FINAL REPORT



RIVERFRONT COMMUNITY

NIAGARA FALLS, ONTARIO

AIR QUALITY, NOISE AND VIBRATION ASSESSMENT RWDI # 2404121 October 10, 2024

SUBMITTED TO

Joe Candeloro Vice President

Centennial Homes 353 Townline Rd Niagara on the Lake, Ontario LOS 1J0

SUBMITTED BY

Khalid Hussein, P.Eng. Project Manager Khalid.Hussein@rwdi.com

Jacquie Kelton, B.A.Sc., P.Eng. Noise and Vibration Scientist Jacquie.Kelton@rwdi.com

Matt Costigane, B.A.Sc., P.Eng. Senior Air Quality Engineer Matt.Costigane@rwdi.com

RWDI AIR Inc. Consulting Engineers & Scientists 600 Southgate Drive Guelph, Ontario N1G 4P6 T: 519.823.1311 x2105 F: 519.823.1316



This document is intended for the sole use of the party to whom it is addressed and may contain information that is privileged and/or confidential. If you have received this in error, please notify us immediately. Accessible document formats provided upon request. © RWDI name and logo are registered trademarks in Canada and the United States of America



EXECUTIVE SUMMARY

RWDI AIR Inc. was retained to prepare an Air Quality, Noise and Vibration (AQNV) assessment for the proposed Riverfront Community development located in Niagara Falls, Ontario. This report updates the Riverfront Community Phase 1A and 1B AQNV Impact Assessment dated August 10th, 2021, (referred to as the "Previous Assessment") which was also an update to a prior report to reflect the revised Riverfront Community plan. This assessment was completed to support a revised Phase 1A and 1B Draft plan of Subdivision (south of the railway), which is now referred to as Phase 2, and site-specific Zoning Bylaw Amendment application as required by the City of Niagara Falls. The revision to the draft plan of the proposed development resulted in a smaller set back distance between the rail line and the proposed development. This updated report provides:

- 1. An updated assessment of noise and vibration levels due to changes in setback distances between the railway line and proposed development.
- 2. An updated assessment of air quality levels due to changes in dwellings site plan and the property boundary surrounding the pumping station.
- 3. The assessment of noise levels from the emergency generator and air quality levels from the wet well at the proposed sewage pumping station located at the southern edge of the development.
- 4. A review of the Stanley Business Park Industries and surrounding area to confirm if there are updates to the industries in the areas since the original reports.

The proposed development is generally low rise residential with a small portion reserved for midrise residential and mixed-use. This AQNV assessment is based on the current design drawings, which are not yet final.

Air Quality

Existing industries in the area are required to meet air quality standards at their property line. One industrial facility was identified as having potential fugitive dust levels that could extend to the proposed development. Although the onus is on industry to control their fugitive dust levels, optional measures are provided to reduce the potential for conflict between the development and industry.

The proposed development will have a sewage pumping station which includes a wet well that will be used to store and pump sewage from proposed residential areas. The proposed sewage pumping station also includes an emergency generator. The well is located in close proximity to proposed residences and is a potential source of odour emissions. Dispersion modelling of odour emissions from the well's vent pipe indicate levels of greater than 1 OU/m³ at sensitive receptors close to the pumping station. However, frequency analysis of odour concentrations shows that odour concentrations above 1 OU/m³ occurred less than 0.5% of the time at all receptors.

No controls were required for the emergency generator to meet air quality criteria.

RWDI#2404121 October 10, 2024

Noise and Vibration

The potential noise impact from stationary sources of sound were evaluated. Based on the noise modeling results and setback distances, the land use compatibility of the proposed development with respect to the nearby industrial land-uses is considered acceptable from the noise impact perspective.

The emergency generator at the Riverfront Community Pumping Station can be tested anytime and will be compatible with respect to noise at the nearby residences.

Noise and vibration levels due to rail traffic are predicted to meet the applicable criteria following the implementation of control measures outlined in Section 4.1 of this report this report. The following noise control measures are recommended for the proposed development:

- 1. Installation of central air-conditioning so that all suites' windows can remained closed.
- 2. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade and in the outdoor amenity areas
 - b. Proximity to railway line
- 3. Brick veneer or equivalent masonry construction for the façades facing the rail corridor. Upgraded windows of at least STC-36 are expected to be required, however details are to be confirmed at detailed design by an acoustical engineer.
- 4. Construction of perimeter noise barriers along select outdoor amenity areas, with the applicable warning clause.

The inclusion of warning clauses related to transportation sources are required to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Optional considerations have been provided in Section 4.2.

This assessment was based on assumptions regarding basic building construction, so the resulting recommendations are broad. The selection of building materials, such as windows and doors should be reviewed by an acoustical engineer prior to construction to ensure the applicable limits are met.

RWDI#2404121 October 10, 2024



TABLE OF CONTENTS

1	INTE		1
2	AIR	QUALITY ASSESSMENT	2
2.1	Revie	ew of Industry in the Surrounding Area	2
2.2	Asse 2.2.1	ssment of the Riverfront Community Pumping Station	
	2.2.2	Pumping Station Emergency Generator:	
3	NOIS	SE AND VIBRATION ASSESSMENT	5
3.1	Noise	e from the Riverfront Community Pumping Station	6
3.2	Stati	onary Sources	6
	3.2.1	Quality Ready-Mix	7
	3.2.2	Airwood/Phoenix Wood Products	8
	3.2.3	South Niagara Falls Wastewater Treatment Plant	9
3.3	Tran	sportation Sources - Rail	9
	3.3.1	Rail Noise	
	3.3.2	Rail Vibration	14
4	REC	OMMENDATIONS	16
4.1	Requ	uired Control Measures Noise and Vibration	16
	- 4.1.1	Rail Noise	
	4.1.2	Barriers	
	4.1.3	Rail Vibration	17
	4.1.4	Warning Clauses	
4.2	Opti	onal Considerations	19
	4.2.1	Quality Ready-Mix	19
5	CON		
6	STA	TEMENT OF LIMITATIONS	21
7	REFI	ERENCES	22

RWDI#2404121 October 10, 2024



LIST OF TABLES

- Table 1:
 NPC-300 Exclusion Limit for Stationary Sources Continuous
- **Table 2:** Summary of Stationary Source Sound levels
- Table 3:
 NPC-300 Limits for Transportation Sources Rail

LIST OF FIGURES

- Figure 1:Proposed Riverfront Community Development
- Figure 2: Pumping Station Wet Well Vent Pipe and Emergency Generator Location
- Figure 3: Representative Receptors for Stationary Sources
- Figure 4: Existing Stationary Sources
- Figure 5: 75 m Setback from Rail Corridor
- Figure 6: Representative Receptors for Rail Source
- Figure 7: Vibration Levels at Different Distances from the Rail Track
- Figure 8: Examples of Vibration Isolation for Low-Rise Buildings
- **Figure 9:** Conceptual Sketch of Optional Mitigation for R1 and Proposed Park

LIST OF APPENDICES

- Appendix A: Preliminary Design Drawing
- Appendix B: List of Updated Industrial Sites in the Study Area
- Appendix C: Wet Well Vent and Emergency Generator Emissions and Assessment
- Appendix D: CP Traffic Data and CP Requirements
- **Appendix E:** STEAM Rail Noise Calculations

RWDI#2404121 October 10, 2024

1 INTRODUCTION

Centennial Homes retained RWDI AIR Inc. to prepare an Air Quality, Noise and Vibration (AQNV) assessment for the proposed Riverfront Community development located in Niagara Falls, Ontario. This assessment has been completed to support a Phase 2 (previously referred to as Phase 1A and 1B) Draft plan of Subdivision (south of the railway) and site-specific Zoning Bylaw Amendment application as required by the City of Niagara Falls. The site plan has been updated and the changes required this report to be updated accordingly. The proposed development is generally low rise residential with a small portion reserved for mixed-use. Several open/green spaces are proposed with a larger park area at the west. This assessment is based on design drawings received on August 9th, 2024, and provided in Appendix A.

This report updates the Riverfront Community Phase 1A and 1B AQNV Impact Assessment dated August 10th, 2021, (referred to as the "Previous Assessment") to reflect the revised Riverfront Community plan. The Riverfront Community development application applies to a portion of the lands formerly referred to as the Thundering Waters Secondary Plan Area. The area planned for development in the Riverfront Community Plan is about half the size of the Thundering Waters Secondary Plan Area and covers only the region south of the rail line that bisects the overall land parcel.

The revision to the draft plan of the proposed development resulted in resulted in a smaller set back distance between the rail line and the proposed development. This updated AQNV report provides:

- 1. An updated assessment of noise and vibration levels due to changes in setback distances between the railway line and proposed development.
- 2. An updated assessment of air quality levels due to changes in the property boundary surrounding the pumping station.
- 3. The assessment of noise levels from the emergency generator and air quality levels from the wet well at the proposed sewage pumping station located at the southern edge of the development.
- 4. A review of the Stanley Business Park Industries and surrounding area to confirm if there are updates to the industries in the areas since the original reports.

As with the Previous Assessment only the relevant sources that have potential to affect the development have been assessed in detail.

<u>SN</u>

RWDI#2404121 October 10, 2024



Figure 1: Proposed Riverfront Community Development

2 AIR QUALITY ASSESSMENT

The air quality assessment consisted of 1) reviewing the Stanley Business Park Industries and surrounding area to confirm if there are any updates to industry in this area since the last report and 2) assessing the potential effect of the Riverfront Community sewage pumping station on sensitive receptors at the development.

2.1 Review of Industry in the Surrounding Area

A review of existing industry was conducted by comparing industries listed in the previous assessment with those existing at the time of this updated report. This comparison revealed very minor changes in the character of the industrial areas surrounding the subject lands:

- 1. No new Class III industries have established in the study area.
- 2. Two (2) new Class II industries were identified within the study area located at 5850 Don Murie Street however these are small to medium scale industries and are located more than 500 m away from the proposed development. A wastewater treatment plant adjacent to the Welland River just south of the Riverfront Community is proposed to be built in 2027. This new facility could also be classified as a Class II industry type. These three facilities are well contained and are not likely to influence the proposed development; the facilities are well beyond the D-6 300m potential influence area of a Class II facility.

RWDI#2404121 October 10, 2024



3. No Class I industries were observed within 70m of the proposed development.

An updated list of industries has been provided in Appendix B. The minor changes to industries in the area does not place any additional constraints on the development beyond those outlined in the Previous Assessment. As detailed in that report, existing industries in the area are required to meet air quality standards at their property line, under Regulation 419/05 "Local Air Quality". In addition, the Ontario Ministry of the Environment, Conservation and Parks (MECP) publication titled Guideline A-10 requires controls to address potential off-site fugitive dust levels. Quality Ready-Mix (QRM) is the only stationary facility identified that may have a potential fugitive dust effect on the new development. This facility was assessed in detail in the Previous Assessment, which provided optional measures to ensure the proposed development does not experience concerns from QRM, although the onus will be on QRM to maintain acceptable levels of fugitive dust beyond their property line. These optional measures are summarized in Section 4.2 of this report.

2.2 Assessment of the Riverfront Community Pumping Station

The Riverfront Community sewage pumping station is located at the southeast of the Riverfront Community Phase 2 on the north side of Chippawa Parkway. The pumping station is located underground and consists of a wet well designed to collect and pump wastewater to a gravity sewer. A diesel fired generator located in an above ground enclosure has been proposed to provide stand-by power to the pumps in case of power outages. The pumping station has two sources of air quality emissions that were assessed for potential effects: 1) the wet well vent pipe and 2) the emergency generator used to provide standby power in case of power outages. These two sources are discussed in detail in the sections below and their locations are shown in Figure 2.



Figure 2: Pumping Station Wet Well Vent Pipe and Emergency Generator Location

RWDI#2404121 October 10, 2024



2.2.1 Pumping Station Wet Well Vent Pipe:

The wet well is used to store and pump sewage from the proposed residential areas. The well is vented using a pipe that bends so the exhaust is oriented downwards and terminates 1.8m above grade. This vent pipe is expected to release odour from storing and pumping wastewater from the well. Given the pumping station's close proximity to proposed residential areas and odour control measures are not included in the design, an assessment was conducted to determine if odour emissions have the potential to adversely affect nearby sensitive receptors. Emissions from the vent pipe were estimated using odour emissions data from The Region of Waterloo's Colonial Pumping Station since the Riverfront Community Pumping Station is not currently operational (no odour data available).

Regulation 419/05 (Reg. 419) provides air quality standards for use in Ontario. However, Reg. 419 does not include a standard for "odour" as a mixture of compounds. According to Section 14 of the Ontario Environmental Protection Act, an odour is deemed to be a nuisance if it is detected and considered to be unpleasant. The MECP does provide some guidance regarding the assessment of odour levels in their document "Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines under O. Reg. 419/05", dated September 2016. This guidance document indicates that odour concentrations need only be assessed at odour-sensitive receptor locations, such as residences, commercial buildings, and outdoor parks and recreation areas. As well odour levels that are greater than 1 odour unit (OU) per cubic metre (m³) are considered acceptable at sensitive receptor locations, as long as the frequency of exceedance is less than 0.5% of the time.

An odour unit is defined as the quantity of odourous substance that, when dispersed in 1 m³ of odour free air, becomes just detectable by a "normal" human observer whose sensitivity to the odorant represents the mean of the population. The average odour detection threshold is 1 OU/m³, although odours at this level are not necessarily a nuisance. Odour concentrations that may cause a complaint due to their ability to annoy typically range from 3 to 5 OU/m³ and higher.

The Riverfront pumping station's odour effects on nearby sensitive receptors were assessed using the AERMOD v22112 dispersion model. The modelling used the MECP's regional meteorological data set for London, ON and therefore is not site-specific. While not ideal, the use of the MECP's regional data set would be sufficient to provide an acceptable initial assessment.

An odour emission scenario was developed based on a client provided pumping rate of 96.4 L/Hour occurring on a 24-hour basis. Receptors were placed on the following blocks that were deemed to be in close proximity to the pumping station:

- One receptor per unit per storey in blocks 112 to 127.
- One receptor per storey at every 10 meters for the Block 225 area (multiple family).
- One receptor per storey at every 10 meters for the Block 180 to 183 area.
- One receptor per storey at every 10 meters for the Block 221 to 224 area.
- One receptor per storey at every 10 meters for the Block 140 to 167 area.

RWDI#2404121 October 10, 2024



Dispersion modelling results of odour emissions shown in figure C1 indicate levels of greater than 1 OU/m³ at sensitive receptors close to the pumping station. The exceedances occur in units in blocks 225, 180 to 183 and 124 to127. The highest predicted odour concentration of 2.0 OU/m³ occurs at a residence on block 125. Frequency analysis of all odour concentrations indicate that odour concentrations above 1 OU/m³ occurred less than 0.5% of the time at all receptors. As outlined in the MECPs' technical bulletin, an acceptable odour impact is one that is less than 1 OU/m³ or if greater than 1 OU/m³, does not occur for more than 0.5% of the time. As such the receptors in these blocks all meet this criterion. Please see **Appendix C** for more details on odour emissions estimation and impact assessment for this scenario.

2.2.2 Pumping Station Emergency Generator:

A 200-kW diesel generator is proposed to provide emergency power at the pumping station. This unit is located in close proximity to proposed residential. As a result, emissions from this unit were modelled and resulting concentrations were assessed against the MECP's screening level criteria for emergency generators.

The MECP's "Emergency Generator Checklist Supplement to Application for Approval, EPA s.9" recognizes nitrogen oxides, or NOx as the significant contaminant emitted from emergency generators and has a screening level of 1880 ug/m³ (0.5-hour average). The AERMOD v22112 dispersion model was used to assess concentrations of NOx emitted from the generator. This modelling used a multi-tiered receptor grid that was developed with reference to Section 7.2 of the Air Dispersion Modelling Guideline for Ontario, Version 3.0, July 2016. Modelling results shown in figure C2 indicate that levels at residential receptors meet the MECP's 0.5-hour averaged NOx screening level of 1880 ug/m³. As such no adverse air quality effects are expected at proposed residences from the use of the emergency diesel generator. Please see Appendix C for additional details of nitrogen oxide emissions and assessment.

3 NOISE AND VIBRATION ASSESSMENT

This assessment considered the potential noise effects from nearby transportation and stationary sources on the proposed development and determined if control measures are required.

Guidance from the MECP Environmental Noise Guideline Publication NPC-300, Stationary and Transportation Sources – Approval and Planning (MOECC, 2013) is used to assess noise and vibration of stationary sources and rail traffic. A site visit to the area on October 30, 2018 measured the sound of stationary sources in operation. Two existing stationary facilities were identified to have noise potential on the development and were measured: QRM (previously assessed) and Airwood/Pheonix Wood Products (AP). The updated site plan has houses located in a similar setback distance to the Canadian Pacific Railway (CP) industrial spur line that runs to the north of the proposed development. The previously completed vibration measurements, completed adjacent to the rail line from May 27th, 2021 to June 14th, 2021, are still applicable for these setbacks. Details are provided in the subsequent sections.

RWDI#2404121 October 10, 2024



Aircraft flyovers are distant and are not expected to influence sound levels at the site. The Queen Elizabeth Parkway is distant and is not expected to influence sound levels at the site. Road traffic along the Chippawa Parkway bordering the south portion of the development is not anticipated to have a high potential impact on the site if construction following the minimum Ontario Building Code is used. Road traffic is not assessed further in this report.

3.1 Noise from the Riverfront Community Pumping Station

The Riverfront Community sewage pumping station, as seen in Figure 2, was evaluated for potential noise effects on the development. The only significant source of noise expected from the pumping station is the 200-kW diesel emergency generator. The sound level limits for continuous stationary sources are found in Table 1, below; however, emergency equipment operating in a testing scenario are permitted to meet a level 5 dB greater than these sound level limits. This equipment is assessed separately from other continuous sources of sound.

For this assessment the sound level from the emergency generator is expected to be in compliance with the sound level limit of 50 dBA applicable to generator testing during the nighttime (23:00-07:00h). The generator can therefore be tested during any time and be in compliance with the applicable sound level limits.

3.2 Stationary Sources

Existing industries near the development are considered as stationary sources of sound per NPC-300.

Stationary sources are treated differently from transportation sources such as rail traffic and require sound levels be assessed for the predictable worst-case 1-hour L_{EQ} for each period of the day. For assessing sound originating from stationary sources at a point of reception (receptor), NPC-300 defines sound level criteria for two locations: outdoor and façade. The outdoor location can be at the lot line for a small lot or 30 m from the façade for a large lot. In this case, the outdoor location at the lot lines of the current site layout is applicable.

The assessment criteria for all receptors is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a receptor. The applicable exclusion limit is determined based on the level of urbanization or "Class" of the area. This development is considered to be in a Class 2 (suburban) area. The background sound levels were not determined in this assessment. As such, the NPC-300 Class 2 exclusion limits apply to the receptors in this study (see Table 1). Receptors applicable for stationary sources are shown in Figure 4.

A site visit by RWDI personnel on October 30, 2018 and September 23rd, 2020 identified only continuous sources. Vibration levels from stationary sources, if present, are not anticipated to be an issue given the separation distance to the proposed development.

RWDI#2404121 October 10, 2024



Table 1: NPC-300 Exclusion Limit for Stationary Sources – Continuous

Time Period	Exclusion Limit for Class 2 Outdoor / Façade L _{EQ-1hr}
Daytime 0700-1900h	50 / 50 dBA
Evening 1900-2300h	45 / 50 dBA
Nighttime 2300-0700h	/ 45 dBA

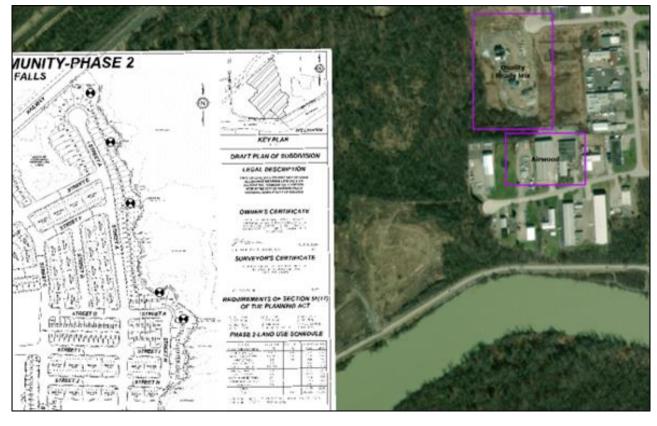


Figure 3: Representative Receptors for Stationary Sources

3.2.1 Quality Ready-Mix

QRM is located on Progress Street, to the east of the proposed development. QRM prepares ready-mix concrete for mixing and delivery by truck mounted in-transit mixers. A telephone discussion with QRM staff on November 30, 2018 provided hours of operation and typical plant operations throughout the day.

QRM currently operates between 6 am and 5 pm. Therefore, both the daytime (7 am to 7 pm) and nighttime (11 pm to 7 am) guideline limits are considered. The nighttime period has the strictest sound level limit (5 dB less) compared to daytime.

RWDI#2404121 October 10, 2024

A quantitative analysis using the Cadna/A noise propagation model was conducted. RWDI staff, on October 30, 2018, measured the sound levels of the QRM equipment at the property line where they were distinguishable from background sounds. These measurements included the loader activity, cement truck loading at loadout, and cement truck mix and wash. Powder unloading did not occur at the time but is not expected to be dominant over other sources. Modelled source locations are shown in Figure 4. Sound data of equipment at QRM was updated with measurements of operating equipment at the site. Sound levels were previously drawn from RWDI's internal database of similar equipment at a different site which resulted in more conservative predictions. QRM equipment sound levels and operating times are summarized in Table 2 based on the duration observed during the site visit. Equipment not measured at QRM is based on sound levels of similar equipment at another facility.

Sound levels resulting from the QRM facility are expected to meet NPC-300 guidelines at proposed receptors for all times of the day. No further actions are required.

3.2.2 Airwood/Phoenix Wood Products

Airwood and Phoenix Wood Products are both wood manufacturing facilities that share the same site located at 6167 Don Murie Street to the east of the proposed development. During a site visit by RWDI staff on October 30, 2018, a dust collector was identified as a source of outdoor sound and measured (see Figure 4 for source location). Both facilities currently operate during daytime hours from 9:30 am to 4 pm. The sound contribution of this source is cumulatively added to the QRM facility sources for the daytime period and found to be below the daytime limit of 50 dBA. No further actions are required.

Source	Sound Pressure Level @ 7m (dBA) ^[1]	Notes
Airwood Flooring Baghouse	80	60 min. duration, day only
QRM Aggregate Gravel Truck Idling	74	2 trucks/hr; 10 min., day only
QRM Aggregate Gravel Truck Unloading	89	2 trucks/hr; 1 min., day only
QRM Cement Truck Loading at Loadout	82	60 min. day/30 min. 6-7am
QRM Cement Truck Mix and Wash	82	60 min. day/30 min. 6-7am
QRM Loader loading aggregate	79	30 min.
QRM Aggregate truck movements ^[2]	79	2 trucks/hr; 5 km/h, day only
QRM Enclosed conveyor	64	60 min., day/night
QRM Cement truck movements ^[2]	78	8 trucks/hr day, 4 trucks/hr night; 5 km/h
QRM Loader movements ^[2]	82	1 loader/hr; 5 km/h, day/night

Table 2: Summary of Stationary Source Sound Levels

Notes: [1] Hemispherical or Q-factor of 2.

[2] Sound pressure level for truck/loader movements is based on sound power level of a single pass-by event.

RWDI#2404121 October 10, 2024





Figure 4: Existing Stationary Sources

3.2.3 South Niagara Falls Wastewater Treatment Plant

A wastewater treatment plant adjacent to the Welland River, south of the Riverfront Community is proposed to be built in 2027. This new facility is expected to be classified as a Class II industry type. A noise impact assessment completed by Golder Associates Ltd. found that the expected sound level from the wastewater treatment plant will be 34 dBA at night at the southernmost part of the development. The wastewater treatment plant is well beyond the D-6 300m potential influence area of a Class II facility and is not expected to impact the sound levels at the Riverfront Community development.

3.3 Transportation Sources - Rail

The following guidelines were used to assess noise and vibration impact potential due to rail traffic:

- Environmental Noise Guideline NPC-300, Stationary and Transportation Sources Approval and Planning (MOECC, 2013).
- Guidelines for New Development in Proximity to Railway Operations, by the Railway Association of Canada (RAC, 2013).
- Canadian Pacific Railway Industrial Spur Line Requirements (CP, received in January 2016).

Guidance from NPC-300 is applicable and used to assess noise from rail traffic. The Railway Association of Canada (RAC) guidelines were used for rail vibration and used as a reference tool of best practices for rail-adjacent development. Requirements for dwellings adjacent to CP rail lines are covered under NPC-300 and consistent with the RAC best practices. CP also endorses the RAC guidelines.

The CP and RAC guidelines outline the following minimum requirements for an industrial spur line:

- CP requires building setback of 15 m for residential dwellings. The latest plan shows building setbacks greater than 15 m which satisfies the CP requirement.
- RAC suggests vibration measurements should be conducted for proposed dwelling units that are within 75 m of the rail right-of-way. The existing rail corridor is located within 75 m of the residential lots as shown in Figure 5.

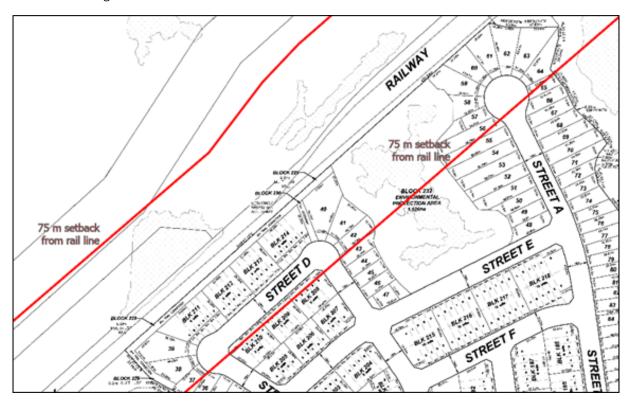


Figure 5: 75 m Setback from Rail Corridor

3.3.1 Rail Noise

Rail sound levels are assessed for the daytime 16-hour L_{EQ} and the nighttime 8-hour L_{EQ}. For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in Table 3, Table 4, and Table 5 for two types of locations: outdoor living areas (OLAs), and indoor areas of sensitive uses. The OLAs are also assessed only during daytime hours from 7 am to 11 pm. The OLA is intended for the quiet enjoyment of the outdoor environment and readily accessible from the building. Given that the proposed design consists of mostly detached homes, the OLAs required to be assessed include adjoining backyards, front yards, gardens, terraces or patios.

RWDI#2404121 October 10, 2024



Table 3: Indoor Sound Level Criteria for Road and Rail Sources

		Sound Level Criteria (Indoors)		
Type of Space	Source	Daytime L _{eq,16-hr} 07:00h – 23:00h	Nighttime L _{eq,8-hr} 23:00h - 07:00h	
Living Quarters Examples: Living, dining and den areas of residences, hospitals, nursing homes, schools and daycare centres	Rail	ail 40 dBA		
Sleeping Quarters	Rail	40 dBA	35 dBA	

Table 4: Sound Level Criteria – Outdoor Living Area

	Sound Level Criteria (Outdoors)			
Assessment Location	Daytime L _{eq.16-hr} 07:00h – 23:00h	Nighttime L _{eq.8-hr} 23:00h – 07:00h		
Outdoor Living Area (OLA) (Rail)	55 dBA	-		

Table 5: Ventilation, Building Component, and Warning Clauses Recommendations for Road/Rail Sources

	Transportation Sou		
Assessment Location	Daytime L _{eq,16-hr} 07:00h – 23:00h	Nighttime L _{eq,8-hr} 23:00h – 07:00h	Recommendations
Plane of Window (Rail ^{1, 2})	> 60 dBA	> 55 dBA	The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved. Warning clause "Type D" is recommended.
		L _{eq, 24hr}) and rom tracks	Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings. Warning clause "Type D" is recommended.

RWDI#2404121 October 10, 2024



	Transportation Sou	nd Level (Outdoors)	
Assessment Location	Daytime L _{eq,16-hr} 07:00h – 23:00h	Nighttime L _{eq.8-hr} 23:00h - 07:00h	Recommendations
	≤ 60 dBA > 55 dBA	-	If sound levels are predicted to exceed 55 dBA, but are less than 60 dBA, noise controls may be applied to reduce the sound level to 55 dBA. If noise control measures are not provided, a warning clause "Type A" is recommended.
Outdoor Living Area (Rail ³)	> 60 dBA	-	Noise controls (barriers) should be implemented to meet the 55 dBA criterion. If mitigation is not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case a warning clause "Type B" would be recommended.

Notes:

1. Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.

2. Some railway companies (e.g., CN, CP) may require that the exterior walls include a brick veneer or masonry equivalent for the façade facing the railway line, regardless of the sound level.

3. Whistle noise is not included in the determination of the sound level at the OLA.

Rail traffic data obtained from correspondence with CP contains forecasted volume. CP classifies the rail line through the subject lands as an industrial spur line with its main purpose to serve existing industry on an ondemand basis. Current rail traffic is one to two trains per day. Forecasted volume by CP is much higher, about 20 trains per day, split between 13 trains during the daytime (0700-2300h) and 7 during the nighttime (2300-0700). The modelling considered a conservative approach where information is not available such as jointed track, hard ground between the track and the receptors, maximum volume and speed, full exposure to the track, and all trains on the nearest track. If actual tracks are continuously welded, noise levels would be less.

RWDI#2404121 October 10, 2024



CP guidelines indicate that a warning clause (see Section 4) be included in purchase agreements for developments within 300 metres of the CP right of way. Data provided by CP and CP's requirements for a spur line are provided in Appendix D. There is currently one at-grade crossing approximately 280 m west of the proposed development. However, CP has confirmed that no whistles and bells are expected.

Sound levels were estimated using the Sound from Trains Environmental Analysis Method (STEAM) algorithms (MOECC, 1990). The worst-case noise-sensitive areas to the rail corridors are shown in Figure 6. The predicted sound levels for the receptor facades and the outdoor living areas (OLA's) are presented in Tables 6 and 7 respectively. Receptor R1 is located approximately 26 m from the tracks with receptor R2 being 24 m from the tracks. Other noise-sensitive areas would be located farther away which will result in lower predicted sound levels. The STEAM calculations are provided in Appendix E.

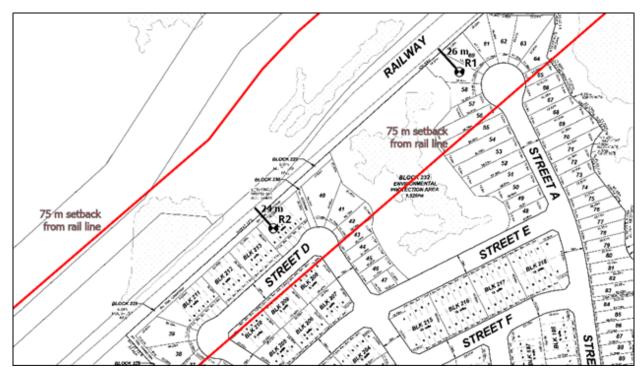


Figure 6: Representative Receptors for Rail Source

	Ra	ail	Sound Le	evel Limit	Exceed	s Limit?	
Receptor	Day L _{EQ} , 16hr	Night L _{EQ} , 8hr	Day L _{EQ} , 16hr	Night L _{EQ} , 8hr	Day	Night	Notes
R1	62	62	60	55	Yes	Yes	1,2
R2	62	63	60	55	Yes	Yes	1,2

 Table 6: Predicted Ground Transportation Source Sound Levels – Plane of Window

Notes:

1. The acoustical performance of building components must be specified to meet the indoor sound level criteria. Installation of air conditioning to allow for windows and doors to remained closed, warning clause "Type D".

2. Brick veneer of masonry equivalent for the first row of housing or adjacent façades with exposure to railway line.

Receptor	Receptor Level Daytime L _{EQ} , 16hr	Sound Level Limit Daytime L _{EQ} , 16hr	Exceeds Limits?	Notes
OLA_R1	63 dBA	55 dBA	Yes	1
OLA_R2	63 dBA	55 dBA	Yes	1

Table 7: Transportation Sound Levels in Outdoor Living Areas (OLAs)

Notes:

 Noise mitigation is required to meet the 55 dBA OLA sound level criterion. If noise controls are not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance up to 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case, a warning clause "Type B" is recommended.

Based on the sound level modeling results recommendations and sample wording for warning clauses are provided in Section 4.

Exact building locations, room dimensions and properties, and window sizes are not known at this time. Conservative assumptions have been made to estimate the indoor sound level due to rail traffic through a closed window. A closed window assumes a 20-dB reduction for a typical Ontario Building Code (OBC) window construction. The resulting indoor daytime/nighttime sound levels are 42 dBA for R1 and R2. These indoor sound levels from rail traffic during the nighttime hours were found to exceed the limits presented in Table 3 based on current assumptions. Therefore, upgraded windows, which are reported in terms of Sound Transmission Class (STC) ratings, are required. Windows that achieve a minimum of STC-36 are predicted to be necessary but could be as much as STC-40 based on the low frequency content of the rail source. Window and door STC specification should be confirmed by an acoustical engineer once interior layouts are determined. Windows with STC ratings meeting these requirements (up to STC 40) are commercially available; therefore, indoor sound level criteria can be met.

The OLAs for homes in the vicinity of both R1 and R2 exceed the recommended limit due to rail noise. The first row of homes to the rail line near R1 and R2 will require a property line barrier to shield the OLA from rail noise. Other excesses can be addressed via warning clauses.

Rail noise, or airborne noise, can cause intrusion for future occupants. Airborne noise at low frequencies caused typically by locomotives can induce vibration in lightweight elements of a building. Control measures are therefore provided in Section 4 to minimize the effects of rail noise for future occupants.

3.3.2 Rail Vibration

The CP guidelines provide a vibration limit of 0.14 mm/s RMS, between 4 and 200 Hz, for railway-induced ground vibration at residential dwellings within 75 m of the rail corridor. The 0.14 mm/s limit is based on the limit for human perception of vibration which is around 0.1 mm/s per RAC guidelines.

Based on the preliminary design drawings, several residential lots are within the 75 m setback as shown in Figure 5, thus vibration monitoring was completed.

Vibration measurements were completed along the CP industrial spur line from May 27th, 2021 to June 14th, 2021. A motion-sensitive camera was installed along with one triaxial vibration sensor at 25 m, and two uniaxial vibration sensors at 50 m and 75 m south of the closest rail track. Several freight train pass-bys were captured and vibration levels from different train pass-bys are summarized in Figure 7.

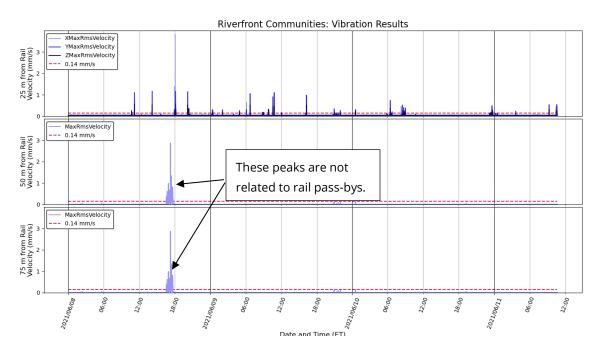


Figure 7: Vibration Levels at Different Distances from the Rail Track

The vibration levels for the presented cases exceed the CP guideline limit of 0.14 mm/s. The dominant frequencies of the measured vibration signals were in the range between 4 and 200 Hz. These exceedances only occur at the sensor that is 25 meters from the rail line and do not appear on the sensors at 50 meters or 75 meters from the rail line. The houses on the northwest side of Street D as well as lots 58 through 63 at the end of Street A are between 50 and 25 m of the rail line and may experience vibration from passing trains.

One exceedance event can be seen in Figure 8 at the 50- and 75-meter sensors however this event was not found to be related to a train and was likely caused by human interference with the sensors. In one case, vibration levels were above 0.2 mm/s RMS however this was not a frequent occurrence.

The RAC guidelines identify levels over 0.2 mm/s to be a significant problem for frequent events such as rapid transit. The levels measured here exceed these annoyance thresholds. The measured vibration levels are not a concern for building damage, which typically is a concern at levels of 5 mm/s and above. Recommendations are provided in Section 4.2.3 to reduce vibration intrusion inside the affected residences.



4 RECOMMENDATIONS

The following section outlines the required control measures to achieve compatibility between the proposed development and the existing industry and rail activity. Recommendations for dust control are provided for consideration.

4.1 Required Control Measures Noise and Vibration

The control measures presented in the following sections pertain to noise and vibration.

4.1.1 Rail Noise

Sound levels due to rail activity at outdoor living areas and indoor areas are predicted to be over NPC-300 limits. Control measures are required for houses in the northern part of the site plan adjacent to the rail line and are outlined below.

- Provision for the installation of central air conditioning.
- Brick veneer or equivalent masonry construction for the façades facing the rail corridor. Upgraded windows of at least STC-36 are expected, however details to be confirmed at detailed design by an acoustical engineer.
- The above window requirements are also required at façades 90° to the façade facing the rail corridor.
- Standard window construction meeting the Ontario Building Code is acceptable for façades opposite the rail corridor (i.e., back façade).
- Ensure exterior window frames/doors and insulation are airtight. Use acoustic seals for operable windows/doors for noise insulation.
- Exterior door construction should be of heavy, thick and/or dense materials (i.e., no hollow-core doors). STC ratings should be confirmed at detailed design by an acoustical engineer if exterior doors open into habitable space (e.g., kitchen, living room, as opposed to garages).
- The houses on the northwest side of Street D as well as lots 58 through 63 at the end of Street A will require NPC-300 warning clause D to address transportation sound levels at the plane of window. Also, the first row of these homes closest to the rail corridor require implementation of a barrier to protect the OLA from rail noise and NPC-300 warning clause Type B to address transportation sound levels in Outdoor Living Areas (OLAs).
- All residences within 300 m of the rail right of way require the Proximity to Railway Line Warning Clause. Sample wording for all warning clauses is provided in Section 4.2.3.

CP also requires that a 1.83 m high chain link fence be constructed and maintained along the common property line of the railway and the development at the expense of the developer. The developer is to be aware the necessity of including a covenant with the lands, in all deeds, obliging the purchasers of the land to maintain the fence in satisfactory condition at their expense. CP requirements are provided in Appendix D. RWDI#2404121 October 10, 2024



4.1.2 Barriers

The sound level at all residences along the rail line is predicted to be approximately 62 dBA with future rail traffic. At this sound level a berm, barrier or berm-barrier combination is required on the development side at a minimum height of 3.7 m (above top of rail) and must break the line of sight between the OLA and the rail line, to reduce the noise by approximately 5 dB. The barrier must be continuous, free of gaps or cracks, and has a face density of 20 kg/m2. Per CP requirements, a 1.83 m high chain link fence would be required at the top if a berm is used. If a berm-barrier combination is used, the barrier portion must be at least 1.83 m high. A conceptual sketch showing the potential location of the berm/barrier is shown in Figure 8. The details of this design can be finalized if Centennial Homes decides to proceed.

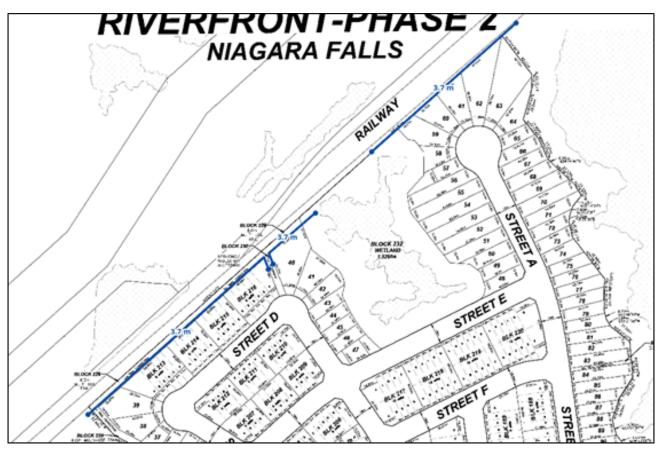


Figure 8: Required Barrier Locations for Houses Along Rail Line

4.1.3 Rail Vibration

The measured vibration levels as a result of freight trains are anticipated to be above 0.14 mm/s RMS for two houses closest to the rail line on the northern most part of the site plan, which requires action per the CP and RAC guidelines. The following items are required for these residential lots to minimize rail vibrations from entering the dwelling units where people may perceive vibration. These recommendations are to be revisited once the design is finalized and building construction is known.

RWDI#2404121 October 10, 2024



- Vibration mitigation for low-rise buildings 3-storeys or less (see Figure 9):
 - Isolate the upper floors from the foundation wall and internal column supports using rubber pads (5-20 mm deflection under load). No rigid connections should exist between the structure above the isolation layer and below it.
 - Use hollow core concrete for 1st floor (if applicable).
 - Seal the seam around the foundation wall (created by the rubber pads) that is insulated and watertight.
 - Finishing components must be attached either above or below isolation joint.
 - Line the outside foundation walls facing the rail line and 90° to the rail line with a soft, resilient layer.

The following recommendation is suggested for houses on the northwest side of Street D as well as lots 58 through 63 at the end of Street A at the northern section of the site plan, closest to the rail line.

- RAC indicates that minor reductions in vibration levels (approximately 30%) can be achieved through lining of the outside of the foundation walls with a resilient layer, as a minimum. The lining must be quite soft but able to withstand the lateral soil pressures present on the foundation wall. This lining should be installed on the foundation areas facing the rail line and 90° to the rail line.
- In addition to the resilient layer, large diameter gravel backfill covered with filter fabric to prevent topsoil infiltration can also be used adjacent to the closest foundations to provide a break in the soil, and further reducing vibration levels.

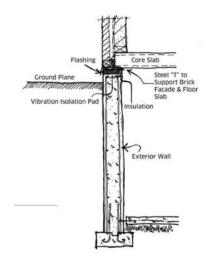


Figure 9: Examples of Vibration Isolation for Low-Rise Buildings (per RAC)

4.1.4 Warning Clauses

Warning clauses are required to be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit.

October 10, 2024

Proximity to Railway Line: CP Warning Clause for developments that are within 300 metres of the right-of-way.

"Warning: Canadian Pacific Railway Company (CPR) 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 alterations 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."

The following warning clause is required by the MECP for the outdoor living areas of the 1st row of dwellings adjacent to the rail line:

NPC-300 Type B: Recommended to address surface transportation sound levels in OLAs if the sound level is in the range of >55 dBA but \leq 60 dBA, and noise controls have been provided. Recommended to address outdoor aircraft sound levels \geq NEF 30.

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions 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."

The following warning clause is required by the MECP for the 1st row of dwellings adjacent to the rail line:

NPC-300 Type D: Recommended to address transportation sound levels at the plane of window.

"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."

4.2 Optional Considerations

Optional considerations provided herein are best practices to minimize potential for undesirable effects.

4.2.1 Quality Ready-Mix

Quality Ready-Mix shows some potential for nuisance-level fugitive dust levels on the eastern portion of the proposed Riverfront Community development. The onus will be on Quality Ready-Mix to maintain acceptable levels of fugitive dust beyond their property line; however, the following optional recommendations may help avoid any future conflicts.

 Maintain vegetative buffers between the Quality Ready-Mix property and the proposed development, where possible. In order to effectively attenuate potential dust from Quality Ready-Mix operations, the vegetative buffer should consist of a minimum of three rows of coniferous trees (approximately 10 m), with a minimum initial height of 2 m.

RWDI#2404121 October 10, 2024



• Assist Quality Ready-Mix in designing, implementing, and maintaining a fugitive dust best management practices plan to limit the emission of fugitive dust from unpaved roads at the facility.

5 CONCLUSIONS

RWDI has completed an Air Quality, Noise and Vibration assessment for the proposed Riverfront Community development located in Niagara Falls, Ontario.

From an air quality perspective, the proposed development is compatible with existing industry. Although levels greater than 1 OU/m3 were predicted at some sensitive receptors close to the pump station, the odour frequency was predicted to be less than the MECP criterion of 0.5% of the time. The emergency generator at the Riverfront Community Pumping Station should only be tested during daytime (07:00-19:00h) hours in order to be compatible with respect to noise at the nearby residences.

The potential noise impact from stationary sources of sound were evaluated. Based on the noise modeling results and setback distances, the land use compatibility of the proposed development with respect to the nearby industrial land-uses is considered acceptable from the noise impact perspective.

Noise and vibration levels due to rail traffic are predicted to meet the applicable criteria following the implementation of control measures outlined in this report.

The following noise control measures are recommended for the proposed development:

- 1. Installation of central air-conditioning so that all suites' windows can remained closed.
- 2. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade and in the outdoor amenity areas
 - b. Proximity to railway line
- 3. Brick veneer or equivalent masonry construction for the façades facing the rail corridor. Upgraded windows of at least STC-36 are expected, however details to be confirmed at detailed design by an acoustical engineer.
- 4. Construction of perimeter noise barriers along select outdoor amenity areas, with the applicable warning clause.

This assessment was based on assumptions regarding basic building construction, so the resulting recommendations are broad. The selection of building materials, such as windows and doors should be reviewed by an acoustical engineer prior to construction to ensure the applicable limits are met.

RWDI#2404121 October 10, 2024



6 STATEMENT OF LIMITATIONS

This report entitled Riverfront Community Phase 2 Air Quality, Noise and Vibration Assessment was prepared by RWDI AIR Inc. ("RWDI") for Centennial Homes ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

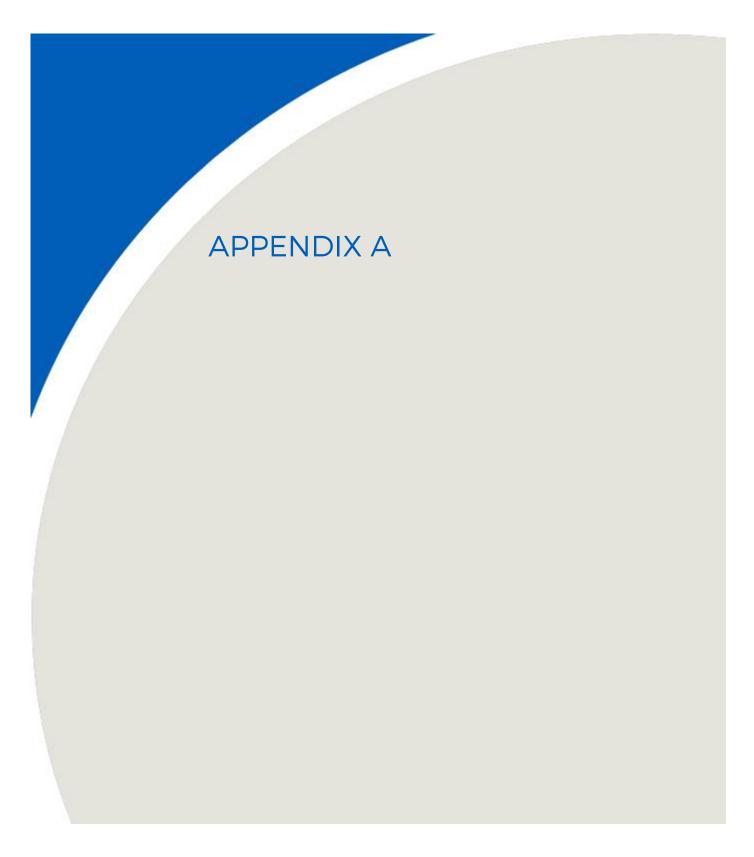
Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

RWDI#2404121 October 10, 2024

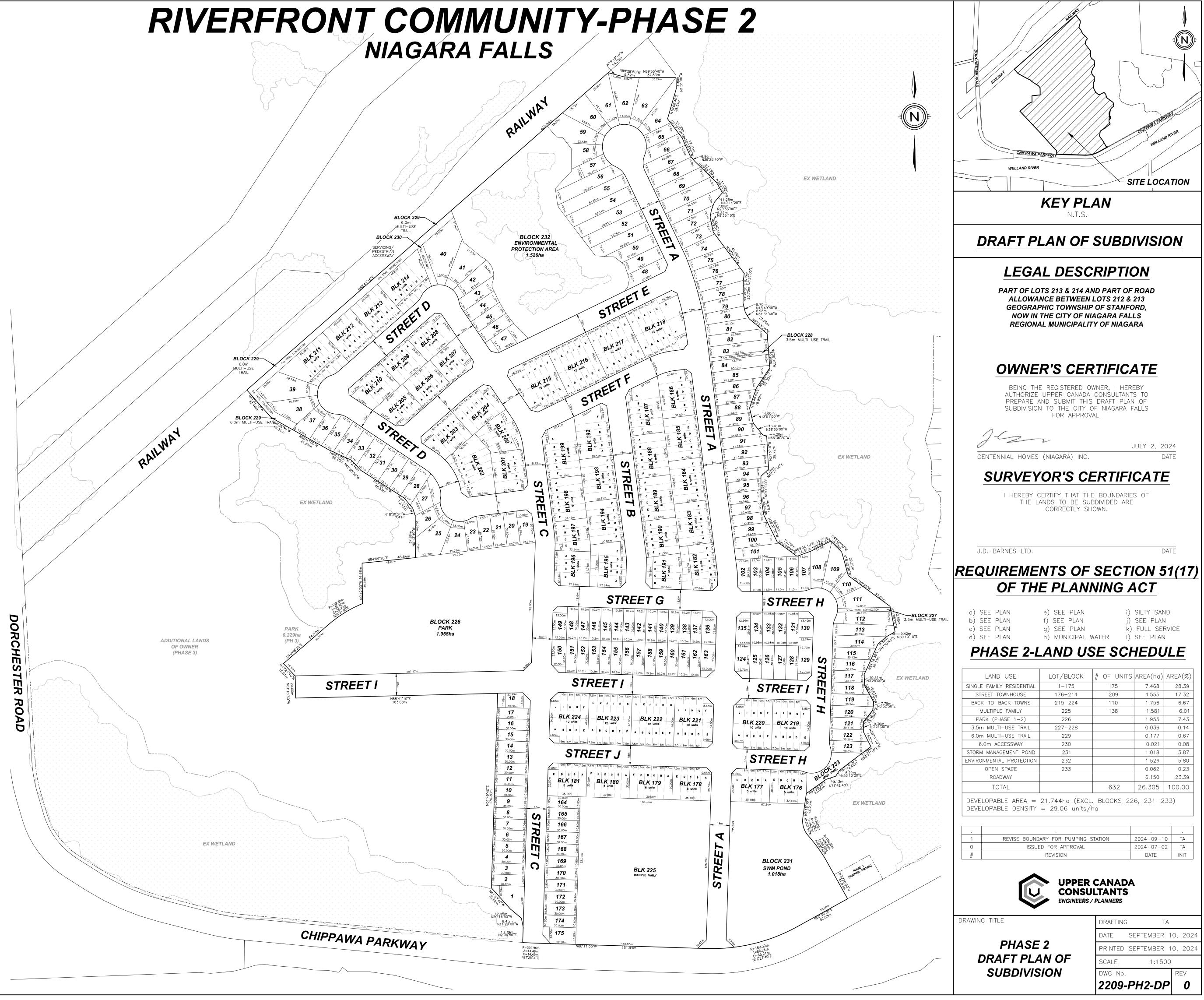
7 REFERENCES

- 1. RWDI. 2019. Riverfront Community Phase 1A and 1B, Niagara Falls, Ontario, Air Quality, Noise and Vibration Impact Assessment. RWDI #1600158.
- 2. MECP. 2018. Procedure for Preparing an Emission Summary and Dispersal Modelling Report [Guideline A-10].
- 3. MECP. 2016. Technical Bulletin: Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines for Odour under O.Reg. 419/05.
- 4. MECP. 2010. Emergency Generator Checklist Supplement to Application For Approval, EPA s.9
- 5. MECP. 2016. Air Dispersion Modelling Guideline for Ontario [Guideline A-11] Version 3.0.
- 6. Ontario Ministry of the Environment and Climate Change (MOECC), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning
- 7. The Railway Association of Canada (RAC, May 2013), Guidelines for New Development in Proximity to Railway Operations.
- 8. Canadian Pacific Railway Industrial Spur Line Requirements (CP, received in January 2016).
- 9. Ontario Ministry of the Environment and Climate Change (MOECC), 1995, Guideline D-6, Compatibility Between Industrial Facilities and Sensitive Land Uses
- 10. Ontario Ministry of the Environment and Climate Change (MOECC), 1990, STEAM Sound from Trains Environmental Analysis Method, Technical Publication.
- 11. International Organization for Standardization (ISO), 1994b, International Standard ISO 9613-1:1994, Acoustics Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere.
- 12. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics Attenuation of sound during propagation outdoors Part 2: General method of calculation

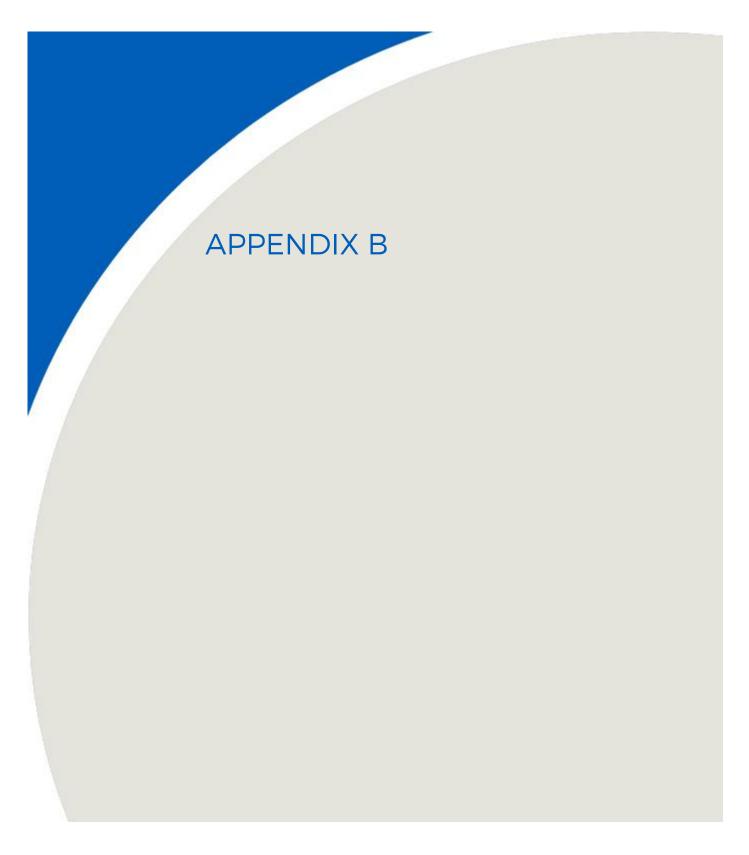




2 3 4 5	301.91 301.88 301.85 301.82	160 161 162 163	305.94 305.94 305.94 365.45	202-B 202-C 202-D 202-E	226.33 217.16 205.54 198.04	223-B 223-C 223-D 223-E	138.00 138.00 138.00 138.00
6 7 8	301.82 301.79 301.76 301.73	163 164 165 166	305.45 323.97 323.97 323.97	202-E 202-F 203-A 203-B	408.45 225.00 180.00	223-E 223-F 223-G 223-H	172.5 172.5 172.5
9 10 11	301.73 301.70 301.67 301.64	168 167 168 169	323.97 323.97 323.97 323.97	203-B 203-C 203-D 203-E	180.00 180.00 180.00 321.47	223-I 223-J 223-K	138.0 138.0 138.0 138.0
11 12 13 14	301.64 301.58 301.54	170 171 172	323.97 323.97 323.97 323.97	203-E 204-A 204-B 204-C	256.41 180.94 180.36	223-K 223-L 224-A 224-B	172.5 212.4 138.0
14 15 16 17	301.54 301.51 301.48 301.45	172 173 174 175	323.97 323.97 323.97 422.71	204-C 204-D 204-E 204-F	180.36 180.06 180.00 225.00	224-Б 224-С 224-D 224-Е	138.0 138.0 138.0 138.0
18 19 20	377.51 412.14 367.47	176-A 176-B 176-C	221.87 180.00 180.00	205-A 205-B 205-C	356.26 174.00 174.00	224-C 224-F 224-G 224-H	172.5 172.5 138.0 138.0
21 22	367.47 367.28 366.40 346.92	176-D 176-Е	180.00 225.00	205-C 205-D 206-A 206-B	217.52 217.52	224-1 224-J	138.0 138.0 198.0
23 24 25	492.14 788.75	177-A 177-B 177-C	225.00 180.00 180.00	206-C 206-D	174.01 174.01 174.01		
26 27 28	407.06 561.60 404.75	177-D 177-Е 178-А	180.00 280.16 280.16	206-E 207-A 207-B	217.52 218.44 176.86		
29 30 31 32	393.55 396.15 398.76 392.01	178-B 178-C 178-D 178-E	180.00 180.00 180.00 225.00	207-C 207-D 208-A 208-B	179.99 331.85 316.96 174.00		
32 33 34 35	380.34 388.44 406.29	179-A 179-B 179-C	225.00 225.00 180.00 180.00	208-B 208-C 208-D 208-E	174.00 174.00 174.00 217.50		
36 37	378.21 448.92	179-D 179-Е	180.00 180.00	209-A 209-B	217.50 174.00		
38 39 40	671.15 953.38 1199.71	179-F 180-A 180-B	225.00 225.00 180.00	209-C 209-D 209-E	174.00 174.00 217.50		
41 42 43	737.33 519.82 405.54	180-C 180-D 180-E	180.00 180.00 180.00	210-A 210-B 210-C	217.50 174.00 174.00		
44 45 46	370.99 357.33 356.95	180-F 181-A 181-B	225.00 225.00 180.00	210-D 210-E 211-A	174.00 338.06 449.98		
47 48 49	517.12 463.61 431.57	181-C 181-D 181-E	180.00 180.00 280.16	211-B 211-C 211-D	198.84 202.11 213.02		
50 51 52	490.90 673.72 692.47	182-A 182-B 182-C	310.98 194.23 188.53	211-E 211-F 212-A	215.99 270.00 270.00		
53 54 55	734.46 764.68 793.64	182-D 182-E 182-F	186.27 186.26 232.82	212-B 212-C 212-D	216.00 216.00 216.00		
56 57 58	746.93 534.87 465.09	183-A 183-B 183-C	232.80 186.23 186.22	212-Е 213-А 213-В	270.00 270.00 216.00		
59 60 61	832.59 715.27 771.51	183-D 183-E 183-F	186.21 186.20 232.74	213-C 213-D 213-E	216.00 216.00 270.00		
62 63 64	802.64 951.11 701.25	184-A 184-B 184-C	232.72 186.17 186.16	214-A 214-B 214-C	270.00 216.00 215.50		
65 66 67	350.35 460.24 516.34	184-D 184-E 184-F	186.15 186.14 232.66	214-D 214-E 214-F	207.83 198.94 353.90		
68 69 70	542.18 594.45 664.69	185-A 185-B 185-C	232.65 186.11 186.10	215-A 215-B 215-C	270.71 138.00 138.00		
71 72 73	564.73 463.00 397.72	185-D 185-E 185-F	186.09 186.08 232.58	215-D 215-E 215-F	138.00 172.50 172.50		
74 75 76	442.26 399.32 440.92	186-A 186-B 186-C	232.57 186.04 186.03	215-G 215-H 215-I	138.00 138.00 138.00		
77 78 79	460.37 440.32 412.23	186-D 186-E 186-F	186.02 186.01 300.63	215-J 216-A 216-B	346.73 172.50 138.00		
80 81 82	410.01 482.37 539.16	187-A 187-B 187-C	435.92 186.00 186.00	216-C 216-D 216-E	138.00 138.00 138.00		
83 84 85	542.57 534.94 508.91	187-D 187-E 187-F	186.00 186.00 232.50	216-F 216-G 216-H	172.50 172.50 138.00		
86 87 88	423.54 358.25 313.42	188-A 188-B 188-C	232.50 186.00 186.00	216-I 216-J 216-K	138.00 138.00 138.00		
89 90 91	314.14 351.79 415.68	188-D 188-E 188-F	186.00 186.00 232.50	216-L 217-A 217-B	172.50 172.50 138.00		
92 93 94	417.16 409.82 365.28	189-A 189-B 189-C	232.50 186.00 186.00	217-C 217-D 217-E	138.00 138.00 138.00		
95 96 97	317.84 305.74 305.22	189-D 189-E 189-F	186.00 186.00 232.50	217-F 217-G 217-H	172.50 172.50 138.00		
98 99 100	315.47 349.19 385.38	190-A 190-B 190-C	232.50 232.50 186.00 186.00	217-I 217-I 217-J 217-K	138.00 138.00 138.00		
100 101 102 103	546.11 343.78 329.58	190-C 190-D 190-E 191-A	186.00 186.00 232.50 285.55	217-K 217-L 218-A 218-B	172.50 172.80 140.94		
105 104 105 106	335.75 341.91 348.15	191-R 191-B 191-C 191-D	196.42 197.03 298.30	218 D 218-C 218-D 218-E	146.83 156.12 167.94		
100 107 108 109	369.65 529.09 508.96	192-A 192-B 192-C	231.07 184.86 184.86	218-F 218-G 218-H	346.94 413.06 138.00		
110 110 111 112	359.07 581.59 594.56	192-D 192-E 192-F	184.86 184.86 391.33	218-I 218-I 218-J 218-K	138.00 138.00 138.00		
112 113 114 115	569.28 462.89 396.15	193-A 193-B 193-C	231.07 184.86 184.86	218-K 218-L 219-A 219-B	172.50 172.50 138.00		
115 116 117 118	349.49 317.42 346.81	193-C 193-D 193-E 193-F	184.86 184.86 184.86 231.07	219-B 219-C 219-D 219-E	138.00 138.00 138.00 193.48		
119 120	391.19 386.48	194-А 194-В	231.07 184.86	219-F 219-G	193.47 137.95		
121 122 123	326.03 344.79 358.91	194-C 194-D 194-E	184.86 184.86 184.86	219-H 219-I 219-J	137.95 137.95 172.45		
124 125 126	386.34 333.68 335.23	194-F 195-A 195-B	231.07 333.78 197.03	220-A 220-B 220-C	221.55 138.00 138.00		
127 128 129	336.79 338.35 385.93	195-C 195-D 195-E	197.03 196.48 371.43	220-D 220-E 220-F	138.00 172.50 172.45		
130 131 132	394.48 337.49 334.54	196-A 196-B 196-C	242.53 194.03 194.03	220-G 220-H 220-I	137.95 137.95 137.95		
133 134 135	331.59 328.64 375.03	196-D 197-A 197-B	385.83 233.92 187.13	220-J 221-A 221-B	206.18 172.50 138.00		
136 137 138	379.82 305.94 305.94	197-C 197-D 198-A	187.90 286.84 233.92	221-C 221-D 221-E	138.00 138.00 212.42		
139 140 141	305.94 305.94 305.94	198-B 198-C 198-D	187.14 187.14 187.14	221-F 221-G 221-H	198.05 138.00 138.00		
142 143 144	305.94 305.94 305.94	198-E 198-F 199-A	187.14 233.92 509.93	221-I 221-J 222-A	138.00 172.50 172.50		
145 146 147	305.94 305.94 305.94	199-B 199-C 199-D	187.14 187.14 187.14	222-B 222-C 222-D	138.00 138.00 138.00		
148 149 150	305.94 379.82 365.45	199-E 199-F 200-A	187.14 233.92 320.08	222-E 222-F 222-G	138.00 172.50 172.50		
151 152 153	305.94 305.94 305.94	200-В 200-С 200-D	200.50 210.58 323.07	222-H 222-I 222-J	138.00 138.00 138.00		
154 155 156	305.94 305.94 305.94	201-A 201-B 201-C	298.28 180.00 180.00	222-K 222-L	138.00 172.50		
157 158	305.94 305.94	201-D 201-E	180.00 263.40				







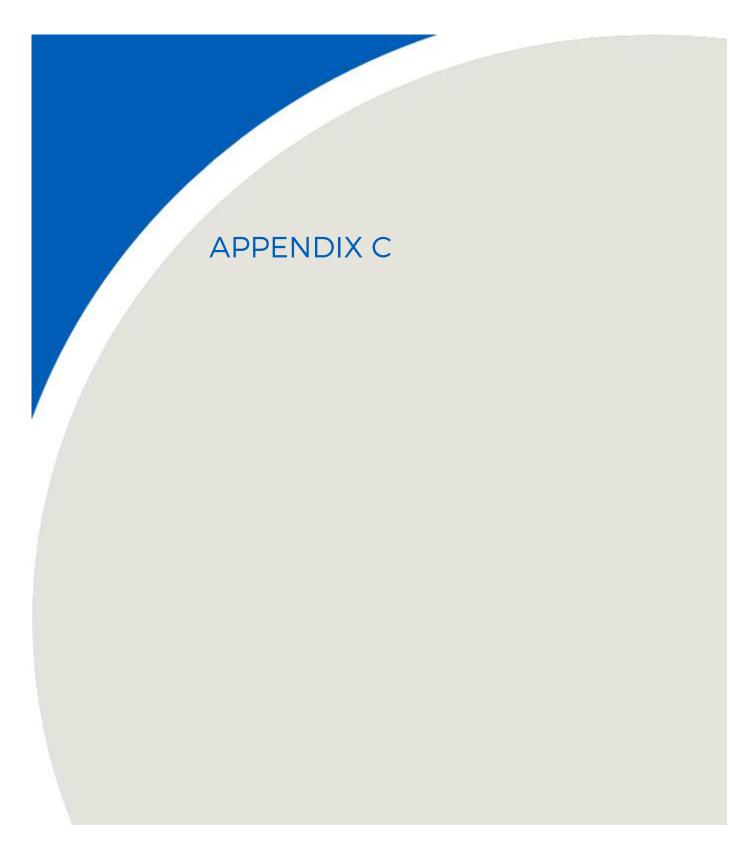
Appendix B: Riverfront Community: List of Industrial Sites Within 1 km of Study Area

RWDI #:2404121

Table B-1: List of Industrial Sites in Study Area

OBJECTID	ADDRESS	Longitude	Latitude	Company_Name	D_Series_Classification	Notes
9	5850 DON MURIE ST	-79.088902	43.051875	Flow Solutions Int. Inc.	Class 1	
10	5850 DON MURIE ST	-79.088902	43.051875	King Contractors of Niagara	Class 1	
11	5850 DON MURIE ST	-79.088902	43.051875	Adrenaline Machine and Fab.	Class 2	Small scale manufacturing site. No air quality concerns.
12	5850 DON MURIE ST	-79.088902	43.051875	Duroair Technologies	Class 2	Small scale manufacturing site. No air quality concerns.
13	5920 DON MURIE ST	-79.089913	43.052257	Dyaco Canada Inc.	Class 2	Former location of Trimac Transportation. Now part of Dyaco Canada operation at 5955 Don Murie.
14	5955 DON MURIE ST	-79.090183	43.050125	Dyaco Canada Inc.	Class 2	Former H&L Tool Site. Currently occupied by Dyaco Canada Inc. a distributor of sports equipment.
16	6050 DON MURIE ST	-79.092216	43.052203	Dynaco Canada Inc.	Class 1	Does not appear to be occupied. Company may not be operating at this location.
19	6150 DON MURIE ST	-79.095033	43.050525	Jadon Outdoors	Class 2	
20	6167 DON MURIE ST	-79.095175	43.051671	Airwood Vents Inc.	Class 2	NAICS code is for Mill work (Wood). Located in a multi tennant building.
28	8100 DORCHESTER RD	-79.113074	43.058594	Avid Growing Systems	Class 2	Former Avid Growing Systems site. Now a distribution centre for retail products.
31	8490 EARL THOMAS AV	-79.087601	43.053615	Three companies under this address - Peninsula Architectural Detail, Ontario Electrical Construction, Progressive Mechanicals Limited	Class 2	Outdoor storage, high probability of fugitive emissions
37	6198 KISTER RD	-79.092582	43.056365	Antonio's Paving and Concrete	Class 2	There is a building of some sort and a bunch of vehicles, other items
41	6471 KISTER RD	-79.094096	43.052778	Purileaf Brands Corp.	Class 1	Former location of: Niagara RV & Trailer Center, Niagara Vacation Rentals, United Medical Systems Canada, Uni-quatro Industries Canada.
42	6501 KISTER RD	-79.09407	43.052353	Micron Installations Ltd Prehung Doors and Hangups Imprinted Sportswear Products	Class 1	
43	6537 KISTER RD	-79.093867	43.051794	Onsite Restoration Services	Class 1	
45	8675 MONTROSE RD	-79.1235	43.048944	Vibrations; Sam's Montrose Hotel	Class 1	
47	8354 OAKWOOD DR	-79.120187	43.055697	Residential; Maid Of The Mist Steamboat Co Ltd	Class 1	Maid Of The Mist Steamboat Co Ltd may not be operation from this location.
48	8446 OAKWOOD DR	-79.120198	43.054113	Residential;	Class 1	Former location of Quantech Electric Contractors
49	8550 OAKWOOD DR	-79.120202	43.053067	Montgomery Bros Construction / Landscape Materials	N/A	Site is permanently closed as per Google web search results.
59	6040 PROGRESS ST	-79.092294	43.053567	Enerdynamic Hybrid Technologies	Class 1	
61	6065 PROGRESS ST	-79.092997	43.054811	Rite-Way Fencing	Class 1	Former site location for Niagara Fence Supply Inc.





Appendix C1 - Wet Well Vent Pipe Uncontrolled Odour Emissions Calculations

Riverfront Community Project, Niagara Falls, ON

RWDI #: 2404121

Table C1-1 - River Front Communit Pumping Station Details

Metric	Value	Units	Comments
Scenario 1 - Uncontrolled Od	our Emission Rate		
Pumping Rate	96.4	L/s	
Flow Rate	0.0964	m³/s	Assumes that the volume of liquid pumped will displace an equal volume of air via the vent pipe
Estimated Uncontrolled Odour Emission Rate (Scenario 1)	519	OU/s	Estimated by Scaling Waterloo Pump Station Odour Emission rate

Table C1-2 - Waterloo Colonial Pumping Station Details

Metric	Value	Units	Comments
Flow Rate	600	CFM	
	0.283	m³/s	
Uncontrolled Odour Emission	1526	OU/s	Please see Appendix C2 for calculation
Rate			details

Sample Calculations:

Uncontrolled Odour Emission Rate = Waterloo Pump Station Odour Rate x (Riverfront Pump Station Flow Rate ÷ Waterloo Pump Station Flow Rate)

=	1526 OU	0.096	m³/s	=	-	519 OU/S
-	1 S	0.283	m³/s			

Revision Date:	June 19 2021
Prepared by:	ADS
Checked by:	TR

Appendix C2: Emission Calculations for City of Waterloo Colonial Sewage Pumping Station

Riverfront Community Project, Niagara Falls, ON

The Riverfront Community Sewage Pumping Station (RCSPS) is not operational and odour for this site was unavailable. As a result, odour emissions information from the City of Waterloo's Colonial Pumping Station Odour Assessment was used to estimate odour emission rates from the RCSPS. Please see below for reference to the Colonial Sewage Station odour study.

Uncontrolled odour emissions from the pumping station were estimated by applying a scaling factor to grab sample odour emissions from the Colonial Pumping Station Wet Well. This grab sample captured odour and total reduced sulphur (TRS). Continuous monitoring which measured TRS at the well showed that levels were many times higher than the grab sample TRS levels. As a result, it was believed that the grab sample odour levels are lower than peak odour levels. To appropriately assess peak odour levels from the wet well, the grab sample odour level was mulitplied by a scaling factor based on the ratio of TRS concentrations in continuous monitoring data and grab sample taken from the wet well. See below for sample calculations.

Reference:

RWDI. April 6, 2018. Phase 2 Colonial SPS OCU Sampling, Waterloo, Ontario. RWDI #1700583

Scaling Colonial Pumping Station Grab Sample TRS Concentrations

Continuous Max	1056 ppb TRS	1056 ppb Max Cont	tinuous TRS	
Grab Sample	143 ppb TRS	143 ppb Grab Sam	nple TRS	=
Scaling Ratio	7.385			
Colonial Pumping Station O	dour Emissions Estimates			
Grab Sample Odour	730.0 OU/m ³	730 OU	1056 ppb TRS	=
Scaled Odour	5391 OU/m ³	1 m ³	143 ppb TRS	
Flow rate	0.283 m3/S			
Odour Emission Rate	1526 OU/s			
		5391 OU	0.283 m ³	=
		1 m ³		

RWDI #: 2404121

Appendix C3: Odour Dispersion Modelling Results and Frequency Analysis

Predicted ID# 1 OU Count 1 OU Freq OU Coun 3 OU Freq OU Coun 5 OU Freq Х Ζ **Receptor Information** Maximum Predcited Excusrions Above Specified 10-Minute Values ID# Events > 1 OU Events > 3 OU Predicted Х Ζ Events > 5 OU Count **10-Minute** Frequency Count Frequency Count Frequency Concentration (OU/m³) 654197 4767873 0 0 1.5 0.3 0% 0% 0 0% R1 654211 4767872 0.5 0 0 0% R2 1.5 0% 0% 0 654221 4767873 1.5 0 0 0 R3 0.5 0% 0% 0% 654231 4767873 1.5 0 0 0 R4 0.3 0.00% 0% 0% R5 654241 4767872 1.5 0.3 0 0% 0 0% 0 0% R6 654251 4767872 1.5 0.2 0 0% 0 0% 0 0% 654265 4767873 R7 1.5 0.2 0 0 0 0% 0% 0% R8 654290 4767873 1.5 0.2 0 0% 0 0% 0 0% 654308 4767885 R9 1.5 0.2 0 0 0% 0 0% 0% 654306 4767903 1.5 0.2 0 0 0 R10 0% 0% 0% R11 654305 4767915 1.5 0.2 0 0% 0 0 0% 0% 654307 4767927 1.5 0.2 0 0% 0 0% 0 0% R12 654311 4767939 0 R13 1.5 0.2 0 0% 0% 0 0% R14 654313 4767952 1.5 0.1 0 0% 0 0% 0 0% 654319 4767963 0 1.5 0 0 R15 0.1 0% 0% 0% 654319 4767974 R16 1.5 0.1 0 0% 0 0% 0 0% 654028 4767924 0 R17 1.5 0.1 0% 0 0% 0 0% 654038 4767924 R18 1.5 0.1 0 0% 0 0% 0 0% 654048 R19 4767924 1.5 0.1 0 0% 0 0% 0 0% 654058 4767924 R20 1.5 0.1 0 0% 0 0% 0 0% 4767924 654068 1.5 0 0 0 R21 0.1 0% 0% 0% R22 654078 4767924 1.5 0.1 0 0% 0 0% 0 0% 654088 4767924 0 0 0 R23 1.5 0.1 0% 0% 0% 654098 4767924 R24 1.5 0.1 0 0% 0 0% 0 0% 654108 4767924 R25 1.5 0.1 0 0% 0 0% 0 0% 654118 4767924 1.5 0 0 0 R26 0.2 0% 0% 0% R27 654128 4767924 1.5 0.2 0 0% 0 0% 0 0% R28 654138 4767924 1.5 0.2 0 0% 0 0% 0 0% 654148 4767924 R29 1.5 0.1 0 0% 0 0% 0 0% R30 654158 4767924 1.5 0.1 0 0% 0 0% 0 0% 654168 4767924 1.5 0 0 0 R31 0.2 0% 0% 0% R32 654028 4767934 1.5 0.1 0 0% 0 0% 0 0% 654038 4767934 0 R33 1.5 0.1 0% 0 0% 0 0% 654048 4767934 0 R34 1.5 0.1 0 0% 0% 0 0% 654058 4767934 R35 1.5 0.1 0 0% 0 0% 0 0% 654068 4767934 R36 1.5 0.1 0 0% 0 0% 0 0% 654078 4767934 0 1.5 0 0 R37 0.1 0% 0% 0% R38 654088 4767934 1.5 0.1 0 0% 0 0% 0 0% 654098 4767934 0 0 R39 1.5 0.1 0% 0% 0 0% R40 654108 4767934 1.5 0.1 0 0% 0 0% 0 0% 654118 4767934 1.5 R41 0.1 0 0% 0 0% 0 0% 0 654128 4767934 0 R42 1.5 0.1 0 0% 0% 0% 654138 4767934 R43 1.5 0.1 0 0% 0 0% 0 0%

#2404121

R55	654108 4767944	i 1.5	0.1	0	0%	0	0%	0	0%
R56	654118 4767944	1.5	0.1	0	0%	0	0%	0	0%
R57	654128 4767944	1.5	0.1	0	0%	0	0%	0	0%
R58	654138 4767944	1.5	0.1	0	0%	0	0%	0	0%
R59	654148 4767944	1.5	0.1	0	0%	0	0%	0	0%
R60	654158 4767944	1.5	0.1	0	0%	0	0%	0	0%
R61	654168 4767944	1.5	0.2	0	0%	0	0%	0	0%
R62	654028 4767954	1.5	0.1	0	0%	0	0%	0	0%
R63	654038 4767954	1.5	0.1	0	0%	0	0%	0	0%
R64	654048 4767954	1.5	0.1	0	0%	0	0%	0	0%
R65	654058 4767954	1.5	0.1	0	0%	0	0%	0	0%
R66	654068 4767954	1.5	0.1	0	0%	0	0%	0	0%
R67	654078 4767954	1.5	0.1	0	0%	0	0%	0	0%
R68	654088 4767954	1.5	0.1	0	0%	0	0%	0	0%
R69	654098 4767954	1.5	0.1	0	0%	0	0%	0	0%
R70	654108 4767954	1.5	0.1	0	0%	0	0%	0	0%
R71	654118 4767954	1.5	0.1	0	0%	0	0%	0	0%
R72	654128 4767954	1.5	0.1	0	0%	0	0%	0	0%
R73	654138 4767954	1.5	0.1	0	0%	0	0%	0	0%
R74	654148 4767954	1.5	0.1	0	0%	0	0%	0	0%
R75	654158 4767954	1.5	0.2	0	0%	0	0%	0	0%
R76	654168 4767954	1.5	0.1	0	0%	0	0%	0	0%

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0

0

0

0

0

0

0

0

0

0

0

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

0%

654148

654048

654058

654068

654078

1100

R44

R45

R46

R47

R48

R49

R50

R51

R52

R53

R54

4767934

4767944

4767944

4767944

4767944

701

654158 4767934

654168 4767934

654028 4767944

654038 4767944

654088 4767944

654098 4767944

1.5

1.5

1.5

1.5

1.5

1.5

1.5

1.5

1.5

1.5

1.5

0.1

0.1

0.2

0.1

0.1

0.1

0.1

0.1

0.1

0.1

0.1

ID#	X Y Receptor Information		Z Predicted		1 OU Count 1 OU Freq Predcited Excusr		OU Coun 3 OU Freq OU Coun 5 OU Freq rions Above Specified 10-Minute Values			
ID#	X	Y	Z	Maximum Predicted		ts > 1 OU		nts > 3 OU	Events > 5 OU	
				10-Minute	Count	Frequency	Count	Frequency	Count	Frequency
				Concentration						
R77	654028	4767964	1.5	(OU/m³) 0.1	0	0%	0	0%	0	0%
R78	654038	4767964	1.5	0.1	0	0%	0	0%	0	0%
R79	654048	4767964	1.5	0.1	0	0%	0	0%	0	0%
R80	654058	4767964	1.5	0.1	0	0%	0	0%	0	0%
R81	654068	4767964	1.5	0.1	0	0%	0	0%	0	0%
R82	654078	4767964	1.5	0.1	0	0%	0	0%	0	0%
R83	654088	4767964	1.5	0.1	0	0%	0	0%	0	0%
R84	654098	4767964	1.5	0.1	0	0%	0	0%	0	0%
R85 R86	654108 654118	4767964 4767964	1.5 1.5	0.1	0	0%	0	0% 0%	0	0%
R87	654128	4767964	1.5	0.1	0	0%	0	0%	0	0%
R88	654138	4767964	1.5	0.1	0	0%	0	0%	0	0%
R89	654148	4767964	1.5	0.1	0	0%	0	0%	0	0%
R90	654158	4767964	1.5	0.1	0	0%	0	0%	0	0%
R91	654168	4767964	1.5	0.1	0	0%	0	0%	0	0%
R92	654028	4767974	1.5	0.1	0	0%	0	0%	0	0%
R93	654038	4767974	1.5	0.1	0	0%	0	0%	0	0%
R94	654048	4767974	1.5	0.1	0	0%	0	0%	0	0%
R95	654058	4767974	1.5	0.1	0	0%	0	0%	0	0%
R96 R97	654068 654078	4767974 4767974	1.5 1.5	0.1	0	0%	0	0% 0%	0	0%
R97 R98	654078	4767974	1.5	0.1	0	0%	0	0%	0	0%
R90	654098	4767974	1.5	0.1	0	0%	0	0%	0	0%
R100	654108	4767974	1.5	0.1	0	0%	0	0%	0	0%
R101	654118	4767974	1.5	0.1	0	0%	0	0%	0	0%
R102	654128	4767974	1.5	0.1	0	0%	0	0%	0	0%
R103	654138	4767974	1.5	0.1	0	0%	0	0%	0	0%
R104		4767974	1.5	0.1	0	0%	0	0%	0	0%
R105	654158	4767974	1.5	0.1	0	0%	0	0%	0	0%
R106	654168	4767974	1.5	0.1	0	0%	0	0%	0	0%
R107 R108	654057 654067	4767673 4767673	1.5 1.5	0.3	0	0%	0	0% 0%	0	0%
R108	654007	4767673	1.5	0.3	0	0%	0	0%	0	0% 0%
R110	654087	4767673	1.5	0.3	0	0%	0	0%	0	0%
R111	654097	4767673	1.5	0.3	0	0%	0	0%	0	0%
R112	654107	4767673	1.5	0.3	0	0%	0	0%	0	0%
R113	654117	4767673	1.5	0.3	0	0%	0	0%	0	0%
R114	654127	4767673	1.5	0.3	0	0%	0	0%	0	0%
R115	654137	4767673	1.5	0.4	0	0%	0	0%	0	0%
R116	654147	4767673	1.5	0.4	0	0%	0	0%	0	0%
R117	654157	4767673	1.5	0.4	0	0%	0	0%	0	0%
R118	654167 654057	4767673	1.5	0.4	0	0%	0	0%	0	0%
R119 R120	654057 654067	4767683 4767683	1.5 1.5	0.3	0	0%	0	0% 0%	0	0%
R120	654077	4767683	1.5	0.3	0	0%	0	0%	0	0%
R121	654087	4767683	1.5	0.3	0	0%	0	0%	0	0%
R123	654097	4767683	1.5	0.2	0	0%	0	0%	0	0%
R124	654107	4767683	1.5	0.2	0	0%	0	0%	0	0%
R125	654117	4767683	1.5	0.2	0	0%	0	0%	0	0%
R126	654127	4767683	1.5	0.3	0	0%	0	0%	0	0%
R127	654137	4767683	1.5	0.3	0	0%	0	0%	0	0%
R128	654147	4767683	1.5	0.3	0	0%	0	0%	0	0%
R129	654157 654167	4767683	1.5	0.3	0	0%	0	0%	0	0%
R130 R131	654167 654057	4767683 4767693	1.5 1.5	0.3 0.2	0	0%	0	0%	0	0%
R131 R132	654057 654067	4767693	1.5	0.2	0	0%	0	0%	0	0%
R132	654077	4767693	1.5	0.2	0	0%	0	0%	0	0%
R134	654087	4767693	1.5	0.2	0	0%	0	0%	0	0%
R135	654097	4767693	1.5	0.2	0	0%	0	0%	0	0%
R136	654107	4767693	1.5	0.2	0	0%	0	0%	0	0%
R137	654117	4767693	1.5	0.2	0	0%	0	0%	0	0%
R138	654127	4767693	1.5	0.2	0	0%	0	0%	0	0%
R139	654137		1.5	0.2	0	0%	0	0%	0	0%
R140	654147		1.5	0.2	0	0%	0	0%	0	0%
R141	654157 654167		1.5	0.2	0	0%	0	0%	0	0%
R142 R143	654167 654057		1.5 1.5	0.2	0	0% 0%	0	0% 0%	0	0% 0%
R143	654067		1.5	0.2	0	0%	0	0%	0	0%
R145	654077		1.5	0.2	0	0%	0	0%	0	0%
R146	654087	4767703	1.5	0.2	0	0%	0	0%	0	0%
R147	654097		1.5	0.2	0	0%	0	0%	0	0%
R148	654107	4767703	1.5	0.2	0	0%	0	0%	0	0%
R149	654117		1.5	0.2	0	0%	0	0%	0	0%
R150	654127		1.5	0.2	0	0%	0	0%	0	0%
R151	654137	4767703	1.5	0.2	0	0%	0	0%	0	0%
R152	654147		1.5	0.2	0	0%	0	0%	0	0%
R153	654157 654167	4767703	1.5	0.3	0	0%	0	0%	0	0%
R154	00416/	4767703	1.5	0.3	0	0%	0	0%	0	0%

IDD X Y Z Predicted IDMinue Contentialio (OUMP) Frequency Frequency Contentialio (OUMP) IDMIN Frequency Contentialio (OUMP) Frequency Frequency Contentialio (OUMP) IDMIN Frequency Contentialio (OUMP) IDMIN Frequency Contential	ID#	X	Y Information	Z	Predicted Maximum	1 OU Count Pro	: 1 OU Freq edcited Excusri		3 OU Freq e Specified 10-		5 OU Freq
Rise Geldoff Afferdia Lise Lise <thlise< th=""> Lise <thlise< th=""></thlise<></thlise<>	ID#	-							-		nts > 5 OU
Internal Internal Internal Internal Internal R157 656 640077 4767713 1.5 0.2 0 0% 0 0% 0 R159 654007 4767713 1.5 0.2 0 0% 0 0% 0 R161 654107 4767713 1.5 0.2 0 0% 0 0% 0 R161 654117 4767713 1.5 0.2 0 0% 0 0% 0 R164 654147 4767713 1.5 0.2 0 0% 0 0% 0 R167 654057 4767723 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0						Count	Frequency	Count	Frequency	Count	Frequency
Riss65406747677131.50.20.00.40.00.440.0Riss65408747677131.50.20.00.440.00.440.0Riss65410747677131.50.20.00.440.00.440.0Riss65412747677131.50.20.00.440.00.440.0Riss65412747677131.50.20.00.440.00.440.0Riss65414747677131.50.20.00.440.00.440.0Riss65415747677131.50.20.00.440.00.440.0Riss65416747677331.50.20.00.440.00.440.0Riss65416747677331.50.20.00.440.00.440.0Riss65416747677331.50.20.00.440.00.440.0Riss65416747677331.50.20.00.440.00.440.0Riss65416747677331.50.20.00.440.00.440.0Riss65416747677331.50.20.00.460.00.440.0Riss65416747677331.50.20.00.460.00.440.0Riss65416747677331.50.20.00.46											
R198G640874767731.50.20.40.40.40.40.4R100G641074767731.50.20.40.40.40.4R101G6411747677131.50.20.40.40.40.40.4R105G6413747677131.50.20.40.40.40.40.40.40.4R104G6414747677131.50.20.4 <td< td=""><td>R156</td><td>654067</td><td>4767713</td><td>1.5</td><td></td><td>0</td><td>0%</td><td>0</td><td>0%</td><td>0</td><td>0%</td></td<>	R156	654067	4767713	1.5		0	0%	0	0%	0	0%
HSDGS400747677131.50.20.00.40.00.940.0HSDSS411747677131.50.20.00.40.00.440.0HSDSS413747677131.50.20.00.40.00.440.0HSDSS413747677131.50.20.00.400.00.440.0HSDSS415747677131.50.20.00.460.00.460.0HSDSS415747677131.50.20.00.460.00.460.0HSDSG405747677231.50.20.00.460.00.460.0HSDSG405747677231.50.20.00.460.00.460.0HSTSG410747677231.50.20.00.460.00.460.0HSTSG410747677231.50.20.00.460.00.460.0HSTSG410747677231.50.20.00.460.00.460.0HSTSG416747677331.50.20.00.460.00.660.0HSTSG416747677331.50.20.00.460.00.660.0HSTSG416747677331.50.20.00.460.00.660.0HSTSG416747677331.50.20.00.460.0	R157	654077	4767713	1.5	0.2	0	0%	0	0%	0	0%
HeadGet410747677131.50.20.00.60.00.60.0HE447677131.50.200.600.600.60HE665412747677131.50.200.600.6000 </td <td>R158</td> <td></td> <td></td> <td>1.5</td> <td>0.2</td> <td>0</td> <td>0%</td> <td>0</td> <td>0%</td> <td>0</td> <td>0%</td>	R158			1.5	0.2	0	0%	0	0%	0	0%
Rief 654117 4767713 1.5 0.2 0 0% 0 0% 0 Ries 654137 4767713 1.5 0.2 0 0% 0 0% 0 Ries 654167 4767713 1.5 0.2 0 0% 0 0% 0 Ries 654167 4767713 1.5 0.2 0 0% 0 0% 0 Ries 654067 4767723 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 Ries 654077 4767723 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0% 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td>0</td> <td></td> <td>0</td> <td>0%</td>						0		0		0	0%
R1C266412747677131.50.200%00%0R16466414747677131.50.200%00%0R16566416747677131.50.200%00%0R16666416747677231.50.200%00%0R16865406747677231.50.200%00%0R16865406747677231.50.200%00%0R17765407747677231.50.200%00%0R1786540747677231.50.200%00%0R1776541747677231.50.200%0%00%0R1786541747677231.50.200%00%00%R1776541747677231.50.200%00%00%R17865416747677331.50.200%00%00%R18865407747677331.50.200%00%00%R18865407747677331.50.200%00%00%R18865407747677331.50.200%00%00%R188654077 </td <td></td> <td>0%</td>											0%
R162 664147 4767713 15 0.2 0 0% 0 0% 0 R165 654157 4767713 15 0.2 0 0% 0 0% 0 R165 654167 4767713 15 0.2 0 0% 0 0% 0 R166 654057 4767723 15 0.2 0 0% 0 0% 0 R167 654057 4767723 15 0.2 0 0% 0 0% 0 R170 654067 4767723 15 0.2 0 0% 0 0% 0 R171 654173 4767723 15 0.2 0 0% 0 0% 0 R174 654177 4767723 15 0.2 0 0% 0 0% 0 0% R174 654177 4767733 15 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% </td <td></td> <td>0%</td>											0%
Rief, 684147 4767713 15 0.2 0 0% 0 0% 0 Rief, 684167 4767713 15 0.2 0 0% 0 0% 0 Rief, 854067 4767723 15 0.2 0 0% 0 0% 0 Rief, 85407 4767723 15 0.2 0 0% 0 0% 0 Rief, 85407 4767723 15 0.2 0 0% 0 0% 0 Rief, 85407 4767723 15 0.2 0 0% 0 0% 0 Riff, 85417 4767733 15 0.2 0 0% 0 0% 0 Riff, 85417 4767733 15 0.2 0 0% 0 0% 0 Riff, 85407 4767733 15 0.2 0 0% 0 0% 0 Riff, 85407 4767733 15 0.2 0 0%											0% 0%
Riss Sch4157 ATE/T13 15 0.2 0 0% 0 0% 0 Riff Sch4057 ATE/T13 15 0.2 0 0% 0 0% 0 Riff Sch4057 ATE/T23 15 0.2 0 0% 0 0% 0 Riff Sch4077 ATE/T23 15 0.2 0 0% 0 0% 0 Riff Sch407 ATE/T23 15 0.2 0 0% 0 0% 0 Riff Sch417 ATE/T23 15 0.2 0 0% 0 0% 0 Riff Sch417 ATE/T23 15 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
Rise 654167 476773 15 0.2 0 0% 0 0% 0 Rise 654067 476773 15 0.2 0 0% 0 0% 0 Rise 654067 476773 15 0.2 0 0% 0 0% 0 Rist 654077 4767723 15 0.2 0 0% 0 0% 0 Rist 654077 4767723 15 0.2 0 0% 0 0% 0 Rist 654137 4767723 15 0.2 0 0% 0 0% 0 Rist 654137 4767733 15 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
No.Schapf.AffertaSchapf.AffertaSchapf.OO<											0%
Ries 65407 476723 15 0.2 0 0% 0 0% 0 R170 654087 4767723 15 0.2 0 0% 0 0% 0 R171 654117 4767723 15 0.2 0 0% 0 0% 0 R174 654127 4767723 15 0.2 0 0% 0 0% 0 R174 654147 4767723 15 0.2 0 0% 0 0% 0 R175 654137 4767733 15 0.2 0 0% 0 0% 0 R180 65407 4767733 15 0.2 0 0% 0 0% 0 R181 65407 4767733 15 0.2 0 0% 0 0% 0 R181 65407 4767733 15 0.2 0 0% 0 0% 0	R167					0	0%	0	0%	0	0%
N170 654087 4767723 1.5 0.2 0 0% 0 0% 0 R173 654107 4767723 1.5 0.2 0 0% 0 0% 0 R173 654117 4767723 1.5 0.2 0 0% 0 0% 0 R175 654137 4767723 1.5 0.2 0 0% 0 0% 0 R176 654147 4767723 1.5 0.2 0 0% 0 0% 0 R177 654057 4767733 1.5 0.2 0 0% 0 0% 0 R181 65407 4767733 1.5 0.2 0 0% 0 0% 0 R181 65407 4767733 1.5 0.2 0 0% 0 0% 0 R181 65417 4767733 1.5 0.2 0 0% 0 0% 0 </td <td>R168</td> <td>654067</td> <td>4767723</td> <td>1.5</td> <td>0.2</td> <td>0</td> <td>0%</td> <td>0</td> <td>0%</td> <td>0</td> <td>0%</td>	R168	654067	4767723	1.5	0.2	0	0%	0	0%	0	0%
NY1 654097 4767723 1.5 0.2 0 0% 0 0% 0 NY2 654117 4767723 1.5 0.2 0 0% 0 0% 0 NY4 654127 4767723 1.5 0.2 0 0% 0 0% 0 NY4 654147 4767723 1.5 0.2 0 0% 0 0% 0 NY7 654167 4767723 1.5 0.2 0 0% 0 0% 0 NY8 654067 4767733 1.5 0.2 0 0% 0 0% 0 NY8 65407 4767733 1.5 0.2 0 0% 0 0% 0 NY8 65417 4767733 1.5 0.2 0 0% 0 0% 0 NY8 65417 4767733 1.5 0.2 0 0% 0 0% 0 <	R169	654077	4767723	1.5	0.2	0	0%	0	0%	0	0%
RIPZ 654107 4767723 1.5 0.2 0 0% 0 0% 0 RIP3 654137 4767723 1.5 0.2 0 0% 0 0% 0 RIP3 654134 4767723 1.5 0.2 0 0% 0 0% 0 RIP3 654167 4767723 1.5 0.2 0 0% 0 0% 0 RIP3 654167 4767733 1.5 0.2 0 0% 0 0% 0 RIP3 65407 4767733 1.5 0.2 0 0% 0 0% 0 RIP3 65407 4767733 1.5 0.2 0 0% 0 0% 0 RIP3 65417 4767733 1.5 0.2 0 0% 0 0% 0 RIP3 65417 4767733 1.5 0.2 0 0% 0 0% 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>0%</td> <td>0</td> <td></td> <td>0</td> <td>0%</td>						0	0%	0		0	0%
R173 664117 4767723 1.5 0.2 0 0% 0 0% 0 R174 654137 4767723 1.5 0.2 0 0% 0 0% 0 R176 654147 4767723 1.5 0.2 0 0% 0 0% 0 R176 654167 4767723 1.5 0.2 0 0% 0 0% 0 R187 654067 4767733 1.5 0.2 0 0% 0 0% 0 R188 654077 4767733 1.5 0.2 0 0% 0 0% 0 R188 654117 4767733 1.5 0.2 0 0% 0 0% 0 R188 654147 4767733 1.5 0.2 0 0% 0 0% 0 R188 654147 4767733 1.5 0.2 0 0% 0 0%											0%
R174 654127 4767723 1.5 0.2 0 0% 0 0% 0 R175 654141 4767723 1.5 0.2 0 0% 0 0% 0 R177 654157 4767723 1.5 0.2 0 0% 0 0% 0 R179 654057 4767733 1.5 0.2 0 0% 0 0% 0 R184 654077 4767733 1.5 0.2 0 0% 0 0% 0 R184 654074 4767733 1.5 0.2 0 0% 0 0% 0 R184 65417 4767733 1.5 0.2 0 0% 0 0% 0 R184 65417 4767733 1.5 0.2 0 0% 0 0% 0 R184 65417 4767733 1.5 0.2 0 0% 0 0% 0 </td <td></td> <td>0%</td>											0%
RY30 654137 4767723 1.5 0.2 0 0% 0 0% 0 RY70 654167 4767723 1.5 0.2 0 0% 0 0% 0 RY70 654167 4767723 1.5 0.2 0 0% 0 0% 0 RY70 654167 4767733 1.5 0.2 0 0% 0 0% 0 RY80 654067 4767733 1.5 0.2 0 0% 0 0% 0 RY81 654177 4767733 1.5 0.2 0 0% 0 0% 0 0% 0 RY81 654147 4767733 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
PR76 654147 4767723 1.5 0.2 0 0% 0 0% 0 R177 654157 4767723 1.5 0.2 0 0% 0 0% 0 R178 654167 4767723 1.5 0.2 0 0% 0 0% 0 R181 65407 4767733 1.5 0.2 0 0% 0 0% 0 R181 65407 4767733 1.5 0.2 0 0% 0 0% 0 R181 654117 4767733 1.5 0.2 0 0%											0% 0%
PR72 654157 4767723 15 0.2 0 0% 0 0% 0 R178 654167 4767733 15 0.2 0 0% 0 0% 0 R180 654067 4767733 15 0.2 0 0% 0 0% 0 R181 654067 4767733 15 0.2 0 0% 0 0% 0 R182 654067 4767733 15 0.2 0 0% 0 0% 0 0% 0 R183 654117 4767733 15 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
PR78 654167 4767723 1.5 0.2 0 0% 0 0% 0 R190 654057 4767733 1.5 0.2 0 0% 0 0% 0 R181 654067 4767733 1.5 0.2 0 0% 0 0% 0 R181 65407 4767733 1.5 0.2 0 0% 0 0% 0 R183 65407 4767733 1.5 0.2 0 0% 0 0% 0 R184 65417 4767733 1.5 0.2 0 0% 0 0% 0 R184 65417 4767733 1.5 0.2 0 0% 0 0% 0 R184 654167 4767743 1.5 0.1 0 0% 0 0% 0 R184 654167 4767743 1.5 0.1 0 0% 0 0% 0 <td></td> <td>0%</td>											0%
RY30 654067 4767733 1.5 0.2 0 0% 0 0% 0 R180 654067 4767733 1.5 0.2 0 0% 0 0% 0 R181 654077 4767733 1.5 0.2 0 0% 0 0% 0 R182 654017 4767733 1.5 0.2 0 0% 0 0% 0 R184 654117 4767733 1.5 0.2 0 0% 0 0% 0 R187 654137 4767733 1.5 0.2 0 0% <td></td> <td>0%</td>											0%
R181 654077 4767733 1.5 0.2 0 0% 0 0% 0 R182 654087 4767733 1.5 0.2 0 0% 0 0% 0 R184 654107 4767733 1.5 0.2 0 0% 0 0% 0 R184 654117 4767733 1.5 0.2 0 0% 0 0% 0 R186 654127 4767733 1.5 0.2 0 0% 0 0% 0 R188 654147 4767733 1.5 0.2 0 0% 0 0% 0 R191 654057 4767743 1.5 0.1 0 0% 0 0% 0 R193 654077 4767743 1.5 0.1 0 0% 0 0% 0 R194 654107 4767743 1.5 0.2 0 0% 0 0%											0%
R182 654087 4767733 1.5 0.2 0 0% 0 0% 0 R188 654097 4767733 1.5 0.2 0 0% 0 0% 0 R186 654117 4767733 1.5 0.2 0 0% 0 0% 0 R186 654117 4767733 1.5 0.2 0 0% 0 0% 0 R188 654147 4767733 1.5 0.2 0 0% 0 0% 0 0% 0 R188 654167 4767733 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0% 0% 0% 0% 0% 0% 0% 0		654067	4767733			0	0%	0	0%	0	0%
R183 654007 4767733 1.5 0.2 0 0% 0 0% 0 R184 654117 4767733 1.5 0.2 0 0% 0 0% 0 R186 654117 4767733 1.5 0.2 0 0% 0 0% 0 R186 654147 4767733 1.5 0.2 0 0% 0 0% 0 R188 654167 4767733 1.5 0.2 0 0% 0 0% 0 R191 654067 4767743 1.5 0.1 0 0% 0 0% 0 R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 0% 0 R193 654107 4767743 1.5 0.2 0 0% 0 0% 0 0% R194 654117 4767743 1.5 0.2 0 <th0< td=""><td></td><td></td><td></td><td></td><td></td><td>0</td><td></td><td>0</td><td></td><td>0</td><td>0%</td></th0<>						0		0		0	0%
R184 654107 ATG7733 1.5 0.2 0 0% 0 0% 0 R185 654117 ATG7733 1.5 0.2 0 0% 0 0% 0 R186 654127 ATG7733 1.5 0.2 0 0% 0 0% 0 R187 654137 ATG7733 1.5 0.2 0 0% 0 0% 0 R188 654167 ATG7733 1.5 0.2 0 0% 0 0% 0 R190 654067 ATG7743 1.5 0.1 0 0% 0 0% 0 R193 654077 ATG7743 1.5 0.1 0 0% 0 0% 0 0% 0 R193 65417 ATG7743 1.5 0.2 0 0% 0 0% 0 0% R194 654137 ATG7743 1.5 0.2 0 0								0			0%
R185 654117 4767733 1.5 0.2 0 0% 0 0% 0 R186 654127 4767733 1.5 0.2 0 0% 0 0% 0 R187 654157 4767733 1.5 0.2 0 0% 0 0% 0 R189 654157 4767733 1.5 0.2 0 0% 0 0% 0 R191 654057 4767743 1.5 0.1 0 0% 0 0% 0 R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 R194 65407 4767743 1.5 0.2 0 0% 0 0% 0 R195 654107 4767743 1.5 0.2 0 0% 0 0% 0 R196 654107 4767743 1.5 0.2 0 0% 0 0% 0						0	0%	0		0	0%
R186 654127 4767733 1.5 0.2 0 0% 0 0% 0 R187 654137 4767733 1.5 0.2 0 0% 0 0% 0 R188 654157 4767733 1.5 0.2 0 0% 0 0% 0 R190 654167 4767733 1.5 0.1 0 0% 0 0% 0 R191 654067 4767743 1.5 0.1 0 0% 0 0% 0 R193 65407 4767743 1.5 0.1 0 0% 0 0% 0 R196 65417 4767743 1.5 0.2 0 0% 0 0% 0 R197 65417 4767743 1.5 0.2 0 0% 0 0% 0 R198 65417 4767743 1.5 0.2 0 0% 0 0% 0 <td></td> <td>0%</td>											0%
R187 654137 4767733 1.5 0.2 0 0% 0 0% 0 R188 654147 4767733 1.5 0.2 0 0% 0 0% 0 R190 654167 4767733 1.5 0.2 0 0% 0 0% 0 R191 654057 4767743 1.5 0.1 0 0% 0 0% 0 R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 R194 654087 4767743 1.5 0.1 0 0% 0 0% 0 R194 654127 4767743 1.5 0.2 0 0% 0 0% 0 R194 654127 4767743 1.5 0.2 0 0% 0 0% 0 R194 654127 4767743 1.5 0.2 0 0% 0 0%											0%
R188 654147 4767733 1.5 0.2 0 0% 0 0% 0 R189 654157 4767733 1.5 0.2 0 0% 0 0% 0 R191 654057 4767743 1.5 0.1 0 0% 0 0% 0 R191 654067 4767743 1.5 0.1 0 0% 0 0% 0 R193 654077 4767743 1.5 0.1 0 0% 0 0% 0 654097 4767743 1.5 0.2 0 0% 0 0% 0 654117 4767743 1.5 0.2 0 0% 0 0% 0 654137 4767743 1.5 0.2 0 0% 0 0% 0 654147 4767743 1.5 0.2 0 0% 0 0% 0 654157 4767753 1											0%
R189 654157 4767733 1.5 0.2 0 0% 0 0% 0 R191 6564167 4767733 1.5 0.2 0 0% 0 0% 0 R191 6564057 4767743 1.5 0.1 0 0% 0 0% 0 R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 R194 654087 4767743 1.5 0.1 0 0% 0 0% 0 R197 654117 4767743 1.5 0.2 0 0% 0 0% 0 R197 654147 4767743 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0% 0%
R190 654167 4767733 1.5 0.2 0 0% 0 0% 0 R191 654057 4767743 1.5 0.1 0 0% 0 0% 0 R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 R194 654087 4767743 1.5 0.1 0 0% 0 0% 0 654107 4767743 1.5 0.2 0 0% 0 0% 0 654117 4767743 1.5 0.2 0 0% 0 0% 0 654137 4767743 1.5 0.2 0 0% 0 0% 0 7001 654147 4767743 1.5 0.2 0 0% 0 0% 0 8001 654167 4767733 1.5 0.2 0 0% 0 0% 0 8001 654167											0%
R191 654057 4767743 1.5 0.1 0 0% 0 0% 0 R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 R194 654087 4767743 1.5 0.1 0 0% 0 0% 0 R196 65407 4767743 1.5 0.1 0 0% 0 0% 0 654107 4767743 1.5 0.2 0 0% 0 0% 0 654117 4767743 1.5 0.2 0 0% 0 0% 0 654137 4767743 1.5 0.2 0 0% 0 0% 0 654147 4767743 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0											0%
R192 654067 4767743 1.5 0.1 0 0% 0 0% 0 R194 654077 4767743 1.5 0.1 0 0% 0 0% 0 R194 654087 4767743 1.5 0.1 0 0% 0 0% 0 R196 654107 4767743 1.5 0.2 0 0% 0 0% 0 R197 654117 4767743 1.5 0.2 0 0% 0 0% 0 R198 654127 4767743 1.5 0.2 0 0% 0 0% 0 R201 654157 4767743 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
R194 654087 4767743 1.5 0.1 0 0% 0 0% 0 R195 654097 4767743 1.5 0.2 0 0% 0 0% 0 R196 654117 4767743 1.5 0.2 0 0% 0 0% 0 R198 654137 4767743 1.5 0.2 0 0% 0 0% 0 R198 654137 4767743 1.5 0.2 0 0% 0 0% 0 R200 654167 4767743 1.5 0.2 0 0% 0 0% 0 R203 654067 4767753 1.5 0.1 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%						0		0		0	0%
R195 654097 4767743 1.5 0.1 0 0% 0 0% 0 R196 654107 4767743 1.5 0.2 0 0% 0 0% 0 R197 654117 4767743 1.5 0.2 0 0% 0 0% 0 R198 654137 4767743 1.5 0.2 0 0% 0 0% 0 R200 654167 4767743 1.5 0.2 0 0% 0 0% 0 R201 654167 4767753 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.1 0 0% 0 0% 0 R204 65407 4767753 1.5 0.2 0 0% 0 0% 0 R206 654107 4767753 1.5 0.2 0 0% 0 0% 0	R193	654077	4767743	1.5	0.1	0	0%	0	0%	0	0%
R196 654107 4767743 1.5 0.2 0 0% 0 0% 0 R197 654117 4767743 1.5 0.2 0 0% 0 0% 0 R198 654127 4767743 1.5 0.2 0 0% 0 0% 0 R199 654137 4767743 1.5 0.2 0 0% 0 0% 0 R201 654167 4767743 1.5 0.2 0 0% 0 0% 0 R202 654067 4767753 1.5 0.2 0 0% 0 0% 0 R206 654087 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%	R194	654087	4767743	1.5	0.1	0	0%	0	0%	0	0%
R197 654117 4767743 1.5 0.2 0 0% 0 0% 0 R198 654127 4767743 1.5 0.2 0 0% 0 0% 0 R199 654137 4767743 1.5 0.2 0 0% 0 0% 0 R200 654147 4767743 1.5 0.2 0 0% 0 0% 0 R201 654067 4767743 1.5 0.2 0 0% 0 0% 0 R203 654067 4767753 1.5 0.1 0 0% 0 0% 0 R204 65407 4767753 1.5 0.2 0 0% 0 0% 0 R206 65407 4767753 1.5 0.2 0 0% 0 0% 0 R208 654117 4767753 1.5 0.2 0 0% 0 0% 0<	R195			1.5	0.1	0	0%	0	0%	0	0%
R198 654127 4767743 1.5 0.2 0 0% 0 0% 0 R199 654137 4767743 1.5 0.2 0 0% 0 0% 0 R201 654157 4767743 1.5 0.2 0 0% 0 0% 0 R202 654167 4767743 1.5 0.2 0 0% 0 0% 0 R203 654057 4767753 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.2 0 0% 0 0% 0 R205 654077 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
R199 654137 4767743 1.5 0.2 0 0% 0 0% 0 R201 654147 4767743 1.5 0.2 0 0% 0 0% 0 R202 654167 4767743 1.5 0.2 0 0% 0 0% 0 R202 654167 4767743 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.2 0 0% 0 0% 0 R206 654077 4767753 1.5 0.2 0 0% 0 0% 0 R207 654074 4767753 1.5 0.2 0 0% 0 0% 0 R210 654117 4767753 1.5 0.2 0 0% 0 0% 0 R211 654147 4767753 1.5 0.2 0 0% 0 0%											0%
R200 654147 4767743 1.5 0.2 0 0% 0 0% 0 R201 654157 4767743 1.5 0.2 0 0% 0 0% 0 R203 654067 4767753 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.1 0 0% 0 0% 0 R205 65407 4767753 1.5 0.2 0 0% 0 0% 0 R206 654097 4767753 1.5 0.2 0 0% 0 0% 0 R207 654097 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
R201 654157 4767743 1.5 0.2 0 0% 0 0% 0 R202 65467 4767753 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.1 0 0% 0 0% 0 R205 654077 4767753 1.5 0.2 0 0% 0 0% 0 R206 654087 4767753 1.5 0.2 0 0% 0 0% 0 R207 654174 4767753 1.5 0.2 0 0% 0 0% 0 R208 654174 4767753 1.5 0.2 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 R213 654157 4767753 1.5 0.2 0 0% 0 0% 0											0% 0%
R202 654167 4767743 1.5 0.2 0 0% 0 0% 0 R203 654057 4767753 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.2 0 0% 0 0% 0 R205 654074 4767753 1.5 0.2 0 0% 0 0% 0 R206 654074 4767753 1.5 0.2 0 0% 0 0% 0 R207 654107 4767753 1.5 0.2 0 0% 0 0% 0 R210 654137 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
R203 654057 4767753 1.5 0.1 0 0% 0 0% 0 R204 654067 4767753 1.5 0.1 0 0% 0 0% 0 R205 654077 4767753 1.5 0.2 0 0% 0 0% 0 R206 654087 4767753 1.5 0.2 0 0% 0 0% 0 R207 654107 4767753 1.5 0.2 0 0% 0 0% 0 R208 654117 4767753 1.5 0.2 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
R204 654067 4767753 1.5 0.1 0 0% 0 0% 0 R205 654077 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R206 654087 4767753 1.5 0.2 0 0% 0											0%
R206 654087 4767753 1.5 0.2 0 0% 0 0% 0 R207 654097 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R208 654107 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R209 654117 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R212 654147 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% <td></td> <td>0%</td>											0%
R207 654097 4767753 1.5 0.2 0 0% 0 0% 0 R208 654107 4767753 1.5 0.2 0 0% 0 0% 0 R209 654117 4767753 1.5 0.2 0 0% 0 0% 0 R210 654127 4767753 1.5 0.2 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 R213 654147 4767753 1.5 0.2 0 0% 0 0% 0 R214 654167 4767753 1.5 0.2 0 0% 0 0% 0 R214 654067 4767763 1.5 0.1 0 0% 0 0% R214 654067 4767763 1.5 0.1 0 0% 0 0% 0	R205			1.5	0.2	0	0%	0	0%	0	0%
R208 654107 4767753 1.5 0.2 0 0% 0 0% 0 R209 654117 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R210 654127 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0						0		0		0	0%
R209 654117 4767753 1.5 0.2 0 0% 0 0% 0 R210 654127 4767753 1.5 0.2 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 R212 654147 4767753 1.5 0.2 0 0% 0 0% 0 R213 654157 4767753 1.5 0.2 0 0% 0 0% 0 R214 654167 4767763 1.5 0.2 0 0% 0 0% 0 R216 654057 4767763 1.5 0.1 0 0% 0 0% 0 0% R216 65407 4767763 1.5 0.1 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0											0%
R210 654127 4767753 1.5 0.2 0 0% 0 0% 0 R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 R212 654147 4767753 1.5 0.2 0 0% 0 0% 0 R213 654157 4767753 1.5 0.2 0 0% 0 0% 0 R214 654167 4767763 1.5 0.2 0 0% 0 0% 0 R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 R216 654087 4767763 1.5 0.1 0 0% 0 0% 0 0% R218 654087 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0											0%
R211 654137 4767753 1.5 0.2 0 0% 0 0% 0 R212 654147 4767753 1.5 0.2 0 0% 0 0% 0 R213 654157 4767753 1.5 0.2 0 0% 0 0% 0 R214 654167 4767753 1.5 0.2 0 0% 0 0% 0 R215 654057 4767763 1.5 0.1 0 0% 0 0% 0 R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 R218 654087 4767763 1.5 0.2 0 0% 0 0% 0 R219 654097 4767763 1.5 0.2 0 0% 0 0% 0 R221 654117 4767763 1.5 0.2 0 0% 0 0%											0%
R212 654147 4767753 1.5 0.2 0 0% 0 0% 0 R213 654157 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R214 654167 4767753 1.5 0.2 0 0% 0 0% 0 0% 0 R214 654167 4767763 1.5 0.1 0 0% 0 0% 0 0% 0 R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 0% 0 R217 654077 4767763 1.5 0.1 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% <td></td> <td>0% 0%</td>											0% 0%
R213 654157 4767753 1.5 0.2 0 0% 0 0% 0 R214 654167 4767753 1.5 0.2 0 0% 0 0% 0 R215 654057 4767763 1.5 0.1 0 0% 0 0% 0 R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 R217 654077 4767763 1.5 0.1 0 0% 0 0% 0 R218 654087 4767763 1.5 0.1 0 0% 0 0% 0 R219 654097 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0% 0 0%											0%
R214 654167 4767753 1.5 0.2 0 0% 0 0% 0 R215 654057 4767763 1.5 0.1 0 0% 0 0% 0 R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 R217 654077 4767763 1.5 0.1 0 0% 0 0% 0 R218 654087 4767763 1.5 0.1 0 0% 0 0% 0 R218 654087 4767763 1.5 0.1 0 0% 0 0% 0 R218 654087 4767763 1.5 0.2 0 0% 0 0% 0 R219 654117 4767763 1.5 0.2 0 0% 0 0% 0 R221 654117 4767763 1.5 0.2 0 0% 0 0% 0 R223 654137 4767763 1.5 0.2 0 0%											0%
R215 654057 4767763 1.5 0.1 0 0% 0 0% 0 R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 R217 654077 4767763 1.5 0.1 0 0% 0 0% 0 R218 654087 4767763 1.5 0.1 0 0% 0 0% 0 0% 0 R218 654087 4767763 1.5 0.1 0 0% 0											0%
R216 654067 4767763 1.5 0.1 0 0% 0 0% 0 R217 654077 4767763 1.5 0.1 0 0% 0 0% 0 0% 0 R218 654087 4767763 1.5 0.1 0 0% 0											0%
R218 654087 4767763 1.5 0.1 0 0% 0 0% 0 R219 654097 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R220 654107 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R221 654117 4767763 1.5 0.2 0 0% 0											0%
R219 654097 4767763 1.5 0.2 0 0% 0 0% 0 R220 654107 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R221 654117 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R222 654117 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R223 654137 4767763 1.5 0.2 0 0% 0	R217	654077	4767763	1.5	0.1	0	0%	0	0%	0	0%
R220 654107 4767763 1.5 0.2 0 0% 0 0% 0 R221 654117 4767763 1.5 0.2 0 0% 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td>0</td> <td></td> <td>0</td> <td>0%</td>						0		0		0	0%
R221 654117 4767763 1.5 0.2 0 0% 0 0% 0 R222 654127 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R223 654137 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R224 654137 4767763 1.5 0.2 0 0% 0 0% 0 0% 0 R224 654147 4767763 1.5 0.2 0 0% 0% 0 0% <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0%</td></td<>											0%
R222 654127 4767763 1.5 0.2 0 0% 0 0% 0 R223 654137 4767763 1.5 0.2 0 0% 0 0% 0 R224 654147 4767763 1.5 0.2 0 0% 0 0% 0 R224 654147 4767763 1.5 0.2 0 0% 0 0% 0 R225 654157 4767763 1.5 0.2 0 0% 0 0% 0 R226 654167 4767763 1.5 0.2 0 0% 0 0% 0 R226 654057 4767763 1.5 0.2 0 0% 0 0% 0 R227 654057 4767773 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0%											0%
R223 654137 4767763 1.5 0.2 0 0% 0 0% 0 R224 654147 4767763 1.5 0.2 0 0% 0 0% 0 R225 654157 4767763 1.5 0.2 0 0% 0 0% 0 R226 654157 4767763 1.5 0.2 0 0% 0 0% 0 R226 654167 4767763 1.5 0.2 0 0% 0 0% 0 R227 654057 4767763 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0%											0%
R224 654147 4767763 1.5 0.2 0 0% 0 0% 0 R225 654157 4767763 1.5 0.2 0 0% 0 0% 0 R226 654167 4767763 1.5 0.2 0 0% 0 0% 0 R226 654167 4767763 1.5 0.2 0 0% 0 0% 0 R227 654057 4767773 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0%											0% 0%
R225 654157 4767763 1.5 0.2 0 0% 0 0% 0 R226 654167 4767763 1.5 0.2 0 0% 0 0% 0 R227 654057 4767773 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0%											0%
R226 654167 4767763 1.5 0.2 0 0% 0 0% 0 R227 654057 4767773 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0%											0%
R227 654057 4767773 1.5 0.1 0 0% 0 0% 0 R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0% 0											0%
R228 654067 4767773 1.5 0.1 0 0% 0 0% 0 R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0% 0											0%
R229 654077 4767773 1.5 0.1 0 0% 0 0% 0 R230 654087 4767773 1.5 0.1 0 0% 0 0% 0 R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0% 0											0%
R231 654097 4767773 1.5 0.1 0 0% 0 0% 0 R232 654107 4767773 1.5 0.2 0 0% 0 0% 0						0		0			0%
R232 654107 4767773 1.5 0.2 0 0% 0 0% 0						0		0		0	0%
				1.5	0.1	0	0%	0	0%	0	0%
						0		0		0	0%
R233 654117 4767773 1.5 0.2 0 0% 0 0% 0 R234 654127 4767773 1.5 0.2 0 0% 0 0% 0 0% 0	R233	654117		1.5	0.2	0	0%	0	0%	0	0%

ID#	X Recentor	Y Information	Z	Predicted Maximum	1 OU Count Pro	: 1 OU Freq edcited Excusri		3 OU Freq e Specified 10-		5 OU Freq
ID#	X	Y	Z	Predicted		ts > 1 OU		nts > 3 OU		nts > 5 OU
				10-Minute	Count	Frequency	Count	Frequency	Count	Frequency
				Concentration						
R235	654137	4767773	1.5	(OU/m ³) 0.2	0	0%	0	0%	0	0%
R236	654147	4767773	1.5	0.2	0	0%	0	0%	0	0%
R237	654157	4767773	1.5	0.2	0	0%	0	0%	0	0%
R238	654167	4767773	1.5	0.2	0	0%	0	0%	0	0%
R239	654057	4767783	1.5	0.1	0	0%	0	0%	0	0%
R240	654067	4767783	1.5	0.2	0	0%	0	0%	0	0%
R241	654077	4767783	1.5	0.2	0	0%	0	0%	0	0%
R242	654087	4767783	1.5	0.2	0	0%	0	0%	0	0%
R243	654097 654107	4767783 4767783	1.5	0.2	0	0%	0	0%	0	0%
R244 R245	654107	4767783	1.5 1.5	0.2	0	0%	0	0% 0%	0	0% 0%
R246	654127	4767783	1.5	0.2	0	0%	0	0%	0	0%
R247	654137	4767783	1.5	0.2	0	0%	0	0%	0	0%
R248	654147	4767783	1.5	0.2	0	0%	0	0%	0	0%
R249	654157	4767783	1.5	0.2	0	0%	0	0%	0	0%
R250	654167	4767783	1.5	0.2	0	0%	0	0%	0	0%
R251	654057	4767793	1.5	0.1	0	0%	0	0%	0	0%
R252	654067	4767793	1.5	0.2	0	0%	0	0%	0	0%
R253	654077 654087	4767793 4767793	1.5	0.2	0	0%	0	0%	0	0%
R254 R255	654087 654097	4767793	1.5 1.5	0.2	0	0%	0	0% 0%	0	0% 0%
R255 R256	654107	4767793	1.5	0.2	0	0%	0	0%	0	0%
R257	654117	4767793	1.5	0.2	0	0%	0	0%	0	0%
R258	654127	4767793	1.5	0.2	0	0%	0	0%	0	0%
R259	654137	4767793	1.5	0.2	0	0%	0	0%	0	0%
R260	654147	4767793	1.5	0.2	0	0%	0	0%	0	0%
R261	654157	4767793	1.5	0.2	0	0%	0	0%	0	0%
R262		4767793	1.5	0.2	0	0%	0	0%	0	0%
R263	654057	4767803	1.5	0.1	0	0%	0	0%	0	0%
R264	654067	4767803	1.5	0.1	0	0%	0	0%	0	0%
R265 R266	654077 654087	4767803 4767803	1.5 1.5	0.1	0	0%	0	0% 0%	0	0% 0%
R267	654097	4767803	1.5	0.1	0	0%	0	0%	0	0%
R268	654107	4767803	1.5	0.2	0	0%	0	0%	0	0%
R269	654117	4767803	1.5	0.2	0	0%	0	0%	0	0%
R270	654127	4767803	1.5	0.2	0	0%	0	0%	0	0%
R271	654137	4767803	1.5	0.2	0	0%	0	0%	0	0%
R272	654147	4767803	1.5	0.2	0	0%	0	0%	0	0%
R273	654157	4767803	1.5	0.2	0	0%	0	0%	0	0%
R274	654167	4767803	1.5	0.2	0	0%	0	0%	0	0%
R275	654028	4767807	1.5	0.1	0	0%	0	0%	0	0%
R276 R277	654038 654048	4767807 4767807	1.5 1.5	0.1	0	0%	0	0% 0%	0	0% 0%
R278	654058	4767807	1.5	0.1	0	0%	0	0%	0	0%
R279	654068	4767807	1.5	0.1	0	0%	0	0%	0	0%
R280	654078	4767807	1.5	0.1	0	0%	0	0%	0	0%
R281	654088	4767807	1.5	0.1	0	0%	0	0%	0	0%
R282	654098	4767807	1.5	0.2	0	0%	0	0%	0	0%
R283	654108	4767807	1.5	0.2	0	0%	0	0%	0	0%
R284	654118	4767807	1.5	0.2	0	0%	0	0%	0	0%
R285	654128 654138	4767807	1.5	0.2	0	0%	0	0%	0	0%
R286 R287	654138 654148	4767807 4767807	1.5 1.5	0.2	0	0%	0	0% 0%	0	0% 0%
R287 R288	654146	4767807	1.5	0.2	0	0%	0	0%	0	0%
R289	654168	4767807	1.5	0.2	0	0%	0	0%	0	0%
R290	654028	4767817	1.5	0.2	0	0%	0	0%	0	0%
R291	654038	4767817	1.5	0.1	0	0%	0	0%	0	0%
R292	654048	4767817	1.5	0.1	0	0%	0	0%	0	0%
R293	654058	4767817	1.5	0.1	0	0%	0	0%	0	0%
R294	654068	4767817	1.5	0.1	0	0%	0	0%	0	0%
R295	654078	4767817	1.5	0.1	0	0%	0	0%	0	0%
R296	654088	4767817	1.5	0.1	0	0%	0	0%	0	0%
R297	654098 654108	4767817 4767817	1.5	0.2	0	0%	0	0%	0	0%
R298 R299	654108		1.5 1.5	0.2	0	0%	0	0% 0%	0	0% 0%
R300	654128	4767817	1.5	0.2	0	0%	0	0%	0	0%
R301	654138		1.5	0.2	0	0%	0	0%	0	0%
R302	654148		1.5	0.2	0	0%	0	0%	0	0%
R303	654158	4767817	1.5	0.2	0	0%	0	0%	0	0%
R304	654168	-	1.5	0.2	0	0%	0	0%	0	0%
R305	654028	4767827	1.5	0.1	0	0%	0	0%	0	0%
R306	654038	4767827	1.5	0.1	0	0%	0	0%	0	0%
R307	654048	4767827	1.5	0.1	0	0%	0	0%	0	0%
R308	654058		1.5	0.1	0	0%	0	0%	0	0%
R309	654068 654078	4767827 4767827	1.5	0.1	0	0%	0	0% 0%	0	0%
R310 R311	654078 654088	4767827	1.5 1.5	0.1	0	0%	0	0%	0	0% 0%
R311 R312	654088		1.5	0.1	0	0%	0	0%	0	0%
R312	654108		1.5	0.1	0	0%	0	0%	0	0%

ID#	X	Y Information	Z	Predicted Maximum	1 OU Count	1 OU Freq edcited Excusri		3 OU Freq		5 OU Freq
ID#		Y	Z	Predicted		s > 1 OU		nts > 3 OU		nts > 5 OU
				10-Minute Concentration	Count	Frequency	Count	Frequency	Count	Frequency
				(OU/m ³)						
R314	654118	4767827	1.5	0.1	0	0%	0	0%	0	0%
R315	654128	4767827	1.5	0.1	0	0%	0	0%	0	0%
R316 R317	654138 654148	4767827 4767827	1.5 1.5	0.2	0	0%	0	0% 0%	0	0% 0%
R317	654158	4767827	1.5	0.2	0	0%	0	0%	0	0%
R319	654168	4767827	1.5	0.2	0	0%	0	0%	0	0%
R320	654028	4767837	1.5	0.1	0	0%	0	0%	0	0%
R321	654038	4767837	1.5	0.1	0	0%	0	0%	0	0%
R322	654048 654058	4767837 4767837	1.5	0.1	0	0%	0	0%	0	0%
R323 R324	654058	4767837	1.5 1.5	0.1	0	0%	0	0% 0%	0	0% 0%
R325	654078	4767837	1.5	0.1	0	0%	0	0%	0	0%
R326	654088	4767837	1.5	0.1	0	0%	0	0%	0	0%
R327	654098	4767837	1.5	0.1	0	0%	0	0%	0	0%
R328	654108	4767837	1.5	0.1	0	0%	0	0%	0	0%
R329 R330	654118 654128	4767837 4767837	1.5 1.5	0.1	0	0% 0%	0	0% 0%	0	0% 0%
R330	654128	4767837	1.5	0.1	0	0%	0	0%	0	0%
R332	654148	4767837	1.5	0.2	0	0%	0	0%	0	0%
R333	654158	4767837	1.5	0.2	0	0%	0	0%	0	0%
R334	654168	4767837	1.5	0.2	0	0%	0	0%	0	0%
R335	654022	4767853	1.5	0.1	0	0%	0	0%	0	0%
R336	654032	4767853	1.5	0.1	0	0%	0	0%	0	0%
R337 R338	654042 654052	4767853 4767853	1.5 1.5	0.1	0	0%	0	0% 0%	0	0% 0%
R338 R339	654052 654062	4767853	1.5	0.1	0	0%	0	0%	0	0%
R340	654072	4767853	1.5	0.1	0	0%	0	0%	0	0%
R341	654082		1.5	0.1	0	0%	0	0%	0	0%
R342	654092	4767853	1.5	0.1	0	0%	0	0%	0	0%
R343	654102		1.5	0.1	0	0%	0	0%	0	0%
R344	654112	4767853	1.5	0.1	0	0%	0	0%	0	0%
R345 R346	654122 654132	4767853 4767853	1.5 1.5	0.1	0	0% 0%	0	0% 0%	0	0% 0%
R340	654142	4767853	1.5	0.1	0	0%	0	0%	0	0%
R348	654152		1.5	0.2	0	0%	0	0%	0	0%
R349	654162	4767853	1.5	0.3	0	0%	0	0%	0	0%
R350	654172	4767853	1.5	0.3	0	0%	0	0%	0	0%
R351	654022	4767863	1.5	0.1	0	0%	0	0%	0	0%
R352	654032	4767863	1.5	0.1	0	0%	0	0%	0	0%
R353 R354	654042 654052		1.5 1.5	0.1	0	0% 0%	0	0% 0%	0	0% 0%
R355	654062	4767863	1.5	0.1	0	0%	0	0%	0	0%
R356	654072	4767863	1.5	0.1	0	0%	0	0%	0	0%
R357	654082	4767863	1.5	0.1	0	0%	0	0%	0	0%
R358	654092	4767863	1.5	0.1	0	0%	0	0%	0	0%
R359	654102		1.5	0.1	0	0%	0	0%	0	0%
R360 R361	654112 654122	4767863 4767863	1.5 1.5	0.1	0	0%	0	0% 0%	0	0%
R361	654122	4767863	1.5	0.2	0	0% 0%	0	0%	0	0% 0%
R363	654142		1.5	0.2	0	0%	0	0%	0	0%
R364	654152		1.5	0.2	0	0%	0	0%	0	0%
R365	654162		1.5	0.3	0	0%	0	0%	0	0%
R366	654172	4767863	1.5	0.3	0	0%	0	0%	0	0%
R367	654022	4767873	1.5	0.1	0	0%	0	0%	0	0%
R368 R369	654032 654042	4767873 4767873	1.5 1.5	0.1	0	0% 0%	0	0% 0%	0	0% 0%
R369	654042 654052		1.5	0.1	0	0%	0	0%	0	0%
R371	654062	4767873	1.5	0.1	0	0%	0	0%	0	0%
R372	654072	4767873	1.5	0.1	0	0%	0	0%	0	0%
R373	654082	4767873	1.5	0.1	0	0%	0	0%	0	0%
R374	654092		1.5	0.1	0	0%	0	0%	0	0%
R375	654102 654112		1.5	0.1	0	0%	0	0%	0	0%
R376 R377	654112 654122	4767873 4767873	1.5 1.5	0.2	0	0%	0	0% 0%	0	0% 0%
R377	654132		1.5	0.2	0	0%	0	0%	0	0%
R379	654142		1.5	0.2	0	0%	0	0%	0	0%
R380	654152		1.5	0.2	0	0%	0	0%	0	0%
R381		4767873	1.5	0.3	0	0%	0	0%	0	0%
R382		4767873	1.5	0.3	0	0%	0	0%	0	0%
R383 R384	654022 654032		1.5 1.5	0.1	0	0%	0	0% 0%	0	0% 0%
R384 R385	654032		1.5	0.1	0	0%	0	0%	0	0%
R386	654052		1.5	0.1	0	0%	0	0%	0	0%
R387	654062		1.5	0.1	0	0%	0	0%	0	0%
R388	654072		1.5	0.1	0	0%	0	0%	0	0%
R389	654082		1.5	0.1	0	0%	0	0%	0	0%
R390	654092		1.5	0.1	0	0%	0	0%	0	0%
R391	654102	4767883 4767883	1.5	0.2	0	0% 0%	0	0% 0%	0	0%

ID#	X Receptor	Y Information	Z	Predicted Maximum	1 OU Count Pre	1 OU Freq		3 OU Freq		5 OU Freq
ID#	X	Y	Z	Predicted		s > 1 OU		nts > 3 OU		nts > 5 OU
				10-Minute	Count	Frequency	Count	Frequency	Count	Frequency
				Concentration (OU/m³)						
R393	654122	4767883	1.5	0.2	0	0%	0	0%	0	0%
R394	654132	4767883	1.5	0.2	0	0%	0	0%	0	0%
R395	654142	4767883	1.5	0.2	0	0%	0	0%	0	0%
R396	654152	4767883	1.5	0.2	0	0%	0	0%	0	0%
R397	654162	4767883	1.5	0.3	0	0%	0	0%	0	0%
R398 R399	654172 654022	4767883 4767893	1.5 1.5	0.3	0	0%	0	0% 0%	0	0% 0%
R400	654032	4767893	1.5	0.1	0	0%	0	0%	0	0%
R401	654042	4767893	1.5	0.1	0	0%	0	0%	0	0%
R402	654052	4767893	1.5	0.1	0	0%	0	0%	0	0%
R403	654062	4767893	1.5	0.1	0	0%	0	0%	0	0%
R404	654072	4767893	1.5	0.1	0	0%	0	0%	0	0%
R405	654082	4767893	1.5	0.1	0	0%	0	0%	0	0%
R406	654092	4767893	1.5	0.1	0	0%	0	0%	0	0%
R407	654102 654112	4767893 4767893	1.5	0.1	0	0%	0	0%	0	0%
R408 R409	654122	4767893	1.5 1.5	0.1	0	0% 0%	0	0% 0%	0	0% 0%
R410	654132	4767893	1.5	0.1	0	0%	0	0%	0	0%
R411	654142	4767893	1.5	0.2	0	0%	0	0%	0	0%
R412	654152	4767893	1.5	0.2	0	0%	0	0%	0	0%
R413	654162	4767893	1.5	0.2	0	0%	0	0%	0	0%
R414	654172	4767893	1.5	0.2	0	0%	0	0%	0	0%
R415	654022	4767903	1.5	0.1	0	0%	0	0%	0	0%
R416	654032	4767903	1.5	0.1	0	0%	0	0%	0	0%
R417	654042	4767903	1.5	0.1	0	0%	0	0%	0	0%
R418	654052 654062	4767903 4767903	1.5 1.5	0.1	0	0%	0	0%	0	0%
R419 R420			1.5	0.1	0	0% 0%	0	0% 0%	0	0% 0%
R420	654082	4767903	1.5	0.1	0	0%	0	0%	0	0%
R422	654092	4767903	1.5	0.1	0	0%	0	0%	0	0%
R423	654102	4767903	1.5	0.1	0	0%	0	0%	0	0%
R424	654112	4767903	1.5	0.1	0	0%	0	0%	0	0%
R425	654122	4767903	1.5	0.1	0	0%	0	0%	0	0%
R426	654132	4767903	1.5	0.2	0	0%	0	0%	0	0%
R427	654142	4767903	1.5	0.2	0	0%	0	0%	0	0%
R428	654152	4767903	1.5	0.2	0	0%	0	0%	0	0%
R429	654162	4767903	1.5	0.2	0	0%	0	0%	0	0%
R430 R431	654172 654193	4767903 4767836	1.5 1.5	0.2	0	0% 0%	0	0% 0%	0	0% 0%
R431	654193	4767826	1.5	0.5	0	0%	0	0%	0	0%
R433	654194	4767816	1.5	0.2	0	0%	0	0%	0	0%
R434	654194	4767807	1.5	0.2	0	0%	0	0%	0	0%
R435	654202	4767835	1.5	0.7	0	0%	0	0%	0	0%
R436	654203	4767826	1.5	0.6	0	0%	0	0%	0	0%
R437	654203	4767817	1.5	0.5	0	0%	0	0%	0	0%
R438	654203	4767808	1.5	0.3	0	0%	0	0%	0	0%
R439	654212	4767835	1.5	1.0	0	0%	0	0%	0	0%
R440	654212	4767825	1.5	0.9	0	0%	0	0%	0	0%
R441 R442	654212 654212	4767816 4767807	1.5 1.5	0.8 0.5	0	0% 0%	0	0% 0%	0	0% 0%
R442	654212	4767835	1.5	0.9	0	0%	0	0%	0	0%
R444	654221	4767825	1.5	1.2	1	0%	0	0%	0	0%
R445	654222	4767816	1.5	1.0	1	0%	0	0%	0	0%
R446	654221	4767808	1.5	0.9	0	0%	0	0%	0	0%
R447	654229	4767834	1.5	0.9	0	0%	0	0%	0	0%
R448	654229	4767826	1.5	1.2	3	0%	0	0%	0	0%
R449	654230	4767816	1.5	1.6	10	0%	0	0%	0	0%
R450	654230	4767808	1.5	1.2	8	0%	0	0%	0	0%
R451	654238 654247	4767808	1.5	1.9	21	0%	0	0%	0	0%
R452 R453	654247 654257	4767808 4767808	1.5 1.5	2.1 1.7	24 12	0% 0%	0	0% 0%	0	0% 0%
R453 R454	654257	4767815	1.5	2.2	12	0%	0	0%	0	0%
R454	654264		1.5	1.3	1	0%	0	0%	0	0%
R456	654271	4767826	1.5	0.4	0	0%	0	0%	0	0%
R457	654279	4767831	1.5	0.4	0	0%	0	0%	0	0%
R458	654285	4767834	1.5	0.4	0	0%	0	0%	0	0%
R459	654291	4767840	1.5	0.4	0	0%	0	0%	0	0%
R460	654297		1.5	0.3	0	0%	0	0%	0	0%
R461	654304	4767849	1.5	0.3	0	0%	0	0%	0	0%
R462	654310 654313	4767854	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R463	654313 654310	4767859 4767865	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R464 R465	654310 654237	4767865	1.5 1.5	0.3 1.7	0 24	0.00%	0	0.000%	0	0.000%
R465 R466	654237	4767825	1.5	1.7	8	0.08%	0	0.000%	0	0.000%
R467	654236	4767834	1.5	0.9	0	0.02%	0	0.000%	0	0.000%
R468	654247	4767815	1.5	1.5	13	0.03%	0	0.000%	0	0.000%
R469	654246	4767825	1.5	1.3	1	0.00%	0	0.000%	0	0.000%
R470	654246	4767834	1.5	1.4	1	0.00%	0	0.000%	0	0.000%
R471	654254	4767833	1.5	1.2	1	0.00%	0	0.000%	0	0.000%

ID#	Х	Y	Z	Predicted	1 OU Count	1 OU Freq	OU Coun	3 OU Freq	OU Coun	5 OU Freq
	Receptor Information		Maximum	Pre	dcited Excusri	ions Abov	e Specified 10-	Minute Va	alues	
ID#	Х	Y	Z	Predicted	Events	s > 1 OU	Ever	ts > 3 OU	Ever	nts > 5 OU
				10-Minute	Count	Frequency	Count	Frequency	Count	Frequency
				Concentration						
				(OU/m³)						
R472	654255	4767824	1.5	1.8	1	0.00%	0	0.000%	0	0.000%
R473	654263	4767830	1.5	0.6	0	0.00%	0	0.000%	0	0.000%
R474	654197	4767862	1.5	0.5	0	0.00%	0	0.000%	0	0.000%
R475	654197	4767852	1.5	0.6	0	0.00%	0	0.000%	0	0.000%
R476	654211	4767862	1.5	0.4	0	0.00%	0	0.000%	0	0.000%
R477	654211	4767852	1.5	0.6	0	0.00%	0	0.000%	0	0.000%
R478	654222	4767862	1.5	0.7	0	0.00%	0	0.000%	0	0.000%
R479	654222	4767853	1.5	0.6	0	0.00%	0	0.000%	0	0.000%
R480	654231	4767862	1.5	0.6	0	0.00%	0	0.000%	0	0.000%
R481	654232	4767852	1.5	0.9	0	0.00%	0	0.000%	0	0.000%
R482	654241	4767862	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R483	654252	4767862	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R484	654240	4767852	1.5	0.8	0	0.00%	0	0.000%	0	0.000%
R485	654252	4767853	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R486	654272	4767837	1.5	0.4	0	0.00%	0	0.000%	0	0.000%
R487	654280	4767840	1.5	0.4	0	0.00%	0	0.000%	0	0.000%
R488	654286	4767845	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R489	654292	4767850	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R490	654299	4767855	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R491	654303	4767861	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R492	654300	4767868	1.5	0.2	0	0.00%	0	0.000%	0	0.000%
R493	654292	4767868	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R494	654282	4767868	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R495	654273	4767867	1.5	0.2	0	0.00%	0	0.000%	0	0.000%
R496	654273	4767861	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R497	654282	4767861	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R498	654292	4767862	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R499	654272	4767853	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R500	654282	4767853	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R501	654274	4767846	1.5	0.3	0	0.00%	0	0.000%	0	0.000%
R502			1.5	0.0	0	0.00%	0	0.000%	0	0.000%
R503			1.5	0.0	0	0.00%	0	0.000%	0	0.000%

Appendix C4 - Combustion Spreadsheet for Generator EGEN

RWDI Project Name:	River Front Community Project
RWDI Project Number:	2404121
RWDI Source ID:	EGEN
Manufacturer:	Cummings
Engine Model:	DGFC 60 Hz

Parameter	Units	Value
Engine Fuel		Diesel
Fuel Heating Value	(Btu/gal)	137000
Stroke Cycle		4-Stroke
Engine Loading	(%)	n/a
Burn Style		n/a
NOx Controlled?		n/a

Rating (enter one set of units)	Units	Value
Engine Horsepower (hp)	(hp)	317
Generator Transfer Efficiency	(%)	90
Engine Combustion Efficiency	(%)	35
Calculated Engine Output	(hp)	317
Calculated Engine Input	(hp)	906
Diesel Generator Size Range	(hp)	<600

Manufacturer Emissions Data	Units	Factor		
Oxides of Sulphur (SOx)	(lb/hp-hr)			
Oxides of Nitrogen (NO _x)	(lb/hp-hr)	0.01058		
Carbon Monoxide (CO)	(lb/hp-hr)			
Particulate Matter (PM)	(lb/hp-hr)			
Source:	Manufacturer Brochure			

Fuel Sulphur Information	Units	Value
Natural Gas Sulphur Content	(%)	
Fuel Oil Sulphur Content	(%)	0.00150

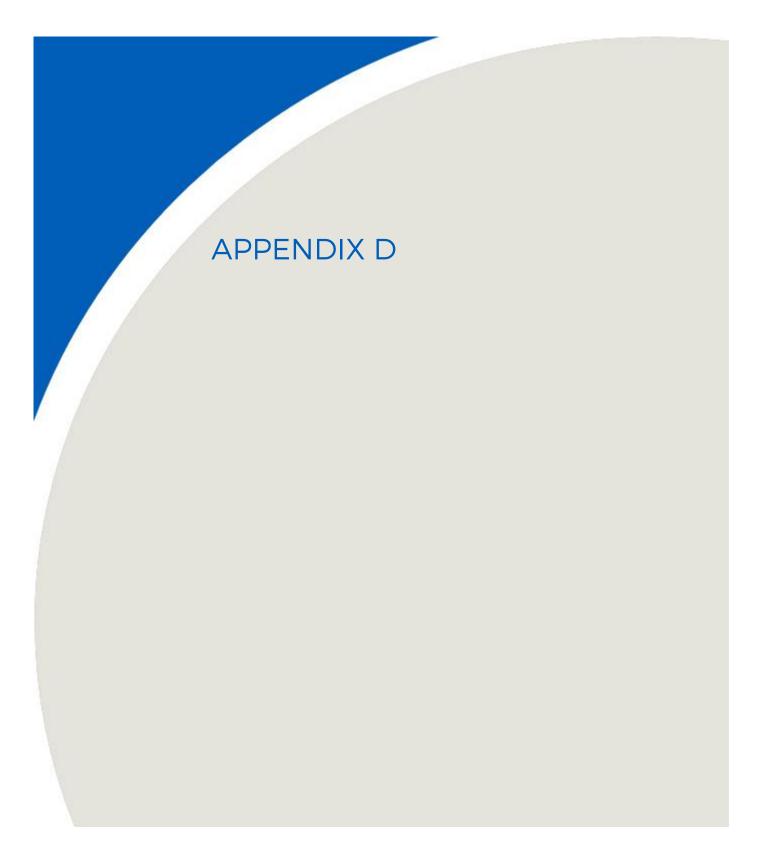
Exhaust Temperature	Units	Value
Exhaust Temperature (°C)	(°C)	511
Calculated Exit Temperature	(K)	784
Exhaust Flow Rate	cfm	1605
	m³/s	0.757575758

Pollutants	Emissio	Emission Factor		Source of Emission Factor
Fondants	Value	Units	Quality	
Oxides of Sulphur (SOx)	2.1E-03	(lb/hp-hr)	D	AP 42 (10/1996) Ch 3.3, Tables 3.3-1
Oxides of Nitrogen (NOx)	1.1E-02	(lb/hp-hr)	С	Manufacturer Brochure
Carbon Monoxide (CO)	6.7E-03	(lb/hp-hr)	D	AP 42 (10/1996) Ch 3.3, Tables 3.3-1
Total Particulate Matter (TSP)	2.2E-03	(lb/hp-hr)	D	AP 42 (10/1996) Ch 3.3, Tables 3.3-1

Pollutants	Emiss	ion Rate	Sample Calculation
Foliatalits	Value	Units	Sample Calculation
Oxides of Sulphur (SOx)	8.2E-02	g/s	= (317 hp) x (0.00205 lb/hp-hr) x (453.6 g / lb) / (3600 s / h)
Oxides of Nitrogen (NOx)	4.23E-01	g/s	= (317 hp) x (0.0105822438766287 lb/hp-hr) x (453.6 g / lb) / (3600 s / h
Carbon Monoxide (CO)	2.7E-01	g/s	= (317 hp) x (0.00668 lb/hp-hr) x (453.6 g / lb) / (3600 s / h)
Total Particulate Matter (TSP)	8.8E-02	g/s	= (317 hp) x (0.0022 lb/hp-hr) x (453.6 g / lb) / (3600 s / h)

Revision Date:	June 03 2021
Prepared by:	ADS
Checked by:	TR





Nghi Nguyen

From:	Gene Chartier <gchartier@ptsl.com></gchartier@ptsl.com>
Sent:	Thursday, January 14, 2016 9:45 AM
То:	Melissa Annett; Lorelei Jones
Subject:	FW: Rail Traffic Data - Montrose Subdivision, Niagara Falls

FYI ...

Gene Chartier, M.A.Sc., P.Eng., FITE Vice-President



Paradigm Transportation Solutions Limited p: 416.479.9684 x501 m: 416.300.7858

From: Josie Tomei [mailto:Josie_Tomei@cpr.ca]
Sent: January-14-16 9:39 AM
To: Gene Chartier
Subject: Rail Traffic Data - Montrose Subdivision, Niagara Falls

Hi Gene,

I refer to your recent request for rail traffic data for a noise study in the vicinity of the Montrose Subdivision in Niagara Falls, mileage 4.0 to 5.35. Please note that the Montrose Subdivision is classified as an industrial spur.

The information requested is as follows:

1. Number of freight trains 0700 to 2300: 10 Number of freight trains 2300 to 0700: 5

> 2. Average number of cars per train: 8 Maximum cars per train: 19

3. Number of Locomotives per train: 2 average

4. Type of Trains: freight

- 5. Maximum speed : 25 mph, normal speed is 15 mph
- 6. There are grade crossings at Biggar Road, Grassy Brook Road and Montrose Road, however whistling is prohibited at these locations. Please note, the whistle signal may be used in any dangerous situation when suitable warning is required.

The information provided is based on rail traffic over the past month to date. Variations of the above may exist on a dayto-day basis. Specific measurements may also vary significantly depending on customer needs Josie Tomei | Specialist Real Estate Sales & Acquisitions | 1290 Central Parkway West, Suite 800, Mississauga, ON L5C 4R3

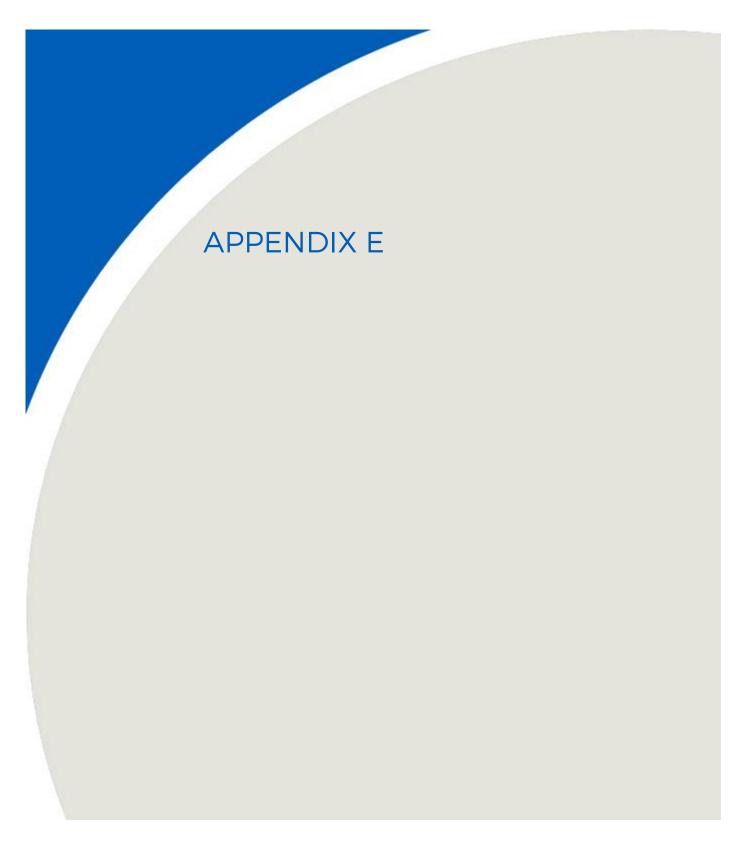
905-803-3429 CP

------ IMPORTANT NOTICE - AVIS IMPORTANT ------ Computer viruses can be transmitted via email. Recipient should check this email and any attachments for the presence of viruses. Sender and sender company accept no liability for any damage caused by any virus transmitted by this email. This email transmission and any accompanying attachments contain confidential information intended only for the use of the individual or entity named above. Any dissemination, distribution, copying or action taken in reliance on the contents of this email by anyone other than the intended recipient is strictly prohibited. If you have received this email in error please immediately delete it and notify sender at the above email address. Le courrier electronique peut etre porteur de virus informatiques. Le destinataire doit donc passer le present courriel et les pieces qui y sont jointes au detecteur de virus. L'expediteur et son employeur declinent toute responsabilite pour les dommages causes par un virus contenu dans le courriel. Le present message et les pieces qui y sont jointes contiennent des renseignements confidentiels destines uniquement a la personne ou a l'organisme nomme ci-dessus. Toute diffusion, distribution, reproduction ou utilisation comme reference du contenu du message par une autre personne que le destinataire est formellement interdite. Si vous avez recu ce courriel par erreur, veuillez le detruire immediatement et en informer l'expediteur a l' This e-mail and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this e-mail in error please notify the sender immediately. Please note that any views or opinions presented in this e-mail are solely those of the author and do not necessarily represent those of Paradigm Transportation Solutions Limited. Finally, the recipient should check this e-mail and any attachments for the presence of viruses. Paradigm Transportation Solutions Limited accepts no liability for any damage caused by any virus transmitted by this e-mail.



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





SY STEAM

Sound from Trains Environmental Analysis Method (Ontario)

Job No. 2404121 Job Name Riverfront Community

Scenario Traffic Grown from 2021

TIME PERIOD T:	16	hrs	Use this method for Diesel and Electrically powered heavy trains, including:
			- Freight Trains and freight switchers - VIA Passenger trains - GO Passenger trains

TRAIN TYPE DEFINITIONS

15	CAIN ITPE DEFII	NITIONS									
	1	2	3	4	5	6	7	8	9	10	11
	Train Type	Type Name	Loco Type (Diesel / Electric)	Rail Type (CWR / Jointed)	# Locos (Per Train)	# Cars (Per Train)	Speed (km/h)	Use Whistle?			
	1	Montrose Max	D	J	2	19	40	N			

DIESEL / ELECTRIC HEAVY RAIL

DIEGEL / ELECTRI	CHEAVIN	AIL																																						
Façade RAIL CHARACTERIST						6			2011	CE-REC					DISTICS					BADDI		RACTERIS	TICS					WHISTLE	. DATA		MODELLI		1 79							
	Component	Train Type	Train Name	No. of Trains of this Type		tive No. of Units Cars	Speed (km/h)	Source Height (m)	Source Receiv Distant (m)	e- Groun er Type ce (1-Haro	d Topo- graphy	-	ewable gle	Rail	Receptor Height (m)	Receptor Elevation		Elevation C Hor. Dist a (m)	Change (m) t Hor. Dist b (m)	Barrier Height	Barrie Elevatio (m asl	r Barrier Recieve	- er	er Viewable Angle	No. of Rows of Houses	Density of Houses (% Houses	Woods	Perpend. Distance to Crossing	Train D	irection for tle (Y/N) Right	Componer		Distance	Finite Segment Adj. A _f (dBA)	Track Type Adjust?		Housing Adj. A _h (dBA)	Woods Adj. A _w (dBA)	Total Component L _{eq} (dBA)	Total Segment L _{ev} (dBA)
R1 along mainline	Locomotive Wheel-Rail Whistle	1	Montrose Max	x 13	25.6016 n/a n/a	i9 n/a 243.216 n/a	40	4.0 0.5 4.0	26.0	1	A	-90	90	0.0	4.5	0.0	0.0														Loco Wheel Whistle	63.1 57.3	-2.4	0.1 -	n/a 0.0 n/a			-	60.8 55.0 0.0	62
																				BARRI	ER CHAF	RACTERIS	TICS																	
R2 along mainline	Locomotive Wheel-Rail Whistle	1	Montrose Max	13	25.6016 n/a n/a	9 n/a 243.216 n/a	6 40	4.0 0.5 4.0	24.0	1	A	-90	90	0.0	4.5	0.0	0.0														Loco Wheel Whistle	63.1 57.3	-2.0	0.1 -	n/a 0.0 n/a	-	-	-	61.1 55.3 0.0	62
OLA																				BARRI	ER CHAF	RACTERIS	TICS																	
R1 along mainline	Locomotive Wheel-Rail Whistle	1	Montrose Max	ú 13	25.6016 n/a n/a	9 n/a 243.216 n/a	40	4.0 0.5 4.0	20.0	1	A	-90	90	0.0	1.5	0.0	0.0			3.7	0.0	9.0	-90	90							Loco Wheel Whistle	63.1 57.3 -	-1.2	0.1 -	n/a 0.0 n/a	-7.6 -12.1 -		-	54.3 44.0 0.0	55
																				BARRI	ER CHAF	RACTERIS	TICS																	
R2 along mainline	Locomotive Wheel-Rail Whistle	1	Montrose Max	13	25.6016 n/a n/a	i9 n/a 243.216 n/a	40	4.0 0.5 4.0	18.0	1	A	-90	90	0.0	1.5	0.0	0.0			3.7	0.0	9.0	-90	90							Loco Wheel Whistle	63.1 57.3 -	-0.8	0.1 -	n/a 0.0 n/a	-7.3 -12.4 -	-	-	55.1 44.1 0.0	55

SW STEAM

Sound from Trains Environmental Analysis Method (Ontario)

Job No. 2404121 Job Name Riverfront Community

Scenario	Traffic Grown from 2021	

TIME PERIOD T:	8	hrs	Use this method for Diesel and Electrically powered heavy trains, including:
L.		-	- Freight Trains and freight switchers - VIA Passenger trains
			- GO Passenger trains

TRAIN TYPE DEFINITIONS

TRAIN TTPE DEFIN	NITIONS										
1	2	3	4	5	6	7	8	. 9	1	0	11
Train Type	Type Name	Loco Type (Diesel / Electric)	Rail Type (CWR / Jointed)	# Locos (Per Train)	# Cars (Per Train)	Speed (km/h)	Use Whistle?				
1	Montrose Max	D	J	2	19	40	N				

DIESEL / ELECTRIC HEAVY RAIL

Façade

RAIL CHARACTER	RISTICS						SOURC	E-RECEIVER-	FOPOGRAPHY	CHARACTERIS	TICS		BARRIE	ER CHAR	ACTERISTI	ICS			WHISTLE DATA	MODELLIN	IG RESUL	LTS						
Name		rain Train Name	No. of Trains of	Effective No. of Units Locos Cars	- Speed (km/h)	Source Height (m)	Source- Receiver Distance (m)	Ground Type grap (1-Hard, Typ 2-Soft)	iy T	Rail Re	ght (m) Rece Eleva (m a	ptor ation Elevati	n) Height (m)	Barrier Elevation (m asl)	Barrier- Reciever Distance (m)	Barrier Viewable Angle	Houses Wo	epth of /oods (m)	Perpend. Distance to Crossing	Component	L _{ref} (dBA)	Distance Adj. A _d (dBA)	Finite Segment Adj. A _f (dBA)	Track Type Adjust?	Barrier Adj. A _b (dBA)	Housing W Adj. A _h A (dBA) (Voods Total kdj. A _w Compon (dBA) L _{eq} (dBA	ent Segment L _{eq}
R1 along mainline	Locomotive Wheel-Rail Whistle	1 Montrose Ma	ax 7	14 n/a n/a 133 n/a n/a	40	4.0 0.5 4.0	26.0	1 A	-90 90	0 0.0	4.5 0.0	0 0.0								Loco Wheel Whistle	63.5 57.7	-2.4	0.1	n/a 0.0 n/a	-	-	- <u>55.4</u> 0.0	62
R2 along mainline	Locomotive Wheel-Rail Whistle	1 Montrose Ma	ax 7	14 n/a n/a 133 n/a n/a	40	4.0 0.5 4.0	24.0	1 A	-90 91	0 0.0	4.5 0.0	0 0.0								Loco Wheel Whistle	63.5 57.7 -	-2.0	0.1	n/a 0.0 n/a	-	-	- <u>55.7</u> 0.0	63

MODELLING RESULTS
