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City of Brampton
2 Wellington Street West
Brampton, ON L6Y 4R2

**Re: Proposed Norval Quarry
Second Peer Review of Air Quality Assessment
RWDI Reference Number: 1011996**

RWDI AIR Inc. (RWDI) was retained by the City of Brampton to conduct a peer review of the Air Quality Assessment Report prepared by Jacques Whitford, in support of a quarry zoning application by Brampton Brick for the proposed Norval Quarry. RWDI completed an initial peer review of the technical report, as summarized in a letter entitled "Proposed Norval Quarry Peer Review of Air Quality Assessment" dated June 1, 2011. Stantec Consulting Limited (formally Jacques Whitford Limited) provided responses to RWDI's peer review comments and additional information in a letter entitled "Brampton Brick Norval Quarry – RWDI Review of Air Quality Report" dated December 21, 2011. This letter provides comments on the responses provided in Stantec's letter.

The review was based on the Peer Review Matrix Guideline, provided by the City of Brampton. The completed matrix is included as Appendix A to this letter.

The opinions expressed in this peer review (including appendices) may be supplemented, reconsidered or otherwise revised by the author(s) due to new or previously unknown information.

COMMENTS

RWDI's comments (plain text) on Stantec's responses (bolded) are provided below, along with the original comments (italicized), for reference.

1. *The maximum hourly watering rate is required to assess that the desired level of control can be achieved. It is our understanding that this requirement for water has not been included in the water balance for the site.*

The water required for dust control is currently anticipated to come from off-site (city water) and therefore will not impact the water balance of the quarry. The watering rates and frequency of watering will be determined and documented during preparation of the Best Management Practices Plan (BMPP) for fugitive dust (see further discussion below).

A revised Best Management Practices Plan (BMPP) has not been provided for review. Until the requested watering rates are provided, RWDI cannot assess whether the desired level of control can be achieved. RWDI's original concern has therefore not been addressed by this response.

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2. *There are minor concerns with the dispersion modeling assessment that cause an underestimate of the predicted impacts. The first concern is the screening out of meteorological anomalies. Our opinion is that some of the meteorological conditions that have been screened out as anomalous should not have been screened out. The screening approach used was not consistent with MOE Guideline A11.*

RWDI notes this to be a minor concern, and it is uncertain how they arrived at this opinion based on the data provided in the report as a full model output file, which would be required to calculate the MOE meteorological screening, was not included in the report. We believe that this concern may be based on the fact that the wording provided in the relevant MOE guidance (MOE Guideline A-11) for screening out met anomalies is somewhat ambiguous and has been interpreted by readers in different ways. We have reviewed our results and believe that the methodology used by Stantec is consistent with the intended approach of the MOE as shown in the case study presented in Appendix A of Guideline A-11.

It should be noted that the maximum predicted concentrations of all contaminants at the special receptors (nearest residences in proximity to the proposed quarry) conservatively did not include removal of meteorological anomalies and all predictions were below their respective air quality criteria.

This was not made clear in the original Jaques Whitford report. Stantec's response to this concern is acceptable.

3. *The second concern is regarding the use on an area source for emissions in the quarry. The use of an area source spreads the emissions over a larger area, creating initial dilution of the emissions when, on any given day, the emissions would be more localized, occurring at a specific active face area and along a specific internal haul route within the extraction area itself. These concerns may result in an increase in predicted impacts.*

We believe the methodology used to aggregate the emissions from the active face and haul route in the quarry should result in conservative predictions relative to actual conditions. The use of an area source accounts for the fact that in quarries (which are below ground level) emissions from the various sources in the pit tend to become mixed prior to being emitted, due to the recirculation of air in the quarry. The US EPA ISC manual notes that observations and measurements in a wind tunnel study (Perry, et al., 1994) showed that emissions within an open pit are not uniformly released from the pit opening but rather have a tendency to be emitted primarily from an upwind sub-area of the pit opening. The Stantec approach used for the Norval Quarry is therefore conservative as the emissions were modeled as being uniformly emitted, which means that for winds with directions blowing from the quarry towards the nearest property lines, a portion of the emissions were modeled as occurring much closer to the property line than would occur in reality.

According to guidance provided by the National Stone Sand and Gravel Association, which reviewed the 1994 study and the ISC manual, indicates that the maximum fetch to depth ratio for a significant level of pit retention to occur is 10:1 (e.g., the pit must be deeper than 1/10 of the longest fetch across the pit). In the early stages of excavation, it is not clear how this will be satisfied from the information provided.

Another aspect of quarry emissions (for particulates) is that due to typically lower wind speeds occurring in the quarry relative to above ground level, only a portion of particulates are actually emitted from the quarry, while the rest settle within it. The methodology used by Stantec conservatively omitted this effect and all particulate was modeled as being emitted from the quarry. The area source used in the assessment was also conservatively located at current ground level and did not account for the depth of the quarry.

The US EPA has released updated emission factors for dust from paved roads (January 2011), which results in a significant reduction in emission factors for heavy duty vehicles travelling on paved roads.

As noted by RWDI, the US EPA revised their methodology for estimating emissions from paved roads, as they were commonly known to be unrealistically high. This occurred after the Norval Quarry AQ assessment had been completed. The updated emissions factors provide significantly lower estimations of particulate emissions from paved roads. Using the updated AP-42 emission factors, the road dust emissions on paved roads will be only 45% of those used in the air quality assessment. Thus emissions from this source are significantly over-estimated in the Norval Quarry air quality assessment, which results in conservative predictions of ambient particulate concentrations.

No additional comment required.

4. *There is no reference to a Best Management Practices Plan (BMPP) for fugitive dust. This is essential to ensure that proposed mitigation measures are implemented, and that the effectiveness of these measures can be monitored.*

Brampton Brick has a fugitive dust best management plan for their current quarry which has been reviewed by the MOE. Brampton Brick will develop a similar plan for the Norval quarry during the CofA permitting process and submit it to the MOE for review. The BMPP will include details on the frequency and amounts of road watering required to control fugitive dust emissions to the levels used in the air quality assessment. It is expected that the MOE Environmental Compliance Approval (ECA) issued for the quarry would include conditions for ambient monitoring similar to the current quarry. This monitoring would be used to ensure that the mitigation measures are properly implemented.

This document has not been provided for review. This response is not acceptable.

5. *The silt and moisture content of the road surfaces and the shale being handled are reasonable based on published values in the literature. These values should be confirmed based on site-specific measurements once normal operations are established, to ensure that they are representative of actual site conditions.*

Confirmatory silt and moisture content sampling will be included in the fugitive dust best management plan.

This response is acceptable, but the BMPP must be provided for review for RWDI to confirm that this has indeed been included.



CONCLUSION

Although there remain some outstanding issues, based on RWDI's second peer review, we maintain our opinion that the assessment warrants approval under the applicable legislation and guidelines.

CLOSING

We trust that this information will be helpful in your review of the application. Should you have any questions or concerns, please do not hesitate to contact us.

Yours very truly,

RWDI AIR Inc.

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Senior Engineer

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APPENDIX A

Norval Quarry Rezoning Application (Brampton Brick)

August 2012

Peer Review Results Chart

Guideline Question	Findings in the initial Peer Review Results	Findings in the Second Peer Review Results	Implications if this concern/issue is not addressed
Purpose			
Is the purpose of the work clearly and understandably stated in the applicant's report?	The report is clear in purpose. The study consists of an air quality assessment conducted in accordance with Ontario Regulation 419/05, MOE Guideline A10 MOE Guideline A11, and considers the Schedule 3 standards under the Regulation, as well as Ontario's Ambient Air Quality Criteria.	The previous findings remain unchanged.	No concerns, this is the appropriate study for this application.
Does the purpose set out the proper direction to undertake the study?	Yes, the purpose sets out the proper direction.	The previous findings remain unchanged.	No concerns.
Methodology			
Is the methodological approach technically sound? Is the review of issues, data, facts objective and appropriate?	<p>The assessment generally goes beyond the requirements of Ontario Regulation 419/05 and the associated guidelines, in that it includes an assessment of tailpipe emissions from motor vehicles. It also considers emissions of PM2.5, which is not required, but is an accepted practice that RWDI agrees with.</p> <p>There are minor concerns with the dispersion modeling assessment that may increase the predicted impacts but further assessment is required to determine the exact level of increase. Specifically, these concerns include the screening out of meteorological anomalies when emissions are not continuous over the entire year, and the use of an</p>	<p>The previous findings remain unchanged.</p> <p>This issue of screening out meteorological anomalies has been clarified and the approach is acceptable.</p> <p>Further clarification is required on the issue of pit retention.</p>	The concerns with the dispersion modeling may result in an increase in predicted impacts. Without re-running the model to confirm, it is difficult to assess whether these impacts will exceed the ambient air quality criteria, but it is not expected to be the case.

Guideline Question	Findings in the initial Peer Review Results	Findings in the Second Peer Review Results	Implications if this concern/issue is not addressed
	area source used for emissions in the quarry, as opposed to specific line and volume sources. This spreads the emissions over a larger area.		
Does the peer review identify any technical concerns stemming from the methodology (and assumptions made to inform the methodology) that may compromise the analysis and/or conclusions of the report?	Overall the methodology is appropriate, with the exceptions noted above.	The methodology is acceptable.	No concerns.
Information			
Are relevant data and facts clearly and consistently presented in the technical report?	Data and facts are clearly presented. The report was easy to follow, and the information supplied was sufficient for my review.	The previous findings remain unchanged.	No concerns.
Is information gathered from appropriate sources? Is the information useful? Accurate? are there concerns regarding their quality or validity?	All information presented in the report was referenced, and is appropriate to the study type. The silt and moisture content of the road surfaces and the shale being handled are consistent with appropriate literature values.	We note the commitment to undertake site specific sampling.	No concerns.
Is the data used critical to the conclusions?	The silt and moisture content of the road surfaces and the shale being handled are critical to the emission estimates.	We note the commitment to undertake site specific sampling.	On-site silt and moisture values may alter the results of the assessment. Once the sampling program is complete, confirmation of adequacy of mitigation is required.
Is the Brampton Brick report thorough/comprehensive / complete? To respond to this question, peer reviewers must consider accuracy, appropriateness and timing/seasonality of the data	Overall the report is sufficient to allow a complete review of air quality issues.	The previous findings remain unchanged, but the BMPP must be provided for RWDI review.	No implications.

Guideline Question	Findings in the initial Peer Review Results	Findings in the Second Peer Review Results	Implications if this concern/issue is not addressed
<p>collection (if applicable).</p> <p>Where specific technical report warrants, there may be a need to consider broader connections (i.e.: water inter-relationships). Please indicate if you feel this is lacking in the Brampton Brick report and what broader connections should be considered.</p>			
<p>How comprehensive and complete are the recommended mitigation and monitoring measures proposed by Brampton Brick? This includes assessing direct and indirect impacts; short and long term aspects.</p>	<p>Controls on the paved haul routes may be overstated. More recent published emission factors suggest that this is acceptable however, as the net emissions will tend to be slightly lower than those shown.</p> <p>There are minor concerns with the dispersion modeling assessment that may increase the predicted impacts. The first concern regards the screening out of meteorological anomalies when emissions are not continuous over the entire year.</p>	<p>We note the commitment to undertake site specific sampling of silt and moisture content.</p> <p>BMPP must be provided in order to assess mitigation plans.</p>	<p>The level of watering to achieve the level of dust control quoted should be specified. The ability to supply this water must be included in the water balance for the site.</p>
<p>The gap analysis will assess the relative importance of the data gaps and limitations to the project and identify potential options for addressing them. As such, a recommendation from a peer reviewer could be that additional survey and baseline monitoring must be undertaken as the project proceeds, provided the necessary frameworks are in place to direct this data collection and any changes that are triggered.</p>	<p>On-site silt and moisture data should be collected as soon as operations commence. This will ensure that the conclusions of the assessment remain valid. The modelling should also be updated to reflect the issues noted above.</p> <p>Despite the issues noted, the assessment is considered to be acceptable.</p>	<p>We note the commitment to undertake site specific sampling. Following the sampling, the conclusions of the assessment should be verified.</p>	<p>No concerns.</p>

Guideline Question	Findings in the initial Peer Review Results	Findings in the Second Peer Review Results	Implications if this concern/issue is not addressed
Certainty			
Are certainties and uncertainties of the proposal's success openly and objectively stated in the applicant's report/study?	The certainties and uncertainties are clearly defined, and are also well-understood in the context of assessments of this type.	The previous findings remain unchanged.	No implications.
Are all assumptions clearly stated? Are the assumptions reasonable? Analysis of assumptions and parameters.	The assumptions are clearly stated, and are supported by the literature, except where noted above.	The previous findings remain unchanged.	No implication.
Are the standards or thresholds commonly accepted in this type of technical area identified and appropriately utilized? (i.e.: transportation, soils, natural environment? Etc...)	The appropriate standards and guidelines have been used in the assessment. These include the standards in O. Reg. 419/05, MOE Guideline A10 and A11, and Ontario's Ambient Air Quality Criteria.	The previous findings remain unchanged.	No implication.
Issue Gaps			
Are there issue gaps arising from the review?	Watering requirements for dust control not determined. On-site dust deposition not addressed.	BMPP must be provided.	This has implications on the water balance. Although not required for the air quality assessment, may have implications on impacts on the natural environment.
Were the identified issues addressed in the technical report?	No	The previous findings remain unchanged.	RWDI requires confirmation that these are addressed in hydro geology or natural environment assessments.
Are there key issues, related to the specific technical report, that have not been considered?	No, not other than those stated above.	No, not other than those stated above.	No implication.
Mitigation/Monitoring			
Are realistic mitigation measures/rehabilitation plans proposed in the applicant's report? Is there sufficient detail?	Controls on the paved haul routes may be overstated. More recent published emission factors suggest that this is acceptable however, as	BMPP should be provided.	Despite the issues noted, the assessment is considered to be acceptable

Guideline Question	Findings in the initial Peer Review Results	Findings in the Second Peer Review Results	Implications if this concern/issue is not addressed
	the net emissions will tend to be slightly lower than those shown.		
Do the proposed measures mitigate the impacts? Is the end result desirable from a technical point of view?	Yes.	The previous findings remain unchanged.	No impact.
Will the proposed measures be adequate to address outstanding concerns?	Yes.	The previous findings remain unchanged.	Despite the issues noted, the assessment is considered to be acceptable.
Conclusion			
<p>Do the conclusions satisfy the applicable policies of the relevant policy documents that need to be consulted as per the specific discipline (i.e.: Official Plan, Provincial legislation, standards and guidelines, etc...). This should be informed by the policy matrix.</p> <p>Have implications relating to required jurisdiction and agency approvals including environmental assessments been identified?</p>	<p>The conclusions show compliance with all applicable regulations and guidelines noted previously. The inclusion of tailpipe emissions from vehicles and the addition of background concentrations actually go beyond the minimum requirements set out in the applicable regulations and guidelines.</p> <p>In addition, the report satisfies the requirement under Section 4.5.15.2.2 (Air Quality & Energy) of Brampton's Official Plan, specifically that "Development applications which have the potential to generate dust, odour and other emissions to air must be evaluated in accordance with the Ministry of Environment's Provincial guidelines and approval requirements."</p>	The previous findings remain unchanged.	No implication.
Are the conclusions relevant to the purpose/objectives and supported by the work undertaken by the report authors?	Yes.	The previous findings remain unchanged.	No implication.

Guideline Question	Findings in the initial Peer Review Results	Findings in the Second Peer Review Results	Implications if this concern/issue is not addressed
Based on the peer review, would the same conclusions be determined?	Although there are differences in the methodology, RWDI would generally reach the same conclusion. RWDI does suggest that a Best Management Practices Plan be implemented, and the requirement for a Best Management Practices Plan should be included as a condition on the Site Plan prepared under the Aggregate Resources Act. This would demonstrate the applications commitment to controlling all on-site sources of dust.	The previous findings remain unchanged.	It is not expected that the differences in the methodology will have a significant implication to the assessment itself. The requirement for a Best Management Practices Plan does have an implication for the Site Plan prepared under the ARA, should the proposal proceed.
Adequacy			
Does the applicant's report/study adequately address the stated purpose?	Yes.	The previous findings remain unchanged.	No implication.
Is there anything that should, in your opinion, have been done differently?	Aside from the differences in the methodology noted above, the assessment was done correctly.	The previous findings remain unchanged.	No implication.

Conclusions Summary (indicate in point form what overall conclusions are made on the technical report and identify issues to focus on).

- Is the revised report supportable in the context of relevant legislation?
- Has the revised report addressed concerns raised from the initial round of peer review?

Gap analysis and a policy matrix table

Please complete a gap analysis and a policy matrix table (compliance with relevant legislation/policy - referencing policies relevant to the technical review). The matrix table should identify if the relevant policy is addressed (completely or in part) or, not addressed. In this way, gaps where policy information is lacking will be identified.