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Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001
By email: genevieve.seed@planning.nsw.gov.au

Attention: Ms Genevieve Seed

1 July 2019

Dear Ms Seed,

**Brandy Hill Quarry Expansion Project SSD 5899
Comments on the Addendum to the Air Quality Impact Assessment Report**

Reference is made to your email to the Environment Protection Authority (EPA) dated 7 June 2019, seeking the EPA's comments and/or advice on the Addendum to the Air Quality Impact Assessment (AQIA) Report submitted to the Department of Planning and Environment (DPE) for the Brandy Hill Expansion Project, SSD 5899.

The EPA is disappointed that this most recent submission has again failed to address the EPA's concerns with the AQIA. DPE routinely asks agencies for recommended conditions of consent in submissions. In its current form, the EPA cannot support the proponent's application and continues to decline to provide such conditions.

As this is the third review of the Air Quality Impact Assessment (AQIA), the proponent should seek an independent review by a suitably qualified expert before resubmitting the document.

Following the EPA's first review of the AQIA a revised document was submitted in February 2019. The EPA's review of this document raised issues largely surrounding: inaccuracies in the emissions inventory and model assumptions; methodology used for validation and comparison of CALMET model and data; practicality of measures in the Air Quality Management Plan; and approach to the assessment of cumulative impacts with regards to background PM₁₀ data.

The EPA considers that some of the above issues raised have still not been satisfactorily resolved including calculation of vehicle kilometres travelled (VKT) on unpaved roads – which are considered to be significantly underestimated. As unpaved roads are a major contributor to particulate impacts, the EPA considers that particulate impacts in the assessment are significantly underestimated. The EPA also considers some of the proposed controls to be unfeasible, including the continuous watering of haul roads.

The EPA recommends that the proponent addresses the issues outlined in Attachment 1 and 2 and revise the AQIA accordingly. Resolving issues with the emissions inventory will likely increase the predicted emissions and hence the modelling should also be revised. Once the modelling is redone, it is possible that there will be additional exceedances of the PM₁₀ criterion in which case additional practical controls will be required to be investigated to mitigate emissions and ensure compliance.

If you require any further information regarding this matter, please contact Jessie Hayne on 4908 6851 or by email to hunter.region@epa.nsw.gov.au.

Yours sincerely

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Enclosed: Attachment A – Issues requiring resolution
Attachment B – EPA comments on emissions inventory
Attachment C – Table of EPA responses

ATTACHMENT 1 – ISSUES REQUIRING RESOLUTION

1. Emission Estimation

Details of the emissions inventory were provided, as requested. However, there are outstanding issues with the emissions inventory which need to be resolved. The issues with the emissions inventory are explained in detail in Attachment 2.

The EPA recommends the proponent resolves the issues with the emissions inventory provided in Attachment 2, including reviewing and providing calculations for emissions from unpaved roads that could not be replicated. Peak daily emission rates for the current stage should be revised. The AQIA should be revised accordingly.

2. PM₁₀ Impacts

Background concentrations for cumulative analysis was obtained from the OEH Beresfield station. At each receptor, there were five occasions where the PM₁₀ concentrations in the background data exceeded the 24-hour average PM₁₀ criterion of 50 µg/m³. The total impact of the project (i.e. incremental and background concentrations) on these 5 occasions were not provided. As requested in earlier advice, results (incremental and background) on days that had exceedances should be provided for each receptor.

Results of the revised dispersion modelling should include the concentration (background and incremental) at each receptor when there are exceedances.

ATTACHMENT 2 – EPA COMMENTS ON EMISSIONS INVENTORY

1. Excavation Rates in the current stage are lower than the annual average throughput

Excavation rates in Table A-9 for the current stage is based on a maximum throughput of 80 tph (1438 tpd). This is equivalent, assuming operations are 6 days per week, 52 weeks per year, to 0.49 Mtpa. This is lower than the current stage annual average throughput of 0.7 Mtpa. Thus, the peak daily throughput of 1438tpd used in calculating emissions in the current stage appears in error.

The peak daily throughput in the current stage should be revised. Emissions for the current stage should be recalculated using the revised peak daily throughput and the modelling then needs to be revised.

2. Emissions from unpaved roads.

Haul truck movements (vkt/day)

- As discussed in the email communication from the EPA to Vipac on 18 April 2019^{Error! Bookmark not defined.}, vkt/day is significantly underestimated. This results in significantly lower haul road emissions and hence significantly lower predicted particulate impacts. Vipac calculations and the corresponding EPA estimates for vkt of haul trucks (laden and empty weights of 93t and 39t respectively) are shown below:

Stage ^a	Length of haul road (km)	Vipac (Tables A10-A12) (vkt/day)	EPA calculations (vkt/day)
Stage 1	0.77	116	116
Stage 2	1.167 ^b	66.6	175
Stage 4	0.77	44	116

Notes: ^a The current stage is not listed here. Since peak daily throughput is in error, EPA was unable to estimate vkt

^b It is thought this value is in error and should be 0.77 km to be consistent with Table A-1.

- The haul road length listed in Table A-1 (0.7 km) is inconsistent with the length listed in Table A-11 (1.167 km) for Stage 2.
- Dispersion modelling assumes watering occurs for all hours and this is reflected in the updated AQMP. The EPA estimates the site will use approximately 435,000 L¹ per day of water on its haul roads for the current stage, and therefore questions the availability of water and the practicality of watering for all hours.

Product truck movements (vkt/day)

- As discussed in the email communication from the EPA to Vipac on 18 April 2019^{Error! Bookmark not defined.}, vkt/day for product truck movements is significantly underestimated. This results in significantly lower emissions from product truck haulage and hence significantly lower predicted particulate impacts. Vipac calculations and the corresponding EPA estimates for vkt of product trucks (laden and empty weights of 99t and 33t respectively) are shown below:

¹ Based on Level 2 watering (<2L/m²/hr), assuming the width of road is 4m.

Stage	Length of haul road (km)	Vipac (Tables A10-A12) (vkt/day)	EPA calculations (vkt/day)
Stage 1	1.78	47	219
Stage 2	1.78	47	219
Stage 4	0.91	24	112

The EPA recommends that emissions from haul roads and product haulage are reviewed to address the above issues and detailed calculations (including truck movements and vkt calculations) be provided. Emissions should be based on peak daily operations. The level of watering proposed to be applied should be confirmed and be realistic. Modelling should be revised using the updated emissions inventory.

3.Wind Erosion of Pits

- According to the National Pollution Inventory for Mining², the ratio of PM₁₀:TSP in emissions from wind erosion is 0.5. Further, the ratio of PM₁₀:TSP in all activities prior to processing is 0.5. However, in the AQA, the ratio of PM₁₀:TSP from wind erosion in the pits (Tables A9-A12) is 0.3. As requested in previous communication^{Error! Bookmark not defined.}, a PM₁₀:TSP ratio of 0.3 should be justified.

The proponent should justify a PM₁₀:TSP ratio of 0.3 for wind erosion in pits. If 0.3 cannot be justified, the NPI value of 0.5 should be used, and modelling be revised accordingly.

² National Pollution Inventory, Emission Estimation Technique Manual for Mining, Version 3.1, Australian Government, January 2012.

ATTACHMENT 3 - TABLE OF EPA RESPONSES

EPA requirement from February 2019	Hanson/Vipac response 3 June 2019	EPA response June 2019
Emissions Inventory		
<u>Peak Daily Emissions</u> <ul style="list-style-type: none"> It is unclear whether peak daily emissions were modelled for each stage. 	<u>Peak Daily Emissions</u> <ul style="list-style-type: none"> Emissions were calculated based on peak daily emissions of <ul style="list-style-type: none"> 80tph current stage; and 450tph stages 1-4 	<u>Peak Daily Emissions</u> <ul style="list-style-type: none"> Peak daily emissions in the current stage are based on a maximum throughput of 80 tph (1438 tpd). This is equivalent, assuming operations are 6 days per week, 52 weeks per year, to 0.49 Mtpa. This is lower than the current stage annual average throughput of 0.7 Mtpa. Thus, the peak daily throughput of 1438tpd used in calculating emissions in the current stage appears in error. <p><i>Emissions in the current stage should be revised to be based on a corrected peak daily extraction rate.</i></p>
<u>Haul Roads</u> <ul style="list-style-type: none"> Haul road emissions are unable to be replicated Haul Road emissions in g/s listed in Appendix B do not correlate to emissions in tpy in Tables 8-3 to 8-5. Table B-2 specifies Level 2 (75%) watering on haul roads. However, the emission estimate tables in Appendix B list a control factor of 50% for Current and Stage 1, and 86% control for Stages 2 and 4. Further, it is unclear what the 86% control factor is based on. Dispersion modelling assumes watering occurs for all hours. However, the air quality management plan states that watering will only be undertaken on dry windy days. The modelling should be revised so that controls are only applied when watering 	<u>Haul Roads</u> <ul style="list-style-type: none"> An example haul road emission calculation for the current stage is provided All haul road emissions provided in g/s Haul roads will have level 2 watering (75% reduction) and a speed limit of 40km/hr (44% reduction). Haul roads will be continuously watered 	<u>Haul Roads</u> <ul style="list-style-type: none"> Haul road calculations do not show how vkt/day is calculated. The EPA calculates vkt/day to be much larger than reported. The EPA questions the practicality of applying Level 2 watering at all hours of operation. <p><i>Calculations for vkt/day should be provided. If vkt/day is different than provided previously, the emissions inventory should be updated, and the modelling be revised. The practicality of undertaking Level 2 watering for all hours of operation should be addressed.</i></p>

is proposed to be undertaken.		
<u>Wind Erosion of pits</u> <ul style="list-style-type: none"> Wind erosion pit emissions could not be replicated. PM₁₀:TSP ratio is specified as 0.3 with no justification Table B-3 specifies that Level 1 watering occurs on pits. However, the AQMP does not specify the use of water cannons, and a water cart will be unable to water the pits. The AQA should confirm what controls, if any, are used for wind erosion from the pits. 	<u>Wind Erosion of pits</u> <ul style="list-style-type: none"> An example wind erosion calculation was provided PM₁₀:TSP ratio is specified as 0.3 with no justification There is no water spraying on pits and controls have been adjusted accordingly in the emissions inventory 	<u>Wind Erosion of pits</u> <ul style="list-style-type: none"> PM₁₀:TSP ratio is specified as 0.3 with no justification. EPA notes that the PM₁₀:TSP ratio for all other activities pre-processing are 0.5, consistent with NPI. <p><i>The PM₁₀:TSP ratio of 0.3 should be justified.</i></p>
<u>Conveyor Emissions</u> <ul style="list-style-type: none"> Emissions from conveyors has been unable to be replicated. 	<u>Conveyor Emissions</u> <ul style="list-style-type: none"> An example calculation for emissions from conveyors was provided 	<u>Conveyor Emissions</u> <p><i>This issue has been resolved</i></p>
<u>Blasting and Drilling</u> <ul style="list-style-type: none"> Modelling of blasting and drilling assumes emissions are averaged over every hour of the year. However, blasting and drilling are discrete events and take place once/week and once/day respectively. The impact of emissions from blasting and drilling have therefore been underestimated. 	<u>Blasting and Drilling</u> <ul style="list-style-type: none"> Blasting and drilling emissions have been modified to reflect emissions for 30 minutes duration at 12pm Fridays. 	<u>Blasting and Drilling</u> <p><i>This issue has been resolved</i></p>
<u>Product Trucks</u> <ul style="list-style-type: none"> Emissions from product truck movements have been unable to be replicated 	<u>Product Trucks</u> <ul style="list-style-type: none"> An example calculation for haul road emissions from product trucks for the current stage is provided 	<u>Product Trucks</u> <ul style="list-style-type: none"> Calculations for emissions from hauling product trucks do not show how vkt/day is calculated. The EPA calculates vkt/day to be much larger than reported. The EPA questions the practicality of applying Level 2 watering at all hours of operation. <p><i>Calculations for vkt/day should be provided. If vkt/day is different than provided previously, the emissions inventory should be updated, and the modelling be revised. The practicality of undertaking Level 2 watering for</i></p>

		<i>all hours of operation should be addressed.</i>
<u>Mobile Plant</u> <ul style="list-style-type: none"> Table 8-2 lists mobile plant as including dump trucks, a mobile crusher and grader. However mobile plant emissions in current and Stage 1 appears to only account for emissions from the excavator and front-end loader. Further, it does not appear that emissions from the mobile crusher have been included at any stage of the project. 	<u>Mobile Plant</u> <ul style="list-style-type: none"> The mobile crusher is enclosed for all future stages Dust emissions from dump truck activities are accounted for in the emissions from loading and unloading stockpiles. 	<u>Mobile Plant</u> <i>This issue has been resolved</i>
Meteorological and Modelling Assessment		
<u>Comparison of Calmet data to observational data</u> Calmet data extracted at the site was compared with monitored data at Patterson AWS located approximately 9 km northwest of the project. The differences between the two data sets were explained as due to the topological differences between the two sites. The quarry site is described as “in a ‘bowl’ with the mountains on the west, north and east”. Calmet data should be validated at the same site as measured data. Further, since Patterson AWS data was assimilated into TAPM, it should not be used for validation purposes. Calmet data extracted at the location of another meteorological station within the 55 km x 55 km domain should have been used for validation against measured data at that station.	<u>Comparison of Calmet data to observational data</u> Calmet data was compared qualitatively to meteorology data from the Beresfield OEH station. Wind roses compared well, and the Calmet data can be considered representative.	<u>Comparison of Calmet data to observational data</u> <i>This issue has been resolved</i>
PM₁₀ Impacts		
Background concentrations for cumulative analysis was obtained from the OEH Beresfield station. Concentrations above the 24-hour average PM ₁₀ criterion of 50 µg/m ³ in the background data were removed. There was no rationale provided for removing data from the background dataset. This data	Results of the modelling included days where there were background exceedances	Maximum cumulative impacts were provided at each receptor, including the number of daily exceedances. Predicted maximum 24hour incremental PM ₁₀ concentrations were also provided. As discussed in previous communication, resulting exceedances should be

should have been included. Resulting exceedances should be discussed with reference to the background exceedances.		discussed with reference to the background exceedances. <i>Results (incremental and background) on days that had exceedances should be provided for each receptor.</i>
Cumulative concentrations at plots of vacant land		
In accordance with the Approved Methods, all receptors and likely future receptors should be included in the modelling. Cumulative impacts at the blocks of vacant land (which could be future receptors) were not provided.	Cumulative concentrations at likely future off-site receptors (plots of vacant land) were provided.	<i>This issue has been resolved</i>