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3 March 2017

Duncan Peake
Director
EMM Consulting
Via email: dpeake@emmconsulting.com.au

**RE: HVO South Modification 5 – Update of the Approved Methods**

Dear Duncan,

**Introduction**

Coal & Allied Operations Pty Ltd (Coal & Allied) lodged an application for the Hunter Valley Operations South Modification 5 with the Department of Planning and Environment on 31 January 2017. The application was supported by an environmental assessment inclusive of an Air Quality and Greenhouse Gas Assessment (AQGHGA) (**Todoroski Air Sciences, 2017**). The AQGHGA was prepared in general accordance with the New South Wales (NSW) Environment Protection Authority (EPA) document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (**NSW DEC, 2005**).

Coal & Allied was notified on 1 February 2017 via the NSW Minerals Council that the NSW EPA updated the Approved Methods, which supersede the previous version. The key update to the Approved Methods document is the inclusion of particle assessment criteria consistent with revised National Environmental Protection (Ambient Air Quality) Measure (AAQ NEPM) particle standards for $PM_{2.5}$ and annual average $PM_{10}$.

**Table 1** outlines the updated NSW EPA air quality impact assessment criteria, which include new criteria for $PM_{2.5}$ and also a reduction in the annual average $PM_{10}$ criteria from a level of 30µg/m$^3$ to 25µg/m$^3$ as indicated by the blue shaded cells. The impact assessment criteria for the other dust metrics remain unchanged.

**Table 1: NSW EPA air quality impact assessment criteria**

| Pollutant | Averaging period | Impact | Criterion |
|---|---|---|---|
| Total suspended particulates (TSP) | Annual | Total | 90µg/m$^3$ |
| Particulate matter ≤10µm ($PM_{10}$) | Annual | Total | 25µg/m$^3$ |
| | 24 hour | Total | 50µg/m$^3$ |
| Particulate matter ≤2.5µm ($PM_{2.5}$) | Annual | Total | 8µg/m$^3$ |
| | 24 hour | Total | 25µg/m$^3$ |
| Deposited dust | Annual | Incremental | 2g/m$^2$/month |
| | | Total | 4g/m$^2$/month |

Source: NSW EPA, 2017

µg/m$^3$ = micrograms per cubic metre

g/m$^2$/month = grams per square metre per month

This letter report provides a summary of the outcomes of the AQGHGA with the revised Approved Methods criteria shown in **Table 1**.

**Assessment of 24-hour and annual average $PM_{2.5}$ impacts**

Potential $PM_{2.5}$ impacts were assessed in the AQGHGA per the AAQ NEPM standards, which are equivalent to the updated NSW EPA air quality impact assessment criteria for $PM_{2.5}$. The predicted $PM_{2.5}$ dispersion modelling results are summarised in Table 6-1 and presented in detail in Appendix D of the AQIA for the assessment locations.

Cumulative 24-hour average $PM_{2.5}$ impacts due to the proposed modification are addressed specifically in Section 6.4 of the AQGHGA. The results of the assessment conclude that there is no likely potential for cumulative 24-hour average $PM_{2.5}$ impacts to occur.

The AQGHGA concludes potential annual average $PM_{2.5}$ impacts are predicted to occur at three privately-owned assessment locations, two in Warkworth village and one south-west of Camberwell village.

One of Warkworth village assessment locations is a non-residence (102 - Warkworth Hall) and the second (assessment location 77) is entitled to acquisition upon request from Wambo Mine and Warkworth Mine. Assessment location 102 is not inhabited and may be used infrequently, and as such, unlike a residence, would only be subject to brief periods of potential exposure (less than the minimum period applicable for dust criteria) when occasionally occupied.

The third location is Assessment location 471 and is north-east of the proposed modification and south-west of Camberwell village. This assessment location is also already subject to air quality effects due to the various surrounding mine operations and is entitled to acquisition upon request from Ashton Coal's South East Open Cut project.

Isopleths of the predicted annual average $PM_{2.5}$ concentrations due to the proposed modifications and other sources during Stage 2 and Stage 3 are presented in **Figure 1** and **Figure 2**, respectively.

**Assessment of annual average $PM_{10}$ impacts**

Annual average $PM_{10}$ impacts have been reassessed per the updated NSW EPA air quality impact assessment criteria of 25µg/m$^3$. **Table 2** outlines the additional annual average $PM_{10}$ impacts predicted to occur at the privately-owned assessment locations.

The results indicate six new privately-owned assessment locations are predicted to be impacted due to the recently revised NSW EPA air quality impact assessment criteria. Five of the assessment locations are on Jerrys Plains Road to the west of the proposed modification and one is north-east of the proposed modification and south-west of Camberwell village. The five privately-owned assessment locations (307 to 310 and 312) on Jerrys Plains Road would be subject to acquisition upon request due to predicted impacts from the United Wambo Open Cut Coal Mine project (not yet approved). The privately-owned assessment location (472) south-west of Camberwell village is entitled to acquisition upon request from Ashton Coal's South East Open Cut project.

Also, 17 additional mine-owned assessment locations are predicted to be impacted due to the recently revised NSW EPA air quality impact assessment criteria in Stage 2 and Stage 3.

**Figure 3** and **Figure 4** present isopleths of the predicted cumulative (total) annual average $PM_{10}$ concentrations due to the proposed modifications and other sources during Stage 2 and Stage 3, respectively.

**Table 2: Summary of additional annual average $PM_{10}$ impacts**

| Assessment location (privately-owned) | Total annual average $PM_{10}$ Year of impact (level of impact - µg/m³) |
|---|---|
| 307 | Stage 2 (27) |
| 308 | Stage 2 (28) |
| 309 | Stage 2 (29) |
| 310 | Stage 2 (26) |
| 312 | Stage 2 (26) |
| 472 | Stage 2 (26) |

**Mitigation and management**

As outlined in the AQGHGA, HVO South and HVO North have integrated their management of air quality and operate an integrated air quality and greenhouse gas management plan. The plan incorporates all relevant conditions of the project approval (PA 06_0261), together with relevant legislation, EPL conditions and relevant standards and guidelines. It was prepared in consultation with relevant government agencies.

Air quality monitoring at HVO South is supplemented with portable real-time $PM_{10}$ monitoring and visual surveillance to support the reactive air quality management system. The monitors are portable to enable relocation as mining and seasonal conditions change. Whilst not a significant component of the air quality monitoring system and network at HVO, depending upon conditions, these monitors can be used for trigger action response plans in response to increasing concentrations of particulate matter approaching levels to protection human health and amenity. Visual surveillance monitoring is also used in the network to assist with identification of problem dust sources, informing a management response and verifying the effectiveness of controls implemented.

The existing air quality management system described in Section 5.4 of the AQGHGA will continue under the proposed modification. In addition, Coal & Allied will continue to liaise with tenants of mine-owned properties regarding monitoring results in accordance with Schedule 3 and notification in accordance with Condition 3, Schedule 4.

**Summary and conclusions**

The recently revised NSW EPA air quality impact assessment criteria have been applied to the modelling predictions for the AQGHGA (**Todoroski Air Sciences, 2017**). In summary, the results indicate the following:

- Cumulative 24-hour average $PM_{2.5}$ impacts are unlikely for the proposed modification;
- Cumulative annual average $PM_{2.5}$ impacts are likely at three privately-owned assessment locations. Two of these assessment locations are already subject to acquisition upon request from neighbouring mining operations due to predicted impacts with the third assessment location a non-residence and infrequently used;
- Six new privately-owned assessment locations would be impacted due to the new cumulative annual average $PM_{10}$. These six assessment locations are already subject to acquisition upon request from neighbouring operations due to predicted impacts; and,
- 17 new mine-owned assessment locations would be impacted due to the new cumulative annual average $PM_{10}$. Coal & Allied would continue to liaise with tenants of mine-owned properties regarding monitoring results.

Please feel free to contact us if you need to discuss (or require clarification on) any aspect of this letter.

Yours faithfully,

Todoroski Air Sciences

Aleks Todoroski

Philip Henschke

**References**

NSW DEC (2005)

"Approved Methods for the Modelling and Assessment of Air Pollutants in NSW", August 2005.

NSW EPA (2017)

"Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales", January 2017.

Todoroski Air Sciences (2017)

"Air Quality and Greenhouse Gas Assessment HVO South Modification 5", prepared by Todoroski Air Sciences for EMM Consulting, 25 January 2017.

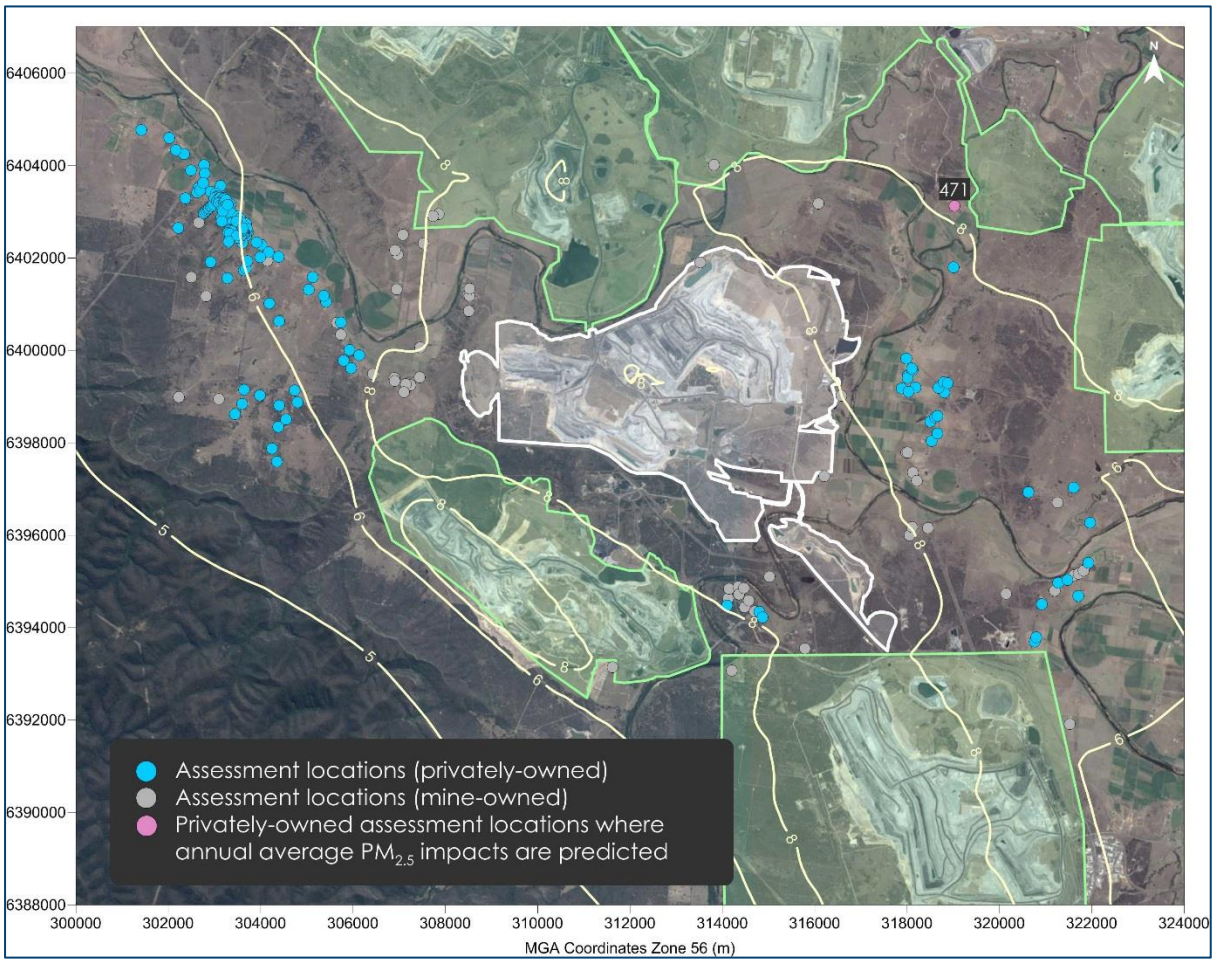


**Figure 1: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the proposed modification and other sources in Stage 2 (µg/m$^3$)**

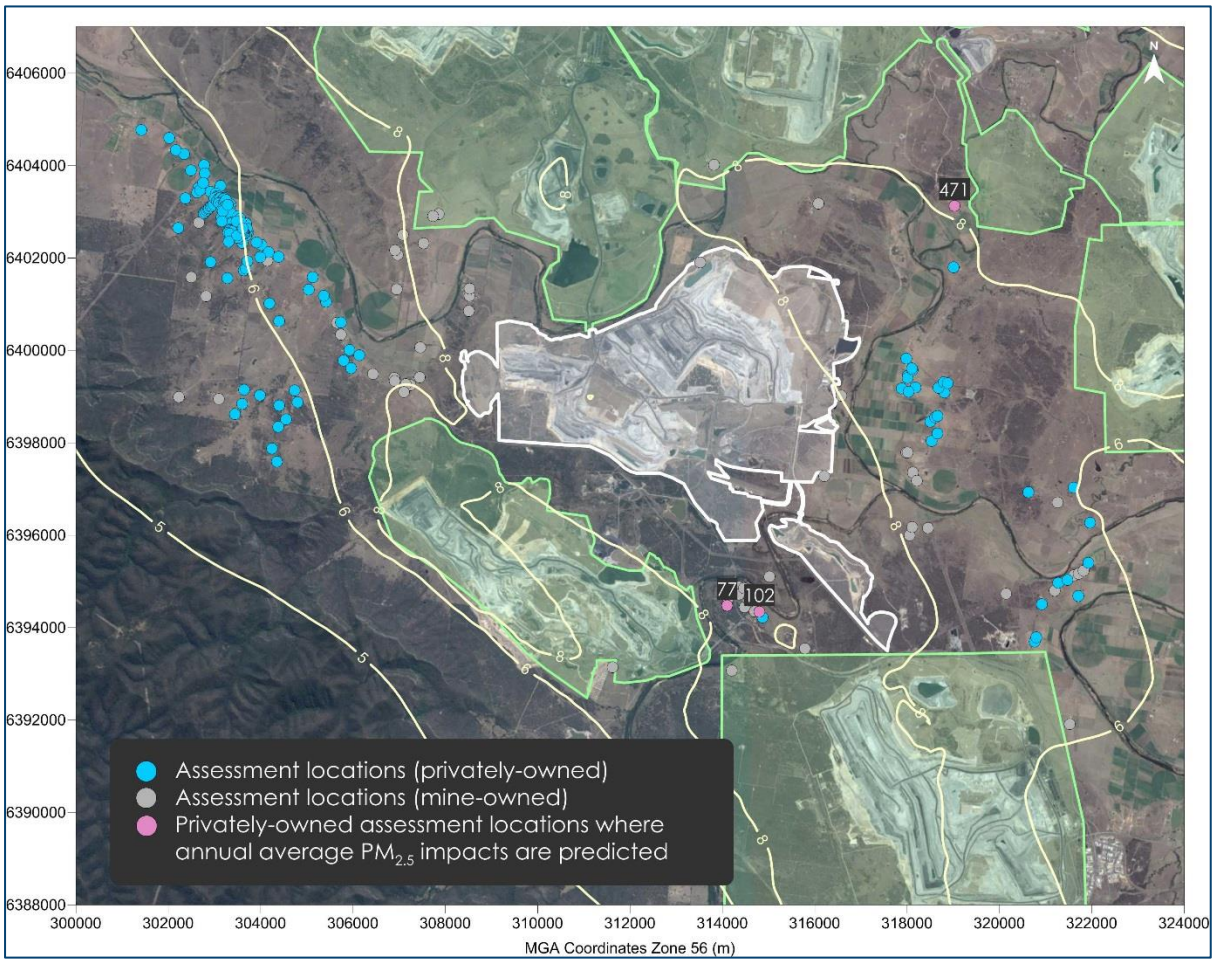


**Figure 2: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the proposed modification and other sources in Stage 3 (µg/m$^3$)**

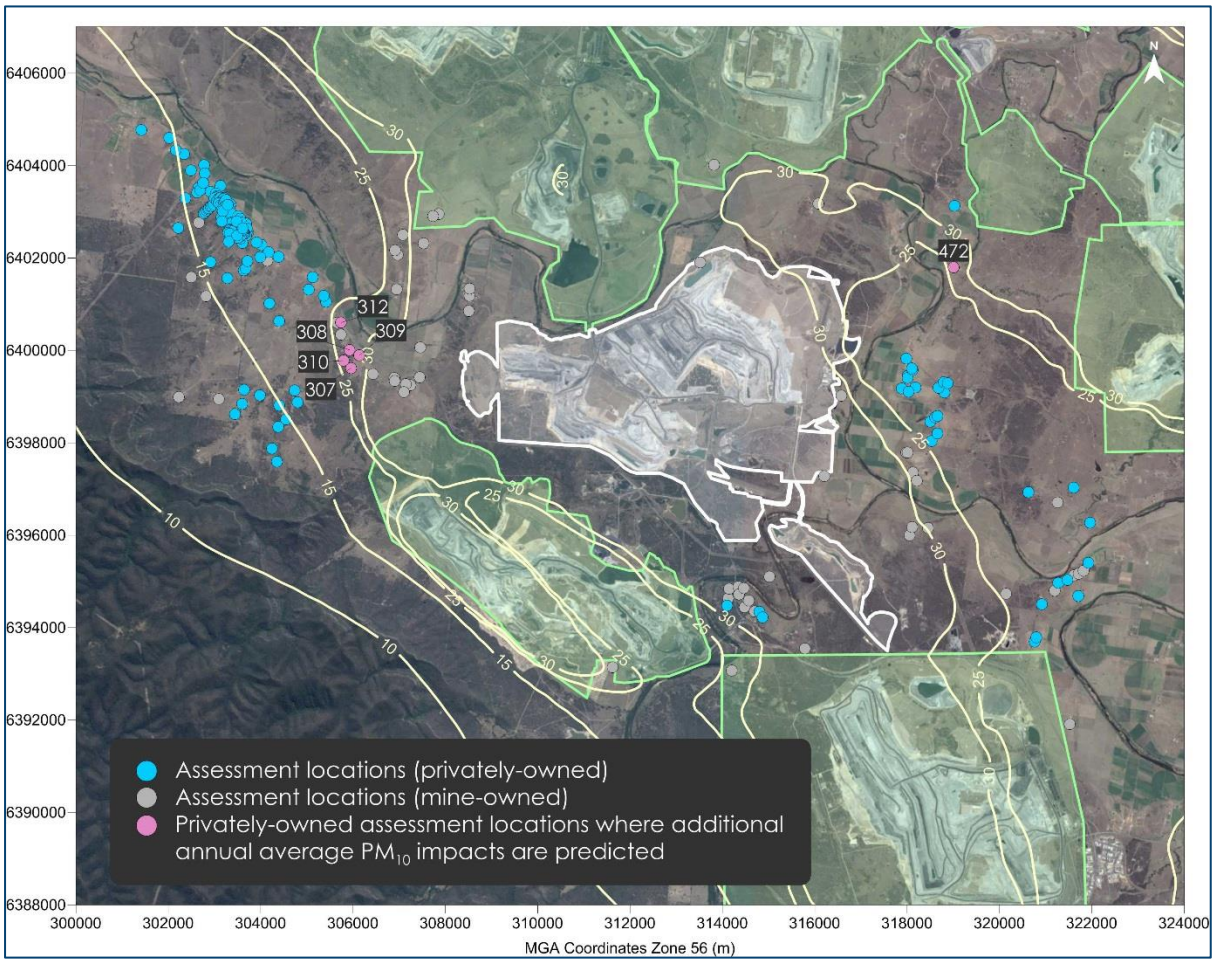


**Figure 3: Predicted annual average $PM_{10}$ concentrations due to emissions from the proposed modification and other sources in Stage 2 (µg/m$^3$)**

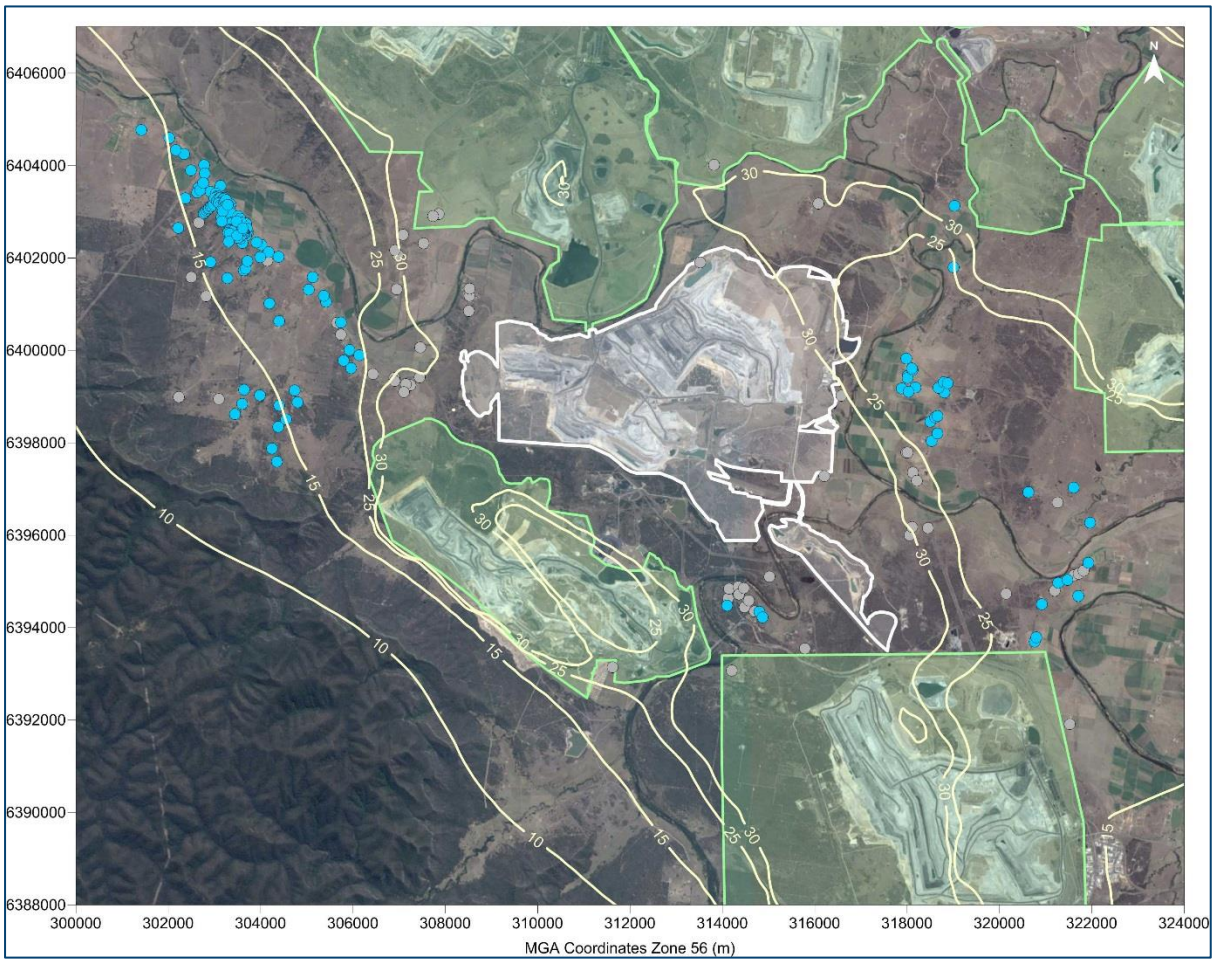


**Figure 4: Predicted annual average $PM_{10}$ concentrations due to emissions from the proposed modification and other sources in Stage 3 (µg/m$^3$)**