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9 April 2021

Attn: Gareth Bramston

AustralAsian Resource Consultants
5b/1 Swann Road
Taringa Qld 4068

Email: gbramston@aarc.net.au

Re: Response to Further Information Request re: Gemini Project: Air Quality and Greenhouse Gas Assessment

Dear Gareth,

Katestone has reviewed the comments of the Department of Environment and Science (DES) relating to the *Gemini Project: Air Quality and Greenhouse Gas Assessment* (Katestone, 2020) (Katestone 2020 Report).

DES's comments in relation to air quality and Katestone's responses to those comments are presented in Attachment A, Table A1.

Please contact the undersigned on (07) 3369 3699 if you would like to discuss further.

Yours sincerely,

Natalie Shaw

Table A1 Response to DES comments

Item	Information Comments & Requirements	Response
1	Explain how Blackwater monitoring data is expected to adequately account for the potential contributions to existing air quality and adequately represent cumulative impacts to air quality in the assessment model, with particular reference to Bluff Coal Mine.	The Blackwater monitoring data adequately accounts for potential contributions to air quality and represents the potential cumulative impacts for the following reasons: • At the time of the Katestone 2020 Report, DES's Blackwater monitoring station was the nearest monitoring station to the project that had more than 12 months of PM_{10} and $PM_{2.5}$ data for analysis. • The Blackwater monitoring station is located approximately 35 km west of the project. • The Blackwater monitoring station is surrounded by five mines located between 6km and 18km from the station, with three of the mines located within 11km. Those three mines are estimated to have emitted 21,242 tonnes of PM_{10} to air for the 2019/2010 based on NPI reporting. • DES commenced monitoring PM_{10} and $PM_{2.5}$ at Bluff in November 2020. Consequently, there is insufficient data available from DES's Bluff monitoring station to adequately characterise air quality. • The Bluff monitoring station is located within 1km of the Bluff Coal Mine, there are no other mines located within 11km of the Bluff monitoring station. The Gemini Project has one mine within 11km and that is the Bluff Coal Mine, located 11km to the west. The Bluff Coal Mine is currently in care and maintenance with no certainty of return to operation. The Bluff Coal Mine was estimated to have emitted 1,098 tonnes of PM_{10} to air for the 2019/2020 reporting period. Consequently, DES's Blackwater monitoring station is expected to adequately account for the potential contribution from the Bluff Coal mine on sensitive receptors near to the Gemini Project for the following reasons: a) There are three mines located within 11km of Blackwater monitoring station, which are closer than the Bluff Coal Mine is to the Gemini Project. b) The emissions to air from those mines are estimated to be 20 times higher than the emissions from the Bluff Coal Mine. In addition, analysis of the meteorological data for the Gemini Project (refer to Appendix A of the Katestone 2020 Report and Figure A1 below) illustrates that winds occur infrequently from the west (less than 8% of the time). Given

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		the low frequency of the winds from the west and distance from Bluff Coal mine to the Gemini Project, it is unlikely that Bluff Coal mine will contribute significantly to dust at the sensitive receptors surrounding the Gemini Project.
2	Provide justification for why workers' accommodation and associated infrastructure, which includes camp access road, sewage treatment plant, sewage pipeline and effluent irrigation management area, has been excluded as sources from the air quality modelling and assessment. Demonstrate how the EVs of air will be enhanced or protected given the change to the conceptual mine layout.	The Katestone 2020 Report was completed using the latest mine layout (refer to Figure 2 in the Katestone 2020 Report). There have been no subsequent changes to the conceptual mine layout. The camp access road, sewage treatment plant and effluent irrigation area will have very minor emissions to air and, therefore, were not quantitatively assessed in the Katestone report. Further explanation is provided below. **Camp access road** The camp access road to the workers' accommodation and to the mine infrastructure area will be sealed. Traffic projections indicate that during peak operations there will be 122 trips per day when light vehicles will travel from the highway to the workers' accommodation camp, which is a distance of 0.45km and five trips per day when the mine bus transports workers from the accommodation camp to the mine infrastructure area, which is a distance of 1.65km. Emissions of TSP, PM_{10} and $PM_{2.5}$ are estimated to be 0.23g/s, 0.04g/s and 0.01g/s, respectively. This is negligible, being less than 0.3% of emissions generated from the mining operations. Inclusion of these emissions will not change the outcome of the assessment. **Sewage Treatment Plant** It is estimated that during operation, up to 140 workers may be accommodated on site. During construction up to 280 workers may be accommodated on site. The STP has been designed for a 280 EP maximum capacity (56,000 L/day), and will be designed in accordance with AS/NZS 1546.1:2008. The STP will be a modular containerised design with very low odour emissions. This is conventional technology that is widely deployed throughout Queensland with minimal odour issues. **Effluent irrigation**

Item	Information Comments & Requirements	Response
		The following management measures will be implemented to manage aerosol drift, odour nuisance and potential impacts to human health: • Irrigation volumes are designed to prevent surface run-off. • Irrigation will cease in significant rainfall events when there is the risk of surface runoff. • Spray drift control (low-throw sprinklers - 180º inward throw). • Restricted irrigation when wind direction is not favourable, or temperature inversions present. • Suitable wet weather storage (3 days) to be provided in tanks, to prevent potential overflow events. • Maintain significant separation distances to sensitive receptors. **Distance to sensitive receptors** The above activities are located to the northwest corner of the ML, south of the highway. The nearest sensitive receptors are private homesteads SR31 and SR32 on Lot 1RP61678, shown in Queensland Globe as being in 'Dunbea'. These sensitive receptors are located approximately 1.5km and 2.1km to the west and northwest of the sewage treatment plant and 1.85km and 2.4km to the west and northwest from the workers' accommodation camp. Given the distance of these receptors to the above activities and the controls to be implemented there will be no adverse impact on environmental values.
3	Provide more information about SR31 and SR32 and the potential impacts to air at these locations given the change to the conceptual mine layout.	SR31 and SR32 are private homesteads on Lot 1RP61678, shown in Queensland Globe as being in 'Dunbea'. The air quality and greenhouse gas assessment (Katestone, 2020) was completed using the latest mine layout (refer to Figure 2 in the Katestone report).
4	Provide a summary or conclusion that interprets the data in Table 7 to help provide understanding of how the emission quantities	Table 7 of the Katestone 2020 Report presents the emissions to air (kg/year) of TSP, PM_{10} and $PM_{2.5}$ per year for each mining activity (for example blasting, drilling, hauling of ROM, wind erosion). The emission rates of TSP, PM_{10} and $PM_{2.5}$ for each activity are proportional to the activity rate for each year (as summarised in Appendix B of the Katestone

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	differ between years of mine operation and explain what might cause differences.	2020 Report). For example, emissions of TSP from haul trucks are proportional to vehicle kilometres travelled. In Year 2 91,440 vehicle kilometres are travelled within 6 months to transport ROM coal from the pit to the CHPP, whereas in Year 15 289,108 vehicle kilometres are travelled over 12 months. .The haul distance in Year 15 is 1.6 times higher than in Year 2 when taking into account period over which the haulage is undertaken. This is reflected in the emission rates in that for Year 15 it is estimated that 365,959 kg/year of TSP is emitted due to ROM coal haul compared to Year 2 where it is estimated 231,494 kg/year of TSP is emitted. It can be seen from Table 7 of Katestone 2020 Report that overall emissions of dust are highest in Year 15. This is predominately due to emissions associated with ROM haulage and overburden haulage as well as wind erosion of rehabilitation areas. In Year 15, haul distances are the longest due to location of the pit relative to the CHPP and dumps (refer to Appendix B Table B1 of Katestone 2020 Report). In Year 15, the area assigned for rehabilitation is the greatest due to it being the year when there is the most land available for rehabilitation (refer to Appendix B Table B1 of Katestone 2020 Report).
5	Explain and demonstrate that meteorological data from 1 January 2016 to 31 December 2016 represents the worst case meteorological conditions, very low rainfall and strong windy conditions, compared to 5 years of hourly site meteorological data.	No meteorological monitoring is undertaken on site. Therefore, meteorological modelling was conducted using the TAPM/CALMET modelling approach (refer to Section A of the Katestone 2020 Report for details). This was conducted in accordance with standard industry practice. In terms of “worst case”, the Katestone 2020 Report assesses the worst-case in terms of emissions of dust to air from the proposed mining activities. For meteorology, strong wind conditions do not necessarily correlate with worst case impacts from a mining activity. For example, strong winds may give rise to dust lift off, but strong winds also help disperse the dust. Very light to calm winds on the other hand can result in elevated dust concentrations due to poor mixing and dispersion of emissions sources such as haul dust. It is important that the meteorological data that is used for the site is representative of average conditions for dust assessments. The year 2016 was chosen as the most recent year at the time of the commencement of the assessment. Notwithstanding this, an analysis of five years of meteorological data from the Bureau of Meteorology’s station at Blackwater has been conducted. Figure A2 presents annual windroses for 2015 to 2020. Wind frequencies including the frequency of strong winds are consistent between the years. There is very little difference in average wind speeds. Therefore, the choice of 2016 as the meteorological year is adequate.

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		The regulatory emission estimation techniques cannot account for the effect of rainfall on dust emissions. The emissions model uses average material moisture contents. Whilst the dispersion model can characterise the effect of rainfall to reduce dust levels in the atmosphere (wet deposition), Katestone has conservatively assumed that rainfall does not remove dust from the atmosphere. This results in higher predicted dust levels rather than lower. Therefore, the choice of a year with high or low rainfall does not affect the outcomes of this assessment.

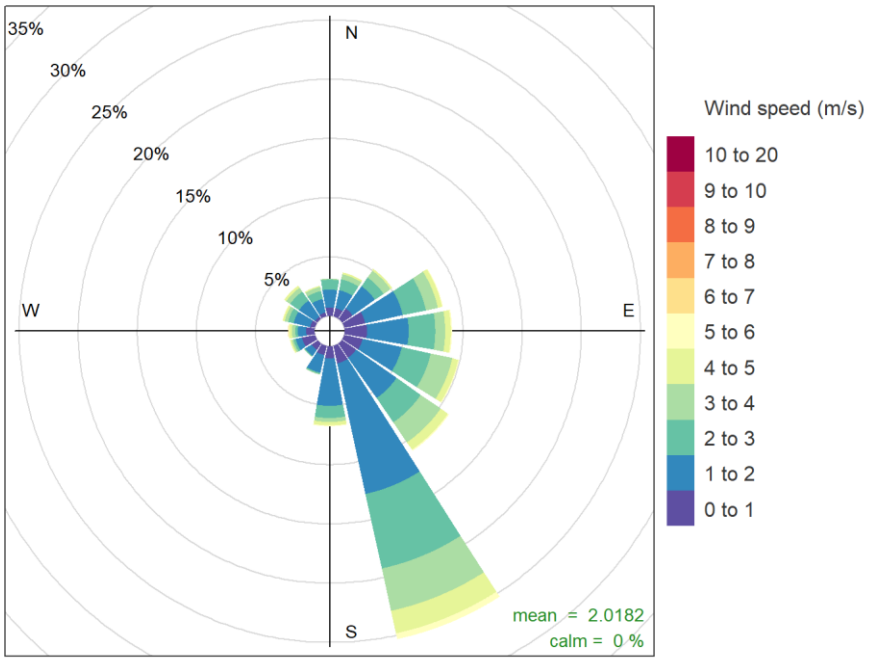

Figure A1 **Annual distribution of winds at the Project site predicted by TAPM/CALMET**

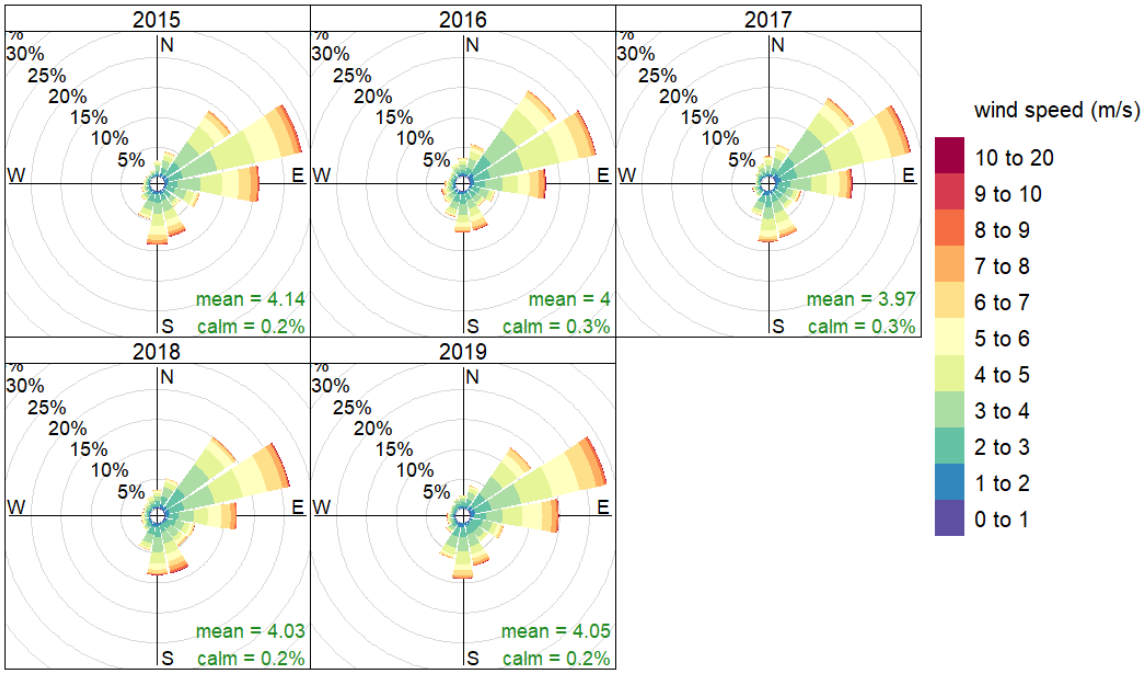

Figure A2 **Annual distributions of winds at Blackwater (BoM) 2015 to 2019**