each condition have been met and all fees have been paid to the satisfaction of the Niagara Region.
2. Prior to final approval for registration, a copy of the draft condominium agreement for the proposed development should be submitted to the Niagara Region for verification that the appropriate clause pertaining to this condition has been included. A copy of the executed agreement shall also be provided prior to registration.
3. In order to request clearance of the above noted Regional conditions, a letter outlining how the conditions have been satisfied, together with all studies and reports (two hard copies and a PDF digital copy), the applicable review fee, and the draft condominium agreement shall be submitted to the Niagara Region by the applicant as one complete package, or circulated to the Niagara Region by the City of Niagara Falls.

**Clearance of Conditions**

Prior to granting approval to the final plan, Planning & Development requires written notice from the following applicable agencies indicating that their respective conditions have been satisfied:

- Canada Post for Condition 5
- Enbridge Gas Distribution Inc. for Condition 6
- Canadian Pacific Railway for Condition 7
- Region of Niagara for Conditions 8-17 (inclusive)



**BURNSIDE**

## **Niagara Village Transportation Study**

**Prelix Associates International  
Limited**

DRAFT

**R.J. Burnside & Associates Limited  
6990 Creditview Road, Unit 2  
Mississauga ON L5N 8R9 CANADA**

**January 2020  
300041230.0000**



Niagara Village Transportation Study  
January 2020

**R.J. Burnside & Associates Limited**

**Report Prepared By:**

Cindy Chung, EIT  
Transportation Planner  
CC:

**Report Reviewed By:**

David Argue, P.Eng., PTOE  
Senior Transportation Specialist

DRAFT

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- Appendix B CP Rail Information
- Appendix C Existing Traffic Counts and Signal Timing Plans
- Appendix D Background Development Site Traffic
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- Appendix H Background 2031 Traffic Operations
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- Appendix J Total 2031 Traffic Operations
- Appendix K Background Traffic Operations with Improvements
- Appendix L Total Traffic Operations with Improvements
- Appendix M Signal Warrant Analysis

## Abbreviations

The following summarizes abbreviations that are utilized within this report:

- City – City of Niagara
- ITE – Institute of Transportation Engineers
- LOS – level of service
- LUC – Land Use Code
- Region – Niagara Region
- TOR – Terms of Reference
- Traffic Movements
  - EB – Eastbound
  - SB – Southbound
  - NB – Northbound
  - WB – Westbound
  - L – left turn
  - T – through
  - R – right turn
  - LT – shared left-through movement
  - LTR – shared left-through-right movement
  - TR – shared through-right movement
- TTS – Transportation Tomorrow Survey
- v/c – volume to capacity ratio

Figure 8 : 2031 Background Traffic Volumes

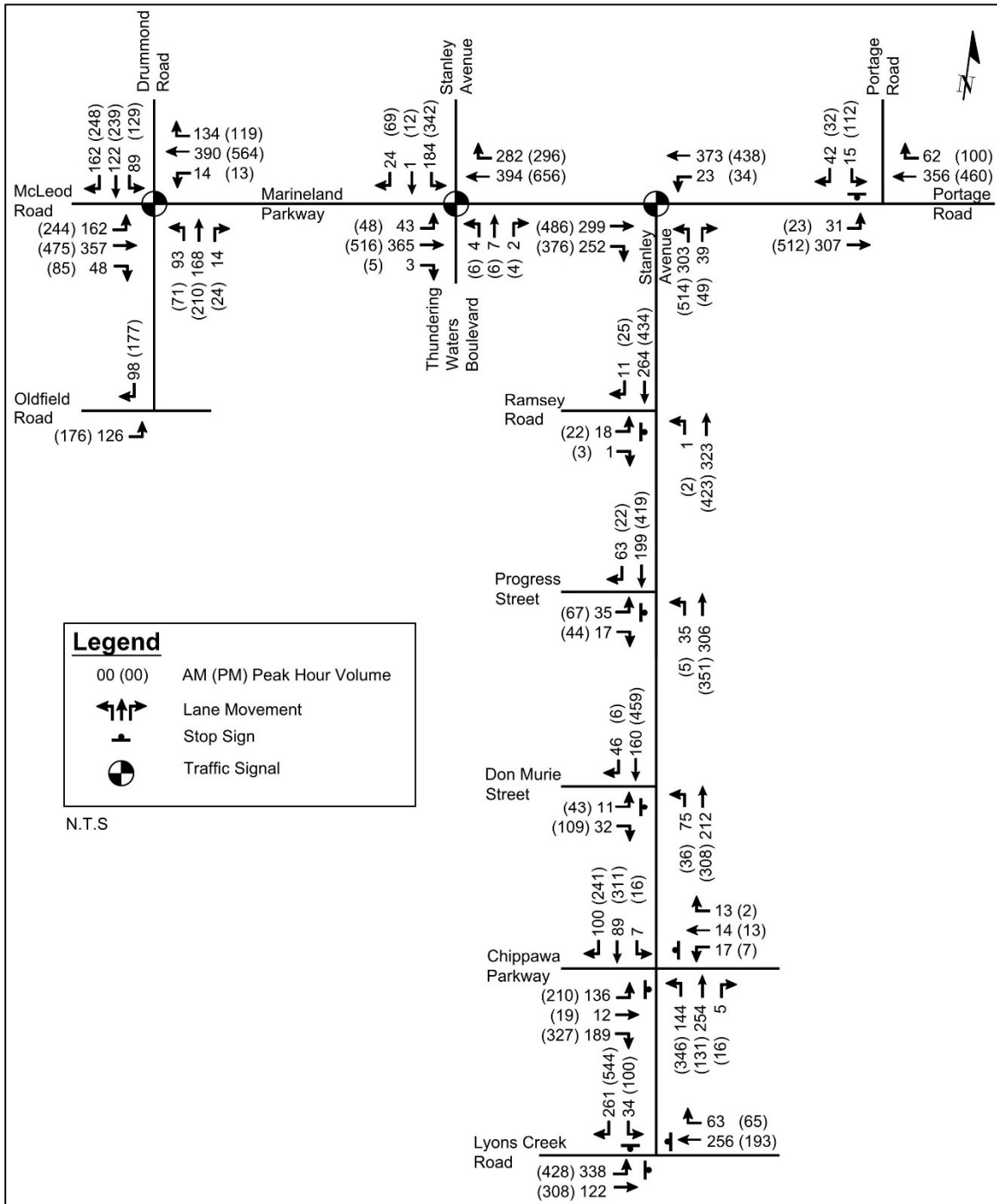
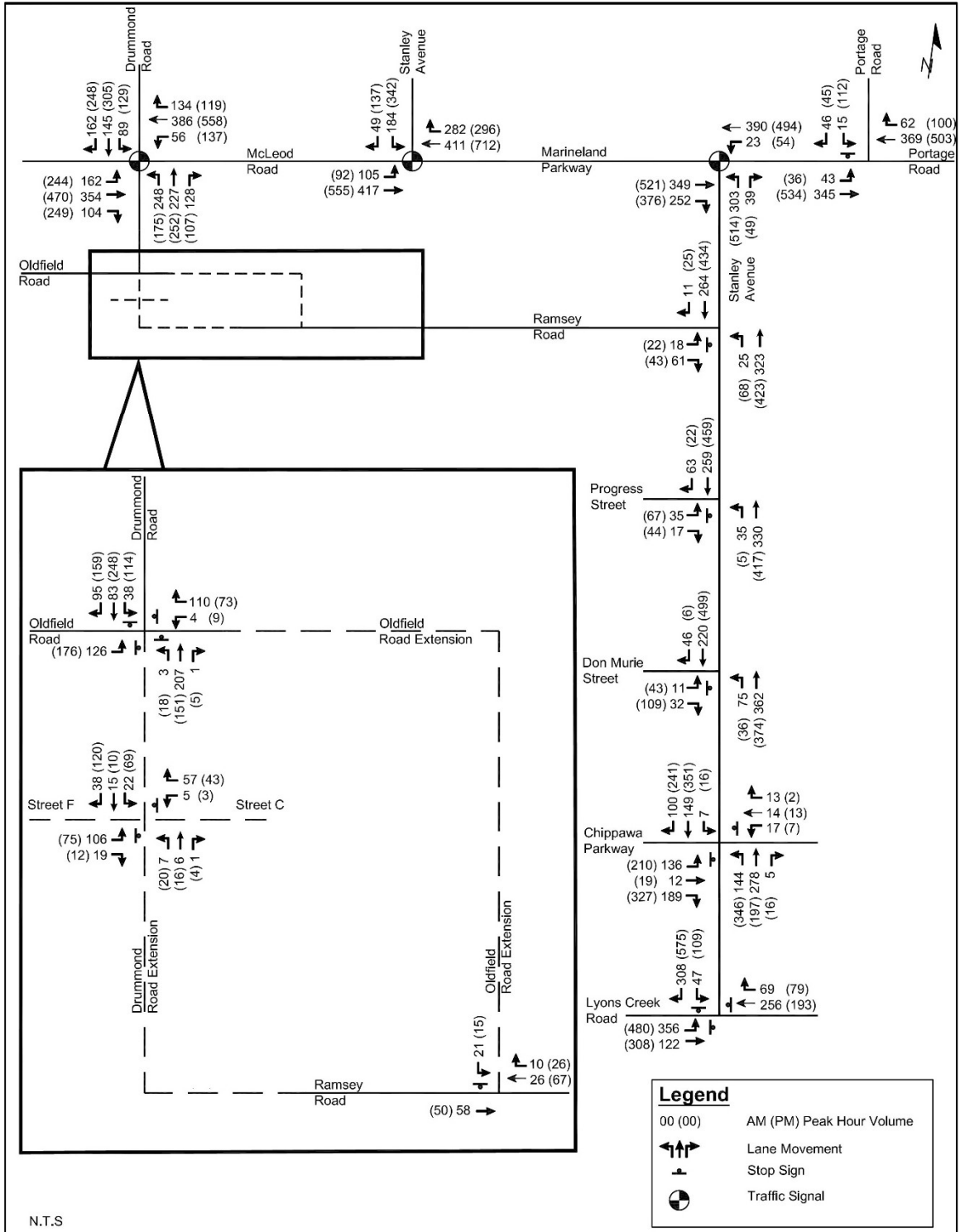


Figure 15: 2031 Total Traffic Volumes



**AADT.dbf** downloaded from <https://niagaraopendata.ca/dataset/regional-road-traffic-volumes>

StationID	Reg_Rd_No	From_St	To_St	Length_Km	Count_Yr	AADT	SADT	WADT	Prev_Yr	Prev_Count	SHAPE_Leng
610156	98	REG. RD. 20 (Lundy's Lane)	McLeod Road	2.1	2015	8900	9400	8500	2012	11500	2219.890276 y
610157	49	REG. RD. 98 (Montrose Rd.)	Oakwood Drive	0.2	2015	26800	23500	28300	2012	23900	1435.018868 y
610158	63	REG. RD. 70 (Thorold Townline Rd.)	REG. RD. 98 (Montrose Rd.)	4.5	2015	1800	1900	1700	2012	2200	4454.370001 y
610164	98	REG. RD. 63 (Chippawa Creek Rd.)	REG. RD. 47 (Lyons Creek Rd.)	2.1	2015	6200	6300	6000	2012	5500	2127.586903 y
610324	49	Oakwood Drive	Dorchester Road	0.8	2015	24400	26500	23200	2012	25500	759.5288545 y
610579	98	Canadian Drive	REG. RD. 63 (Chippawa Creek Rd.)	1.3	2015	5800	5800	5700	2012	5600	1487.974076 y
610703	98	McLeod Road	REG. RD. 98 (Niagara Sq. Dr.)	0.4	2015	4400	4300	4400	2012	4500	893.0664187 y



Ministry of  
Transportation

Highway  
Standards  
Branch

Traffic  
Office

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## **Provincial Highways**

## **Traffic Volumes**

**2016**

King's Highways / Secondary Highways / Tertiary Roads

### **Ministry Contact:**

Traffic Office (905)-704-2960

### **Abstract:**

This annual publication contains averaged traffic volume information for each of the sections of highway under MTO jurisdiction for the year 2016 only.

### **Key Words:**

Annual Average Daily Traffic volume (AADT)

Highway	Location Description From	Location Description To	Dist. (KM)	2016 AADT
QEW	FORT ERIE-GODERICH ST-PEACE BRIDGE PLAZA	CENTRAL AV IC	0.2	14,600
QEW	CENTRAL AV IC	CONCESSION RD IC-1	0.9	18,700
QEW	CONCESSION RD IC-1	THOMPSON RD IC-2	1.0	15,500
QEW	THOMPSON RD IC-2	GILMORE RD IC-5	2.4	17,700
QEW	GILMORE RD IC-5	BOWEN RD IC-7	2.0	24,200
QEW	BOWEN RD IC-7	NETHERBY RD IC-12 NIAGARA FALLS LTS	5.5	25,700
QEW	NETHERBY RD IC-12 NIAGARA FALLS LTS	SODOM RD IC-16	3.2	22,000
QEW	SODOM RD IC-16	LYONS CREEK RD IC-21	6.6	29,000
QEW	LYONS CREEK RD IC-21	MCLEOD RD IC-27	4.4	36,700
QEW	MCLEOD RD IC-27	HWY 420 IC-30	2.9	45,100
QEW	HWY 420 IC-30	THOROLD STONE RD IC-32	2.0	70,400
QEW	THOROLD STONE RD IC-32	MOUNTAIN RD IC-34	2.5	67,400
QEW	MOUNTAIN RD IC-34	HWY 405(WBL)IC-37	2.4	71,000
QEW	HWY 405(WBL)IC-37	GLENDALE AV IC-38	1.3	88,100
QEW	GLENDALE AV IC-38	NIAGARA ST SERVICE RDS	4.8	90,500
QEW	NIAGARA ST SERVICE RDS	NIAGARA ST IC-44	1.2	78,600
QEW	NIAGARA ST IC-44	LAKE ST IC-46	1.6	81,900
QEW	LAKE ST IC-46	ONTARIO ST IC-47	1.3	117,000
QEW	ONTARIO ST IC-47	MARTINDALE RD IC-48	0.7	97,400
QEW	MARTINDALE RD IC-48	HWY 406 IC-49	0.7	74,400
QEW	HWY 406 IC-49	SEVENTH ST IC-51	1.9	97,100
QEW	SEVENTH ST IC-51	JORDAN RD IC-55	4.3	98,100
QEW	JORDAN RD IC-55	VICTORIA AV IC-57	2.8	104,300
QEW	VICTORIA AV IC-57	ONTARIO ST IC-64	6.7	105,100
QEW	ONTARIO ST IC-64	BARTLETT AV IC-68	3.8	99,800
QEW	BARTLETT AV IC-68	MAPLE AV IC-71	2.5	99,300
QEW	MAPLE AV IC-71	CASABLANCA BV IC-74	3.6	107,100
QEW	CASABLANCA BV IC-74	FIFTY RD IC-78	3.5	112,300
QEW	FIFTY RD IC-78	FRUITLAND RD IC-83	5.1	120,300
QEW	FRUITLAND RD IC-83	HAMILTON 20 IC 88-CENTENNIAL PKWY	5.2	119,000
QEW	HAMILTON 20 IC 88-CENTENNIAL PKWY	BURLINGTON ST IC-89	1.6	130,000
QEW	BURLINGTON ST IC-89	EASTPORT RD IC-93 (7189)	4.0	135,000
QEW	EASTPORT RD IC-93 (7189)	HAMILTON HARBOUR ENTRANCE	0.9	149,400
QEW	HAMILTON HARBOUR ENTRANCE	NORTH SHORE BLVD IC 97	2.3	271,300
QEW	NORTH SHORE BLVD IC 97	FAIRVIEW ST IC-99	2.3	161,300
QEW	FAIRVIEW ST IC-99	HWY 403/407 IC-100	1.0	172,900
QEW	HWY 403/407 IC-100	BRANT ST IC 101	0.8	164,300
QEW	BRANT ST IC 101	GUELPH LINE IC-102	1.8	162,100
QEW	GUELPH LINE IC-102	WALKERS LINE IC-105	2.0	195,000
QEW	WALKERS LINE IC-105	APPLEBY LINE IC-107	2.0	190,000
QEW	APPLEBY LINE IC-107	BURLOAK DR IC-109	1.9	195,000
QEW	BURLOAK DR IC-109	BRONTE SERVICE RD IC-110	1.5	204,000
QEW	BRONTE SERVICE RD IC-110	REG. RD 25(N) BRONTE RD(S) IC-111	0.4	202,200
QEW	REG. RD 25(N) BRONTE RD(S) IC-111	THIRD LINE RD IC 113	2.0	191,300

**APPENDIX C**

# Noise Monitoring Program



### Onsite Noise Measurement Summary

Filename #	Measurement	LAeq	LF(min)	LAFmax	LAF1.00	LAF5.00	LAF10.00	LAF90.00	LAF99.00
80	Measurement 7	50.4	41.3	65.8	58.8	55.0	53.5	44.3	42.8
81	Measurement 6	48.2	41.5	67.9	54.6	51.7	50.5	44.3	42.9
83	Measurement 5	47.2	40.3	62.0	55.4	51.6	49.3	42.6	41.1
85	Measurement 4	51.8	41.5	71.0	62.1	57.8	54.7	43.9	42.5
86	Measurement 3	50.0	41.5	72.6	61.2	54.0	51.5	43.8	42.6
87	Measurement 2	50.7	42.6	69.9	60.2	54.6	52.2	45.1	44.0
88	Measurement 1	50.7	42.0	67.9	59.7	55.9	53.7	44.4	43.2
89	Measurement 10	49.8	43.0	67.0	57.6	54.4	52.6	45.1	44.1
90	Measurement 9	47.1	41.5	61.0	55.5	51.8	49.5	43.7	42.7
91	Measurement 8	50.1	39.3	68.5	58.9	55.0	53.2	42.6	40.6
92	Measurement 7	51.5	40.4	69.3	62.5	54.7	52.7	44.7	41.8

## Offsite Noise Measurement Summary

Filename #	Measurement Location	LAeq	LF(min)	LF(max)	LAF1.00	LAF5.00	LAF10.00	LAF50.00	LAF90.00	LAF99.00
56	CAL	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
57	Location 16	56.3	42.2	69.4	66.7	63.5	60.5	48.9	44.0	42.9
58	Location 21	57.7	56.3	58.9	58.6	58.4	58.2	57.7	57.2	56.7
59	Location 17	53.2	51.0	55.5	55.2	54.9	54.5	53.0	52.0	51.4
60	Location 2	63.1	46.6	83.3	77.1	67.1	61.8	50.2	48.5	47.1
61	Location 8A	67.5	65.1	72.7	72.1	69.8	68.7	67.0	66.2	65.7
62	Location 8B	58.6	51.7	67.8	65.9	64.3	62.0	55.1	52.3	51.9
63	Location 9	60.9	56.1	67.3	66.5	65.1	63.7	60.1	56.5	56.2
64	Location 8C	60.1	58.7	65.5	64.0	61.0	60.8	59.9	59.1	58.9
65	Location 1	62.5	40.6	80.0	78.0	63.4	57.5	46.5	43.8	41.8
66	Location 7	57.6	55.4	60.1	59.7	59.0	58.6	57.5	56.3	55.6
67	Location 5	54.4	52.9	57.8	56.7	55.6	55.3	54.2	53.4	53.1
68	Location 4A	50.9	49.3	55.4	54.9	52.8	51.6	50.5	50.0	49.6
69	Location 4B	53.2	51.8	55.1	54.7	54.1	54.0	53.1	52.5	52.1
70	Location 15	60.8	44.6	78.0	73.3	66.4	64.1	53.5	47.1	45.2
71	Location 10 & 11	67.2	55.0	81.0	76.8	73.0	70.3	64.0	57.1	55.8
72	Location 12	51.3	41.5	67.4	62.2	56.6	53.2	47.3	44.6	43.0
73	Location 20	56.3	38.9	73.5	69.4	61.9	57.4	49.1	43.6	40.5



# RION SERVICE CENTER CO., LTD.

2-22-2 Hyoe, Hachioji, Tokyo 192-0918 JAPAN  
Tel. + 81-42-632-1122 Fax. + 81-42-632-1140

To 00360372

Issuing Date: May 9, 2017

## Service Report

Dear Sir/Madame,

We are glad to inform you that following check/adjustment, repair and calibration have been carried out on your instrument:

DA-21, 4 channel data recorder  
Serial Number: 00360372  
Option:

Your Declaration: The instrument does not power on.  
Repair and calibration with test report and calibration certificate are required.

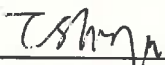
Our Judgement: The LCD did not operate correctly because of a loose connection of the flexible cable.

Our Treatment: Cleaning and reconnection of the flexible cable and the connector.  
Check and calibration.  
Attachment of test report and calibration certificate.

The instrument works well now, the followings show the check results:

Check & adjustment: Good  
General: Good

RION SERVICE CENTER CO., LTD.

  
\_\_\_\_\_  
Manager, S&V Measuring Instruments Section

## Traceability Certificate

- Test Report
  - Calibration Certificate
  - Traceability Flow Chart
  - Calibration Certificate (Copy)  
or  
Test Report (Copy)
- of Primary Standards

RION SERVICE CENTER CO., LTD.

2-22-2 Hyoe, Hachioji, Tokyo 192-0918, JAPAN

TEST REPORT  
for  
4 channel DATA RECORDER

Model : DA-21

Serial No. : 00360372

Synthetic judgement Pass

Condition : Temperature 26 °C

Humidity 43 %RH

Date : May, 2, 2017

Signature : Takuya

RION SERVICE CENTER CO., LTD

TOKYO JAPAN

Input section

1. Frequency response

Settings: Voltage range 1V, HPF OFF, LPF OFF, Sampling frequency 20kHz×2.56

Reference input signal : 1kHz, 1V (peak)

AC coupling

Frequency (Hz)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
		ch1	ch2	ch3	ch4	
0.315	-3.0	0.90	0.80	0.90	0.80	± 1.0
1 k	Ref.	—	—	—	—	—
20 k	-0.1	0.00	0.00	0.10	0.10	± 0.5

DC coupling

Frequency (Hz)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
		ch1	ch2	ch3	ch4	
DC	0.0	-0.10	0.00	0.00	0.00	± 1.0
0.315	0.0	-0.10	-0.10	-0.10	-0.10	± 1.0
1 k	Ref.	—	—	—	—	—

2. High-pass filter

Settings: Voltage range 1V, Coupling AC, LPF OFF, Sampling frequency 20kHz×2.56

Reference input signal: 1kHz, 1V (peak)

HPF (Hz)	Frequency (Hz)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
			ch1	ch2	ch3	ch4	
5	1	-28.0	-0.30	-0.30	-0.30	-0.30	± 3.0
	5	-3.0	-0.10	-0.10	-0.10	-0.10	± 0.5
	1k	Ref.	—	—	—	—	—

### 3.Low-pass filter

Settings: Voltage range 1V,Coupling AC,HPF OFF,Sampling frequency 20kHz×2.56

Reference input signal: 20kHz,1V(peak)

LPF (Hz)	Frequency (Hz)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
			ch1	ch2	ch3	ch4	
200	20	Ref.	—	—	—	—	—
	200	-3.0	0.00	0.00	0.00	0.00	± 1.0
	1k	-28.3	0.40	0.30	0.30	0.30	± 3.0
1k	20	Ref.	—	—	—	—	—
	1k	-3.0	0.10	0.00	0.00	0.00	± 1.0
	5k	-28.3	-0.10	-0.20	-0.20	-0.20	± 3.0
2k	20	Ref.	—	—	—	—	—
	2k	-3.0	0.00	0.00	0.00	0.00	± 1.0
	10k	-28.3	-1.90	-2.00	-2.00	-2.00	± 3.0

### 4.Offset

Settings: Coupling DC,HPF OFF,LPF OFF,Sampling frequency 20kHz×2.56

Input signal: Input terminals shorted

Reference: Full-scale point of each range

Voltage range (V)	Measurement value (%)				Tolerance (%)
	ch1	ch2	ch3	ch4	
1	0.00	0.00	0.00	0.00	±0.1
0.01	0.02	0.02	0.02	0.02	± 3.0

### 5.Voltage range control accuracy

Settings: Coupling AC,HPF OFF,LPF OFF,Sampling frequency 20kHz×2.56

Reference input signal: 1kHz,1V(peak)

Voltage range (V)	Input signal level (dB)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
			ch1	ch2	ch3	ch4	
10	+10.0	+10.0	0.00	0.00	0.00	0.00	± 0.3
3	+10.0	+10.0	-0.10	-0.10	-0.10	-0.10	
1	Ref.	0.0	—	—	—	—	—
0.3	-10.0	-10.0	-0.10	-0.20	-0.10	-0.10	± 0.3
0.1	-20.0	-20.0	0.00	-0.10	0.00	-0.10	
0.03	-30.0	-30.0	-0.10	-0.20	-0.10	-0.10	
0.01	-40.0	-40.0	-0.20	-0.20	-0.20	-0.20	

6.Lineariry

Settings: Coupling AC,HPF OFF,LPF OFF,Sampling frequency 20kHz×2.56

Reference input signal : 1kHz,1V(peak)

Input (dB)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
		ch1	ch2	ch3	ch4	
2.0	2.0	0.00	0.00	0.00	0.00	± 0.2
0.0	Ref.	—	—	—	—	—
-80.0	-80.0	0.60	0.70	0.60	0.70	± 1.2

7.Phase differences between channels

Settings: Coupling AC,HPF OFF,LPF OFF,Sampling frequency 20kHz×2.56

Input: Equivalent to range full-scale

Voltage range (V)	Frequency (Hz)	Reference channel	Measurement value (degrees)			Tolerance (degrees)
			ch2	ch3	ch4	
3	50	ch1	0.002	-0.002	-0.017	± 0.03
		ch2	—	0.004	0.019	
		ch3	—	—	0.015	
	20k	ch1	-0.073	-0.032	-0.080	± 1.00
		ch2	—	-0.041	0.007	
		ch3	—	—	0.048	

8.Inherent noise FFT analysis

Settings: INPUT BNC,HPF OFF,LPF OFF,Sampling frequency 20kHz×2.56

Input: Shorted

FFT: 1024 lines,Hanning window,Average count 128 or more

Reference: Effective value of 1 Vpeak sine wave taken as 0 dB

Voltage range (V)	Measurement value (dB)				Tolerance (dB)
	ch1	ch2	ch3	ch4	
1	-118.2	-117.5	-117.9	-116.7	-105 or less



Monitor output section

9. Frequency response

Settings: Coupling AC, HPF OFF, LPF OFF, Sampling frequency 20kHz×2.56

Reference input signal : 1kHz, 1V(peak)

Frequency (Hz)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
		ch1	ch2	ch3	ch4	
0.315	-3.0	0.82	0.81	0.81	0.84	± 1.0
1 k	Ref.	—	—	—	—	—
20 k	-0.1	0.12	0.12	0.12	0.13	± 0.3

10. Offset

Settings: Coupling DC, HPF OFF, LPF OFF, Sampling frequency 20kHz×2.56

Input signal: Input terminals shorted

Voltage range (V)	Measurement value (mV)				Tolerance (mV)
	ch1	ch2	ch3	ch4	
1	-0.05	0.43	0.72	0.88	±20
0.01	-0.22	4.60	1.75	3.22	± 75

11. Output level

Reference input signal : 1kHz, 1V(peak)

Reference: 3.16 Vpeak taken as 0 dB

Output AC voltage	Measurement value (dB)				
	ch1	ch2	ch3	ch4	Tolerance (dB)
	0.03	0.06	0.05	0.04	

Playback output section

12. Frequency response

Settings: Recall mode

Output: Equivalent to 3.16 V (peak)

Frequency (Hz)	Reference value (dB)	Deviation from reference (dB)				Tolerance (dB)
		ch1	ch2	ch3	ch4	
0.315	0.0	-0.20	-0.20	-0.20	-0.20	± 0.2
1 k	Ref.	—	—	—	—	—
20 k	-0.3	-0.10	0.00	0.00	-0.10	+0.3,-0.5

13. Offset

Settings: Recall mode

Output signal: Play signal equivalent to GND level

Output DC voltage	Measurement value (mV)				Tolerance (mV)
	ch1	ch2	ch3	ch4	
	0.51	0.40	0.21	0.68	± 40

14. Linearity

Settings: Recall mode

Output: Equivalent to each D/A value

D/A value (HEX)	Reference value (mV)	Deviation from reference (mV)				Tolerance (mV)
		ch1	ch2	ch3	ch4	
7FFF	4079+ $\alpha$	14.22	8.83	8.93	7.79	± 81.6
0000	$\alpha$ (Reference)	—	—	—	—	—
8000	-4079+ $\alpha$	-13.68	-8.33	-8.93	-6.89	± 81.6

15. Phase differences between channels

Settings: Recall mode

Frequency (Hz)	Reference channel	Measurement value (degrees)			Tolerance (degrees)
		ch2	ch3	ch4	
50	ch1	-0.002	-0.001	-0.001	± 0.03
	ch2	—	0.001	0.001	
	ch3	—	—	0.000	
20k	ch1	-0.274	-0.109	-0.547	± 1.00
	ch2	—	0.165	-0.273	
	ch3	—	—	-0.273	

16. Tacho input

Input: 5 kHz, square wave

Measurement value (pulse/min)	Tolerance (pulse/min)
300000	303,001~296,999

17. Current consumption

Settings: Factory default settings

External power supply: 6.0 V

Backlight	Measurement value (mA)	Tolerance (mA)
ON	238	220~260

Operation checks

1. SD card operation

Format card in unit, store data, perform recall, verify that data files are readable in a computer.

Pass

2. LCD backlight on/off operation

Verify that backlight can be turned on and off.

Pass

3. Key operation

Verify that all keys operate normally.

Pass

4. LED operation

Verify that all LEDs light up normally.

Pass

5. Multi-unit synchronized operation

Connect two DA-21 units and verify that both operate in sync.

Pass

6. USB operation

Verify that access from a computer is possible.

Pass

RION SERVICE CENTER CO., LTD

TOKYO JAPAN

Certificate Number:50195781

Issue Date:09/05/2017

DD/MM/YYYY

## CALIBRATION CERTIFICATE

Customer name: 00360372

Description: 4ch DATA RECORDER

Model name: DA - 2 1

Serial number: 0 0 3 6 0 3 7 2

Calibration date: 02/05/2017(DD/MM/YY)

Ambient condition: Temperature 26°C Relative Humidity 43%

We hereby certify that the above product was tested and calibrated according to the prescribed RION SERVICE CENTER (RSC) procedures, and that it fulfills all requirements of the product specifications, as described in the attached test report.

The measuring equipment and reference devices used for testing and calibrating this unit are managed under the RSC traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

### RION PRIMARY STANDARDS

Model Description	Model Number	Controlled Number	Cal Due Date MM/YYYY
Digital multimeter	3458A	MY45051584	7/2017
Universal counter	53230A	MY50004233	3/2018

### RSC WORK STANDARDS

Model Description	Model Number	Controlled Number	Cal Due Date MM/YYYY
Digital multimeter	34401A	US36051869	4/2018
Attenuator	TRA-501A	238193	7/2017
Frequency response analyzer	NF-5090	164816	4/2018

RION SERVICE CENTER CO., LTD.

Manager, Service Dept.

Tahye

# Calibration Certificate

# Instantel

Part Number: 716A0403

Description: MINIMATE PLUS W/EXT. GEO

Serial Number: BE19586

Calibration Date: May 17, 2018

Calibration Equipment: 718A1501

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Calibrated By: \_\_\_\_\_



Li Pan

 **Instantel**

# Instantel

# Calibration Certificate

# Instantel

Part Number: 714A9701

Description: TRIAXIAL GEOPHONE (ISEE)

Serial Number: BG12444

Calibration Date: May 17, 2018

Calibration Equipment: 714J7402

# Instantel

# Instantel

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

# Instantel

# Instantel

Calibrated By: \_\_\_\_\_



Li Pan

 **Instantel**

# Instantel

# Calibration Certificate

Instantel

Part Number: 720A2301

Description: MINIMATE PRO 4

Serial Number: MP12721

Calibration Date: February 27, 2018

Calibration Equipment: KEITHLEY S/N 1125403

Instantel

Instantel

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Instantel

Instantel

Calibrated By: \_\_\_\_\_



Li Pan



**Instantel**

Instantel

# Calibration Certificate

Instantel

Part Number: 720A2001

Description: ISEE TRIAXIAL GEOPHONE

Serial Number: SE12724

Calibration Date: February 27, 2018

Calibration Equipment: 714J7401

Instantel

Instantel

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*


*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Instantel

Instantel

Calibrated By:



Li Pan



**Instantel**

Instantel



## Calibration Certificate

Instantel

Part Number: 720A2301

Description: MINIMATE PRO 4

Serial Number: MP12710

Calibration Date: February 26, 2018

Calibration Equipment: KEITHLEY S/N 1350688

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Calibrated By: \_\_\_\_\_

Xiaochuan He

 Instantel®

Instantel

# Calibration Certificate

# Instantel

Part Number: 720A2001

Description: ISEE TRIAXIAL GEOPHONE

Serial Number: SE12723

Calibration Date: February 26, 2018

Calibration Equipment: 714J7403

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Calibrated By: \_\_\_\_\_

Xiaochuan He

 **Instantel**

# Instantel

# Calibration Certificate

# Instantel

Part Number: 716A0406  
Description: MINIMATE PLUS W/EXT. GEO  
Serial Number: BE9118  
Calibration Date: May 17, 2018  
Calibration Equipment: 718A1501

# Instantel

# Instantel

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

# Instantel

# Instantel

Calibrated By:



Andrew Stockwell

 Instantel

# Instantel

## Calibration Certificate

Part Number: 714A8302  
Description: Low Level Geophone X10  
Serial Number: BQ21514  
Calibration Date: March 21, 2018  
Calibration Equipment: 714J5601

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Calibrated By: \_\_\_\_\_

  
Martin Hogue

 **Instantel**

# Calibration Certificate

Instantel

Part Number: 716A0403

Description: MINIMATE PLUS W/EXT. GEO

Serial Number: BE6146

Calibration Date: May 18, 2018

Calibration Equipment: 718A1501

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Calibrated By: Hamid Khan

Hamid Khan

 **Instantel**

Instantel

# Calibration Certificate

Part Number: 714A9701

Description: TRIAXIAL GEOPHONE (ISEE)

Serial Number: BG8722

Calibration Date: May 18, 2018

Calibration Equipment: 714J7401

*Instantel certifies that the above product was calibrated in accordance with the applicable Instantel procedures. These procedures are part of a quality system that is designed to assure that the product listed above meets or exceeds Instantel specifications*

*Instantel further certifies that the measurement instruments used during the calibration of this product are traceable to the National Institute of Standards and Technology; or National Research Council of Canada. Evidence of traceability is on file at Instantel and is available upon request.*

*The environment in which this product was calibrated is maintained within the operating specifications of the instrument.*

*Please note that the sensor check function is intended to check that the sensors are connected to the unit, installed in the proper orientation and sufficiently level to operate properly. This function should not be confused with a formal calibration, which requires the sensors be checked against a reference that is traceable to a known standard. Instantel recommends that products be returned to Instantel or an authorized service and calibration facility for annual calibration.*

Calibrated By: Hamid Khan  
Hamid Khan



# Calibration Certificate

**Certificate Number** 2017010368

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

<b>Model Number</b>	831	<b>Procedure Number</b>	D0001.8378
<b>Serial Number</b>	0001669	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	29 Sep 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	29 Sep 2019
<b>Description</b>	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314	<b>Temperature</b>	23.12 °C ± 0.25 °C
		<b>Humidity</b>	50.7 %RH ± 2.0 %RH
		<b>Static Pressure</b>	86.61 kPa ± 0.13 kPa

**Evaluation Method** Tested electrically using Larson Davis PRM831 S/N 019104 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

**Compliance Standards** Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

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Provo, UT 84601, United States  
716-684-0001



# Calibration Certificate

Certificate Number 2017010367

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

<b>Model Number</b>	831	<b>Procedure Number</b>	D0001.8384
<b>Serial Number</b>	0001669	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	29 Sep 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	29 Sep 2019
<b>Description</b>	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314	<b>Temperature</b>	22.91 °C ± 0.25 °C
		<b>Humidity</b>	52.5 %RH ± 2.0 %RH
		<b>Static Pressure</b>	86.59 kPa ± 0.13 kPa

**Evaluation Method**      **Tested with:**      **Data reported in dB re 20 µPa.**

Larson Davis PRM831. S/N 019104  
PCB 377B20. S/N 112206  
Larson Davis CAL200. S/N 9079  
Larson Davis CAL291. S/N 0203

**Compliance Standards**      Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.

Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

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# Calibration Certificate

Certificate Number 2017010354

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

**Model Number** 377B20  
**Serial Number** 112206  
**Test Results** Pass  
**Initial Condition** AS RECEIVED same as shipped  
**Description** 1/2 inch Microphone - RI - 0V

**Procedure Number** D0001.8387  
**Technician** Abraham Ortega  
**Calibration Date** 28 Sep 2017  
**Calibration Due** 28 Sep 2019  
**Temperature** 23.4 °C ± 0.01 °C  
**Humidity** 33.3 %RH ± 0.5 %RH  
**Static Pressure** 101.11 kPa ± 0.03 kPa

**Evaluation Method** Tested electrically using an electrostatic actuator.

**Compliance Standards** Compliant to Manufacturer Specifications.

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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## Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	07/17/2017	07/17/2018	001230
Microphone Calibration System	08/30/2017	08/30/2018	001233
1/2" Preampifier	12/15/2016	12/15/2017	001274
Agilent 34401A DMM	12/06/2016	12/06/2017	001329
Larson Davis CAL250 Acoustic Calibrator	01/04/2017	01/04/2018	003030
1/2" Preampifier	04/12/2017	04/12/2018	006506
Larson Davis 1/2" Preampifier 7-pin LEMO	09/12/2017	09/12/2018	006507
1/2 inch Microphone - RI - 200V	10/03/2016	10/03/2017	006511
1/2 inch Microphone - RI - 200V	08/09/2017	08/09/2018	006519
Larson Davis 1/2" Preampifier 7-pin LEMO	09/12/2017	09/12/2018	006530
Larson Davis 1/2" Preampifier 7-pin LEMO	08/11/2017	08/11/2018	006531

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716-684-0001



# Calibration Certificate

**Certificate Number** 2017010366

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

<b>Model Number</b>	PRM831	<b>Procedure Number</b>	D0001.8383
<b>Serial Number</b>	019104	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	29 Sep 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	29 Sep 2019
<b>Description</b>	Larson Davis 1/2" Preamplifier for Model 831 Type 1	<b>Temperature</b>	23.1 °C ± 0.01 °C
		<b>Humidity</b>	51.6 %RH ± 0.5 %RH
		<b>Static Pressure</b>	86.59 kPa ± 0.03 kPa
<b>Evaluation Method</b>	Tested electrically using a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.		
<b>Compliance Standards</b>	Compliant to Manufacturer Specifications		

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma ( $k=2$ ) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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## Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	03/08/2017	03/08/2018	003003
Hart Scientific 2626-S Humidity/Temperature Sensor	06/11/2017	06/11/2018	006943
Agilent 34401A DMM	06/28/2017	06/28/2018	007165
SRS DS360 Ultra Low Distortion Generator	10/14/2016	10/14/2017	007167

# Calibration Certificate

Certificate Number 2017009620

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

<b>Model Number</b>	831	<b>Procedure Number</b>	D0001.8378
<b>Serial Number</b>	0001702	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	6 Sep 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	
<b>Description</b>	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314	<b>Temperature</b>	23.58 °C ± 0.25 °C
		<b>Humidity</b>	49.4 %RH ± 2.0 %RH
		<b>Static Pressure</b>	86.59 kPa ± 0.13 kPa

**Evaluation Method** Tested electrically using Larson Davis PRM831 S/N 019106 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

**Compliance Standards** Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

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Provo, UT 84601, United States  
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# Calibration Certificate

Certificate Number 2017009656

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

<b>Model Number</b>	831	<b>Procedure Number</b>	D0001.8384
<b>Serial Number</b>	0001702	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	6 Sep 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	
<b>Description</b>	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314	<b>Temperature</b>	23.5 °C ± 0.25 °C
		<b>Humidity</b>	49 %RH ± 2.0 %RH
		<b>Static Pressure</b>	86.45 kPa ± 0.13 kPa

**Evaluation Method**      **Tested with:**      **Data reported in dB re 20 µPa.**

Larson Davis PRM831. S/N 019106  
PCB 377B20. S/N 115034  
Larson Davis CAL200. S/N 9079  
Larson Davis CAL291. S/N 0203

**Compliance Standards**      Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.

**Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

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# Calibration Certificate

**Certificate Number 2017009618**

**Customer:**

Golder Associates Inc  
6925 Century Avenue  
Mississauga, ON L5N 7K2, Canada

<b>Model Number</b>	PRM831	<b>Procedure Number</b>	D0001.8383
<b>Serial Number</b>	019106	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	6 Sep 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	
<b>Description</b>	Larson Davis 1/2" Preamplifier for Model 831 Type 1	<b>Temperature</b>	23.55 °C ± 0.01 °C
		<b>Humidity</b>	50.9 %RH ± 0.5 %RH
		<b>Static Pressure</b>	86.58 kPa ± 0.03 kPa
<b>Evaluation Method</b>	Tested electrically using a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.		
<b>Compliance Standards</b>	Compliant to Manufacturer Specifications		

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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## Standards Used

Description	Cal Date	Cal Due	Cal Standard
Larson Davis Model 2900 Real Time Analyzer	03/08/2017	03/08/2018	003003
Hart Scientific 2626-S Humidity/Temperature Sensor	06/11/2017	06/11/2018	006943
Agilent 34401A DMM	06/28/2017	06/28/2018	007165
SRS DS360 Ultra Low Distortion Generator	10/14/2016	10/14/2017	007167

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## Weather Data

	SiteVisit 1	SiteVisit 2	SiteVisit 3	SiteVisit 4	SiteVisit 5	SiteVisit 6	SiteVisit 7	SiteVisit 8	SiteVisit 9
Date	23-May-18	12-Jun-18	13-Jun-18	14-Jun-18	15-Jun-18	20-Jun-18	21-Jun-18	22-Jun-18	26-Jun-18
Maximum Temperature (°C)	19.1	27.4	25	26.6	24.4	23.7	23	23.3	26.3
Minimum Temperature (°C)	8.9	11.8	15.6	11.3	9.6	14.1	12.3	10.8	8.7
Mean Temperature (°C)	14	19.6	20.3	18.9	17	18.9	17.6	17.1	17.5
Percipitation (mm)	0	0	2.4	0	0	0	0	1.8	0
Winds (km/hr)	25.7	17.7	38.6	37	17.7	9.6	27	17.7	17.7
Speed of Maximum Gust (km/hr)	28	28	54	54	19	11	28	19	27

**APPENDIX D**

**Road Noise Prediction Modelling  
Verification**

RLS-90 road predictions were verified using the ORNAMENT prediction model at two prediction locations. The prediction locations were within 500 m of Stanley Road S and Ramsey Road and therefore partial noise levels due to these roads were considered. The RLS-90 calculation protocol from the Cadna-A model and the ORNAMENT calculation are presented in the following pages. Table 1 presents a summary of the results.

**Table 1: Summary of RLS-90 and ORNAMENT Noise Modelling Results**

Prediction Location	ORNAMENT			RLS-90			Difference		
	Leq (dBA) Stanley Avenue S	Leq (dBA) Ramsey Road	Leq Total (dBA)	Leq (dBA) Stanley Avenue S	Leq (dBA) Ramsey Road	Leq Total (dBA)	Change in Leq (dB) Stanley Avenue S	Change in Leq (dB) Ramsey Road	Change in Leq (dB) Leq Total (dBA)
Noise_Offsite02	40	48	<b>49</b>	41	47	<b>48</b>	-1	1	<b>1</b>
Noise_Offsite03	-	47	<b>47</b>	32	46	<b>46</b>	-	1	<b>1</b>

Note: “-“ indicates a road/receiver distance of greater than 500 m



ORNAMENT Road Traffic Noise Prediction

Road	Prediction Location	Posted Speed Limit (km/hr)	Road Grade (%)	Road Grade Mode	Road Pavement	Angle 1 (degrees)	Angle 2 (degrees)	Topography	Wood Depth	No of Row of Houses	Density of 1st Row	Intermediate Surface	Receptor Height (m)	Source-Receptor Perpendicular Distance	Source-Receptor Total Distance	Elevation Change	Barrier Angle 1 (degrees)	Barrier Angle 2 (degrees)	Barrier Height (m)	Barrier Receiver Distance (m)	Source Elevation (m)	Receiver Gnd Elevation (m)	Barrier Base Elevation (m)	# Vehicles	Leq (dBA)	Pre	Main	Post	%Cars	%MT	%HT				
Stanley Avenue S	Noise_Offsite02	60	0.0%	2	Manual	1	Typical Asphalt or Concrete	-65 75	1	Flat/gentle slope; no barrier	0	None, or < 30 m woods	0	95%	1	Absorptive Ground	1.50	300	300	0	0.00	0.00	0.00	0.00	180.00	180.00	0.00	231	39.5	0.00	39.52	0.00	94.2%	1.7%	4.1%
Ramsey Road	Noise_Offsite02	50	0.0%	2	Manual	1	Typical Asphalt or Concrete	-85 85	1	Flat/gentle slope; no barrier	0	None, or < 30 m woods	0	95%	1	Absorptive Ground	1.50	30	30	0	0.00	0.00	0.00	0.00	180.00	180.00	0.00	26	48.2	0.00	48.18	0.00	87.0%	4.3%	8.7%
Ramsey Road	Noise_Offsite03	50	0.0%	2	Manual	1	Typical Asphalt or Concrete	-90 -10	1	Flat/gentle slope; no barrier	0	None, or < 30 m woods	0	95%	1	Absorptive Ground	1.50	20	20	0	0.00	0.00	0.00	0.00	180.00	180.00	0.00	26	47.4	0.00	47.40	0.00	87.0%	4.3%	8.7%

## Receiver

Name: Noise\_Offsite02  
 ID: Noise\_Offsite02  
 X: 655741.00  
 Y: 4769267.00  
 Z: 181.50

Road, RLS-90, Name: "Stanley Ave S_Ramsey Rd_Progress St", ID: "!02!2018_S09"															
Nr.	X	Y	Z	Refl.	DEN	LmE	DI	Dstg	Drefl	K	Ds	Dbm	Dz	RL	Lr
	(m)	(m)	(m)			dB(A)	dB	dB	dB	dB	(dB)	(dB)	(dB)	(dB)	dB(A)
50	656050.73	4769180.50	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-40.6	-4.7	0.0	0.0	31.1
51	656060.62	4769031.96	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-42.8	-4.7	0.0	0.0	28.9
53	656070.51	4768883.41	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-45.4	-4.7	0.0	0.0	26.2
55	656080.39	4768734.87	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-48.0	-4.7	0.0	0.0	23.6
57	656046.99	4769180.25	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-40.4	-4.7	0.0	0.0	31.2
58	656056.88	4769031.71	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-42.7	-4.7	0.0	0.0	28.9
60	656066.76	4768883.16	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-45.4	-4.7	0.0	0.0	26.2
62	656076.65	4768734.62	180.50	0	D	54.6	21.7	0.0	0.0	0.0	-47.9	-4.7	0.0	0.0	23.7

Road, RLS-90, Name: "Ramsey Rd", ID: "!02!2018_S13"															
Nr.	X	Y	Z	Refl.	DEN	LmE	DI	Dstg	Drefl	K	Ds	Dbm	Dz	RL	Lr
	(m)	(m)	(m)			dB(A)	dB	dB	dB	dB	(dB)	(dB)	(dB)	(dB)	dB(A)
1	656013.15	4769251.08	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-38.9	-4.7	0.0	0.0	20.8
2	655951.42	4769247.68	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-36.4	-4.6	0.0	0.0	23.4
3	655889.69	4769244.28	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-33.1	-4.5	0.0	0.0	26.7
4	655843.39	4769241.73	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-29.8	-4.4	0.0	0.0	27.2
5	655812.52	4769240.03	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-26.8	-4.3	0.0	0.0	30.3
6	655789.37	4769238.75	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-24.0	-4.0	0.0	0.0	30.3
7	655773.94	4769237.90	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-21.9	-3.7	0.0	0.0	32.8
8	655758.50	4769237.05	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-19.8	-3.3	0.0	0.0	35.3
9	655746.93	4769236.42	180.50	0	D	46.5	8.9	0.0	0.0	0.0	-18.8	-3.1	0.0	0.0	33.4
10	655739.21	4769235.99	180.50	0	D	46.5	8.9	0.0	0.0	0.0	-18.8	-3.1	0.0	0.0	33.5
11	655727.64	4769235.35	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-19.7	-3.3	0.0	0.0	35.4
12	655712.20	4769234.51	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-21.8	-3.7	0.0	0.0	32.9
13	655689.05	4769233.23	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-25.0	-4.1	0.0	0.0	32.3
14	655658.19	4769231.53	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-28.3	-4.3	0.0	0.0	28.7
16	655627.32	4769229.83	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-31.0	-4.5	0.0	0.0	25.9
18	655581.02	4769227.28	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-34.0	-4.6	0.0	0.0	25.8
20	656012.94	4769254.82	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-38.9	-4.7	0.0	0.0	20.9
22	655951.21	4769251.42	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-36.3	-4.6	0.0	0.0	23.4
24	655889.48	4769248.02	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-33.1	-4.5	0.0	0.0	26.8
26	655843.18	4769245.47	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-29.7	-4.4	0.0	0.0	27.3
28	655812.31	4769243.77	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-26.7	-4.2	0.0	0.0	30.5
30	655789.16	4769242.50	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-23.7	-4.0	0.0	0.0	30.7
32	655773.73	4769241.65	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-21.3	-3.6	0.0	0.0	33.4
34	655758.30	4769240.80	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-18.9	-3.1	0.0	0.0	36.4
36	655746.72	4769240.16	180.50	0	D	46.5	8.9	0.0	0.0	0.0	-17.7	-2.8	0.0	0.0	34.9
39	655739.01	4769239.74	180.50	0	D	46.5	8.9	0.0	0.0	0.0	-17.7	-2.8	0.0	0.0	34.9
41	655727.43	4769239.10	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-18.8	-3.1	0.0	0.0	36.5
42	655712.00	4769238.25	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-21.2	-3.6	0.0	0.0	33.5
43	655696.57	4769237.40	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-23.6	-4.0	0.0	0.0	30.8
44	655681.13	4769236.55	180.50	0	D	46.5	11.9	0.0	0.0	0.0	-25.7	-4.2	0.0	0.0	28.5
46	655657.98	4769235.28	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-28.2	-4.3	0.0	0.0	28.8
47	655627.12	4769233.58	180.50	0	D	46.5	14.9	0.0	0.0	0.0	-30.9	-4.5	0.0	0.0	26.0
48	655580.82	4769231.03	180.50	0	D	46.5	17.9	0.0	0.0	0.0	-33.9	-4.6	0.0	0.0	25.9
80	655510.21	4769223.38	179.91	0	D	46.5	16.4	0.0	0.0	0.0	-37.4	-4.7	0.0	0.0	20.8
82	655510.01	4769227.13	179.91	0	D	46.5	16.4	0.0	0.0	0.0	-37.4	-4.7	0.0	0.0	20.9
103	655541.17	4769225.09	180.23	0	D	46.5	12.6	0.0	0.0	0.0	-36.0	-4.6	0.0	0.0	18.4
104	655540.96	4769228.83	180.23	0	D	46.5	12.6	0.0	0.0	0.0	-36.0	-4.6	0.0	0.0	18.4
119	655448.60	4769219.95	179.89	0	D	46.5	13.7	0.0	0.0	0.0	-39.7	-4.7	0.0	0.0	15.8
120	655447.99	4769223.65	179.89	0	D	46.5	13.7	0.0	0.0	0.0	-39.7	-4.7	0.0	0.0	15.8
123	655467.75	4769221.93	179.72	0	D	46.5	11.9	0.0	0.0	0.0	-39.0	-4.7	0.0	0.0	14.7

Road, RLS-90, Name: "Ramsey Rd", ID: "I02I2018_S13"															
Nr.	X	Y	Z	Refl.	DEN	LmE	DI	Dstg	Drefl	K	Ds	Dbm	Dz	RL	Lr
	(m)	(m)	(m)			dB(A)	dB	dB	dB	dB	(dB)	(dB)	(dB)	(dB)	dB(A)
124	655467.71	4769225.68	179.72	0	D	46.5	11.9	0.0	0.0	0.0	-39.0	-4.7	0.0	0.0	14.7
125	655402.85	4769214.18	180.27	0	D	46.5	13.5	0.0	0.0	0.0	-41.2	-4.7	0.0	0.0	14.1
126	655402.24	4769217.88	180.27	0	D	46.5	13.5	0.0	0.0	0.0	-41.2	-4.7	0.0	0.0	14.1
127	655310.26	4769204.77	180.50	0	D	46.5	15.5	0.0	0.0	0.0	-43.8	-4.7	0.0	0.0	13.5
128	655310.03	4769208.51	180.50	0	D	46.5	15.5	0.0	0.0	0.0	-43.7	-4.7	0.0	0.0	13.5
129	655481.86	4769222.10	179.76	0	D	46.5	11.0	0.0	0.0	0.0	-38.5	-4.7	0.0	0.0	14.3
130	655481.82	4769225.85	179.76	0	D	46.5	11.0	0.0	0.0	0.0	-38.5	-4.7	0.0	0.0	14.3
133	655381.57	4769210.80	180.50	0	D	46.5	13.1	0.0	0.0	0.0	-41.8	-4.7	0.0	0.0	13.1
134	655381.00	4769214.51	180.50	0	D	46.5	13.1	0.0	0.0	0.0	-41.8	-4.7	0.0	0.0	13.1
135	655421.88	4769216.69	180.09	0	D	46.5	12.1	0.0	0.0	0.0	-40.6	-4.7	0.0	0.0	13.3
136	655421.55	4769220.42	180.09	0	D	46.5	12.1	0.0	0.0	0.0	-40.6	-4.7	0.0	0.0	13.3
139	655339.70	4769206.85	180.50	0	D	46.5	13.7	0.0	0.0	0.0	-43.0	-4.7	0.0	0.0	12.5
140	655339.38	4769210.59	180.50	0	D	46.5	13.7	0.0	0.0	0.0	-43.0	-4.7	0.0	0.0	12.5
141	655361.29	4769208.54	180.50	0	D	46.5	13.0	0.0	0.0	0.0	-42.4	-4.7	0.0	0.0	12.4
142	655361.03	4769212.28	180.50	0	D	46.5	13.0	0.0	0.0	0.0	-42.4	-4.7	0.0	0.0	12.4
147	655281.99	4769201.16	180.50	0	D	46.5	13.5	0.0	0.0	0.0	-44.4	-4.7	0.0	0.0	10.8
148	655281.12	4769204.80	180.50	0	D	46.5	13.5	0.0	0.0	0.0	-44.5	-4.7	0.0	0.0	10.8
149	655261.56	4769195.66	180.50	0	D	46.5	13.1	0.0	0.0	0.0	-44.9	-4.7	0.0	0.0	9.9
150	655260.47	4769199.25	180.50	0	D	46.5	13.1	0.0	0.0	0.0	-44.9	-4.7	0.0	0.0	9.9
153	655242.96	4769190.13	180.50	0	D	46.5	12.7	0.0	0.0	0.0	-45.4	-4.7	0.0	0.0	9.1
154	655241.91	4769193.73	180.50	0	D	46.5	12.7	0.0	0.0	0.0	-45.4	-4.7	0.0	0.0	9.1
155	655433.41	4769217.71	180.07	0	D	46.5	8.4	0.0	0.0	0.0	-40.2	-4.7	0.0	0.0	9.9
156	655433.08	4769221.44	180.07	0	D	46.5	8.4	0.0	0.0	0.0	-40.2	-4.7	0.0	0.0	10.0

Road, RLS-90, Name: "Stanley Ave S_Marineland Pkway_Ramsey Rd", ID: "I02I2018_S08"															
Nr.	X	Y	Z	Refl.	DEN	LmE	DI	Dstg	Drefl	K	Ds	Dbm	Dz	RL	Lr
	(m)	(m)	(m)			dB(A)	dB	dB	dB	dB	(dB)	(dB)	(dB)	(dB)	dB(A)
64	656043.00	4769462.40	180.50	0	D	55.3	19.7	0.0	0.0	0.0	-41.7	-4.7	0.0	0.0	28.6
65	656039.25	4769462.34	180.50	0	D	55.3	19.7	0.0	0.0	0.0	-41.6	-4.7	0.0	0.0	28.7
66	656041.05	4769607.65	182.50	0	D	55.3	20.6	0.0	0.0	0.0	-44.2	-4.7	0.0	0.0	27.0
67	656037.30	4769607.60	182.50	0	D	55.3	20.6	0.0	0.0	0.0	-44.1	-4.7	0.0	0.0	27.0
68	656045.41	4769283.27	180.50	0	D	55.3	17.6	0.0	0.0	0.0	-40.0	-4.7	0.0	0.0	28.2
69	656041.66	4769283.22	180.50	0	D	55.3	17.6	0.0	0.0	0.0	-39.9	-4.7	0.0	0.0	28.3
70	656044.57	4769345.92	181.35	0	D	55.3	17.2	0.0	0.0	0.0	-40.3	-4.6	0.0	0.0	27.6
71	656040.82	4769345.87	181.35	0	D	55.3	17.2	0.0	0.0	0.0	-40.2	-4.6	0.0	0.0	27.7
72	656038.18	4769824.70	182.50	0	D	55.3	22.1	0.0	0.0	0.0	-48.0	0.0	4.8	0.0	24.7
73	656034.43	4769824.65	182.50	0	D	55.3	22.1	0.0	0.0	0.0	-47.9	0.0	4.8	0.0	24.7
74	656042.01	4769535.40	181.60	0	D	55.3	14.2	0.0	0.0	0.0	-42.9	-4.7	0.0	0.0	21.9
76	656038.26	4769535.34	181.60	0	D	55.3	14.2	0.0	0.0	0.0	-42.9	-4.7	0.0	0.0	22.0
78	656044.11	4769379.68	181.59	0	D	55.3	11.8	0.0	0.0	0.0	-40.6	-4.6	0.0	0.0	21.8
79	656040.36	4769379.63	181.59	0	D	55.3	11.8	0.0	0.0	0.0	-40.5	-4.6	0.0	0.0	22.0
83	656039.47	4769727.42	181.72	0	D	55.3	15.2	0.0	0.0	0.0	-46.3	0.0	4.8	0.0	19.4
85	656035.72	4769727.37	181.72	0	D	55.3	15.2	0.0	0.0	0.0	-46.3	0.0	4.8	0.0	19.5
86	656043.94	4769392.40	181.42	0	D	55.3	10.2	0.0	0.0	0.0	-40.8	-4.6	0.0	0.0	20.1
87	656040.19	4769392.34	181.42	0	D	55.3	10.2	0.0	0.0	0.0	-40.6	-4.6	0.0	0.0	20.2
89	656043.69	4769410.60	180.87	0	D	55.3	10.1	0.0	0.0	0.0	-41.0	-4.7	0.0	0.0	19.8
90	656039.94	4769410.55	180.87	0	D	55.3	10.1	0.0	0.0	0.0	-40.9	-4.7	0.0	0.0	19.9
91	656042.28	4769515.63	180.60	0	D	55.3	11.2	0.0	0.0	0.0	-42.6	0.0	4.8	0.0	19.1
92	656038.53	4769515.58	180.60	0	D	55.3	11.2	0.0	0.0	0.0	-42.5	0.0	4.8	0.0	19.2
93	656044.97	4769315.73	180.80	0	D	55.3	9.0	0.0	0.0	0.0	-40.1	-4.7	0.0	0.0	19.5
94	656041.22	4769315.68	180.80	0	D	55.3	9.0	0.0	0.0	0.0	-40.0	-4.7	0.0	0.0	19.7
95	656043.82	4769401.55	181.24	0	D	55.3	9.0	0.0	0.0	0.0	-40.9	-4.7	0.0	0.0	18.8
96	656040.07	4769401.50	181.24	0	D	55.3	9.0	0.0	0.0	0.0	-40.8	-4.7	0.0	0.0	18.9
97	656037.66	4769923.58	182.50	0	D	55.3	15.6	0.0	0.0	0.0	-49.6	0.0	4.8	0.0	16.6
98	656033.91	4769923.69	182.50	0	D	55.3	15.6	0.0	0.0	0.0	-49.5	0.0	4.8	0.0	16.6
99	656040.18	4769673.71	181.74	0	D	55.3	12.4	0.0	0.0	0.0	-45.4	0.0	4.8	0.0	17.6
100	656036.43	4769673.66	181.74	0	D	55.3	12.4	0.0	0.0	0.0	-45.3	0.0	4.8	0.0	17.6
101	656039.80	4769701.95	180.91	0	D	55.3	12.5	0.0	0.0	0.0	-45.9	0.0	4.8	0.0	17.2
102	656036.06	4769701.90	180.91	0	D	55.3	12.5	0.0	0.0	0.0	-45.8	0.0	4.8	0.0	17.3
105	656138.99	4770075.70	182.50	0	D	55.3	16.9	0.0	0.0	0.0	-52.4	0.0	4.8	0.0	15.0
106	656136.62	4770078.60	182.50	0	D	55.3	16.9	0.0	0.0	0.0	-52.4	0.0	4.8	0.0	15.0
107	656081.71	4770026.47	182.50	0	D	55.3	15.5	0.0	0.0	0.0	-51.4	0.0	4.8	0.0	14.7
108	656079.04	4770029.11	182.50	0	D	55.3	15.5	0.0	0.0	0.0	-51.4	0.0	4.8	0.0	14.7

Road, RLS-90, Name: "Stanley Ave S_Marineland Pkway_Ramsey Rd", ID: "!02!2018_S08"															
Nr.	X	Y	Z	Refl.	DEN	LmE	DI	Dstg	Drefl	K	Ds	Dbm	Dz	RL	Lr
	(m)	(m)	(m)			dB(A)	dB	dB	dB	dB	(dB)	(dB)	(dB)	(dB)	dB(A)
109	656050.50	4769982.51	182.50	0	D	55.3	14.9	0.0	0.0	0.0	-50.5	0.0	4.8	0.0	14.9
110	656047.11	4769984.10	182.50	0	D	55.3	14.9	0.0	0.0	0.0	-50.5	0.0	4.8	0.0	14.9
111	656041.14	4769955.24	182.50	0	D	55.3	14.5	0.0	0.0	0.0	-50.1	0.0	4.8	0.0	15.0
112	656037.48	4769956.03	182.50	0	D	55.3	14.5	0.0	0.0	0.0	-50.1	0.0	4.8	0.0	15.0
113	656107.07	4770049.66	182.50	0	D	55.3	15.2	0.0	0.0	0.0	-51.9	0.0	4.8	0.0	13.9
114	656104.70	4770052.57	182.50	0	D	55.3	15.2	0.0	0.0	0.0	-51.9	0.0	4.8	0.0	13.9
115	656173.15	4770103.07	182.89	0	D	55.3	15.9	0.0	0.0	0.0	-53.0	0.0	4.8	0.0	13.4
116	656170.83	4770106.02	182.89	0	D	55.3	15.9	0.0	0.0	0.0	-53.0	0.0	4.8	0.0	13.4
117	656039.99	4769687.70	180.93	0	D	55.3	10.2	0.0	0.0	0.0	-45.6	0.0	4.8	0.0	15.1
118	656036.24	4769687.65	180.93	0	D	55.3	10.2	0.0	0.0	0.0	-45.6	0.0	4.8	0.0	15.2
121	656063.10	4770005.02	182.50	0	D	55.3	13.4	0.0	0.0	0.0	-50.9	0.0	4.8	0.0	13.0
122	656060.02	4770007.16	182.50	0	D	55.3	13.4	0.0	0.0	0.0	-51.0	0.0	4.8	0.0	13.0
131	656211.03	4770151.05	184.02	0	D	55.3	13.4	0.0	0.0	0.0	-53.8	0.0	4.8	0.0	10.2
132	656207.46	4770152.21	184.02	0	D	55.3	13.4	0.0	0.0	0.0	-53.8	0.0	4.8	0.0	10.2
137	656217.15	4770171.69	184.33	0	D	55.3	13.2	0.0	0.0	0.0	-54.1	-4.8	0.0	0.0	9.7
138	656213.52	4770172.65	184.33	0	D	55.3	13.2	0.0	0.0	0.0	-54.1	-4.8	0.0	0.0	9.7
143	656193.73	4770121.11	183.45	0	D	55.3	11.9	0.0	0.0	0.0	-53.3	0.0	4.8	0.0	9.1
144	656190.91	4770123.58	183.45	0	D	55.3	11.9	0.0	0.0	0.0	-53.4	0.0	4.8	0.0	9.1
145	656203.22	4770133.67	183.74	0	D	55.3	11.9	0.0	0.0	0.0	-53.6	0.0	4.8	0.0	8.9
146	656200.07	4770135.71	183.74	0	D	55.3	11.9	0.0	0.0	0.0	-53.6	0.0	4.8	0.0	8.9
151	656041.82	4769549.47	182.50	0	D	55.3	2.3	0.0	0.0	0.0	-43.2	-4.7	0.0	0.0	9.8
152	656038.07	4769549.42	182.50	0	D	55.3	2.3	0.0	0.0	0.0	-43.1	-4.7	0.0	0.0	9.9
157	656219.99	4770184.37	184.50	0	D	55.3	1.5	0.0	0.0	0.0	-54.3	-4.8	0.0	0.0	-2.2
158	656216.24	4770184.26	184.50	0	D	55.3	1.5	0.0	0.0	0.0	-54.2	-4.8	0.0	0.0	-2.2
159	656219.94	4770182.74	184.50	0	D	55.3	1.3	0.0	0.0	0.0	-54.3	-4.8	0.0	0.0	-2.4
160	656216.21	4770183.12	184.50	0	D	55.3	1.3	0.0	0.0	0.0	-54.2	-4.8	0.0	0.0	-2.3

## Receiver

Name: Noise\_Offsite03

ID: Noise\_Offsite03

X: 655223.00

Y: 4769206.00

Z: 181.50

Road, RLS-90, Name: "Stanley Ave S\_Ramsey Rd\_Progress St", ID: "!02!2018\_S09"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	LmE dB(A)	DI dB	Dstg dB	Drefl dB	K dB	Ds (dB)	Dbm (dB)	Dz (dB)	RL (dB)	Lr dB(A)
38	656055.67	4769106.23	180.50	0	D	54.6	24.7	0.0	0.0	0.0	-51.5	-4.8	0.0	0.0	23.1
40	656075.45	4768809.14	180.50	0	D	54.6	24.7	0.0	0.0	0.0	-53.0	-4.8	0.0	0.0	21.6
45	656051.93	4769105.98	180.50	0	D	54.6	24.7	0.0	0.0	0.0	-51.4	-4.8	0.0	0.0	23.2
49	656071.71	4768808.89	180.50	0	D	54.6	24.7	0.0	0.0	0.0	-52.9	-4.8	0.0	0.0	21.6

Road, RLS-90, Name: "Ramsey Rd", ID: "!02!2018\_S13"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	LmE dB(A)	DI dB	Dstg dB	Drefl dB	K dB	Ds (dB)	Dbm (dB)	Dz (dB)	RL (dB)	Lr dB(A)
15	655247.41	4769191.43	180.50	0	D	46.5	9.7	0.0	0.0	0.0	-18.0	-2.9	0.0	0.0	35.3
17	655238.51	4769188.83	180.50	0	D	46.5	9.7	0.0	0.0	0.0	-16.2	-2.2	0.0	0.0	37.7
19	655246.36	4769195.03	180.50	0	D	46.5	9.7	0.0	0.0	0.0	-17.2	-2.6	0.0	0.0	36.4
21	655237.46	4769192.43	180.50	0	D	46.5	9.7	0.0	0.0	0.0	-14.9	-1.6	0.0	0.0	39.7
23	655266.40	4769197.13	180.50	0	D	46.5	10.0	0.0	0.0	0.0	-22.0	-3.7	0.0	0.0	30.8
25	655256.72	4769194.20	180.50	0	D	46.5	10.0	0.0	0.0	0.0	-20.0	-3.4	0.0	0.0	33.1
27	655265.31	4769200.72	180.50	0	D	46.5	10.0	0.0	0.0	0.0	-21.6	-3.7	0.0	0.0	31.2
29	655255.63	4769197.78	180.50	0	D	46.5	10.0	0.0	0.0	0.0	-19.5	-3.3	0.0	0.0	33.8
31	655281.99	4769201.16	180.50	0	D	46.5	13.5	0.0	0.0	0.0	-24.5	-4.1	0.0	0.0	31.4
33	655281.12	4769204.80	180.50	0	D	46.5	13.5	0.0	0.0	0.0	-24.4	-4.0	0.0	0.0	31.5
35	655310.26	4769204.77	180.50	0	D	46.5	15.5	0.0	0.0	0.0	-28.1	-4.3	0.0	0.0	29.6
37	655310.03	4769208.51	180.50	0	D	46.5	15.5	0.0	0.0	0.0	-28.0	-4.3	0.0	0.0	29.6
52	655920.55	4769245.98	180.50	0	D	46.5	23.9	0.0	0.0	0.0	-49.2	-4.7	0.0	0.0	16.5
54	655735.35	4769235.78	180.50	0	D	46.5	20.9	0.0	0.0	0.0	-45.6	-4.7	0.0	0.0	17.1
56	655611.89	4769228.98	180.50	0	D	46.5	20.9	0.0	0.0	0.0	-42.6	-4.7	0.0	0.0	20.1
59	655920.35	4769249.72	180.50	0	D	46.5	23.9	0.0	0.0	0.0	-49.2	-4.7	0.0	0.0	16.5
61	655735.15	4769239.52	180.50	0	D	46.5	20.9	0.0	0.0	0.0	-45.6	-4.7	0.0	0.0	17.1
63	655611.68	4769232.73	180.50	0	D	46.5	20.9	0.0	0.0	0.0	-42.6	-4.7	0.0	0.0	20.1
75	655339.70	4769206.85	180.50	0	D	46.5	13.7	0.0	0.0	0.0	-30.7	-4.5	0.0	0.0	25.0
77	655339.38	4769210.59	180.50	0	D	46.5	13.7	0.0	0.0	0.0	-30.7	-4.5	0.0	0.0	25.0
88	655361.29	4769208.54	180.50	0	D	46.5	13.0	0.0	0.0	0.0	-32.3	-4.5	0.0	0.0	22.6
161	655361.03	4769212.28	180.50	0	D	46.5	13.0	0.0	0.0	0.0	-32.3	-4.5	0.0	0.0	22.6
166	655381.57	4769210.80	180.50	0	D	46.5	13.1	0.0	0.0	0.0	-33.6	-4.6	0.0	0.0	21.5
167	655381.00	4769214.51	180.50	0	D	46.5	13.1	0.0	0.0	0.0	-33.6	-4.6	0.0	0.0	21.5
168	655402.85	4769214.18	180.27	0	D	46.5	13.5	0.0	0.0	0.0	-34.8	-4.6	0.0	0.0	20.6
169	655402.24	4769217.88	180.27	0	D	46.5	13.5	0.0	0.0	0.0	-34.8	-4.6	0.0	0.0	20.6
172	655510.21	4769223.38	179.91	0	D	46.5	16.4	0.0	0.0	0.0	-39.4	-4.7	0.0	0.0	18.8
173	655510.01	4769227.13	179.91	0	D	46.5	16.4	0.0	0.0	0.0	-39.4	-4.7	0.0	0.0	18.8
176	655448.60	4769219.95	179.89	0	D	46.5	13.7	0.0	0.0	0.0	-37.0	-4.7	0.0	0.0	18.5
177	655447.99	4769223.65	179.89	0	D	46.5	13.7	0.0	0.0	0.0	-37.0	-4.7	0.0	0.0	18.5
178	655421.88	4769216.69	180.09	0	D	46.5	12.1	0.0	0.0	0.0	-35.8	-4.6	0.0	0.0	18.2
179	655421.55	4769220.42	180.09	0	D	46.5	12.1	0.0	0.0	0.0	-35.8	-4.6	0.0	0.0	18.2
180	655467.75	4769221.93	179.72	0	D	46.5	11.9	0.0	0.0	0.0	-37.8	-4.7	0.0	0.0	15.9
181	655467.71	4769225.68	179.72	0	D	46.5	11.9	0.0	0.0	0.0	-37.8	-4.7	0.0	0.0	15.9
190	655481.86	4769222.10	179.76	0	D	46.5	11.0	0.0	0.0	0.0	-38.4	-4.7	0.0	0.0	14.4
191	655481.82	4769225.85	179.76	0	D	46.5	11.0	0.0	0.0	0.0	-38.4	-4.7	0.0	0.0	14.4
194	655541.17	4769225.09	180.23	0	D	46.5	12.6	0.0	0.0	0.0	-40.5	-4.7	0.0	0.0	13.9
195	655540.96	4769228.83	180.23	0	D	46.5	12.6	0.0	0.0	0.0	-40.5	-4.7	0.0	0.0	13.9
204	655433.41	4769217.71	180.07	0	D	46.5	8.4	0.0	0.0	0.0	-36.3	-4.7	0.0	0.0	13.9
205	655433.08	4769221.44	180.07	0	D	46.5	8.4	0.0	0.0	0.0	-36.3	-4.6	0.0	0.0	13.9

Road, RLS-90, Name: "Stanley Ave S\_Marineland Pkway\_Ramsey Rd", ID: "!02!2018\_S08"

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	LmE dB(A)	DI dB	Dstg dB	Drefl dB	K dB	Ds (dB)	Dbm (dB)	Dz (dB)	RL (dB)	Lr dB(A)
81	656038.18	4769824.70	182.50	0	D	55.3	22.1	0.0	0.0	0.0	-54.1	-4.7	0.0	0.0	18.5

Road, RLS-90, Name: "Stanley Ave S_Marineland Pkway_Ramsey Rd", ID: "I02 2018_S08"															
Nr.	X	Y	Z	Refl.	DEN	LmE	DI	Dstg	Drefl	K	Ds	Dbm	Dz	RL	Lr
	(m)	(m)	(m)			dB(A)	dB	dB	dB	dB	(dB)	(dB)	(dB)	(dB)	dB(A)
84	656034.43	4769824.65	182.50	0	D	55.3	22.1	0.0	0.0	0.0	-54.1	-4.7	0.0	0.0	18.6
162	656041.05	4769607.65	182.50	0	D	55.3	20.6	0.0	0.0	0.0	-52.6	0.0	4.8	0.0	18.6
163	656037.30	4769607.60	182.50	0	D	55.3	20.6	0.0	0.0	0.0	-52.5	0.0	4.8	0.0	18.6
164	656043.00	4769462.40	180.50	0	D	55.3	19.7	0.0	0.0	0.0	-51.8	0.0	4.8	0.0	18.5
165	656039.25	4769462.34	180.50	0	D	55.3	19.7	0.0	0.0	0.0	-51.7	0.0	4.8	0.0	18.5
170	656045.41	4769283.27	180.50	0	D	55.3	17.6	0.0	0.0	0.0	-51.3	-4.8	0.0	0.0	16.9
171	656041.66	4769283.22	180.50	0	D	55.3	17.6	0.0	0.0	0.0	-51.2	-4.8	0.0	0.0	16.9
174	656044.57	4769345.92	181.35	0	D	55.3	17.2	0.0	0.0	0.0	-51.4	-4.7	0.0	0.0	16.4
175	656040.82	4769345.87	181.35	0	D	55.3	17.2	0.0	0.0	0.0	-51.3	-4.7	0.0	0.0	16.5
182	656039.47	4769727.42	181.72	0	D	55.3	15.2	0.0	0.0	0.0	-53.4	0.0	4.8	0.0	12.4
183	656035.72	4769727.37	181.72	0	D	55.3	15.2	0.0	0.0	0.0	-53.3	0.0	4.8	0.0	12.4
184	656042.01	4769535.40	181.60	0	D	55.3	14.2	0.0	0.0	0.0	-52.1	0.0	4.8	0.0	12.7
185	656038.26	4769535.34	181.60	0	D	55.3	14.2	0.0	0.0	0.0	-52.1	0.0	4.8	0.0	12.7
186	656138.99	4770075.70	182.50	0	D	55.3	16.9	0.0	0.0	0.0	-57.1	0.0	4.8	0.0	10.3
187	656136.62	4770078.60	182.50	0	D	55.3	16.9	0.0	0.0	0.0	-57.1	0.0	4.8	0.0	10.3
188	656037.66	4769923.58	182.50	0	D	55.3	15.6	0.0	0.0	0.0	-54.9	0.0	4.8	0.0	11.2
189	656033.91	4769923.69	182.50	0	D	55.3	15.6	0.0	0.0	0.0	-54.9	0.0	4.8	0.0	11.3
192	656081.71	4770026.47	182.50	0	D	55.3	15.5	0.0	0.0	0.0	-56.2	0.0	4.8	0.0	9.9
193	656079.04	4770029.11	182.50	0	D	55.3	15.5	0.0	0.0	0.0	-56.2	0.0	4.8	0.0	9.9
196	656050.50	4769982.51	182.50	0	D	55.3	14.9	0.0	0.0	0.0	-55.6	0.0	4.8	0.0	9.8
197	656047.11	4769984.10	182.50	0	D	55.3	14.9	0.0	0.0	0.0	-55.6	0.0	4.8	0.0	9.9
198	656041.14	4769955.24	182.50	0	D	55.3	14.5	0.0	0.0	0.0	-55.2	0.0	4.8	0.0	9.8
199	656037.48	4769956.03	182.50	0	D	55.3	14.5	0.0	0.0	0.0	-55.2	0.0	4.8	0.0	9.9
200	656173.15	4770103.07	182.89	0	D	55.3	15.9	0.0	0.0	0.0	-57.7	0.0	4.8	0.0	8.8
201	656170.83	4770106.02	182.89	0	D	55.3	15.9	0.0	0.0	0.0	-57.7	0.0	4.8	0.0	8.8
202	656107.07	4770049.66	182.50	0	D	55.3	15.2	0.0	0.0	0.0	-56.7	0.0	4.8	0.0	9.1
203	656104.70	4770052.57	182.50	0	D	55.3	15.2	0.0	0.0	0.0	-56.7	0.0	4.8	0.0	9.1
206	656044.11	4769379.68	181.59	0	D	55.3	11.8	0.0	0.0	0.0	-51.5	-4.7	0.0	0.0	10.9
207	656040.36	4769379.63	181.59	0	D	55.3	11.8	0.0	0.0	0.0	-51.4	-4.7	0.0	0.0	11.0
208	656040.18	4769673.71	181.74	0	D	55.3	12.4	0.0	0.0	0.0	-53.0	0.0	4.8	0.0	10.0
209	656036.43	4769673.66	181.74	0	D	55.3	12.4	0.0	0.0	0.0	-52.9	0.0	4.8	0.0	10.1
210	656039.80	4769701.95	180.91	0	D	55.3	12.5	0.0	0.0	0.0	-53.2	0.0	4.8	0.0	9.9
211	656036.06	4769701.90	180.91	0	D	55.3	12.5	0.0	0.0	0.0	-53.1	0.0	4.8	0.0	10.0
212	656042.28	4769515.63	180.60	0	D	55.3	11.2	0.0	0.0	0.0	-52.0	0.0	4.8	0.0	9.7
213	656038.53	4769515.58	180.60	0	D	55.3	11.2	0.0	0.0	0.0	-52.0	0.0	4.8	0.0	9.8
214	656063.10	4770005.02	182.50	0	D	55.3	13.4	0.0	0.0	0.0	-55.9	0.0	4.8	0.0	8.1
215	656060.02	4770007.16	182.50	0	D	55.3	13.4	0.0	0.0	0.0	-55.9	0.0	4.8	0.0	8.1
216	656043.94	4769392.40	181.42	0	D	55.3	10.2	0.0	0.0	0.0	-51.5	-4.7	0.0	0.0	9.3
217	656040.19	4769392.34	181.42	0	D	55.3	10.2	0.0	0.0	0.0	-51.5	-4.7	0.0	0.0	9.3
218	656043.69	4769410.60	180.87	0	D	55.3	10.1	0.0	0.0	0.0	-51.6	-4.7	0.0	0.0	9.1
219	656039.94	4769410.55	180.87	0	D	55.3	10.1	0.0	0.0	0.0	-51.5	-4.7	0.0	0.0	9.2
220	656211.03	4770151.05	184.02	0	D	55.3	13.4	0.0	0.0	0.0	-58.4	-4.8	0.0	0.0	5.6
221	656207.46	4770152.21	184.02	0	D	55.3	13.4	0.0	0.0	0.0	-58.3	-4.8	0.0	0.0	5.7
222	656039.99	4769687.70	180.93	0	D	55.3	10.2	0.0	0.0	0.0	-53.1	0.0	4.8	0.0	7.7
223	656036.24	4769687.65	180.93	0	D	55.3	10.2	0.0	0.0	0.0	-53.0	0.0	4.8	0.0	7.7
224	656044.97	4769315.73	180.80	0	D	55.3	9.0	0.0	0.0	0.0	-51.3	-4.7	0.0	0.0	8.2
225	656041.22	4769315.68	180.80	0	D	55.3	9.0	0.0	0.0	0.0	-51.3	-4.7	0.0	0.0	8.3
226	656043.82	4769401.55	181.24	0	D	55.3	9.0	0.0	0.0	0.0	-51.5	-4.7	0.0	0.0	8.0
227	656040.07	4769401.50	181.24	0	D	55.3	9.0	0.0	0.0	0.0	-51.5	-4.7	0.0	0.0	8.1
228	656217.15	4770171.69	184.33	0	D	55.3	13.2	0.0	0.0	0.0	-58.6	-4.7	0.0	0.0	5.2
229	656213.52	4770172.65	184.33	0	D	55.3	13.2	0.0	0.0	0.0	-58.5	-4.7	0.0	0.0	5.2
230	656193.73	4770121.11	183.45	0	D	55.3	11.9	0.0	0.0	0.0	-58.0	0.0	4.8	0.0	4.5
231	656190.91	4770123.58	183.45	0	D	55.3	11.9	0.0	0.0	0.0	-58.0	-4.8	0.0	0.0	4.5
232	656203.22	4770133.67	183.74	0	D	55.3	11.9	0.0	0.0	0.0	-58.2	-4.8	0.0	0.0	4.3
233	656200.07	4770135.71	183.74	0	D	55.3	11.9	0.0	0.0	0.0	-58.1	-4.8	0.0	0.0	4.3
234	656041.82	4769549.47	182.50	0	D	55.3	2.3	0.0	0.0	0.0	-52.2	-4.7	0.0	0.0	0.7
235	656038.07	4769549.42	182.50	0	D	55.3	2.3	0.0	0.0	0.0	-52.2	-4.7	0.0	0.0	0.8
236	656219.99	4770184.37	184.50	0	D	55.3	1.5	0.0	0.0	0.0	-58.7	-4.7	0.0	0.0	-6.6
237	656216.24	4770184.26	184.50	0	D	55.3	1.5	0.0	0.0	0.0	-58.7	-4.7	0.0	0.0	-6.6
238	656219.94	4770182.74	184.50	0	D	55.3	1.3	0.0	0.0	0.0	-58.7	-4.7	0.0	0.0	-6.8
239	656216.21	4770183.12	184.50	0	D	55.3	1.3	0.0	0.0	0.0	-58.6	-4.7	0.0	0.0	-6.7

**APPENDIX E**

**Noise Prediction Modelling Input  
Data**

Industry ID	Facility/Source Name	Facility Address	Estimated Sound Power Level (dBA)
IN01	Chemtrade - Compressor	6300 Oldfield Road	81
IN01	Chemtrade - CO2 Truck Loading	6300 Oldfield Road	99
IN01	Chemtrade - Rail Car Unloading Pump	6300 Oldfield Road	92
IN01	Chemtrade - Rail Car Unloading Pump	6300 Oldfield Road	92
IN01	Chemtrade - Rail Car Unloading Pump	6300 Oldfield Road	92
IN01	Chemtrade - Rail Car Unloading Pump	6300 Oldfield Road	92
IN01	Chemtrade - Portable Compressor	6300 Oldfield Road	98
IN01	Chemtrade - Scrubber	6300 Oldfield Road	98
IN01	Chemtrade - Railcar Air Brake	6300 Oldfield Road	122
IN02	Washington Mills Electro Minerals Corporation Source	7780 Stanley Ave	110
IN02	Washington Mills Electro Minerals Corporation Source	7780 Stanley Ave	110
IN02	Washington Mills Electro Minerals Corporation Source	7780 Stanley Ave	110
IN02	Washington Mills Electro Minerals Corporation Source	7780 Stanley Ave	110
IN02	Washington Mills Electro Minerals Corporation Source	7780 Stanley Ave	110
IN02	Washington Mills Electro Minerals Corporation Source	7780 Stanley Ave	110
IN05	Niagara Pattern Limited	6135 Don Murie Street	97
IN07	Brunner Manufacturing & Sales Ltd.	5720 Don Murie Street	97
IN08	Tecna-Division of Brunner - East Side	5770 Don Murie Street	102
IN08	Tecna-Division of Brunner - West Side	5770 Don Murie Street	104
IN09	Laurcoat Inc.	8591 Earl Thomas Ave	98
IN10	St. Lawrence Cement Inc. / Dufferin Concrete - Cement Truck Blower	5980 Don Murie Street	112
IN10	St. Lawrence Cement Inc. / Dufferin Concrete - Loader	5980 Don Murie Street	111
IN10	St. Lawrence Cement Inc. / Dufferin Concrete - Truck Loading (Fan Off)	5980 Don Murie Street	109
IN10	St. Lawrence Cement Inc. / Dufferin Concrete - Truck Loading (Fan On)	5980 Don Murie Street	118
IN10	St. Lawrence Cement Inc. / Dufferin Concrete - Truck Rinsing (Fan Off)	5980 Don Murie Street	108
IN10	St. Lawrence Cement Inc. / Dufferin Concrete - Truck Rinsing (Fan On)	5980 Don Murie Street	118
IN11	Pumpcrete Corporation	6000 Progress Street	108
IN12	Mancuso Chemicals Limited	5635 & 5725 Progress Street	108
IN14	Barbisan Allmetal Designs	5835 Progress Street	96
IN16	Fencast Industries Ltd	6272 Kister Road	96
IN19	Dyaco Canada Inc.	5955 Don Murie Street	98
IN21	Gordon Wright Electrical Limited	6255 Don Murie Street	98
IN23	Airwood Vents	6167 Don Murie Street	101
IN30	Batemans Tires	8407 Stanley Avenue	98
IN32	Salit Steel - Tractor-Trailer Coupling (Impulsive) (Unmitigated)	7771 Stanley Avenue	115
IN32	Salit Steel - Tractor-Trailer Coupling (Impulsive) (Mitigated)	7771 Stanley Avenue	109
IN32	Salit Steel - Material Handling North Yard (Impulsive) (Unmitigated)	7771 Stanley Avenue	130
IN32	Salit Steel - Material Handling North Yard (Impulsive) (Mitigated)	7771 Stanley Avenue	114
IN33	L. Wallter & Sons Excavating Ltd.	7527 Stanley Avenue	98
IN40	Davert Tools	5676 Progress Street	98
IN46	Niagara Fastener Inc.	6095 Progress Street	99
IN50	Lafarge Quality Ready Mix - Cement Truck Blower	6224 Progress Street	112
IN50	Lafarge Quality Ready Mix - Loader	6224 Progress Street	111
IN50	Lafarge Quality Ready Mix - Truck Loading (Fan Off)	6224 Progress Street	109
IN50	Lafarge Quality Ready Mix - Truck Loading (Fan On)	6224 Progress Street	118
IN50	Lafarge Quality Ready Mix - Truck Rinsing (Fan Off)	6224 Progress Street	108
IN50	Lafarge Quality Ready Mix - Truck Rinsing (Fan On)	6224 Progress Street	118
IN52	Factor Forms and Labels	8481 Earl Thomas Avenue	98
IN53	Stelfab Niagara Limited	8594 Earl Thomas Avenue	98
IN54	Food Roll Sales (Niagara) Ltd.	8464 Earl Thomas Avenue	96
IN56	Avid Growing Systems	8100 Dorchester Road	108
IN57	Palfinger Inc.	7942 Dorchester Road	108



**APPENDIX F**

# Screening Assessment Results

ID	Facility Name	Maximum Predicted Boundary Noise Level (dBA)
IN01	Chemtrade	<b>60</b>
IN02	Washington Mills Electro Minerals Corporation	<b>51</b>
IN05	Niagara Pattern Limited	29
IN07	Brunner Manufacturing & Sales Ltd.	25
IN08	Tecna-Division of Brunner	35
IN09	Laurcoat Inc.	27
IN10	St. Lawrence Cement Inc. / Dufferin Concrete	<b>47</b>
IN11	Pumpcrete Corporation	39
IN12	Mancuso Chemicals Limited	42
IN14	Barbisan Allmetal Designs	29
IN16	Fencast Industries Ltd	31
IN19	Dyaco Canada Inc.	25
IN21	Gordon Wright Electrical Limited	30
IN23	Airwood Vents	33
IN30	Batemans Tires	30
IN32	Salit Steel	<b>70</b>
IN33	L. Wallter & Sons Excavating Ltd.	36
IN40	Davert Tools	29
IN46	Niagara Fastener Inc.	35
IN50	Lafarge Quality Ready Mix	<b>55</b>
IN52	Factor Forms and Labels	29
IN53	Stelfab Niagara Limited	27
IN54	Food Roll Sales (Niagara) Ltd.	28
IN56	Avid Growing Systems	39
IN57	Palfinger Inc.	37

**Bold** indicates noise levels above the most stringent Class 2 exclusionary sound level limit (i.e., 45 dBA)

**APPENDIX G**

**Sample Calculations**

## Report (1784512 NiagaraVillage Noise Jul2021 samplecalc.cna)

### CALCULATION CONFIGURATION

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.00
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	1000.00
Min. Length of Section (#(Unit,LEN))	1.00
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	6.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	96.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.50
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (FTA/FRA)	
Aircraft (ECAC Doc.29)	
Strictly acc. to AzB	

### NOISE SOURCES

#### Noise Source Library

Name	ID	Type	Oktave Spectrum (dB)													Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin		
Class 2 industry sound	C2_1	Lw	98.5	99.3	101.6	93.6	92.8	94.7	90.5	83.9	75.1	98.0	105.9			
Class 2 industry sound 2	C2_2	Lw	115.9	113.0	111.4	107.6	105.5	103.5	99.0	89.1	65.3	108.0	119.3			
Class 3 industry sound	C3_1	Lw	100.7	108.8	110.7	103.3	107.1	109.5	107.4	98.6	77.0	113.0	116.3			
Class 3 industry sound 2	C3_2	Lw	129.9	126.1	124.6	122.7	114.6	108.8	105.6	102.5	97.1	118.0	132.8			
Rail_Locomotive Idling	Rail_10	Lw	105.0	100.0	95.0	97.0	99.0	100.0	101.0	102.0	102.0	108.0	110.5			
Railway - Locomotive Idling - Marshalling Yard	S200	Lw	109.0	104.0	99.0	101.0	103.0	104.0	105.0	106.0	106.0	112.0	114.5			
Railway - Crossover - Marshalling Yard	S204	Lw	103.9	109.6	104.7	95.5	93.5	92.9	90.1	84.9	81.5	98.0	111.9			
Diesel Locomotive - 3355 kW - Passby	S208	Lw	127.0	122.0	117.0	119.0	121.0	122.0	123.0	124.0	124.0	130.0	132.5			
Shunting Diesel Locomotive - 500 kW - Passby	S209	Lw	122.7	117.7	112.7	114.7	116.7	117.7	118.7	119.7	119.7	125.7	128.2			
Railway Wheel Squeal	S210	Lw	112.2	122.2	109.6	109.1	97.2	95.0	99.5	134.0	110.3	135.0	134.4			
Railway Impulses	S211	Lw	105.2	104.6	100.7	112.8	118.6	124.3	120.4	114.9	110.7	127.0	127.2			
Railcar - Passby	S212	Lw	113.6	119.3	111.7	109.6	106.6	101.9	109.5	105.7	105.1	113.9	121.9			
Truck Loading - Fan Off	QRM01	Lw	100.4	102.0	107.5	101.1	104.8	103.9	101.8	98.4	93.3	108.6	112.4			
Truck Loading - Fan On	QRM02	Lw	102.3	108.9	110.8	122.1	117.4	110.3	108.4	101.7	97.0	118.5	124.1			
Truck Rinsing - Fan Off	QRM03	Lw	101.8	104.7	107.4	102.4	104.8	102.2	102.1	98.3	92.6	108.2	112.8			

Name	ID	Type	Weight	Oktave Spectrum (dB)											Source
				31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
Truck Rinsing - Fan On	QRM04	Lw		102.9	109.8	112.7	120.4	114.9	111.4	108.8	103.2	97.6	117.6	122.9	
Truck Pass-By	QRM05	Lw		99.7	106.5	108.5	105.5	103.1	101.7	100.3	95.7	89.4	107.1	113.2	
Loader	QRM06	Lw		96.0	108.1	117.5	110.0	106.1	105.7	104.7	99.9	94.7	111.4	119.3	
Cement Truck Blower	QRM07	Lw		105.6	109.9	114.1	107.5	104.9	102.3	97.8	91.2	78.7	107.5	117.0	
Dust Collector	DC01	Lw		108.7	109.5	95.6	94.5	93.5	90.3	86.1	86.6	84.0	96.2	112.4	
Gantry Crane	GC01	Lw		104.0	106.0	117.0	105.0	103.0	101.0	100.0	96.0	87.0	107.6	118.1	
CO2 Truck loading operation	CO2TLO	Lw		99.0	94.0	94.0	90.0	96.0	95.0	93.0	87.0	79.0	99.3	103.7	
Scrubber	Scru	Lw		81.0	81.0	83.0	89.0	93.0	92.0	92.0	90.0	88.0	98.1	99.1	
Portable Compressor	PC	Lw		106.0	99.0	90.0	88.0	89.0	94.0	92.0	85.0	81.0	97.5	107.4	
Rail Cars Unloading Pump	RCUP	Lw		78.0	73.0	72.0	80.0	84.0	90.0	83.0	79.0	71.0	91.8	92.4	
Compressor Louvre	Comp	Lw		68.0	71.0	70.0	76.0	80.0	77.0	73.0	68.0	56.0	81.4	83.9	
Railcar Air Break	RAB	Lw		84.0	79.0	75.0	80.0	87.0	94.0	106.0	114.0	112.0	116.9	116.6	
Shunting Machine	SM	Lw		96.0	96.0	112.0	115.0	102.0	104.0	99.0	95.0	86.0	109.8	117.3	
Traffic Activities	TR	Lw		0.0	105.0	105.0	104.0	102.0	95.0	88.0	84.0	82.0	102.1	110.4	
Backup Alarm	BUA	Lw		13.0	13.0	13.0	13.0	13.0	115.0	13.0	13.0	13.0	115.0	115.0	

### Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li		Correction				Sound Reduction		Attenuation			Operating Time			K0	Freq.	Direct.	Height	Coordinates		
			Day (dBA)	Evening (dBA)	Night (dBA)	Type	Value (dB(A))	norm. (dB(A))	Day (dB(A))	Evening (dB(A))	Night (dB(A))	R	Area (m²)	Day (min)	Special (min)	Night (min)	X (m)	Y (m)	Z (m)							
1683063 Ontario Inc	-	10016100 Progress	0.0	0.0	0.0	Lw														0.0	(Hz)	(none)	3.00 r	655206.81	4768575.00	182.11
Air Liquide Canada Inc	-	10016090 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655245.77	4768231.23	0.00	
Aztec Frames	-	10016025 Progress	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655416.55	4768666.84	0.00	
Collins Concessions Ltd	-	10018621 Earl Thomas	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655611.63	4768402.18	0.00	
CYRO Canada Inc	-	10018100 Dorchester	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	653651.68	4769052.38	181.00	
BA Canada (was Edscha)	-	10015795 Don Murie	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655684.55	4768256.33	181.00	
Factor Forms and Labels	-	1000718481 Earl Thomas	98.0	98.0	98.0	Lw	C2_1													0.0	(none)	4.00 r	655627.31	4768562.00	183.25	
Falls Contracting Inc	-	10015850 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655641.81	4768347.00	0.00	
Fastenal	-	10016537 Kister	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655238.00	4768331.00	0.00	
Fred's Concrete	-	10015806 Ramsey	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655600.12	4769176.99	183.00	
GC Customs Services Inc	-	10016045 Progress	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655358.31	4768669.50	0.00	
Gordon Wright Electrical Limited	-	1000C16255 Don Murie	98.0	98.0	98.0	Lw	C2_1													0.0	(none)	4.00 r	654969.42	4768261.37	182.00	
H & L Tool and Die Ltd	-	10015955 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655546.24	4768226.17	181.00	
Hangups Sportware	-	10016537 Kister	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655238.00	4768331.00	0.00	
Hoco Limited	-	10015720 Progress	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655819.94	4768555.50	181.70	
International Sew-Right	-	10016190 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655090.63	4768182.00	0.00	
Louver-Lite	-	10016015 Progress	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655474.25	4768713.00	0.00	
Marine Clean Ltd	-	10016220 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655038.49	4768165.47	0.00	
Marineland Canada	-	10015680 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655896.95	4768386.91	0.00	
Marineland Canada	-	10018455 Stanley	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	656023.56	4768612.00	0.00	
Marineland Canada	-	10018529 Stanley	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	656038.73	4768370.65	0.00	
Marineland Canada	-	10018559 Stanley	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	656030.40	4768459.15	0.00	
Micron Installations	-	10016501 Kister	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655219.75	4768392.00	0.00	
Niagara Analytical Laboratories	-	10015805 Progress	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655646.44	4768699.30	0.00	
Niagara Bus Wash	-	10016441 Kister	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655213.00	4768484.00	0.00	
Niagara Commercial Coating & Insulation	-	10016260 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	654998.25	4768179.50	0.00	
Niagara Fence Supply	-	10016065 Progress	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655300.44	4768666.50	0.00	
Niagara Moving and Storage	-	10017825 Dorchester	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	653754.19	4769515.00	0.00	
Niagara Pattern Limited	-	1000816135 Don Murie	97.4	97.4	97.4	Lw	DC01	97.4												0.0	(none)	8.00 r	655178.63	4768329.34	186.00	
Niagara River Trading	-	10016199 Don Murie	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655085.63	4768309.00	0.00	
Niagara RV & Trailer Center	-	10016471 Kister	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655216.06	4768438.50	0.00	
Peglow Tool & Die Inc	-	10018345 Stanley	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	656010.88	4768792.00	0.00	
Provincial Design & Fabrication Inc	-	10016159 Progress	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655110.90	4768698.17	183.00	
Specialty Cast Metals Ltd	-	10015635 Progress	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655854.14	4768709.21	183.00	
Spencer ARL	-	10016040 Progress	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655291.61	4768519.93	181.45	
T Hodgson & Co Ltd	-	10016411 Kister	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655209.94	4768529.50	0.00	
Unit 1 Advanced Cryogenic Services	-	10016100 Progress	0.0	0.0	0.0	Lw														0.0	(none)	3.00 r	655206.81	4768575.00	0.00	
Airwood Vents	-	1000616167 Don Murie	101.2	101.2	101.2	Lw	DC01	101.2												0.0	(none)	8.00 r	655139.27	4768312.63	186.00	
Avid Growing Systems	-	1000518100 Dorchester	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	653686.87	4769061.42	183.00	
Barbisan Allmetal Designs	-	1000915835 Progress	96.4	96.4	96.4	Lw	C2_2	96.4												0.0	(none)	4.00 r	655614.69	4768679.02	183.83	
Batemans Tires	-	1000B18407 Stanley	98.0	98.0	98.0	Lw	C2_1													0.0	(none)	3.00 r	656018.97	4768690.63	183.00	
Brunner Manufacturing & Sales Ltd	-	1000E15720 Don Murie	96.8	96.8	96.8	Lw	C2_1	96.8												0.0	(none)	3.00 r	655828.60	4768335.76	181.00	
Tecna-Division of Brunner	-	1000115770 Don Murie_B	102.1	102.1	102.1	Lw	C2_2	102.1												0.0	(none)	3.00 r	655766.06	4768356.16	181.00	
Can Mar Manufacturing Inc	-	10015869 Progress	108.0	108.0	108.0	Lw	C2_2													0.0	(none)	3.00 r	655550.38	4768717.00	183.00	
Chemtrade	-	1000L16300 Oldfield	98.0	98.0																						

Name	M.	ID	Result. PWL			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height	Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R		Area	Day	Special					Night	X	Y
			(dBA)	(dBA)	(dBA)		(dB(A))	(dB(A))	(dBA)	(dBA)	(dBA)		(m²)	(min)	(min)	(min)	(dB)	(Hz)	(m)	(m)	(m)		
Chemtrade - Impulsive	~	!0116300 Oldfield	127.0	127.0	127.0	Lw	S211									0.0	(none)	3.00	r	654892.70	4769428.87	183.19	
Salit Steel - Impulsive	~	!0117771 Stanley	127.0	127.0	127.0	Lw	S211							80.00	0.00	40.00	0.0	(none)	3.00	r	655826.50	4769610.55	185.00
Quality Ready Mix - Truck Loading, Fan Off		!0002!QRM01	108.6	108.6	108.6	Lw	QRM01							280.00	0.00	40.00	0.0	(none)	1.80	r	654973.84	4768546.44	181.15
Quality Ready Mix - Truck Loading, Fan On		!0002!QRM02	118.5	118.5	118.5	Lw	QRM02							280.00	0.00	40.00	0.0	(none)	1.80	r	654973.84	4768546.60	181.15
Quality Ready Mix - Truck Rinsing - Fan Off		!0002!QRM03	108.2	108.2	108.2	Lw	QRM03							280.00	0.00	40.00	0.0	(none)	1.80	r	654982.53	4768563.48	181.41
Quality Ready Mix - Truck Rinsing - Fan On		!0002!QRM04	117.6	117.6	117.6	Lw	QRM04							280.00	0.00	40.00	0.0	(none)	1.80	r	654982.49	4768563.72	181.41
Quality Ready Mix - Loader		!0002!QRM06	111.4	111.4	111.4	Lw	QRM06							320.00	0.00	80.00	0.0	(none)	2.40	r	655011.66	4768493.62	182.26
Quality Ready Mix - Cement Truck Blower		!0002!QRM07	112.5	112.5	112.5	Lw	QRM07							720.00	0.00	180.00	0.0	(none)	1.80	r	654998.57	4768537.26	181.33
Dufferin Ready Mix - Truck Loading, Fan Off		!0003!DRM01	108.6	108.6	108.6	Lw	QRM01							280.00	0.00	40.00	0.0	(none)	1.80	r	655476.24	4768415.27	180.21
Dufferin Ready Mix - Truck Loading, Fan On		!0003!DRM02	118.5	118.5	118.5	Lw	QRM02							280.00	0.00	40.00	0.0	(none)	1.80	r	655476.36	4768415.20	180.21
Dufferin Ready Mix - Truck Rinsing - Fan Off		!0003!DRM03	108.2	108.2	108.2	Lw	QRM03							280.00	0.00	40.00	0.0	(none)	1.80	r	655502.17	4768363.73	180.07
Dufferin Ready Mix - Truck Rinsing - Fan On		!0003!DRM04	117.6	117.6	117.6	Lw	QRM04							280.00	0.00	40.00	0.0	(none)	1.80	r	655502.09	4768363.80	180.07
Dufferin Ready Mix - Loader		!0003!DRM06	111.4	111.4	111.4	Lw	QRM06							320.00	0.00	80.00	0.0	(none)	2.40	r	655490.27	4768434.20	180.92
Dufferin Ready Mix - Cement Truck Blower		!0003!DRM07	112.5	112.5	112.5	Lw	QRM07							720.00	0.00	180.00	0.0	(none)	1.80	r	655463.17	4768415.56	180.18
Tecna-Division of Brunner		!0001!5770 Don Murie_A	103.8	103.8	103.8	Lw	C2_2	103.8									0.0	(none)	3.00	r	655723.90	4768363.24	181.00
Chemtrade - Compressor		!000L!Comp	81.4	81.4	81.4	Lw	Comp										0.0	(none)	1.00	r	654739.49	4769332.85	182.00
Chemtrade - CO2 Truck Loading		!000L!CO2TO	99.3	99.3	99.3	Lw	CO2TLO										0.0	(none)	3.00	r	654786.95	4769345.85	184.02
Chemtrade - Rail Car Unloading Pump		!000L!RCUP4	91.8	91.8	91.8	Lw	RCUP										0.0	(none)	0.50	r	654768.66	4769314.16	181.50
Chemtrade - Rail Car Unloading Pump		!000L!RCUP3	91.8	91.8	91.8	Lw	RCUP										0.0	(none)	0.50	r	654759.15	4769306.03	181.50
Chemtrade - Rail Car Unloading Pump		!000L!RCUP2	91.8	91.8	91.8	Lw	RCUP										0.0	(none)	0.50	r	654751.11	4769298.72	181.50
Chemtrade - Rail Car Unloading Pump		!000L!RCUP1	91.8	91.8	91.8	Lw	RCUP										0.0	(none)	0.50	r	654741.85	4769290.60	181.50
Chemtrade - Portable Compressor		!000L!PC	97.5	97.5	97.5	Lw	PC										0.0	(none)	1.00	r	654728.25	4769303.35	182.00
Chemtrade - Scrubber		!000L!Scru	98.1	98.1	98.1	Lw	Scru										0.0	(none)	1.00	r	654730.70	4769306.21	182.00
Chemtrade - Railcar Air Brake		!000L!RAB	121.9	121.9	121.9	Lw	RAB							32.00	0.00	16.00	0.0	(none)	2.00	r	654650.27	4769227.21	183.00
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656269.53	4769705.36	184.32
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656141.25	4769656.88	184.00
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656185.69	4769744.69	184.36
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656244.05	4769697.09	184.32
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656150.40	4769651.29	184.00
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656215.40	4769744.70	184.53
Washington Mills Electro Minerals Corporation		!000D!7780 Stanley	110.0	110.0	110.0	Lw	C3_2-8										0.0	(none)	2.00	r	656154.77	4769655.92	184.00
Quality Ready Mix - Truck Backup Alarm	~	!09!BUA	115.0	115.0	115.0	Lw	BUA										0.0	(none)	1.80	r	654982.85	4768563.60	181.42

#### Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R		Area	Day	Special				Night	Number	Speed
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)		(dB(A))	(dB(A))	(dBA)	(dBA)	(dBA)		(m²)	(min)	(min)	(min)	(dB)	(Hz)	Day	Evening	Night	(km/h)
Quality Ready Mix - Truck Passby		!0002!QRM05	95.8	-15.7	90.3	75.5	-36.0	70.1	PWL-Pt	QRM05								0.0	(none)	14.0	0.0	4.0	20.0		
Dufferin Ready Mix - Truck Passby		!0003!DRM05	97.4	-11.1	91.9	72.5	-36.0	67.1	PWL-Pt	QRM05								0.0	(none)	7.0	0.0	2.0	20.0		
Chemtrade Traffic		!000L!TR	86.8	-13.2	86.8	59.1	-40.9	59.1	PWL-Pt	TR							480.00	0.00	240.00	0.0	(none)	1.0	0.0	1.0	20.0
Chemtrade - Shunting		!000L!S12	105.0	-5.7	105.0	78.8	-32.0	78.8	PWL-Pt	SM								0.0	(none)	12.0	0.0	12.0	15.0		
Chemtrade - Shunting		!000L!S12	103.5	-7.3	103.5	78.8	-32.0	78.8	PWL-Pt	SM								0.0	(none)	12.0	0.0	12.0	15.0		
Tractor-trailer Coupling		!000403!S12	115.0	115.0	115.0	93.6	93.6	93.6	Lw	C2_1+17								0.0	(none)						

#### Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src		
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R		Area	Day	Special				Night	Number	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)		(dB(A))	(dB(A))	(dBA)	(dBA)		(m²)	(min)	(min)	(min)	(dB)	(Hz)	Day	Evening	Night		
Material Handling North Yard - Salit Impulsive		!000402!	129.8	129.8	129.8	87.1	87.1	87.1	Lw	QRM06+18.4								0.0	(none)						

#### Vertical Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li		Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R		Area	Day	Special			
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)		(dB(A))	(dB(A))	(dBA)	(dBA)		(m²)	(min)	(min)	(min)	(dB)	(Hz)		

#### Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Length
			left	right		horz.	vert.	Begin	End	
			(m)	(m)	(m)	(m)	(m)	(m)		
Barrier - 6 storey	~	Bar01	0.21	0.21				20.80	r	12
Barrier - 6 storey	~	Bar02	0.21	0.21				20.80	r	12
Barrier - 6 storey	~	Bar03	0.21	0.21				20.80	r	12
Barrier - 6 storey	~	Bar04	0.21	0.21				20.80	r	12
Parapet	~	Bar05	0.21	0.21				1.30	g	282
Parapet	~	Bar06	0.21	0.21				1.30	g	195
Parapet	~	Bar07	0.21	0.21				1.30	g	195
Parapet	~	Bar08	0.21	0.21				1.30	g	236
Parapet	~	Bar09	0.21	0.21				1.30	g	213
Parapet	~	Bar10	0.21	0.21				1.30	g	216
Barrier - 2.5m (Chemtrade C1)	-	!000L!Bar11	0.21	0.21				2.50	r	252
Barrier - 5m (Chemtrade C1)	-	!000L!Bar12	0.21	0.21				5.00	r	407
Barrier - 3m (Chemtrade C4)	-	!000L!Bar13	0.21	0.21				3.00	r	407

Name	M.	ID	Absorption		Z-Ext.		Cantilever		Height		Length (m)
			left	right	(m)	(m)	horz.	vert.	Begin (m)	End (m)	
Barrier - 3m (QRM)	-	100021Bar14	0.21	0.21					3.00	r	234
Barrier - 4m (Salit, At-source)	-	10004021Bar15	0.21	0.21					4.00	r	193
Barrier - 30m (Salit Day C2 unmit)	-	10004021Bar16	0.21	0.21					30.00	r	392
Barrier - 20m (Salit Day C4 Unmit)	-	10004021Bar17	0.21	0.21					20.00	r	392
Barrier - 2.5m (Salit Day C2 Unmit)	-	10004021Bar18	0.21	0.21					2.50	g	86
Barrier - 3m (Salit Night C2 Unmit)	-	10004031Bar19	0.21	0.21					3.00	r	350

### Building(s)

Name	M.	ID	RB	Residents	Absorption	Height (m)	Coordinates	
							x (m)	y (m)
QualityReadyMix	~	!07!QualityReadyMix	x	0	0.37	9.00	654990.46	4768547.25
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	654741.87	4768697.52
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	6.00	655345.07	4768507.68
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655396.05	4768382.41
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655204.57	4768692.10
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	6.00	655322.44	4768735.21
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655478.12	4768552.76
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	6.00	655465.68	4768549.27
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655493.52	4768498.27
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	4.50	655113.08	4768670.47
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	6.00	655472.24	4768736.10
SalitBuilding	~	!07!SalitBuilding	x	0		6.00	655848.60	4769714.65
SalitBuilding	~	!07!SalitBuilding	x	0		5.00	655918.60	4769649.92
SalitBuilding	~	!07!SalitBuilding	x	0		5.00	655963.04	4769638.46
Apartment_VistaGate	~	!07!Apartment_VistaGate	x	0	0.37	30.00	655275.11	4769676.93
GreenVistaGate1	~	!07!GreenVistaGate1	x	0	0.37	6.00	655357.96	4769741.84
GreenVistaGate2	~	!07!GreenVistaGate2	x	0	0.37	6.00	655393.40	4769774.36
GreenVistaGate3	~	!07!GreenVistaGate3	x	0	0.37	6.00	655428.46	4769805.73
GreenVistaGate4	~	!07!GreenVistaGate4	x	0	0.37	6.00	655463.66	4769836.94
GreenVistaGate5	~	!07!GreenVistaGate5	x	0	0.37	6.00	655328.86	4769771.05
GreenVistaGate6	~	!07!GreenVistaGate6	x	0	0.37	6.00	655361.99	4769801.42
GreenVistaGate7	~	!07!GreenVistaGate7	x	0	0.37	6.00	655404.50	4769838.40
GreenVistaGate8	~	!07!GreenVistaGate8	x	0	0.37	6.00	655384.00	4769861.83
Chemtrade Quonset Hut	~	!07!ChemtradeQuonsetHut	x	0	0.37	4.50	654718.93	4769367.55
Sulphuric Acid Storage Tank	~	!07!SulphuricAcidStorageTank	x	0	0.37	9.00	654692.55	4769335.63
Chemtrade Sulphuric Acid Storage Tank	~	!07!ChemtradeSulphuricAcidStorageTank	x	0	0.37	7.30	654780.92	4769406.79
Chemtrade Office	~	!07!ChemtradeOffice	x	0	0.37	4.20	654817.08	4769411.36
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	6.00	655415.17	4768667.05
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	4.00	655370.72	4768666.09
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655371.44	4768650.64
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655290.09	4768663.27
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	6.00	655502.06	4769180.33
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655415.96	4769193.05
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655338.84	4769128.87
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655555.84	4768674.29
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655602.61	4768675.94
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655654.42	4768680.40
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	4.00	655545.66	4768480.40
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655579.76	4769203.52
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655598.81	4769204.40
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655623.35	4769203.52
OffsiteBuilding	~	!07!OffsiteBuilding	x	0	0.37	3.00	655542.76	4769202.03
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655350.99	4769282.34
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655352.60	4769252.40
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655297.94	4769244.76
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655247.62	4769248.08
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655255.63	4769277.00
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655301.60	4769280.62
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	655436.21	4769572.50
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	655505.25	4769475.28
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	655582.67	4769369.29
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	655654.67	4769298.41
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655204.91	4769647.96
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655223.69	4769692.27
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655244.55	4769735.19
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655452.04	4769338.67
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655417.17	4769377.94
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655392.43	4769406.11
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655355.97	4769443.98
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655331.23	4769472.14
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655293.56	4769508.50
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655319.71	4769462.09
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655308.43	4769452.17
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655297.42	4769442.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655285.89	4769432.60
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655274.63	4769422.56
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655263.92	4769412.29
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655253.59	4769401.53
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655242.19	4769391.81
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655231.05	4769382.09

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates	
						Begin	x	y
						(m)	(m)	(m)
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655219.39	4769371.99
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655207.99	4769361.88
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655282.20	4769498.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655270.97	4769488.74
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655259.88	4769478.96
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655248.44	4769468.78
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655237.28	4769458.93
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655226.84	4769447.93
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655217.30	4769436.28
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655207.21	4769425.31
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655191.42	4769411.48
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655178.69	4769403.24
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655165.65	4769395.45
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655153.97	4769385.85
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655142.74	4769375.86
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655131.47	4769366.11
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655120.20	4769355.86
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655108.66	4769345.94
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655344.61	4769434.20
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655333.41	4769424.26
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655321.90	4769414.39
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655310.79	4769404.41
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655299.58	4769394.54
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655287.65	4769383.02
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655279.01	4769368.06
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655274.38	4769353.10
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655381.16	4769396.27
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655369.76	4769386.35
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655358.57	4769376.56
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655429.51	4769318.93
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655418.10	4769308.85
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655407.09	4769299.08
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655392.45	4769289.36
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655375.48	4769283.79
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655228.87	4769345.84
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655243.08	4769337.81
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655257.72	4769330.90
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655273.16	4769326.85
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655166.39	4769336.10
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655176.26	4769324.84
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655186.22	4769313.49
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655197.32	4769301.74
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655211.36	4769291.45
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655227.04	4769283.45
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655138.45	4769311.46
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655148.43	4769299.92
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655158.02	4769288.65
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655168.56	4769277.80
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655179.82	4769268.31
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655191.33	4769259.64
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655203.96	4769252.68
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 655217.22	4769247.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654728.69	4768893.05
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654739.96	4768902.95
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654762.50	4768922.75
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654773.77	4768932.65
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654785.04	4768942.55
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654796.30	4768952.45
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654807.57	4768962.35
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654818.84	4768972.25
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654830.11	4768982.15
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654841.38	4768992.05
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654852.65	4769001.95
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654887.16	4768960.42
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654841.95	4768921.12
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654876.49	4769140.80
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654751.57	4768841.97
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654762.86	4768851.85
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654774.14	4768861.73
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654785.43	4768871.61
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r 654796.72	4768881.49



Name	M.	ID	RB	Residents	Absorption	Height	Coordinates	
						Begin	x	y
						(m)	(m)	(m)
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654808.00	4768891.37
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654819.29	4768901.25
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654830.57	4768911.13
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654703.47	4768921.04
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654714.76	4768930.92
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654726.05	4768940.80
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654737.33	4768950.68
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654748.62	4768960.56
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654759.90	4768970.44
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654771.19	4768980.32
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654782.48	4768990.20
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654793.76	4769000.08
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654805.05	4769009.96
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654816.34	4769019.84
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654828.01	4769029.88
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654887.76	4769150.70
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654899.03	4769160.60
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654910.30	4769170.50
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654921.57	4769180.40
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654932.84	4769190.30
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654944.10	4769200.20
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654955.37	4769210.10
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654966.64	4769220.00
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654977.91	4769229.90
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654989.18	4769239.80
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655000.45	4769249.70
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655011.72	4769259.60
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655022.99	4769269.50
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655034.26	4769279.40
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655045.52	4769289.30
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655056.79	4769299.20
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655068.06	4769309.10
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654658.03	4768948.15
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654669.28	4768958.07
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654680.53	4768967.99
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654691.78	4768977.91
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654703.03	4768987.83
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654714.28	4768997.74
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654725.54	4769007.66
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654736.79	4769017.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654748.04	4769027.50
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654759.29	4769037.42
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654770.54	4769047.34
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654781.79	4769057.26
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654793.05	4769067.18
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654804.30	4769077.10
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654820.29	4769090.95
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654842.80	4769110.79
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655062.50	4769647.07
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655063.22	4769664.18
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655065.94	4769680.71
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655069.77	4769696.28
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655075.61	4769711.16
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655083.13	4769725.39
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655090.27	4769738.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655097.40	4769751.78
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655104.53	4769764.97
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655118.80	4769791.36
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655126.07	4769805.20
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655135.18	4769818.49
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655144.43	4769831.04
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655154.44	4769843.57
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654955.61	4769141.29
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654967.34	4769151.62
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654978.50	4769161.43
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654989.67	4769171.29
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655001.02	4769181.35
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655012.25	4769191.22
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655023.56	4769201.26
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655034.83	4769211.16
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655046.10	4769221.06
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655057.37	4769230.96
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655068.64	4769240.86
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655079.78	4769250.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655090.93	4769260.17
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655102.72	4769270.28
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655165.72	4769855.65
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	655180.74	4769865.49
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	654865.30	4769130.63
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655272.31	4769769.79
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	655306.43	4769800.97

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates		
						Begin	x	y	
						(m)	(m)	(m)	
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655153.07	4769655.36
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655185.78	4769730.55
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655168.50	4769694.34
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655204.44	4769766.32
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655186.76	4769797.53
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655177.96	4769784.79
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655169.62	4769771.11
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655162.07	4769757.97
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655155.38	4769744.50
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655148.51	4769731.15
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655141.81	4769717.84
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655134.87	4769704.28
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655128.26	4769690.47
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655122.55	4769674.91
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655119.83	4769658.32
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655119.32	4769641.65
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655236.66	4769817.42
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On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655247.88	4769807.03
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655270.29	4769829.83
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655260.28	4769842.08
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655195.44	4769872.35
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655210.46	4769877.09
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655225.11	4769881.12
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655239.41	4769884.83
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655253.92	4769888.84
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655291.11	4769887.21
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655305.15	4769876.05
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655315.86	4769863.53
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655270.77	4769891.69
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654898.46	4768970.22
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654909.76	4768980.03
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654921.21	4768990.00
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654932.34	4768999.80
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654943.54	4769009.53
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654955.00	4769019.42
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654968.68	4769031.45
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	654872.22	4769068.11
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	654913.86	4769104.57
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	654895.97	4769041.89
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	654937.33	4769077.89
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654835.29	4769187.91
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654846.56	4769197.81
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654857.83	4769207.71
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654869.10	4769217.61
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654880.37	4769227.51
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654891.64	4769237.41
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654902.91	4769247.31
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654914.18	4769257.21
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654925.45	4769267.11
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654936.71	4769277.01
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654947.98	4769286.91
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654959.25	4769296.81
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654970.52	4769306.71
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654981.79	4769316.61
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654993.06	4769326.51
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655004.33	4769336.41
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655015.60	4769346.31
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655026.87	4769356.21
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654789.19	4769233.24
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654802.50	4769245.97
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654817.24	4769253.97
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654828.51	4769263.87
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654839.78	4769273.77
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654851.04	4769283.67
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654862.31	4769293.57
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654873.58	4769303.47
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654884.85	4769313.37
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654896.12	4769323.27
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654907.39	4769333.17
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654918.66	4769343.07
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654929.93	4769352.97
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654941.20	4769362.87
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654952.47	4769372.77
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654963.73	4769382.67
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654975.00	4769392.57
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654986.27	4769402.47
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654811.60	4769181.77
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654791.33	4769192.89
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654782.34	4769213.20
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655070.30	4769385.69
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655060.16	4769396.91
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655050.40	4769408.23
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655040.53	4769419.55

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates		
						Begin	x	y	
						(m)	(m)	(m)	
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655031.14	4769431.26
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	r	655361.02	4769564.77
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654986.55	4769646.39
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654986.28	4769661.36
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	654986.98	4769632.79
Salit	~	!07!Salit	x	0	0.37	3.00	r	655941.63	4769766.26
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656084.66	4769636.45
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656152.52	4769628.78
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656108.03	4769725.34
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656137.02	4769863.25
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656094.28	4769779.67
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656078.11	4769758.06
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656107.89	4769756.38
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656189.44	4769724.83
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656279.40	4769725.62
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656118.97	4769643.23
Washington Mills	~	!07!WashingtonMills	x	0	0.37	12.00	r	656226.36	4769795.77
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656150.59	4769770.30
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656117.17	4769672.08
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656124.24	4769708.81
Washington Mills	~	!07!WashingtonMills	x	0	0.37	6.00	r	656208.68	4769766.55
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656278.43	4769647.30
Washington Mills	~	!07!WashingtonMills	x	0	0.37	3.00	r	656172.34	4769753.21
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	10.50	r	655615.10	4769262.42
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	10.50	r	655564.73	4769331.71
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	r	655513.28	4769395.62
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655463.11	4769408.60
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	10.50	r	655642.29	4769263.89
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	10.50	r	655539.96	4769343.03
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	10.50	r	655515.20	4769354.34
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655487.01	4769429.58
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655462.86	4769457.01
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655439.01	4769436.07
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655393.79	4769487.57
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655369.57	4769515.17
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655420.06	4769510.63
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	9.00	r	655398.26	4769540.35
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	3.00	r	655609.46	4769331.59
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	3.00	r	655537.29	4769423.97
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	3.00	r	655474.07	4769511.77
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655378.60	4769250.26
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655395.28	4769250.72
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655412.30	4769251.38
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655430.15	4769252.21
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655447.17	4769253.86
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655463.86	4769254.36
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655480.55	4769259.32
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655497.74	4769260.14
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655514.60	4769261.14
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655530.60	4769261.66
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655547.13	4769262.18
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	6.00	r	655563.65	4769262.45
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	r	654679.47	4768822.14
On-Site Buildings	~	!07!OnSiteBuildings	x	0	0.37	19.50	r	654557.04	4768821.03

**Ground Absorption Area(s)**

Name	M.	ID	G
Chemtrade		GA01	0.0
Salit		GA02	0.5
Grass		GA03	1.0
Grass		GA04	1.0
Grass		GA05	1.0
Grass		GA06	1.0
EPA		GA07	1.0
EPA		GA08	1.0
EPA		GA09	1.0
Park		GA10	1.0
Park		GA11	1.0
Park		GA12	1.0
Park		GA13	1.0
Grass		GA14	1.0
Grass		GA15	1.0
Grass		GA16	1.0
Grass		GA17	1.0
Grass		GA18	1.0
Grass		GA19	1.0
Grass		GA20	1.0
Grass		GA21	1.0
Grass		GA22	1.0

**Road(s)**

Name	M.	ID	Lme			Count Data		exact Count Data						Speed Limit		SCS	Surface		Gradient	Mult. Reflection			Height	
			Day (dBA)	Evening (dBA)	Night (dBA)	DTV	Str.class.	M			p (%)			Auto (km/h)	Truck (km/h)	Dist.	Dstro (dB)	Type	Dreff (%)	Hbuild (m)	Dist. (m)	Height (m)		
								Day	Evening	Night	Day	Evening	Night											
McLeod Rd_Drummond Rd	~	!03!2031_S00	62.7	-6.6	56.2			1093.5	0.0	243.0	2.1	0.0	2.1	50		RQ 16	0.0	1	0.0	0.0			0.0	r
Marineland Pkway_Drummond Rd_Stanley Ave/Thundering Waters	~	!03!2031_S01	62.1	-6.6	55.6			841.5	0.0	187.0	2.9	0.0	2.9	50		RQ 16	0.0	1	0.0	0.0			0.0	r
Marineland Pkway_Stanley Ave/Thundering Waters_Stanley Ave S	~	!03!2031_S02	63.3	-6.6	56.7			1071.6	0.0	238.1	3.1	0.0	3.1	50		RQ 16	0.0	1	0.0	0.0			0.0	r
Marineland Pkway_Stanley Ave S_	~	!03!2031_S03	62.3	-6.6	55.7			628.9	0.0	139.7	5.8	0.0	5.8	50		RQ 16	0.0	1	0.0	0.0			0.0	r
Drummond Rd N_	~	!03!2031_S04	60.2	-6.6	53.6			729.6	0.0	162.1	0.9	0.0	0.9	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Drummond Rd S_	~	!03!2031_S05	58.9	-6.6	52.3			518.1	0.0	115.1	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Stanley Ave N_	~	!03!2031_S06	60.5	-6.6	54.0			487.7	0.0	108.4	4.3	0.0	4.3	50		RQ 16	0.0	1	0.0	0.0			0.0	r
Thundering Waters Blvd_	~	!03!2031_S07	-4.6	-6.6	-4.6			0.0	0.0	0.0	6.3	0.0	6.3	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Stanley Ave S_Marineland Pkway_Ramsey Rd	~	!03!2031_S08	61.8	-5.2	55.2			508.5	0.0	113.0	4.1	0.0	4.1	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Stanley Ave S_Ramsey Rd_Progress St	~	!03!2031_S09	61.7	-5.2	55.2			544.5	0.0	121.0	3.5	0.0	3.5	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Stanley Ave S_Progress St_Don Murie St	~	!03!2031_S10	61.3	-5.2	54.7			520.3	0.0	115.6	3.0	0.0	3.0	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Stanley Ave S_Don Murie St_Chippawa Pkway	~	!03!2031_S11	63.3	-5.2	56.8			572.6	0.0	127.2	6.7	0.0	6.7	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Stanley Ave S_Chippawa Pkway_Lyons Creek	~	!03!2031_S12	63.6	-5.2	57.0			699.8	0.0	155.5	5.1	0.0	5.1	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Ramsey Rd_	~	!03!2031_S13	54.8	-6.6	48.3			88.9	0.0	19.7	8.7	0.0	8.7	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Progress St_	~	!03!2031_S14	52.0	-6.6	45.5			77.6	0.0	17.2	3.3	0.0	3.3	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Don Murie St_	~	!03!2031_S15	56.6	-6.6	50.1			109.1	0.0	24.2	11.7	0.0	11.7	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Chippawa Pkway W_	~	!03!2031_S16	62.0	-5.2	55.5			650.3	0.0	144.5	2.6	0.0	2.6	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Chippawa Pkway E_	~	!03!2031_S17	49.9	-5.2	43.4			41.1	0.0	9.1	2.4	0.0	2.4	60		RQ 12	0.0	1	0.0	0.0			0.0	r
Lyons Creek W_	~	!03!2031_S18	65.2	-3.9	58.6			875.3	0.0	194.5	3.9	0.0	3.9	70		RQ 12	0.0	1	0.0	0.0			0.0	r
Lyons Creek E_	~	!03!2031_S19	59.9	-5.2	53.3			387.6	0.0	86.1	2.8	0.0	2.8	60		RQ 12	0.0	1	0.0	0.0			0.0	r
RR 49_REG. RD. 98 (Montrose Rd.)_Oakwood Drive	~	!03!2031_S20	69.5	-6.6	62.9			2069.5	0.0	459.9	12.0	0.0	12.0	50		RQ 16	0.0	1	0.0	0.0			0.0	r
RR 49_Oakwood Drive_Dorchester Road	~	!03!2031_S21	69.1	-6.6	62.5			1884.1	0.0	418.7	12.0	0.0	12.0	50		RQ 16	0.0	1	0.0	0.0			0.0	r
RR 63_REG. RD. 70 (Thorold Townline Rd.)_REG. RD. 98 (Montrose Rd.)	~	!03!2031_S22	60.7	-2.5	54.2			139.0	0.0	30.9	12.0	0.0	12.0	80		RQ 12	0.0	1	0.0	0.0			0.0	r
RR 98_REG. RD. 20 (Lundy's Lane)_McLeod Road	~	!03!2031_S23	64.7	-6.6	58.2			687.3	0.0	152.7	12.0	0.0	12.0	50		RQ 16	0.0	1	0.0	0.0			0.0	r
RR 98_McLeod Road_Canadian Drive	~	!03!2031_S24	61.6	-6.6	55.1			339.8	0.0	75.5	12.0	0.0	12.0	50		RQ 16	0.0	1	0.0	0.0			0.0	r
RR 98_Canadian Drive_REG. RD. 63 (Chippawa Creek Rd.)	~	!03!2031_S25	63.9	-5.2	57.4			447.9	0.0	99.5	12.0	0.0	12.0	60		RQ 16	0.0	1	0.0	0.0			0.0	r
RR 98_REG. RD. 63 (Chippawa Creek Rd.)_REG. RD. 47 (Lyons Creek Rd.)	~	!03!2031_S26	66.1	-2.5	59.6			478.8	0.0	106.4	12.0	0.0	12.0	80		RQ 16	0.0	1	0.0	0.0			0.0	r
QEW_McLeod Road_Lyons Creek	~	!03!2031_S27	75.6	-0.1	71.1			2624.0	0.0	926.1	20.0	0.0	20.0	100		RQ 20	0.0	1	0.0	0.0			0.0	r
Drummond Rd Extension_Oldfield Rd_Street F/C	~	!03!2031_S28	55.6	-6.6	49.0			242.4	0.0	53.9	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Drummond Rd Extension_Street F/C_Ramsey Rd	~	!03!2031_S29	47.3	-6.6	40.8			36.6	0.0	8.1	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Ramsey Rd_Drummond Rd_Oldfield Rd Extension	~	!03!2031_S30	53.5	-6.6	47.0			65.8	0.0	14.6	8.7	0.0	8.7	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Street F_	~	!03!2031_S31	52.8	-6.6	46.2			127.7	0.0	28.4	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Street C_	~	!03!2031_S32	50.0	-6.6	43.4			66.9	0.0	14.9	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Oldfield Rd Extension_Drummond Rd_Oldfield Rd Extension	~	!03!2031_S33	52.3	-6.6	45.7			113.1	0.0	25.1	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r
Oldfield Rd Extension_Oldfield Rd Extension_Ramsey Rd	~	!03!2031_S34	45.3	-6.6	38.8			23.1	0.0	5.1	1.2	0.0	1.2	50		RQ 12	0.0	1	0.0	0.0			0.0	r

**Rail Line(s)**

Name	M.	ID	Lw'		Train Class	Correct.	Vmax
			Day (dBA)	Night (dBA)			
Train Pass by (2031)		!05!ORWN_TRACK00020	56.9	62.9	Train 2028 Pass by	5.0	(km/km/h)

**Rail Line(s) Type**

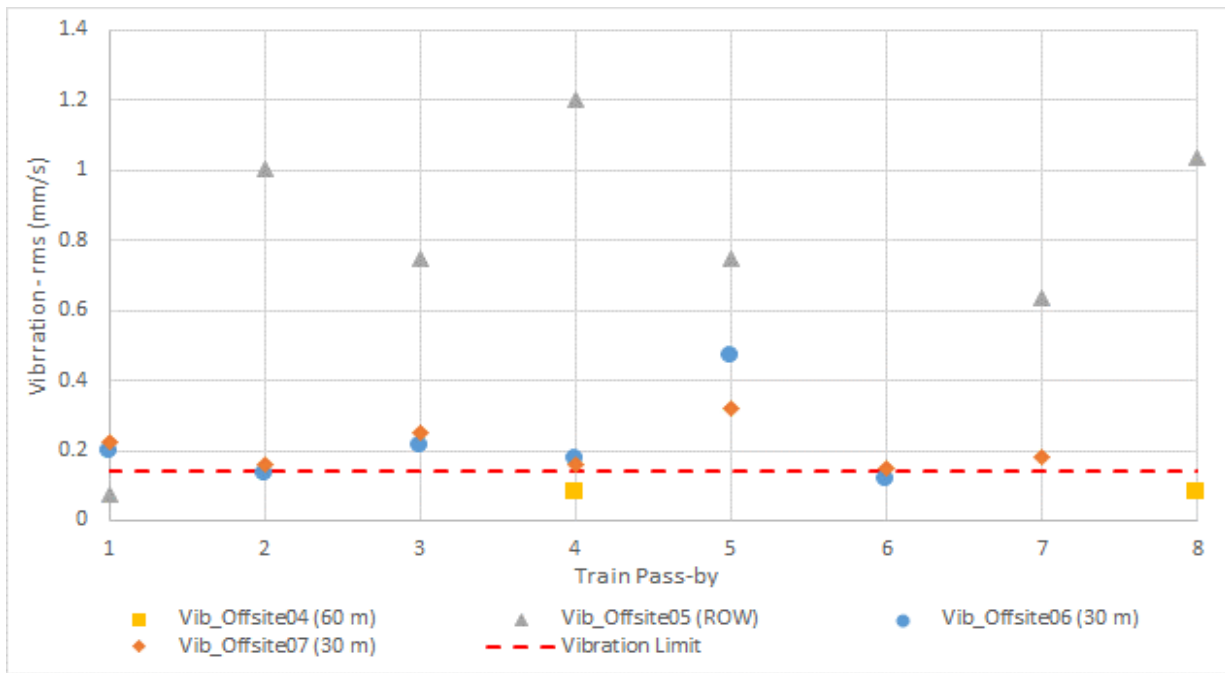
Name	M.	ID	Lw'		Train Class						Correct.	Vmax		
			Day (dBA)	Night (dBA)	Type	Number of Trains			v (km/h)	Lw,i' (dBA)			Track (km/h)	
						Day	Evening	Night		Day				Night
Train Pass by (2031)		!05!ORWN_TRACK00020	56.9	62.9	FRA_CONV_FRE_LOC	2	0	4	40	49.5	55.6	5.0		
					FRA_CONV_FRE_CAR	20	0	40	40	48.0	54.0			

**Number of Train(s)**

Name	Lw'		Train Class						
	Day (dBA)	Night (dBA)	Type	Number of Trains			v (km/h)	Lw,i' (dBA)	
				Day	Evening	Night		Day	Night
Train 2028 Pass by	51.9	57.9	FRA_CONV_FRE_LOC	2	0	4	40	49.5	55.6
			FRA_CONV_FRE_CAR	20	0	40	40	48.0	54.0

**APPENDIX H**

# Vibration Measurement Data





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