

12 April 2024

Joe Fittell
Team Leader
Department of Housing, Infrastructure and Planning

Re: HVO Continuation Project (SSD-11826681 and SSD-11826621)

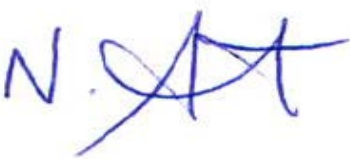
Dear Joe,

I refer to the request for further information from the NSW Environment Protection Authority (EPA) relating to the HVO Continuation Project (the Project), in a letter dated 8 March 2024. The EPA requested additional information in relation to the predicted air and noise impacts of the Project.

The purpose of this letter and accompanying attachments is to provide a response to this request from the EPA. Attachment 1 has been prepared by EMM Consulting Pty Limited (EMM) and responds to matters relating to the noise assessment, and Attachment 2 has been prepared by Airen Consulting, and responds to air quality matters raised by the EPA.

If you require any further information, please don't hesitate to contact me or Jason Martin, Approvals Manager, HVO Continuation Project, at Jason.martin@glencore.com.au.

Yours sincerely



Nicole Armit
Director
narmit@emmconsulting.com.au

Attachment 1

HVO Continuation Project – Response to EPA request
for additional information relating to noise

Memorandum

11 April 2024

Subject: HVO Continuation Project - EPA comments on Response to Submissions relating to noise

The Environment Protection Authority (EPA) provided comments on the *HVO Continuation Project Response to Submissions Report* (EMM 2023) in a letter dated 8 March 2024.

The purpose of this memorandum is to respond to the comments from the EPA relating to the noise impact assessment prepared for the Project (EMM 2022). Each comment from the EPA is provided in the boxes below, followed directly by a response.

a) Justification that the background noise levels are undertaken at locations that are representative of the 'Noise Assessment Group' (receiver catchment)

The EPA has concerns that the background noise levels presented in the Noise Impact Assessment (NIA) may not be representative, and this may lead to underestimating noise impacts including potentially fewer residents that may be eligible for consideration under the VLAMP.

The project noise trigger levels (PNTLs) presented in the NIA are based on intrusiveness trigger levels (i.e. background plus 5dBA). However, the background monitoring data for some areas affected by the proposal have been derived from monitoring undertaken at HVO's real time monitoring sites. These real time monitoring sites appear to have been selected due to their exposure to the mine and hence may be more impacted by mine noise than other areas represented by the background noise data.

For example, background monitoring data undertaken by the proponent's noise consultant (Global Acoustics) and submitted to DPHI in a Briefing Note dated 22 February 2021 presented background noise results for some areas that are lower than those reported in the NIA, for example, Noise Assessment Group 3 (NAG). The EPA had previously raised concerns on this approach in letters to DPHI dated the 21 March 2021 and 29 June 2021. In this regard the EPA recommends that the proponent be required to provide justification that the background noise levels reported in the NIA are undertaken at locations that are conservatively representative of the 'Noise Assessment Group' (receiver catchment) that they represent.

The PNTLs presented in the NIA (EMM 2022) are based on intrusiveness trigger levels (i.e. background plus 5 dB), measured in accordance with Table A1 of Fact Sheet A in the NPfI. Fact Sheet A requires that background noise monitoring occurs at the "reasonably most- or potentially most- affected residence(s)". The background monitoring locations selected for the NIA satisfy this NPfI requirement.

NAGs included in the NIA are exposed to multiple existing open cut mining operations in the area. Mining noise is considered a feature of their acoustic environments and is likely received at various times from multiple directions. Monitoring undertaken at residences that are not potentially most affected by HVO noise could result in measuring a higher contribution for a neighbouring mining operation.

Furthermore, the NPfl states that noise from an existing site in operation for 10+ years with demonstrated compliance is not required to be excluded from background monitoring.

The background monitoring data provided to and mentioned by the EPA above, was obtained over a limited number of weeks, whereas the rating background level (RBL) used in the NIA were derived from a full calendar year dataset from two real time monitoring locations. This is preferable when available as it is more comprehensive and accounts for seasonal variability.

Based on the information above, particularly that the locations were selected in accordance with the NPfl requirements and mining noise is considered a feature of each area, the locations are considered representative and suitable for use in the NIA.

b) Further information is required to demonstrate that the noise prediction method adopted in the NIA is not materially different to predicted noise levels assessed under the *Noise Policy for Industry* (NPfl) ‘noise enhancing’ conditions.

The NIA applies a noise prediction methodology based on a statistical distribution of predicted noise levels over varying meteorological conditions using the upper 10th percentile method. In this case 260 meteorological conditions are modelled, and the upper 10th percentile result is assigned as the predicted level for a receiver location for the day, evening, and night period. The NPfl acknowledges this prediction method with the following caveat:

“Prediction approaches that present a statistical distribution of noise levels based on a range of prevailing meteorological conditions are useful in explaining to the community the range of noise levels that could result from a development. However, it is the proponent’s responsibility to present a noise level that can be met under the meteorological conditions that apply to the site based on Fact Sheet D”.

It is important to note that both the NPfl and VLAMP are based on predictions using either standard or noise enhancing weather conditions dependent on the significance of occurrence of noise enhancing conditions. It is well established that noise enhancing conditions predominate the Hunter Coal Mining Region. On this basis the proponent should be required to demonstrate that the predictions based on the upper 10th percentile approach are not significantly different to levels that would occur under NPfl noise enhancing conditions.

The statistical distribution methodology has been regularly accepted by the EPA for large mining operations in NSW for decades (for example at Mount Pleasant, Rix’s Creek, Bulga Coal and Mangoola Coal) and is known in the industry as the best available technology and a more robust assessment than adopting the NPfl prevailing meteorology.

The statistical distribution method results in levels being calculated for all possible meteorological conditions (including those prevailing). The range of wind speed, wind direction and stability class combinations is actually infinite in the real world. For the purposes of modelling this has been broken down into 260 conditions. The modelled 260 meteorological conditions represent a more comprehensive evaluation of possible noise impact than only modelling those required by the NPfl Fact Sheet D. The NPfl procedure requires assessment of noise enhancing meteorological conditions only if they occur more than 30 percent of a time period (day, evening and night) in any season. This could mean conditions that enhance noise and result in unacceptably high levels, and which may occur for significant periods of time (up to 30 percent), are not assessed.

Statistical distribution predictions also inform the proponent about the required duration of mitigation required to meet noise criteria (such as the number of hours equipment needs to be stood down, referred to as 'shutdown hours' in the NIA, to meet noise limits). This approach for the Project led to the development of achievable noise levels (ANL) and proposed limits which are detailed in Chapter 5 of the NIA (EMM 2022). Importantly, this process allowed HVO to make project design changes to ensure that the Project will remain feasible while still complying with noise limits under all meteorological conditions.

Regardless of whether or not the statistical distribution predictions are materially different to predicted noise levels assessed under the NPfl 'noise enhancing' conditions, HVO is committing to manage noise impact to meet the ANL under all meteorological conditions (including NPfl 'noise enhancing' conditions); a decision that was informed by the more comprehensive assessment. That level of evaluation is not possible using the NPfl prevailing meteorology method.

If the statistical distribution predictions were materially different to predicted noise levels assessed under the NPfl 'noise enhancing' conditions (prevailing), it has no relevance because:

- a) where prevailing predictions are lower, it can be concluded they don't represent potential worst case impact (determined via the statistical distribution assessment) and can be ignored
- b) where prevailing predictions are higher, HVO is committing to manage noise to the lower ANL, and hence those prevailing predictions should never be realised.

In summary:

- A statistical distribution assessment has been completed and is historically accepted by the EPA in place of a prevailing assessment.
- The ANL represent noise levels that can be met under all meteorological conditions (including those in Fact Sheet D), satisfying the NPfl caveat noted by the EPA.
- Determining the material difference between assessment methodology predictions is therefore not considered relevant.

c) Clarify why HVO North and HVO South are being considered as separate operations and not a "complex" in terms of impacts assessment.

The EPA notes that the NIAs for both the North and South Continuation Project State Significant Developments (SSDs) are identical. However, impacts from each SSD have been assessed separately. The EPA advises that it is unclear why HVO North and South are being assessed as separate entities when the NIA clearly identifies that HVO North and South operate as the HVO Complex. Whilst we recognise that assessing cumulative impacts from the "complex" may not be mandatory in this case, we believe it has the potential to alter the scale of impacts when assessed against the NPfl and could have implications in relation to the application of VLAMP. In addition, the premises identified in EPL 640 covers both HVO North and South and reflects limits based on the combined operation.

Consequently, if the project is approved and separate noise limits are issued for HVO North and HVO South through the two project approvals, this will present complex compliance assessment requirements and risks associated in demonstrating compliance in the EPL. This is due to some receivers being impacted by both HVO North and HVO South making it difficult to determine with any certainty the level of noise from each mine. In this regard clarification is being sought on why HVO North and HVO South are being considered as separate operations and not a "complex" in terms of impacts.

As described in the Environmental Impact Statement (EIS, EMM 2022) prepared for the Project, while HVO North and HVO South are approved under separate development consents (DA 450-10-2003 and PA 06_0261, respectively), they operate as one complex with fully integrated environmental management systems.

The Project seeks to maintain separate development consents for HVO North and HVO South, as is currently the case, and therefore two separate State significant development applications have been submitted, as required under the NSW *Environmental Planning and Assessment Act 1979*. HVO North and HVO South have accordingly been assessed as separate entities in the EIS, as required for the separate development applications, as well as presenting the combined impacts of the complex in the cumulative assessment, as is also the case in the NIA.

In recognition of the fact that the two sites operate as a complex, only one set of noise criteria has been proposed, that will apply to the whole complex. This is in recognition of the complexity the EPA raise that would arise if separate criteria were to be issued for HVO North and HVO South in terms of demonstrating compliance. The single set of proposed criteria is presented in Chapter 5 (Table 5.2) of the NIA (EMM 2022). The proposed criteria for the complex are based on operational shutdown requirements that are reasonable for the Project to remain viable. All reasonable and feasible mitigation measures detailed in Section 3.4.5 of the NIA were implemented to reduce noise towards the PNTLs, and noise impacts were re-evaluated before further mitigation measures (equipment shutdowns) were then considered. HVO advised that the frequency of additional operational mitigation measures (equipment shutdowns) required to meet the proposed criteria can be accommodated by HVO North and HVO South.

In relation to the Environment Protection Licence (EPL), this approach is also consistent with existing operations, with one EPL currently applying to the complex. It is proposed that this continues for the Project. Pending approval of the Project, the current EPL will be varied to align with the single set of criteria in the development consent.

Attachment 2

HVO Continuation Project – Response to EPA request
for additional information relating to air quality

12 April 2024

Attention: Nicole Armit
EMM Consulting Pty Ltd
Level 3, 175 Scott Street Newcastle NSW 2300

Dear Nicole

Hunter Valley Operations March 2024 request for additional information from the EPA

Thank you for providing a copy of the letter from the Environment Protection Authority (EPA) (dated 8 March 2024) requesting additional information on the potential air quality impacts of the Hunter Valley Operations Continuation Project. Please see attached for the requested information.

Reference is made to the following documents:

- "Hunter Valley Operations Continuation Project – Air Quality and Greenhouse Gas Assessment". Report prepared by Jacobs Group (Australia) Pty Ltd for HV Operations Pty Ltd. Final, Revision 3, dated 9 November 2022. Hereafter referred to as the "Air Quality Impact Assessment" or "AQIA".
- "Hunter Valley Operations Continuation Project – Submissions Report". Report prepared by EMM Consulting Pty Ltd for HV Operations Pty Ltd, November 2023. Hereafter referred to as the "Submissions Report".
- "First Submission - HVO North and South Open Cut Coal Continuation Projects (SSD-11826681 and SSD-11826621) - EPA Comments to Response to Submissions" EPA letter dated 8 March 2024. Hereafter referred to as the "EPA Request".

The applicant, HV Operations Pty Ltd, has requested that Airen Consulting assist with the response to the EPA Request.

Yours sincerely

Shane Lakmaker
Director / Atmospheric Scientist
Airen Consulting

1. Introduction

The EPA has indicated that matters raised in the EPA's submission on the exhibited Environmental Impact Statement (EIS), dated 6 March 2023, had not been fully addressed. The issues raised, including the additional information as documented in the EPA Request (in a letter dated 8 March 2024), and responses are provided below.

2. Requested Information

2.1 Potential for additional exceedances of air pollutants at other receptors and adequacy of proposed mitigation measures

1a) A list of receptors ranked by the highest predicted cumulative impacts and predicted incremental impacts for all modelling scenarios included in the original Air Quality Impact Assessment (AQIA).

The EPA request referred to exceedances of "PM₁₀ concentrations" so it is understood that this request relates to potential exceedances of the 24-hour average PM₁₀ assessment criterion (that is, 50 µg/m³). Appendix F of the AQIA provided the results from the dispersion modelling, including the modelled maximum 24-hour average PM₁₀ concentrations and the modelled number of days above the 24-hour average PM₁₀ assessment criterion. It is relevant to note that the cumulative and incremental 24-hour average PM₁₀ concentrations for each receptor in Appendix F of the AQIA were not paired in time (that is, the times of modelled maximum contributions did not necessarily coincide with the times of maximum cumulative impacts). The Submissions Report (EMM, 2023) provided results from modelling the effect of reactive controls, for two key sensitive receptors. Further analysis (below) has been done.

Table 1 shows the number of days, at receptors locations, where the modelled 24-hour average cumulative PM₁₀ concentration exceeds 50 µg/m³ for more than 5 days, ranked by highest number of days. It is noted that some exceedances of 50 µg/m³ (cumulative) will be inevitable under adverse air quality events outside of the control of HVO such as bushfires and dust storms. In addition, the air quality outcomes for some locations are also primarily influenced by other mining operations and are located at significant distances (say, greater than 10 km) from HVO (for example, receptor 596). Many receptors are already subject to acquisition rights from these other operations.

Table 1 Modelled number of days where 24-hour average PM₁₀ concentration exceeds 50 µg/m³

Receptor ID	Description (more detailed descriptions in the text after Table 3)	Distance from HVO (km)*	Cumulative (days above 50 µg/m ³)				
			Y3	Y7	Y11	Y18	Y22
596	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (air quality and noise), Integra Underground PA08_0101 (noise)</i>	10.2	173	178	169	0	0
735	Private - Commercial (Daracon mining)	6.0	150	157	72	6	0
833	Private - Commercial (HVGCC)	0.7	82	109	86	62	0
862	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise)</i>	8.6	32	47	14	0	0
863	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise)</i>	8.8	34	47	15	0	0
102	Private - Subject to Acquisition Rights <i>Warkworth SSD6464 (air quality and noise)</i>	3.4	36	27	24	0	0

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Receptor ID	Description (more detailed descriptions in the text after Table 3)	Distance from HVO (km)*	Cumulative (days above 50 µg/m³)				
			Y3	Y7	Y11	Y18	Y22
861	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise), Glendell DA80/952</i>	9.1	24	30	18	0	0
264	Community Infrastructure (St Phillips Church)	3.6	30	27	24	0	0
626	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality). Note - acquisitions apply to both contiguous lots 1/8/758214 and 2/8/758214</i>	7.7	15	25	10	0	0
621	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise); Ashton DA309-11-2001-I (air quality)</i>	7.5	16	24	17	1	0
624	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality). Note - acquisitions apply to all 9 contiguous lots 1/248748, 2/9/758214, 3/9/758214, 4/9/758214, 5/9/758214, 6/9/758214, 7/9/758214, 8/9/758214, 9/9/758214</i>	7.5	12	24	8	0	0
860	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise), Glendell DA80/952</i>	8.1	14	24	13	0	0
623	Community Infrastructure (St Clements Church)	7.3	11	23	10	0	0
627	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality).</i>	7.8	13	23	8	0	0
628	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality).</i>	7.9	13	21	6	0	0
629	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality). Note - acquisitions apply to both contiguous lots 103//852484 and 104//852484</i>	8.1	11	21	4	0	0
471	Private - Subject to Acquisition Rights <i>Ashton DA309-11-2001-I (air quality and noise); Ravensworth Operations DA 09_0176 (air quality)</i>	5.0	8	18	17	7	0
619	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality)</i>	8.1	2	13	0	0	0

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Receptor ID	Description (more detailed descriptions in the text after Table 3)	Distance from HVO (km)*	Cumulative (days above 50 µg/m³)				
			Y3	Y7	Y11	Y18	Y22
499	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise) (lots 2//1111313 & 3//1111313); Ashton DA309-11-2001-I (air quality and noise); Rixs Creek South SSD 6300 (air quality) (lots 2//1111313 & 3//1111313)</i>	5.7	3	9	7	0	0
599	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality)</i>	13.0	7	7	4	0	0
613	Private - Subject to Acquisition Rights <i>Mount Owen SSD-5850 (air quality) vacant lots 31//6842 and 2//1175728 within landholding only</i>	13.0	7	7	4	0	0
614	Private - Dwelling	13.0	7	7	4	0	0
308	Private - Subject to Acquisition Rights <i>United Wambo JV SSD7142 (noise)</i>	2.5	3	2	6	2	0

* calculated minimum distance from active mining areas of HVO to the receptor

Table 2 shows the modelled maximum 24-hour average PM₁₀ concentration ranked by project increment. There are no EPA assessment criteria for PM₁₀ relating to project increment. The modelling in the EIS (Jacobs, 2022) showed that the incremental 24-hour average PM₁₀ criteria from the NSW Voluntary Land Acquisition and Mitigation Policy (DPIE, 2018) (VLAMP) would not be exceeded at any sensitive receptor, except for at the Hunter Valley Gliding Club (HVGC), a location which is only occupied periodically for short periods of time. An amenity plan is in place for this receptor.

Table 2 Modelled maximum 24-hour average PM₁₀ concentration ranked by project increment

Receptor ID	Description (more detailed descriptions in the text after Table 3)	Distance from HVO (km)*	Project increment (µg/m³)				
			Y3	Y7	Y11	Y18	Y22
833	Private – Commercial (HVGC)	0.7	61	69	66	73	30
328	Private - Dwelling	4.2	10	15	22	37	35
327	Private - Dwelling	4.5	10	16	24	36	32
331	Community Infrastructure (Pony Club Shed)	4.3	10	15	21	35	34
326	Private - Dwelling	4.4	10	16	23	35	32

* calculated minimum distance from active mining areas of HVO to the receptor

Table 3 shows the modelled maximum 24-hour average PM₁₀ concentration ranked by cumulative concentrations. Section 5.1.3 of the 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW' (EPA, 2022) states that "In some locations, existing ambient air pollutant concentrations may exceed the impact assessment criteria from time to time. In such circumstances, a licensee must demonstrate that no additional exceedances of the impact assessment criteria will occur as a result of the proposed activity and that best management practices will be implemented to minimise emissions of air pollutants as far as is practical". This is relevant to the Hunter Valley. Further analysis (below) has been done to test whether the Project would cause exceedances of 50 µg/m³.

Table 3 Modelled maximum 24-hour average PM₁₀ concentration ranked by cumulative concentration

Receptor ID	Description (more detailed descriptions in the text after Table 3)	Distance from HVO (km)*	Cumulative concentration (µg/m ³)				
			Y3	Y7	Y11	Y18	Y22
735	Private - Commercial (Daracon)	6.0	132	132	89	55	42
833	Private - Commercial (HVGC)	0.7	97	104	92	87	45
596	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (air quality and noise), Integra Underground PA08_0101 (noise)</i>	10.2	94	94	94	45	41
862	Private - Subject to Acquisition Rights <i>Rixs Creek North PA08_0102 (noise)</i>	8.6	66	71	60	49	41
471	Private - Subject to Acquisition Rights <i>Ashton DA309-11-2001-I (air quality and noise); Ravensworth Operations DA 09_0176 (air quality)</i>	5.0	61	69	66	59	41

* calculated minimum distance from active mining areas of HVO to the receptor

The requested lists of receptors have been presented graphically in Figure 1 showing the top 5 receptors based on Project increment, the top 5 receptors based on cumulative concentrations, or where the modelling indicates more than 5 days above the 24-hour average PM₁₀ assessment criterion. In some cases (e.g. 596) the receptors do not appear on Figure 1 as they are at significant distances from HVO and the air quality outcomes were primarily influenced by other mining operations.

The receptors include:

- Community infrastructure
- Private commercial properties
- Private dwellings
- Private dwellings subject to acquisition rights under other mining operations consents

The following observations can be made:

- Based on cumulative impacts (shown labelled in purple in Figure 1):
 - Receptor 735 relates to an industrial workplace (owned by Daracon Mining Pty Ltd), located adjacent to the New England Highway to the east of the Project Area. This is excluded on the basis of it being a mining-related receptor.
 - Receptor 833 is the Hunter Valley Gliding Club which is only occupied periodically for short periods of time.
 - Receptors 596, 862 and 471 are private dwellings that are subject to acquisition rights under other mining operations approvals as detailed below. There are significant mining operations closer to those receptors than HVO.
 - 596: Rixs Creek North PA08_0102 (air quality and noise), Integra Underground PA08_0101 (noise).
 - 862: Rixs Creek North PA08_0102 (noise).
 - 471: Ashton DA309-11-2001-I (air quality and noise); Ravensworth Operations DA 09_0176 (air quality)

- Based on incremental impacts from the Project (shown labelled in blue in Figure 1):
 - Receptors 326, 327, 328 and 437 are private sensitive receptors in Jerrys Plains, that are not subject to any acquisition rights.
 - Receptor 331 is a pony club shed in Jerrys Plains which is only occupied periodically for short periods of time.
 - Receptor 833 is the Hunter Valley Gliding Club which is only occupied periodically for short periods of time.
- Based on more than 5 days modelled above the 24-hour average PM₁₀ assessment criterion:
 - Receptor 623 is the deconsecrated St Clements Church in Camberwell which is rarely occupied. A sensitive receptor is defined by the EPA as “a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area” and interpreted as places of near continuous occupation (e.g. with likely daily occupation).
 - Receptors 471, 499, 626, 627, 628 and 629 are private dwellings in Camberwell that are subject to acquisition rights under other mining operations approvals as detailed below. There are significant mining operations closer to those receptors than HVO.
 - 471: Ashton DA309-11-2001-I (air quality and noise); Ravensworth Operations DA 09_0176 (air quality)
 - 499: Rixs Creek North PA08_0102 (noise) (lots 2//1111313 & 3//1111313); Ashton DA309-11-2001-I (air quality and noise); Rixs Creek South SSD 6300 (air quality) (lots 2//1111313 & 3//1111313)
 - 626: Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality). Note - acquisitions apply to both contiguous lots 1/8/758214 and 2/8/758214
 - 627: Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality).
 - 628: Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality).
 - 629: Mount Owen SSD-5850 (air quality); Rixs Creek South SSD 6300 (air quality). Note - acquisitions apply to both contiguous lots 103//852484 and 104//852484
 - Receptor 308 is a private dwelling that is subject to noise acquisition rights under the United Wambo JV SSD7142 approval, but not air quality acquisition rights.
 - Receptor 102 is Warkworth Hall in Warkworth that is subject to air quality and noise acquisition rights under the Warkworth SSD6464 approval. The hall is a community-based facility which is only occupied periodically for short periods of time.
 - Receptor 264 is St Phillips Church in Warkworth, a community-based facility which is only occupied periodically for short periods of time.
 - Receptor 735 is already noted above and is an industrial workplace owned by Daracon Mining Pty Ltd and Ormand Holdings Pty Ltd respectively.
 - Receptor 833 (already mentioned above) is the Hunter Valley Gliding Club which is only occupied periodically for short periods of time.

Receptor 308 remains the closest private sensitive receptor to the proposed mining activities that is not subject to air quality acquisition rights. It is also downwind of the proposed mining activities in the southeast winds that typically occur in the warmer months of the year. Receptor 161 was also selected in the AQIA to represent the private sensitive receptors in Maison Dieu, downwind of the proposed mining activities in the prevailing northwest winds that are most commonly associated with exceedances of 50 µg/m³ for 24-hour average PM₁₀, based on monitoring data. An additional receptor (328) has been investigated based on this analysis.

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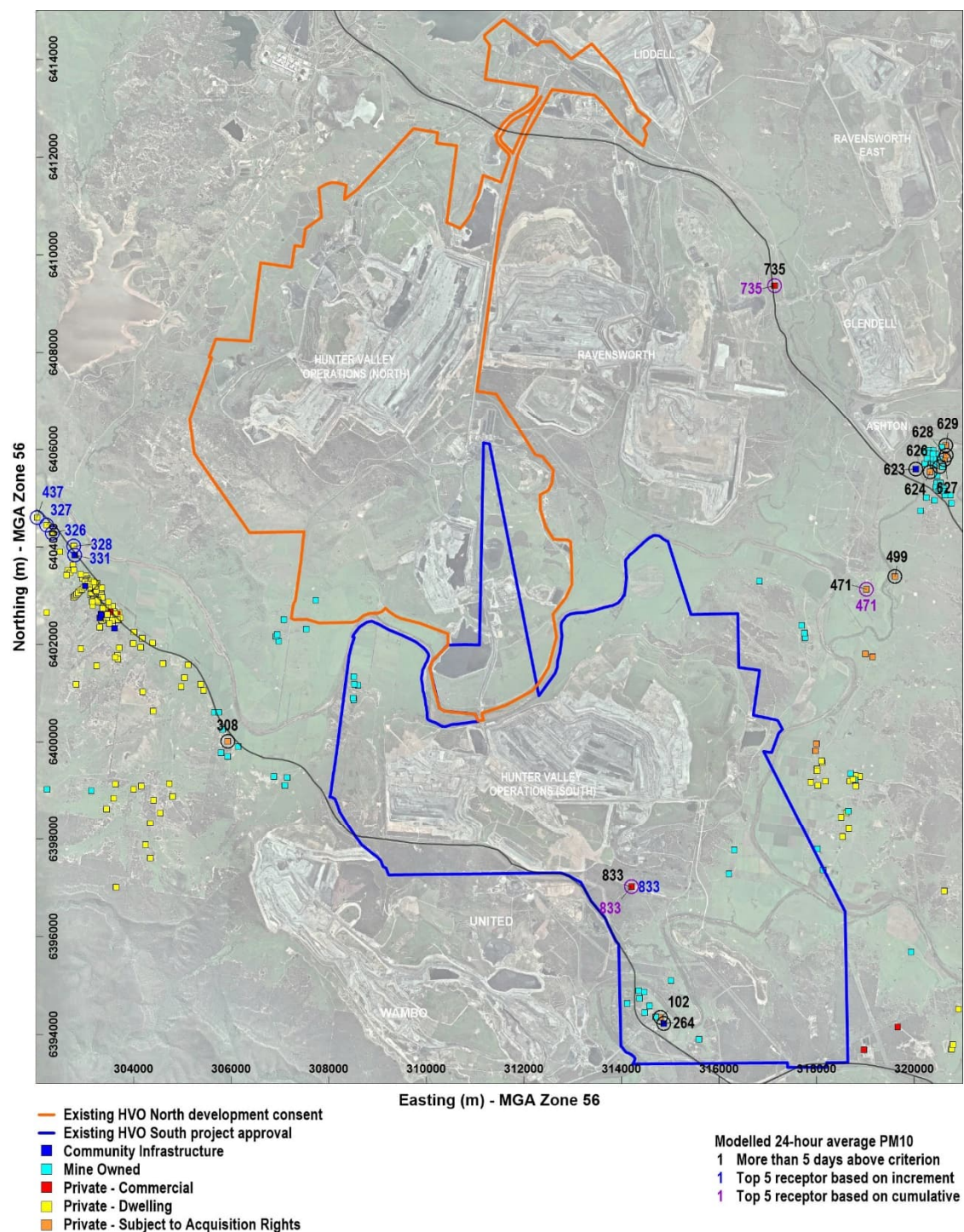


Figure 1 Potentially highest impacted receptors based on modelled 24-hour average PM₁₀ concentrations

1b) Based on the analysis of information in (a) above, revise the analysis of results for the 'reactive control' modelling scenario to clearly demonstrate that the proposed trigger levels and implementation of reactive measures are not predicted to result in additional exceedances of all relevant impact assessment criteria at any of the receptors.

An additional receptor (328) has been investigated based on the analysis above. Receptor 328 was selected as the modelling indicated that this receptor may experience the highest incremental 24-hour average PM₁₀ contributions from the Project of all private dwellings not subject to air quality acquisition rights. Outcomes for this receptor will be similar to outcomes for the surrounding receptors in Jerrys Plains.

Figure 2 shows the modelled 24-hour average PM₁₀ concentrations at receptor 328. It can be seen from these results that the implementation of reactive controls (in response to elevated off-site air quality levels) can be effective at reducing the Project contribution to 24-hour average PM₁₀ concentrations in a representative meteorological year, and that the Project will not cause additional exceedances of the impact assessment criteria. By nature, the reactive controls primarily address days when the PM₁₀ concentrations may be approaching or exceeding the 24-hour average criterion. These results do not reflect any similar reactive controls that are employed at other mining operations so the cumulative results can be considered as worst case.

The modelling shows that reactive controls will be effective for minimising the potential of the Project to cause exceedances of the EPA's air quality assessment criteria. It is also noted that the modelling does not show any exceedances of the air quality criteria in HVO's existing development consents. HVO is committed to refining their Trigger Action Response Plan (TARP), where necessary, to maintain compliance at all sensitive receptors.

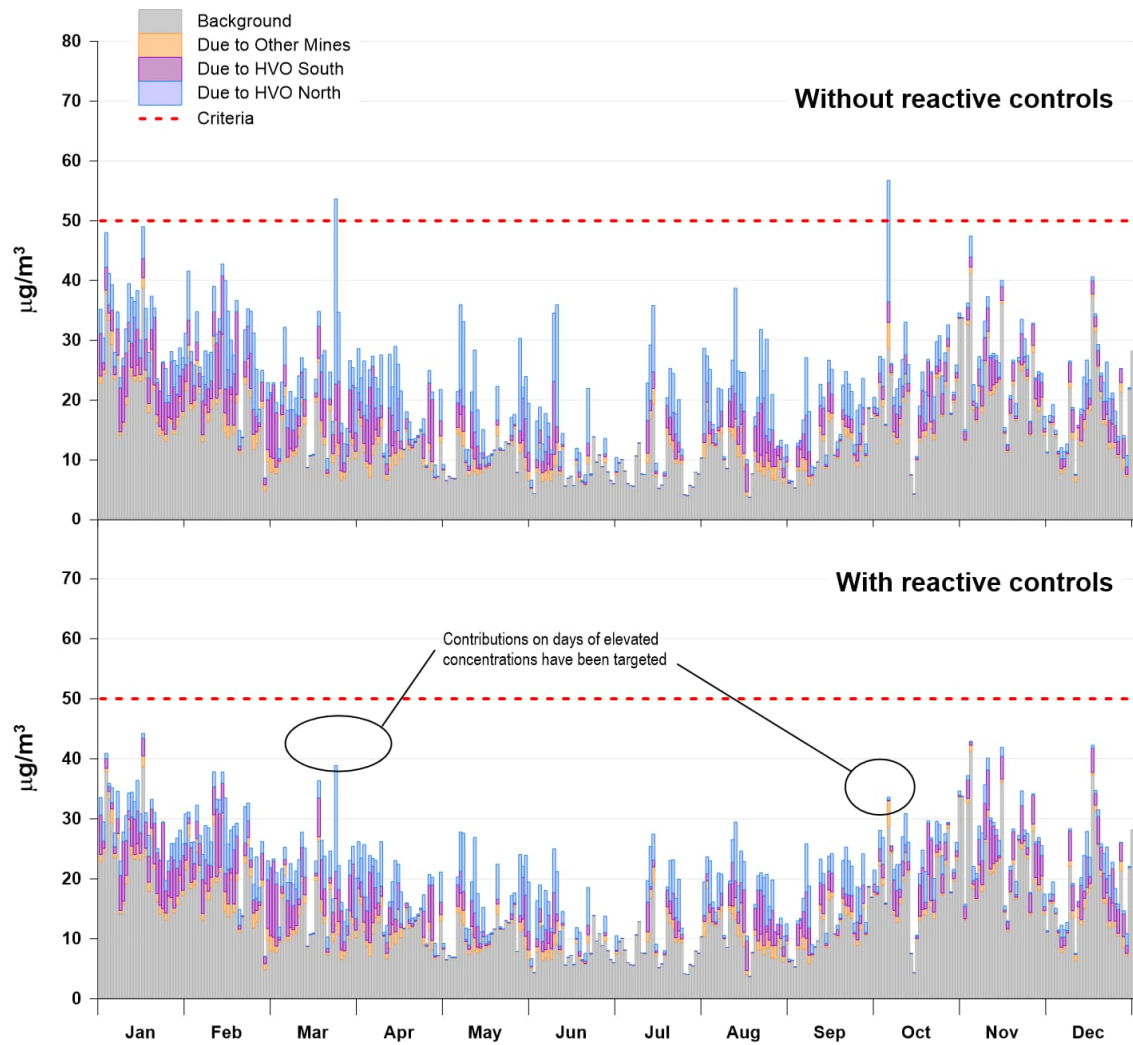


Figure 2 Modelled 24-hour average PM₁₀ concentrations at Receptor 328

1c) Information to specify how individual activities were modified (i.e. modelled) to be representative of the actual reaction time and implementation of the proposed reactive mitigation measures

The modelling has been configured to simulate HVO's air quality management system as closely as possible. The hourly average modelled PM₁₀ concentrations at the closest Maison Dieu and Jerrys Plains Receptors (161 and 308 respectively) were examined and reactive controls were assumed to be implemented when an alarm was triggered. An alarm was defined by:

- Modelled 1-hour average PM₁₀ > 50 µg/m³ for two consecutive hours or rolling 24-hour average PM₁₀ > 50 µg/m³ for one hour (winds in arc of mine to monitor), and
- Wind was from the direction of either HVO North or HVO South towards Maison Dieu or Jerrys Plains. The directions were defined as 260 to 350 degrees and 0 to 120 degrees.

In practice these alarms will be triggered by monitoring.

The following reactive controls were assumed for each determined alarm:

- Downtime for stripping (modelled emissions were set to zero one hour after the alarm hour).
- Downtime for drilling and blasting (modelled emissions were set to zero one hour after the alarm hour).
- Downtime for loading, hauling and unloading of coal and overburden (modelled emissions were set to zero one hour after the alarm hour).
- Downtime for dozers (modelled emissions were set to zero one hour after the alarm hour).
- Downtime for grading (modelled emissions were set to zero one hour after the alarm hour).
- Reduced level of activity from processing (additional 50% control one hour after the alarm hour).
- Shutdown on three days in the year for air quality management. There were three days identified in the modelled meteorological year where the reactive controls may not be sufficient to eliminate an additional exceedance of the 24-hour average assessment criterion for PM₁₀ (even though HVO's contribution may have been low). On these three days (3 Jan, 6 Oct and 4 Nov) it was assumed, for the purposes of modelling, that all activities except for wind erosion would be stopped. HVO is committed to proactively shutting down any activities that may be increasing the risk of air quality impacts.

The modelling was developed to provide an indication of whether modifying activities in response to monitored air quality conditions will be effective for minimising air quality impacts. It is not possible to precisely reproduce all alarm situations, the changes in emissions, or the site responses through modelling; however, as the model works on an hourly time step and HVO's alert system is based on higher resolution 10-minute averages, the model assumptions can be considered to provide a conservative representation of the actual implementation of reactive mitigation measures.

The EPA Request also stated that:

Whilst it is understood that the alarms for activating these reactive measures are set up on 10-minute steps to allow their staggered implementation, it is unclear if the proposed trigger levels are sufficient to allow for these activities to stop within the hour without resulting in adverse air quality impacts occurring over this period.

It is important that the proposed trigger levels allow for sufficient implementation time as the large number of hours in a year when levels are triggered is only indicative of the likelihood for adverse air quality impacts to occur. The EPA considers it is important that appropriate fit for purpose trigger levels and reactive measures are identified and implemented.

The relevant assessment criterion (for PM₁₀) relates to a 24-hour average period and adverse impacts over shorter periods of time are not defined in the EPA's assessment process. The reactive controls in the modelling included a one-hour delay before any modification of emissions was included. This approach aims to simulate a conservative implementation time.

1d) Information to discuss what 'Shutdown on three days in the year for air quality management' refers to and how this was included in the modelling

As noted in the response to 1c) above there were three days identified in the modelled meteorological year where the reactive controls may not be sufficient to eliminate an additional exceedance of the 24-hour average assessment criterion for PM₁₀ (even though HVO's contribution may have been low). On these three days (3 Jan, 6 Oct and 4 Nov) it was assumed, for the purposes of modelling, that all activities except for wind erosion would be stopped. HVO is committed to proactively shutting down any activities that may be increasing the risk of air quality impacts.

1e) A list of specific receptors that are subject to mitigation and/or acquisition rights and clarify how these have been assessed to date

Appendix F of the AQIA (Jacobs 2022, included as Appendix F of the EIS [EMM, 2022]) included information to identify the status of each receptor. The assessments to date (AQIA [Jacobs, 2022] and Submissions Report [EMM 2023]) have primarily considered private sensitive receptors that are not currently subject to air quality acquisition rights.

The EPA definition of a sensitive receptor was also adopted, specifically "a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area". This has been interpreted as places of near continuous occupation (e.g. with likely daily occupation). The assessments have excluded sensitive receptors where the receptor:

- Is a business supplying or connected to the operations of surrounding mines; or
- Is only occupied periodically for short periods of time; or
- Is subject to air quality acquisition rights.

2.2 Further information is required to allow for a detailed review of the input data and assumptions made in preparation of the AQIA – PM_{2.5} background

2a) Additional analysis to demonstrate that the adopted PM_{2.5}/PM₁₀ annual ratio is representative of the range of anticipated hourly PM_{2.5}/PM₁₀ ratios

As noted in the Submissions Report (EMM, 2023), the two HVO high volume air samplers do not provide sufficient measurements to carry out a contemporaneous model data and background data assessment for every day in the meteorological year, so an alternative approach had to be adopted. An hourly PM_{2.5} concentration dataset was derived which had the following statistics:

- Maximum 24-hour average PM_{2.5} = 15.3 µg/m³
- Annual average PM_{2.5} = 5.2 µg/m³

The PM_{2.5} to PM₁₀ ratio for the AQIA was calculated to be 37%. The data derived above are more conservative than historical estimates of background PM_{2.5} (for example, annual average of 4.6 µg/m³ from TAS, 2017) and have been

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added to the modelled Project contributions for the assessment of potential cumulative impacts, in accordance with EPA's Approved Methods.

Figure 3 provides some additional analysis of PM_{2.5} to PM₁₀ ratios based on 24-hour average co-located PM₁₀ and PM_{2.5} monitors at 'Kelly' in 2023. Average PM_{2.5} to PM₁₀ ratios were calculated to be 32% with a 70th percentile (Victorian EPA approach) of 36%. A ratio of 37% was used for the Project. The data from Figure 3 show a reasonable correlation between PM_{2.5} and PM₁₀ concentrations and no alternative (i.e. non-linear) relationships are evident. It is therefore maintained that the approach adopted for the AQIA provides for reasonable and conservative estimates of background PM_{2.5} concentrations for the purposes of assessment and for determining potential risks of PM_{2.5} impacts.

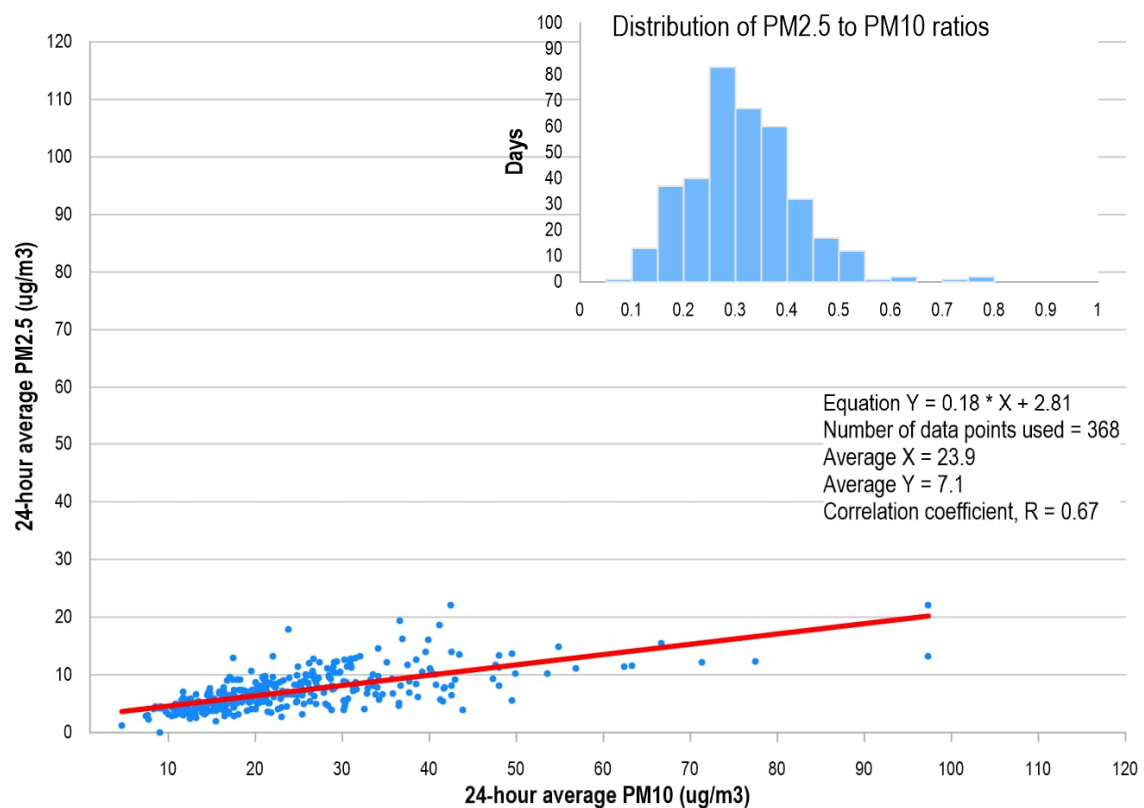


Figure 3 Relationships between PM_{2.5} and PM₁₀ concentrations from data collected at Kelly in 2023

3. References

DPIE (2018) "Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments". September 2018. Published by the, then, Department of Planning, Industry and Environment.

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