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12 August 2022

Attn: Damien Plucknett

Senior Consultant - Environment
METServe
310 Edward Street
Brisbane QLD 4000

Email: Damien.Plucknett@metserve.com.au

Re: Emissions Analysis for the VCM Matilda Pit, Rail Loop and CHPP

Dear Damien,

In 2020, Katestone completed an air quality assessment of the Vulcan Coal Mine (VCM) (Document reference D19001-6). Vitrinite Pty Ltd (the proponent of the VCM) has submitted an EA and PRCP amendment application to include a CHPP and rail loop within the mine site. The amendment application was submitted, referring to Katestone's report (D19001-6) and stated that due to the significant separation distance to the nearest sensitive receptors, that the addition of the CHPP and rail loop were unlikely to cause a measurable difference to air quality. In response, the Department of Environment and Science (DES) has issued an information request, requesting the CHPP and rail loop be incorporated into the air quality dispersion model as part of the amendment application.

Since the initial amendment application the site plan has been further revised to incorporate mining of a new shallow open cut pit (Matilda Pit) within the rail loop alignment, to be developed concurrently with the main existing east pit. METServe have advised that there are no requirements to increase production rate or alter the project timeframes as additional planning work has been completed on the main pit while overall coal extraction has been reduced from what was originally proposed and approved. No changes are expected to the equipment fleet, workforce, or accommodation. Instead, material extracted from the Matilda Pit will supplement material no longer being mined from the main east pit. Additionally, Katestone has reviewed the D19001-6 assessment and notes the emissions of dust associated with a CHPP (activities including transfer of ROM, crushing and screening) were included in the emissions inventory and dispersion modelling assessment, thus accounting for an onsite CHPP. As the amendment focuses primarily on method of transport for product coal (train rather than truck) while other proposed changes involve only a redistribution of activities within the same mine lease area, new modelling has not been performed and is not considered necessary as impacts are expected to remain similar and all potential source types exist in the initial modelling.

This letter addresses potential air quality impacts from the proposed changes to the VCM. These changes include the transition to processing material at an onsite CHPP, the inclusion of a train load out (TLO) and rail loop, and the extraction of material from the Matilda Pit. The letter presents an analysis of expected emission rates from the proposed activities utilising the same approach taken by the initial assessment using regulatory emission factors and emissions data provided by METServe.

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

Yours sincerely,

Daniel Gallagher

ATTACHMENT A – ASSESSMENT OF THE VCM

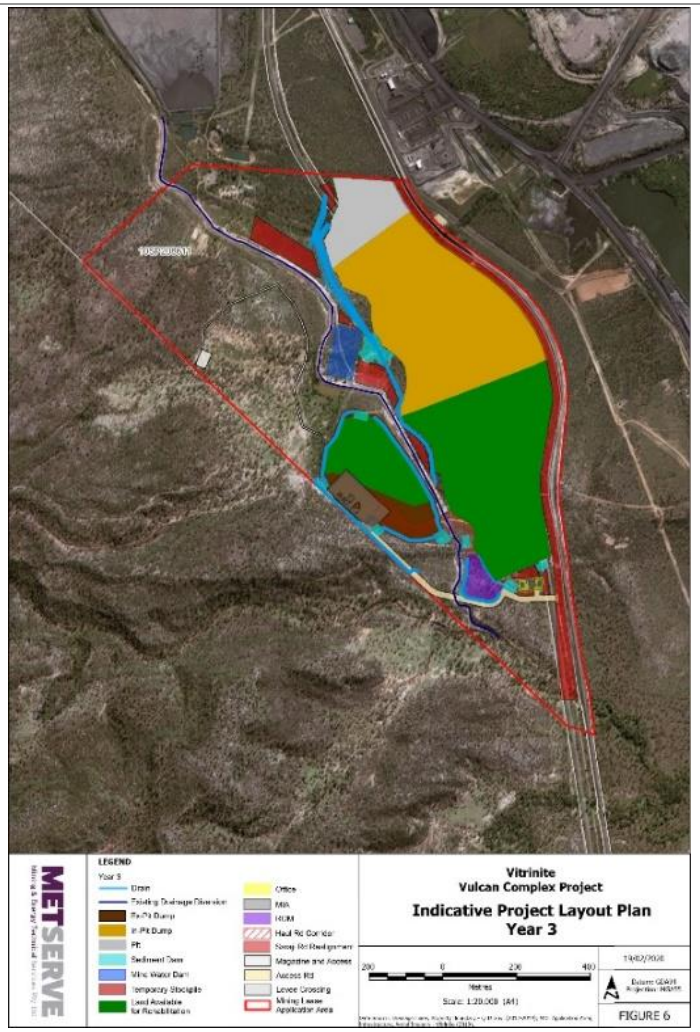
A1 AMENDED DESIGN AND ACTIVITIES

The VCM is approved to operate for four years with a Run of Mine (ROM) rate of up to 1.95 Million tonnes per annum (Mtpa). The mine has completed its first year of operations according to these requirements and as informed by the initial air quality assessment prepared by Katestone (Katestone report D19001-6). Details of the existing operations can be found in Katestone report D19001-6. Proposed changes to the site layout and operations to be conducted over the remaining three years will not increase the duration, equipment fleet, extent, or volumes extracted for the VCM.

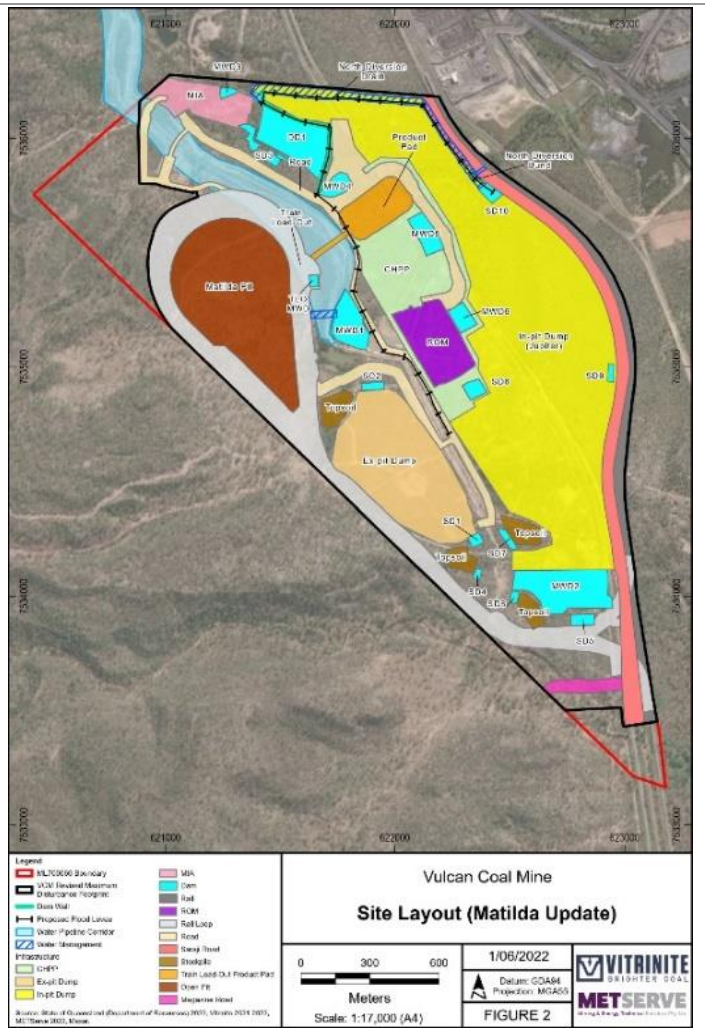
The proposed changes include:

- Construction of an onsite CHPP, TLO and rail loop over 18 months to replace the need for hauling ROM off site for toll washing and export at third-party facilities. This is expected to commence operation in year three of the mine life.
- Reduction in the ROM extraction volumes from the existing pit alongside development of the shallow open cut Matilda Pit to maintain approved extraction limits.
- Preference given to dumping waste materials in-pit, minimising the need for an out-of-pit dump and removing the requirement for an onsite tailings storage facility.

Figure A1 presents the layout as assessed in Katestone report D19001-6 and the proposed layout.



Previous mine extent and locations of operations



Newly proposed mine layout

Figure A1 Plans for initial and proposed mine layouts

A2 SENSITIVE RECEPTORS

The extent of the VCM site boundary has not changed, therefore, distances to sensitive receptors are equivalent to those presented in Katestone report D19001-6. Table A1 and Figure A 2 illustrate the distance between the sensitive receptors and the VCM site boundary, with sensitive receptors located more than 12 km south-east of the VCM site boundary.

Table A1 Sensitive receptors

Receptor ID	Type	Description	Easting (km)	Northing (km)	Distance and direction from the VCP
1	Residential	Property Manager	630434	7523439	12.1 km SE
2		Workers Accommodation	630689	7522987	12.8 km SE
3		Saraji Station residence	629573	7519127	15.5 km SE

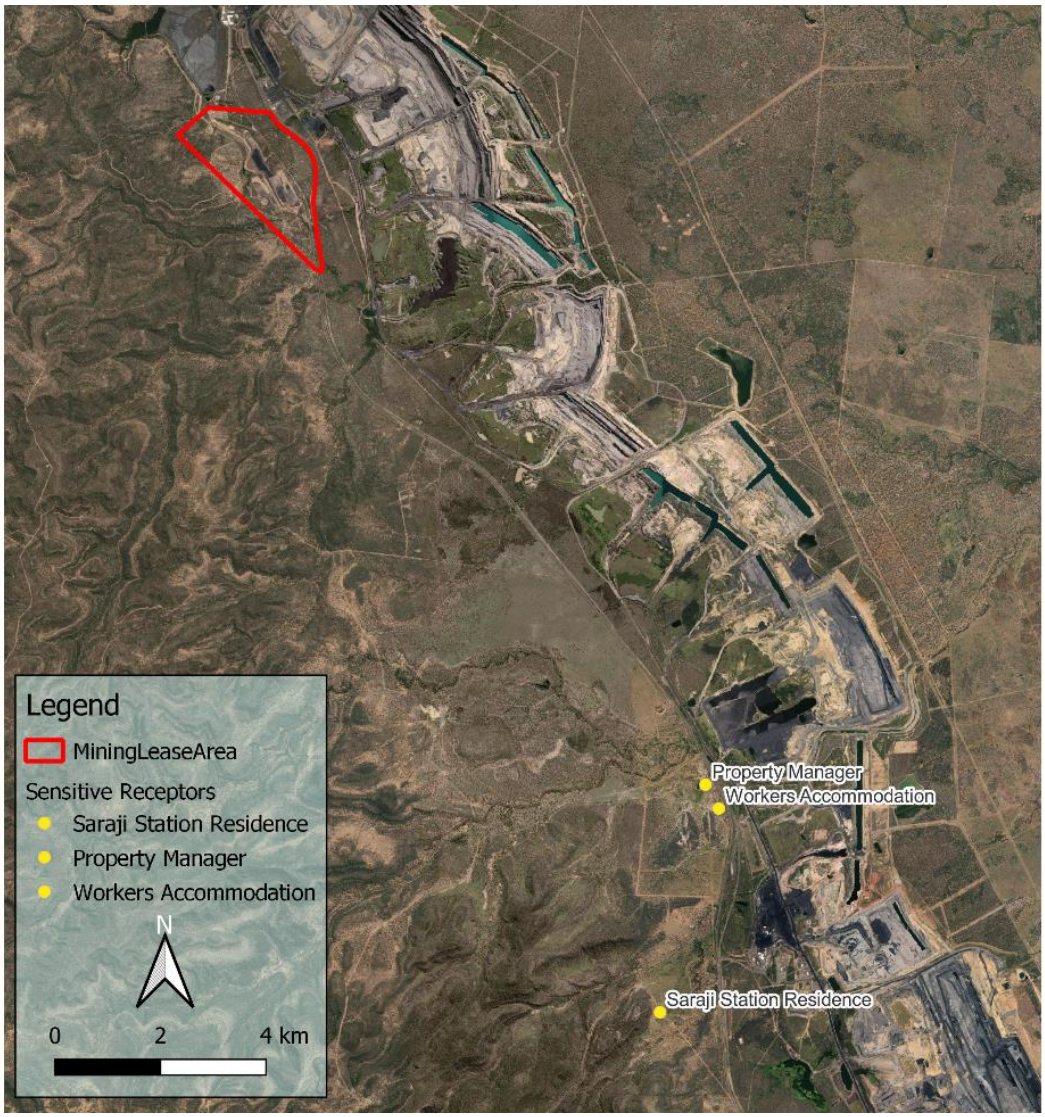


Figure A 2 Location of mine lease and sensitive receptors

A3 EMISSIONS INVENTORY

Annual total emissions and emission inventories for the initial assessment (Katestone report D19001-6) and proposed operations occurring in Financial Year (FY) 23, FY24, and Calendar Year (from July to December 2024) (CY) 24 are provided in Table A2 and Table A3, respectively. CY24 represents emissions for a six-month period.

The emissions inventories show the following changes relative to Katestone report D19001-6:

- TSP – emission rates are predicted to be 8% and 17% higher compared to D19001-6 for FY23, FY24 respectively, and 7% lower for CY24.
- PM_{10} – emission rates are predicted to be 12% and 26% higher compared to D19001-6 for FY23, FY24 respectively, and 2% lower for CY24.
- $PM_{2.5}$ – emission rates are predicted to be 9% and 20% higher compared to D19001-6 for FY23, FY24 respectively, and 12% lower for CY24.

Train loading and the onsite CHPP will commence operation in the second half of FY24, in the meantime ROM coal will still be trucked to a third-party facility. Therefore, no onsite processing of ROM will occur in FY23 other than the loading of trucks for offsite transport. Emissions increases are expected to be due to increased contributions from wind erosion and some additional hauls. The requirement for truck loading and hauling off site is replaced with train loading, and onsite processing coincides with decreasing extraction volumes in FY24 and CY24.

Table A2 Estimated TSP, PM_{10}, and $PM_{2.5}$ emission rates for the initial assessment of the VCM and for the proposed VCM operational amendments

Assessment	Mine Year	Units	TSP	PM_{10}	$PM_{2.5}$
D19001-6	Year 2	tonnes/annum	1,366	548	89[2]
VCM – Amendment	FY23/Yr2		1,453	606	96
	FY24/Yr3		1,586	679	107
	CY24/Yr4[1]		703	295	44

[1] Operations occurring over a 6-month period.

[2] This value is a correction to the D19001-6 assessment after identifying an incorrect emission rate for ROM excavation.

Table A3 Breakdown of TSP, PM_{10}, and $PM_{2.5}$ emission rates for the assessment D19001-6 and proposed operations for FY 23, FY 24, and CY 24

Activity	D19001-6 Year 2			FY 23 (Year 2)			FY 24 (Year 3)			CY 24 (Year 4)		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Pit activities												
Bulldozing overburden	0.05	0.05	0.01	0.08	0.08	0.01	0.05	0.05	0.01	0.00	0.00	0.00
Drilling and blasting	0.33	0.32	0.02	0.67	0.66	0.04	0.92	0.91	0.06	0.30	0.30	0.02
Excavating overburden	3.00	2.74	0.43	3.35	3.06	0.48	4.49	4.10	0.64	2.62	2.39	0.38
Excavating ROM	1.13	0.33	0.17	1.13	0.33	0.17	1.13	0.33	0.17	0.19	0.05	0.03
Dumping activities												
Truck dumping overburden	2.88	1.96	0.41	1.61	1.10	0.23	2.16	1.47	0.31	1.26	0.86	0.18
Truck dumping ROM	2.26	0.35	0.12	2.26	0.35	0.12	2.26	0.35	0.12	0.37	0.06	0.02
Bulldozing overburden	0.12	0.05	0.02	0.12	0.05	0.02	0.12	0.05	0.02	0.23	0.11	0.05
Bulldozing ROM	2.55	0.88	0.06	2.55	0.88	0.06	2.55	0.88	0.06	5.10	1.75	0.11
Haulage												
ROM coal haulage	1.49	0.37	0.04	1.27	0.32	0.03	1.36	0.34	0.03	0.27	0.07	0.01
Overburden haulage	3.63	0.91	0.09	2.74	0.68	0.07	4.10	1.02	0.10	2.11	0.53	0.05
Grading haul roads	9.20	1.68	0.29	9.71	1.77	0.30	9.71	1.77	0.30	9.71	1.77	0.30
Processing												
Sizing and crushing	0.94	0.34	0.03	0.00	0.00	0.00	0.47	0.17	0.02	0.15	0.06	0.01
Truck loading and transfers	1.38	0.22	0.10	1.00	0.15	0.05	1.15	0.18	0.06	0.02	0.01	0.001
TLO	-	-	-	0.00	0.00	0.00	2.8E-03	1.3E-03	2.0E-04	2.8E-03	1.3E-03	2.0E-04
Wind erosion												
Stockpiles	10.94	5.47	0.82	16.15	8.07	1.21	16.15	8.07	1.21	16.15	8.07	1.21
Exposed areas	2.24	1.12	0.17	2.75	1.37	0.21	2.96	1.48	0.22	0.85	0.43	0.06
Rehabilitated areas	0.70	0.35	0.05	0.70	0.35	0.05	0.70	0.35	0.05	0.70	0.35	0.05
Total (g/s)	**42.85**	**17.14**	**2.81**	**46.09**	**19.22**	**3.06**	**50.29**	**21.53**	**3.39**	**40.03**	**16.80**	**2.48**

Table note: Totals may not match manual sum of column due to rounding

A4 IMPACTS TO AIR QUALITY

In order to provide an indication of the expected impacts to air from the proposed mine plan, predicted ground-level concentrations for TSP, PM_{10} and $PM_{2.5}$ from the Katestone report D19001-6 have been scaled by the increases in emission rates discussed in the previous section. In the case of dust deposition previous ground level predictions have been scaled by the largest increase in emissions of either TSP, PM_{10}, or $PM_{2.5}$. This scaling depends upon the assumption that the existing modelling is representative of the new operations. This assumption is considered reasonable for the following reasons:

- Mine areas and locations: The total extent of mine areas including active pits, stockpiles, dumps and areas for rehabilitation will increase by at most 5% relative to Katestone report D19001-6 and will occur within the same mine lease area. No sources will occur closer to the sensitive receptors than in the existing assessment. Furthermore, given the locations are largely unchanged the influence of meteorological conditions on dispersion will remain unchanged.
- Extraction rates and equipment: Additional planning work has been completed on the main pit to maintain originally proposed and approved extraction rates. The proposed changes, therefore, involve only a redistribution of activities rather than additional extraction requiring larger equipment fleets.
- Rail transport and ROM processing replacing offsite processing and truck transport: The initial assessment included emissions of dust associated with the CHPP (activities including transfer of ROM, crushing and screening) alongside loading of product into trucks. Therefore, the processes and locations of ROM processing which will occur onsite once the CHPP and TLO are constructed are represented in the initial modelling and will still process the same quantities of material.

Results from the Katestone report D19001-6 are reproduced below in Table A4. Results scaled by emissions increases for FY23, FY24, and CY24 are shown in Table A5. The results indicate that impacts from the VCM at the sensitive receptors will remain minimal and that compliance with Schedule B: Air and in particular the values presented in Table B1 – Air Quality Limits of the existing EA (EA0002912) will be maintained.

Table A4 Predicted ground-level concentrations for the initial assessment (D19001-6) in isolation and including ambient background (µg/m³)

Receptor	Isolation						Including Background					
	TSP	PM_{10}	PM_{10}	$PM_{2.5}$	$PM_{2.5}$	Dust Dep	TSP	PM_{10}	PM_{10}	$PM_{2.5}$	$PM_{2.5}$	Dust Deposition
	Ann Avg	24hr Max	Ann Avg	24hr Max	Ann Avg	Max Monthly	Ann Avg	24hr Max	Ann Avg	24hr Max	Ann Avg	Max Monthly
Property Manager	0.3	3.1	0.1	0.9	0.0	0.9	60.5	38.1	30.2	5.2	3.6	71.9
Workers Accommodation	0.3	4.4	0.2	1.1	0.0	1.1	60.5	39.4	30.3	5.4	3.6	72.1
O'Sullivan Residence	0.4	4.4	0.2	1.4	0.1	1.3	60.6	39.4	30.3	5.7	3.7	72.3
Criteria	**90**	**50**	**25**	**25**	**8**	**120 mg/m²/day**	**90**	**50**	**25**	**25**	**8**	**120 mg/m²/day**

Table A5 Scaled ground-level concentrations for the proposed operations in isolation and including ambient background (µg/m³)

Year	Receptor	Isolation						Including Background					
		TSP	PM_{10}	PM_{10}	$PM_{2.5}$	$PM_{2.5}$	Dust Dep	TSP	PM_{10}	PM_{10}	$PM_{2.5}$	$PM_{2.5}$	Dust Dep
		Ann Avg	24hr Max	Ann Avg	24hr Max	Ann Avg	Max Monthly	Ann Avg	24hr Max	Ann Avg	24hr Max	Ann Avg	Max Monthly
FY 23	Property Manager	0.3	3.4	0.2	1.0	0.05	1.1	60.5	38.4	30.3	5.3	3.6	90.3
	Workers Accommodation	0.3	5.0	0.2	1.2	0.05	1.4	60.5	40.0	30.3	5.5	3.7	90.5
	O'Sullivan Residence	0.4	5.0	0.3	1.6	0.08	1.6	60.6	40.0	30.4	5.9	3.7	90.8
FY 24	Property Manager	0.3	3.8	0.2	1.1	0.1	1.1	60.5	38.8	30.3	5.4	3.7	90.3
	Workers Accommodation	0.4	5.6	0.2	1.4	0.1	1.4	60.6	40.6	30.3	5.7	3.7	90.5
	O'Sullivan Residence	0.5	5.6	0.3	1.7	0.1	1.6	60.7	40.6	30.4	6.0	3.7	90.8
CY 23	Property Manager	0.2	3.0	0.1	0.8	0.04	1.1	60.4	38.0	30.2	5.1	3.6	90.3
	Workers Accommodation	0.3	4.3	0.2	1.0	0.04	1.4	60.5	39.3	30.3	5.3	3.6	90.5
	O'Sullivan Residence	0.4	4.3	0.2	1.3	0.07	1.6	60.6	39.3	30.3	5.6	3.7	90.8
Criteria		**90**	**50**	**25**	**25**	**8**	**120 mg/m²/day**	**90**	**50**	**25**	**25**	**8**	**120 mg/m2/day**