



January 22, 2015

**Via: Email (kwingrove@get.on.ca)**

Ms. Kim Wingrove  
Chief Administrative Officer  
Township of Guelph/Eramosa  
8348 Wellington Road 124  
P.O. Box 700  
Rockwood ON N0B 2K0

Dear Kim:

**Re: Hidden Quarry Air Quality Report  
AirZone One's Review and RWDI's Response  
Project No.: 300032475.0000**

R.J. Burnside & Associates Limited (Burnside) has been retained to review the Air Quality Assessment related documents regarding the James Dick Construction Limited (JDCL) proposal for a quarry located in the Township of Guelph-Eramosa, Wellington County. Initially, RWDI Air Inc. (RWDI) prepared an Air Quality Assessment on behalf of JDCL. Burnside reviewed that document in November 2012. Subsequently, Airzone One Ltd. (Airzone) was retained by the Concerned Residents Coalition to prepare a review of the same Air Quality Assessment. RWDI provided a response to the Airzone review. For this review, Burnside was retained to provide a balanced review of the Airzone review and RWDI response to that review.

The relevant documents are listed in Table A:

**Table A:**

<b>File</b>	<b>Description</b>	<b>Abrev.</b>
Air Quality Report.pdf Title: "Proposed Hidden Quarry, Township of Guelph-Eramosa, Wellington County, Final Report, Air Quality Assessment" Dated: September 6, 2012	RWDI prepared an Air Quality Assessment to assess the predicted air contaminant emissions from the proposed James Dick Construction Limited (JDCL) quarry called "Hidden Quarry" in the Township of Guelph-Eramosa, Wellington County.	AQA
032475 Hidden Quarry Assess ESDM Report.pdf Title: "Memo to Dave Hopkins, Review of Hidden Quarry" Dated: November 14, 2013	Burnside's review of AQA dated November 14, 2012. As this document was not previously distributed, it has been attached in Appendix A.	RJB

<b>File</b>	<b>Description</b>	<b>Abrev.</b>
AirZone One Screening-level review of JDCL AQ Report.pdf Title: "Screening-level review of James Dick Construction Ltd. air quality assessment re: Proposed Hidden Quarry" Dated: April 15, 2014	Airzone One Ltd.'s review of the "Proposed Hidden Quarry, Township of Guelph-Eramosa, Wellington County, Final Report, Air Quality Assessment" on behalf of the Concerned Resident's Coalition (CRC).	AZO
rwdi response to airzone one.pdf Title: "RWDI Response to Airzone One Ltd. Screening-Level Review Air Quality Assessment for the Proposed Hidden Quarry" Dated: June 6, 2014	RWDI's response to issues raised by Airzone One Ltd in their review "Screening-level review of James Dick Construction Ltd. air quality assessment re: Proposed Hidden Quarry".	RSP

Other documents used as part of the review which were assigned abbreviations are listed in Table B.

**Table B:**

<b>File</b>	<b>Description</b>	<b>Abrev.</b>
Guideline A-10 Procedure for Preparing an ESDM Report (March 2009) - 3614e03.pdf	MOE guidance document directing proponents in how to prepare an ESDM in support of an Environmental Compliance Approval.	A10
O.Reg 419_05 Air Quality 1Feb2013.pdf	Ontario Regulation 419/05	OReg419

### **Overall Characterization**

Burnside was retained by the Township of Guelph-Eramosa to review the documents in Table A. The position of the reviewer is that this review should follow the spirit of R.R.O. 1990, Reg. 194, S.53.03 Expert Witness which is that a technical expert will provide opinion based evidence that is fair, objective, and non-partisan regardless of the party engaging the expert.

If RWDI was deemed to have responded sufficiently to the Airzone comment, further discussion was not provided.

The RJB document as noted in Table A is an interoffice memorandum prepared by the author of this correspondence. Although a number of improvements to the AQA as prepared by RWDI were noted in the memorandum, only a summary statement was included from this memorandum in the general review letter submitted to the municipality on January 11, 2013. In hindsight, it would have been useful to include the additional detail as per the memorandum. In the RJB, Burnside provided 11 specific comments. Those comments could be summarized as identifying several places where the documentation was insufficient as previously noted

Airzone provided a large number of comments which RWDI subsequently numbered (total of 44). A summary of the AZO would appear to be similar to the RJB summary: There are numerous places in the AQA document that did not provide sufficient documentation.

RWDI has attempted to provide a substantial amount of that missing documentation in the text of the RSP.

Overall, the documents in Table A show:

- The proponent can receive an Environmental Compliance Approval for the property (as summarized in the initial general review letter of January 11, 2013),
- Including road dust, there are some exceedences of the appropriate particulate criteria,
- The number of exceedences predicted depends on the scaling factor used to predict the background values for PM<sub>10</sub> and TSP based on the PM<sub>2.5</sub> background values. Using either scaling factor, the number of exceedences is likely acceptable since the exceedences will only happen when the meteorological conditions match the model and the production is at a maximum, which the proponent indicates is unlikely. The difference between scaling factors is within the uncertainty of each factor.

Based on these points, the AQA shows that the HiddenQuarry is unlikely to cause an adverse effect to sensitive receptors in the area.

Additional detail is provided below. To make it easier for the reader, the location in the appropriate and related portion of a document is given **in bold** and the quote from the original text of that document is provided *in italics*. Burnside comments are provided in regular text.

### **General Overview (RSP Letter) – Conservative Worst-Case**

**AZO, Section 4.1, paragraph 3:** *...The key issue in assessing those data is dealing with the range of data values from those other sites. Unless one has good reason to argue against it, it is prudent to choose the upper limit of the range, the value that will result in the highest emissions or impacts.*

**In RSP, General Overview, paragraph 3:** *... RWDI profoundly disagrees with this statement and considers it to be inconsistent with sound engineering and scientific principles. It is not appropriate to choose the upper limit of the range for every uncertain input that goes into the model. This would lead to unrealistically high results that would not be informative for decision-making purposes.*

### **In A10, section 8.2, paragraph 3-5 (page 52 of 131):**

*In summary, the emission rate estimating must be either:*

- *“conservative”<sup>11</sup>, as represented by paragraph 1 of subsection 11(1); or*
- *as accurate as possible, as represented by the methodologies set out in paragraphs 2 and 3 of subsection 11(1).”*

*In many cases, emission rate estimating is an iterative process where estimates start out conservative and are then refined to be more accurate and less conservative when earlier iterations result in a prediction of an exceedence of a MOE POI Limit. Although the emission rate estimating methodologies described in paragraph 2 and 3 of subsection 11(1) of the Regulation can be selected at any time, they also represent the end of the iterative or refinement process.*

<sup>11</sup> *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.*

## **OReg419 Section 11:**

### *Source of contaminant emission rates*

*11. (1) An approved dispersion model that is used for the purposes of this Part shall be used with an emission rate that is determined in one of the following ways for each source of contaminant and for each averaging period applicable to the relevant contaminant under section 19 or 20, whichever is applicable:*

- 1. The emission rate that, for the relevant averaging period, is at least as high as the maximum emission rate that the source of contaminant is reasonably capable of for the relevant contaminant.*
- 2. The emission rate that, for the relevant averaging period, is derived from site specific testing of the source of contaminant that meets all of the following criteria:
  - i. The testing must be conducted comprehensively across a full range of operating conditions.*
  - ii. The testing must be conducted according to a plan approved by the Director as likely to provide an accurate reflection of emissions.*
  - iii. The Director must be given written notice at least 15 days before the testing and representatives of the Ministry must be given an opportunity to witness the testing.*
  - iv. The Director must approve the results of the testing as an accurate reflection of emissions.**
- 3. The emission rate that, for the relevant averaging period, is derived from a combination of a method that complies with paragraph 1 or 2 and ambient monitoring, according to a plan approved by the Director as likely to provide an accurate reflection of emissions. O. Reg. 516/07, s. 7 (1); O. Reg. 507/09, s. 9 (1).*

The text of the regulation above provides insight into the level of conservativeness generally expected by agencies in Ontario. Where the estimate is not “conservative”, the report would be expected to document the justification for a less conservative emission rate.

Over the last 10 years, the MOE has been requiring better and better documentation. This report was written in 2012 and so to expect 2014 levels of documentation is unrealistic; however, expecting 2012 levels of documentation is not unrealistic. The comments identified in the R.J. Burnside & Associates Limited document were intended to hold the authors to that level of documentation.

### **Table 1 (RSP Table 1) - Material Moisture Levels**

**RSP, Table 1, Material moisture levels:** *Used middle-of-the range values from published data and previous measurements by RWDI for above-water aggregate extraction; whereas, this will be predominantly an underwater extraction operation.*

The site will be “predominantly an underwater extraction operation” but the initial extraction will be *above-water* and so the above-water moisture levels will be representative of extraction emissions; however, the majority of the extraction over the life of the facility will “be predominantly an underwater extraction operation”.

Therefore, while the worst-case is appropriately specified, that situation will exist for a relatively short period of time relative to the life of the site.

It might be more representative to characterize the RWDI approach for this parameter as unbiased. Note that this change would not alter the final opinion of the document.

#### **Comment 4 (RSP Table 2) – Missing combustion By-Products Assessments.**

**AQA section 3.1.1.3 (p. 9 of 80):** *With respect to emissions of combustion by-products from on-site mobile equipment and the drag-line, the principal contaminants of interest are typically nitrogen oxides (NOx), PM<sub>2.5</sub>, PM<sub>10</sub>, and TSP and these are used as surrogates for all products of combustion.*

**AZO p.9 of 25:** *It is more reasonable to have followed the general procedure that RWDI did in their Henning Pit analysis (although some of the details of their procedure were questionable). Thus, BaP should have been included in their analysis for the present JDCL assessment. In their Henning Pit assessment, RWDI demonstrated that BaP has the highest potential to exceed the air quality standard; thus it would potentially be the contaminant of greatest concern.*

**RSP, comment 4:** *RWDI has conducted environmental assessments for highway projects throughout Ontario, and based on RWDI's analysis and experience, NO<sub>2</sub> is a suitable surrogate for examining potential impacts from diesel-fuelled vehicle emissions.*

*The primary reason for including benzo(a)pyrene in the Henning Pit assessment was due to the presence of an asphalt recycling operation. There are no plans for asphalt recycling at the proposed Hidden Quarry.*

**A10 section 7.1.1 Combustion of Natural Gas and Propane (page 36 of 131):** *The significant contaminant from the combustion of natural gas and propane is typically nitrogen oxides. Other contaminants, for this type of source, are generally emitted in negligible amounts.*

While the A10 guidance does not apply directly to emissions from the combustion of diesel, it does illustrate the methodology recommended by the MOE. Presentations by the MOE have indicated that the reason for the above guidance is that they have determined that the nitrogen oxide emission factors are the largest percent of criteria of all the contaminant emission factors for products of combustion from natural gas so that for any source of natural gas combustion, the nitrogen oxide limit will be reached before any other contaminant.

Previous MOE guidance directed the proponent to model nitrogen oxides and any other contaminant emitted by the site that is also emitted as a product of combustion which is what RWDI has done.

Since there are no other sources of the contaminants produced as products of combustion, it seems reasonable to assess the emission of nitrogen oxides against its criteria since the other contaminants will show a lower percentage of criteria.

Using the emission factors in AP-42, "3.3 Gasoline And Diesel Industrial Engines", Table 3.3-1 and comparing to the various criteria in Schedule 3 of OReg419 shows the same relationship: emission factors will always result in nitrogen oxide POI concentrations meeting criteria before any other contaminant reaches its respective criteria.

## **Comment 8 (RSP Table2) – Fugitive Road Dust and Storage Piles in ECA Application**

**AQA section 3.3.2.1 (page 12 of 80):** *JDCL will develop a Best Management Practice Plan, which will serve as a guideline for dust management practices at the facility. With the implementation of this plan, the facility is exempt from assessing particulate emissions from paved roadways, unpaved roadways, and aggregate storage piles located on-site, as per guidance in Section 7.4.1 of MOE Guideline A10.*

**AZO (p.11 of 25), paragraph 1:** *... MOE guideline s.7.4.1, which only refers to no requirement to assess metals in dust; other components still need to be assessed.*

**RSP, Table 2, comment 8:** *Mr. Di Giovanni misunderstands Section 7.4.1 of MOE Guideline A10.*

*Section 7.4.1 actually refers to a specific set of facilities (identified by the relevant North American Industrial Classification System, or NAICS Code) that must include metals from road dust emissions in their compliance assessment. An aggregate facility such as the proposed Hidden Quarry falls under NAICS Code 212315, which is not included on Table 7-2 in Section 7.4.1. Therefore, dust emissions from internal haul roads can be excluded from the compliance assessment. RWDI's interpretation of the MOE guidance has been confirmed to RWDI by the MOE on numerous occasions.*

*In any case, additional model runs were performed as part of the cumulative effects assessment that included the haul roads.*

**A10, section 7.4.1, paragraph 1:** *Fugitive particulate from on-site roadways and storage piles (that are susceptible to wind erosion) must be included in an ESDM report when the particulate contains significant quantities of contaminants (e.g., metals) that contribute to an MOE POI Limit that may cause a health effect. As set out below, in certain circumstances fugitive particulate does not have to be included in the ESDM report if the facility has implemented a best management practices approach to fugitive dust.*

**A10, section 7.4.1, Heading 2:** *Fugitive dust emitted from facilities in the sectors listed in Table 7-3 is generally not anticipated to contain significant quantities of metals. Nevertheless, fugitive particulate from on-site roadways and storage piles from facilities within the sectors listed in Table 7-3 must be included in the assessment of compliance with MOE POI Limits unless the facility:*

- 1. implements a BMP plan;*
- 2. includes a BMP plan as an Appendix to the ESDM report;*
- 3. retains a BMP plan and implementation on-site for inspection by the MOE; and ...*

*It should be noted that proponents may be asked to include sources of fugitive dust in the ESDM report if the best management practices plan is not acceptable to the MOE.*

The position in both AZO and RSP agree that JDCL's quarry would appear in Table 7-3 under the heading "2123 Non-Metallic Mineral Mining and Quarrying" so heading 2 applies.

**AQA section 3.2.1.4, paragraph 3:** *JDCL will also develop a Best Management Practice Plan (BMPP), which will serve as a guideline for dust management practices at the facility. As Section 7.4.1 of MOE Guideline A10 allows for the exclusion of stockpiles when a BMPP is in place, and given the washed nature of the aggregate, emissions from the aggregate stockpiles are expected to be insignificant.*

Therefore, while “*particulate from on-site roadways and storage piles can be omitted if a BMP Plan is provided*”, the AQA does not provide a BMP plan (requirement 2) and so does not meet all the requirements of A10 but does indicate that one will be prepared. The AQA indicates that the BMP can be written to achieve the mitigation suggested but does not provide the details. Burnside is confident that a BMP plan will be written for the Site that will demonstrate the level of mitigation indicated and so can be prepared at a later time.

Note that while the road dust emission is ignored as part of the ECA Application assessment portion of the AQA document, it is not ignored in the “Cumulative Effects Modelling” portion of the report.

#### **Comment 12 (RSP Table 2) – Soil Moisture Content**

**AQA section 4.2.1 (page 14 of 80):** *A moisture value of 5% was used to reflect the high moisture content of material taken directly from the working face. This is consistent with RWDI’s experience at sand and gravel operations in Southern Ontario.*

**AZO (p.11 of 25), last paragraph:** *RWDI needs to explicitly prove that 5% is a reasonably conservative value to use. In this case, a conservative value would be the lowest moisture value (driest) that it could reasonably be. In this we cannot depend on “RWDI’s experience at sand and gravel operations in Southern Ontario” so we cannot verify if those other experience(s) are representative of the situation at the proposed Hidden Quarry. Rather than assume “trust” in RWDI’s “experience,” RWDI must, instead, provide explicit evidence of their claims. Without such explicit evidence, these claims remain uncertain and unverifiable.*

**RSP, Table 2, comment 12:** *The value of 5% for moisture content was conservatively based on previous measurements by RWDI at aggregate sites where unconsolidated aggregates were extracted. RWDI’s measurements show moisture values consistently higher than 5%.*

If possible, RWDI should provide a brief summary of the results they do have, perhaps with sample analysis sheets. If not, a statement like “In the past, RWDI has measured soil moisture content more than x times with resulting values between y and z and a mean/median of a.” would provide assurance that, if required, RWDI can demonstrate that their value is defensible.

#### **Comment 14 (RSP Table 2) – Supplemental Control Efficiency**

**AQA section 4.2.3 (page 15 of 80):** *The amount of aggregate material handled at each location was assumed to be equivalent to the production rate of the material stockpiled at that location. A supplemental control efficiency of 90% was applied to reflect the washed nature of the aggregate.*

**AZO (p.12 of 25), paragraph 7:** *We require quantitative evidence of RWDI’s “supplemental control efficiency of 90%” claim...*

**RSP, Table 2, comment 14:** *It is normally assumed that there are negligible emissions from handling of washed stone, and it is common practice for air quality experts to assume 100% control when dealing with aggregate sites. This practice is supported by observations made by RWDI and other respected air quality consulting firms over decades of work on aggregate sites.*

*Regardless, RWDI has used 90%, which is conservative given the washed nature of the stone.*

**AP-42 Chapter 13.2.4 Aggregate Handling and Storage Piles, section 13.2.4.2, paragraph 2:** *When freshly processed aggregate is loaded onto a storage pile, the potential for dust emissions is at a maximum. Fines are easily disaggregated and released to the atmosphere upon exposure to air currents, either from aggregate transfer itself or from high winds. As the aggregate pile weathers, however, potential for dust emissions is greatly reduced. Moisture causes aggregation and cementation of fines to the surfaces of larger particles. Any significant rainfall soaks the interior of the pile, and then the drying process is very slow.*

The washing process is intended to remove the fines from the rest of the aggregate leaving a clear stone. Based on the AP-42 quote, the majority of the emissions would be expected to occur when the aggregate is first loaded onto a storage pile. Since the washed aggregate will still be wet at that time, the expectation of dust being emitted from this source is low. Further, the AP-42 text indicates that the remaining fines will be bound because of “aggregation and cementation of fines to the surfaces of larger particles” as the pile ages and so there will be less dust released later.

This assessment of the process clearly suggests that a 90 % reduction is reasonable.

#### **Comment 18 (RSP Table 2) – Source Characterization**

**AQA, Section 6, paragraph 2 (p. 22 of 80):** *Sources were modelled as a series of volume sources with parameters based on information obtained from the Site Plan and typical dimensions of processing equipment and vehicles used at other facilities of this nature. The modelled source parameters are consistent with guidance from the NSSGA<sup>2</sup>. Internal haul roads were modelled as adjacent volume sources, also in accordance with guidance from the National Sand Stone and Gravel Association and the U.S. EPA.*

**AZO (p.12 of 25), 2<sup>nd</sup> last paragraph:** *The volume source specifications used by RWDI require a third-party check. This should be completed as part of a more detailed review.*

**RSP, Comment 18:** *This was conducted by the Township's peer reviewer and no concerns were raised. No additional action required.*

Burnside was not able to retrieve a copy of “Modelling Fugitive Dust Sources”, National Stone, Sand & Gravel Association, Alexandria, VA., 2004 without paying for it as it is a copyrighted document. An earlier document<sup>1</sup> provides a detailed method for modelling haul roads using AERMOD. Where it could be determined, the method of determining parameter values in the earlier document was the same as the method used in the Lakes Environmental’s “Haul Road” calculator.

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<sup>1</sup> “Analysis Of Haul Road Emission Test Data For Determining Dispersion Modeling Parameters”, Arron Heinerikson, Abby Goodman, and Kathryn Anderson, Trinity Consultants, 25055 West Valley Parkway, Suite 101, Olathe, Kansas 66061, August 15, 2003.



Lakes Environmental's "AERMOD Air Dispersion Modelling Course" in the "Lakes\_AERMOD\_Course\_Slides.pdf" from the course presented in Toronto on September 16-17, 2013, on slide 292 indicates that examples of volume sources include "Examples: building roof monitors, multiple vents, conveyor belts, haul roads".

Burnside did not identify any missing sources.

### **Comment 21 (RSP Table 2) – Sensitive Receptors**

**AQA, Section 6.1.2, paragraph 2 (p. 23 of 80):** *In addition, 18 discrete receptor locations were included in the assessment. These receptors represent residences near the quarry.*

**AZO (p.15 of 25), paragraph 2:** *As part of a more detailed review, there should be a third-party check that all appropriate human receptors have been included in the assessment, including future potential, as-of-right, land uses.*

**RSP, Comment 21:** *This was conducted by the Township's peer reviewer and no concerns were raised. No additional action required.*

Burnside used Google Earth and Google Street View to review the area for sensitive receptors. Burnside identified a number of locations<sup>2</sup> which would be considered sensitive receptors that were not identified in AQA; however, in every case, there was an identified receptor closer to the site than the omitted receptor. Given that the impact will be higher closer to the site, the existing list of receptors is expected to adequately show all the relevant impacts.

### **Comment 22 (RSP Table 2) – Terrain Data**

**AQA, Section 6.1.4, paragraph 1 (p. 23 of 80):** *Terrain information for the area surrounding the facility was obtained from the MOE Ontario Digital Elevation Model Data web site. The terrain data is based on the North American Datum 1983 (NAD83) horizontal reference datum. These data were run through the AERMAP terrain pre-processor to estimate base elevations for receptors and to help the model account for changes in elevation of the surrounding terrain. Base elevations for sources are based on information contained on the Site Plan and are assumed to be at the elevation of the first lift.*

**AZO (p.15 of 25), paragraph 5:** *Cross reference to the Site Plan is required to verify the credibility of this assumption; further explanation may be required.*

**RSP, Comment 22:** *RWDI used the terrain data provided by the MOE for use in dispersion modelling assessments. This approach is standard practice for dispersion modelling in Ontario. Base elevations within the quarry were based on the Site Plans. The Township's peer reviewer raised no concerns with the base elevations used. No additional action required.*

Burnside agrees that the methodology described for the incorporation of terrain data is the appropriate method to incorporate height elevations.

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<sup>2</sup> 4216 Highway 7, 4248 Highway 7, 5198 Highway 7, and 14207 Fifth Line Nassagaweya.

## Comment 27 (RSP Table 2) – Background PM2.5 Levels

**AQA, Section 6.4, paragraph 7 (p. 25 of 80):** *Background PM2.5 levels were based on a 5-year average of the annual 90th percentile hourly concentration measured at the MOE monitoring station in Guelph (14.8 µg/m<sup>3</sup>).*

**AZO (p.16 of 25), paragraph 6:** *Notwithstanding the previous comment, in regards to the use of the Guelph air quality dataset, why was the average and not the maximum 5-year 90<sup>th</sup> percentile used? Significant between-year variations may lead to underestimates of base-line, background concentrations if only the average is used. Elaboration is required of year-to-year differences in the 90<sup>th</sup> percentile value (if this dataset were to be justified as appropriate). Also, does the quality of the dataset used justify use of the 90<sup>th</sup> percentile (as opposed to the maximum)?*

*Notwithstanding the previous criticism there should be a third-party check of the analysis of background data from the Guelph station used by RWDI.*

**RSP, Comment 27:** *The information used by RWDI is publicly available information through the MOE's Air Quality in Ontario Reports. With respect to the Guelph monitoring station had 8561 hours of valid observations for PM2.5 in 2011 (compared to 8760 hours the year), and a similar number of observations in previous years. The data set for this location is therefore suitable for this assessment.*

*Given the decreasing trend in PM2.5 concentrations both at the Guelph monitoring location, and throughout Ontario as a whole over the last decade, using the 5-year average of the 90th percentile is indeed conservative. In fact, the most recent MOE report (2011 Air Quality in Ontario Report) report shows a corresponding value of 13 µg/m<sup>3</sup> which is below the average value used in the AQA.*

Burnside has verified that the MOE published value<sup>3</sup> for PM<sub>2.5</sub> at the Guelph monitoring station in 2011 is 13 µg/m<sup>3</sup>. The 90<sup>th</sup> percentile values PM<sub>2.5</sub> at the Guelph monitoring station are listed in the table below.

Year	PM <sub>2.5</sub> 90 <sup>th</sup> percentile value (µg/m <sup>3</sup> )
2011 <sup>4</sup>	13
2010 <sup>5</sup>	14
2009 <sup>6</sup>	12
2008 <sup>7</sup>	15
2007 <sup>8</sup>	17
2006 <sup>9</sup>	16

Average of 2006 through 2010 values = 14.8 µg/m<sup>3</sup>.

<sup>3</sup> "Air Quality in Ontario Report & Appendix (2011) - stdprod\_104486.pdf" page 52 of 96.

<sup>4</sup> "Air Quality in Ontario Report & Appendix (2011) - stdprod\_104486.pdf" page 52 of 96.

<sup>5</sup> "Air Quality in Ontario Report & Appendix (2010) - stdprod\_095558.pdf" page 50 of 90.

<sup>6</sup> "Air Quality in Ontario Report & Appendix (2009) - stdprod\_081228.pdf" page 28 (34 of 52).

<sup>7</sup> "Air Quality in Ontario Report & Appendix (2008) - std01\_079215.pdf" page A1 (79 of 110).

<sup>8</sup> "Air Quality in Ontario Report & Appendix (2007) - std01\_079175.pdf" page 71 (79 of 118).

<sup>9</sup> "Air Quality In Ontario Report And Appendix 2006.pdf" page 66 of 81.

The 90<sup>th</sup> percentile background value is the value typically used as the background in air quality assessments for environmental assessments.

**Comment 28 (RSP Table 2) – PM10 and TSP Background Estimation Method**

**AQA, Section 6.4, paragraphs 8&9 (p. 25 of 80):** *Background TSP was derived from the PM2.5 data for Guelph, based on an estimated PM2.5/ TSP ratio of 0.30. This value came from a published study of 500 monitoring sites in the US.<sup>3</sup> The resulting 90<sup>th</sup> percentile background concentration is 49 µg/m<sup>3</sup>.*

*Background PM10 was also derived from the PM<sub>2.5</sub> data for the Guelph, based on an estimated PM<sub>2.5</sub>/PM<sub>10</sub> ratio of 0.54 from the study noted above. The resulting 90<sup>th</sup> percentile background concentration is 27 µg/m<sup>3</sup>.*

**AZO (p.16-17 of 25):** *RWDI used scaling factors to derive (by calculation) estimated background levels of PM10 and TSP (based upon measurements of the PM2.5 dust size fraction) as measurements of these larger size fractions were not conducted at the chosen site. RWDI obtained these scaling factors from a study by Lall et al. (Atmos.Environ. 2004), which represented measurements from Metropolitan locations in the US. However, there is a similar Canadian version of this study, which provides different scaling factors (Brook et al. J. Air & Waste Manage. Assoc., 1997) and includes data from rural southern Ontario. The values derived in the Canadian study indicates: “On average across all sites, PM2.5 accounted for 49% of the PM10, and PM10 accounted for 44% of the TSP.”*

**RSP, Comment 28:** *The differences to which Dr. DiGiovanni reflect some of the uncertainty in the estimates of the background concentrations of PM<sub>10</sub> and TSP. However the differences are small and are not material to the findings of the assessment.*

*This source of uncertainty is adequately accounted for in the conservatisms built into the analysis, such as using the 90<sup>th</sup> percentile values.*

The background concentrations provided using the scaling factors provided by RWDI and Airzone One are in the table below.

<b>RWDI value for PM2.5</b>	<b>90th Percentile PM2.5</b>	<b>Calculated PM10</b>	<b>Calculated TSP</b>
AQA	14.8	27.41	49.33
AZO	14.8	30.20	68.65
Difference (µg/m <sup>3</sup> )		2.80	19.31
% increase (AZO-AQA/AQA)		10.2%	39.1%
Criterion (µg/m <sup>3</sup> )		25	120
Difference as a % of Criterion [Difference (µg/m <sup>3</sup> ) / Criterion (µg/m <sup>3</sup> )]		11.2%	16.1%

A slightly longer quote of the document referenced in AZO<sup>10</sup> says *On average across all sites, PM<sub>2.5</sub> accounted for 49 % of the PM<sub>10</sub>, and PM<sub>10</sub> accounted for 44 % of the TSP. However, there was considerable variability among sites, with the mean PM<sub>2.5</sub> to PM<sub>10</sub> ratio ranging from 0.36 to 0.65. This ratio varied substantially from measurement to measurement, but at most sites a majority (>50 %) of the ratios were within ± 10 % of the median value.*

The values presented appear to agree with all the above statements.

#### **Comment 29 (RSP Table 2) – Background O<sub>3</sub> and NO<sub>2</sub>**

**AQA, Section 6.4, paragraph 10 & 11 (p. 25 of 80):** *Background O<sub>3</sub> concentrations were obtained from the MOE monitoring station in Guelph. A 5-year average of the annual 90<sup>th</sup> percentile hourly and daily concentrations was adopted.*

*NO<sub>2</sub> concentrations were not measured at the Guelph station prior to 2010, so data from the MOE monitoring station in Kitchener were used for the years prior to 2010. NO<sub>2</sub> levels in Kitchener in 2010 were similar to but slightly higher than in Guelph, and therefore it is expected that using NO<sub>2</sub> data from Kitchener will be conservative, and is therefore appropriate. The MOE does not provide 90<sup>th</sup> percentile values of the 24-hour average concentrations, therefore, as a conservative simplification, the 90<sup>th</sup> percentile 1-hour average concentration was used as the 24-hour value.*

**AZO (p.17 of 25), paragraph 3:** *Values derived for ozone and NO<sub>2</sub> should be checked at some point in the future.*

**RSP, Comment 29:** *This was conducted by the Township's peer reviewer and no concerns were raised. No further action required.*

Burnside verified that the values in AQA, Table 6.4 (page 37 of 80) corresponded to the values in the appropriate MOE reference.

#### **Comment 33 (RSP Table 2) – RJ Burnside Review Was Inadequate**

**AZO (p.18 of 25), paragraph 8:** *I do not understand what is meant by "although the documentation took some time to interpret." RJB's focus on an MOE ECA application would seem to ignore the more fundamental study on cumulative impacts. Given these two issues it would be of interest to enquire as to the expertise and experience of the RJB reviewers.*

**RSP, Comment 33:** *Dr. DiGiovanni has questioned the credentials of the Township peer reviewer, which is a serious allegation without providing any sound substantiation.*

The author to this report is Harvey Walter Watson. I am a Professional Engineer (P.Eng.) registered in the Province of Ontario (number 90401571). I am the Technical Group Leader of the Air and Noise Group at R.J. Burnside & Associates Limited (Burnside). I have been employed at Burnside as a professional Engineer in this role since 2012 and in a similar position at DJA Environmental Consultants Inc. starting in 2002. I have an Honours Bachelors of Applied Science degree (B.A.Sc.) in Chemical Engineering, with a minor in English and a specialization in Environment, 1991.

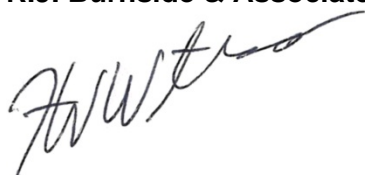
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<sup>10</sup> "Journal of Air & Waste Management - Issue 47\_1 (1997) pages 2-17.

I have been actively engaged in the environmental field for over 20 years. I have been preparing Environmental Compliance Approval (ECA) Applications full time since 2003. In that time I have written and submitted to the Ministry of the Environment (MOE) more than 100 Applications all of which have been approved and I continue to prepare ECA Applications. I am a member of the Air Practitioners Group in Ontario which brings issues to the MOE of concern to the regulated community. I am a past member of the AWMA's Best Practises Committee which prepared guidance to the entire province on the best practises used for the submission of ECA Applications to the MOE. Prior to that, I spent 8 years writing software that companies used to monitor their environmental programs and subsequently assisting companies to configure that software to match their real world situation.

Yours truly,

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



Harvey Watson, P.Eng.  
Technical Group Leader, Air and Noise  
HW:sj



Don McNalty, P.Eng.  
Vice President, Public Sector

Enclosure(s)      Appendix A - 032475 Hidden Quarry Assess ESDM Report.pdf

cc:      Elizabeth Howson, Macaulay Shiromi Howson Ltd (enc.) (Via: Email –  
howson@mshplanning.ca)

Ms. Kim Wingrove, Chief Administrative Officer  
January 22, 2015  
Project No.: 300032475.0000

## Appendix A



## Memo

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**Date:** November 14, 2012 **File No.:** 300032475  
**Project:** Review of Hidden Quarry  
**Prepared By:** Harvey Watson  
**Distribution:** Dave Hopkins

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### Comments

Dave,

In general, RWDI prepared an Emission Summary and Dispersion Modelling (“ESDM”) report that was well written and followed the Ontario Ministry of the Environment (“MOE”) guidance “A-10 – Procedure for Preparing an ESDM Report”. The air dispersion model used (AERMOD) is an acceptable air dispersion model and produces results that are acceptable to the MOE for the foreseeable future. The older model (346) would not have been a good choice. The format of the application document titled “Proposed Hidden Quarry, Township of Guelph-Eramosa, Wellington County, Final Report, Air Quality Assessment, September 6, 2012” (the “Application”) followed the recommended format as provided in the “Acme” examples which provides examples of how the MOE would like to see application documents prepared. The basic concept of the “Procedure for Preparing an ESDM Report” guidance is that the proponent must write an ESDM that describes the “worst case reasonable” operations at the location. Having done that and showing compliance, it is then reasonable to expect that the proponent will always be in compliance.

The air dispersion methodology used followed the methodology outlined in the MOE’s Guideline “A-11 Air Dispersion Modelling Guideline for Ontario (ADMGO)”.

The first simplifying assumption of the Application is that the only contaminant of concern at the location is particulate matter. While the dolostone collected has a large number of constituents, the majority of them have no specific criteria and the ones that do have individual criteria are found in concentrations much less than the concentration that would cause them to exceed their criterion before the particulate matter criterion is exceeded. Therefore, this simplifying assumption is reasonable.

The Application indicates that the emissions for dry extraction will exceed the emissions for underwater extraction which is also a reasonable assumption because the aggregate that is removed during the underwater extraction will be wet and not emit as much dust.

There was nothing in this ESDM to indicate that the site could not request and receive an Environmental Compliance Approval (“ECA”). The modelling appears to have taken into account all the appropriate scenarios and situations. However, the ESDM document did not always make it easy to find the information or confirm that what was done did meet the criteria.

The recommended improvements in documentation are listed below.

- 1) Section 4.1.1 Paragraph 2 (page 13 of .pdf) says “The option exists to use conveyors to move material from working face to the processing plant.” However, the information in Table 2.1 and Table 5.1 do not provide sufficient information to determine whether the “Compliance” simulation used conveyors as sources of emissions to demonstrate compliance. Would it be possible to add this information to Table 5.1 to show which scenario used which sources?
- 2) Section 4.2.4 Paragraph 2 (page 15 of .pdf). The author may wish to state in the document that “intensive flushing / sweeping programs” will be employed at the Site and so the lower silt loading used is reasonable rather than just indicating that such a program would have the stated effect.
- 3) The ESDM write up in Section 4.3 does not indicate to which of the 13 tables in Appendix B each calculation relates. Would it be possible for the author to indicate specifically which table and row is the subject of each calculation described in Section 4.3? This additional information would make finding and verifying the calculations much easier.

For instance, section 4.3.1.2 shows an emission rate of 0.13 g<sub>SPM</sub>/s. That value was the first emission rate calculated but that value appeared as “1.3 E-01” in the 11<sup>th</sup> column of 15 columns in the second table in Appendix B.

- 4) Section 4.3.3.1 shows the “Material Handling Emission Factor” as  $3.2 \times 10^{-3}$  kg<sub>TSP</sub>/Mg<sub>aggregate</sub>. The corresponding emission factor in Appendix B1, “Bulk Material Handling / Transfer Emissions” on the 4<sup>th</sup> row from the bottom (LOADOUT1) shows “ $3.2 \times 10^{-4}$ ”. If the table shows the emission factor “(with controls if applicable)”, why would the calculation in section 4.3 not show the same value?
- 5) Section 4.4 (page 20 of .pdf) paragraph 1 says “The assessment of data quality for each emission rate is provided on Table 5.1, and is generally based on the AP-42 data quality ratings. In general, the emission data quality ratings for the processing sources are equivalent to a “Marginal” rating as per Section 8.3 of MOE Guideline A10. The emission factors used, and the data quality rating assigned to those factors do reflect the best available data for these types of sources, and are accepted by the MOE for air quality assessments of this nature.”

While the above is all accurate, Guideline A-10 in Section 8.3.4 says “In many cases, the use of emission rate estimating methodologies that are classified as Marginal or Uncertain Data Quality may be the only available method. Where the maximum POI concentration is not approaching the MOE POI Limit (i.e., the POI concentration is less than 10% of the respective limit), emission rate estimates of Marginal or Uncertain Data Quality, would be adequate. In most cases, where POI



concentrations are more significant, emission rate estimates that are based on Marginal or Uncertain Data Quality may also be considered acceptable provided these emission rate estimates have been altered to be sufficiently conservative.”

As a result, the author may wish to provide the justification recommended by Guideline A-10 since the POI concentrations exceed 10 % of the criterion for TSP at the property line in the compliance scenario.

- 6) Section 7.2.1 (page 27 of .pdf) indicates that “the facility is in compliance with the relevant criteria at the property line and at all receptor locations, with the exception of PM<sub>10</sub> along the property line.” Table 7.1A (page 38 of .pdf) shows a maximum value of 48 % of criterion for PM<sub>10</sub> at the property line under the heading “P3”. Does the text refer to Table 7.1A?
- 7) Table 2.1 Sources and Contaminant Identification Table (page 31 of .pdf) indicates that “C01 – Conveyer Transfer” is discussed in Section 3.2.2.3. The text on page 11 of the .pdf goes from Section 3.2.1.5 to 3.3 without any 3.2.2 in the middle.
- 8) Appendix B1 Crushed Stone Processing (page 61 of .pdf). The AP-42 factor for the primary crusher is 6.0E-04. That factor is the factor from AP 42 for a tertiary crusher. The author may wish to explain why the factor for a tertiary crusher can be used in this instance.
- 9) Appendix B1 Crushed Stone Processing (page 61 of .pdf). The AP-42 factor for the primary crusher is 6.0E-04. If the maximum processing rate is 500 tonnes/hour (Mg/h), then how was the emission rate of 0.075 g/s calculated?  $500 \text{ Mg/h} * 0.0006 \text{ kg/Mg} * 1000 \text{ g/kg} / 3600 \text{ s/h} = 0.08333 \text{ g/s}$ .
- 10) Appendix B1 Crushed Stone Processing (page 61 of .pdf). There are multiple columns which have a column title of “1”, “3”, “5”, etc. The table would be more easily understood if there was an indication that these values correspond to the wind speed used to generate the emission rate in that column.
- 11) Tables 7.1A through 7.1C may be more clear if the title “P1” through “P3” had been labelled “Phase 1” through “Phase 3”.