

Overall Conclusion:

The air quality assessment completed for the Burlington Quarry Extension includes consideration of the proposed extension in combination with processing activities at the existing quarry. Our analysis concludes that the proposed operation can operate within the applicable MOE Ambient Air Quality Criteria.

In response to AMEC's peer review additional calculations and information has been provided below, including the development of a best management plan for dust control at the quarry. The best management plan is intended to be an in-house document utilized by quarry personal to outline the mitigation measures available to ensure the operation complies with the prescribed conditions as required by the Aggregate Resources Act. Many of the mitigation measures as outlined in the best management plan are currently implemented at the Burlington Quarry, including calcium chloride, watering of internal roads, covered conveyors, screen decks and crushing plants, the use of a road sweeper, paved entrance/exit, wheel grates before scales and wash plants.

The prescribed conditions under the Aggregate Resources Act are:

“3.1 Dust will be mitigated on site.

3.2 Water or another provincially approved dust suppressant will be applied to internal haul roads and processing areas as often as required to mitigate dust.

3.3 Processing equipment will be equipped with dust suppressing or collection devices, where the equipment creates dust and is being operated within 300 metres of a sensitive receptor.”

In addition to the prescribed conditions the site plans require that during the hours of 5:30 am to 8:00 am and 7:00 pm to 9:00 pm Nelson, the licensee is to apply additional mitigation with water to control dust when necessary to ensure compliance with prescribed conditions.

Compliance with these site plan notes will ensure that the proposed extension will not result in unacceptable air quality impacts on surrounding land uses.

Responses to Reviewer Comments:

Section Number	Comment	Response
Reviewer: AMEC – Halton Region		
General	Certificates of Approval – Only the asphalt plant has a current Certificate of Approval (Air and Noise)	<p>The existing aggregate processing plant located on the current licensed site, which was erected prior to 1972, by necessity will have to be re-located below grade to access the remaining resource in the existing quarry. Due to the timing this will occur prior to extraction commencing in the proposed extension. As noted in AMEC’s report, “relocating the plant below grade will reduce air quality impacts”. Golder’s original analysis modelled the plant operating at grade, and concluded the plant is operating within the applicable MOE Ambient Air Quality Criteria.</p> <p>When the existing processing plant is re-located, a Certificate of Approval (Air and Noise) will be applied for.</p> <p>As per AMEC’s recommendation a “best management plan” for dust control has been prepared, and is appended. This plan will be implemented at the existing Burlington Quarry and proposed extension. Many of the proposed measures are already being undertaken at the existing quarry.</p>
General	Asphalt Plant Emissions – Only particulate was considered, not	Airborne particulate (dust) was identified as the primary impact concern at the Nelson site and modelling of VOC

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	other (VOC) emissions from the Asphalt Plant.	was not considered necessary as Nelson has never received complaints regarding VOC or odour emissions since the plant began operations. The asphalt plant is located on the quarry floor and operates in accordance with its Certificate of Approval.
General	Standards – No dustfall modelling was completed.	<p>Golder has completed dustfall modelling for the facility, using the same layout and set up as in the initial report. Maximum monthly deposition under existing and future operating conditions was found to be 1.2 g/m², in both cases Both of these values are below the MOE dustfall criterion of 7 g/m²/month. The Future case maximum monthly deposition has been appended as Figure A.</p> <p>Golder noted AMEC’s comment that inclusion of ½ -hour and one-hour air quality standards are not necessary as MOE recognizes that these standards are not appropriate for large quarry operations. Table B shows the maximum predicted 24-hour and annual concentrations of TSP, PM₁₀ and PM_{2.5} from the Nelson facility (this table replaces the Table 4-1 from the original Golder report). As noted in the revised table both the existing and proposed quarry are operating within the applicable MOE Ambient Air Quality Criteria.</p>

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General	Contaminants – Only dust was assessed, not NO _x , not odorous compounds from the asphalt plant.	Airborne particulate (dust) was identified as the primary impact concern at the Nelson site and modelling VOC / NO _x was not considered necessary. The asphalt plant is located on the quarry floor and operates in accordance with its Certificate of Approval.
General	Complaints and Reporting – No discussion in the report regarding historical complaints about the facility.	In the past 5 years Nelson has not directly received any dust complaints from on-site activities. Some dust complaints have been received regarding truck traffic on No. 2 Side Road and mitigation measures have been incorporated into the operation to control dust on No. 2 Sideroad (eg. road sweeper, watering road). These mitigation measures have been incorporated in the “best management plan” for dust control at the quarry. As per AMEC’s recommendation the best management plan includes the monitoring program and serves as a manual for the quarry operator to manage dust on-site.
Page 19, Section 3.2	Sources – Modelling only addresses Phase 4 of extension, and only when in full production (not stripping or preparation).	Based on our review, Phase 4 operations constituted a reasonable assessment of worst case conditions since on-site truck traffic is the main contributor to TSP emissions and travel distances are greatest in Phase 4. Truck traffic is predicted to account for 77% of the TSP emissions from Phase 4 (as modelled). Reducing traffic distances travelled (as would be the case during Phases 1-3, and during site

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		<p>preparation and stripping), would be expected to reduce overall emissions and impacts. Additionally, as the pit grows larger (Phases 5a, 5b and 6) emissions would not be greatly increased, but the size of the pit would be increased, thereby providing additional initial dispersion of emissions, lowering impacts.</p>
<p>Page 19, Section 3.2</p>	<p>Sources – All above ground crushing and screening, material handling, traffic and other sources were consolidated into a single area source for modelling. It was suggested that each source should have been modelled separately, as point, individual area, or individual volume sources</p>	<p>Modelling emissions as area sources is a more conservative approach for the sources listed. Volumes and points have increased dispersion within the model and generally provide lower predicted concentrations. Additionally, modelling the included sources as a large area source allows for the possibility of the equipment being moved around within the area source defined. As the area source in question was large, and approached the fence line (and therefore off-site receptors) more closely than would individual volume, point or area sources, it is expected that the predicted impacts from additional modelling would be similar to, or lower than, those described in the Dust Study report.</p>
<p>Page 19, Section 3.2</p>	<p>Sources – The section of road along No. 2 Sideroad should have been included in the modelling due to track-out from the facility.</p>	<p>Emissions from No. 2 Sideroad are not entirely attributable to the facility as this is a public road. Nelson implements wet sweeping and periodical washing on No. 2 Sideroad, wheel grates and paved entrance/exit road from quarry and it is Golder's opinion that these dust control measures are</p>

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		appropriate and implement best management practices.
Page 23, Section 3.3	Mitigation due to rainfall and snow cover – Report was not clear how mitigation from rainfall and snow cover were handled.	Annual average emissions were calculated based on the annual operations/emissions information available from the quarry. The annual emissions were mitigated by the annual effects of rainfall and snowfall. 24-hour emissions were calculated based on the higher emissions during the smog season. These emissions were also mitigated by the effects of rainfall as an annual average.
Page 23, Section 3.3	On-site mitigation – process and roads – Reviewer felt that additional discussion should have been provided in the Dust Study.	<p>Frequency of dust mitigation activities is variable, based on site conditions and atmospheric conditions, and a detailed log of all actions to control dust has not been kept, nor required for the existing operation. It is noted that based on AMEC’s discussion with Nelson that AMEC concluded that very extensive practice of dust control was being implemented and the company’s initiative to monitor and curtail operations when increased levels of dust are measured was commendable and was considered a best management practice.</p> <p>A best management plan has been drafted, and is appended. This plan includes the requirement to document and record all dust mitigation measures undertaken on-site when</p>

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		increased levels of dust are detected.
Page 24, Section 3.4	70% Reduction from road emissions – Reviewer agreed with the use of a reduction factor for dust emissions from roads.	Golder notes the concurrence of AMEC for the use of this reduction factor.
Page 25, Section 4; Page 37, Sections 4.2 and 4.3	Results Summary Table – Reviewer suggested that background concentrations should be included with modelling results.	<p>Average background 24-hour PM₁₀ measured at the onsite dust monitor was found to be 8.7 µg/m³ (background, in this case, was defined as any time the winds were not from the site operations towards the monitor). The Dust Report incorrectly identified this as being TSP. The maximum predicted 24-hour PM₁₀ concentration was 21.6 µg/m³ for this exact location, in both the existing and future cases (note that the maximum measured PM₁₀ at the monitoring location was found to be 11.1 µg/m³ when the winds were from the direction of the facility). Adding the maximum predicted, and measured, 24-hour PM₁₀ concentrations therefore gives an estimate of 32.7 µg/m³, which is below the interim 24-hour standard of 50 µg/m³ for PM₁₀.</p> <p>There are no MOE or NAPS monitoring stations located near the facility, to provide appropriate background data (the nearest stations are located in urban areas: Burlington near Lake Ontario, downtown Guelph, downtown Kitchener, etc.).</p>

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Page 25, Section 4	Maximum results – The future expansion area was considered to be “on site” for the purposes of modelling the existing case.	The lands considered to be “on site” in the dust study are currently owned by Nelson Aggregate Co., and are therefore exempt from consideration, even under current conditions.
Page 25	Results – The nursing home should be considered as a specific sensitive receptor.	Maximum predicted concentrations at the nursing home are attached as Table A. All predicted concentrations are well below MOE Ambient Air Quality Criteria.
Page 35-36	Figures – Annual TSP concentrations shown to go down in the future case, further discussion required.	This was the result of a typographic error. The actual maximum predicted annual concentration for the future case was 8.2 µg/m ³ (compared to 8.1 µg/m ³ in the existing case). A corrected figure is appended as Figure B, and a corrected table is appended as Table B (this replaces Table 4-1 from the original Golder report).
Page 42, Section 5	Background Air Quality – Onsite dust monitoring discussions	The dust monitoring station was installed and is being monitored as a voluntary measure. The purpose of the station is for Nelson Staff to monitor dust levels and detect increasing dust concentrations. If increased dust concentrations are detected, mitigation measures such as those described in the Best Management Plan. In consultation with Nelson a new location for the monitor will be sited and the “Best Management Plan” includes a more formal monitoring and analysis program that will be

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		implemented on-site.
Page 43, Section 6	Recommendation for dust emissions – Site plans don't specifically address how dust emissions might be further mitigated in future.	<p>The best management plan outlines procedures that Nelson will undertake to reduce dust emissions.</p> <p>The site plan requires that dust will be mitigated on site; water or another provincially approved dust suppressant will be applied to internal haul roads and processing areas as often as required to mitigate dust; processing equipment will be equipped with dust suppressing or collection devices, where the equipment creates dust and is being operated within 300 metres of a sensitive receptor and during the hours of 5:30 am to 8:00 am and 7:00 pm to 9:00 pm, the licensee is to apply additional mitigation with water to control dust when necessary to ensure compliance with prescribed conditions.</p>
Appendix B	Input Files – More detail requested on how monthly variations in emissions were developed.	Monthly variations in emissions were developed based on the ratio of smog season and total annual emission rates, as well as estimates of monthly productivity from Nelson Aggregate Co. annual emissions reporting (National Pollutants Report Inventory).

Table A Maximum predicted ground level particulate concentrations at the Mount Nemo Nursing Home on Guelph Line.

Contaminant	Averaging Period	Air Quality Standard	Existing Case ($\mu\text{g}/\text{m}^3$)	Future Case ($\mu\text{g}/\text{m}^3$)
TSP	24-hour	120	29	29
	Annual	60	4.7	4.8
PM ₁₀	24-hour	50	17	17
PM _{2.5}	24-hour	30	8.6	8.6

Table B Maximum predicted ground level particulate concentrations (replaces Table 4-1 from the original Golder Report)

Contaminant	Averaging Period	Air Quality Standard	Existing Case ($\mu\text{g}/\text{m}^3$)	Future Case ($\mu\text{g}/\text{m}^3$)
TSP	24-hour	120	42	42
	Annual	60	8.1	8.2
PM ₁₀	24-hour	50	26	26
PM _{2.5}	24-hour	30	17	17

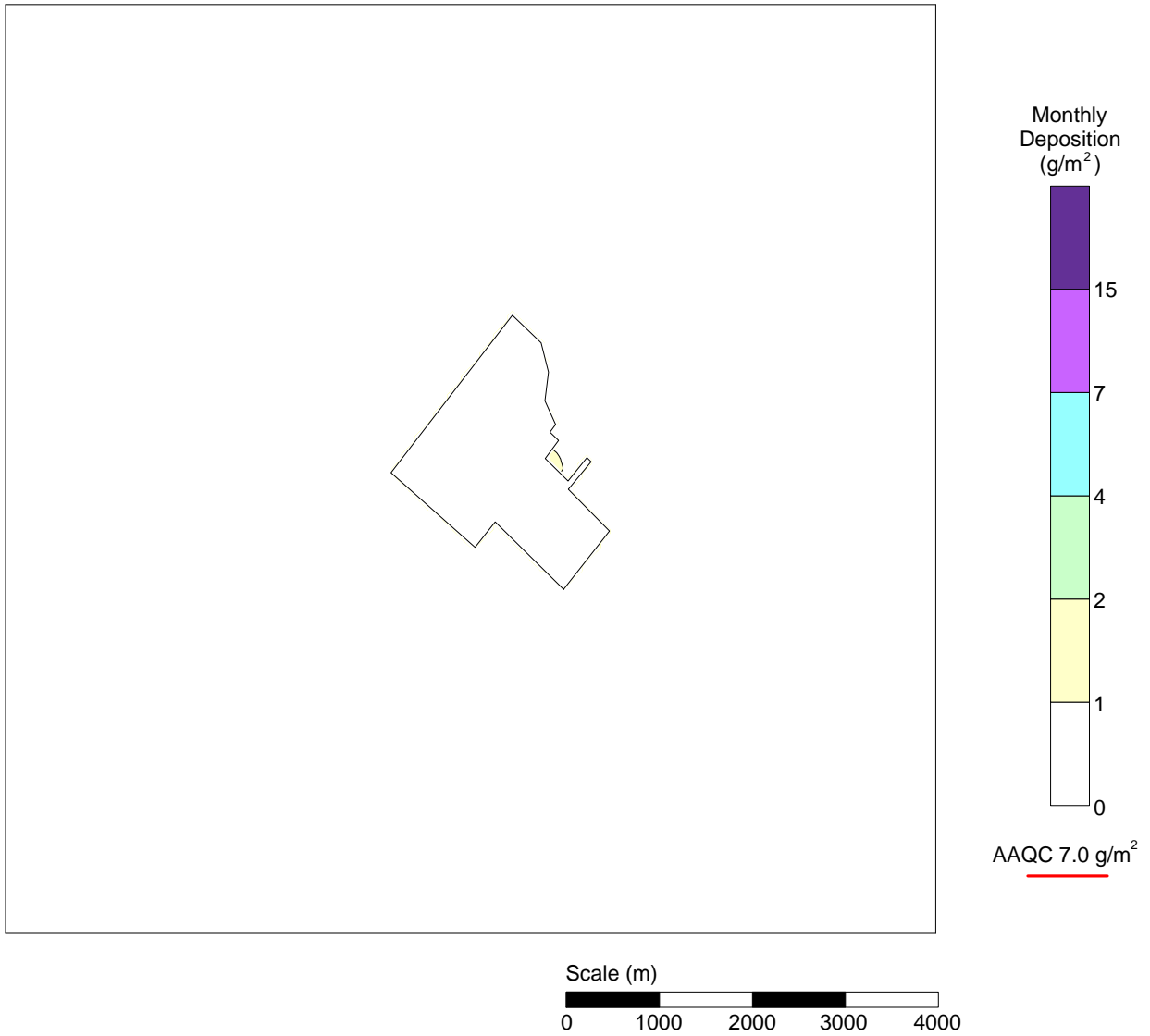


Figure A Predicted Monthly Maximum TSP Deposition (g/m2) for the Future Case.

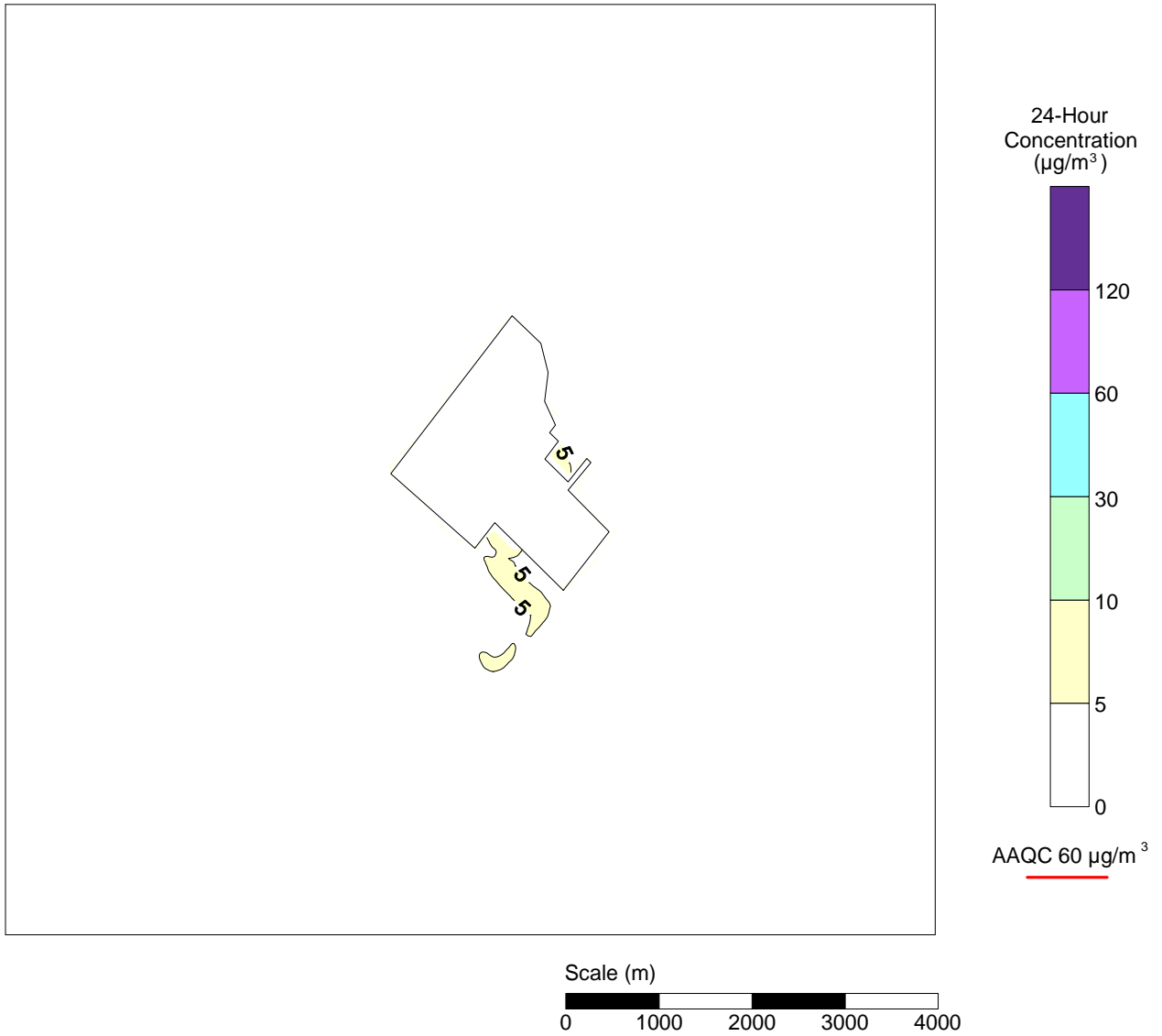


Figure B Predicted Annual Average TSP Concentrations (µg/m3) for the Future Case.