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April 4, 2023

Ed Lamb

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**Re: Response to Comment Letter from Joint Agency Review Team (JART)**
**Proposed Expansion of the Law Crushed Stone Quarry**
**RWDI Reference No. 2301858**

Dear Mr. Lamb,

I have reviewed the air quality-related comments provided in the to Comment Letter from Joint Agency Review Team (JART) letter dated January 13, 2023.

**Table 1**, attached, provides the detailed responses to these comments.

Please do not hesitate to contact me if you have any questions.

Yours truly,

**RWDI AIR Inc.**

Brian G. Sulley, B.A.Sc., P.Eng.
Technical Director, Principal

BGS/MMG/klm

Attach.

**Table 1: RWDI Responses to Comment Letter from Joint Agency Review Team – Air Quality Comments**

| Index | Comment | RWDI Response |
|---|---|---|
| 1 | 1. INTRODUCTION:<br>a) As the main purpose of the AQA report is to present dispersion modelling results, a short introduction to dispersion modelling is recommended, including atmospheric processes, modeling objectives and options related to the project.<br>b) The processes and limitations of selecting sensitive receptor locations should be described here based on the project requirements.<br>c) Please provide a list of references from the literature for the Best Management Practices Plan for dust. Practices include reducing the traffic, reducing the speed, improving road design, watering the road, covering the road with gravel, increasing the moisture content of the road surface, binding the road particles together, sealing unpaved roads, reducing exposed ground, and slowing the surface wind. | 1. a) This is a stylistic preference and has no material effect on the assessment. The report is intended for a qualified and experienced peer reviewer, not the general public. No further action required.<br><br>1. b) The receptors chosen reflect the closest residences to the site, as shown on the Site Plans. This is consistent with normal practice for ARA License Applications and is described in Section 4 of the Air Quality Assessment. There are no major point sources aside from the hot-mix asphalt ("HMA") plant stack, which is located at the bottom of the excavation. Impacts will be greatest at receptors nearest to the site. Including additional receptors that are further afield provides no useful information.<br><br>1. c) RWDI would suggest the following references are appropriate for understanding dust control practices:<br><br>• Cowherd, C., G. E. Muleski, and J. S. Kinsey (1988). Control of Open Fugitive Dust Sources. United States Environmental Protection Agency, EPA-450/3-88-008.<br>• Fitz, D. R. and K. Burmiller (2000). Evaluation of Watering to Control Dust in High Winds. J. A&WMA, 50, pp. 570-577.<br>• Gillies, J. A., J. G. Watson, C. F. Rogers, D. DuBois and J. C. Chow (1999): Long-term Efficiencies of Dust Suppressants to Reduce PM10 Emissions from Unpaved Roads. J. Air & Waste Manage. Assoc., 49, pp. 3-16.<br>• Heinerikson, A. J., Goodman, A. C., Harrison, D, Pham, M (2007). Modeling Fugitive Dust Sources with AERMOD. Trinity Consultants for National Stone, Sand & Gravel Association (2007). |

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|---|---|---|
| | | • Local Road Research Board (2009). Best Practices for Dust Control on Gravel Roads. Minnesota Department of Transportation, Research Services Section.<br>• Muleski, G. E. and C. Cowherd (1987). Evaluation of the Effectiveness of Chemical Dust Suppressants on Unpaved Roads. U.S. Environmental Protection Agency, EPA/600/2-87/102.<br>• National Research Council of Canada and Federation of Canadian Municipalities (2005). Dust Control for Unpaved Roads. National Guide to Sustainable Municipal Infrastructure, Issue No. 10. ISBN 1-897094-93-0.<br>• Rosbury, K. D., 1985: Handbook, Dust Control at Hazardous Waste Sites, EPA/540/2-85/003.<br>• United States Environmental Protection Agency (2006). Compilation of Air Pollutant Emission Factors (AP-42), Chapter 13.2.2, Unpaved Roads.<br>• Watson, J. G., J. C. Chow and T. G. Pace (2000). Fugitive Dust Emissions. From Air Pollution Engineering Manual, ed. by W. T. Davis, Wiley and Sons.<br>• Wisconsin Transportation Information Center (1997). Dust Control on Unpaved Roads. Wisconsin Transportation Bulletin No. 13. |
| **2** | 2. SITE DESCRIPTION AND OPERATIONS<br>a) Please detail the surrounding lands and emphasize that the eastern fence line of the current quarry is more than 2 km away from Port Colborne, i.e., the geographical location of the extension helps minimize the impact of emissions from the quarry on the City.<br>b) In the Introduction it is mentioned that the annual extraction limit will be 800,000 tonnes per year, which corresponds to a daily average of 2,200 tonnes. In paragraph 2 of the current section, it is written: “a maximum daily capacity of 8,000 tonnes per day”. Which one was considered for the conservative approach? | 2. a) The Existing Features Plan provided as Page 1 of 5 of the ARA Site Plans clearly show the location of the existing and proposed quarry relative to Port Colborne. The extreme eastern edge of the existing quarry is approximately 1.5 km from the nearest built-up residential areas of Port Colborne. The proposed extension is moving operations further from the City as time progresses, therefore reducing potential impacts. No further action is required.<br><br>2. b) It is unclear how the quoted daily average of value of 2,200 tonnes per day was determined. Regardless, the daily average is not relevant. The analysis based on the maximum, peak shipping capacity of the quarry, which is 8,000 |

| Index | Comment | RWDI Response |
|---|---|---|
| | | tonnes per day. This is reflected in the shipping traffic volume for the site (daily extraction and processing rates are lower than peak shipping volumes, which is normal). No action is required. |
| **3** | 3. OPERATING SCENARIO<br>a) The expression "conservative approach" could be introduced in the first paragraph to indicate that the AQ impact assessment is based on the "worst-case" scenario for the emissions and the dispersion.<br>b) Please quantify the "peak day", i.e., in terms of extraction and/or operations? | 3. a) "Conservative" is also a standard term used in air quality assessments in Ontario and is consistent with standard guidance documents such as MECP Guideline A10, as noted below:<br><br>"For the purpose of this Procedure Document the term "conservative" refers to an estimated emission rate that is certain to be higher than the actual emission rate."<br><br>3. b) RWDI agrees that this could be clearer. The "peak day" refers to the peak day in the peak year over the entire life of the Quarry production, which is based on shipping rates, with a maximum of 8,000 tonnes per day. Daily extraction and processing rates are lower than peak shipping volumes, which is normal. As shown in Appendix B, the extraction and processing rate (the rate at which shot rock material is moved from the muck pile to the grizzly on the primary crusher) is 5,000 tonnes per day. No further action required. |
| **4** | 4. SENSITIVE IMPACT LOCATIONS<br>a) Detail the criteria to select receptors for this study. A good practice for locating receptors is to draw a 1-km circle over the main activity area and check what potential receptors are inside the circle and closer to the future extension of the quarry.<br>b) Residential buildings on the west side (along Graybiel Rd) and south side (along Highway 3) of the domain were included in the dispersion modeling study. Since there are not too many receptors, a short list detailing them could be included in this section: which ones are residential? Which ones are churches? Include their positions relative to the site (south, west, | 4. a) The physics of dispersion dictate that impacts from fugitive sources (modelled as volume sources in the dispersion model) decrease with distance. This is especially true for such sources that are below grade. Impacts will be greatest at receptors nearest to the site. There is no valid rationale to examine impacts further away than already assessed, as the predicted impacts will be lower than those already predicted. With respect to emissions from the HMA plant, the HMA plant is operated by a separate entity (Miller Paving), and these emissions are already managed under an Environmental Compliance Approval 8-2129-78-987. It has been included only as a source of like contaminants. No further action required. |

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| | northeast), which is a key parameter when dispersion modeling results and impact on receptors are presented in a subsequent section.<br>c) Please specify why the 2 receptors in the southwest corner of Highway 3 and Rathfon Rd were not considered in the dispersion modeling exercise. | 4. b) The receptors are clearly identified on Tables 2 through 5. Receptors R02 and R11 are churches. All other receptors are residences. Regardless, all were considered as sensitive receptors. No further action required.<br><br>4. c) Receptors R09 and R11 are much closer to the operations and are already limiting with respect to volume sources located below grade. Including the receptors 140 metres south of Highway 3 along Rathfon Road will not impact the outcome of the assessment, nor the recommendations regarding processing plant exclusion zones or dust mitigation measures. No further action required. |
| **5** | 5. CONTAMINANTS AND SOURCES CONSIDERED<br>a) It is common practice to include in the text a table listing the relevant air quality criteria and standards for the air pollutants of concern (NO2, TSP, PM10, PM2.5, silica) with proper references.<br>b) Please modify. Dust emissions are mostly TSP, PM10, and PM2.5. However, NO2, PM10, PM2.5 are key representatives of combustion products (we usually do not consider TSP in this case). | 5. a) All relevant criteria are listed at the bottom of Tables 2, 3, 4 and 5. No further action required.<br><br>5. b) RWDI does not agree with this statement. Dust emissions are indeed mostly TSP, PM10, and PM2.5, however crystalline silica does form a portion of the dust as well. Similarly, TSP is a regulated contaminant in Ontario and was assessed from all potential sources on-site, including tailpipe emissions. It is unclear why the peer reviewer is requesting that TSP emissions be removed from the emission inventory. RWDI's approach is conservative, and appropriate. No further action required. |
| **6** | 6. EMISSION ESTIMATION<br>a) US Environmental Protection Agency's document "AP-42: Compilation of Air Emissions Factors" is the main reference to estimate emissions for this type of AQA study. Therefore, it should be cited in this section, such as (https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors, date of access; US Environmental Protection Agency, year).<br>b) What data are included in the meteorological records used for the study? Which years are considered? 1996-2000? | 6. a) Appendices A through E provide the relevant chapter from the U.S. EPA for each emission estimate. This is a stylistic preference and has no material effect on the assessment. No further action required.<br><br>6. b) The meteorological records are provided by the MECP (through Ontario Regulation 419/05) for use in conducting air quality assessments in Ontario. These are also specified in MECP Guideline A11: Air Dispersion Modelling Guideline for Ontario. All such MECP data sets use the period 1996 through 2000. These are the standard data sets used in Ontario. No further action required. |

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| | c) Please provide a short description for each operating scenario considered in the study. Are the scenarios the same as the phases (#) indicated in the figures? | 6. c) The operating scenarios refer to operations in the various phases, focusing on the phases where operations are closest to nearby receptors. These locations are shown on Figures 2a through 2d. No further action required. |
| **7** | 7. DISCUSSION OF MITIGATION MEASURES<br>a) "by maintaining a road surface moisture level of five times that of the ambient soil": Please indicate what the initial moisture level considered in the EPA study is. | 6. a) The actual value used by the U.S. EPA is not relevant, nor is it referenced by the U.S. EPA. As described in Chapter 13.2.2 of the U.S. EPA AP-42 emission factors, the key factor in the U.S. EPA is the ratio of the moisture content in the controlled surface to that of an uncontrolled surface or ambient soil. Regardless, the work by Rosbury clearly shows the required watering rate to achieve such levels of control. No further action required. |
| **8** | 8. DISPERSION MODELLING<br>a) Please indicate the date of the version for AERMOD such as "AERMOD version 19191 dispersion model (version date July 10, 2019)".<br>b) In that section it should be specified that the dispersion simulation was conducted with the 95% level of control applied to the emissions.<br>c) The meteorological dataset was obtained from https://www.ontario.ca/page/map-regional-meteorological-and-terrain-data-air-dispersion-modelling . Based on the location and characteristics of the project site, the file "West_Central_Crops", including the "London 1996-2000" dataset, seems to be the dataset required by MECP to run AERMOD. Is it the land use type used in the simulations with AERMOD?<br>d) The wind rose shown below indicates that the prevailing wind direction is mostly from the southwest, west, and northwest. Including the wind rose in the report would allow to indicate the x% of days that the sensitive receptors are downwind of the quarry. x% could be calculated from the wind direction data included in the meteorological records used to run AERMOD.<br>e) Include the bibliographic reference for the Oxygen Limiting Method. | 8. a) As per the U.S EPA model code system, the AERMOD version code is the version date. 19191 refers to Julian day 191 of 2019, which was July 10, 2019. This has been the standard convention for U.S. EPA model version codes (e.g., AERMOD, SCREEN3) for at least 2 decades.<br><br>8. b) 95% was the outcome of the modelling, and is clearly referenced in Appendix D. No further action required.<br><br>8. c) Yes, this should have been noted. The MECP "CROPS" data set for the West Central Region was used, in accordance with MECP Guideline A11. The area surrounding the proposed extension is largely crop land, with forest to the north. Regardless, using the MECP CROPS data set is the most conservative option, as the other MECP data sets all lead to lower predicted concentrations. This is well known by air quality practitioners in Ontario.<br><br>8. d) The percentage of winds blowing in any direction has no relevance to the analysis. The reason MECP Guideline A11 requires 5 years of meteorological data is to ensure that all wind directions are captured, under a wide range of |

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| | | atmospheric conditions, with 43848 lines of hourly meteorological data used in the analysis.<br><br>8. e) There is a typographical error in this section. This should be the Ozone Limiting Method. There is no such method as the Oxygen Limiting Method. |
| 9 | 9. LOCAL EMISSION SOURCES<br>a) This section includes important information that could be reorganized by sub-sections in order to make it clearer:<br>i. 9.1 Reeb Quarry (across Highway 3).<br>ii. 9.2 Kwik-Mix Materials Limited (next to the quarry).<br>iii. 9.3 Other sources (such as the Vale Facilities in Port Colborne). | 9. a) This is a stylistic preference and has no material effect on the assessment. No action required. |
| 10 | 10. BACKGROUND AIR QUALITY DATA<br>a) "Nearest" is too vague: Please consider replacing it with the approximate distance between the quarry and the closest AQ monitoring station operated by MECP, such as: "The St. Catharines ambient air monitoring station (43°09'36" N, 79°14'05" W) is approx. located 30 km from the proposed Law Quarry site extension".<br>b) The St. Catharines AQ station is considered an urban site. In general, background PM2.5 and NO2 levels (by-products of combustion processes, such as road traffic) are expected to be higher at an urban site than in a rural area where Law Quarry is located.<br>c) "A review of stations with similar land use profiles". Could you provide a list of the stations that were reviewed? | 10. a) We apologize for this oversight. It was assumed that expert peer reviewers know the location of the MECP monitoring stations. As per the Air Quality in Ontario Reports, published by the MECP, the St. Catharines monitoring station is located at latitude 43°09'36.2" and longitude -79°14'05.1". The street address is 62 Argyle Crescent, St. Catharines. It is located approximately 30 km from the subject site.<br><br>10. b) RWDI agrees with this statement. No further action required.<br><br>10. c) RWDI reviewed the stations in the Air Quality in Ontario Reports. Stations such as Tiverton, Grand Bend and Port Stanley, while in more rural areas, primarily reflect transboundary influences. Reported values of the key contaminants were higher at St. Catharines, especially NO2. The National Air Pollutant Surveillance network station at Simcoe would be more reflective of rural areas dominated by agricultural activities, but it also shows lower concentrations that at St. Catharines. |
| 11 | 11. Conclusions and Recommendations: | 11. a) The report already states this clearly: |

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| | a) This section should emphasize that the mitigation measures (e.g., 95%) appear sufficient to significantly decrease dust emissions and to minimize their impact on local air quality (i.e., at the receptors).<br>b) It should also emphasize that the wind blows from SW and NW quadrants, which will help minimize the impact of operations on the closest receptors. | "The results indicate that, with an appropriate BMPP for the site in place, concentrations at the nearby receptors are predicted to be at or below the relevant criteria for all contaminants 99.9% of the time during all phases. The results of the analysis demonstrate that the proposed Quarry extension has been appropriately designed, managed, and separated from surrounding sensitive land uses to prevent and mitigate adverse effects."<br><br>11. b) While RWDI agrees with the statement, we do not feel that it is necessary to explicitly state this in the report. It is RWDI's experience that relying on prevailing wind patterns is not an effective mitigation measure with respect to the potential magnitude of impacts, but we do agree that it reduces the probability of these impacts occurring. |
| 12 | 12. TABLES<br>a) All Tables: Relevant Criteria, PM10 row, top left of page. Should "Interim" be replaced with "24-Hour"?<br>b) Table 1: [1] corresponds to the air pollutants (i.e., PM2.5, O3, NO2) measured at the St Catharines' station. Writing [1] beside the title of the table is confusing. It would be better to write it in the relevant column headers, such as "PM2.5[1]", "NO2[1, 4]" and "O3[1, 4]"<br>c) Table 5: Correct "Cumulative". Receptor 14, PM10 row; "number of predicted excursions above criteria over 5 years" should be > 0 since "% of Relevant Criteria" is 111%.<br>d) Summarizing dispersion modeling results show that operations (from all phases) have only a very limited (negligible?) impact on 24-hour TSP concentrations at receptors and that this impact would be mostly noticeable at receptors (1 to 8) located south of Highway 3. Is this impact mostly due to area sources in the Reeb Quarry? | 12. a) No, although RWDI agrees that the term "24-hour" could be added. The same could be said for silica. Ontario's AAQC for PM10 remains interim, so that wording is correct. This not material to the assessment however, as the tables clearly designate the averaging periods. No further action is required.<br><br>12. b) This is a stylistic preference and has no material effect on the assessment. No action required.<br><br>12. c) RWDI acknowledges the typographical error in the title. With respect to the value for PM10, there is indeed an error in the PM10 results for Table 5, and Table 5 only. This has been corrected, and an updated version of Table 5 is attached.<br><br>12. d) RWDI agrees with this general conclusion, however these receptors are also much closer to the hot-mix asphalt plant, which is also a contributor. |

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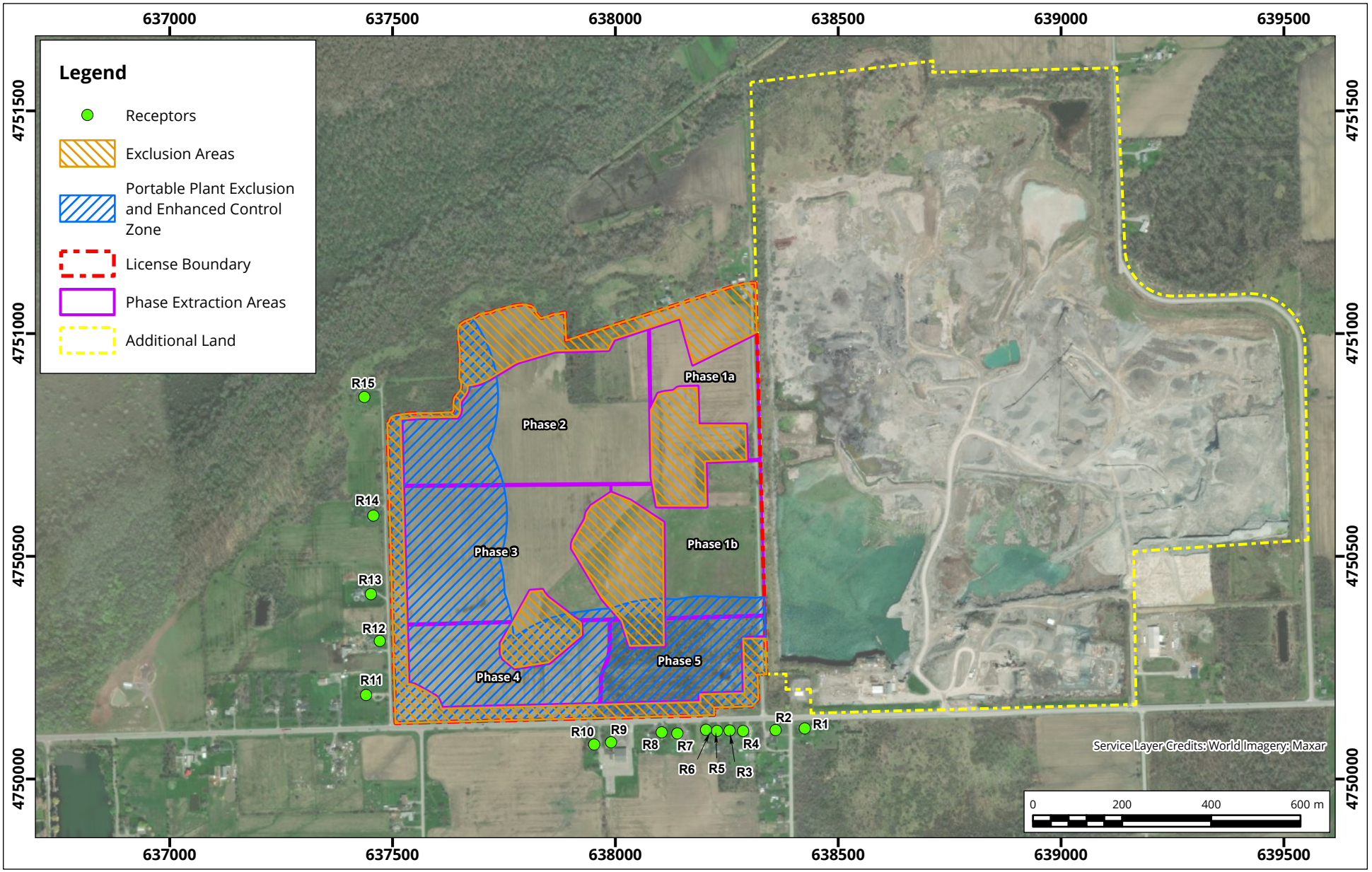
| 13 | 13. FIGURES<br>a) It is recommended that the figures include the names of the roads in the area of the current Law Quarry site and its extension.<br>b) The location of receptor R17 is missing on Figure 1. Is R17 the residence beside R16 (i.e., northeast of extension)? | 13. a) The Existing Features Plan provided as Page 1 of 5 of the ARA Site Plans clearly show the location of the existing and proposed quarry relative to Port Colborne, as well as the names of all roads near the project site. No action required.<br><br>13. b) R17 was the residence located northeast of R16. It was purchased by Waterford Group and is no longer a receptor. It was removed from the Figure 1 but was not removed from the Tables, as the modelling had already been conducted.<br><br>It should be noted that R16 has also been purchased by Waterford Group, and is no longer a receptor for the purposes of the assessment. |
| 14 | 14. REFERENCES<br>Please consider including a section at the end of the document listing the bibliographical references cited in the report. | 14. This is a stylistic preference and has no material effect on the assessment. Rather than a list of references at the end of a report, references are provided in footnotes as required. No action required. |




# Phase Extraction, License Boundary, Additional Lands & Receptor Locations

True North

| | |
|---|---|
| Drawn by: DJH | Figure: 1 |
| Approx. Scale: | 1:12,000 |
| Date Revised: | Apr 5, 2023 |

Map Projection: NAD 1983 UTM Zone 17N
Law Quarry - Port Colborne, ON

Project #: 2202166

Map Document: C:\GIS Temp - Copy\1801373\Law Quarry.aprx

# Table 5: Cumulartive Effects Assessment - Operations in Phases 3 and 4

RWDI# 2202166

## Modelled Values & Frequency of Excursions above the Relevant Criteria

Days of Valid Meteorological Data: 1745

| Relevant Criteria: | | | |
|---|---|---|---|
| | TSP | 120 | µg/m³ 24-Hour AAQC |
| | | 60 | µg/m³ Annual AAQC |
| | $PM_{10}$ | 50 | µg/m³ Interim AAQC |
| | $PM_{2.5}$ | 27 | µg/m³ 24-Hour CAAQS |
| | | 8.8 | µg/m³ Annual CAAQS |
| | Silica | 5 | µg/m³ AAQC |
| | $NO_2$ | 400 | µg/m³ 1-Hour AAQC |
| | | 200 | µg/m³ 24-Hour AAQC |

| Background Concentrations (90th Percentile, all except $O_3$) ($O_3$ 99th percentile) | | | |
|---|---|---|---|
| | TSP | 44 | µg/m³ (24-hour) |
| | | 22 | µg/m³ (Annual) |
| | $PM_{10}$ | 24 | µg/m³ (24-hour) |
| | $PM_{2.5}$ | 13 | µg/m³ (24-hour) |
| | | 6.6 | µg/m³ (Annual) |
| | Silica | 1.5 | µg/m³ (24-hour) |
| | $NO_2$ | 25 | µg/m³ (1-hour) |
| | | 21 | µg/m³ (24-hour) |
| | $O_3$ | 124 | µg/m³ (1-hour) |

| Receptor | | UTM Coordinates | | Contaminant | Averaging Period | With No Background Concentration | | | | With Additional Background Concentrations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Type | X (m) | Y (m) | | (hours) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) |
| R01 | Residence | 638425 | 4750114 | TSP | 24 | 115 | 96% | 0 | 0.0% | 159 | **132%** | **2** | **0.1%** |
| | | | | | Annual | 7 | 12% | 0 | 0.0% | 29 | 49% | 0 | 0.0% |
| | | | | PM10 | 24 | 12 | 24% | 0 | 0.0% | 36 | 72% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 6 | 21% | 0 | 0.0% | 19 | 69% | 0 | 0.0% |
| | | | | | Annual | 1 | 6% | 0 | 0.0% | 7 | 81% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 36% | 0 | 0.0% | 3.3 | 66% | 0 | 0.0% |
| | | | | NO2 | 1 | 319 | 80% | 0 | 0.0% | 344 | 86% | 0 | 0.0% |
| | | | | | 24 | 47 | 24% | 0 | 0.0% | 68 | 34% | 0 | 0.0% |
| R02 | Church | 638360 | 4750110 | TSP | 24 | 127 | **106%** | **1** | **0.1%** | 171 | **143%** | **2** | **0.1%** |
| | | | | | Annual | 6 | 11% | 0 | 0.0% | 28 | 47% | 0 | 0.0% |
| | | | | PM10 | 24 | 10 | 20% | 0 | 0.0% | 34 | 68% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 6 | 23% | 0 | 0.0% | 19 | 71% | 0 | 0.0% |
| | | | | | Annual | 0 | 6% | 0 | 0.0% | 7 | 81% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 40% | 0 | 0.0% | 3.5 | 70% | 0 | 0.0% |
| | | | | NO2 | 1 | 312 | 78% | 0 | 0.0% | 337 | 84% | 0 | 0.0% |
| | | | | | 24 | 52 | 26% | 0 | 0.0% | 73 | 36% | 0 | 0.0% |
| R03 | Residence | 638256 | 4750109 | TSP | 24 | 128 | **107%** | **1** | **0.1%** | 172 | **143%** | **1** | **0.1%** |
| | | | | | Annual | 5 | 9% | 0 | 0.0% | 27 | 46% | 0 | 0.0% |
| | | | | PM10 | 24 | 9 | 17% | 0 | 0.0% | 33 | 65% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 6 | 23% | 0 | 0.0% | 19 | 71% | 0 | 0.0% |
| | | | | | Annual | 0 | 5% | 0 | 0.0% | 7 | 80% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 40% | 0 | 0.0% | 3.5 | 70% | 0 | 0.0% |
| | | | | NO2 | 1 | 334 | 83% | 0 | 0.0% | 359 | 90% | 0 | 0.0% |
| | | | | | 24 | 53 | 27% | 0 | 0.0% | 74 | 37% | 0 | 0.0% |

| Receptor | | UTM Coordinates | | Contaminant | Averaging Period | With No Background Concentration | | | | With Additional Background Concentrations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Type | X (m) | Y (m) | | (hours) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) |
| R04 | Residence | 638287 | 4750108 | TSP | 24 | 130 | **108%** | **1** | **0.1%** | 174 | **145%** | **2** | **0.1%** |
| | | | | | Annual | 6 | 9% | 0 | 0.0% | 28 | 46% | 0 | 0.0% |
| | | | | PM10 | 24 | 9 | 18% | 0 | 0.0% | 33 | 66% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 6 | 23% | 0 | 0.0% | 19 | 71% | 0 | 0.0% |
| | | | | | Annual | 0 | 5% | 0 | 0.0% | 7 | 80% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 41% | 0 | 0.0% | 3.6 | 71% | 0 | 0.0% |
| | | | | NO2 | 1 | 331 | 83% | 0 | 0.0% | 356 | 89% | 0 | 0.0% |
| | | | | | 24 | 54 | 27% | 0 | 0.0% | 75 | 37% | 0 | 0.0% |
| R05 | Residence | 638228 | 4750108 | TSP | 24 | 125 | **104%** | **1** | **0.1%** | 169 | **141%** | **1** | **0.1%** |
| | | | | | Annual | 5 | 9% | 0 | 0.0% | 27 | 45% | 0 | 0.0% |
| | | | | PM10 | 24 | 9 | 18% | 0 | 0.0% | 33 | 66% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 6 | 22% | 0 | 0.0% | 19 | 71% | 0 | 0.0% |
| | | | | | Annual | 0 | 5% | 0 | 0.0% | 7 | 80% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 40% | 0 | 0.0% | 3.5 | 70% | 0 | 0.0% |
| | | | | NO2 | 1 | 333 | 83% | 0 | 0.0% | 358 | 89% | 0 | 0.0% |
| | | | | | 24 | 53 | 26% | 0 | 0.0% | 74 | 37% | 0 | 0.0% |
| R06 | Residence | 638203 | 4750110 | TSP | 24 | 122 | **101%** | **1** | **0.1%** | 166 | **138%** | **1** | **0.1%** |
| | | | | | Annual | 5 | 8% | 0 | 0.0% | 27 | 45% | 0 | 0.0% |
| | | | | PM10 | 24 | 10 | 19% | 0 | 0.0% | 34 | 67% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 6 | 22% | 0 | 0.0% | 19 | 70% | 0 | 0.0% |
| | | | | | Annual | 0 | 5% | 0 | 0.0% | 7 | 80% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 38% | 0 | 0.0% | 3.4 | 68% | 0 | 0.0% |
| | | | | NO2 | 1 | 329 | 82% | 0 | 0.0% | 354 | 88% | 0 | 0.0% |
| | | | | | 24 | 52 | 26% | 0 | 0.0% | 73 | 36% | 0 | 0.0% |
| R07 | Residence | 638139 | 4750102 | TSP | 24 | 110 | 92% | 0 | 0.0% | 154 | **128%** | **1** | **0.1%** |
| | | | | | Annual | 5 | 8% | 0 | 0.0% | 27 | 44% | 0 | 0.0% |
| | | | | PM10 | 24 | 10 | 20% | 0 | 0.0% | 34 | 68% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 5 | 20% | 0 | 0.0% | 18 | 68% | 0 | 0.0% |
| | | | | | Annual | 0 | 4% | 0 | 0.0% | 7 | 79% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 35% | 0 | 0.0% | 3.2 | 65% | 0 | 0.0% |
| | | | | NO2 | 1 | 305 | 76% | 0 | 0.0% | 330 | 83% | 0 | 0.0% |
| | | | | | 24 | 47 | 24% | 0 | 0.0% | 68 | 34% | 0 | 0.0% |
| R08 | Residence | 638104 | 4750105 | TSP | 24 | 103 | 86% | 0 | 0.0% | 147 | **123%** | **1** | **0.1%** |
| | | | | | Annual | 4 | 7% | 0 | 0.0% | 26 | 44% | 0 | 0.0% |
| | | | | PM10 | 24 | 8 | 17% | 0 | 0.0% | 32 | 65% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 5 | 19% | 0 | 0.0% | 18 | 67% | 0 | 0.0% |
| | | | | | Annual | 0 | 4% | 0 | 0.0% | 7 | 79% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 33% | 0 | 0.0% | 3.1 | 63% | 0 | 0.0% |
| | | | | NO2 | 1 | 293 | 73% | 0 | 0.0% | 318 | 79% | 0 | 0.0% |
| | | | | | 24 | 45 | 22% | 0 | 0.0% | 66 | 33% | 0 | 0.0% |

| Receptor | | UTM Coordinates | | Contaminant | Averaging Period | With No Background Concentration | | | | With Additional Background Concentrations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Type | X (m) | Y (m) | | (hours) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) |
| R09 | Residence | 637990 | 4750082 | TSP | 24 | 76 | 63% | 0 | 0.0% | 120 | 100% | 0 | 0.00% |
| | | | | | Annual | 4 | 6% | 0 | 0.0% | 26 | 43% | 0 | 0.0% |
| | | | | PM10 | 24 | 9 | 18% | 0 | 0.0% | 33 | 66% | 0 | 0.00% |
| | | | | PM2.5 | 24 | 4 | 14% | 0 | 0.0% | 17 | 62% | 0 | 0.0% |
| | | | | | Annual | 0 | 4% | 0 | 0.0% | 7 | 79% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 24% | 0 | 0.0% | 2.7 | 54% | 0 | 0.0% |
| | | | | NO2 | 1 | 297 | 74% | 0 | 0.0% | 322 | 80% | 0 | 0.0% |
| | | | | | 24 | 33 | 17% | 0 | 0.0% | 54 | 27% | 0 | 0.0% |
| R10 | Residence | 637952 | 4750077 | TSP | 24 | 68 | 56% | 0 | 0.0% | 112 | 93% | 0 | 0.0% |
| | | | | | Annual | 4 | 6% | 0 | 0.0% | 26 | 43% | 0 | 0.0% |
| | | | | PM10 | 24 | 10 | 19% | 0 | 0.0% | 34 | 67% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 3 | 12% | 0 | 0.0% | 16 | 61% | 0 | 0.0% |
| | | | | | Annual | 0 | 3% | 0 | 0.0% | 7 | 78% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 21% | 0 | 0.0% | 2.6 | 51% | 0 | 0.0% |
| | | | | NO2 | 1 | 299 | 75% | 0 | 0.0% | 324 | 81% | 0 | 0.0% |
| | | | | | 24 | 30 | 15% | 0 | 0.0% | 51 | 25% | 0 | 0.0% |
| R11 | Church | 637441 | 4750189 | TSP | 24 | 41 | 34% | 0 | 0.0% | 85 | 71% | 0 | 0.0% |
| | | | | | Annual | 2 | 3% | 0 | 0.0% | 24 | 40% | 0 | 0.0% |
| | | | | PM10 | 24 | 10 | 20% | 0 | 0.0% | 34 | 68% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 2 | 7% | 0 | 0.0% | 15 | 56% | 0 | 0.0% |
| | | | | | Annual | 0 | 2% | 0 | 0.0% | 7 | 77% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 12% | 0 | 0.0% | 2.1 | 42% | 0 | 0.0% |
| | | | | NO2 | 1 | 227 | 57% | 0 | 0.0% | 252 | 63% | 0 | 0.0% |
| | | | | | 24 | 18 | 9% | 0 | 0.0% | 39 | 20% | 0 | 0.0% |
| R12 | Residence | 637471 | 4750310 | TSP | 24 | 80 | 66% | 0 | 0.0% | 124 | **103%** | **1** | **0.1%** |
| | | | | | Annual | 3 | 4% | 0 | 0.0% | 25 | 41% | 0 | 0.0% |
| | | | | PM10 | 24 | 29 | 57% | 0 | 0.0% | 53 | **105%** | **1** | **0.1%** |
| | | | | PM2.5 | 24 | 3 | 11% | 0 | 0.0% | 16 | 59% | 0 | 0.0% |
| | | | | | Annual | 0 | 3% | 0 | 0.0% | 7 | 78% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 43% | 0 | 0.0% | 3.7 | 73% | 0 | 0.0% |
| | | | | NO2 | 1 | 196 | 49% | 0 | 0.0% | 221 | 55% | 0 | 0.0% |
| | | | | | 24 | 25 | 12% | 0 | 0.0% | 46 | 23% | 0 | 0.0% |
| R13 | Residence | 637452 | 4750415 | TSP | 24 | 71 | 59% | 0 | 0.0% | 115 | 96% | 0 | 0.0% |
| | | | | | Annual | 3 | 5% | 0 | 0.0% | 25 | 42% | 0 | 0.0% |
| | | | | PM10 | 24 | 25 | 50% | 0 | 0.0% | 49 | 98% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 4 | 13% | 0 | 0.0% | 17 | 62% | 0 | 0.0% |
| | | | | | Annual | 0 | 3% | 0 | 0.0% | 7 | 78% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 30% | 0 | 0.0% | 3.0 | 60% | 0 | 0.0% |
| | | | | NO2 | 1 | 194 | 49% | 0 | 0.0% | 219 | 55% | 0 | 0.0% |
| | | | | | 24 | 24 | 12% | 0 | 0.0% | 45 | 23% | 0 | 0.0% |

| Receptor | | UTM Coordinates | | Contaminant | Averaging Period | With No Background Concentration | | | | With Additional Background Concentrations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Type | X (m) | Y (m) | | (hours) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) | Maximum Predicted 24-Hour Concentration (µg/m³) | Percentage of Revelant Criteria (%) | Number of Predicted Excursions Above Criteria over 5 Years | Frequency of Predicted Excursions Above Criteria (%) |
| R14 | Residence | 637457 | 4750591 | TSP | 24 | 105 | 88% | 0 | 0.0% | 149 | **124%** | **2** | **0.1%** |
| | | | | | Annual | 3 | 5% | 0 | 0.0% | 25 | 42% | 0 | 0.0% |
| | | | | PM10 | 24 | 31 | 63% | 0 | 0.0% | 55 | **111%** | **1** | **0.1%** |
| | | | | PM2.5 | 24 | 5 | 19% | 0 | 0.0% | 18 | 67% | 0 | 0.0% |
| | | | | | Annual | 0 | 2% | 0 | 0.0% | 7 | 77% | 0 | 0.0% |
| | | | | Silica | 24 | 2 | 39% | 0 | 0.0% | 3.4 | 69% | 0 | 0.0% |
| | | | | NO2 | 1 | 255 | 64% | 0 | 0.0% | 280 | 70% | 0 | 0.0% |
| | | | | | 24 | 45 | 22% | 0 | 0.0% | 66 | 33% | 0 | 0.0% |
| R15 | Residence | 637437 | 4750858 | TSP | 24 | 62 | 52% | 0 | 0.0% | 106 | 89% | 0 | 0.0% |
| | | | | | Annual | 2 | 3% | 0 | 0.0% | 24 | 40% | 0 | 0.0% |
| | | | | PM10 | 24 | 11 | 22% | 0 | 0.0% | 35 | 70% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 3 | 10% | 0 | 0.0% | 16 | 58% | 0 | 0.0% |
| | | | | | Annual | 0 | 2% | 0 | 0.0% | 7 | 77% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 13% | 0 | 0.0% | 2.2 | 43% | 0 | 0.0% |
| | | | | NO2 | 1 | 224 | 56% | 0 | 0.0% | 249 | 62% | 0 | 0.0% |
| | | | | | 24 | 16 | 8% | 0 | 0.0% | 37 | 19% | 0 | 0.0% |
| R16 | Residence | 638112 | 4751073 | TSP | 24 | 65 | 54% | 0 | 0.0% | 109 | 91% | 0 | 0.0% |
| | | | | | Annual | 3 | 4% | 0 | 0.0% | 25 | 41% | 0 | 0.0% |
| | | | | PM10 | 24 | 10 | 20% | 0 | 0.0% | 34 | 68% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 3 | 11% | 0 | 0.0% | 16 | 60% | 0 | 0.0% |
| | | | | | Annual | 0 | 2% | 0 | 0.0% | 7 | 77% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 16% | 0 | 0.0% | 2.3 | 46% | 0 | 0.0% |
| | | | | NO2 | 1 | 188 | 47% | 0 | 0.0% | 213 | 53% | 0 | 0.0% |
| | | | | | 24 | 30 | 15% | 0 | 0.0% | 51 | 25% | 0 | 0.0% |
| R17 | Residence | 638288 | 4751083 | TSP | 24 | 69 | 58% | 0 | 0.0% | 113 | 94% | 0 | 0.0% |
| | | | | | Annual | 3 | 5% | 0 | 0.0% | 25 | 41% | 0 | 0.0% |
| | | | | PM10 | 24 | 11 | 23% | 0 | 0.0% | 35 | 71% | 0 | 0.0% |
| | | | | PM2.5 | 24 | 3 | 11% | 0 | 0.0% | 16 | 60% | 0 | 0.0% |
| | | | | | Annual | 0 | 2% | 0 | 0.0% | 7 | 77% | 0 | 0.0% |
| | | | | Silica | 24 | 1 | 18% | 0 | 0.0% | 2.4 | 48% | 0 | 0.0% |
| | | | | NO2 | 1 | 231 | 58% | 0 | 0.0% | 256 | 64% | 0 | 0.0% |
| | | | | | 24 | 26 | 13% | 0 | 0.0% | 47 | 23% | 0 | 0.0% |

**Notes:**

Values in bold indicate excursions above the relevant crtieria