

MEMORANDUM

To: Chris Barnett, Osler, Hoskin & Harcourt LLP

From: Dr. H. Andrew Gray, Gray Sky Solutions

Date: February 2, 2021

Re: Comments Regarding BCX's Air Quality Study for Nelson Aggregate Co. Burlington Quarry Extension

I have reviewed BCX's modeling report and all the appendices. Here are my comments:

1. Their analysis limited the computed air quality impacts by breaking the project up into smaller segments (phases) which were each evaluated separately. The BCX report should clearly indicate whether any of the phases will overlap.
2. The dispersion model receptors were restricted to areas immediately surrounding the facility and did not include any receptors at distances further away from the facility, including areas of larger population (and exposure). Most of the larger computed impacts were fairly close to the sources, however it would be useful to also have estimated impacts in a larger geographical area. The modelled receptors should include a broader geographic area, extending to at least 5 km from the facility.
3. The analysis appears to include a fairly thorough inventory of all the various emission-generating activities in each phase, however they relied almost entirely on US EPA AP-42 emission factors, many of which have very low data quality ratings, and some of which are not directly applicable to the source in question at the proposed facility. The AP-42 document makes it very clear that these lower rated emission factors should only be used as a last resort, and it is highly recommended that source-specific emission factors should be sought, either from source testing at the facility, or from directly applicable source tests from similar nearby sources. Although there may not be any better (textbook) or more recent data sources for some of these activities, many of the AP-42 emission factors were obtained from very old sources (over 40 years old) and are only marginally related to the activities at the proposed Burlington site. Using

such low quality emission factors will likely result in significantly large uncertainties in the modeled air quality impacts. A range of potential emission levels (and exposures) should be developed based on lower and upper bound emissions factors (which generally exist in AP-42 and its supporting documents). A careful review of each of the emissions factors used in the BCX analysis should be conducted to determine those emission factors that are not representative of actual emission levels at the proposed site, and the potential errors (and possible underprediction) due to the use of the emission factors to estimate emission levels. Source testing of existing operations at the facility should also be conducted where applicable.

The SO₂ emission factors that were used for diesel-fired engines are rated (in AP-42) as quality D (marginal), and the B(a)P emissions factors for diesel engines are rated E (marginal). The emission factors for Sand and Gravel processing were obtained from AP-42, Section 11.19.2 (mistakenly quoted in BCX Appendix B as Section 11.9.2), where it is stated that “The emission factors for industrial sand storage and screening presented in Table 11.19.1-1 are not recommended as surrogates for construction sand and gravel processing, because they are based on emissions from dried sand and may result in overestimates of emissions from those sources. Construction sand and gravel are processed at much higher moisture contents.” PM emission factors for controlled tertiary crushing and controlled and uncontrolled screening were taken from AP-42, Section 11.19.2, and are all rated E (marginal). As stated in AP-42 (Section 11.19.2.2), “Factors affecting emissions from either source category [stone quarrying or processing] include the stone size distribution and the surface moisture content of the stone processed, the process throughput rate, the type of equipment and operating practices used, and topographical and climatic factors.” PM emission factors for conveyor transfers and rock truck unloading were also taken from AP-42 (Section 11.19.2) and are all rated E (marginal). Estimates of emission rates using emission factors from AP-42 that are rated D or E cannot be considered reliable for the Burlington Quarry facility.

4. Although the estimated (modeled) levels of particulate matter (PM) were below acceptable “air quality criteria”, there are still potential health effects (mortality and morbidity risk) associated with the emitted PM and these additional risks should be evaluated.
5. The background level for B(a)P was obtained from monitoring data collected at Newmarket and Simcoe (Barrie), which are located 78 km and 109 km, respectively, from the Nelson quarry, and are likely not representative of the air quality in the vicinity of the quarry. Further analysis of these data needs to be performed to justify their use in establishing background B(a)P levels, including potentially collecting local B(a)P data to determine background B(a)P levels.

6. The meteorological preprocessor for the AERMOD model (AERMET) has been updated (in 2011) to include a separate processing tool (AERMINUTE) that is recommended to be used to account for calm wind speeds when using hourly wind data from nearby airports. The BCX report should indicate where the meteorological data were obtained (and assess whether it is close enough to reliably represent conditions at the Burlington site), and whether one-minute (ASOS) wind data were used to reduce the number of calm winds (using AERMINUTE). The AERMOD computer files that I received do not include the AERMET processing files.
7. The BCX modeling report indicates that the traffic was represented in the modeling using a “typical shipping” assumption. However the traffic report for the proposed quarry extension (Paradigm Transportation Solutions Limited, report dated February 2020) indicates that “the site’s the weekday AM peak hour truck generation is forecast to be 111 truck trips...”, which is significantly greater than the average daily truck traffic and would therefore generate much higher emissions during morning hours. The modeling therefore needs to include a non-uniform diurnal distribution of traffic emissions that includes the peak AM traffic density.