



Englobe Consulting Engineers Inc.
A Division of Englobe Corp.
3397 American Drive, Units 14 & 15
Mississauga ON, L4V 1T8
Tel: (877) 300-4800
Fax: (888) 979-6772

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Regional Municipality of Niagara

Planning and Development Services
1815 Sir Isaac Brock Way
Thorold, ON, L2V 4T7

Attention: Sean Norman, PMP, MCIP, RPP – Senior Planner

Re: **Peer Review of – Air Quality Assessment, Third Iteration Comments**
Upper's Quarry Walker Aggregates Inc.

1. INTRODUCTION

Englobe Consulting Engineers Inc. (“Englobe”) was retained by the Regional Municipality of Niagara, Planning and Development Services (“Niagara Region”), to carry out a peer review of the air quality impact assessment pertaining to the proposed Upper’s Quarry project.

The peer review was completed as part of a multi-disciplinary peer review being completed for Niagara Region’s Joint Application Review Team (JART), in respect of an application by the proponent, Walker Aggregates Inc. (WA), for the proposed quarry project.

This report summarized the third steps completed in the peer review of the Air Quality Assessment aspects of the project and provides Englobe’s comments on the third iteration of the technical report reviewed.

2. REPORTS REVIEWED

The following reports have been reviewed, with respect to aspects pertaining to air quality impact assessment of the project by the proponent’s consultants:

- “Walker Aggregates Inc., Niagara Falls, ON, Air Quality Assessment for the Proposed Upper’s Quarry”, prepared by RWDI, dated October 26, 2021 [AQA report].

- “Walker Aggregates Inc., Niagara Falls, ON, Air Quality Assessment for the Proposed Upper’s Quarry”, Updated Air Quality Assessment prepared by RWDI, dated July 12, 2023 [updated AQA report].
- “Walker Aggregates Inc., Niagara Falls, ON, Air Quality Assessment for the Proposed Upper’s Quarry”, Updated Air Quality Assessment prepared by RWDI, dated December 5, 2023 [3rd version]

3. COMMENTS FROM REPORTS REVIEWED

D.13.04.ROPA-21-0003		2 nd Review	3 rd Review
ID	Comment		
5.1.a	As the main purpose of the AQA report is to present dispersion modelling results, a short introduction to dispersion modelling would be welcome, including atmospheric processes, modeling objectives and options related to the project.	Comment removed. The information provided in Section 1 is sufficient as long as more information is available in other sections. Replace “Section 0” by “Section 18”.	No additional comment.
5.1.b	The processes and limitations of selecting sensitive receptor locations should be described here based on the project requirements.	Comment removed. The selection process of the closest discrete receptors around the site is detailed in Section 5. See 5.5.a, 5.5.b, and 5.5.c.	No additional comment.
5.1.c	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.	Issue was addressed in the updated AQA. Section 18 lists dust control references at the end of the report.	No additional comment.
5.2.a	Provide the latitude and longitude of the site to help locate it with a GIS or a geo-browser (e.g., Google Earth): “Upper’s Quarry site (43°5'41"N, 79°10'23"W) is located at Upper’s Lane and Thorold Townline Road.”	Issue was not addressed in the updated AQA. Including coordinates of the site of interest at the beginning of the report would allow readers to	Not addressed in the 3 rd version of the document. Coordinates would help find the location with Google Maps or Google Earth or

		immediately locate the site on a map with the help of a geo-browser.	any Geographic Information System platform.
5.2.b	Detail the surrounding lands and building types and explain the potential effect of the quarry operations on those areas.	Issue was partially addressed in the updated AQA. The selection process of the closest discrete receptors around the site is detailed in Section 5. See 5.5.a, 5.5.b, and 5.5.c. However, there is still no mention of a close residential area located east of the proposed extension, only a few hundred meters away.	The reviewer understands that the residential area is still not mentioned in the document because modeling outputs based on 95% control efficiency indicate that the impact on closest receptors is already limited.
5.2.c	Provide a list of the main operations for phases 1A, 2A, 3B, and 5 with their respective potential emission sources.	Issue was addressed in the updated AQA. A list of the 5 main phases of operations was included in Section 2.	No additional comment.
5.3.a	Hours of operation are the key parameters to estimate emissions and conduct the dispersion modeling study.	Hours were included in the initial AQA. Presenting activities/days/hours with tabulations would allow the reader to compare activities' operating hours to each other's more easily.	No additional comment.
5.3.b	The use of a table would improve the readability of the information provided in this section.	Hours were included in the initial AQA. Presenting activities/days/hours with tabulations would allow the reader to compare activities' operating hours to each other's more easily.	No additional comment.
5.3.c	Provide a list of all the abbreviations given in this section, and more generally in the report.	Issue was addressed in the updated AQA.	No additional comment.
5.4.a	The operating scenario should be detailed based on the future operations listed in section 2.	Listing the main phases of operation in Section 2 (see 5.2.c) improves the readability of the operating scenario.	No additional comment.
5.4.b	Explain what "conservative" means in the context of the AQA study.	Specifying that "conservative" corresponds to a "upper	No additional comment.

		range emission scenario" would add clarity.	
5.4.c	Consider one scenario for the short-term activity to evaluate how much emissions would increase and to assess its impact on air pollution in the area surrounding the proposed quarry.	Comment removed. See 5.5.a., 5.5.b, and 5.5.c.	No additional comment.
5.5.a	Considering receptors farther from the domain is strongly recommended. Plumes emitted by activities at the site may move upward from the source area and then come downward far from the domain, which would increase air pollution at receptors further down.	Issue was addressed in the updated AQA. The comparison between receptor & quarry altitudes in Section 5 permits to point out that the bulk of potential dust plumes would be contained within the geographical boundaries of the quarry, and therefore would have a limited impact on the closest receptors around the site. Receptors located further away are expected to be much less impacted. It should be emphasized that current modeling results are obtained with a 95% reduction control efficiency of the dust emissions. No modeling results are provided if reduction control are not as effective (e.g., 75%).	No additional comment.
5.5.b	Because there are residential buildings on the southeast and west sides of the domain (highlighted in blue in the Figure below), receptors at these locations should be included in the dispersion modeling study.		
5.5.c	Detail the criteria to select receptors for this study. A good practice for locating receptors is to draw 1 and 1.5-km circles over the main activity area and check what potential receptors are inside these circles.		
5.6.a	List all the permanent/temporary and short-term/long-term emission sources in a table.	Comment removed. The combination of information provided in Sections 2 & 4 can be used to list and compare emission source types.	No additional comment.
5.6.b	A brief description of Figures 2 to 5 has to be included in this section.	Issue was not addressed in the updated AQA. A	No additional comment.

		list of the figures with their respective titles in the body of the report will help clarify the document.	
5.7.a	Change the title of this section to “Air Quality Criteria and Standards”.	Issue was not addressed in the updated AQA. Changing the title and adding a simple table listing current air quality standards pertinent to the project would greatly improve the clarity of the document.	Not addressed in the 3 rd version of the report.
5.7.b	It's common practice to include in the text a table listing the relevant criteria and standards for the air pollutants of concern.		
5.8.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).	Issue was addressed in the updated AQA. Section 18 now includes a reference to the EPA's document.	No additional comment.
5.8.b	Provide a reference for the silica content. Is a silica/PM10 ratio of 10% used to estimate silica concentrations from the PM10 concentrations modeled with AERMOD?	Issue was partially addressed in the updated AQA. The reference for Silica has been added to Section 8. Silica as a “% of PM ₁₀ ” appears in the tables but should also appear in Section 8 for clarity.	No additional comment.
5.8.c	Detail the mitigation measures included in the emission calculation. “Control efficiency” is an expression used in the Appendices and is the key parameter applied to raw emissions to decrease them. That expression should be explained in this section.	Issue was addressed in the updated AQA. A paragraph detailing measures to attain 95% reduction control efficiency was added to Section 8.	No additional comment.
5.8.d	Watering the unpaved road is an effective control method and is suggested to be used in the project. The “95% reduction control efficiency” as a result of watering could be considered as optimistic since an average	Please replace “Section 0” by “Section 18”.	

	efficiency of 75% is considered in the literature (US EPA 1993).		
5.9.a	Please indicate the date of the version for AERMOD such as “AERMOD version 19191 dispersion model (version date July 10, 2019)”.	The issue was addressed in the updated AQA with a paragraph about sensitivity runs performed with the version of AERMOD used in the current study and with the latest version of the dispersion model.	No additional comment.
5.9.b	How many simulations were conducted? Did you conduct various simulations based on different “control efficiency” values applied to the raw emission inventories?	See 5.8.c and 5.8.d.	No additional comment.
5.9.c	Let's assume that 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?	Issue was addressed in the updated AQA.	No additional comment.
5.9.d	The wind rose shown below indicates that the prevailing wind direction is mostly between the southwest and the northwest, but it has also a strong component from the east.	Issue was not addressed in the updated AQA. The report should include a short description of the wind directions used in this AQ assessment since the wind direction is the key parameter driving the atmospheric dispersion of the fugitive dust in the vicinity of the project site.	Not explicitly addressed in the 3 rd version of the document. However, the document details the reasons why other potential receptors are unlikely to be impacted, based on modeling results.
5.9.e	Since AERMOD is not a terrain-following coordinate system code, how was it applied to a domain characterized by the non-flat terrain of a quarry? Was CALPUFF considered for this project as an alternative dispersion model?	See 5.5.a, 5.5.b, and 5.5.c.	No additional comment.

5.9.f	What are the receptor heights used in the model? It is suggested to use receptors at different heights to see how far air pollutants travel vertically. It has an impact on the horizontal transport of pollutants.		
5.10.a	“Due to this distance, impacts from this site are not expected to significantly influence the predicted impacts from the extension”. The only way to know for sure would be to apply AERMOD with receptors located 2+ km away from the site.	The reviewer did not initially understand what the purpose of Section 10 was. Its purpose is to list the current local emission sources around the future site in order to assess whether such sources should be considered to evaluate suitable background pollutant concentrations. Maybe it should be mentioned at the beginning of Section 10. Because both WEG and WQB sites are located north of the extension and because the prevailing wind direction is mostly from the west, it is very unlikely that emissions from both existing emission sources will have a significant impact on background air quality 2 km south of their locations.	No additional comment.
5.10.b	What is a “suitable background air quality level”?	Issue was addressed with additional explanation provided at the end of Section 10	No additional comment.
5.11.a	“Background values were estimated.” Confirm this is PM2.5 background data.	Issue was partially addressed in the updated AQA. Please	No additional comment.

5.11.b	"Nearest" is too vague. It's better to specify the distance between the project site and the closest MECP monitoring station, such as: "St. Catharine's ambient air monitoring station (43°9'36"N, 79°14'5"W) is located 9 km from the proposed Upper's Quarry site". This AQ station is considered an urban site. In general, PM and NO ₂ levels are expected to be higher at an urban site than in a rural area where Upper's Quarry would be located.	specify: "PM _{2.5} background concentration values were estimated using data from the nearest MECP monitoring station (MECP Station ID 27067) ...".	
5.13.a	"... as they are potentially influenced by many factors." Identify which factors are considered here.	Issue was addressed in the updated AQA.	No additional comment.
5.13.b	"... to estimate impacts under worst-case weather." Explain what "worstcase" means here.	Issue was not addressed in the updated AQA. Please provide examples such maximum wind speed considered, absence of rainfall in the simulations that could naturally mitigate the dust issue.	No additional comment.
5.13.c	Provide examples of a few "assumed mitigation measures".	"Assumed mitigation measures" were explained in other sections of the report.	No additional comment.
5.14.a	In this section, the main results extracted from the tables must be summarized quantitatively.	A summary of the results in a table included in the body of the report would be welcome to improve the readability of Section 14.	Not addressed in the 3 rd version of the document. PM modeling results could have been summarized in a table.
5.14.b	"With the addition of background concentrations to benzo(a)pyrene, this contaminant exceeds the AAQC. This is due to the ambient background levels throughout most of Ontario already being above the AAQC.". "Most of Ontario" means that the AAQC is shown to be exceeded at more than one air monitoring site.	The additional information provided in the updated AQA clarifies the interpretation of the BaP modeling results in Section 14.	No additional comment.

5.14.c	Using a receptor grid instead of discrete receptors would have helped present (i.e., concentration maps) and interpret (i.e., atmospheric dispersion processes) the results calculated with AERMOD.	The reviewer believes that using a receptor grid would be a better approach for this kind of AQ assessment study, as it would permit to visualize the horizontal dispersion of the dust plume. Using a grid and considering 2 to 3 control efficiency values for the emissions would permit to compare plume dispersion patterns and potential impacts on the residential area.	Not addressed in the 3 rd version of the document. A receptor grid would allow to plot modelled dust plumes on a map of the Project area and to pinpoint potential issues with PM pollution levels around the Quarry.
5.15.a	Would there be a system on-site to alert the quarry's staff/management when fugitive dust events occur?	The site will operate in accordance with the Best Management Practices Plan for fugitive dust emissions.	No additional comment.
5.15.b	How frequently a dust suppressant (e.g., water) has to be applied? The frequency can be linked to the "control efficiency" of the emissions.	A note about the frequency of water application to haul routes was added to Section 16 of updated AQA.	No additional comment.
5.16.a	Are there recommendations to control benzo(a)pyrene emissions from the operations at the quarry site?	Issue was addressed in Section 14 of the updated AQA. See 5.14.b.	No additional comment.
5.17.a	Replace "Section 13" by "Section 15".	Issue was addressed in the updated AQA. References to Sections 15 and 16 were included in Section 17.	No additional comment.
5.18.a	Correct "Upper's Quarry" in all table captions.	Issue was addressed in the updated AQA.	No additional comment.
5.19.a	A description of each figure is needed.	Comment removed by reviewer.	No additional comment.

5.20.a	Create at the end of the report a section to list all references cited in the report.	Issue was addressed in the updated AQA. All pertaining references are now listed in Section 18.	No additional comment.
5.20.b	Add "EPA, 1993, Emission factor documentation for AP-42, section 13.2.2, unpaved roads.	The EPA reference to unpaved roads was included in Section 18.	
5.21	There are concerns with benzo(a)pyrene exceeding the AAQC guidelines. What is affected by this increase? What are the concerns when benzo(a)pyrene exceed AAQC guidelines?	Issue was addressed in the updated AQA. See 5.14.b.	No additional comment.

4. CLOSURE

We trust the foregoing will satisfy your present requirements. Please contact the undersigned should you require further assistance.

Yours sincerely,



David Lavoué, Ph.D., M.Eng.
Air Quality Specialist