Empire (Grand Niagara) Project GP Inc.

8547 Grassy Brook Road

Compatibility Study

Air Quality, Dust, Odour & Noise

Niagara Falls, ON

SLR Project No: 241.30351.00000

January 2023

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Air Quality, Dust, Odour and Noise
Niagara Falls, ON

SLR Project No.: 241.30351.00000

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EXECUTIVE SUMMARY

SLR Consulting (Canada) Ltd. (SLR), was retained by Armstrong Planning to conduct a Compatibility Study focusing on air quality, odour, dust, and noise for Empire Communities proposed development, to be located at 8547 Grassy Brook Road (currently Grand Niagara Golf Course) in Niagara Falls, Ontario. This assessment has been completed in support of the draft plan for subdivision application. This assessment has considered:

- Industrial air quality, odour, and dust emissions;
- Transportation-related air pollution;
- Industrial/commercial noise and vibration; and
- Transportation-related noise and vibration.
- The assessment has included a review of air quality and noise emissions from industrial facilities in the area.

Based on the assessment the Project site is anticipated to be compatible with the surrounding land uses. Further, the Project site will not affect industrial facility compliance with applicable Ministry of Environment, Conservation and Parks ("MECP") environmental policies, regulations, approvals, authorizations, and guidelines.

The requirements of MECP Guideline D-6 are met with respect to air quality, dust, and odour. The D-6 requirements, Publication NPC-300, and the Federation of Canadian Municipalities and the Railway Association of Canada ("FCM/RAC") guidelines for noise/vibration are also met provided the recommended receptor-based mitigation measures are applied with respect to noise and vibration, including:

- Façade upgrades at several project locations (i.e., upgraded exterior wall and window construction to meet specified Sound Transmission Classes ("STC") requirements);
- Mandatory air conditions and the provision for installing air conditioning at a later date for several project buildings; and
- Appropriate warning clauses in agreements registered on Title for residential units, in all agreements of purchase and sale or lease, and all rental agreements.

As the applicable policies and guidelines are met, the Project site is:

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

Versions

Version	Date	Comment
1	August 2022	• Draft Report
2	October 2022	• Final Report Version 1
3	January 2023	• Final Report Version 2

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1. INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR), was retained by Armstrong Planning to conduct a Compatibility Study focusing on air quality, odour, dust, and noise for Empire Communities proposed development, to be located at 8547 Grassy Brook Road (currently Grand Niagara Golf Course) in Niagara Falls, Ontario ("the Project"). This assessment has been completed in support of approval to develop the property as a residential subdivision.

Potential environmental impacts from the following sources have been considered:

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

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

- The Provincial Policy Statement;
- Ministry of the Environment, Conservation and Parks ("MECP") Guidelines D-1 and D-6;
- Ontario Regulation 419/05: *Air Pollution – Local Air Quality* and its associated air quality standards and assessment requirements;
- Environment Canada and Climate Change Environmental Emergencies Guideline; and,
- The MECP's draft policies on odour impacts and assessment.

SLR has also included discussions on existing setbacks from industry that have been negotiated in past land use planning decisions.

This report is intended to meet the requirement for a Compatibility Study. This report identifies existing and potential land use compatibility issues and identifies and evaluates options to achieve appropriate design, buffering and/or separation distances between the proposed sensitive land uses, including residential uses, and nearby employment areas and/or major facilities. Recommended measures intended to eliminate or mitigate negative impacts and adverse effects are provided.

Appendix F summarizes the required mitigation measures and warning clause recommendations developed in this report.

2. DESCRIPTION OF DEVELOPMENT AND SURROUNDINGS

2.1 PROPOSED DEVELOPMENT

The subject property is currently occupied by the Grand Niagara Golf Course. The site location and preliminary context plan can be found in Figure 1 and Figure 2. The project is in its early design process and building design has not been finalized at this time, however, the development will consist of low-rise and mid-rise residences and town homes. A sub-division plan is provided in Appendix B.

2.2 SURROUNDINGS

The site is bounded by the Welland River to the north, Crowland Avenue to the west, Biggar Road to the south and Montrose Road to the east. The site is the existing Grand Niagara Golf Course that is surrounded mainly by agricultural land to the west and south, with some commercial/industrial properties located east of the property on Montrose Road. There are large industrial facilities (specifically, Solvay Canada) located to the northwest of the property, however these industries are greater than 2 kilometres away from the site.

2.2.1 CITY OF NIAGARA FALLS OFFICIAL PLAN

The City of Niagara Falls Official Plan Map for the area can be seen in Figure 3. The Project site is designated as Residential Low/Medium Density, mixed-use and open space. The lands to the east are designated as prestige employment, open space and agricultural. Lands to the west, and south of the Project are designated as rural agricultural. The lands north of the Project are designated as industrial.

2.2.2 CITY OF NIAGARA FALLS ZONING BY-LAW 79-200

The City of Niagara Falls Zoning Map for the area can be seen in Figure 4. The Project site is covered under the current City of Niagara Falls By-Law 79-200. The lands located south and west of the site are covered under the City of Niagara Falls zoning by-law and are zoned as rural agricultural (RA). The lands located to the east are zoned as institutional (I), tourist commercial (TC-H), and industrial. Lands located north are zoned prestige industrial (PI) and heavy industrial (HI)

3. ASSESSMENT FRAMEWORK

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

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

- The Provincial Policy Statement ("PPS" sets out goals – making sure adjacent land uses are compatible from a health and safety perspective and are appropriately buffered; then
- The Ministry of the Environment, Conservation & Parks ("MECP") D-series of guidelines set out methods to determine if assessments are required (areas of influence, recommended separation distances, and the need for additional studies); then
- MECP and Municipal regulations, policies, standards and guidelines then set out the requirements of additional air quality, noise and vibration studies and the applicable policies, standards, guidelines and objectives to ensure that adverse effects do not occur.

3.1 PROVINCIAL POLICY STATEMENT

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

to enhance the quality of life for all Ontarians."

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

From the current 2020 version:

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

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

3.2 D-SERIES OF GUIDELINES

The D-series of guidelines were developed by the MECP in 1995 as a means to assess recommended separation distances and other control measures for land use planning proposals in an effort to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. D-series guidelines address sources including sewage treatment (Guideline D-2), gas and oil pipelines (Guideline D3), landfills (Guideline D-4), water services (Guideline D-5) and industries (Guideline D-6).

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

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

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

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

3.2.1 GUIDELNE D-6 REQUIREMENTS

The guideline specifically addresses issues of air quality, odour, dust, noise and litter. To minimize the potential to cause an adverse effect, areas of influence and recommended minimum setback distances are included within the guidelines. The areas of influence and recommended separation distances from the guidelines are provided in the table below.

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

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

Industrial categorization criteria are supplied in Guideline D-6-2, and are shown in the following table:

Table 2: Guideline D-6 - Industrial Categorization Criteria

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

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

3.2.2 REQUIREMENTS FOR ASSESSMENTS

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

The D-series guidelines reference previous versions of the air quality regulation (Regulation 346) and noise guidelines (Publications NPC-205 and LU-131). However, the D-Series of guidelines are still in force, still represent current MECP policy and are specifically referenced in numerous other current MECP policies. In applying the D-series guidelines, the current policies, regulations, standards and guidelines have been used (e.g., Regulation 419, Publication NPC-300).

3.2.3 REQUIREMENTS FOR MINIMUM SEPARATION DISTANCES

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

3.3 OMAFRA MINIMUM SEPARATION DISTANCE

The Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) has developed a methodology for determining the recommended separation distance between livestock barns and new residential, commercial, or industrial developments. The methodology, called the Minimum Distance Separation (MDS) calculation, considers the type of livestock, scope of operation, and surroundings in order to determine a recommended setback to reduce the likelihood of odour issues. OMAFRA recommends that this method be used during zoning or implemented through the Official Plan to safeguard Ontario's agriculture.

According to MDS Guidelines, MDS setbacks are not required for livestock facilities within approved settlement areas, as are the case for the lands of the proposed development under Niagara's Official Plan. However, for completeness of the assessment, the MDS calculations have been applied in this study to the existing Queen E chicken farm to the east of the proposed lands.

Note that, unlike the MOECC's D-6 approach, the setback from the MDS calculations is the finding. For instance, where the MOECC recommends industries which do not meet the D-6 setback distances perform a detailed assessment to determine compatibility, OMAFRA recommends that developments not be allowed within the prescribed setback distances.

4. NEARBY INDUSTRIES

Zoning information for the area is provided in Figure 4. The Guideline D-6 setback distances from the Development are shown in Figure 5a and 5b. Local industries within 1 km of the site were inventoried. The lands surrounding the proposed development site are generally comprised of residential properties, light industrial and heavy industrial (further southwest). The area located to the west is Environmental Protection Area.

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

Table 3 lists the identified industries within 1000m of the site. The Solvay and Garner Road Biosolids facilities are located outside of 1000m but have been included in the assessment as they are potential major emission/odour sources. A more detailed table of the identified industries is provided in Appendix A. Industries which lie within their applicable Area of Influence in respect to the Project are discussed further below.

Table 3: Identified Industries Within the Potential Area of Influence of the Proposed Development

Facility	Type of Operation	Environmental Compliance Approval No.	Industry Class	Area of Influence Dist (m)	Actual Distance to Site (m)	Additional Assessment Required?
Solvay Canada (Formerly Cytec)	Chemical Manufacturing	1282-AQRMJB	Class III	1000	1200	No
Garner Road Biosolids Storage Facility	Biosolids Storage	A120215 4332-7B3L3S 2914-6SWPBE	Class II	300	1,320	No
E.S. Fox Ltd.	Construction Services	9177-9ZJJFQ	Class I	70	40	Yes

Grassy Brook Sewage Pump Station	Pump Station	8120-72DGYB	Class I	70	350	No
E.S Fox. Ltd	Storage Yard	-	Class I	70	290	No
Concentrix	Office	0502-7XUKPC	Class I	70	Adjacent	Yes

All the Industries listed above were identified inside their potential area of influence and, therefore, require additional assessment:

4.1 CLASS III HEAVY INDUSTRIES

The area within 1 km of the Project was reviewed. As shown in Figure 5, there are no Class III Heavy industries within 1 km of the site. However, under the Niagara Official Plan – Grand Niagara Secondary Plan, Solvay Canada (formerly Cytec), has a negotiated 2km arc from the plant from which proposed development needs to be evaluated. As indicated in Figure 4, the proposed development occurs outside of the 2km arc.

4.1.1 SOLVAY CANADA

ADDRESS	9061 GARNER ROAD
DISTANCE TO PROJECT:	1200 m
D-6 CLASSIFICATION:	Class III heavy industry

Solvay is currently permitted to produce up to 40,000 tonnes of phosphine-based chemicals annually under an existing Environmental Compliance Approval (ECA) held with the MOECC (ECA # 1282-AQRMJB)

The Solvay facility consists of the following processes and support units:

- Phosphine plant including derivatives section;
- Purification, mixing and packaging; and
- Research and development pilot plant.

The facility is equipped with thermal oxidizers to limit emissions from the waste streams that comprise of phosphine, nitrogen, isobutylene, butene and small amounts of other raw materials and waste organic liquids (solvents and phosphine derivatives). The facility is also equipped with emergency flares to combust emergency releases of waste streams.

The Solvay facility is considered Class III given that it is a chemical manufacturing facility that has the potential to release a variety of chemicals to atmosphere. The Potential Area of Influence is 1000 m and the Minimum Recommended Separation distance is 300m. The Project fenceline site lies outside the Potential Area of Influence and outside of the negotiated 2km Cytec arc from the plant itself as per the Grand Niagara Secondary Plan.

During the site visit to the area, SLR staff walked along Comstock Road to observe operations of the facility. No fugitive dust emissions were observed.

Given the above, there is little potential for adverse air quality and impacts from Solvay's current operations on the Project. Additional assessment is therefore not warranted.

4.2 CLASS I LIGHT AND CLASS II MEDIUM INDUSTRIES

There is one Class I light and one Class II medium scale industries identified within 1000 m of the Project, as shown in Figure 5a, namely:

- E.S Fox Ltd;

- E.S. Fox Ltd Storage Yard;
- Garner Road Biosolids Storage Facility;
- Grassy Brook Sewage Pumping Station; and
- Concentrix.

4.2.1 E.S FOX LTD

ADDRESS	9127 MONTROSE ROAD
DISTANCE TO PROJECT:	40 m
D-6 CLASSIFICATION:	Class I Light Industry

The E.S Fox Ltd facility is a tool crib warehouse and construction services facility used for contracting services. Operations on the site permitted under Environmental Compliance Approval (#9177-9ZJJFQ) are expected to produce air emissions from: one 315 kW standby diesel generator, one dust collector serving a tool cleaning station, natural gas fired comfort heating equipment and minor surface painting operations.

On July 10, 2021, SLR personnel conducted a site visit to the area. No odours or visible dust were observed at the facility at the time of the site visit.

Based on the size and nature of the of the facility operations E.S. Fox Ltd. is considered to be a Class I Light Industry under MECP Guideline D-6, with a Potential Area of Influence of 70m and a minimum recommended separation distance of 20m. The Project lies outside recommended separation distance but within the Potential Area of Influence therefore, additional assessment is warranted for this facility.

4.2.2 E.S FOX LTD STORAGE YARD

ADDRESS	9514 MONTROSE ROAD
DISTANCE TO PROJECT:	290 m
D-6 CLASSIFICATION:	Class I Light Industry

The E.S Fox Ltd. Storage yard facility is used for storage of construction equipment and supplies. The facility stored vehicles and equipment used for contracting services.

On July 10, 2021, SLR personnel conducted a site visit to the area. No odours or visible dust were observed at the facility at the time of the site visit. There are no significant air quality sources of interest at the facility.

Based on the size and nature of the of the facility operations the E.S Fox Ltd storage yard is considered to be a Class I Light Industry under MECP Guideline D-6, with a Potential Area of Influence of 70m. The Project lies beyond this distance.

Given the above, there is no potential for adverse air quality impacts anticipated from the current operations of this facility on the proposed Project. Additional assessment is, therefore, not warranted for this facility.

4.2.3 GARNER ROAD BIOSOLIDS STORAGE FACILITY

ADDRESS	8925 CHIPPAWA CREEK ROAD

DISTANCE TO PROJECT:	470
D-6 CLASSIFICATION:	Class II Medium Industry

Located at 8925 Chippawa Creek Road, the Garner Road Biosolids Storage Facility stores the majority of the region's liquid biosolids in lagoon structures. Processed liquid waste from the region's wastewater treatment plants is sent to the Garner Road facility before it can be used or disposed.

On July 10, 2021 and Aug 20, 2021, SLR personnel conducted a site visit to the area. Odours were detectable in the vicinity of the facility up to 200 m, however, no odours were detected near the Project Site.

Based on the size and nature of the of the facility operations, Garner Road Biosolids Storage Facility is considered a Class II Medium Industry under MECP Guideline D-6, with a Potential Area of Influence of 300m. The Project lies beyond this distance.

Given the above, and the distance to the Project, there is little potential for adverse air quality impacts from the Facility's current operations on the proposed Project in terms of odour. Additional assessment is, therefore, not warranted.

4.2.4 GRASSY BROOK SEWAGE PUMPING STATION

ADDRESS	9240 MONTROSE ROAD
DISTANCE TO PROJECT:	350
D-6 CLASSIFICATION:	Class I Light Industry

The Grassy Brook Sewage Pumping Station is operated by the City of Niagara Falls.

On July 10, 2021, SLR personnel conducted a site visit to the area. No odours or visible dust were observed at the facility at the time of the site visit. There are no significant air quality sources of interest at the facility. Under the existing Certificate of Approval (#2948-6XKLQQ), the pumping station has one (1) 200 kW standby diesel generator to provide power to the pumps during emergencies.

Based on the size and nature of the of the facility operations Grassy Brook Pumping station is considered to be a Class I Light Industry under MECP Guideline D-6, with a Potential Area of Influence of 70m and a minimum recommended separation distance of 20 m. The Project lies outside these distances.

Given the above, there is no potential for adverse air quality impacts anticipated from the current operations of this facility on the proposed Project. Additional assessment is, therefore, not warranted for this facility.

4.2.5 CONCENTRIX

ADDRESS	9515 MONTROSE ROAD
DISTANCE TO PROJECT:	Adjacent
D-6 CLASSIFICATION:	Class I Light Industry

The Concentrix building is an office/warehouse facility used for office-based services. Concentrix is a consulting services providing digital services to customers.

On July 10, 2021, SLR personnel conducted a site visit to the area. No odours or visible dust were observed at the facility at the time of the site visit. There are no significant air quality sources of interest

at the facility. The only potential emission sources are roof-top HVAC systems and a 400kW emergency generator as specified their Certificate of Approval (#0502-7XUKPC).

Based on the size and nature of the facility operations, Concentrix is considered to be a Class I Light Industry under MECP Guideline D-6, with a Potential Area of Influence of 70m and a minimum recommended separation distance of 20m. The Project lies within the minimum separation distance therefore, additional assessment is warranted for this facility.

4.3 QUEEN E FARMS

ADDRESS	9101 BROWN ROAD
DISTANCE TO PROJECT:	210
D-6 CLASSIFICATION:	N/A

Queen E Farms was assessed using the OMAFRA Minimum Distance Separation (MDS) formula. The farm capacity was estimated using a housing calculation in the OMAFRA method which is based on barn size (approximately 9500 ft2). The OMAFRA method does not consider terrain or meteorology; the calculation provides a separation from the livestock housing barn to the lot line which should be followed during planning.

Based on the calculations, the recommended minimum separation from the livestock barn is 215 m. The concept plan illustrates that the residential development will be approximately 320 m from the barn. As such, the proposed development site is anticipated to be compatible with Queen E Farm, particularly the lands identified for residential development.

Given the above, adverse air quality impacts are not anticipated from the current operations of this facility on the proposed Project. Additional assessment is, therefore, not warranted for this facility. As odours are subjective, it is recommended that a warning clause be included for the properties located adjacent to Queen E Farms (Appendix F).

4.4 CP RAILWAY

In addition to the surrounding industries, transportation related pollution from the CP railway was included in this assessment, given its proximity to the site. This rail corridor is used by CP for freight transport.

Given the rail activity and the proximity to the Project, there is potential for adverse air quality and noise impacts from the CP railway operations on the Project. Therefore, additional assessment is warranted and provided within the context of this report.

4.5 SUMMARY

From the list of industries identified in Section 4, only two were identified to require further analysis as a result of being within their area of influence:

- E.S. Fox Ltd
- Concentrix

Provided below, are comments and findings with respect to predicted impacts at the proposed development from the identified industrial facilities nearby.

5. AIR QUALITY, DUST AND ODOUR ASSESSMENT

5.1 INDUSTRIAL SOURCES

5.1.1 GUIDELINES AND REGULATIONS

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

5.1.1.1 Air Quality Contaminants

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

5.1.1.2 Odour

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

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

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

The MECP has decided to apply odour-based standards to locations "where human activities regularly occur at a time when those activities regularly occur," which is generally accepted to be places that would be considered sensitive such as residences and public meeting places. As a guide, the MECP has provided proposed clarification of human odour receptors, as shown in the following table:

Table 4: Proposed Clarification of Human Receptors (MECP 2008)

Receptor Category	Examples	Exposure Type	Type of Assessment
Permanent potential 24-hour sensitivity	Anywhere someone could sleep including any resident or house, motels, hospitals, senior citizen homes, campgrounds, farmhouse, etc.	Individual likely to receive multiple exposures	Considered sensitive 24 hours per day
Permanent daily hours but with definite periods of shutdown/closure	Schools, daycares, community centres, soccer fields, farmland, churches, bicycle paths, hiking areas, lakes, commercial or institutional facilities (with consideration of hours of operation such as night clubs, restaurants, etc.)	Individual could receive multiple exposures	Night-time or daytime exclusion only (consider all other hours)
Seasonal variations with clear restrictions on accessibility during the off season	Golf courses, amusement parks, ski hills, other clearly seasonal private property	Short term potential for exposure	Exclusions allowed for non-seasonal use
Transient	Open fields, roadways, easements, driveways, parking lots, pump houses	Very short-term potential for exposure, may not be a single resident exposed to multiple events	Generally, would not be included as human receptors unless otherwise specified.

Note that commercial facilities are considered to be odour sensitive points of reception, as well as community spaces and residences. The MECP odour policy would apply to the commercial uses in the existing commercial plazas, as well as the proposed development.

5.1.1.3 Dust

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

5.1.1.4 Cumulative Assessments

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

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

5.1.2 LOCAL METEOROLOGY

Surface wind data was obtained to generate a wind rose from data collected at the Niagara Falls International Airport from 2001 through 2020, as shown in **Figure 6.** As can be seen in the wind rose, predominant winds are from the southwest, while winds from the northeast and southeast quadrants may be the least frequent.

5.1.3 SITE VISITS AND ODOUR AND DUST OBSERVATIONS

A site visit was conducted to the area on July 10, 2021, and February 2, 2022, by SLR personnel to identify significant sources of air quality emissions and to identify any significant sources of odour or dust in the Project neighbourhood. During the site visit, the staff members observed existing industries from the side of road and other publicly accessible areas. Wind conditions during the site visit were noted as:

- July 10, 2021: northerly winds, 4 km/h, 24 °C, 54%RH
- February 1, 2022: northerly winds, 23km/h, -2 °C, 59%RH

No odours or fugitive dust emissions were detected at the Project site during the site visit.

5.1.4 ASSESSMENT OF POTENTIAL AIR QUALITY IMPACTS

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

- E.S Fox Ltd.
- Concentrix

Further discussion regarding these facilities and potential air quality impacts on the proposed development site is provided below.

5.1.4.1 E.S. Fox Ltd

The E.S Fox Ltd facility is a tool crib warehouse and construction services facility used for contracting services. Operations on the site permitted under Environmental Compliance Approval (#9177-9ZJJFQ) are expected to produce air emissions from: one 315 kW standby diesel generator, one dust collector serving a tool cleaning station, natural gas fired comfort heating equipment and minor surface painting operations.

Provincial regulations require that E.S. Fox Ltd. comply with prescribed concentrations at all ground-level point off-site. Therefore, provided that the proposed development does not incorporate mid- or high-rise features, the proposed development can be concluded to be compatible with E.S. Fox for general air quality contaminants.

Dust from E.S. Fox has not been considered in this assessment. Fugitive dust from outdoor operations is not regulated but is rather managed under a Best Management Practice Plan. If operations at E.S. Fox are predicted to generate fugitive dust, E.S. Fox would have an obligation to institute a plan to control dust at the source.

Odours were not considered from E.S. Fox Ltd, as the facility activities are not conducive to highly odourous emissions. For instance, minor surface painting may emit odours but the health-based standards for the VOC's in the paint would typically be more restrictive than any odours which may be released.

Since the facility is regulated under their Environmental Compliance Approval, offsite air quality issues are not anticipated and, therefore, the E.S. Fox Ltd facility is compatible with the proposed development

5.1.4.2 Concentrix

The Concentrix building is an office/warehouse facility used for office-based services. Concentrix is a consulting service providing digital services to customers.

The only potential emission sources are roof-top HVAC systems and a 400kW emergency generator as specified their Certificate of Approval (#0502-7XUKPC). HVAC systems typically do not a pose an air quality issue offsite and the emergency generator is only operated during emergency power outages. Nitrogen oxides from fuel combustion is not expected to result in high offsite air quality concentrations and is therefore compatible with the proposed development

5.2 TRANSPORTATION RELATED AIR POLLUTION

Common mitigation strategies for Transportation Related Air Pollution (TRAP) include filtration, strategic intake/amenity location, HVAC system operational procedures (i.e. timing around rush hour), physical barriers and vegetation buffers.

The CP Railway runs through the Project site. The rail line serves as a railway corridor for freight transport. The trains are a source of NO_x emissions and can produce odorous emissions from diesel combustion. Because of the proximity of the railway to the Project site, dispersion modelling has been conducted to assess the NO_x impacts on the Project.

CP Rail train data for this track segment was taken the Government of Canada's Grade Crossings Inventory for the Grassy Brook Road Crossing that passes through the Project site. A copy of applicable train data and calculations can be found in Appendix C.

The following table summarizes the railway traffic volumes used in the analysis:

Table 5: Rail Traffic Data

Rail	Train Type	No. of locomotives/Cars per Train	# of Trains		Modelled Speed (km/h)
			Daytime (7am to 11pm)	Night-time (11pm to 7am)	
CP Trains	Freight	4/100	2	1	16

5.2.1 MODELLING ASSESSMENT

U.S. EPA's AERMOD air dispersion model (Version 19191) was used to predict worst-case contaminant concentrations from railway emissions at the Project. Nitrogen oxides (NO_x) was used as a surrogate for criteria air contaminants (CACs) associated with diesel combustion, since compared to other CACs, NO_x is considered a limiting contaminant when evaluating combustion related emissions. Based on rail traffic data, a worst-case pass-by scenario of 4 locomotives per hour was assumed for locomotive pass-by. Even though there are two time-based standards for NO_x (1-h and 24-h), only the 1-h standard was assessed for the worst-case scenario as train movement over the 24-hour period is highly variable.

An emission factor approach was used to estimate the emission rate, based on the information presented in Table 5. Moving trains were assumed to operate at Notch 3, which equates 20% operating load, due to the low operating speed in the area.

Table 6: Pass-by Train Emission Rate

Locomotive Size (hp)	Train Speed (km/h)	Length of Railway Adjacent to Proposed Development (km)	US EPA Tier Level	Contaminant	Emission Factor (g/bhp-h)	1 -Hour Emission Rate (g/s)
4,000 (operating at 22%) [1]	16	2.16	2, 3	NO_x	5.5	$6.60x10^{-1}$

Notes: [1]: Based on Notch 3 power rating for line-haul locomotives

Locomotives operate at different power or "Notch" settings ranging from idle to Notch 8. The horsepower used in each setting was derived from the document - Fraser Surrey Docks Direct Coal Transfer Facility: Air Quality Assessment (Levelton Consultants, 2014), where each Notch setting operated at a certain percentage of the maximum power rating, ranging from 1% in idle mode to 100% at Notch 8. As the speed limit for the rail crossing is 10 mph (16 kph), the locomotives will be operating at a lower Notch setting, which was assumed to be Notch 3 for this assessment.

A line source approach, consisting of adjacent volume sources with a height and width of typical locomotives, was used to model emissions from locomotive pass-bys. Pre-processed terrain data and meteorological data (Crops dataset) provided by the MECP for the site location was used in the model. In summary, the worst-case 1-hour emission scenario modelled includes four locomotives passing by, at 22% load, in an hour.

5.2.2 AIR DISPERSION MODELLING RESULTS

The maximum NO_x concentration at the Project is predicted to be below the applicable standard for the 1-hour averaging period. The maximum predicted NO_x concentration is presented below:

Table 7: Air Dispersion Modelling Results

Contaminant	Averaging Period	MECP POI Concentration Limit (Schedule 3 Standard) ($\mu g/m^3$)	Predicted Maximum POI Concentration ($\mu g/m^3$)	Percentage of MECP POI Limit
Nitrogen Oxides	1-hour	400	186	47%

The maximum predicted point of impingement (POI) concentration is below the 1-hour NO_x standards under O. Reg. 419/05 and occurs on the rail tracks.

5.2.3 DIESEL ODOUR

Based on the dispersion modelling results, diesel odours from the locomotive emissions are not anticipated at the Project site as predicted odours do not reach the 1OU threshold.

5.3 SUMMARY OF AIR QUALITY, DUST AND ODOUR CONCLUSIONS AND RECOMMENDATIONS

The potential for air quality impacts on and at the proposed development, including dust and odour have been assessed. Based on the results of our studies adverse air quality impacts from industrial sources are not anticipated at the Project. The requirements of MECP Guideline D-6 are met. No air quality mitigation measures are required.

6. NOISE ASSESSMENT

6.1 INDUSTRIAL (STATIONARY) SOURCES

6.1.1 GUIDELINES

6.1.1.1 MECP Publication NPC-300 Guidelines for Stationary Noise

The applicable MECP noise guidelines for new sensitive land uses adjacent to existing industrial commercial uses are provided in MECP Publication NPC-300. NPC-300 revokes and replaces the previous noise assessment guideline, Publication LU-131 and Publication NPC-205, which was previously used for assessing noise impacts as part of Certificates of Approval / Environmental Compliance Approvals granted by the MECP for industries.

The new guideline sets out noise limits for two main types of noise sources:

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

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

- Outdoor points of reception (e.g., back yards, communal outdoor amenity areas); and
- Façade points of reception such as the plane of windows on the outdoor façade which connect onto noise sensitive spaces, such as living rooms, dens, eat-in kitchens, dining rooms and bedrooms.

The applicable noise limits at a point of reception are the higher of:

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

The following tables set out the exclusion limits from the guideline.

Table 8: NPC-300 Exclusion Limits for Non-Impulsive Sounds (L_{eq} (1-hr), dBA)

Time of Day	Class 2 Area	
	Plane of Windows of Noise Sensitive Spaces	Outdoor Points of Reception
7 am to 7 pm	50	50
7 pm to 11 pm	50	45
11 pm to 7 am	45	n/a

Table 9: NPC-300 Exclusion Limits for Impulsive Sounds (L_{LLM}, dBAI)

Time of Day	No. of Impulses in a 1-hour Period	Class 2 Area	
		Plane of Windows of Noise Sensitive Spaces	Outdoor Points of Reception
7 am to 11 pm	9 or more	50	50
	7 to 8	55	55
	5 to 6	60	60
	4	65	65
	3	70	70
	2	75	75
	1	80	80
11 pm to 7 am	9 or more	45	n/a
	7 to 8	50	n/a
	5 to 6	55	n/a
	4	60	n/a
	3	65	n/a
	2	70	n/a
	1	75	n/a

Notes:

n/a Not Applicable. Outdoor points of reception are not considered to be noise sensitive during the overnight period.

- Area classifications are: Class 2 - Suburban

The applicable guideline limits for infrequent events such as emergency generator set testing are +5 dB higher than the values above.

6.1.2 APPLICATION OF THE NPC-300 GUIDELINES

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

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

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

6.1.2.1 Guideline Summary and Interpretation

The following presents a summary of the guidelines and settlements presented above.

- The applicable Ministry of the Environment noise guideline for assessing new residential development applications is Publication NPC-300.
- The Class 2 limits have been adopted in this study.

6.1.3 SOURCES OF INTEREST

Based on the information obtained from the site visits and the review of the aerial imagery, the significant sources of noise in the area of the proposed development have been identified. A screening level noise model was prepared for each of the above facilities identified in Section 4.0 above, as follows:

E.S. Fox Limited

- Forklift movement (daytime operation); and
- HVAC units (duty cycling at night-time).

Concentrix

- Truck shipping and receiving activity (daytime operation);
- Loading bay impulsive noise (daytime operation); and
- Emergency generator testing (daytime operation).

Garner Road Biosolids Storage Facility - assumed to receive deliveries, etc. during daytime

- Idling trucks (daytime operation); and
- Biosolids Delivery (Pump truck noise) (daytime operation).

Figure 7 shows the location of the above facilities. Noise emission data used in the assessment can be found in Appendix D.

6.1.4 NOISE MODELLING AND RESULTS

Worst-case scenario noise levels from the surrounding commercial/ industrial operations were modelled using Cadna/A, a computerized version of the internationally recognized ISO 9613-2 noise propagation algorithms. This is the preferred noise modelling methodology of the MECP. The ISO 9613 equations account for:

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

The following additional parameters were used in the modelling, which are consistent with providing a conservative (worst-case assessment of noise levels):

- Temperature: 10°C
- Relative Humidity: 70%
- Ground Absorption G: G=1.0 (absorptive) as default global parameter, specific reflective areas such as parking lots defined as G=0.0 (reflective).

- Reflection: An order of reflection of 2 was used (accounts for noise reflecting from walls)
- Wall Absorption Coefficients: Set to 0.20 (20 % of energy is absorbed, 80% reflected)
- Terrain: Assumed to be flat

Predicted façade sound levels are shown in Figure 8, 9, and 10 for continuous, impulsive, and emergency equipment testing impacts, respectively. Overall predicted sound levels are provided in the following tables:

Table 10: Overall Industrial Sound Levels – Normal Operations, Non-Impulsive Noise

Industry	Normal Operations				
	Worst-case Predicted Level		Guideline Limit		Meets Guideline?
	Day	Night	Day	Night	
E.S. Fox Limited	45	40	50	45	Yes
Concentrix	47	N/A	50	45	Yes
Garner Road Biosolids Storage	26	N/A	50	45	Yes

Notes: Sound levels are L_{eq} (1-hr) sound levels, in dBA

Table 11: Overall Industrial Sound Levels – Normal Operations, Impulsive Noise

Component	Normal Operations [1]				
	Predicted Level		Guideline Limit		Meets Guideline?
	Day	Night [2]	Day [2]	Night [3]	
Concentrix	56	N/A	75	N/A	Yes

Notes: [1] Sound levels are L_{LM} (1-hr) sound levels, in dBAI.
[2] 2 impulses per hour were assumed as a maximum for daytime activity.
[3] Night-time operations of loading dock activity at Concentrix are not expected

Table 12: Overall Industrial Sound Levels – Normal Operations, Emergency Equipment Testing

Component	Normal Operations [1]				
	Predicted Level		Guideline Limit		Meets Guideline?
	Day	Night [2]	Day	Night [2]	
Concentrix	43	N/A	55	N/A	Yes

Notes: [1] Sound levels are L_{eq} (1-hr) sound levels, in dBA
[2] Night-time testing operations are not expected.

6.1.5 STATIONARY NOISE MITIGATION MEASURES

Based on the detailed stationary noise modelling above, noise mitigation measures are not expected to be required for the surrounding industries to meet the applicable guideline limits at the development site.

As the development is in proximity to the industrial/stationary noise sources, a warning clause "Type E" would be recommended for all residential units. See Appendix F for warning clause details.

6.2 TRANSPORTATION SOURCES

6.2.1 TRANSPORTATION NOISE SOURCES

Transportation sources of interest with the potential to produce noise at the proposed development are:

- Queen Elizabeth Way;
- Montrose Road;
- Chippawa Creek Road;
- Biggar Road; and
- CPR Montrose Subdivision.

Sound exposure levels at the development have been predicted, and this information has been used to identify façade, ventilation, and warning clause requirements.

6.2.2 MECP PUBLICATION NPC-300 GUIDELINES FOR TRANSPORTATION SOURCES

6.2.2.1 Indoor Criteria

The following table summarizes the criteria in terms of energy equivalent sound exposure (L_{eq}) levels for specific indoor noise-sensitive locations. These indoor criteria vary with sensitivity of the space. As a result, sleep areas have more stringent criteria than Living / Dining room space.

Table 13: NPC-300 Sound Level Criteria for Road and Rail Noise

Type of Space	Time Period	Energy Equivalent Sound Exposure Level L_{eq} (dBA) [1]		Assessment Location
		Road	Rail [2]	
Criteria for Residential Units				
Living / Dining Room	Daytime (7 am to 11 pm)	45	40	Indoors
	Night-time (11 pm to 7 am)	45	40	Indoors
Sleeping Quarters	Daytime (7 am to 11 pm)	45	40	Indoors
	Night-time (11 pm to 7 am)	40	35	Indoors
Supplementary Criteria for Non-Residential Uses				
General offices, reception areas, retail stores, etc.	Daytime (7 am to 11 pm)	50	45	Indoors
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Daytime (7 am to 11 pm))	45	40	Indoors
Sleeping quarters of hotels/motels	Night-time (11 pm to 7 am)	45	40	Indoors
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	Night-time (11 pm to 7 am)	40	35	Indoors

Notes: [1] Road and Rail noise impacts are to be combined for assessment of impacts.
[2] Whistle/warning bell noise is excluded for OLA noise assessments and included for indoor assessments, where applicable.

6.2.2.2 Ventilation and Warning Clauses

The following table summarizes requirements for ventilation where windows potentially would have to remain closed as a means of noise control. Despite the implementation of ventilation measures where required, some occupants may choose not to use the ventilation means provided, and as such, warning clauses advising future occupants of the potential excess over the indoor guideline limits are required.

Table 14: NPC-300 Ventilation and Warning Clause Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} (dBA)		Ventilation and Warning Clause Requirements [2][3]
		Road	Rail [1]	
Plane of Window	Daytime (7am to 11 pm)	≤ 55		None
		56 to 65 incl.		Forced Air Heating with provision to add AC + Applicable Warning Clause(s)
		> 65		Central AC + Applicable Warning Clause(s)
	Night-time (11 pm to 7 am)	51 to 60 incl.		Forced Air Heating with provision to add AC+ Applicable Warning Clause(s)
		> 60		Central AC + Applicable Warning Clause(s)

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

6.2.2.3 Building Shell Requirements

The following table provides sound exposure (L_{eq}) thresholds which if exceeded, require the building shell and components (i.e., wall, windows) to be designed and selected accordingly to ensure that the indoor location criteria are met.

Table 15: NPC-300 Building Component Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} (dBA)		Component Requirements
		Road	Rail [1]	
Facade	Daytime (7am to 11 pm)	> 65	> 60	Designed/ Selected to Meet Indoor Requirements [2]
	Night-time (11 pm to 7 am)	> 60	> 55	

Notes: [1] Including whistle/warning bell noise.
[2] The resultant sound isolation parameter from Road and Rail are to be combined for determining the overall acoustic parameter.

6.2.2.4 Outdoor Sound Level Criteria

The following table summarizes criteria in terms of energy equivalent sound exposure (L_{eq}) levels for the outdoor noise-sensitive locations, with a focus of outdoor areas being amenity spaces (called Outdoor Living Areas (OLAs) per NPC-300).

Table 16: NPC-300 Outdoor Sound Level Criteria for Road and Rail Noise

Type of Space	Time Period	Energy Equivalent Sound Exposure Level L_{eq} (dBA) [1, 2]	Assessment Location
OLA	Daytime (0700-2300h)	55	Outdoors

Notes: [1] Excluding whistle/warning bell noise for OLA noise assessments
[2] Road and Rail noise impacts are to be combined for assessment of OLA impacts.

6.2.2.5 Mitigation and Warning Clauses

The following table summarizes mitigation and warning clause requirements for outdoor amenity spaces.

Table 17: NPC-300 Outdoor Living Area Mitigation & Warning Clause Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} [1][2] (dBA)	Mitigation and Warning Claus Requirements [3]
OLA	Daytime (0700-2300h)	≤ 55	None
		56 to 60 incl.	Noise Control Measures may be applied, **and/or** Applicable Warning Clause(s)
		> 60	Noise barrier to reduce noise to 55 dBA, **or** Noise barrier to reduce noise to 60 dBA and Applicable Warning Clause(s)

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

As indicated in NPC-300, noise control measures may be applied to reduce sound levels to 55 dBA. If measures are not provided, potential purchasers/tenants are required to be informed of potential noise problems with the applicable Warning Clause(s).

If noise impacts are predicted to be greater than 60 dBA, noise control measures are required to reduce noise levels to 55 dBA. If noise control measures are not technically feasible for meeting 55 dBA, an excess of up to 5 dBA is allowed, with the inclusion of the applicable Warning Clause(s).

6.2.3 TRAFFIC DATA AND FUTURE PROJECTIONS

Road traffic data was obtained from WSP, the traffic consultants for the project. Existing volumes were taken from the EA completed for Montrose Road. Average annual daily traffic (AADT) volumes were then calculated for each roadway based on these counts The roadway volumes for the QEW were taken from the MTO's iCorridor open data website. The percentage of vehicle splits were also provided by WSP for Montrose, Biggar, and Chippawa Creek Road. Commercial vehicle percentage for the QEW were taken from the iCorridor website. Copies of applicable traffic data and calculations can be found in Appendix C. The following Table 18 summarizes the road traffic volumes used in the analysis.

Table 18: Summary of Road Traffic Data Used in the Transportation Analysis

Roadway Link	2039 Traffic Levels (AADT)	% Day/ Night Volume Split [1]		Commercial Traffic Breakdown [2]		Vehicle Speed (km/h)
		Daytime	Night-time	% Medium Trucks	% Heavy Trucks	
Queen Elizabeth Way	40,400	85	15	1.9	11.4	100
Montrose Road	9,597	90	10	3.0	3.0	70
Biggar Road	4,778	90	10	3.0	3.0	80
Chippawa Creek Road	2,335	90	10	3.0	3.0	80

Notes: [1] The Day/Night split was determined from historic data at SLR for provincial highways and similar roadways.
[2] Existing volumes and commercial percentages were taken from the traffic counts provided by WSP.
[3] The worst-case volumes were assumed based on provided turning movement counts.

6.2.4 RAILWAY TRAFFIC DATA

Freight traffic volumes for the CPR Montrose Subdivision were obtained from previous noise and vibration assessments along the Montrose Subdivision and assessed based on an annual growth rate of 2.5%. Total daily volumes were obtained from the Government of Canada's "Grade Crossing Inventory" for all at-grade railway crossings. Copies of all rail traffic data are provided in Appendix C. The rail traffic data used in the assessment is summarized in the following table:

Table 19: Summary of Rail Traffic Data Used in the Transportation Noise Analysis

Rail	Train Type	No. of Trains		No. of Locomotives/Train	No. of Cars/Train	Maximum Speed (km/h)
		Daytime (7AM-11PM)	Night-time (11PM-7AM)			
CPR Freight [1]	Diesel Locomotive	2	2	2	20	16

Notes: [1] Railway traffic data was grown based on CPR supplied growth rate of 2.5% annually to 2031.

6.2.5 PROJECTED SOUND LEVELS

Future roadway and railway sound levels at the proposed development were predicted using Cadna/A, a commercially available noise propagation modelling software.

Roadways were modelled as line sources of sound, with sound emission rates calculated using ORNAMENT algorithms, the road traffic noise model of the MECP. These predictions were validated and are equivalent to those made using the MECP's ORNAMENT or STAMSON v5.04 road traffic noise models.

Future CPR rail sound levels at the proposed development were predicted using the FTA/FRA modelling algorithms included in Cadna/A, a commercially available noise propagation modelling software. FTA reference sound levels were used for diesel-electric locomotives, and rail cars. Based on information provided by CPR, the CPR Montrose Subdivision track is constructed of continuous welded rail, with no rail switches in the immediate area.

As described in ISO 9613-2, ground factor values that represent the effect of ground absorption on sound levels range between 0 and 1. Paved areas (on-site, roadway, etc.) were modelled as a reflective surface (ground factor of 0). All other surrounding areas were assumed to be absorptive (ground factor of 1).

Predicted worst-case sound levels are presented in Table 20. The transportation sound levels at the development, showing the ranges of predicted daytime and night-time sound levels are shown in Figure 11 for combined road and railway impacts, respectively.

Table 20: Overall Projected Sound Levels

Location [1]	Roadway Sound Levels [2]		Railway Sound Levels [2]		Combined [2]	
	L_{eq} Day (dBA)	L_{eq} Night (dBA)	L_{eq} Day (dBA)	L_{eq} Night (dBA)	L_{eq} Day (dBA)	L_{eq} Night (dBA)
North	54	49	48	48	55	51
East	61	56	37	41	61	56
Central	47	42	53	65	54	65
South	59	53	40	43	60	53
West	43	37	40	43	45	44

Notes: [1] The sound levels presented are for the worst-case exposed location for combined impacts at a 2nd-storey window (4.5m)

The predicted railway sound levels are predicted to be above 55 dBA during the night-time periods, respectively. Therefore, an assessment of building components is required.

24-hour railway sound levels are predicted to be below 60 dBA in the central region of the proposed development. Therefore, there are no restrictions on the non-glazing portion of the façades.

6.2.6 GLAZING REQUIREMENTS

An assessment of indoor noise levels is required providing the façade sound levels due to road and rail traffic exceed 65 dBA during the daytime or 60 dBA during the night-time periods.

Based on the roadway and railway sound levels summarized in Table 20, exceedances are predicted on portions of the development. Therefore, a detailed assessment of glazing requirements is necessary to meet indoor noise criteria listed in Table 13.

Indoor sound levels and required Sound Transmission Class (STC) ratings for façade components were estimated using the procedures outlined in the National Research Council Building Practice Note BPN-56. This document provides corrections to estimate the STC ratings required based on either the roadway and/or railway noise.

Detailed floor plates were not provided at the time of this assessment. For the analysis, room dimensions for bedrooms and living/dining rooms have been assumed. The following assumptions have been made:

- Window wall construction with glazing and glass spandrel panel elements;
- For kitchen/dining/living rooms 70% of the exterior wall area is vision glass / patio doors;
- For bedrooms 50% of the exterior wall area is vision glass;
- Non-glazing portions of the wall have an assumed STC rating of 45;
- Living rooms were assumed to be 3 m x 6 m in size and typically have a reflective level of acoustic absorption; and
- Bedrooms were assumed to be 3 m x 3 m in size and are very acoustically absorptive.

Table 21 outlines the requirements for glazing for each worst-case receiver location.

Table 21: Transportation Noise Façade Sound Transmission Class (STC) Requirements

Location	Living Room (STC) [1]	Bedroom (STC) [1]
North	OBC	OBC
East	OBC	OBC
Central	OBC	OBC
South	OBC	OBC
West	OBC	OBC

Notes: OBC – Element must meet the minimum thermal and structural requirements of the Ontario Building Code (i.e., no acoustical upgrades required)
[1] STC requirements may change once building outlines are defined at a later planning stage.

Detailed façade requirements and calculations for each façade are provided in Appendix E. The combined glazing and frame assembly must be designed to ensure the overall sound isolation performance for the entire window unit meets the sound isolation requirements. It is recommended window manufacturers test data be reviewed to confirm acoustical performance is met.

6.2.7 OUTDOOR LIVING AREAS

Outdoor living areas (OLAs) of the proposed development include potential rear yards located on the ground level adjacent to the railway corridor/roadway, as shown in Figure 12. Predicted impacts at these locations are also shown in the figure. Locations are approximated and sound levels should be re-assessed as the development progresses.

The predicted noise impacts from the adjacent combined roadways and railway are summarized below.

Table 22: Summary of Unmitigated Road Impacts - OLAs

Location [1]	Transportation Noise Level L_{eq} Day (dBA)	Applicable Guideline Limit L_{eq} Day (dBA) [2]	Meets Criteria? (Yes/No)
North	53	60	Yes
East	60		Yes
Central	5049		Yes
South	59		Yes
West	476		Yes

Notes: [1] Outdoor amenity area locations are shown in Figure 12.
[2] Sound levels up to 60 dBA are allowed with the use of a Type A Warning Clause.

The projected sound levels at the outdoor sensitive points of reception along the railway corridor are predicted to be above 60 dBA within the inclusion of additional noise mitigation. Mitigation strategies are detailed further below.

6.2.8 VENTILATION REQUIREMENTS

The requirements regarding warning clauses are summarized in Table 14. Where required, the Warning Clauses should be included in agreements registered on Title for the residential units and included in all agreements of purchase and sale or lease, and all rental agreements. Warning Clauses are summarized in Appendix F.

The façade sound levels due to the surrounding roadway and railway, as shown in Table 20, are predicted to be greater than or equal to 65 dBA during the daytime and 60 dBA during the night-time for portions of the development. Therefore, mandatory central air conditioning and a Type D Warning Clause should be included for residential units in the central region (See Figure 11).

Due to the sound levels exceeding 55 dBA during the daytime at the outdoor amenity spaces, a Type A warning clause would be included for all units within the development along the eastern region facing the Montrose Road.

6.2.9 OTHER TRANSPORTATION WARNING CLAUSE REQUIREMENTS

CPR has additional warning clause requirements for residential development projects located near their operations. See Appendix A for warning clause details. The warning clauses must be registered on Title and included in all agreements of purchase and sale or lease and all rental agreements.

6.3 SUMMARY OF NOISE CONCLUSIONS AND RECOMMENDATIONS

The potential for noise impacts on and the proposed development have been assessed. Based on the results of our studies:

- SLR staff completed a site visit on February 1st, 2022, to the development lands and surrounding area. The surrounding Concentrix, E.S. Fox, and Biosolids Transfer facility were identified as a potential source for stationary noise impacts at portions of the proposed development.
- An assessment of surrounding stationary noise was conducted. Sound levels are predicted to meet the NPC 300 Class 2 guideline limits for continuous, impulsive, and testing of emergency equipment noise.
- An assessment of transportation noise impacts has been completed for the surrounding roadways, and railway corridor.
- Based on transportation façade sound levels, windows will not require acoustical upgrades, as outlined in Section 6.2.6. Façade STC requirements should be reviewed by an acoustical consultant as the design progresses.
- Mandatory air conditioning and a Type D Warning Clause will be required for all of the residential units of the proposed development in the central region (see Figure 11) due to the sound levels from surrounding roadways and railway corridor.
- A Type A warning clause must also be included for all residential units in the eastern portion of the proposed development (see Figure 12) facing the Queen Elizabeth Way highway.

7. VIBRATION ASSESSMENT

7.1 INDUSTRIAL (STATIONARY) SOURCES

There are no existing or proposed significant industrial vibration sources within 75 m of the Project, such as large stamping presses or forges. All vacant industrial lots are more than 400 m away from the Project site. Any future industries which may use significant vibration sources will be able to incorporate vibration isolation into their design. Under applicable MECP guidelines, a detailed vibration assessment is not required. Adverse impacts from industrial vibration are not anticipated.

7.2 TRANSPORTATION SOURCES

There is a potential source of vibration in the area:

- CPR Montrose subdivision.

Vibration impacts from other transportation sources such as local roadways will be negligible.

7.2.1 GUIDELINES

The Railway Association of Canada / Federation of Canadian Municipalities ("RAC/FCM") have developed *Guidelines for New Development in Proximity to Railway Operations*. The "Proximity Guidelines" have been adopted by CN, CP, and Metrolinx. International Standard ISO 2631-2: 2003 (1989) also provides supplementation criteria for commercial and office space and for industrial buildings. For public transit systems, the MECP has previously issued a number of draft protocols for vibration assessment of various planned TTC expansions. The MECP has also developed a draft *Guideline for Noise and Vibration Assessment of Transit Projects*. The adopted guideline limits are presented in the following table.

Table 23: Transportation Vibration Guideline Limits

Train Type	Receptor Type	Limit (mm/s RMS)	Source
Heavy Rail (Freight and Commuter)	Residential	0.14	RAC/FCM, CN, CP, Metrolinx, MECP
	Commercial / Office	0.40	ISO 2631-2: 2003 (1989)
	Industrial	0.80	ISO 2631-2: 2003 (1989)
Transit Rail (Streetcars and LRTs)	Residential	0.10	TTC, MECP

Notes: Limits are overall vibration levels in the vertical direction, measured in root-mean square ("RMS") values (1-second averaging time), in the frequency range from 4 Hz to 200 Hz.

7.2.2 MEASUREMENTS

Rail passbys are very infrequent and can range from 1-3/week in some cases. Vibration measurements were conducted by WSP/MMM Group in April 2016. The vibration measurement locations were chosen as the best location for attaining measurements of freight passbys.

Measurements were conducted at two locations at the closest setback to the rail corridor (30 meters). The measurement locations are shown in Figure 13.

Vibration measurements were conducted using the following instrumentation.

- 1. Two types of ICP accelerometers;

    - A. Type 353B33 by PCB Piezotronics, suitable for lower amplitude vibration tests from 1 to 4000 Hz;
    - B. Type 393A03 by PCB Piezotronics suitable for lower amplitude vibration tests from 1 to 2000 Hz;
- 2. Four-channel handheld dynamic signal analyzer, Model CoCo-80 by Crystal Instruments; and,
- 3. Engineering Data Management (EDM) System by Crystal Instruments.

The signal analyzer reads the maximum RMS vibration levels from the recorded vibration signals. At each location, the accelerometers were rigidly mounted on a large steel stake vertically placed in the ground.

Based on the results provided in the report conducted by WSP in 2016 (attached in Appendix G), vibration mitigation measures are not required. This recommendation is provided, assuming that the residential dwellings will be positioned at a maximum of 30 m from the nearest set of railway tracks.

7.3 SUMMARY OF VIBRATION CONCLUSIONS AND RECOMMENDATIONS

The potential for vibration impacts on and the proposed development have been assessed. Based on the results of our studies:

- Adverse vibration impacts from transportation sources are not anticipated.

8. CONCLUSIONS

A compatibility assessment has been completed, examining the potential for air quality, dust, odour, noise, and vibration from nearby industrial land uses to affect the proposed development Project.

The assessment has included a review of the industrial facilities in the area as well as railway and transportation sources.

The requirements of MECP Guideline D-6 and Regulation 419/05 are met. As the applicable policies and guidelines are met, the Project is:

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

Warning clauses should be considered in purchase agreements of selected units to address the unlikely potential for the perception of dust, odour or noise due to local industrial and agricultural activities.

9. REFERENCES

Environmental Commissioner of Ontario (ECO, 2010), *Review of Posted Decision: Developing an Odour Policy Framework*, April 2010.

City of Toronto Noise By-law, Municipal Code Chapter 591

International Organization for Standardization, (ISO, 1989), ISO 2631-2: 2003 (1989) *Evaluation of human exposure to whole-body vibration — Part 2: Continuous and shock-induced vibrations in buildings (1 to 80 Hz)*

National Research Council Canada (NRCC, 1985), Building Practice Note BPN 56: *Controlling Sound Transmission Into Buildings*

Ontario Ministry of the Environment, Conservation & Parks (MECP), 1989, *ORNAMENT Ontario Road Noise Analysis Method for Environment and Transportation – Technical Document*.

Ontario Ministry of the Environment, Conservation & Parks (MECP), 1993, Publication NPC-207: *Impulse Vibration in Residential Buildings (Draft)*

Ontario Ministry of the Environment, Conservation & Parks (MECP), 1993, Publication NPC-216: *Residential Air Conditioning Devices*

Ontario Ministry of the Environment, Conservation & Parks (MECP), 1994, *Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices*

Ontario Ministry of the Environment, Conservation & Parks (MECP, 1995), Guideline D-1: *Land Use Compatibility*

Ontario Ministry of the Environment, Conservation & Parks (MECP, 1995), Guideline D-6: *Compatibility Between Industrial Facilities and Sensitive Land Uses*

Ontario Ministry of the Environment, Conservation & Parks (MECP, 2008), *Technical Bulletin, Standards Development Branch, Methodology For Modelling Assessments Of Contaminants With 10-Minute Average Standards And Guidelines Under O. Reg. 419/05*, April 2008.

Ontario Ministry of the Environment, Conservation & Parks (MECP), 2013, Publication NPC-300: *Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning*

Ontario Ministry of Municipal Affairs and Housing (MMAH, 2020). *Provincial Policy Statement*

Ontario Regulation 419/01 – *Local Air Quality.*

10. STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Armstrong Planning & Empire Communities, hereafter referred to as the "Client". It is intended for the sole and exclusive use of the Client. The report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client and the City of Niagara Falls in their role as a land use planning authority, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted unless payment for the work has been made in full and express written permission has been obtained from SLR.

This report has been prepared in a manner generally accepted by professional consulting principles and practices for the same locality and under similar conditions. No other representations or warranties, expressed or implied, are made.

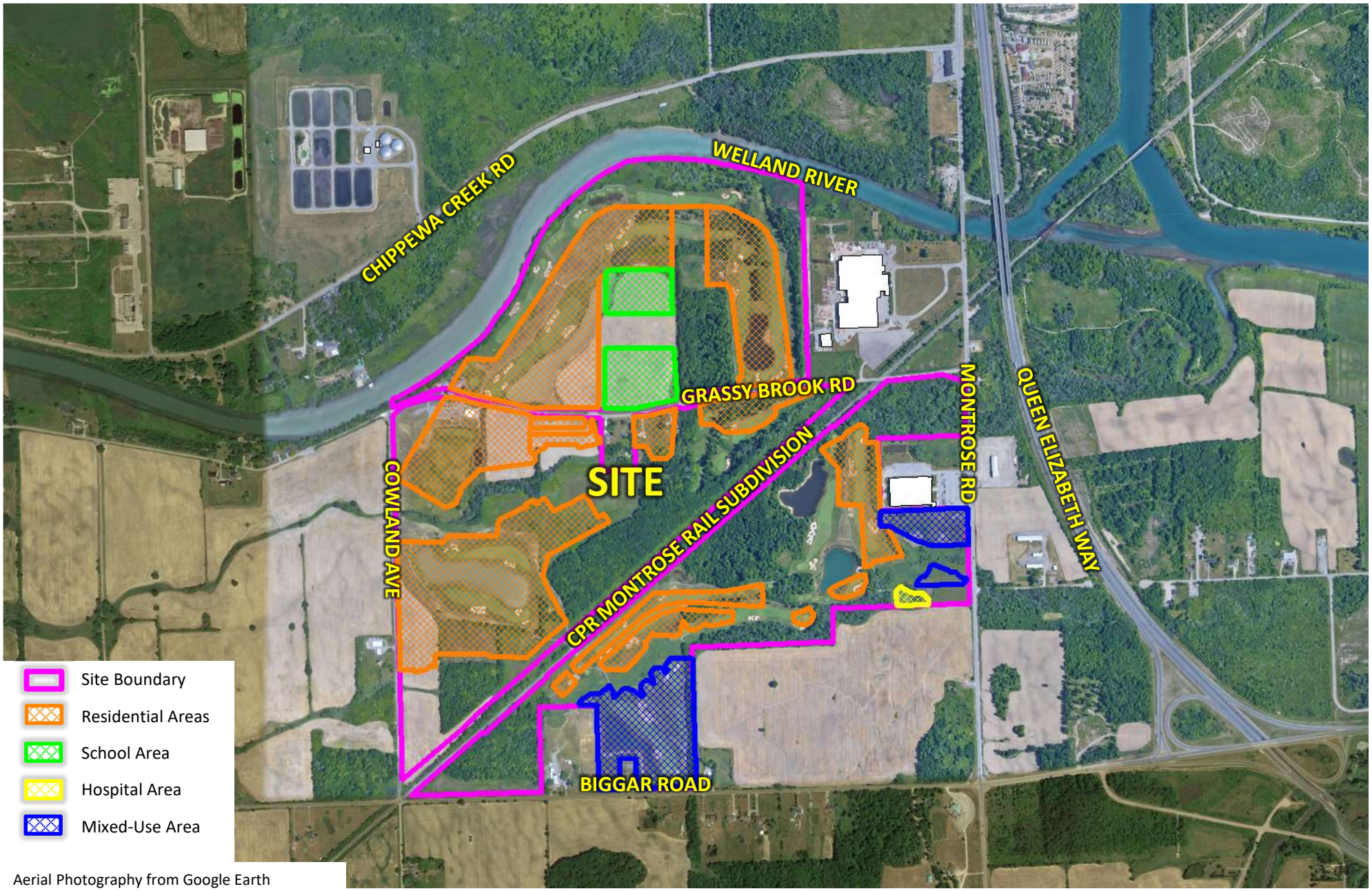
Opinions and recommendations contained in this report are based on conditions that existed at the time the services were performed and are intended only for the client, purposes, locations, time frames and project parameters as outlined in the Scope or Work and agreement between SLR and the Client. The data reported, findings, observations and conclusions expressed are limited by the Scope of Work. SLR is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. SLR does not warranty the accuracy of information provided by third party sources.

Figures

8547 Grassy Brook Road

Compatibility & Mitigation Study

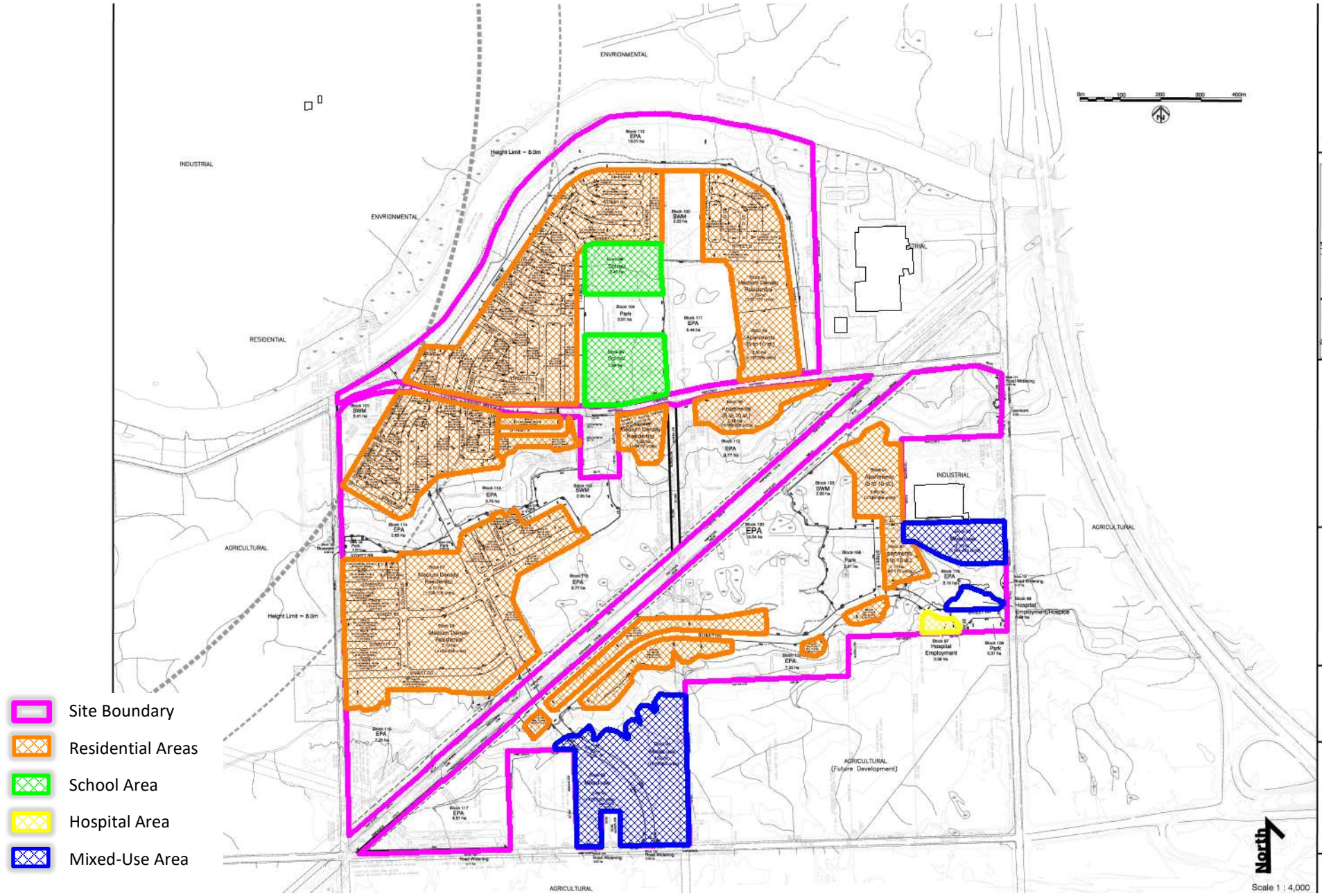
SLR Project No.: 241.30351.00000



Aerial Photography from Google Earth

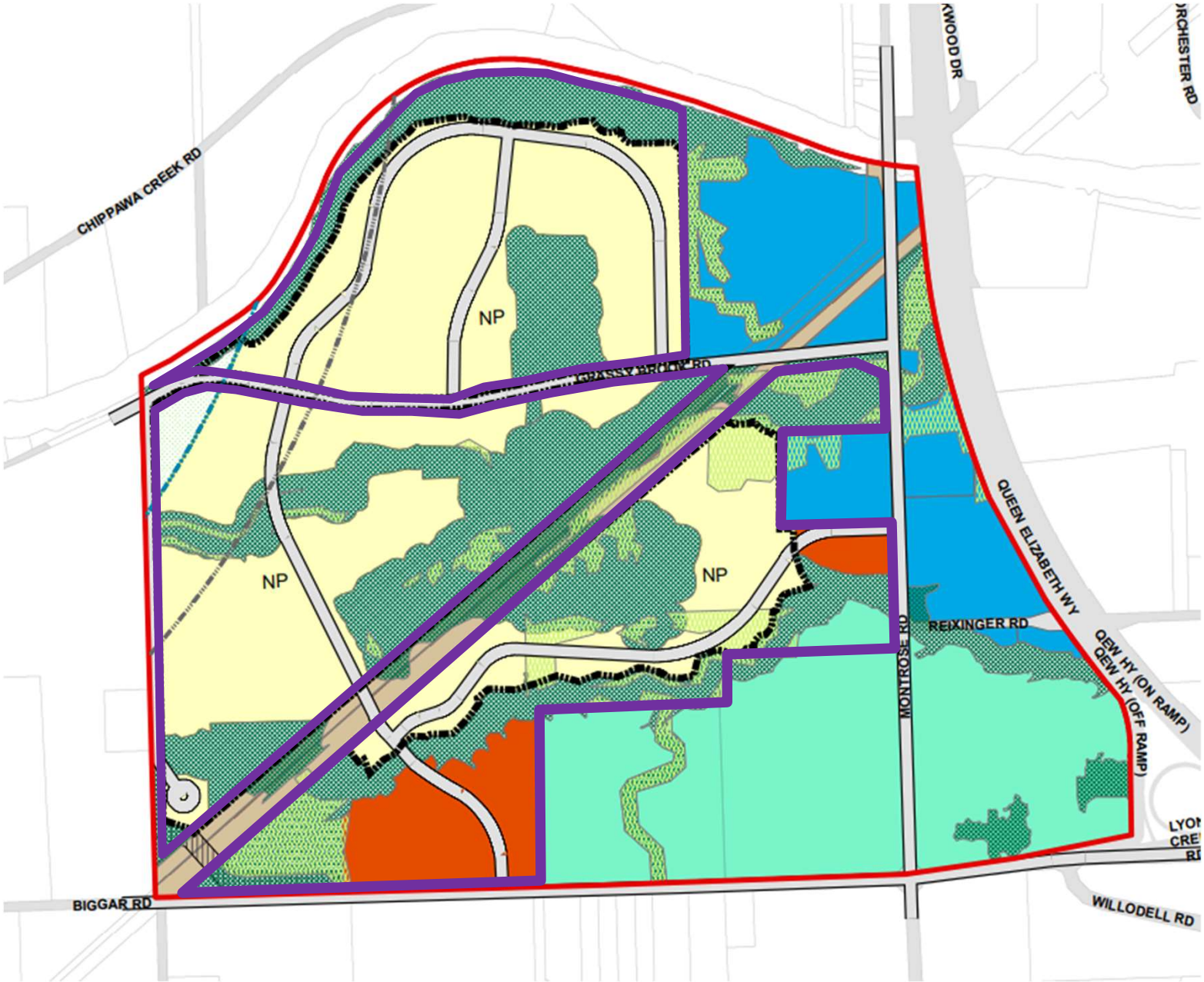
EMPIRE (GRAND NIAGARA) PROJECT GP INC.	True North	Scale: 1: 15,000	METRES
8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON		Date: Jan 12, 2023 Rev 0.0	Figure No. 1
SITE AND CONTEXT PLAN		Project No. 241.30351.00000	

SLR global environmental solutions



EMPIRE (GRAND NIAGARA) PROJECT GP INC.	True North	Scale: 1: 13,000	METRES
8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON		Date: Jan 12, 2023 Rev 0.0	Figure No. **2**
EXCERPTS FROM SITE PLAN		Project No. 241.30351.00000	

SLR global environmental solutions



Grand Niagara Secondary Plan
Neighbourhoods
Proposed Collector Roads
Cytec Arc (2 Km)
200m Setback Arc

Schedule A-4 Land Use

Hospital Employment
Residential Low/Medium Density
Mixed Use
Prestige Employment
Environmental Conservation Area
Environmental Protection Area
Open Space
NP Neighbourhood Park

NOTE: For Outside Plan Area see Schedule for Land Use Designations

Development Site

True North

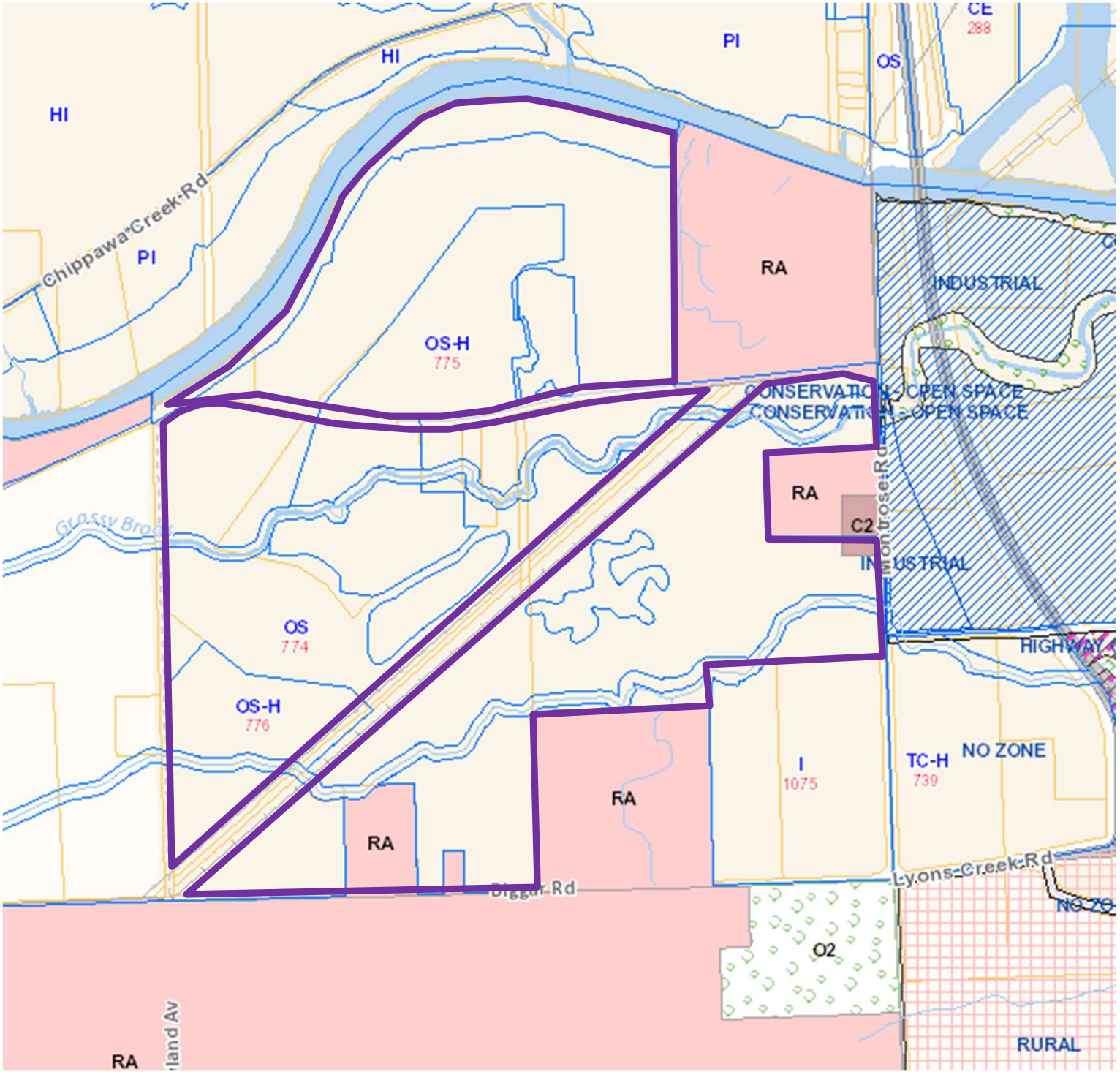
EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON

OFFICIAL PLAN MAP (GRAND NIAGARA SECONDARY PLAN SCHEDULE A-4)

Scale:	n/a	METRES
Date: Jan 12, 2023	Rev 0.0	Figure No. 3
Project No. 241.30351.00000		

SLR global environmental solutions



OS-H Open Space Holding
OS Open Space
RA Rural Agricultural
C2 Commercial Shopping District
I Insitutional
TC-H Tourist Commercial Holding
O2 Public & Private Open Space
PI Prestige Industrial
HI Heavy Industrial

Development Site

True North

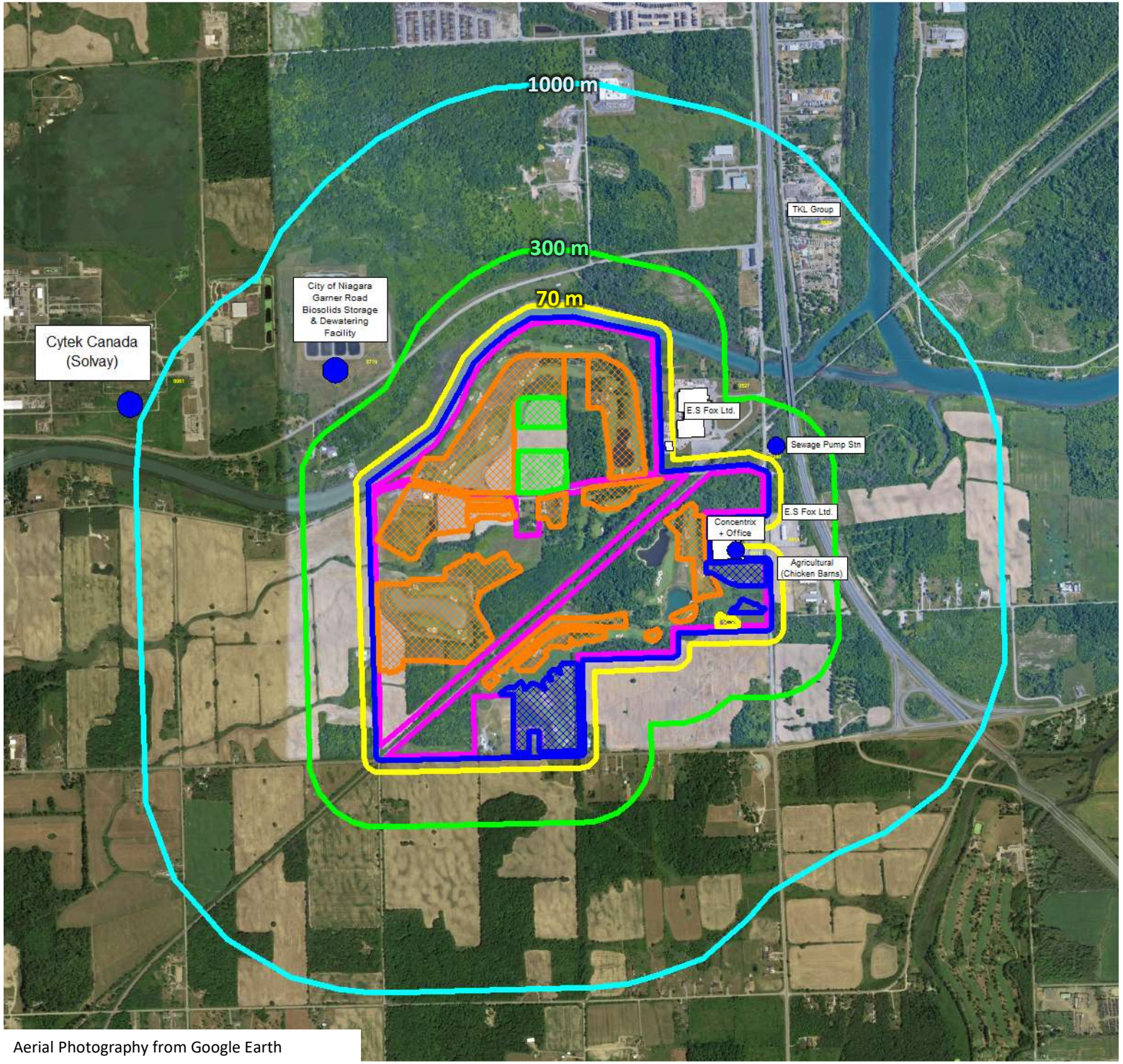
EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD
(GRAND NIAGARA GOLF COURSE)
– NIAGARA FALLS, ON

AREA ZONING MAP

Scale: n/a		METRES
Date: Jan 12, 2023	Rev 0.0	Figure No. 4
Project No. 241.30351.00000		

SLR
global environmental solutions



Aerial Photography from Google Earth

- Site Boundary
- Residential Areas
- Institutional Areas (Schools)
- Facility with MECP Permit (ECA/EASR)
- 20 m Separation Distance
- 70 m Separation Distance
- 300 m Separation Distance
- 1000 m Separation Distance

True North

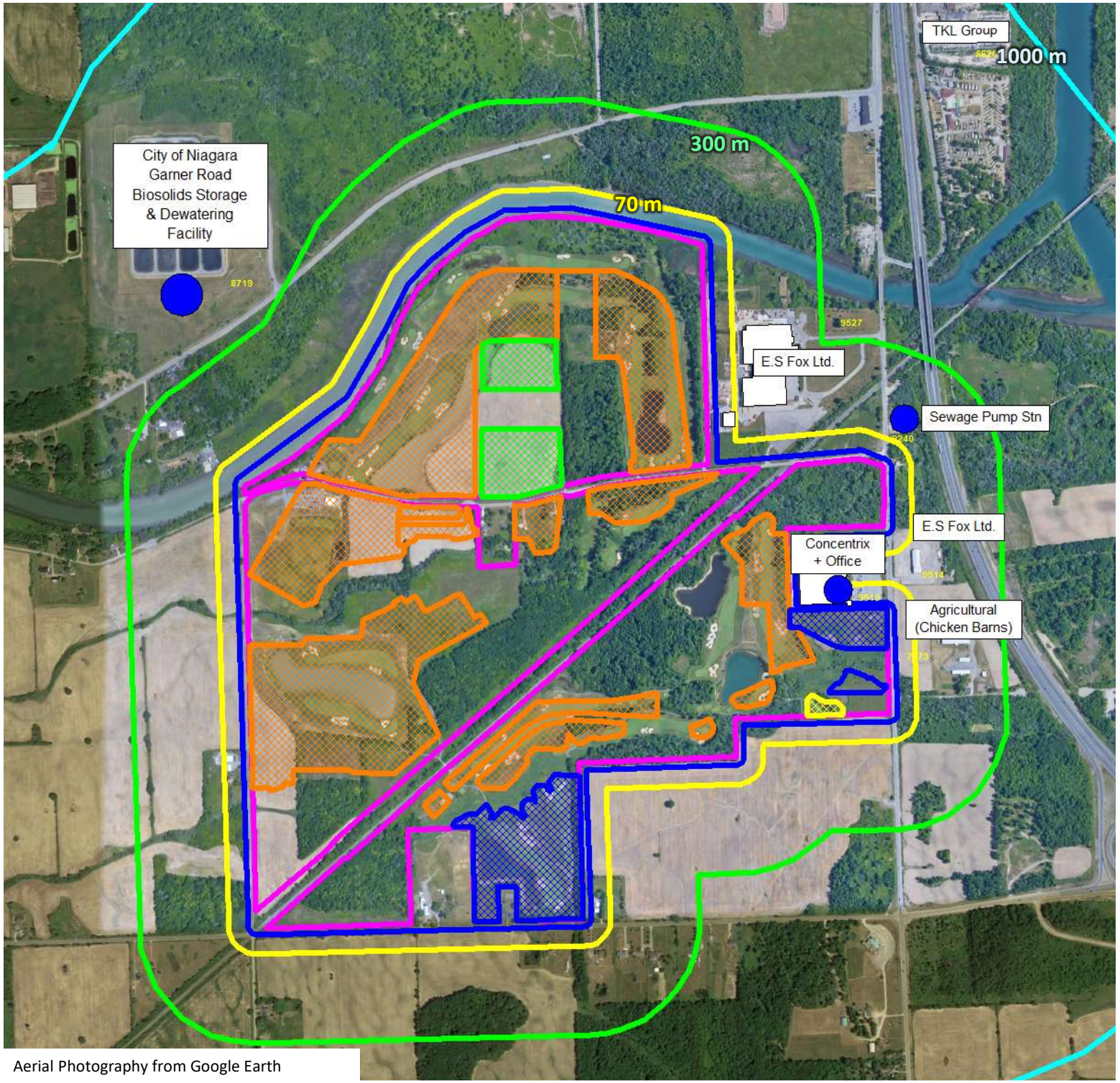
EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON

GUIDELINE D-6 SEPARATION DISTANCES TO 1000 METRES

Scale: 1: 23,000		METRES
Date: Jan 12, 2023	Rev 0.0	Figure No. **5a**
Project No. 241.30351.00000		

SLR global environmental solutions



Aerial Photography from Google Earth

- Site Boundary
- Residential Areas
- Institutional Areas (Schools)
- Facility with MECP Permit (ECA/EASR)
- 20 m Separation Distance
- 70 m Separation Distance
- 300 m Separation Distance
- 1000 m Separation Distance

True North

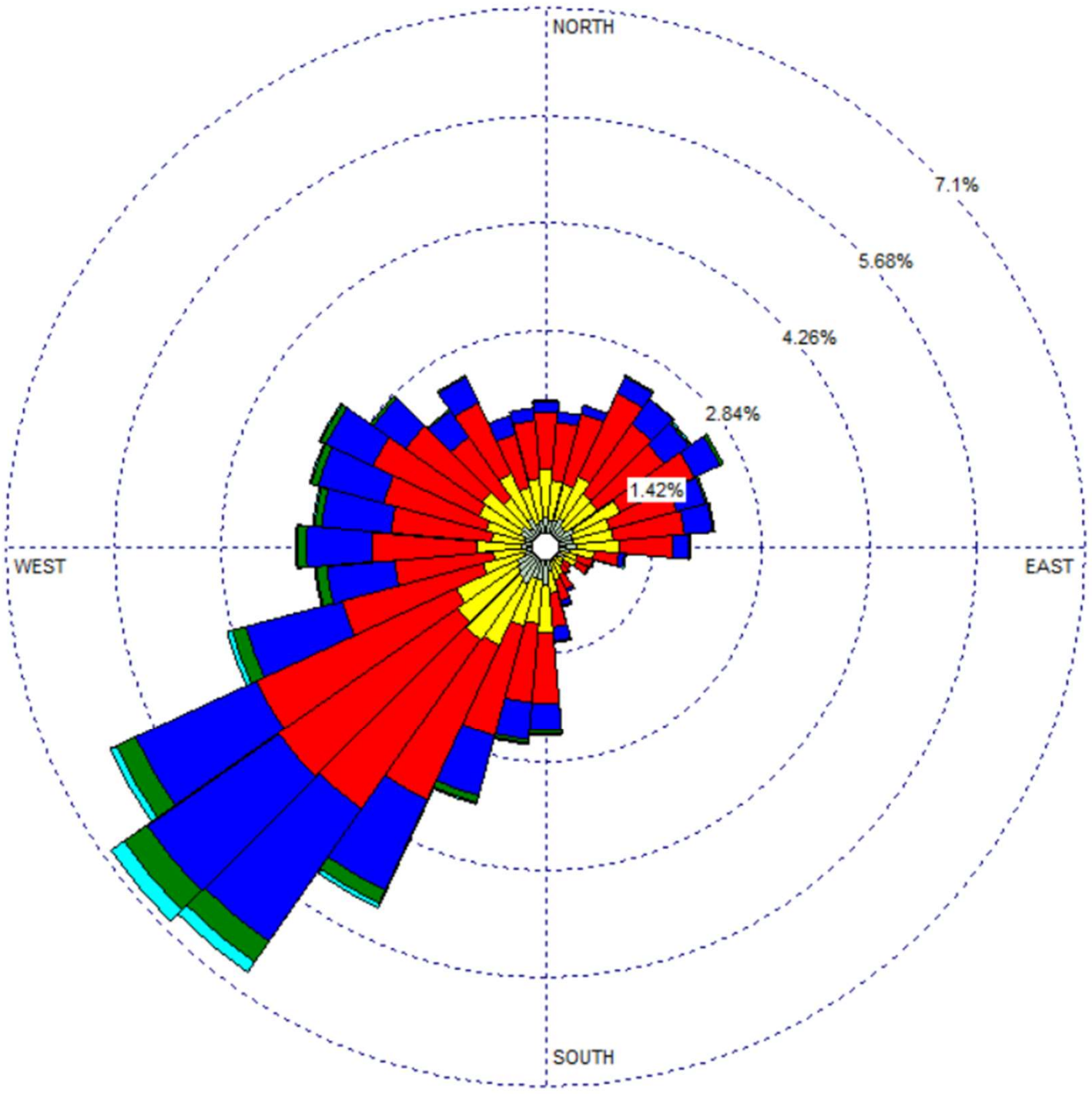
EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD
(GRAND NIAGARA GOLF COURSE)
– NIAGARA FALLS, ON

GUIDELINE D-6 SEPARATION DISTANCES TO 300 METRES

Scale: 1: 14,000		METRES
Date: Jan 12, 2023	Rev 0.0	Figure No. **5b**
Project No. 241.30351.00000		

SLR global environmental solutions



WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

True North

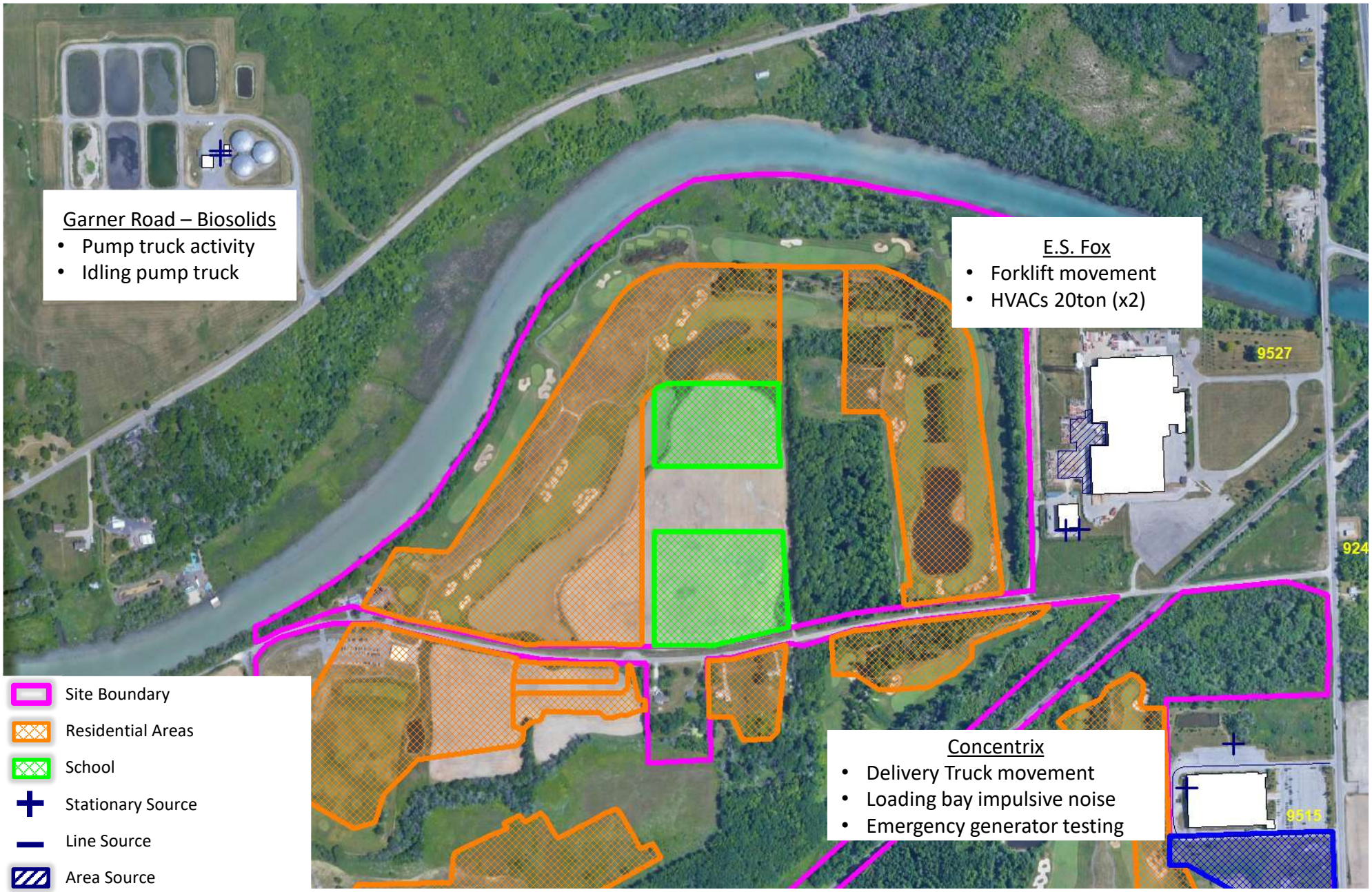
EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD
(GRAND NIAGARA GOLF COURSE)
– NIAGARA FALLS, ON

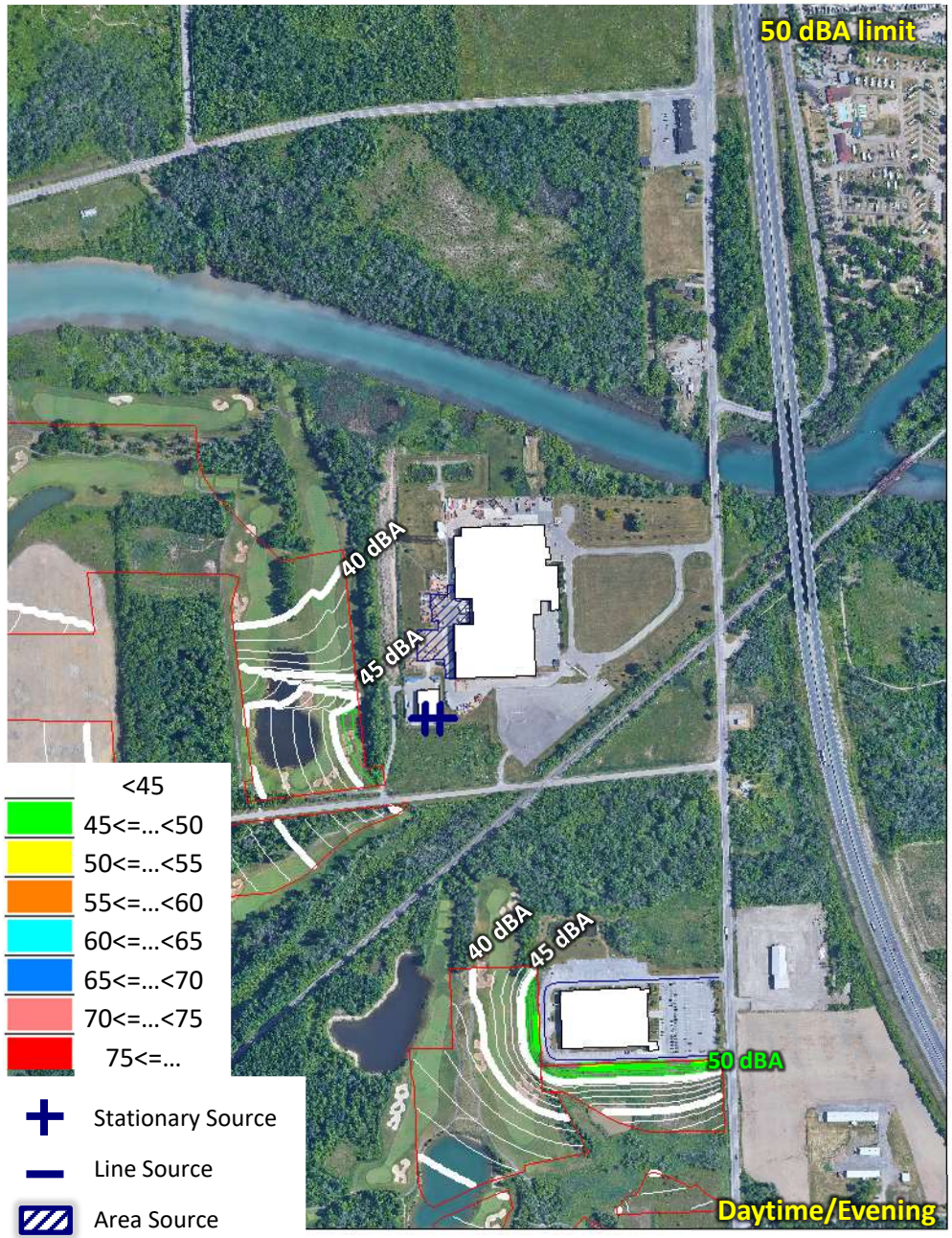
WIND FREQUENCY DISTRIBUTION DIAGRAM
(WIND ROSE – ST CATHARINES 1983-2013)

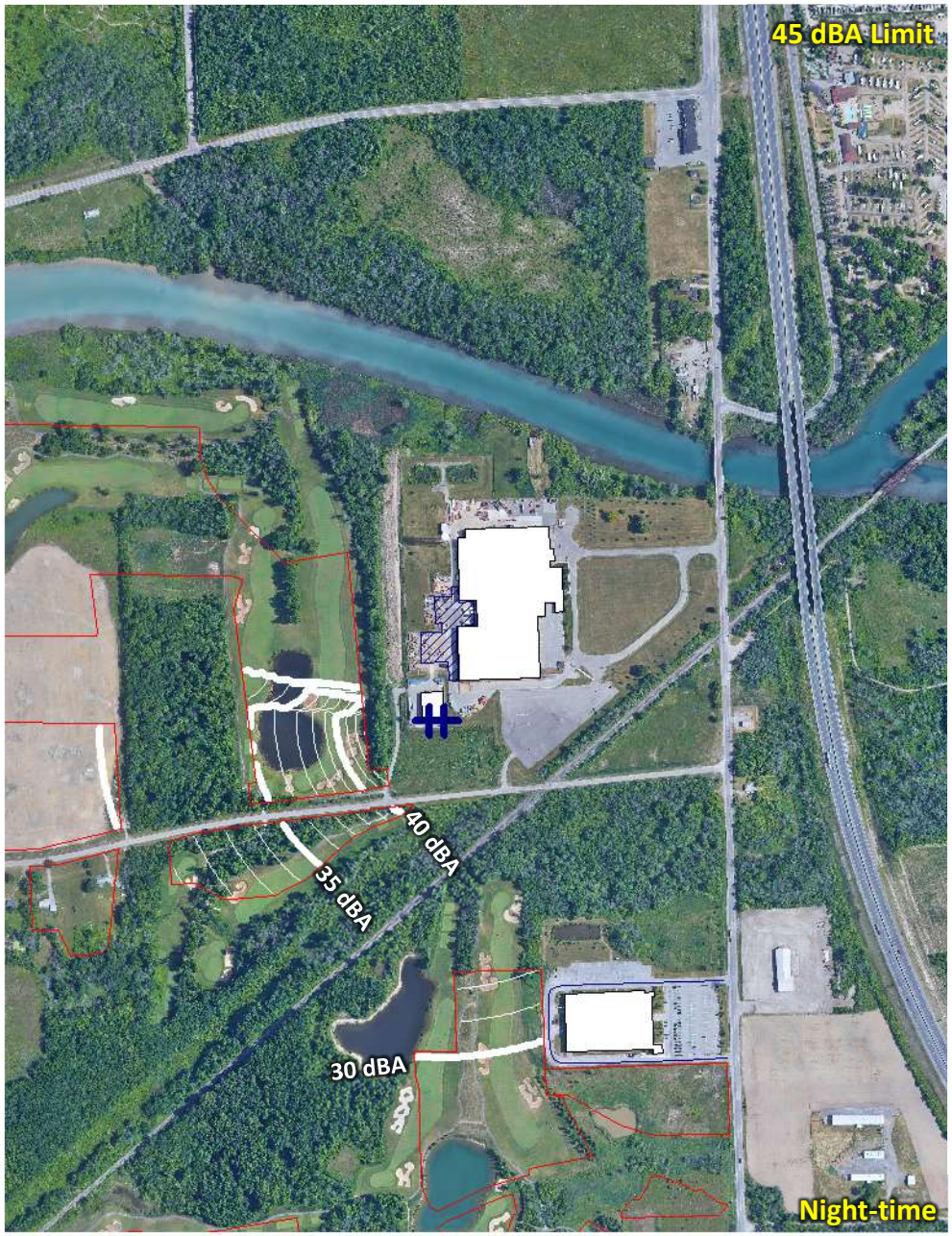
Scale: n/a		METRES
Date: Jan 12, 2023	Rev 0.0	Figure No. **6**
Project No. 241.30351.00000		

SLR
global environmental solutions



EMPIRE (GRAND NIAGARA) PROJECT GP INC.	True North	Scale: 1: 8,000	METRES	SLR global environmental solutions
8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON		Date: Jan 12, 2023 Rev 0.0	Figure No. 7	
STATIONARY NOISE SOURCES MODELLED		Project No. 241.30351.00000		





EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON

PREDICTED SOUND LEVELS – CONTINUOUS STATIONARY NOISE

True North

Scale: 1: 10,000 METRES

Date: Jan 12, 2023 Rev 0.0

Project No. 241.30351.00000

Figure No. **8**

SLR global environmental solutions

EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON

PREDICTED SOUND LEVELS – IMPULSIVE STATIONARY NOISE

True North

Scale: 1: 4,000 METRES

Date: Jan 12, 2023 Rev 0.0

Project No. 241.30351.00000

Figure No. **9**

SLR global environmental solutions

EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON

PREDICTED SOUND LEVELS – EMERGENCY GENERATOR TESTING

True North

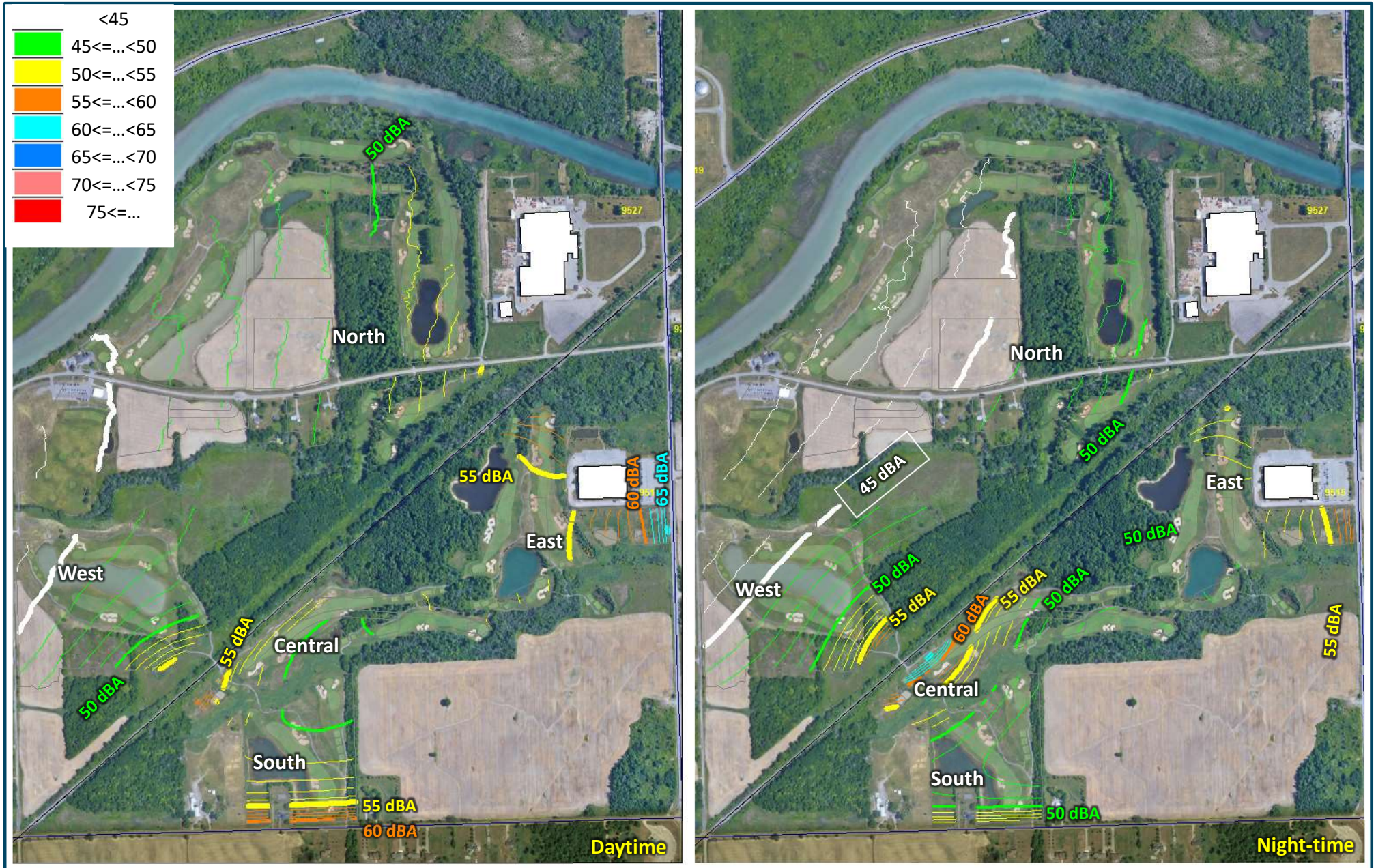
Scale: 1: 3,000 METRES

Date: Jan 12, 2023 Rev 0.0

Project No. 241.30351.00000

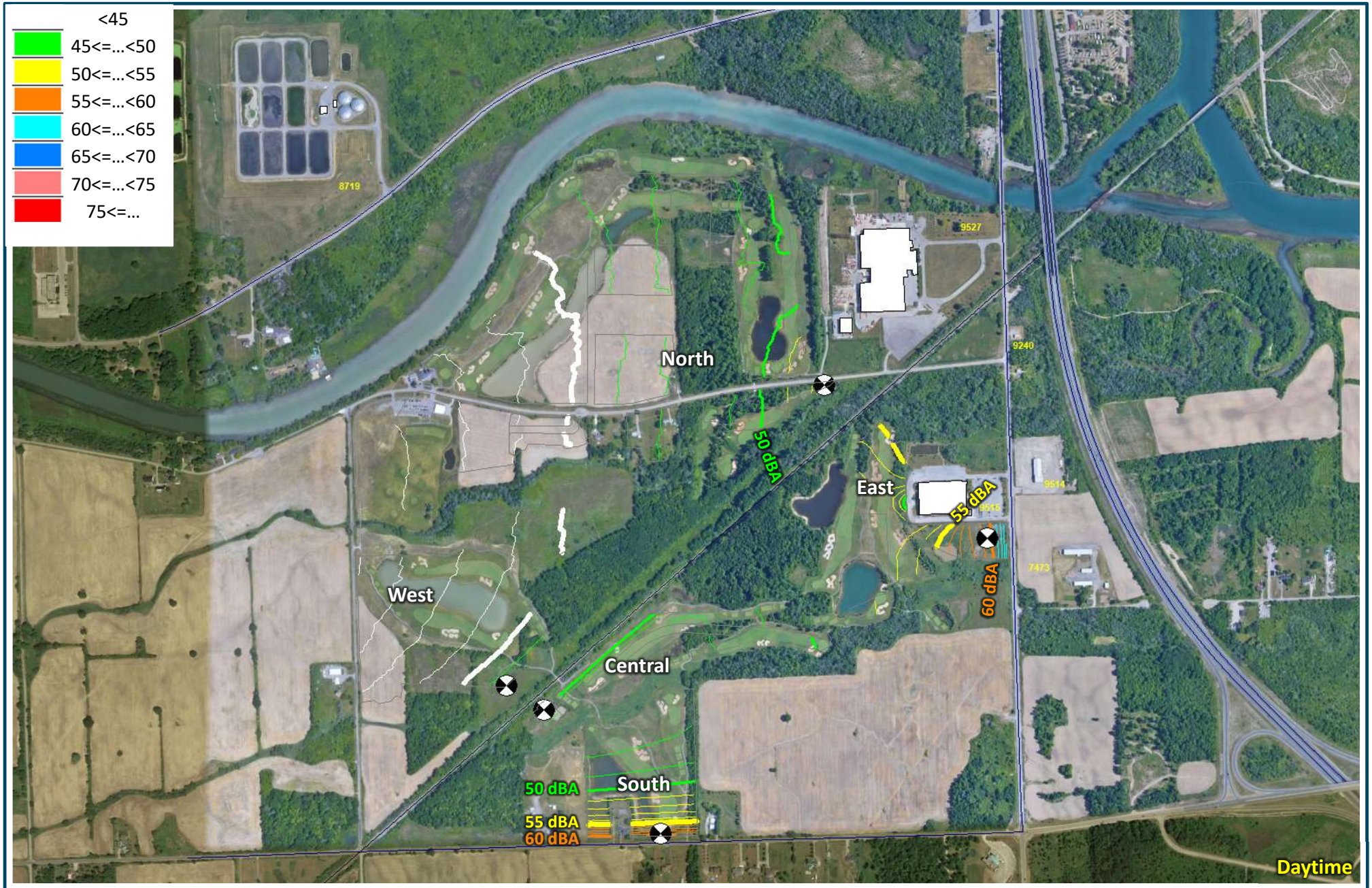
Figure No. **10**

SLR global environmental solutions



EMPIRE (GRAND NIAGARA) PROJECT GP INC.	True North	Scale: 1: 13,000	METRES
8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON		Date: Jan 12, 2023 Rev 0.0	Figure No. **11**
PREDICTED SOUND LEVELS – COMBINED TRANSPORTATION IMPACTS – ROAD + RAIL – 3RD STOREY WINDOW (7.5M)		Project No. 241.30351.00000	

SLR global environmental solutions



EMPIRE (GRAND NIAGARA) PROJECT GP INC.	True North	Scale: 1: 13,000	METRES
8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON		Date: Jan 12, 2023 Rev 0.0	Figure No. **12**
PREDICTED SOUND LEVELS – COMBINED TRANSPORTATION IMPACTS – ROAD + RAIL – OUTDOOR LIVING AREAS (1.5M)		Project No. 241.30351.00000	

SLR global environmental solutions

EMPIRE (GRAND NIAGARA) PROJECT GP INC.

8547 GRASSY BROOK ROAD (GRAND NIAGARA GOLF COURSE) – NIAGARA FALLS, ON

VIBRATION MEASUREMENT LOCATIONS

True North

Scale: 1: 13,000

METRES

Date: Jan 12, 2023

Rev 0.0

Project No. 241.30351.00000

Figure No. **13**

SLR global environmental solutions

Appendix A
Industrial Information

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000

Content Copy Of Original

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A120215
Issue Date: April 11, 2018

The Regional Municipality of Niagara
1815 Sir Isaac Brock Way
Post Office Box, No. 1042
Thorold, Ontario
L2V 4T7

Site Location: Garner Road Biosolids Facility
8719 Chippawa Creek Road
City of Niagara Falls, Regional Municipality Of Niagara

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

a 31.16 hectare Waste Disposal Site serving the Region of Niagara and consisting of:

- ten (10) clay lined lagoons each with a 6,830 m^3 storage capacity;
- three (3) storage tanks each with a 7,736 m^3 storage capacity;
- one (1) 405 m^2 dewatering building containing two (2) centrifuges;
- one (1) 84 m^2 pump building containing three (3) mixing pumps and ancillary equipment; and
- one (1) 170 m^2 sludge transfer building;
- two (2) 35 m2 utility buildings
- a pumping chamber and forcemain

to be used for the temporary storage and transfer of:

a. processed organic waste generated by wastewater treatment plants located within the Region of Niagara; and

b. waste sludges from the treatment of water for use as a potable water supply within the Region of Niagara subject to the OWRA

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

" **Approval** " means this Environmental Compliance Approval and any Schedules to it,

including the application and supporting documentation listed in Schedule "A";
" **competent person** " means a person who, because of training and experience, is knowledgeable in the following:

relevant waste management legislation, regulations and guidelines;

major environmental concerns pertaining to the waste to be handled;

occupational health and safety concerns pertaining to the processes and wastes to be handled;

emergency management procedures for the processes and wastes to be handled;

use and operation of the equipment to be used;

emergency response procedures and alerting;

Municipality specific written procedures for the control of nuisance conditions; and

requirement of this Approval

" **Director** " means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part II.1 of the EPA;
" **District Manager** " means the District Manager of the local district office of the Ministry for the geographic area in which the Site is located;
" **EPA** " means the *Environmental Protection Act,* R.S.O. 1990, C.E-19, as amended;
" **incident** " means an abnormal event which causes a spill, emission, emergency situation or other occurrence which may affect the environment, causes or may cause an adverse effect;
" **Ministry** " and " **MOECC** " means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;
" **Municipality** " means the Regional Municipality of Niagara;
" **OWRA** " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O.40, as amended;
" **PA** " means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended from time to time;
" **Provincial Officer** " means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the OWRA or section 5 of the EPA or section 17 of PA;
" **PWQO** " means the Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives,* as amended from time to time;
" **Regulation 347** " means Regulation 347, R.R.O. 1990, General - Waste Management, made under the EPA, as amended from time to time;

" **RUP** " means the Reasonable Use Policy (Guideline B-7) of the Ministry of the Environment; and
" **Site** " means Part of Lots 205 and 206, Geographic Township of Stamford, County of Welland, now in the City of Niagara Falls, Part 10 - Registry Plan 59R and with the municipal address of 8719 Chippawa Creek Road.

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

TERMS AND CONDITIONS

Revoke and replace
1.1 This Approval revokes and replaces all Provisional Certificate of Approval No. A120215 issued March 5, 1996 and Notices of amendment Nos. 1 through 10, inclusive, issued for this Site under Part V of the EPA. The approval given herein, including the terms and conditions set out, replaces all previously issued approvals, terms and conditions under Part V of the EPA for this Site.
General
2.1 Except as otherwise provided for in this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the applications for this Approval, and the supporting documentation listed in Schedule “A”.
2.2 Requirements specified in this Approval are minimum requirements and do not abrogate the need to take all reasonable steps to avoid violating the provisions of applicable legislation.
2.3 The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.
2.4 In all matters requiring the interpretation and implementation of this Approval, the Terms and Conditions of this Approval shall take precedence, followed in descending order by the Municipality's application and the documentation, referred to in this Approval, which is submitted in support of the application.
2.5 The Municipality shall ensure that all communications made pursuant to this Condition will refer to this Approval number A120215.
2.6 The Municipality shall retain all records, diagrams and reports required by this Approval for a minimum of two (2) years from the date of creation of the record, diagram or report. The Municipality shall make all records, diagrams and reports available upon request for inspection by a Provincial Officer.
Ministry Inspections
3.1 It is a Condition of this Approval that the Municipality shall allow Provincial Officers and/or Ministry personnel, or a Ministry authorized representative(s), to carry out any and all inspections authorized by Section 156, 157 or 158 of the EPA, Section 15, 16 or 17 of the OWRA, or Section 19 or 20 of the PA, of any place other than any room

actually used as a dwelling to which this Approval relates, and without restricting the generality of the foregoing to:

a. enter upon the premises where the records required by the Conditions of this Approval are kept;
b. have access to and copy, at any reasonable time, any records required by the Conditions of this Approval;
c. inpsect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations approved pursuant to this Approval; and
d. sample and monitor at reasonable times for the purposes of determining compliance with the Conditions of this Approval.

Change of Ownership

4.1 The Municipality shall notify the Director of any of the following changes, in writing, within thirty (30) days of the change occurring:

a. change of owner'/operator of the Site, or both;
b. change of address or address of the new owner.

4.2 In the event of any change in ownership of the Site, the Owner shall notify, in writing, the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the District Manager.

Security

5.1 The Municipality shall ensure that a competent person is on Site at all times during loading and unloading at this Site. No loading, unloading or transfer shall occur unless a competent person supervises the loading or unloading.

5.2 The Municipality shall ensure the area of the Site bounded by the fence is locked and secured by a minimum 1.8 metre high lockable security fence at all times when a competent person is not present.

5.3 The Municipality shall ensure the Site is adequately lit at all times during loading and unloading.

5.4 The municipality shall post a sign at the Site, readable at a distance of 25 metres from the public roadway bordering the Site, identify the name of the Site, the Municipality's name and emergency telephone number.

Operating Hours

6.1 Waste may be received and transferred form the Site from 7:00 a.m. to 9:00 p.m., Monday through Saturday excluding holidays as defined under the Business Holidays Act.

6.2 The Municipality shall ensure that a competent person is on duty at all times when the Site is operating and that all waste management activities are carried out under supervision.

Site Operations

7.1 a. The Site shall be operated in accordance with the Operation and Management Plan required by Condition 17.1.
b. If at any time, problems such as dust, odours, pests, noise or other nuisances are generated at the Site, then the Municipality shall take appropriate remedial action immediately. Appropriate measures may include the temporary cessation of all operations until the problem is rectified and measures have been undertaken to prevent future occurrence.
7.2 The Municipality shall ensure that all vehicles leaving the Site do not drag off the Site waste, dirt and/or other material that may become a contaminant or nuisance.
7.3 The Municipality shall manage all discharges from this Site, including stormwater run-off in accordance with appropriate Municipal, Provincial and/or Federal Legislation, Regulations and By-Laws and in accordance with approvals received under Section 53 of the OWRA for storm water management systems constructed on this Site.

Sludge Quantity and Quality

8.1 The Municipality shall ensure that the total amount of waste transported from the Site and directed for final disposal (landfill or incineration) does not exceed 200 tonnes on any one day. Any waste requiring disposal shall only be disposed of at a Ministry approved site or at a site approved to accept such waste by the appropriate jurisdiction.
8.2 The Municipality shall ensure that the total amount of waste received at the Site does not exceed 3,000 m^3 on any one day.
8.3 Prior to being received at the Site, the Municipality shall ensure that incoming waste has been sampled and analyzed in accordance with the sampling frequency, parameters, and procedures specified for the corresponding Category 3 NASM in Ontario Regulation 267 and the "Sampling and Analysis Protocol", both made under the Nutrient Management Act, 2002, S.O. 2002 c 4, as amended.
8.4 Water treatment plant sludge and digested sewage sludge can be mixed in a 1:20 ratio, respectively, at the Garner Road Waste Disposal Site Lagoons. The content of each disposal site lagoon shall be thoroughly mixed by pumping around the lagoon prior to loading on to tank trucks for agricultural land application.
8.5 The Municipality shall monitor all waste transferred from the Site in accordance with the Ontario Regulation 267 to ensure that the waste meets the requirements for agricultural land application.

Sludge Storage

9.1 a. The Municipality shall maintain the integrity of the lagoons at all times to ensure against spills, leaks and discharges.
b. The freeboard in the lagoons shall not be less than 0.9 metres at any time except as permitted in Condition 9.1 c.;
c. In an emergency which would restrict the transfer of sludge from the Site, the freeboard in the lagoons shall be no less than 0.5 metres, providing the emergency is reported in advance to the District Office and the District Manager agrees an emergency situation exists; and
d. When the emergency situation ceases to exist, the freeboard in the lagoons shall be increased to 0.9 metres as soon as possible, and the District Manager shall be notified

when the 0.9 metres freeboard level is achieved.

Dewatered Biosolids Processing

10.1 The Site is approved to dewater biosolids within a dewatering facility consisting of a polymer system, two (2) centrifuges, an HVAC system and a truck bay.

10.2 The maximum amount of liquid biosolids accepted at the dewatering facility shall not exceed 1250 m^3 per day.

Monitoring

11.1 The Municipality shall conduct groundwater and surface water monitoring and report the monitoring results to the District Manager on an annual basis.

11.2 By **August 31, 2018** the Municipality shall submit to the District Manager, a hydrogeological review report which provides an analysis and interpretation of groundwater monitoring results collected up to and inclusive of 2017 analytical results. The review should include:

a. an evaluation of historical data to determine the potential for the lagoons to impact offsite groundwater quality;

b. an updated water well survey for the area and an assessment of the potential for impact to potable users; and

a. based on the result of a. and b., submit a proposal for a groundwater monitoring program with appropriate scope using the historical groundwater quality data.

11.3 By **August 31, 2018** , the Municipality shall submit to the District Manager:

a. a surface water review report which provides an analysis and interpretation of the surface water monitoring results collected up to and inclusive of 2017 analytical results; and

b. based on the results of the review, submit a proposal for a surface water monitoring program.

Site Inspections and Maintenance

12.1 a. The Municipality shall maintain an inspection program which catalogues the areas of the Site to be inspected and a daily/weekly/monthly plan of inspection.

b. The Municipality shall ensure that the inspections as outlined in the inspection program are completed according to schedule by a competent person.

c. Any leaks, discharges, excessive odours or other malfunctions that may cause an adverse effect revealed by the inspections shall be rectified forthwith and inspections shall be increased to daily until the deficiencies are rectified.

d. The inspection program shall be reviewed on an annual basis at a minimum, and shall be updated as required to ensure that it is current.

e. The inspection program shall be available for inspection by a Provincial Officer upon request.

12.2 a. The Municipality shall maintain a preventative maintenance program for all on-

site equipment associated with the management of wastes in accordance with good engineering practices and the equipment suppliers' recommendations.
b. The Municipality shall ensure that the preventative maintenance tasks are completed as outlined in the program.
c. The preventative maintenance program shall be reviewed on an annual basis, at a minimum, and updated as required to ensure that it is current.
d. The preventative maintenance program shall be made available on-site for inspection by a Provincial Officer.

Complaints

13.1 Upon receiving a complaint, the Municipality shall:

a. initiate appropriate steps to determine all possible causes of the complaint and proceed to take the necessary actions to eliminate the cause of the complaint; and
b. verbally notify the District Manager within two (2) business days of the complaint received; and
c. provide a formal reply to the complainant, if contact details are available.

Emergency Response & Reporting

14.1 The Municipality shall promptly take all necessary steps to contain and clean up any spills or upsets which result from this operation.
14.2 The Municipality shall notify the Ministry's Spills Action Centre at 1-800-268-6060 of any spill, as defined in the EPA, which occurs at this Site. In addition, the Municipality shall submit to the District Manager, a written report within three (3) days of any spill which could result in the discharge of a contaminant from this Site, outlining the nature of the spill, remedial measures taken and the measures taken to prevent future occurrences at this Site.

Training

15.1 The Municipality shall ensure that all persons employed at the Site are trained, and received refresher training, according to the training manual required by Condition 17.3.

Record Keeping

16.1 The Municipality shall maintain daily records of the waste received at the Site and the waste transferred from the Site for disposal, further treatment, or use on agricultural lands. These records shall be in the form of a daily log(s) and shall include as a minimum:

a. date, quantity, type and source of waste received;
b. date, quantity, type and the destination of waste transferred off-site;
c. date, quantity, type and the destination of any waste directed for disposal; and
d. date, quantity, storage location and type of waste stored.

16.2 The Municipality shall monitor and maintain records of the dewatering process for

the following parameters on a daily basis:

a. potable water flow rate;
b. polymer flow rate;
c. centrifuge run times;
d. total amount of biosolids processed;
e. total amount of dewatered solids produced;
f. total amount of centrate produced;
g. all other parameters as prescribed under the Nutrient Management Act.

16.3 The Municipality shall keep a record of inspections conducted in accordance with the inspection program. The record shall be available for review by a Provincial Officer upon request. At a minimum, the record shall include:

a. time and date of the inspection;
b. name and signature of the competent person conducting the inspection;
c. a description of the equipment, lagoon, storage tank or area inspected;
d. freeboard in each lagoon, level in each storage tank;
e. a summary of any deficiencies, that might negatively impact the environment, observed;
f. recommendations for remedial action and the date on which any required remedial action was completed.

16.4 The Municipality shall keep a record of preventative maintenance conducted in accordance with the preventative maintenance program. The record shall be available for review by a Provincial Officer upon request. At a minimum, the record shall include:

a. time and date that maintenance work is performed;
b. name, signature and qualifications, if relevant, of the person conducting the maintenance activity;
c. the equipment or piece of equipment on which maintenance was performed;
d. a description of the maintenance work performed; and
e. the date of the next scheduled maintenance event.

16.5 The Municipality shall maintain a written record of any written or verbal complaint received concerning the operation of the Site. This record shall be in the form of an incident report and shall include as a minimum:

a. date and time of the complaint, and the name of the complainant, if available;

b. nature and circumstances of the complaint; and

c. recommendations for remedial action and the date remedial action was completed

16.6 The Municipality shall maintain a record of all employee training. At a minimum, the record shall include the following:

a. date of training;

b. type of training received;

c. name and signature of employee receiving training; and

d. date when refresher training is required.

Documents

17.1 a. The Municipality shall maintain an Operations and Management Plan that describes the operating procedures to be followed for the environmentally safe and efficient operation of the Site and in a manner which ensures the health and safety of all persons and minimizes visual impact, dust, odours, pests, litter and noise.

b. The Operations and Management Plan shall be reviewed on an annual basis, at a minimum, and updated as required to ensure that it describes current operations, procedures and practices.

17.2 a. The Municipality shall maintain a contingency plan for the Site. The plan shall include, as a minimum, the following:

i. measures to prevent fires/spills;

ii. fire protection system, control and safety devices;

iii. measures for spill alerting, containment, treatment, disposal and clean-up, training of the Site operators;

iv. availability of spill clean-up equipment;

v. maintenance and testing programs for spill clean-up equipment;

vi. emergency site plan and site diagram;

vii. measures to address odours;

viii. description of how sludge will be managed should the Municipality be unable to apply it to land; and

ix. measures for handling of odorous and off specification

sludge.

b. The contingency plan shall be reviewed on an annual basis at a minimum, and updated as required to reflect any changes in equipment, operating procedures or Site conditions.
c. A copy of the most up-to-date contingency plan shall be submitted to the local fire department as well as being available on Site for review by a Provincial Officer upon request.
17.3 a. The Municipality shall maintain a training manual covering at a minimum a list of employee functions and the type of training required to fulfil that job function with respect to the operation, management, inspection, record keeping requirements, contingency plan, monitoring and maintenance of this Site.
b. The training plan shall be reviewed on an annual basis, at a minimum, an updated as required to reflect any changes in equipment, operational procedures or Site conditions.
c. A copy of the training manual shall be available at the Site for review by a Provincial Officer upon request.

Annual Report

18.1 By March 31st of each year, the Municipality shall prepare and submit to the District Manager an annual report which covers the previous calendar year. The annual report shall include as a minimum (all quantities shall be reported in metric units of measurement):

a. a monthly summary of the waste received at the Site, including quantity in tonnes, source and type;
b. a monthly summary of the waste stored at the end of each month including quantity in tonnes and type;
c. a monthly summary of the waste generated at the Site and transported off-site, including the quantity in tonnes, destination and type;
d. an annual summary material balance of the waste received at and transported from the Site;
e. a descriptive summary of any incidents or spills or other emergency situations which have occurred at the Site, the remedial measures taken, and the measures taken to prevent future occurrences;
f. a descriptive summary describing any rejected waste including quantity, type, reasons for rejection and origin of the rejected waste;
g. a descriptive summary of maintenance conducted during the previous calendar year; and

h. a summary description of any analytical data pertinent to the operation of this facility;

i. an assessment of surface water quality in relation to the PWQO based on the surface water monitoring program; and

j. an assessment of groundwater quality in relation to the RUP based on the groundwater monitoring program.

Closure Plan

19.1 At least 30 days prior to the closure of this Site, the Municipality shall submit to the District Manager for concurrence, a detailed clean-up and closure plan for this Site which confirms that this Site will be closed in an environmentally acceptable manner.

19.2 Within 30 days of the closure of this Site, the Municipality shall submit an independent confirmation that this Site has been closed in accordance with the submitted plan, and present this Approval for revocation to the Director.

Schedule A

This Schedule "A" forms part of Environmental Compliance Approval No. A120215.

1. Application for a Certificate of Approval for a Waste Disposal Site (Transfer) dated April 4, 1986.

2. Detailed Hydrogeological Study, Digested Sludge Transfer Lagoons, City of Niagara Falls for the Regional Municipality of Niagara dated January 24, 1986, prepared by Gartner Lee Associates.

3. Application for a Certificate of Approval for a Waste Disposal Site (Transfer) dated August 4, 1995.

4. Garner Road Sludge Lagoon Upgrade Contract RN 95-30 drawings prepared by Gore and Storrie Limited dated July 1995, as follows:

G2 Proposed Site Plan

G3 Sections and Details

G4 Road and Subdrain Plan and Details

G5 Landscape Plan

5. Regional Municipality of Niagara, Garner Road Digested Sludge Holding Facility Class Environmental Assessment Screening Report, March 1995, Gore and Storrie

Limited.

6. Geotechnical Investigation Garner Road Digested Sludge Holding Facility, City of Niagara Falls, Jagger Hims Limited, June 1995.

7. The Regional Municipality of Niagara Contract 95-30, Garner Road Sludge Lagoon Upgrade, City of Niagara Falls.

8. Application for a Certificate of Approval for a Waste Disposal Site (Transfer) dated November 7, 1995.

9. Letter from mike Rabishaw regarding Garner Road Lagoon to Deanna Barrow, Project Manager, dated October 11, 1995.

10. Letter from Ms. Deanna Barrow, P.Eng., regarding Upgrade and Expansion of the Garner Road Sludge Storage Facility, to Mr. Lee Van Biesbrouck, P.Eng., dated December 11, 1995.

11. Letter from Ms. Deanna Barrow, P.Eng., regarding Upgrade and Expansion of the Garner Road Sludge Storage Facility, to Mr. Lee Van Biesbrouck, P.Eng., dated January 22, 1996.

12. Application and letter dated May 14, 1996, to Mr. H. Wong, Director, Ministry of Environment and Energy, from Mr. Sal Iannello, Public Works Department, The Regional Municipality of Niagara, RE: Application to Amend Certificate of Approval A120215 and Further Information.

13. Letter dated April 24, 1996, to Mr. H. Wong., Ministry of Environment and Energy, from Sal Iannello, P.Eng., Public Works Department, The Regional Municipality of Niagara, RE: Amendment ot Certificate of Approval No. A120215.

14. Letter dated June 25, 1996, to Mr. Dennis Corr, Ministry of Environment and Energy from Mr. Ed Dujlovic, The City of Niagara Falls, RE: City's approval letter.

15. Letter dated August 6, 1996, to Mr. H. Wong, Ministry of Environment and Energy, from Sal Iannello, Public Works Department, The Regional Municipality of Niagara, RE: Supporting Documentation.

16. Letter dated November 1, 1996, to Ms. Belinda Koblik, Ministry of Environment and Energy, from Sal Iannello, Public Works Department, The Regional Municipality of Niagara, RE: Operation of Lagoon for the interim storage of water process wastes and response to draft amendment of Certificate of Approval A120215.

17. Application for Approval of a Waste Disposal Site dated April 24, 1998 and the covering letter dated May 7, 1998 from Mr. D.J. Payne, Regional Municipality of Niagara, to Mr. W. Ng, Ministry of the Environmenta, and the supporting information attached (Project Description Summary, Pre-Design Technical Memorandum, Contract Drawings and Specifications).

18. Application and attached Letter, dated September 23, 2999 from Joe Furgal, P.Eng., Process Engineer, Water and Wastewater Division, the Regional Municipality of Niagara to Approvals Branch, Ministrey of the Environment, regarding request to withdraw condition 8(5) and 8(6) of Notice of Amendment dated November 8, 1996 to Provisional Certificate of Approval No. A120215 dated March 5, 1996.

19. Letter dated November 4, 1999 and attached document from J. Furgal, P.Eng., Process Engineer, Water and Wastewater Division, the Regional Municipality of Niagara to Mr. George Lai, Ministry of the Environment, regarding procedures for incorporating water treatment plant backwash residuals and pollution control plant biosolids at the Garner Road Waste Management Site Lagoons and, data, quality and application rate of WTP residuals and PCP biosolids for agricultural land application.

20. Letter dated September 6, 2000 from Joseph P. Furgal, P.Eng., Process Engineer, Public Works Department, the Regional Municipality of Niagara to Mr. Bob Slattery, MOE regarding application for and amendment to Certificate of Approval Garner Road Waste Transfer Site for biosolids, dewatering.

21. Application for Approval dated September 6, 2000 and signed by Joe Furgal, P.Eng., Process Engineer, the Regional Municipality of Niagara.

22. Design and Operations report on sludge dewatering mobile unit prepared by Azurix North America.

23. Letter dated August 24, 2004 from Julie Parker, P.Eng., Project Engineer, Hydromantis Inc., Consulting Engineers to Eugenia Chalambalacis, Application Processor, MOE regarding the public notification letters sent to adjacent property owners.

24. Letter dated September 13, 2004 from Julie Parker, P.Eng., Project Engineer, Hydromantis Inc., Consulting Engineers to Richard Saunders, MOE regarding additional information requested.

25. Email dated September 20, 2004 from Julie Parker, P.Eng., Project Engineer, Hydromantis Inc., Consulting Engineers to Richard Saunders, MOE regarding odour control plans at the dewatering facility.

26. Email dated September 21, 2004 from Julie Parker, P.Eng., Project Engineer, Hydromantis Inc., Consulting Engineers to Richard Saunders, MOE regarding contact information for emergencies.

27. Email dated September 30, 2004 from Julie Parker, P.Eng., Project Engineer, Hydromantis Inc., Consulting Engineers to Richard Saunders, MOE regarding the maximum daily amount of waste received at the dewatering facility.

28. Application for a Provisional Certificate of Approval for a Waste Disposal Site signed by Deanna Barrow, Manager, Process & Staff Development of the Regional Municipality of Niagara, dated April 6, 2006.

29. Design and Operations Report for the Dewatered Biosolids Solar Drying Facility (Pilot Project) at the Garner Road Biosolids Storage Facility, Regional Municipality of Niagara, dated February 2006.

30. Fax from Ms. Deanna Barrow, Manager of Process & Staff Development (Regional Municipality of Niagara) to Richard Saunders (MOE) dated June 28, 2006 regarding additional information such as the reporting requirements, greenhouse design, uses of the dried biosolids and fire department comments.

31. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated January 21, 2010.

32. Application for a Provisional Certificate of Approval for a Waste Disposal Site signed by Robin Young, Project Manager, Water & Wastewater Engineering for the Regional Municipality of Niagara, signed February 10, 2009, including supporting documentation prepared by Hydromantis, Inc.

33. Environmental Compliance Approval Application, signed by Ms. Dawn MacArthur, W-WW Compliance Technologist, Regional Municipality of Niagara dated August 14, 2017.

34. Memorandum dated August 9, 2017, to J. Oatley, Region of Niagara, from M. Newbigging, Cole Engineering Group, re: Garner Road Biosolids Facility - CofA Consolidation Report.

35. Email dated March 9, 2018, to V. Pochmursky, MOECC, from D. Macarthur, Region of Niagara re: Garner Road Biosolids Mixer Replacement and includes attached drawings (56 drawings total) and construction specifications.

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

The reason for condition 1.1 is to clarify that the Certificate of Approval issued March 5, 1996 and Notices of Amendment Nos. 1 through 10 inclusive, are no longer in effect and have been replaced and superseded by the Terms and Conditions in this Approval.

The reason for Condition 2.1 is to ensure that the Site has been built in accordance with the applicaiton and supporting information submitted by the Municipality, and not in a manner which the Director has not been asked to consider.

Conditions 2.2 and 2.3 have been included to clarify the legal rights and obligation of this Approval.

The reason for Condition 2.4 is to clarify how to interpret this Approval in relation to the application and supporting documentation.

The reason for Condition 2.5 is to ensure that correspondence related to this Approval is easily identified.

The reason for Condition 2.6 is to ensure the availability of records for inspection and compliance purposes.

The reason for Condition 3.1 is to ensure that Ministry personnel, when acting in the course of their duties, will be given unobstructed access to the information and records related to the Site which are required by this Approval.

The reason for Conditions 4.1 and 4.2 is to ensure that the Site is operated under the corporate, limited or applicant's own name which appears on the application and supporting information submitted with the application and not under any name which the Director has not been asked to consider.

The reason for Condition 5.1 is to ensure that the Site is only operated in the presence of a competent person.

The reason for Condition 5.2 is to minimize the risk of vandalism.

The reason for Conditions 5.3, 8.1, 8.2, 8.3, 8.5, 9.1, 10.1, 10.2, and 17.1 is to ensure that the biosolids processing is conducted in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 5.4 is to ensure that users of the Site are fully aware of important information and restrictions related to the use of the Site.

The reason for Condition 8.4 is to allow proper mixing of digested sewage sludge and water treatment plant sludge at the Garner Road Waste Disposal Site Lagoon.

The reason for Conditions 11.1, 11.2 and 11.3 is to demonstrate that the Site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for analysis of trends over time and ensures that there is an early warning of potential problems so that remedial action can be taken.

The reason for Condition 12.1 and 12.2 is to ensure that the Site is maintained in good working order.

The reason for Condition 13.1 is to ensure that any complaints regarding operations at the Site are responded to in a timely manner.

The reason for condition 14.1 is to ensure that the Municipality takes immediate action during an operational upset or emergency.

The reasons for Condition 14.2 is to ensure that the Municipality notifies the Ministry forthwith of any spills as required in Part X of the EPA so that appropriate spills response can be determined.

The reason for Conditions 15.1 and 17.3 is to ensure that site personnel are familiar with the operation and its associated hazards and to ensure the facility is operated in accordance with its Approval.

The reason for Conditions 16.1, 16.2, 16.3, 16.4, 16.5 and 16.6 is to ensure that accurate records are maintained to demonstrate compliance with the Conditions of this Approval, the EPA and its regulations.

The reason for Condition 17.2 is to ensure the Municipality follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site.

The reason for Condition 18.1 is to ensure that an annual review of the dewatering operations is documented and monitored so that any possible improvements to the operations or monitoring programs are identified.

The reason for Conditions 19.1 and 19.2 is to ensure this Site is closed in an orderly and environmentally acceptable manner. The use and operation of this Site without this condition would not be in the public interest.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A120215 issued on March 5, 1996

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after

receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

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

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

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

DATED AT TORONTO this 11th day of April, 2018

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection*

Act

DL/
c: District Manager, MOECC Niagara

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Ontario

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

CERTIFICATE OF APPROVAL
AIR
NUMBER 2914-6SWPBE
Issue Date: August 28, 2006

The Regional Municipality of Niagara
P.O. Box 1042 Stn Main
Thorold, Ontario
L2V 4T7

Site Location: Garner Road Waste Disposal Site (Transfer)
8719 Chippawa Creek Road
Niagara Falls City, Regional Municipality Of Niagara

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

- two (2) exhaust systems, serving a solar biosolids drying process, exhausting into the atmosphere at a maximum total volumetric flow rate of 16.4 actual cubic metres per second at approximate temperature of 29.4 degrees Celsius through two (2) exhaust fans, each having an exit diameter of 0.98 metre, each located 4.27 metres to center above grade;

all in accordance with the application for a Certificate of Approval (Air) dated April 18, 2006, and signed by Deanna Barrow, Manager of Process & Staff Development, the letters (e-mails) from Joe Brown (Hydromantis, Inc., Consulting Engineers) dated August 15 and August 24, 2006, and all information associated with the application.

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

(1) "Act" means the Environmental Protection Act;

(2) "Certificate" means this Certificate of Approval, issued in accordance with Section 9 of the Act;

(3) "Company" means The Regional Municipality of Niagara;

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

(5) "Equipment" means the solar biosolids drying unit described in the Company's application, this Certificate and in the supporting documentation submitted with the application, to the extent approved by this Certificate;

(6) "Manual" means a document or a set of documents that provide written instructions to staff of the Company; and

(7) "Ministry" means the Ontario Ministry of the Environment.

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

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

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

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

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

(b) emergency procedures;

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

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

(2) implement the recommendations of the Manual.

RECORD RETENTION

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

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

(2) all records of any environmental complaints; including:

(a) a description, time and date of each incident to which the complaint relates;

(b) wind direction at the time of the incident to which the complaint relates; and

(c) a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

NOTIFICATION OF COMPLAINTS

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

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

(2) the time and date of the incident to which the complaint relates;

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

1. Condition No. 1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the Regulations and this Certificate.

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

3. Condition No. 3 is included to require the Company to notify staff of the Ministry so as to assist the Ministry with the review of the site's compliance.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

CONTENT COPY OF ORIGINAL

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

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

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

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

DATED AT TORONTO this 28th day of August, 2006

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

JK/
c: District Manager, MOE Niagara
Joe Brown, Hydromantis Inc.

CONTENT COPY OF ORIGINAL

Ontario

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

CERTIFICATE OF APPROVAL
AIR
NUMBER 4332-7B3L3S
Issue Date: January 22, 2008

The Regional Municipality of Niagara
3501 Schmon Parkway
Post Office Box, No. 1042
Thorold, Ontario
L2V 4T7

Site Location: Garner Road Waste Disposal Site (Transfer)
8719 Chippawa Creek Rd
Niagara Falls, Regional Municipality Of Niagara

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

- one (1) standby natural gas generator set, having a rating of 25 kilowatts, to provide power for the facility during emergency situations;

all in accordance with the Application for Approval (Air & Noise) dated October 22, 2007 and signed by Robin Young, (Project Manager), The Regional Municipality of Niagara, and all supporting information associated with the application including additional information provided by Hydromantis Inc., dated October 12, 2007.

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

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

(2) "Certificate" means this Certificate of Approval issued in accordance with Section 9 of the Act;

(3) "Equipment" means the natural gas generator set described in the Owner's application, this Certificate and in the supporting documentation submitted with the application, to the extent approved by this Certificate;

(4) "Manual" means a document or a set of documents that provide written instructions to staff of the Owner;

(5) "Ministry" means the Ontario Ministry of the Environment;

(6) "Owner" means The Regional Municipality of Niagara, and includes its successors and assignees;

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

(8) "Publication NPC-232" means Ministry Publication NPC-232, Sound Level Limits for Stationary Sources in Class 3 Areas (Rural), October, 1995.

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

TERMS AND CONDITIONS

GENERAL

1. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Equipment in accordance with the description given in this Certificate, application for approval of the Equipment and the submitted supporting documents and plans and specifications as listed in this Certificate.

2. Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

PERFORMANCE

3. The Owner shall ensure that the noise emissions from the Equipment comply with the limits set out in Publication NPC-205 or NPC-232, as applicable.

OPERATION AND MAINTENANCE

4. The Owner shall restrict the periodic testing of the Equipment to the daytime hours from 7:00 am to 7:00 pm.

5. The Owner shall ensure that the Equipment is properly operated and maintained at all times. The Owner shall:

(1) prepare, not later than three (3) months after the date of this Certificate or the date of commissioning of the Equipment, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:

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

(b) emergency procedures;

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

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

(2) implement the recommendations of the Manual; and

(3) retain, for a minimum of two (2) years from the date of their creation, all records on the maintenance, repair and inspection of the Equipment, and make these records available for review by staff of the Ministry upon request.

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

1. Condition Nos. 1 and 2 are imposed to ensure that the Equipment is built and operated in the manner in which it was described for review and upon which approval was granted. These conditions are also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition No. 3 is included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Equipment.

3. Condition No. 4 is included to ensure that the proposed operation, excluding emergency situations, is not extended beyond specific daytime hours to prevent an adverse effect resulting from the operation of the Equipment.

4. Condition No. 5 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate. In addition the Owner is required to keep records and provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require

CONTENT COPY OF ORIGINAL

a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

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

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

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

DATED AT TORONTO this 22nd day of January, 2008

Zafar Bhatti, P.Eng.
Director
Section 9, *Environmental Protection Act*

AA/
c: District Manager, MOE Niagara District Office
Joe Brown, Hydromantis Inc.

CONTENT COPY OF ORIGINAL

Ontario

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

AMENDED CERTIFICATE OF APPROVAL
AIR
NUMBER 8120-72DGYB
Issue Date: June 10, 2007

The Corporation of the City of Niagara Falls
4310 Queen Street
Post Office Box, No. 1023
Niagara Falls, Ontario
L2E 6X5

Site Location: Grassy Brook Sewage Pumping Station
9240 Montrose Road
Niagara Falls City, Regional Municipality of Niagara, Ontario
L2E 6S5

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

- one (1) standby diesel generator set, having an initial rating of 100 kilowatts (upgradeable to 200 kilowatts), to provide power for the sewage pumping station during emergency situations;

all in accordance with the Application for Approval (Air & Noise) dated October 23, 2006 and signed by Ed Dujlovic, (Director of Municipal Works), The Corporation of the City of Niagara Falls, and all supporting information associated with the application including additional information provided by Heather O'Hagan of Earth Tech Canada Inc., dated January 18, 2007 and additional information provided by Kelly M. Walsh, P.Eng. of Earth Tech Canada Inc., dated March 19, 2007, March 20, 2007 and April 11, 2007.

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

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

(2) "Certificate" means this Certificate of Approval issued in accordance with Section 9 of the Act;

(3) "Equipment" means the diesel generator set described in the Owner's application, this Certificate and in the supporting documentation submitted with the application, to the extent approved by this Certificate;

(4) "Manual" means a document or a set of documents that provide written instructions to staff of the Owner;

(5) "Ministry" means the Ontario Ministry of the Environment;

(6) "Owner" means The Corporation of the City of Niagara Falls, and includes its successors and assignees; and,

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

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

TERMS AND CONDITIONS

GENERAL

1. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Equipment in accordance with the description given in this Certificate, application for approval of the Equipment and the submitted supporting documents and plans and specifications as listed in this Certificate.

CONTENT COPY OF ORIGINAL

2. Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

PERFORMANCE

3. The Owner shall ensure that the noise emissions from the Equipment comply with the limits set out in Publication NPC-205.

OPERATION AND MAINTENANCE

4. The Owner shall restrict the periodic testing of the Equipment to the daytime hours from 7:00 am to 7:00 pm.

5. The Owner shall ensure that the Equipment is properly operated and maintained at all times. The Owner shall:

(1) prepare, not later than three (3) months after the date of this Certificate or the date of commissioning of the Equipment, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:

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

(b) emergency procedures;

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

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

(2) implement the recommendations of the Manual; and

(3) retain, for a minimum of two (2) years from the date of their creation, all records on the maintenance, repair and inspection of the Equipment, and make these records available for review by staff of the Ministry upon request.

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

1. Condition Nos. 1 and 2 are imposed to ensure that the Equipment is built and operated in the manner in which it was described for review and upon which approval was granted. These conditions are also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition No. 3 is included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Equipment.

3. Condition No. 4 is included to ensure that the proposed operation, excluding emergency situations, is not extended beyond specific daytime hours to prevent an adverse effect resulting from the operation of the Equipment.

4. Condition No. 5 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate. In addition the Owner is required to keep records and provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 2948-6XKLQQ issued on February 1, 2007.

CONTENT COPY OF ORIGINAL

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

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

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

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

DATED AT TORONTO this 10th day of June, 2007

Sarah Paul, P.Eng.
Director
Section 9, *Environmental Protection Act*

TS/
c: District Manager, MOE Niagara District Office
Heather O'Hagan, Earth Tech Canada Inc.

CONTENT COPY OF ORIGINAL

Ontario

Ministry of the Environment
Ministère de l'Environnement

CERTIFICATE OF APPROVAL
AIR
NUMBER 0502-7XUKPC
Issue Date: November 25, 2009

Aditya Birla Minacs Worldwide
9515 Montrose Rd
Niagara Falls, Ontario
L0S 1K0

Site Location: 9515 Montrose Road
City of Niagara Falls, Ontario
L0S 1K0

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

- one (1) standby diesel generator set, having a rating of 400 kilowatts, to provide power for the facility during emergency situations;

all in accordance with the Application for Approval (Air & Noise) dated October 22, 2009 and signed by Michael Ross, (Director, Facilities), Aditya Birla Minacs Worldwide , and all supporting information associated with the application including additional information provided by Aercoustics Engineering Limited, dated September 16, 2009, and signed by Trevor Copeland.

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

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

(2) "Certificate" means this Certificate of Approval issued in accordance with Section 9 of the Act;

(3) "Equipment" means the diesel generator set described in the Owner's application, this Certificate and in the supporting documentation submitted with the application, to the extent approved by this Certificate;

(4) "Manual" means a document or a set of documents that provide written instructions to staff of the Owner;

(5) "Ministry" means the Ontario Ministry of the Environment;

(6) "Owner" means Aditya Birla Minacs Worldwide, and includes its successors and assignees;

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

(8) "Publication NPC-232" means Ministry Publication NPC-232, Sound Level Limits for Stationary Sources in Class 3 Areas (Rural), October, 1995.

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

TERMS AND CONDITIONS

GENERAL

CONTENT COPY OF ORIGINAL

1. Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the Equipment in accordance with the description given in this Certificate, application for approval of the Equipment and the submitted supporting documents and plans and specifications as listed in this Certificate.

2. Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

PERFORMANCE

3. The Owner shall ensure that the noise emissions from the Equipment comply with the limits set out in Publication NPC-205 or NPC-232, as applicable.

OPERATION AND MAINTENANCE

4. The Owner shall ensure that the Equipment is properly operated and maintained at all times. The Owner shall:

(1) prepare, not later than three (3) months after the date of this Certificate or the date of commissioning of the Equipment, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:

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

(b) emergency procedures;

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

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

(2) implement the recommendations of the Manual; and

(3) retain, for a minimum of two (2) years from the date of their creation, all records on the maintenance, repair and inspection of the Equipment, and make these records available for review by staff of the Ministry upon request.

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

1. Condition Nos. 1 and 2 are imposed to ensure that the Equipment is built and operated in the manner in which it was described for review and upon which approval was granted. These conditions are also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition No. 3 is included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Equipment.

3. Condition No. 4 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate. In addition the Owner is required to keep records and provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

CONTENT COPY OF ORIGINAL

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 25th day of November, 2009

Zafar Bhatti, P.Eng.
Director
Section 9, *Environmental Protection Act*

JO/
c: District Manager, MOE Niagara District Office
Trevor Copeland, Aercoustics Engineering Limited

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Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 9177-9ZJJFQ
Issue Date: September 28, 2015

E.S. Fox Limited
9127 Montrose Rd
Niagara Falls, Ontario
L2E 7J9

Site Location: E.S. Fox Limited Head Office
9127 Montrose Rd
Niagara Falls City, Regional Municipality of Niagara
L2E 7J9

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

- one (1) stand-by diesel generator set, having a rating of 315 kilowatts, to provide power for the E.S. Fox Limited head office during emergency situations;

- one (1) dust collector serving a tool cleaning station, equipped with a shaker filter cleaning mechanism and polyester filter bags, having a filtering velocity of 4.5 centimetres per second, discharging into the atmosphere at a volumetric flow rate of 0.73 cubic metres per second, through a wall vent having an exit diameter of 0.25 metre, located 3.05 metres above grade;

- various natural-gas fired comfort heating equipment, with a combined maximum thermal input of 22,062,160 kilojoules per hour;

- two (2) battery charging stations;

- minor surface painting operations;

all in accordance with the Application for Approval (Air & Noise) submitted by E.S. Fox Limited, dated August 29, 2014 and signed by Gino Squeo, Corporate Environmental Health & Safety Manager; and the supporting information, including the Emission Summary and Dispersion Modelling Report, submitted by AMEC, dated August 25, 2014 and signed by Akhter Iqbal, P. Eng., the additional information prepared by AMEC, dated July 24, 2015 and submitted by Akhter Iqbal, P. Eng., and the additional information prepared by AMEC, dated August 19, 2015 and submitted by Akhter Iqbal, P. Eng.

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

1. "Approval" means this Environmental Compliance Approval, including the application and supporting documentation listed above;
2. "Company" means E.S. Fox Limited, that is responsible for the construction or operation of the Facility and includes any successors and assigns;

3. "District Manager" means the District Manager of the appropriate local district office of the Ministry,

where the Facility is geographically located;

4. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

5. "Equipment" means the equipment and processes described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

6. "Facility" means the entire operation located on the property where the Equipment is located;

7. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

8. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

9. "Publication NPC-300" means the Ministry Publication NPC-300, " Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300", August, 2013, as amended.

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

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

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

(1) prepare, not later than three (3) months after the date of this Approval, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:

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

(b) emergency procedures, including spill clean-up procedures;

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

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

(e) the frequency of inspection and replacement of the filter material in the Equipment;

(2) implement the recommendations of the Manual.

RECORD RETENTION

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

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

(2) all records of any environmental complaints; including:

(a) a description, time and date of each incident to which the complaint relates;

(b) wind direction at the time of the incident to which the complaint relates; and

(c) a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

NOTIFICATION OF COMPLAINTS

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

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

(2) the time and date of the incident to which the complaint relates.

NOISE

4. The Company shall, at all times, ensure that the noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-300.

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

1. Condition No. 1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the EPA, the Regulations and this Approval.

2. Condition No. 2 is included to require the Company to keep records and to provide information to staff of the Ministry so that compliance with the EPA, the Regulations and this Approval can be verified.

3. Condition No. 3 is included to require the Company to notify staff of the Ministry so as to assist the Ministry with the review of the site's compliance.

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

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 5161-7SEKCQ, and 0028-4LRSUX issued on May 31, 2009 and July 17, 2000, respectively.

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*****
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

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

AND

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

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca , you can determine when the leave to appeal period ends.

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

DATED AT TORONTO this 28th day of September, 2015

Ian Greason, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

AB/
c: District Manager, MOECC Niagara
Akhter Iqbal, P. Eng, AMEC

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 1282-AQRMJB
Issue Date: December 19, 2017

Cytec Canada Inc.
9061 Garner Road
Niagara Falls, Ontario
L2H 0Y2

Site Location: Cytec Canada Inc.
9061 Garner Road
Niagara Falls City, Regional Municipality of Niagara
L2E 6S5

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

Description Section

A phosphine and phosphine derivatives facility, consisting of the following processes and support units:

- Phosphine Plant including derivatives section;
- Purification, mixing and packaging; and;
- Research and development pilot plant;

and the following *Equipment with Specific Operational Limits* :

- one (1) emergency flare located in the phosphine building equipped with a natural gas fired continuous pilot having a maximum thermal input of 241,000 kilojoules per hour, used to burn spills, releases from safety valves, rupture disk type vents and vapour headspace in reaction vessels from Train 1 operations. Under the worst case upset, the flare combusts pyrophoric waste gas originating from a safety valve of an autoclave, having a maximum volumetric flow rate of 1,262 standard cubic metres per minute;
- one (1) emergency flare located in the flare and thermal oxidizer building equipped with a natural gas fired continuous pilot having a maximum thermal input of 242,663 kilojoules per hour, used to burn spills, releases from safety valves, rupture disk type vents and vapour headspace in reaction vessels from Train 2 operations. Under the worst case upset, the flare combusts pyrophoric waste gas originating from a safety valve of an autoclave, having a maximum volumetric flow

rate of 1,262 standard cubic metres per minute;

- one (1) natural gas fired thermal oxidizer serving Train 1, designed for a maximum heat input of 7,157,000 kilojoules per hour equipped with an auxiliary natural gas fired burner having a maximum heat input of 1,265,000 kilojoules per hour, used to incinerate the following streams:
    - waste gas comprising of phosphine, nitrogen, isobutylene, butene, low levels of all raw materials and phosphine compounds from the vessel vapour headspaces, having a maximum volumetric flow rate of 4.39 standard cubic metres per minute with a maximum heat input of 302,000 kilojoules per hour;
    - waste organic liquid, a mixture of organic solvents and phosphine derivatives, consisting of toluene, isopropyl alcohol mixture, octene, organophosphines, diisobutylene, tri-isobutyl phosphine, methyl tosylate, cyclooctadiene, hexene and isopar-M, having a maximum flow rate of 2.5 litres per minute with a maximum heat input of 5,590,000 kilojoules per hour; and
    - waste aqueous having a volumetric flow rate of 7.57 litres per minute.

  The thermal oxidizer operates at a normal temperature of 871 degrees Celsius with a minimum gas residence time of 2 seconds and is equipped with a continuous monitoring and recording system, a quench section, a venturi scrubber and a mist eliminator comprising of polyester fiber filters, having a dust removal efficiency of not less than 90 percent. The thermal oxidizer temperature will drop to 843 degrees Celsius during swings in operation before the waste organic liquid is shut off;
- one (1) natural gas fired thermal oxidizer serving Train 2, designed for a maximum heat input of 10,736,000 kilojoules per hour equipped with an auxiliary natural gas fired burner having a maximum heat input of 1,898,000 kilojoules per hour, used to incinerate the following streams:
    - waste gas comprising of phosphine, nitrogen, isobutylene, butene, low levels of all raw materials and phosphine compounds from the vessel vapour headspaces, having a maximum volumetric flow rate of 4.39 standard cubic metres per minute with a maximum heat input of 453,000 kilojoules per hour;
    - waste organic liquid, a mixture of organic solvents and phosphine derivatives, consisting of toluene, isopropyl alcohol mixture, octene, organophosphines, diisobutylene, tri-isobutyl phosphine, methyl tosylate, cyclooctadiene, hexene and isopar-M, having a maximum flow rate of 3.75 litres per minute with a maximum heat input of 8,385,000 kilojoules per hour; and
    - waste aqueous having a volumetric flow rate of 11.4 litres per minute.

  The thermal oxidizer operates at a normal temperature of 871 degrees Celsius with a volumetric gas flow rate of 8.36 actual cubic metres per second and a

minimum gas residence time of 2 seconds, and is equipped with a continuous monitoring and recording system, a quench section, a venturi scrubber and a mist eliminator comprising of polyester fiber filters, having a dust removal efficiency of not less than 90 percent. The thermal oxidizer will drop to 843 degrees Celsius during swings in operation before the waste organic liquid is shut off;

- two (2) natural gas fired boilers located in the steam plant, each having a total maximum heat input of 13,900,000 kilojoules per hour;
- two (2) natural gas fired boilers located in the utilities building, each having a total maximum heat input of 21,797,500 kilojoules per hour;

including the *Equipment* and any other ancillary and support processes and activities, operating at a *Facility Production Limit* of up to **40,000 tonnes of phosphine based chemicals per year** discharging to the air as described in the *Original ESDM Report.*

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

1. "*ACB list"* means the document entitled "Air Contaminants Benchmarks (ACB) List: Standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants", as amended from time to time and published by the *Ministry* and available on a Government website;
2. "*Acceptable Point of Impingement Concentration"* means a concentration accepted by the *Ministry* as not likely to cause an adverse effect for a *Compound of Concern* that,
    a. is not identified in the *ACB list,* or
    b. is identified in the *ACB list* as belonging to the category "Benchmark 2" and has a concentration at a *Point of Impingement* that exceeds the concentration set out for the contaminant in that document.
    With respect to the *Original ESDM Report,* the *Acceptable Point of Impingement Concentration* for a *Compound of Concern* mentioned above is the concentration set out in the *Original ESDM Report;*
3. "*Acoustic Assessment Report"* means the report, prepared in accordance with *Publication NPC-233* and Appendix A of the *Basic Comprehensive User Guide,* by Sharon Schajnoha and Aaron Haniff, RWDI AIR Inc. and dated December 22, 2016, submitted in support of the application, that documents all sources of noise emissions and *Noise Control Measures* present at the *Facility,* as updated in accordance with Condition 5 of this *Approval;*
4. "*Acoustic Assessment Summary Table"* means a table prepared in accordance

with the *Basic Comprehensive User Guide* summarising the results of the *Acoustic Assessment Report,* as updated in accordance with Condition 5 of this *Approval;*

5. "*Approval"* means this entire Environmental Compliance Approval and any *Schedules* to it;
6. "*Basic Comprehensive User Guide"* means the *Ministry* document titled "Basic Comprehensive Certificates of Approval (Air) User Guide" dated March 2011, as amended;
7. "*Best Management Practices Plan for Facility Flares"* means a document or a set of documents which describe record keeping and notification processes for *Flaring Events* at the *Facility;*
8. "*Company"* means **Cytec Canada Inc.** that is responsible for the construction or operation of the *Facility* and includes any successors and assigns in accordance with section 19 of the *EPA;*
9. "*Compound of Concern"* means a contaminant described in paragraph 4 subsection 26 (1) of *O. Reg. 419/05,* namely, a contaminant that is discharged from the *Facility* in an amount that is not negligible;
10. "*Description Section"* means the section on page one of this *Approval* describing the *Company's* operations and the *Equipment* located at the *Facility* and specifying the *Facility Production Limit* for the *Facility;*
11. "*Director"* means a person appointed for the purpose of section 20.3 of the *EPA* by the *Minister* pursuant to section 5 of the *EPA;*
12. "*District Manager"* means the District Manager of the appropriate local district office of the *Ministry,* where the *Facility* is geographically located;
13. "*Emission Summary Table"* means a table described in paragraph 14 of subsection 26 (1) of *O. Reg. 419/05;*
14. "*Environmental Assessment Act"* means the Environmental Assessment Act, R.S.O. 1990, c.E.18, as amended;
15. "*EPA"* means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;
16. "*Equipment"* means equipment or processes described in the *ESDM Report,* this *Approval* and in the *Schedules* referred to herein and any other equipment or processes;
17. "*Equipment with Specific Operational Limits"* means emergency flares, natural gas fired thermal oxidizers, natural gas fired boilers each with a heat input greater than 10.5 gigajoules per hour and any *Equipment* related to the thermal oxidation of waste or waste derived fuels, fume incinerators or any other *Equipment* that is specifically referenced in any published *Ministry* document that outlines specific

operational guidance that must be considered by the *Director* in issuing an *Approval;*

18. "*ESDM Report"* means the most current Emission Summary and Dispersion Modelling Report that describes the *Facility.* The *ESDM Report* is based on the *Original ESDM Report* and is updated after the issuance of this *Approval* in accordance with section 26 of *O. Reg. 419/05* and the *Procedure Document;*
19. "*Facility"* means the entire operation located on the property where the *Equipment* is located;
20. "*Facility Production Limit"* means the production limit placed by the *Director* on the main product(s) or raw materials used by the *Facility;*
21. "*Flaring Event"* means the operation of an emergency flare that was reported to the Ministry's Spills Action Centre;
22. "*Log"* means a document that contains a record of each change that is required to be made to the *ESDM Report* and *Acoustic Assessment Report,* including the date on which the change occurred. For example, a record would have to be made of a more accurate emission rate for a source of contaminant, more accurate meteorological data, a more accurate value of a parameter that is related to a source of contaminant, a change to a *Point of Impingement* and all changes to information associated with a *Modification* to the *Facility* that satisfies Condition 2;
23. "*Minister"* means the Minister of the Environment and Climate Change or such other member of the Executive Council as may be assigned the administration of the *EPA* under the Executive Council Act;
24. "*Ministry"* means the ministry of the *Minister;*
25. "*Modification"* means any construction, alteration, extension or replacement of any plant, structure, equipment, apparatus, mechanism or thing, or alteration of a process or rate of production at the *Facility* that may discharge or alter the rate or manner of discharge of a *Compound of Concern* to the air or discharge or alter noise or vibration emissions from the *Facility;*
26. "*Noise Control Measures"* means measures to reduce the noise emissions from the *Facility* and/or *Equipment* including, but not limited to, silencers, acoustic louvres, enclosures, absorptive treatment, plenums and barriers;
27. "*O. Reg. 419/05"* means Ontario Regulation 419/05, Air Pollution – Local Air Quality, as amended;
28. "*Original ESDM Report"* means the Emission Summary and Dispersion Modelling Report which was prepared in accordance with section 26 of *O. Reg. 419/05* and the *Procedure Document* by RWDI AIR Inc. and dated December 21, 2016 submitted in support of the application, and includes any changes to the report

made up to the date of issuance of this *Approval;*

29. "*Point of Impingement"* has the same meaning as in section 2 of *O. Reg. 419/05;*
30. "*Point of Reception"* means Point of Reception as defined by *Publication NPC-300* ;
31. "*Procedure Document"* means *Ministry* guidance document titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated February 2017, as amended;
32. "*Processes with Significant Environmental Aspects"* means the *Equipment* which, during regular operation, would discharge one or more contaminants into the air in an amount which is not considered as negligible in accordance with section 26 (1) 4 of *O. Reg. 419/05* and the *Procedure Document;*
33. "*Publication NPC-207"* means the *Ministry* draft technical publication "Impulse Vibration in Residential Buildings", November 1983, supplementing the Model Municipal Noise Control By-Law, Final Report, published by the *Ministry,* August 1978, as amended;
34. "*Publication NPC-233"* means the *Ministry* Publication NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October, 1995, as amended;
35. "*Publication NPC-300"* means the *Ministry* Publication NPC-300, "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300", August 2013, as amended;
36. "*Schedules"* means the following schedules attached to this *Approval* and forming part of this *Approval* namely:
    - Schedule A - Supporting Documentation;
    - Schedule B - Continuous Temperature Monitor and Recorder;
    - Schedule C - Carbon Monoxide Monitor and Recorder; and
    - Schedule D - Continuous Oxygen Monitor and Recorder;
37. "*Thermal Oxidizers*" means the two (2) thermal oxidizers (referenced in the *Original ESDM Report* as sources 74 and AH) each equipped with a quenched section, venturi scrubber and mist eliminator, described in the *Company's* application, this *Approval* and in the supporting documentation submitted with the application, to the extent approved by this *Approval;*
38. "*Toxicologist"* means a qualified professional currently active in the field of risk assessment and toxicology that has a combination of formal university education, training and experience necessary to assess contaminants; and
39. "*Written Summary Form"* means the electronic questionnaire form, available on

the *Ministry* website, and supporting documentation, that documents the activities undertaken at the *Facility* in the previous calendar year.

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

TERMS AND CONDITIONS

1. **GENERAL**
    1. Except as otherwise provided by this *Approval,* the *Facility* shall be designed, developed, built, operated and maintained in accordance with the terms and conditions of this *Approval* and in accordance with the following *Schedules* attached hereto:

    - Schedule A - Supporting Documentation;
    - Schedule B - Continuous Temperature Monitor and Recorder;
    - Schedule C - Carbon Monoxide Monitor and Recorder; and
    - Schedule D - Continuous Oxygen Monitor and Recorder;

2. **LIMITED OPERATIONAL FLEXIBILITY**
    1. Pursuant to section 20.6 (1) of the *EPA* and subject to Conditions 2.2 and 2.3 of this *Approval,* future construction, alterations, extensions or replacements are approved in this *Approval* if the future construction, alterations, extensions or replacements are *Modifications* to the *Facility* that:
        a. are within the scope of the operations of the *Facility* as described in the *Description Section* of this *Approval;*
        b. do not result in an increase of the *Facility Production Limit* above the level specified in the *Description Section* of this *Approval;* and
        c. result in compliance with the performance limits as specified in Condition 4.

    2. Condition 2.1 does not apply to,
        a. the addition of any new *Equipment with Specific Operational Limits* or to the *Modification* of any existing *Equipment with Specific Operational Limits* at the *Facility;* or
        b. *Modifications* to the *Facility* that would be subject to the *Environmental Assessment Act.*

    3. Condition 2.1 of this *Approval* shall expire ten (10) years from the date of this

Approval, unless this *Approval* is revoked prior to the expiry date. The *Company* may apply for renewal of Condition 2.1 of this *Approval* by including an *ESDM Report* and an *Acoustic Assessment Report* that describes the *Facility* as of the date of the renewal application.

3. **REQUIREMENT TO REQUEST AN *ACCEPTABLE POINT OF IMPINGEMENT CONCENTRATION***
    1. Prior to making a *Modification* to the *Facility* that satisfies Condition 2.1.a. and 2.1.b., the *Company* shall prepare a proposed update to the *ESDM Report* to reflect the proposed *Modification.*
    2. The *Company* shall request approval of an *Acceptable Point of Impingement Concentration* for a *Compound of Concern* if the *Compound of Concern* is not identified in the *ACB list* as belonging to the category "Benchmark 1" and a proposed update to an *ESDM Report* indicates that one of the following changes with respect to the concentration of the *Compound of Concern* may occur:
        a. The *Compound of Concern* was not a *Compound of Concern* in the previous version of the *ESDM Report* and
            i. the concentration of the *Compound of Concern* exceeds the concentration set out for the contaminant in the *ACB list;* or
            ii. the *Compound of Concern* is not identified in the *ACB list;* or
        b. The concentration of the *Compound of Concern* in the updated *ESDM Report* exceeds the higher of,
            i. the most recent *Acceptable Point of Impingement Concentration,* and
            ii. the concentration set out for the contaminant in the *ACB list,*if the contaminant is identified in that document.
    3. The request required by Condition 3.2 shall propose a concentration for the *Compound of Concern* and shall contain an assessment, performed by a *Toxicologist,* of the likelihood of the proposed concentration causing an adverse effect at *Points of Impingement.*
    4. If the request required by Condition 3.2 is a result of a proposed *Modification* described in Condition 3.1, the *Company* shall submit the request, in writing, to the *Director* at least 30 days prior to commencing to make the *Modification.* The *Director* shall provide written confirmation of receipt of this request to the *Company.*
    5. If a request is required to be made under Condition 3.2 in respect of a proposed *Modification* described in Condition 3.1, the *Company* shall not

make the *Modification* mentioned in Condition 3.1 unless the request is approved in writing by the *Director.*

6. If the *Director* notifies the *Company* in writing that the *Director* does not approve the request, the *Company* shall,
    a. revise and resubmit the request; or
    b. notify the *Director* that it will not be making the *Modification.*
7. The re-submission mentioned in Condition 3.6 shall be deemed a new submission under Condition 3.2.
8. If the *Director* approves the request, the *Company* shall update the *ESDM Report* to reflect the *Modification.*
9. Condition 3 does not apply if Condition 2.1 has expired.

4. **PERFORMANCE LIMITS**
    1. Subject to Condition 4.2, the *Company* shall not discharge or cause or permit the discharge of a *Compound of Concern* into the air if,
        a. the *Compound of Concern* is identified in the *ACB list* as belonging to the category "Benchmark 1" and the discharge results in the concentration at a *Point of Impingement* exceeding the Benchmark 1 concentration; or
        b. the *Compound of Concern* is not identified in the *ACB list* as belonging to the category "Benchmark 1" and the discharge results in the concentration at a *Point of Impingement* exceeding the higher of,
            i. if an *Acceptable Point of Impingement Concentration* exists, the most recent *Acceptable Point of Impingement Concentration,* and
            ii. the concentration set out for the contaminant in the *ACB list,* if the contaminant is identified in that document.
    2. Condition 4.1 does not apply if the benchmark set out in the *ACB list* has a 10-minute averaging period and no ambient monitor indicates an exceedance at a *Point of Impingement* where human activities regularly occur at a time when those activities regularly occur.
    3. The *Company* shall ensure that the noise emissions from the *Facility* comply with the limits set out in *Ministry Publication NPC-300*.
    4. The *Company* shall ensure that the vibration emissions from the *Facility* comply with the limits set out in *Ministry Publication NPC-207.*
    5. The *Company* shall operate any *Equipment with Specific Operational Limits* approved by this *Approval* in accordance with the *Original ESDM Report* and Conditions 7, 8, 10, 11 and 12 in this *Approval.*

5. **DOCUMENTATION REQUIREMENTS**
    1. The *Company* shall maintain an up-to-date *Log.*
    2. No later than March 31 in each year, the *Company* shall update the *Acoustic Assessment Report* and shall update the *ESDM Report* in accordance with section 26 of *O. Reg. 419/05* so that the information in the reports is accurate as of December 31 in the previous year.
    3. The *Company* shall make the *Emission Summary Table* (see section 27 of *O. Reg. 419/05)* and *Acoustic Assessment Summary Table* available for examination by any person, without charge, by posting it on the Internet or by making it available during regular business hours at the *Facility.*
    4. The *Company* shall, within three (3) months after the expiry of Condition 2.1 of this *Approval,* update the *ESDM Report* and the *Acoustic Assessment Report* such that the information in the reports is accurate as of the date that Condition 2.1 of this *Approval* expired.
    5. Conditions 5.1 and 5.2 do not apply if Condition 2.1 has expired.

6. **REPORTING REQUIREMENTS**
    1. Subject to Condition 6.2, the *Company* shall provide the *Director* no later than June 30 of each year, a *Written Summary Form* to be submitted through the *Ministry's* website and by email to MOECC.Niagara@ontario.ca that shall include the following:
        a. a declaration of whether the *Facility* was in compliance with section 9 of the *EPA, O. Reg. 419/05* and the conditions of this *Approval;*
        b. a summary of each *Modification* satisfying Condition 2.1.a. and 2.1.b. that took place in the previous calendar year that resulted in a change in the previously calculated concentration at a *Point of Impingement* for any *Compound of Concern* or resulted in a change in the sound levels reported in the *Acoustic Assessment Summary Table* at any *Point of Reception.*
    2. Condition 6.1 does not apply if Condition 2.1 has expired.

7. **OPERATION AND MAINTENANCE**
    1. The *Company* shall prepare and implement, not later than three (3) months from the date of this *Approval,* operating procedures and maintenance programs for all *Processes with Significant Environmental Aspects,* which shall specify as a minimum:
        a. frequency of inspections and scheduled preventative maintenance;
        b. procedures to prevent upset conditions;

c. procedures to minimize all fugitive emissions;

d. procedures to prevent and/or minimize odorous emissions;

e. procedures to prevent and/or minimize noise emissions;

f. procedures for record keeping activities relating to the operation and maintenance programs;

g. routine and emergency operating and maintenance procedures recommended by *Thermal Oxidizers*, the continuous monitoring and recording systems and emergency flares suppliers;

h. calibration procedures of the continuous monitoring and recording systems;

i. operator training which is to be provided by an individual experienced with Thermal Oxidizer Systems and emergency flares;

j. procedures for optimizing the operation of the *Thermal Oxidizers* to minimize the emissions from the *Thermal Oxidizers*;

k. periodic inspection of the *Thermal Oxidizers* which are to be conducted by individuals experienced with the *Thermal Oxidizers*;

l. procedures for recording and responding to complaints regarding the operation of the *Thermal Oxidizers*;

m. procedures to record the usage rate of chemicals in fume hoods; and

n. The *Company* shall ensure that any *Equipment* subject to Guideline A-9 is operated in compliance with the requirements of Guideline A-9, and that the emissions of nitrogen oxides, expressed collectively as nitrogen dioxide equivalent, from the natural gas fired boilers having a maximum heat input greater than 10.5 gigajoules per hour, shall not exceed the nitrogen oxides emission limit of 26 grams per gigajoule of input fuel energy.

2. The *Company* shall ensure that the combustion chambers of each of the thermal oxidizers are not loaded unless the continuous temperature monitoring system is fully operational.

3. The *Company* shall ensure that no substances containing chlorinated and/or fluorinated and/or brominated compounds, including polyvinyl chloride and Teflon are combusted in the *Thermal Oxidizers*.

4. The *Company* shall ensure that all *Processes with Significant Environmental Aspects* are operated and maintained in accordance with this *Approval,* the operating procedures and maintenance programs.

8. **FLARE OPERATIONS**

1. The *Company* shall submit to the *District Manager* for approval, not later than six (6) months after the date of the *Approval,* a *Best Management Practices Plan for Facility Flares,* to outline the processes used to minimize flare events. This *Best Management Practices Plan for Facility Flares* shall include, but not be limited to:
    a. identification of flare sources and properties;
    b. procedures for recording *Flaring Event;*
    c. procedures for determining the significance of *Flaring Events* and the potential for off site impacts;
    d. procedures for quantifying the total contaminant mass sent to a flare during each *Flaring Event;*
    e. procedure for notifying the Ministry's Spills Action Centre of a *Flaring Events;*
    f. procedures for notifying the public, adjacent property owners, the municipality and other appropriate bodies of a *Flaring Event* that could result in an adverse effect off-site;
    g. procedures for conducting root cause analyses for *Flaring Events;*
    h. procedures for developing actions/measures to be taken to prevent future occurrences of root causes that lead to *Flaring Events;* and
    i. procedures for periodic inspection of emergency flares, which are to be conducted by individuals experienced with emergency flares, to be established within one year of the date of this *Approval.*

2. The *Company* shall retain on-site for inspection by the *Ministry,* upon request, the following information following each *Flaring Event:*
    a. the start and end times of the *Flaring Event;*
    b. the type of gas sent to flare;
    c. estimated total volume and mass of gas sent to flare;
    d. the contaminants discharged during the *Flaring Event;*
    e. a summary of investigations conducted including an assessment of root causes and failure analyses linked to the *Flaring Event;*
    f. a summary of findings from investigations conducted;
    g. corrective actions taken to prevent future events; and
    h. any remaining actions and their proposed completion dates.

3. The *Company* shall prepare, no later than March 31 in each year, and retain on-site for inspection by the *Ministry,* upon request, an annual report for the

previous calendar year that includes at a minimum:

a. a list of *Flaring Events,* provided in table format, including start and end times, type and total volume and mass of gas sent to flare, and the contaminants discharged during the *Flaring Event;*

b. a summary of the assessment of root cause and failure analyses;

c. a summary of actions taken to prevent future *Flaring Events;*

d. a summary of pending actions to be taken to prevent future *Flaring Events;* and

e. as established within the *Best Management Practices Plan for Facility Flares,*a summary of efforts taken to notify local communities and other interested parties of *Flaring Events.*

9. **COMPLAINTS RECORDING AND REPORTING**

1. If at any time, the *Company* receives an environmental complaint from the public regarding the operation of the *Equipment* approved by this *Approval,* the *Company* shall take the following steps:

a. Record and number each complaint, either electronically or in a log book. The record shall include the following information: the time and date of the complaint and incident to which the complaint relates, the nature of the complaint, wind direction at the time and date of the incident to which the complaint relates and, if known, the address of the complainant.

b. Notify the *District Manager* of the complaint within two (2) business days after the complaint is received, or in a manner acceptable to the *District Manager.*

c. Initiate appropriate steps to determine all possible causes of the complaint, and take the necessary actions to appropriately deal with the cause of the subject matter of the complaint.

d. Complete and retain on-site a report written within one (1) week of the complaint date. The report shall list the actions taken to appropriately deal with the cause of the complaint and set out steps to be taken to avoid the recurrence of similar incidents.

10. **RECORD KEEPING REQUIREMENTS**

1. Any information requested by any employee in or agent of the *Ministry* concerning the *Facility* and its operation under this *Approval,* including, but not limited to, any records required to be kept by this *Approval,* shall be provided to the employee in or agent of the *Ministry,* upon request**,** in a timely manner.

2. Unless otherwise specified in this *Approval,* the *Company* shall retain, for a minimum of five (5) years from the date of their creation all reports, records and information described in this *Approval,* including,
    a. a copy of the *Original ESDM Report* and each updated version*;*
    b. a copy of each version of the *Acoustic Assessment Report;*
    c. supporting information used in the emission rate calculations performed in the *ESDM Reports* and *Acoustic Assessment Reports;*
    d. the records in the *Log;*
    e. copies of each *Written Summary Form* provided to the *Ministry* under Condition 6.1 of this *Approval;*
    f. records of maintenance, repair and inspection of *Equipment* related to all *Processes with Significant Environmental Aspects;*
    g. all records on maintenance, repair and inspection of the continuous monitoring and recording system, and original date that work was recommended;
    h. all records produced by the continuous monitoring and recording system;
    i. all records on operators training;
    j. all records of the usage rate of chemicals in fumehoods;
    k. description of all upset conditions associated with the operation of the *Thermal Oxidizers* and remedial action taken; and
    l. all records related to environmental complaints made by the public as required by Condition 9 of this *Approval.*

11. **EQUIPMENT WITH SPECIFIC OPERATIONAL LIMITS**
    1. The *Company* shall ensure that the *Thermal Oxidizers*, used to incinerate waste gas, waste organic liquid and water containing organic are designed and operated to comply, at all times, with the following performance requirements:
        a. the temperature in the combustion chamber, as recorded by the continuous monitoring and recording system, shall be at least 871 degrees Celsius throughout the combustion cycle but may drop to 843 degrees Celsius during swings in operation before the waste organic liquid is shut off ; and
        b. the minimum residence time of the combustion gases in the combustion chamber shall be 2.0 seconds, operating at a temperature of not less than 843 degrees Celsius.

12. **CONTINUOUS MONITORING**
    1. The *Company* shall install, conduct and maintain a program to continuously monitor:
        a. the temperature at the location in the combustion chamber of each of the *Thermal Oxidizers* where the minimum retention time of the combustion gases at a minimum temperature of 843 degrees Celsius at 2 seconds is achieved. The continuous monitoring and recording system shall be equipped with continuous recording devices, and shall comply with the requirements outlined in the attached Schedule B.

        b. carbon monoxide at an accessible location where the measurements are representative of the actual concentrations of carbon monoxide in the gases leaving each of the *Thermal Oxidizers*. The continuous monitoring and recording system shall be equipped with continuous recording devices, and shall comply with the requirements outlined in the attached Schedule C.

        c. oxygen at an accessible location where the measurements are representative of the actual concentrations of oxygen in the gases leaving each of the *Thermal Oxidizers*. The continuous monitoring and recording system shall be equipped with continuous recording devices, and shall comply with the requirements outlined in the attached Schedule D.

        d. the continuous monitoring and recording systems required under Section 12.1.a, 12.1.b and 12.1.c, shall be installed and operational on the *Thermal Oxidizer* serving Train 1 by November 30, 2019.

13. **REVOCATION OF PREVIOUS APPROVALS**
    1. This *Approval* replaces and revokes all Certificates of Approval (Air) issued under section 9 *EPA* and Environmental Compliance Approvals issued under Part II.1 *EPA* to the *Facility* in regards to the activities mentioned in subsection 9(1) of the *EPA* and dated prior to the date of this *Approval.*

SCHEDULE A - Supporting Documentation

1. Environmental Compliance Approval Application, dated December 22, 2016, signed by Heidi Kelly and submitted by the *Company;*
2. Emission Summary and Dispersion Modelling Report, prepared by RWDI AIR Inc. and dated December 21, 2016;
3. The emails from Sharon Schajnoha, RWDI Air Inc. dated July 10, 11 and 24, 2017.

4. Acoustic Assessment Report, prepared by Sharon Schajnoha and Aaron Haniff, RWDI AIR Inc., and dated December 22, 2016; and
5. The letter dated March 10, 2017 and signed by Hedi Kelly, Health, Safety and Environmental Engineer, Cytec Canada Inc.; and
6. The letters (e-mails) dated March 10 and 13, 2017 and provided by Katie Allen and Sharon Schajnoha, RWDI AIR Inc.

SCHEDULE B - Continuous Temperature Monitoring and Recording System Requirements

PARAMETER:

Temperature

LOCATION:

The sample point for the Continuous Temperature Monitoring and Recording system shall be located at a location where the measurements are representative of the minimum temperature of the gases leaving the combustion chamber of each of the *Thermal Oxidizers* .

PERFORMANCE:

The Continuous Temperature Monitoring and Recording system shall meet the following minimum performance specifications for the following parameters:

PARAMETERS	SPECIFICATION
Type	shielded "K" type thermocouple, or equivalent
Accuracy	± 1.5 percent of the minimum gas temperature

DATA RECORDER:

The data recorder must be capable of registering continuously the measurement of the monitor system without a significant loss of accuracy and with a time resolution of 1 minutes or better.

RELIABILITY:

The monitoring system shall be operated and maintained so that accurate data is obtained during a minimum of 95 percent of the time for each calendar quarter.

SCHEDULE C - Carbon Monoxide Monitor and Recorder

INSTALLATION:

The continuous carbon monoxide monitor shall be installed at an accessible location

where the measurements are representative of the actual concentrations of carbon monoxide in the gases leaving each of the *Thermal Oxidizers* and shall meet the following installation specifications:

PARAMETERS	SPECIFICATION
Range (parts per million, ppm)	0 to highest concentration anticipated from the source
Calibration Gas Ports	close to the sample point

PERFORMANCE:

The continuous carbon monoxide monitor shall meet the following minimum performance specifications for the following parameters:

PARAMETERS	SPECIFICATION
Span Value (nearest ppm equivalent)	2 times the average normal concentration of the source
Relative Accuracy	< 10 percent of the mean value of the reference method test
Calibration Error	< 2 percent of actual concentration
System Bias	< 4 percent of the mean value of the reference method test
Procedure for Zero and Span Calibration Check	all system components check
Zero Calibration Drift (24-hour)	< 5 percent of span value
Span Calibration Drift (24-hour)	< 5 percent of span value
Response Time (90 percent response to step change)	< 90 seconds
Operational Test Period	> 168 hours without corrective maintenance

CALIBRATION:

Daily calibration drift checks on the monitor shall be performed and recorded when each of the *Thermal Oxidizers* are operating and in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:

The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:

The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter when each of the *Thermal Oxidizers* is

operating.

SCHEDULE D - Continuous Oxygen Monitor and Recorder

INSTALLATION:

The continuous oxygen monitor shall be installed at an accessible location where the measurements are representative of the actual concentrations of oxygen in the gases leaving each of the *Thermal Oxidizers* and shall meet the following installation specifications:

PARAMETERS	SPECIFICATION
Range (percentage)	0 to highest concentration anticipated from the source
Calibration Gas Ports	close to the sample point

PERFORMANCE:

The continuous oxygen monitor shall meet the following minimum performance specifications for the following parameters:

PARAMETERS	SPECIFICATION
Span Value (percentage)	2 times the average normal concentration of the source
Relative Accuracy	< 10 percent of the mean value of the reference method test
Calibration Error	0.25 percent O2
System Bias	< 4 percent of the mean value of the reference method test
Procedure for Zero and Span Calibration Check	all system components checked
Zero Calibration Drift (24-hour)	< 0.5 percent O2
Span Calibration Drift (24-hour)	< 0.5 percent O2
Response Time (90 percent of full scale)	< 90 seconds
Operational Test Period	> 168 hours without corrective maintenance

CALIBRATION:

Daily calibration drift checks on the monitor shall be performed and recorded when each of the *Thermal Oxidizers* is operating and in accordance with the requirements of Report EPS 1/PG/7.

DATA RECORDER:

The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 2 minutes or better.

RELIABILITY:

The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time for each calendar quarter during the first full year of operation, and 95 percent, thereafter when each of the *Thermal Oxidizers* is operating.

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

1. **GENERAL**
   Condition No. 1 is included to require the *Approval* holder to build, operate and maintain the *Facility* in accordance with the Supporting Documentation in Schedule A considered by the *Director* in issuing this *Approval.*
2. **LIMITED OPERATIONAL FLEXIBILITY, REQUIREMENT TO REQUEST AN *ACCEPTABLE POINT OF IMPINGEMENT CONCENTRATION* AND PERFORMANCE LIMITS**
   Conditions No. 2, 3 and 4 are included to limit and define the *Modifications* permitted by this *Approval,* and to set out the circumstances in which the *Company* shall request approval of an *Acceptable Point of Impingement Concentration* prior to making *Modifications.* The holder of the *Approval* is approved for operational flexibility for the *Facility* that is consistent with the description of the operations included with the application up to the *Facility Production Limit.* In return for the operational flexibility, the *Approval* places performance based limits that cannot be exceeded under the terms of this *Approval. Approval* holders will still have to obtain other relevant approvals required to operate the *Facility,* including requirements under other environmental legislation such as the *Environmental Assessment Act.*
3. **DOCUMENTATION REQUIREMENTS**
   Condition No. 5 is included to require the *Company* to maintain ongoing documentation that demonstrates compliance with the performance limits as specified in Condition 4 of this *Approval* and allows the *Ministry* to monitor on-going compliance with these performance limits. The *Company* is required to have an up to date *ESDM Report* and *Acoustic Assessment Report* that describe the *Facility* at all times and make the *Emission Summary Table* and *Acoustic Assessment Summary Table* from these reports available to the public on an ongoing basis in order to maintain public communication with regard to the emissions from the *Facility.*
4. **REPORTING REQUIREMENTS**
   Condition No. 6 is included to require the *Company* to provide a yearly *Written Summary Form* to the *Ministry,* to assist the *Ministry* with the review of the site's

compliance with the *EPA,* the regulations and this *Approval.*

5. **OPERATION AND MAINTENANCE**
   Condition No. 7 is included to require the *Company* to properly operate and maintain the *Processes with Significant Environmental Aspects* to minimize the impact to the environment from these processes.

6. **FLARE OPERATIONS**
   Condition No. 8 is included to require the *Company* to develop documentation and maintain records that require best management practices to reduce the potential for *Flaring Events.*

7. **COMPLAINTS RECORDING AND REPORTING PROCEDURE**
   Condition No. 9 is included to require the *Company* to respond to any environmental complaints regarding the operation of the *Equipment,* according to a procedure that includes methods for preventing recurrence of similar incidents and a requirement to prepare and retain a written report.

8. **RECORD KEEPING REQUIREMENTS**
   Condition No. 10 is included to require the *Company* to retain all documentation related to this *Approval* and provide access to employees in or agents of the *Ministry,* upon request, so that the *Ministry* can determine if a more detailed review of compliance with the performance limits as specified in Condition 4 of this *Approval* is necessary.

9. **EQUIPMENT WITH SPECIFIC OPERATIONAL LIMITS**
   Condition No. 11 is included to outline the specific operational limits considered necessary to prevent an adverse effect resulting from the operation of each of the *Thermal Oxidizers.* This condition is also included to emphasize that the *Thermal Oxidizers* must be operated according to a procedure that will result in compliance with the *EPA*, the regulations and this *Approval.*

10. **CONTINUOUS MONITORING**
    Condition No. 12 is included to require the *Company* to gather accurate information on a continuous basis so that compliance with the *EPA*, the regulations and this *Approval* can be verified.

11. **REVOCATION OF PREVIOUS APPROVALS**
    Condition No. 13 is included to identify that this *Approval* replaces all Section 9 Certificate(s) of Approval and Part II.1 Approvals in regards to the activities mentioned in subsection 9(1) of the *EPA* and dated prior to the date of this *Approval.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 3197-8LNHYU issued on December 13, 2011.

In accordance with Section 139 of the Environmental Protection Act, you may by written

Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, 1993, S.O. 1993, c. 28 (Environmental Bill of Rights), the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

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

AND

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

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca*, you can determine when the leave to appeal period ends.*

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

DATED AT TORONTO this 19th day of December, 2017

Rudolf Wan, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

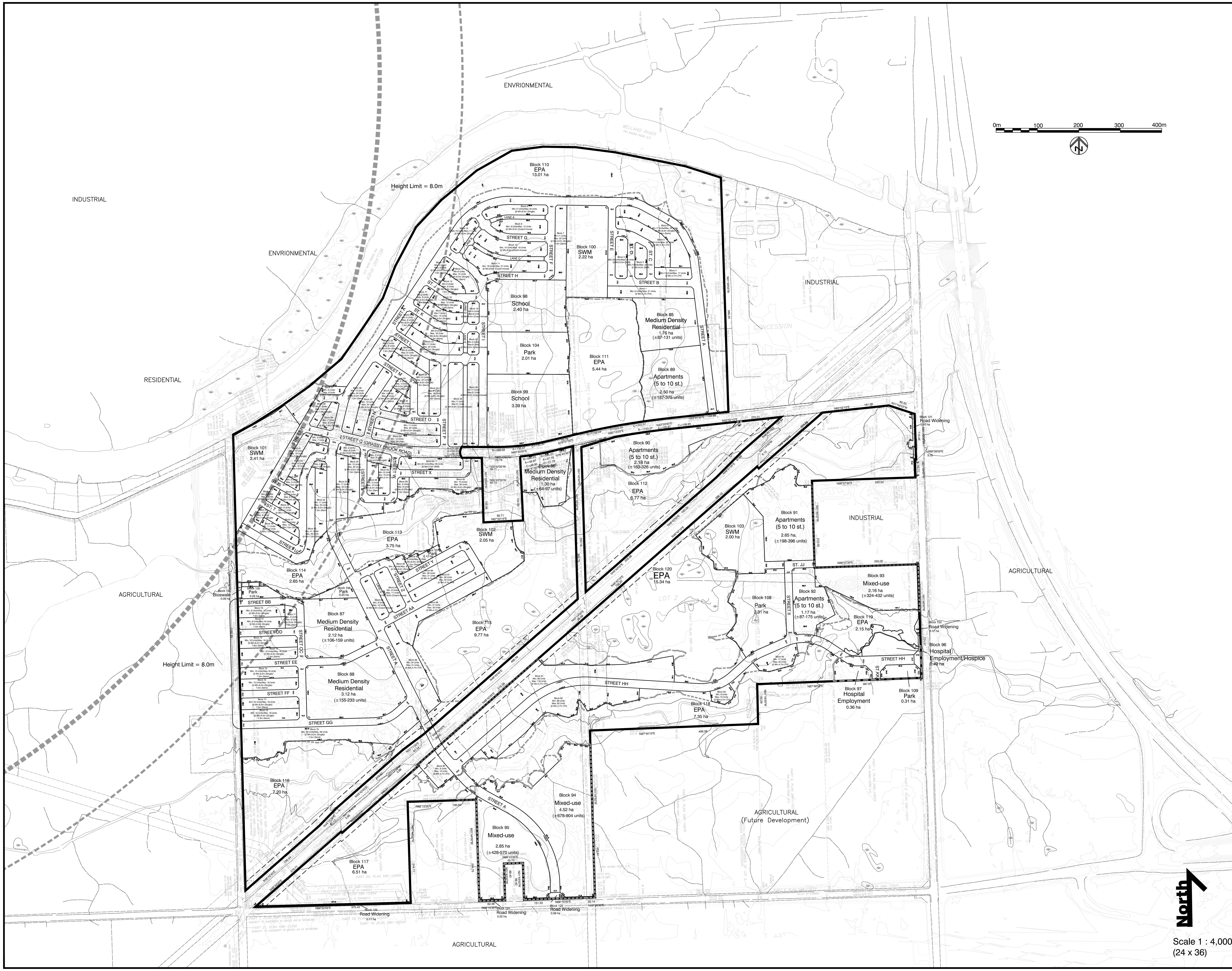
MS/
c: District Manager, MOECC Niagara District Office
Sharon Schajnoha, RWDI AIR Inc.

Appendix B
Development Drawings

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000



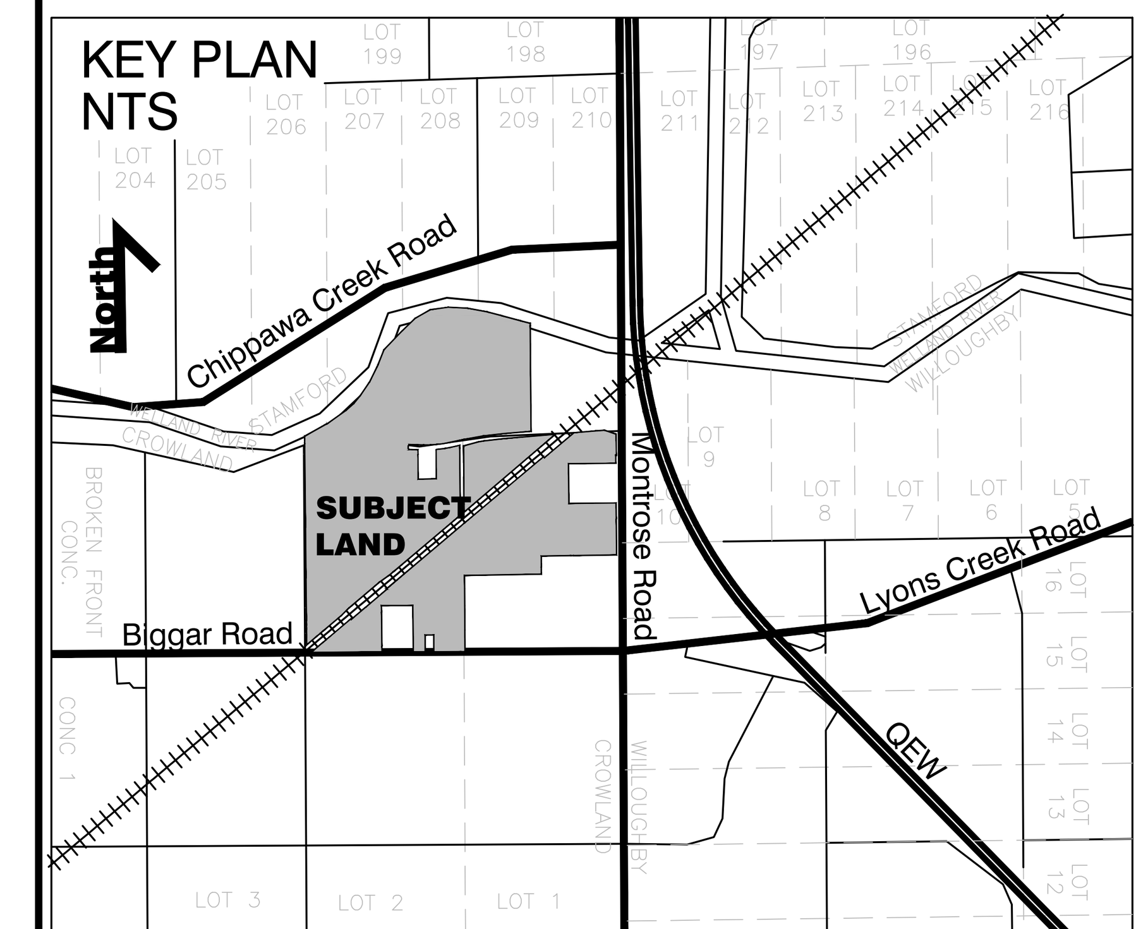
Scale 1 : 4,000
(24 x 36)

DRAFT PLAN OF SUBDIVISION

FOR PART OF LOTS 1 & 2
BROKEN FRONT CONCESSION
(GEOGRAPHIC TOWNSHIP OF CROWLAND)
REGIONAL MUNICIPALITY OF NIAGARA

January 4, 2023

KEY PLAN
NTS



LAND USE	Block Number	Units	Area (ha)	Area (ac)
Residential Back-to-back, 6.5m x 14.75m	2, 3, 61	57 to 74	0.99	2.5
Residential Townhouse, 5.5m x 28.0m	1, 4, 5, 58, 66, 67 68, 69, 80-84	374 to 455	10.08	24.9
Residential, Detached with coach house, 9.5m x 28.0m	11, 19, 20, 29, 65	50 to 66	1.87	4.6
Residential, Detached with coach house, 9.5m x 36.0m	9, 10, 28, 64	48 to 62	2.21	5.5
Residential Detached, Semi-det. 28.0m	3, 6, 7,13-18, 21-27 30-36, 52-57, 59, 60, 62, 63, 70-79	348 to 678	15.39	38.0
Residential Detached, 28.0m	8, 12	27 to 29	0.62	1.5
Residential Small-lot Detached, 7.0m x 20.0m	37-51	142 to 184	2.81	6.9
Residential Medium Density	85-88	415 to 622	8.30	20.5
Residential Apartments	89-92	637 to 1,274	8.49	21.0
Residential Mixed Use	93-95	1431 to 1,907	9.54	23.6
Subtotal		3,528 to 5,351	60.30	149.0

LAND USE	Block Number	Units	Area (ha)	Area (ac)
Hospital Employment/Hospice	96, 97	-	0.85	2.1
Schools	98, 99	-	5.78	14.3
SWM	100-103	-	8.78	21.7
Parks	104-109	-	5.23	12.9
EPA (Envrionmental Protection Area)	110-120	-	79.94	197.5
Road Widenings	121-125	-	0.49	1.2
Bioswale	126	-	0.09	0.2
Roads	Streets A-NN	-	23.00	56.8
Subtotal		-	124.17	306.8
Subtotal		3,528 to 5,351	60.30	149.0
Total		3,528 to 5,351	184.47	455.8

Flood line
Development Limit
2.0km to Cytec property
200m buffer to Cytec 2.0km line
15.0m setback from rail line

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O., 1990

(a) AS SHOWN ON DRAFT AND KEY PLANS
(b) AS SHOWN ON DRAFT PLAN AS SHOWN ON DRAFT AND KEY PLANS
(c) AS SHOWN ON DRAFT PLAN AS SHOWN ON DRAFT AND KEY PLANS
(d) THE LAND IS TO BE USED ACCORDING TO THE SCHEDULE OF LAND USE
(e) AS SHOWN ON DRAFT AND KEY PLANS
(f) AS SHOWN ON DRAFT PLAN
(g) AS SHOWN ON DRAFT AND KEY PLANS
(h) MUNICIPAL WATER SUPPLY TO BE MADE AVAILABLE
(i) SOIL IS SILTY CLAY
(j) AS SHOWN ON DRAFT PLAN
(k) FULL MUNICIPAL SERVICES TO BE MADE AVAILABLE
(l) SUBJECT TO EASEMENTS AS SHOWN ON THE DRAFT PLAN

Note:
All dimensions on curves are chord lengths unless otherwise indicated.

OWNER'S AUTHORIZATION

I AUTHORIZE WSP CANADA GROUP LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF NIAGARA FALLS FOR APPROVAL.

Daniel Guizzetti, President
Empire (Grand Niagara) GP Inc.
DATE

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

Yuriy Bogdanov, Ontario Land Surveyor, OLIP
Geoverra
OCT. 30, 2020
DATE

PLAN PREPARED BY

Norman Hibbert, MCIP, RPP
WSP CANADA GROUP LTD.
OCT. 30, 2020
DATE

20M-00764-DPP

Appendix C
Traffic Data and Calculations

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000

Appendix D
Stationary Noise Sources Modelled

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000

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	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m^2)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
Generator - Concentrix Property	~	concentrix_gen	93.1	93.1	93.1	Lw	gen		0	0	0					60	0	0	0	(none)	1.5	r	652737.03	4766980.12	1.5
4 fan HVAC - ES Fox	~	HVAC_fox	94.5	94.5	94.5	Lw	HVAC_20ton		0	0	0					45	45	15	0	(none)	1.5	r	652478.58	4767307.64	1.5
4 fan HVAC - ES Fox	~	HVAC_fox	94.5	94.5	94.5	Lw	HVAC_20ton		0	0	0					45	45	15	0	(none)	1.5	r	652498.72	4767308.24	1.5
Loading Bay Impulsive	-	loading_impls	97.9	97.9	97.9	Lw	loading_impl		0	0	0					60	0	0	0	(none)	1.5	r	652664.85	4766912.3	1.5
Pump Truck	~	pumptruck_bsw	87.9	87.9	87.9	Lw	PumpTruck		0	0	0					60	0	0	0	(none)	2	r	651181.12	4767883.69	2
Idling Truck	~	idle_bsw	99.1	99.1	99.1	Lw	idletruck		0	0	0					60	0	0	0	(none)	2	r	651181.15	4767889.63	2

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src				ht
			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)	dB(A)	dB(A)		(m^2)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night	(km/h)	
Shipping and Receiving - Concentrix Building	~	shipping_con	91.3	27.6	27.6	63.7	0	0	Lw'	roadway		0	63.7	0	0			60	0	0	0	(none)					2.4	

Name	ID	Overall A	Type	1/3 Oktave Spectrum (dB) Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	Source
HVAC Unit (20 ton)	HVAC_20ton	94.5	Lw		89	92	93	93	92	90	86	82	76	94.5	99.8	H&K calc, adj against Man Data Avg
Forklift over threshold of truck	loading_impl	97.9	Lw	A								97.9		97.9	96.9	On file at Novus/SLR
Generator	gen	93.1	Lw		95	97.5	97.2	97.2	91.3	85.2	80.4	73.8	66.1	93.1	103.2	On file at Novus/SLR
Forklift movement	forklift	82	Lw		0	91	86	81	78	76	75	71	61	82	92.9	On file at Novus/SLR
BioSolids Pump Truck - Operating	PumpTruck	87.9	Lw		90	90.5	88.5	82.9	82.7	83.8	81.5	75.7	67.6	87.9	95.6	On file at Novus/SLR
Idling Pump Truck - No Air Bag, No Pumping	idletruck	99.1	Lw		106.4	101.4	100.1	94.8	96.2	95.6	89.5	85.9	78.7	99.1	109	On file at Novus/SLR

Appendix E
Façade Calculations

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000

BPN 56 Calculation Procedure - Required Glazing STC Rating (Fixed Veneer)

	Receptor ID	Source Description	Sound Levels		Room / Façade Inputs					Source Inputs		Veneer - Component 1		Glazing - Component 2	
			Façade Sound Level: (dBA)	Required Indoor Sound Level: (dBA)	Glazing as % of Wall Area	Exposed Wall Height (m)	Exposed Wall Length (m)	Room Depth (m)	Room Absorption:	Incident Sound Angle: (deg)	Spectrum type:	Assumed Veneer STC (STC)	Component Category:	Component Category:	Require Glazing STC (STC)
DAYTIME															
Living/Dining Room	North	Roadways, Daytime	54	45	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	11
	East	Roadways, Daytime	56	45	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	13
	Central	Roadways, Daytime	47	45	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	4
	South	Roadways, Daytime	59	45	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	16
	West	Roadways, Daytime	43	45	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	0
Bedroom	North	Roadways, Daytime	54	45	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	14
	East	Roadways, Daytime	56	45	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	16
	Central	Roadways, Daytime	47	45	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	7
	South	Roadways, Daytime	59	45	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	19
	West	Roadways, Daytime	43	45	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	3
NIGHT-TIME															
Living/Dining Room	North	Roadways, Night-time	49	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	11
	East	Roadways, Night-time	52	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	14
	Central	Roadways, Night-time	42	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	4
	South	Roadways, Night-time	53	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	15
	West	Roadways, Night-time	37	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-1
Bedroom	North	Roadways, Daytime	49	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	14
	East	Roadways, Daytime	52	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	17
	Central	Roadways, Daytime	42	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	7
	South	Roadways, Daytime	53	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	18
	West	Roadways, Daytime	37	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	2

BPN 56 Calculation Procedure - Required Glazing STC Rating (Fixed Veneer)

	Receptor ID	Source Description	Sound Levels: Façade Sound Level: (dBA)	Sound Levels: Required Indoor Sound Level: (dBA)	Room / Façade Inputs: Glazing as % of Wall Area	Room / Façade Inputs: Exposed Wall Height (m)	Room / Façade Inputs: Exposed Wall Length (m)	Room / Façade Inputs: Room Depth (m)	Room / Façade Inputs: Room Absorption:	Source Inputs: Incident Sound Angle: (deg)	Source Inputs: Spectrum type:	Veneer - Component 1: Assumed Veneer STC (STC)	Veneer - Component 1: Component Category:	Glazing - Component 2: Component Category:	Glazing - Component 2: Require Glazing STC (STC)
DAYTIME															
Living/Dining Room	North	Locomotive, Daytime	38	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**2**
	East	Locomotive, Daytime	47	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**11**
	Central	Locomotive, Daytime	48	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**12**
	South	Locomotive, Daytime	32	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-4**
	West	Locomotive, Daytime	31	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-5**
Bedroom	North	Locomotive, Daytime	38	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**5**
	East	Locomotive, Daytime	47	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**14**
	Central	Locomotive, Daytime	48	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**15**
	South	Locomotive, Daytime	32	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-1**
	West	Locomotive, Daytime	31	40	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-2**
NIGHT-TIME															
Living/Dining Room	North	Locomotive, Night-time	41	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**5**
	East	Locomotive, Night-time	50	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**14**
	Central	Locomotive, Night-time	51	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**15**
	South	Locomotive, Night-time	35	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-1**
	West	Locomotive, Night-time	34	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-2**
Bedroom	North	Locomotive, Night-time	41	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**13**
	East	Locomotive, Night-time	50	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**22**
	Central	Locomotive, Night-time	51	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**23**
	South	Locomotive, Night-time	35	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**7**
	West	Locomotive, Night-time	34	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	F. diesel railway locomotive	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**6**

BPN 56 Calculation Procedure - Required Glazing STC Rating (Fixed Veneer)

	Receptor ID	Source Description	Sound Levels: Façade Sound Level: (dBA)	Sound Levels: Required Indoor Sound Level: (dBA)	Room / Façade Inputs: Glazing as % of Wall Area	Room / Façade Inputs: Exposed Wall Height (m)	Room / Façade Inputs: Exposed Wall Length (m)	Room / Façade Inputs: Room Depth (m)	Room / Façade Inputs: Room Absorption:	Source Inputs: Incident Sound Angle: (deg)	Source Inputs: Spectrum type:	Veneer - Component 1: Assumed Veneer STC (STC)	Veneer - Component 1: Component Category:	Glazing - Component 2: Component Category:	Glazing - Component 2: Require Glazing STC (STC)
DAYTIME															
Living/Dining Room	North	Rail Cars, Daytime	20	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-21
	East	Rail Cars, Daytime	29	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-13
	Central	Rail Cars, Daytime	30	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-11
	South	Rail Cars, Daytime	13	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-28
	West	Rail Cars, Daytime	12	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-29
Bedroom	North	Rail Cars, Daytime	20	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-21
	East	Rail Cars, Daytime	29	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-13
	Central	Rail Cars, Daytime	30	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-11
	South	Rail Cars, Daytime	13	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-28
	West	Rail Cars, Daytime	12	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-29
NIGHT-TIME															
Living/Dining Room	North	Rail Cars, Night-time	23	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-18
	East	Rail Cars, Night-time	32	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-10
	Central	Rail Cars, Night-time	33	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-8
	South	Rail Cars, Night-time	16	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-25
	West	Rail Cars, Night-time	15	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-26
Bedroom	North	Rail Cars, Night-time	23	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-10
	East	Rail Cars, Night-time	32	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-2
	Central	Rail Cars, Night-time	33	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	0
	South	Rail Cars, Night-time	16	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-17
	West	Rail Cars, Night-time	15	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	-18

BPN 56 Calculation Procedure - Required Glazing STC Rating (Fixed Veneer)

	Receptor ID	Source Description	Sound Levels: Façade Sound Level: (dBA)	Sound Levels: Required Indoor Sound Level: (dBA)	Room / Façade Inputs: Glazing as % of Wall Area	Room / Façade Inputs: Exposed Wall Height (m)	Room / Façade Inputs: Exposed Wall Length (m)	Room / Façade Inputs: Room Depth (m)	Room / Façade Inputs: Room Absorption:	Source Inputs: Incident Sound Angle: (deg)	Source Inputs: Spectrum type:	Veneer - Component 1: Assumed Veneer STC (STC)	Veneer - Component 1: Component Category:	Glazing - Component 2: Component Category:	Glazing - Component 2: Require Glazing STC (STC)
DAYTIME															
Living/Dining Room	North	Whistle, Daytime	46	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**5**
	East	Whistle, Daytime	57	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**16**
	Central	Whistle, Daytime	59	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**18**
	South	Whistle, Daytime	38	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-3**
	West	Whistle, Daytime	38	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-4**
Bedroom	North	Whistle, Daytime	46	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**5**
	East	Whistle, Daytime	57	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**16**
	Central	Whistle, Daytime	59	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**18**
	South	Whistle, Daytime	38	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-3**
	West	Whistle, Daytime	38	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-4**
NIGHT-TIME															
Living/Dining Room	North	Whistle, Night-time	45	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**4**
	East	Whistle, Night-time	51	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**10**
	Central	Whistle, Night-time	54	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**13**
	South	Whistle, Night-time	41	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**0**
	West	Whistle, Night-time	40	40	70%	2.4	3.0	6.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**-1**
Bedroom	North	Whistle, Night-time	45	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**12**
	East	Whistle, Night-time	51	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**18**
	Central	Whistle, Night-time	54	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**21**
	South	Whistle, Night-time	41	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**8**
	West	Whistle, Night-time	40	35	70%	2.4	3.0	3.0	Intermediate	0 - 90	B. avg aircraft, railway wheel noise	45	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**7**

Appendix F
Warning Clause Requirements

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000

Ventilation, Warning Clause and Barrier Summary

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

A summary of the Warning Clause and Ventilation Requirements is included in Table E1 on the following page.

> MECP Type A: "Purchasers/tenants are advised that sound levels due to road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
>
> MECP Type D: "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 sound level limits of the Municipality and the Ministry of the Environment."
>
> MECP Type E: "Purchasers/tenants are advised that due to the proximity of the adjacent commercial facilities, noise from the facilities may at times be audible."

Odour Warning Clause

The following Warning Clause is recommended for inclusion in agreements registered on Title for the residential units, located adjacent to Queen E Farms, and included in all agreements of purchase and sale or lease, and all rental agreements.

Odour (Units ### to ###)

"Purchasers/tenants are advised that due to the proximity of adjacent agricultural activities, odours from these facilities may occasional be perceptible."

Proximity to Heavy Industry Warning Clause

A Warning Clause is required as per negotiations of the Grand Niagara Secondary Plan for inclusion in agreements registered on Title for the residential units, located in the Grand Niagara Secondary Plan area included in all agreements of purchase and sale or lease, and all rental agreements.

Proximity to Heavy Industry (Units ### to ###)

"Purchasers/tenants are advised that the property is located near heavy industrial activities."

Appendix G
WSP Vibration Report

8547 Grassy Brook Road

Compatibility & Mitigation Study

SLR Project No.: 241.30351.00000

MMM GROUP

Prepared for: Grand Niagara.

REPORT
VIBRATION IMPACT STUDY

GRAND NIAGARA SECONDARY PLAN

14-15039-001-N02 | April 2016

WSP | MMM GROUP

MMM Group Limited
100 Commerce Valley Drive West
Thornhill, ON Canada L3T 0A1
t: 905.882.1100 | f: 905.882.0055

www.mmmgrouplimited.com

April 25, 2016
1415039-001-N02

Mr. Frank Baldesarra, P.Eng.
Managing Co-owner of Grand Niagara
5285 Solar Drive
Mississauga, Ontario L4W 5B8

Dear Mr. Baldesarra:

Subject: **Vibration Impact Study**
Grand Niagara Secondary Plan

MMM Group, a WSP Global company, is very pleased to submit the enclosed Vibration Impact Study in support of the Grand Niagara Secondary Plan.

The report examines the vibration impact of trains passing on the Canadian Pacific Rail right-of-way bisecting the subject lands. Our study concludes that the issue of ground-borne vibration from train pass-bys **does not pose any constraint** to the re-development of the subject lands.

We thank you for the opportunity to undertake this study. Should you have any comments or questions or require clarification, please contact us at your earliest convenience.

Yours truly,

MMM GROUP LIMITED

Bill Hoogeveen, P.Eng.
Senior Project Manager
Noise and Vibration Section
Transportation Planning

Felipe Vernaza, P.Eng.
Project Engineer
Noise and Vibration Section
Transportation Planning

1.0 INTRODUCTION

MMM Group, a WSP Global company, was retained by Grand Niagara to undertake a Vibration Impact Study in support of the Grand Niagara Secondary Plan. The purpose of this study is to ensure that ground-borne vibration resulting from passing freight trains on the Canadian Pacific Railway right-of-way complies with applicable ISO (International Organization for Standardization) vibration criteria. This report assesses the impacts of the vertical vibration displacement originating from the tracks that bisect the subject site from southwest to northwest. The objective of this study is to determine if the residential uses which are proposed to be located along the railway tracks will be impacted by ground-borne vibration generated by passing CPR freight trains.

2.0 RAILWAY VIBRATION GUIDELINES

The ground-borne vibration criteria used in this study are based on the CPR guidelines. The CPR guidelines are based on criteria set by the International Organization for Standardization (ISO).

The measured vibration velocity or equivalent acceleration should not exceed the vibration velocity limit of **0.10 mm/sec (root mean square)** for trains on the rail line, from 4 Hz to 200 Hz over the one-third octave band frequency, at a reasonably short integration time of one second or less.

The suggested railway vibration limit applies directly to the measured outdoor and indoor ground-borne vibration levels. If the measured vibration levels exceed these limits, then vibration control measures must be investigated and considered to ensure that vibration velocity limits are not exceeded at living areas on and above the first floor of the dwelling.

3.0 VIBRATION MEASUREMENT METHODOLOGY

Vibration measurements were undertaken at two locations as shown in **Figure 1**. The resulting measurement locations' distance to the railway right-of-way is approximately 30 metres. These measurement locations are referred to as Locations 1 and 2.

Vibration instrumentation used in this assessment includes the following:

1. Two types of ICP accelerometers;
    a. Type 353B33 by PCB Piezotronics, suitable for lower amplitude vibration tests from 1 to 4000 Hz;
    b. Type 393A03 by PCB Piezotronics suitable for lower amplitude vibration tests from 1 to 2000 Hz;
2. Four-Channel Handheld Dynamic Signal Analyzer, Model CoCo-80 by Crystal Instruments; and,
3. Engineering Data Management (EDM) System by Crystal Instruments.

The Handheld Dynamic Signal Analyzer was set to read the "maximum" (rms) vibration levels in every one-third octave band for the range 3.15 Hz to 315 Hz in one second intervals.

The accelerometers were rigidly mounted on a large steel stake vertically placed in the ground at Locations 1 and 2. This accelerometer mounting procedure is used to measure the vertical axis vibration component. Both accelerometers were connected to the CoCo-80 Handheld Dynamic Signal Analyzer.

The vertical acceleration of a CPR freight train was recorded on November 26, 2015 at both locations. The vibration measurements were recorded on the CoCo-80 Handheld Dynamic Signal Analyzer and were later downloaded to a desktop computer using the EDM system. The vibration measurement data was then compiled and analyzed to determine the vibration levels associated with the CPR freight train pass-bys on the nearby railway track.

Not to Scale

MMM GROUP

Legend

● **Vibration Measurement Locations**

FIGURE 1
CPR Freight Train Pass-by
Vibration Measurement Locations
Grand Niagara Secondary Plan

4.0 VIBRATION MEASUREMENT RESULTS

Based on our research and observations by employees at the Grand Niagara Golf Course, a short freight train passes along this section of railway approximately only 1-3 times per week. However, no train pass-bys were observed during some weeks. We understand this secondary track only services a ceramic materials factory. The train from which vibration levels were measured was comprised of 12 rail cars.

The results are shown as amplitude of acceleration versus frequency. The acceleration levels are presented in terms of decibels (dB) relative to 1 g (9.807 m/s^2) (rms). For example, -20 dBg is equal to 0.1g, -40 dBg is equal to 0.01g, etc. These acceleration values can be converted to vibration displacement or vibration velocity if a sinusoidal or near sinusoidal waveform is assumed.

Figure 2 and **Table 1** in the **Appendix** contain the measured vibration levels taken at Locations 1 and 2. Measured vibration levels are compared to the CPR Vibration Guidelines criteria outlined in Section 2 of this report.

The results illustrated on the graphs and tables show that the **maximum vibration levels** due to the CPR train pass-bys on the railway lines **exceed the applicable vibration criteria**. This is consistent with the findings of Grand Niagara Resort – Noise/Vibration Study prepared by Aercoustics Engineering Limited in December 7, 2006, at locations approximately 150 to 200 metres away. The vibration exceedances were observed in the 6.3 Hz, 8 Hz, 10 Hz and 12.5 Hz third-octave bands. Given the low frequency of vibration, we note that mitigation may not be practical or effective.

These exceedances are considered marginal and range from only 0.5 to 4 decibels above the ISO criteria. In general, these exceedances manifested themselves as short 1-second exceedances totaling 5 and 11 non-consecutive seconds out of the 90-second observed train pass-by duration for locations 1 and 2, respectively.

Furthermore, based on discussions with CPR and the client, trains operate on the railway one to three times per week. Consequently, vibration levels above the ISO criteria are expected to occur for less than half-a-minute in total during a typical week. Many weeks, this would be less than 10 seconds per week given the infrequent use of this rail spur.

We emphasize that the measured vibration levels are several orders of magnitude lower than vibration levels that could cause damage to any structures in the vicinity of the railway.

Therefore, it is our opinion that the vibration impacts due to train traffic along the CPR railway will be negligible.

Rail unevenness, large gaps between rail segments, roughness and corrugation are very important factors causing vibration during train pass-bys. Train maintenance such as proper wheel alignment and well-

maintained wheels (i.e. no flat spots) are very important as well. These factors can increase vibration levels by up to 20 dB in the most extreme cases. We observed large gaps between rails, and based on a consultation with our Senior Rail Inspector, the rail is badly corrugated, as shown in the **Photograph 1** below. As such, the poor state of the tracks is likely to be exacerbating any vibration caused by the trains (see attached correspondence).

Photograph 1

We also note that based on discussions with the client, it is possible that this rail line be decommissioned in the future.

5.0 FORMAL NOTIFICATION

The dwelling units in this development within 300 metres of the rail right-of-way will require formal notification to the purchasers or occupants by means of a warning clause included in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit. The warning clause shall read as follows:

> *"Warning: Canadian Pacific Railway Company or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alternations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion 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 dwelling(s). CPR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."*

6.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- The measurement results indicate that the maximum vibration levels due to the CPR freight train pass-bys on the railway line exceed the applicable vibration criteria. The poor state of the railway is likely to be exacerbating any vibration caused by the trains. We expect the vibration levels to noticeably drop if the observed corrugation, the roughness and the large gaps between rail segments are addressed by CPR.

- These exceedances manifested themselves as short 1-second exceedances totaling 5 and 11 non-consecutive seconds out of the 90-second observed train pass-by duration. In conjunction with the very infrequent train operations along the track, vibration levels would exceed criteria for less than a minute on a typical week. Moreover, we understand that this secondary track services only a ceramic materials factory on a demand basis and therefore we do not expect train frequency to increase.

- Moreover, the observed vibration levels are several orders of magnitude below vibration levels that could cause damage to any nearby structures to the railway.

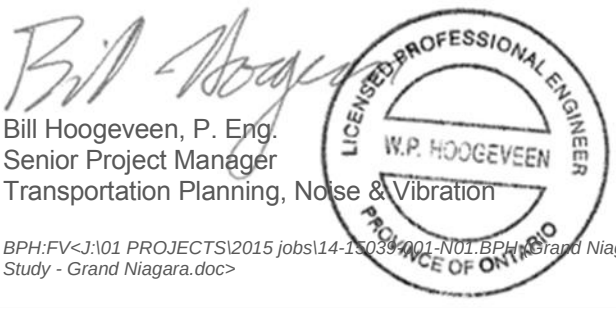
- Thus, it is our opinion that the vibration impacts due to train traffic along the CPR railway are negligible from the CPR right-of-way and therefore no mitigation is recommended.

- Therefore, ground-borne vibration emanating from trains passing along the CPR right-of-way bisecting the subject land do not pose any constraint on the re-development of these lands.

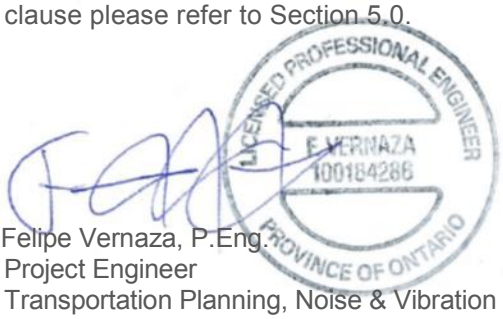
Recommendations

- The dwelling units in this development within 300 metres of the rail right-of-way will require formal notification to the purchasers or occupants by means of a warning clause included in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit. For the exact wording of the warning clause please refer to Section 5.0.

Respectfully submitted,



Bill Hoogeveen, P. Eng.
Senior Project Manager
Transportation Planning, Noise & Vibration



Felipe Vernaza, P.Eng.
Project Engineer
Transportation Planning, Noise & Vibration

BPH:FV<J:\01 PROJECTS\2015 jobs\14-15039-001-N01.BPH (Grand Niagara Noise)\Vibration Study\Report\[2016.01.06] Draft - Vibration Impact Study - Grand Niagara.doc>

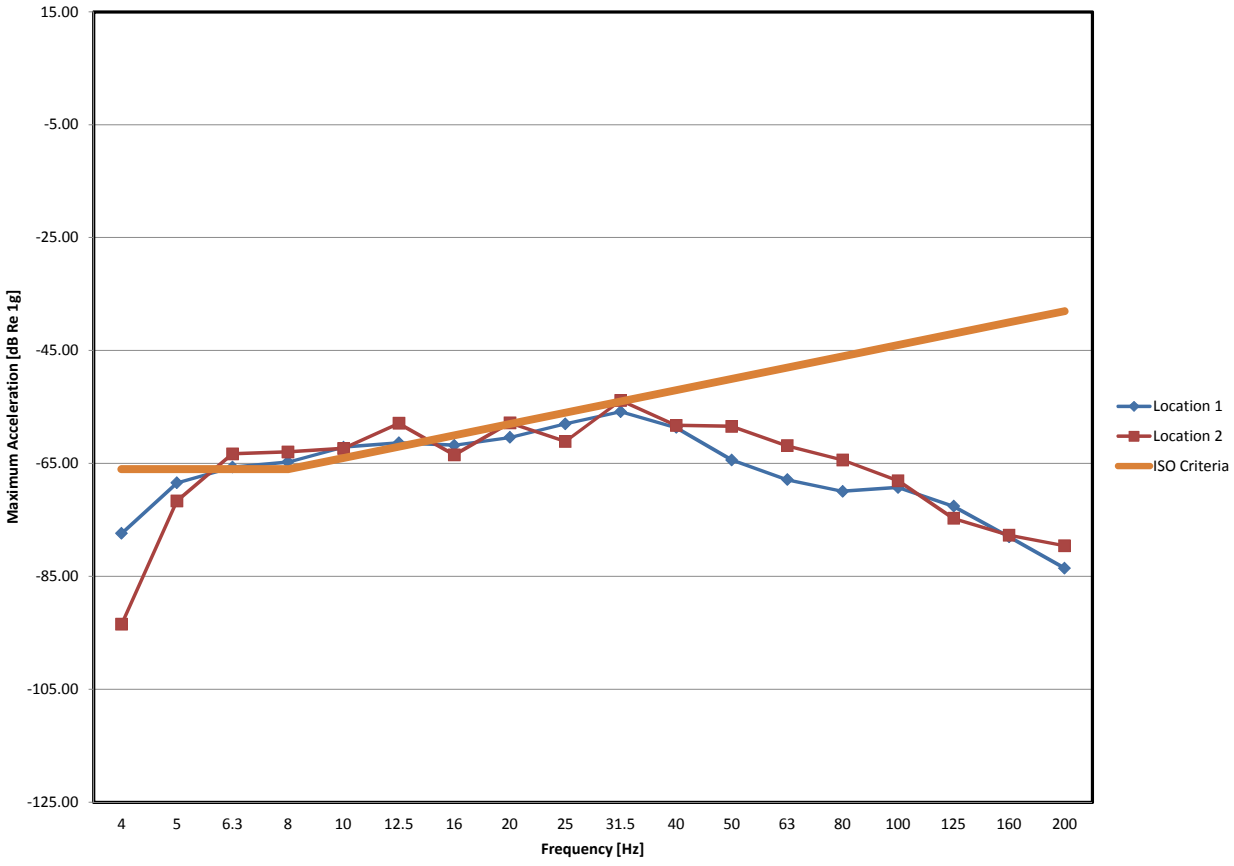
APPENDIX A

Train Pass-by Vibration Measurements

Table 1 - Maximum Vertical Vibration at Locations and 2

Frequency	Acceleration Location 1	Acceleration Location 2	Acceleration Location 3	Acceleration Location 4	Acceleration Location 5	ISO Criteria
4	-77.38	-93.47				-66.00
5	-68.43	-71.61				-66.00
6.3	-65.66	-63.30				-66.00
8	-64.74	-62.95				-66.00
10	-62.11	-62.34				-64.00
12.5	-61.35	-57.88				-62.00
16	-61.78	-63.45				-60.00
20	-60.37	-57.79				-58.00
25	-57.97	-61.10				-56.00
31.5	-55.81	-53.82				-54.00
40	-58.61	-58.26				-52.00
50	-64.38	-58.41				-50.00
63	-67.86	-61.84				-48.00
80	-69.92	-64.38				-46.00
100	-69.23	-68.04				-44.00
125	-72.56	-74.71				-42.00
160	-77.98	-77.68				-40.00
200	-83.51	-79.54				-38.00

FIGURE 2
Go Train Pass-bys Maximum Vertical Vibration at Locations 1 & 2



APPENDIX B

Correspondence with Rail Inspector

Bill Hoogeveen

From: Felipe Vernaza
Sent: Wednesday, January 06, 2016 10:56 AM
To: Bill Hoogeveen
Subject: FW: Rail corrugation

FYI

Regards,

Felipe Vernaza, P.Eng
Project Engineer
Noise and Vibration, Transportation Planning

MMM Group Limited
100 Commerce Valley Drive West
Thornhill, ON Canada L3T 0A1
T: 905-882-4211 Ext. 6391:
F : 905-882-7277
vernazaf@mmm.ca

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From: Doug Botting
Sent: December-16-15 10:31 AM
To: Felipe Vernaza
Subject: Re: Rail corrugation

Felipe

As per the pictures this is getting to the point that it should be addressed.

As per the pictures is this on tangent track
Normally occurs on the low rail of curve.

Doug

Sent from my BlackBerry 10 smartphone on the Rogers network.

From: Felipe Vernaza
Sent: Tuesday, December 15, 2015 3:48 PM
To: Doug Botting
Subject: Rail corrugation

Hi Doug,

We are undertaking a vibration study for the Grand Niagara Secondary Plan. A railway crosses the site, on which infrequent freight trains operate. These trains are causing a bit of vibration. One significant cause rail corrugation. Based on the attached pictures, can you please comment how badly the railway is corrugated? Is this severe or typical?

Thanks in advance!

Regards,

Felipe Vernaza, P.Eng
Project Engineer
Noise and Vibration, Transportation Planning

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