

5 Government submissions

5.1 Introduction

This chapter provides a summary and response to the eight local and State government submissions (including interagencies) received on the proposed modification.

The following local and state government agencies provided a submission:

- Singleton Council;
- EPA;
- DPI Water;
- Hunter New England Health;
- RMS;
- DRE; and
- OEH.

DPE also provide comments on the proposed modification and EA, which have also been addressed below.

5.2 Department of Planning and Environment

The DPE wrote to Coal & Allied under cover of a letter dated 21 March 2017 with the Secretary's request to prepare and submit a Response to Submissions.

The DPE provided a summary of the submissions made and drew particular reference to submissions made by a number of members in the local community who are opposed to aspects of the proposed modification. The DPE noted that similar issues had been identified during Coal & Allied's early engagement programme as summarised in Table 5.1 of the EA and requested careful consideration and a well-thought out response. In addition, the DPE provided an attachment requesting additional information.

The matters raised by the DPE are addressed in the sections below.

5.2.1 Local community opposition

The DPE letter noted the key concerns raised by the local community, which include:

- increased noise, dust, blasting, visual amenity and health impacts;
- increased size of the final void and its function as a perpetual groundwater sink;
- additional groundwater drawdown and potential impacts to groundwater dependent ecosystems;
- increased mine water discharges into the Hunter River;

- cumulative impacts on the Hunter region;
- uncertainty surrounding flow-on public benefits; and
- increased greenhouse gas emissions.

These concerns are also noted in Section 2 of this report, and reflect similar themes raised with Coal & Allied through our engagement programme. These issues have been addressed throughout the RTS, however to assist readers, Section 2.1.1 identifies the sections of this report relevant to each issue.

5.2.2 Referrals of proposed action

The DPE submission referenced Section 4.4.1 of the EA that stated two referrals had been lodged for HVO South. The DPE requested further information on the status of these referrals.

Section 4.4.1 of the EA stated that two referrals were lodged for activities at HVO that may impact on matters of national environmental significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

These referrals and their current status are described in the follow sections.

i EPBC 2016/7640 State-approved mining

This referral related to existing State-approved disturbance areas within Riverview and Cheshunt Pits that contained vegetation communities that were listed in May 2015 subsequent to PA 06_0261 being granted in 2009 by the NSW Minister for Planning. This referral also comprised State-approved disturbance areas within HVO North.

The Commonwealth Department of Environment and Energy (DoEE) determined that this referral was a controlled action and decided that the proposed action would be assessed by preliminary documentation under Section 87 of the EPBC Act.

Preliminary documentation inclusive of a preliminary biodiversity offset strategy was provided to DoEE for assessment and determination. This preliminary documentation was publically exhibited from 18 May 2016 to 1 June 2016. No public submissions were received and the preliminary documentation was finalised for DoEE assessment and determination.

On 10 October 2016, DoEE approved the proposed action (within conditions) under sections 130(1) and 133 of the EPBC Act. A biodiversity offset strategy is currently being finalised for the proposed action.

ii EPBC 2016/7641 – Modification 5

This referral was initially provided to DoEE for potential impacts on water resources from the proposed modification. Subsequent to lodgement of this referral, Coal & Allied has informed DoEE that, for the purposes of the referral, South Lemington Pit 2 as approved by the State does not have prior authorisation (see footnote¹) under the EPBC act and would no longer form part of the proposed action.

¹ Section 43A of the EPBC Act exempts an action from the requirement for approval under Part 9, if that action is a use of land, sea or seabed that was specifically authorised under a law of the Commonwealth, a State or a self-governing Territory prior to the commencement of the EPBC Act. Section 43B exempts an action from the requirement for approval under Part 9, if the action is a lawful continuation of a use of land, sea or seabed that was occurring immediately before the commencement of the EPBC Act. (Source: EPBC Guidance Note 11, Prior Authorisation and Continuing Use Exemptions: Sections 43A and 43B of the EPBC Act, available at <http://www.environment.gov.au/resource/guidance-note-11-prior-authorisation-and-continuing-use-exemptions-sections-43a-and-43b>).

Given this, Coal & Allied need more time to consider the capital expenditure consequences of not having prior authorisation and any further studies that may be required. It is likely the timing to mine South Lemington Pit 2 would be later than originally considered in the staged mines plans for the State modification. The mine plans for the State modification are considered to be worst case in order to assess the maximum potential impacts. During operations, alternative mine plans to the indicative mine plans presented within the EA may be used, provided that the environmental impacts remain within the envelope of effects assessed. This enables the mining operations to retain some flexibility within the constraints of the identified and assessed environmental envelope.

It is considered appropriate for mining of South Lemington Pit 2 to the Vaux seam to remain in the scope for the proposed modification, as it is still anticipated that mining of this area will occur within the current approved project approval (and therefore, this modification) period of 2030. A separate referral under the Commonwealth approval process will be required to enable the timing for mining South Lemington Pit 2 to be confirmed, which at this time, is likely to be beyond 2022 (but before 2030).

A letter of variation was submitted to DoEE regarding the proposed action. The letter of variation confirmed the proposed action only comprised the continuation of mining from Cheshunt Pit into the Riverview Pit to access the deeper Bayswater seam within the Riverview Pit area.

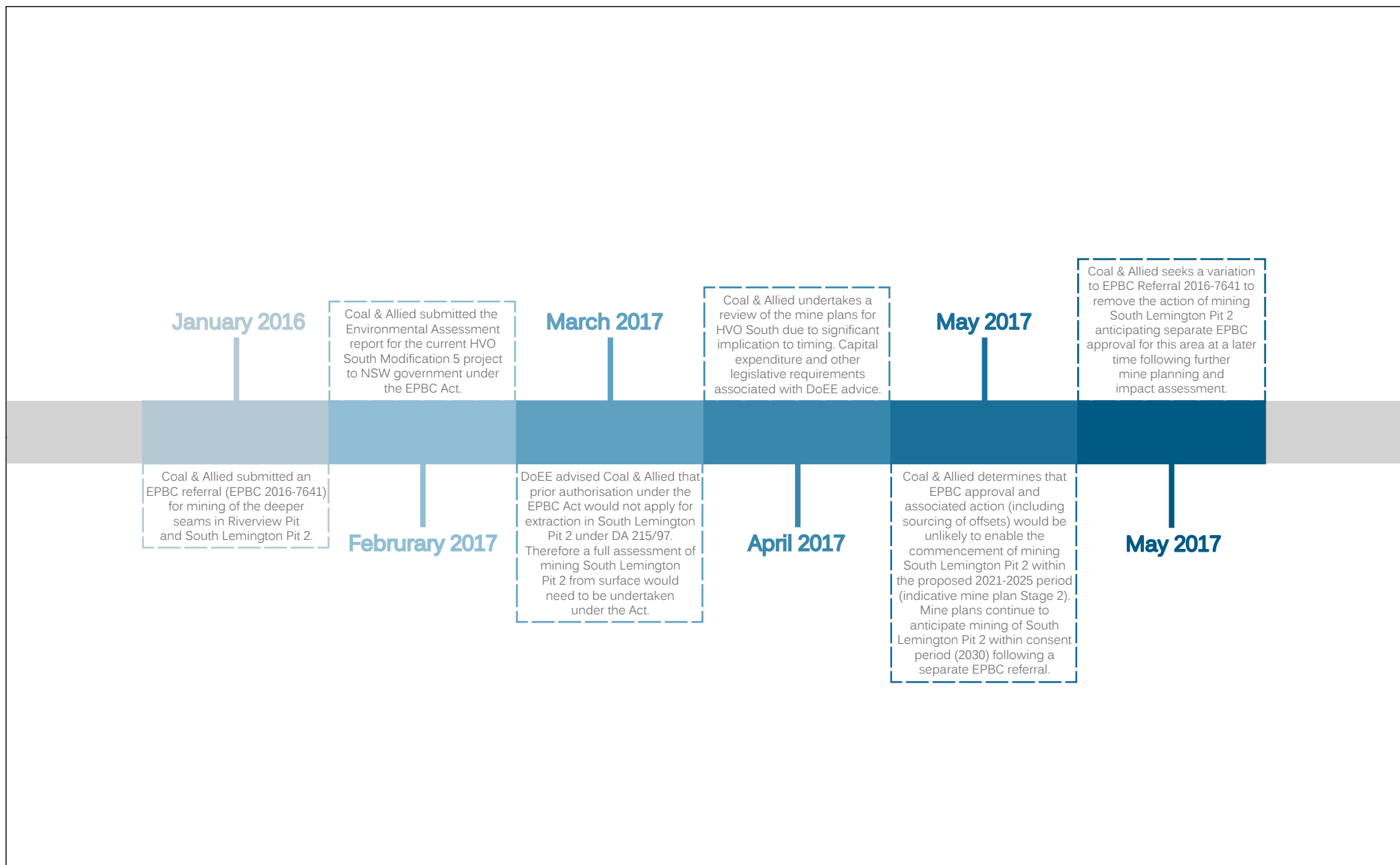
On 29 May 2017, DoEE approved the request to vary the proposed action.

The timeline of the assessment processes that have led to this position and the change of the scope for the referral compared with the proposed modification are shown in Figure 5.1.

HVO South's short and medium term mine plans continue to focus on progressing mining in the Cheshunt and Riverview Pits, and maximising the large resources within the deeper seams of these pits. Cheshunt and Riverview Pits comprise the main active mining areas of HVO South. These pits total 984ha and contain approximately 278.3Mt ROM coal yet to be mined. In comparison, South Lemington Pit 2 is just 73.5ha and contains approximately 11Mt ROM coal.

Coal & Allied will continue to review the scope, timeframes and implications for mining activities associated with South Lemington Pit 2. Should this process identify that either mining would be delayed beyond the current approved project approval period (2030) or mine plans would require substantial amendment, further State approval would be sought and the requisite environmental assessment prepared.

Consideration of the potential changes to the final landform should mining not occur in South Lemington Pit 2 are outlined in Appendix C. Should mining not occur in South Lemington Pit 2 within the current approved project approval period (2030) changes to the final landform within Cheshunt/ Riverview as presented in the proposed modification would be immaterial. The impacts assessed from mining South Lemington Pit 2 would not occur, reducing the overall impacts associated with mining at HVO South.



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5.2.3 Additional ROM processing

The DPE submission noted that the proposed modification seeks to increase ROM coal production at HVO South from 16Mtpa to 20Mtpa and that the Hunter Valley Coal Preparation Plant (HVCPP) within HVO North is limited to receiving 16Mtpa from south of the Hunter River. Therefore, the DPE requested additional information on how the potential balance of 4Mtpa will be processed whilst not exceeding approved processing limits.

HVO South is integrated at an operational level with HVO North and has the ability to move material and associated equipment around HVO including ROM coal, product coal, coal rejects, overburden and water as required. This is documented within the relevant approval documentation for HVO South (Table 5.1, page 95 of ERM 2008) and HVO North (ERM 2003).

Figure 5.5 of the ERM (2008) EA shows that the HVCPP may receive up to 20Mtpa from mining areas within HVO North and HVO South. The proposed modification seeks to provide greater future optionality for processing arrangements at this facility. As outlined in section 3.2.2 of the EA, any increase in extraction rate for HVO South at peak production (from existing limit of 16Mtpa to 20Mtpa ROM) would occur at indicative Stage 2 of the mine plan (nominally 2022). Coal & Allied recognises that prior to this, review of the HVCPP operations including approved volumes of ROM from HVO South, would be necessary. This increase will provide operational flexibility for HVO South to supply all of HVCPP's processing capacity (ie 20Mtpa), should there be occasions where it is economically practical to source the coal from HVO South rather than 4Mtpa to be sourced from within HVO North.

The proposed modification does not seek to increase the ROM coal processing volumes of HVO South or HVO North, nor increase the net output from HVO. HVO will manage the distribution of the proposed increase of ROM coal at HVO South (from 16Mtpa to 20Mtpa) between the CPPs within their respective processing limits.

5.2.4 Placement areas and final landform

i Landform design

The DPE submission noted that a number of overburden emplacement options were considered during the design process. The DPE has requested further information be presented to explain the opportunities and/or constraints that ultimately guided HVO's final landform design.

Section 3.4 of this RTS provides further information detailing the design principles and considerations regarding the overburden emplacement areas and final landform, with particular emphasis on noise, dust and visual amenity for surrounding properties. In summary, several emplacement options were investigated to accommodate the additional overburden material from mining the deeper seams within the existing disturbance footprint. The process identified a number of constraints for each of the options as shown in Table 3.2. Analysis identified that the preferred option provides a balance of these constraints and minimises off-site impacts to a greater number of surrounding properties than other options considered.

ii Macro-relief within Cheshunt overburden emplacement area

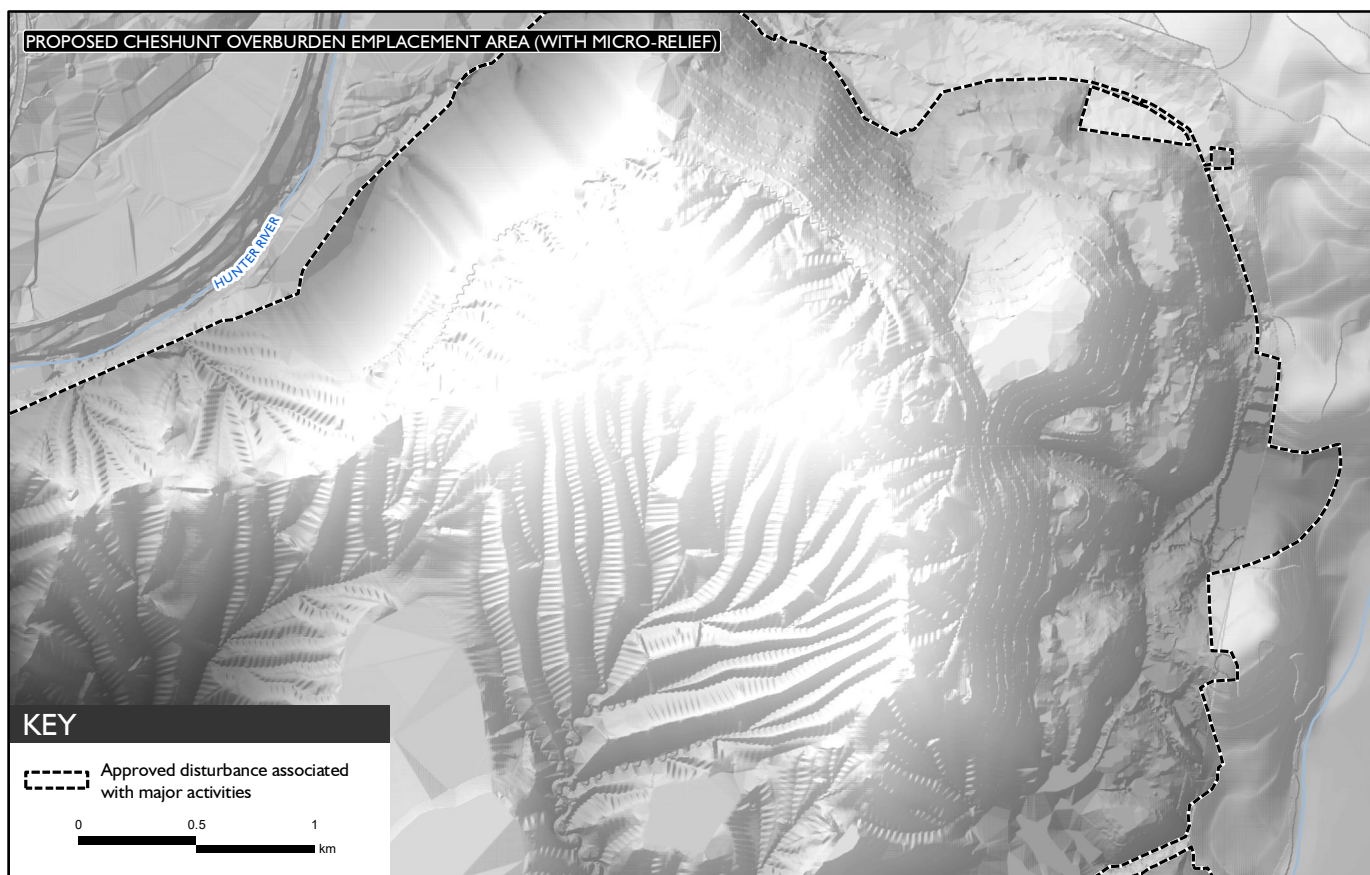
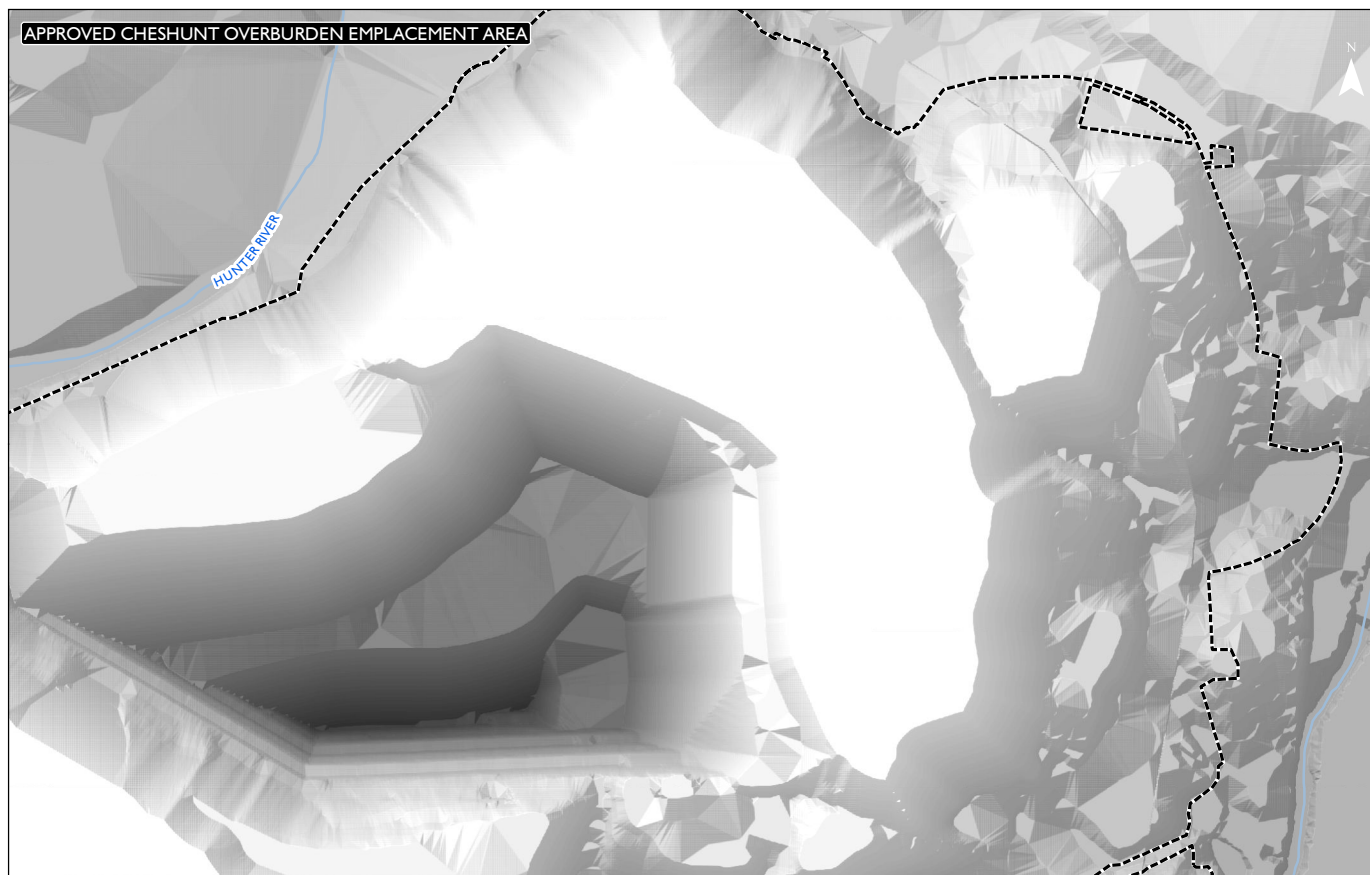
The DPE noted that the proposed design of the overburden emplacement area represents a substantial improvement to the traditional design and methods. The submission requested that Coal & Allied consider opportunities for further refinements, such as incorporating more topographic variation to the external slopes of the emplacement areas to improve visual amenity. DPE stated that the northern area of the Cheshunt overburden emplacement area appeared to have minimal macro-relief and may represent an opportunity for further refinement.

Figure 13.2 in the EA provides a stylised cross-section showing the macro-relief and Figure 13.3 of the EA shows the micro-relief at a broad scale comparing the proposed modification to that currently approved.

In response to the DPE request, Figure 3.3 of this RTS has been prepared to illustrate the stylised macro-relief at a 1:1 scale. Figure 5.2 has been prepared at a finer scale to assist with visualising the topographical relief in the northern area of the Cheshunt overburden emplacement area.

A detailed analysis of the design options considered for the overburden emplacement, to accommodate the additional volume of overburden material required to be extracted to access the deeper coal seams is provided in Section 3.4 of this RTS. The design of the proposed modification was developed through this process to offer a balance of visual, noise and dust impacts on near neighbours while accommodating the additional volume of overburden material.

In addition to micro-relief, the proposed final landform also comprises some macro-relief within its design. Macro-relief of overburden emplacement areas is generally visible at distance rather than at closer proximity. This is shown in photomontages presented within the EA for viewpoints at Knodlers Lane (Figure 9.5) and Long Point (Figure 9.7), which are 3.6km and 7km from the Cheshunt overburden emplacement area, respectively. Viewers from Long Point are able to more readily view the macro-relief within the final landform than those in closer proximity at Knodlers Lane due to the increased setback.



Macro-relief within upper slopes of Cheshunt overburden emplacement area

HVO South Modification 5

Response to submissions

Figure 5.2

In summary, the proposed modification includes:

- emplacement of the additional material within the Cheshunt emplacement area (and set back from the existing rehabilitated face) rather than in areas to the south which would have reduced views of the nearby Wollemi National Park for sensitive receivers to the east of HVO South;
- retention of the existing rehabilitated faces (eg eastern Cheshunt overburden emplacement area) for incorporation into the final improved landform design;
- maintaining the current 2.6km setback distance of rehabilitated areas to Maison Dieu;
- the construction of a more natural looking final landform that complements the existing environment, including progressive rehabilitation such as seeding of emplacement areas with a temporary vegetative cover during their construction; and
- construction methods for overburden emplacement would comprise an initial lift on the outer edges, which would be seeded to create a temporary vegetative cover, enabling emplacement of overburden behind the initial lift which would reduce the visibility of these emplacement activities.

iii Highwall considerations

The DPE submission considered that additional material could be directed to reducing the final void or improving its shape and/or slopes. The DPE noted that whilst the final void is further away from the Hunter River, with a smaller surface water catchment, gentler low-wall slopes and more useable surface area, these improvements did not extend to the final highwall.

The submission stated the final slope appeared to be significantly steeper with the southwest corner at almost 90 degrees and requested the Coal & Allied consider further refinements to make the highwall less angular and more natural in shape. DPE also requested further information on the long term stability and safety of this final highwall design.

We have reviewed the EA and acknowledge that it is difficult to discern the angle of the final highwall from the scale of figures provided in the EA. In response to the feedback from DPE, a new figure has been developed and is further discussed below.

The final void and highwall design have been optimised within the scope of the current mine plan, assuming completion of mining at the end of the current approval period. It is recognised that the potential mine life for HVO, like many other mines in the Hunter Valley, extends beyond the current approval period, with a number of potential mine plan options.

Should future approval be sought to continue mining beyond 2030, extensive mine planning would be undertaken, and this would include review of and potential changes to design elements including the final void and highwall position. Should the mine not progress beyond the current consent period, the final void and therefore highwall would be as described.

Figure 13.4 of the EA shows a stylised cross-section attempt to visualise the difference in low-wall slope and the design improvements made under the proposed modification. The figure shows the increased area of useable land in the short, medium and long-term that would be available for sustainable agricultural practices consistent with the requirements of the Synoptic Plan (Department of Mineral Resources 1999).

Figure 3.3 has been developed to show a 1:1 cross-section of the final void to assist in visualising the micro-relief context and slope angles afforded to the low-wall at scale, as well as the highwall's slope angle and its height/depth in context to landform within the overall disturbance footprint.

The highwall for the proposed modification is proposed to have an overall slope angle of between 35 to 42 degrees with a maximum individual slope angle of 75 degrees. This is consistent with the current approved final landform.

A detailed assessment of the options considered when designing the highwall angle is provided in Section 3.3 of this RTS.

iv Available fine reject storage capacity

The DPE requested demonstration that the HVO complex has approved tailings storage capacity to accommodate processing of the additional 56.8Mt of ROM coal under the proposed modification.

The management of coarse and fine reject is integrated across HVO. Although HVO South has approval to dispose of coal rejects within the Eastern Riverview, Glider Club and South Lemington tailings storage facilities (TSF), these facilities would only be used if the approved but not yet constructed LCPP became operational, which is not contemplated at this time.

All of the coal currently extracted from HVO South is washed in the HVCPP and the coal rejects from the HVCPP are disposed within HVO North. A Life of Mine Fine Reject Management Strategy is in place for HVO North, which was prepared in accordance with Condition 28A Schedule 4 of HVO North's development consent (DA 450-10-2003).

The recently approved HVO North Modification 5 provided an additional eight years of fine reject storage capacity within HVO. The current HVO North development consent expires in June 2025.

5.2.5 Socio-economic benefits

The DPE submission noted the justification for the proposed modification referenced regional and local economic and social benefits. The submission requested further information regarding the social benefits expected to be generated from the proposed modification.

The proposed modification would result in the extraction of an additional 56.8Mt of ROM coal. The social benefits generated from the proposed modification would be the continuation of those benefits from the original project approval granted in 2009 plus the social benefits to NSW from the additional taxes and royalties associated with the extraction of the additional ROM coal.

As outlined in Section 15.3.2 of the EA, the existing socio-economic benefits of HVO South will continue under the proposed modification, including:

- ongoing direct and indirect employment and expenditure on local suppliers; and
- continued community engagement and investment through the HVO CCC and programmes such as partnerships, sponsorships and donations, with current community contributions commitments being approximately \$4 million for the period between January 2015 and December 2017.

The proposed modification would result in additional direct economic benefits and flow-on economic effects of HVO South with 21 per cent of revenue to be paid in the form of \$160 million taxes and \$243 million royalties. This proportion is consistent with the ERM (2008) EA.

As described above, the proposed modification does not seek to increase HVO South's workforce nor extend the project approval period. Accordingly, there is unlikely to be any additional demand for community services. Should the proposed modification be approved, the additional royalties generated by the continued operation of HVO South (estimated to be around \$243 million in net present value (NPV) terms) will go to State revenue to provide for community services and facilities.

Section 17.3 of the EA describes that the economic and social benefits under the proposed modification are also considered consistent with the principles of ecologically sustainable development (ESD); namely, conserving and enhancing community resources.

The proposed modification will enhance community resources by providing additional public revenues through royalties and taxes. In this way it will contribute to improvements in the local, State and National economies and contribute to an overall increase in quality of life.

Feedback from community members has identified a number of concerns relating to social impacts, particularly amenity impacts. The technical assessment outcomes of the proposed modification predict a low to moderate impact on amenity (noise, air quality and visual) for local communities, we understand that even low levels of noise and dust can be a concern to nearby residents. This was particularly pertinent for residents of private dwellings with predicted impacts for noise and air quality that were negligible and, therefore, do not require mitigation in accordance with NSW Government policy (refer to Section 4.3.4.iii of the EA). Coal & Allied, however, recognises these concerns, and is working with neighbours to implement activities to assist, such as drinking water tank cleaning.

In summary, the original project approval was granted in 2009 on the basis that the social, economic and environmental benefits outweigh the impacts. While some neighbours have raised concerns about potential impacts to amenity associated with the proposed modification, these will be mitigated in accordance with Government policy and standard. Coal & Allied will also continue to look for proactive activities to implement to assist neighbours with areas of concern. The overall benefits continue to significantly outweigh the impacts.

5.2.6 Air quality

i Trigger levels for voluntary acquisition

The DPE submission noted that air quality impacts would exceed trigger levels for voluntary acquisition at eight properties, already entitled to acquisition from other neighbouring mines, under the *Voluntary Land Acquisition and Mitigation Policy* (VLAMP). The submission requested further information on HVO South's proportional impacts and mitigation measures to reduce these impacts.

The EA identifies four properties that may be entitled to acquisition as per the VLAMP in relation to air quality. These are assessment locations 77, 102, 264, and 471. The predicted contribution from the proposed modification to the total dust levels at these receptors is 18 per cent, 19 per cent, 18 per cent and 7 per cent in Stage 2 and 16 per cent, 21 per cent, 20 per cent and 5 per cent in Stage 3, respectively.

Section 8.3.2.i of the EA identifies assessment locations 102 and 264 as Warkworth Hall and St Phillip's Church, respectively, which are uninhabited and used infrequently. Therefore, these two assessment locations do not fall within the VLAMP criteria as, unlike a residence, they will only be subject to brief periods of potential exposure (less than the minimum period applicable for dust criteria) when infrequently occupied.

HVO South implements a range of management techniques to reduce dust from the operation as outlined in the *Air Quality and Greenhouse Gas Management Plan for Hunter Valley Operations*. The measures

include applying physical measures such as the application of water, proactive and reactive measures using weather predictions and real-time monitoring and provide staff guidance for the visual identification of dust plumes and problem dust sources.

The HVO South air quality monitoring network manages dust levels in real time, supported by a reactive air quality management system. Air quality alarms are set to indicate potentially rising dust levels and thus also help prevent or reduce potential impacts through enforcing a cessation of particular operations during periods of high dust readings to provide additional assistance in reducing the potential dust impacts.

Visual surveillance monitoring and general visual dust plume identification is effective to assist with identification of problem dust sources, informing a management response and verifying the effectiveness of controls implemented.

These air quality measures will continue to be applied under the proposed modification.

ii Change in 24-hour average PM₁₀ impacts

The DPE submission acknowledged the information within the EA illustrating the comparison of predicted impacts compared with the approved operations. The submission requested further information on the change in predicted impacts at key sensitive receivers.

A comparison of the modelling predictions for the proposed modification with the latest modelling assessment for HVO South (Holmes Air Sciences 2008) was conducted at key sensitive receptor locations (privately-owned assessment locations where the original predictions were made). The modelled stages represent the highest levels of proposed activity, nearest to sensitive receptors (ie residences) for the modification in future years. Stage 2 is closest to the south eastern and eastern receptors and Stage 3 is closest to the north western and western receptors.

These modelled stages are similarly compared with the maximum activity stage (B1) set out in the air quality study for the original project approval (Holmes Air Sciences 2008). The results of the comparison are presented in Table 5.1 and Table 5.2 for 24-hour average and annual average PM₁₀ predictions, respectively.

Table 5.1 Comparison of predicted 24-hour average PM₁₀ concentrations (µg/m³)

Assessment location / ID	Approved - Scenario B1*	Proposed modification (Stage 2)	Change due to Modification (Stage 2)	Proposed modification (Stage 3)	Change due to Modification (Stage 3)
311 / 3	48.1	28	-21	29	-19
307 / 4	40.9	31	-10	22	-19
160 / 5	85.3	42	-43	40	-45
379 / 13	29.8	24	-6	34	5
308 / 31	48	35	-13	25	-23
121 / 34	101.5	48	-53	53	-49
309 / 36	49.7	37	-13	25	-24
256 / 47	81.9	36	-46	36	-46
162 / 61	84.1	39	-45	38	-46
Average	63	36	-28	34	-30

Notes: * Holmes Air Sciences, 2008

Table 5.2 Comparison of predicted annual average PM₁₀ concentrations (µg/m³)

Assessment location / ID	Approved - Scenario B1*	Proposed modification - Stage 2	Change due to Modification (Stage 2)	Proposed modification - Stage 3	Change due to Modification (Stage 3)
311 / 3	5.5	7	2	6	1
307 / 4	4.4	6	2	4	0
160 / 5	12.9	8	-5	8	-5
379 / 13	4.4	4	0	4	0
308 / 31	4.9	7	2	5	0
121 / 34	17.2	10	-7	10	-7
309 / 36	5.2	7	2	5	0
256 / 47	9.6	6	-4	6	-4
162 / 61	11.2	7	-4	7	-5
Average	8.4	7	-1	6	-2

Notes: * Holmes Air Sciences, 2008

The comparison indicates the following for the assessable locations:

- For 24-hour average PM₁₀ impacts, the predicted levels due to the proposed modification range from a reduction of 53µg/m³ to an increase of 5µg/m³.
- On average, the change due to the proposed modification would result in a reduction of 28µg/m³ and 30µg/m³ in Stage 2 and Stage 3, respectively.
- The change in annual average PM₁₀ impacts results in a reduction of approximately 1µg/m³ and 2µg/m³ in Stage 2 and Stage 3 respectively, relative to the approved operation.

iii Updated Approved Methods results

The DPE acknowledged the supplementary air quality study provided on 6 March 2017, addressing the EPA's recent release of the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales 2016*. The revised Approved Methods formalise the generally adopted PM_{2.5} criteria (already considered in the air quality study) and tighten the annual average PM₁₀ criterion from a level of 30µg/m³ to 25µg/m³. The DPE submission requested Coal & Allied provide an update to its results summary table to reflect the outcomes of the supplementary air quality study.

Table 5.3 presents the updated results summary table of modelled predicted impacts that exceed assessment criteria based on the updated NSW EPA air quality impact assessment criteria. The privately owned assessment locations are shown in yellow shading, and the mine owned assessment locations are shown in grey shading.

Compared to the results shown in the air quality study (January 2017) for the proposed modification which was based on the now superceded criteria, the updated results in Table 5.4 (based on the new criteria) indicate that there would be six additional privately-owned assessment locations and four additional mine-owned assessment locations where the predicted impacts would be above the new cumulative annual average PM₁₀ impact assessment criteria. The ten additional assessment locations are shown in italics in Table 5.3.

It should be noted the VLAMP applies to mining operations to address dust impacts at properties. The VLAMP annual average PM₁₀ impact assessment criteria remains at 30µg/m³ and has been applied to the proposed modification.

Table 5.3 Summary of modelled predictions where predicted impacts exceed assessment criteria

Assessment location / ID	PM _{2.5}		PM ₁₀		PM ₁₀		TSP		DD	
	Total ann. average		Project 24-hour average		Total ann. average		Project ann. average		Total ann. average	
	Criterion 8µg/m ³		Criterion 50µg/m ³		Criterion 25µg/m ³		Criterion 90µg/m ³		Criterion 2g/m ² /mth	
	Stage of impact (level of impact - µg/m ³)		No. of days >50µg/m ³		Stage of impact (level of impact - µg/m ³)		Stage of impact (level of impact - g/m ² /mth)			
77	Stage 2 (64)		1		Stage 2 (35)					
	Stage 3 (9)		1		Stage 3 (39)		Stage 3 (93)			
78	Stage 3 (9)				Stage 3 (39)		Stage 3 (94)			
79*	Stage 2 (9)		1		Stage 2 (38)		Stage 2 (92)			
	Stage 3 (9)		1		Stage 3 (41)		Stage 3 (97)			
83*	Stage 2 (9)		2		Stage 2 (44)		Stage 2 (103)			
	Stage 3 (10)		1		Stage 3 (46)		Stage 3 (105)			
90	Stage 2 (10)		3		Stage 2 (46)		Stage 2 (106)			
	Stage 3 (10)		2		Stage 3 (47)		Stage 3 (108)			
91*	Stage 2 (9)		1		Stage 2 (42)		Stage 2 (98)			
	Stage 3 (9)		1		Stage 3 (44)		Stage 3 (101)			
93	Stage 2 (68)		1		Stage 2 (36)					
	Stage 3 (9)		1		Stage 3 (40)		Stage 3 (93)			
94*	Stage 2 (10)		3		Stage 2 (44)		Stage 2 (104)			
	Stage 3 (10)		4		Stage 3 (46)		Stage 3 (105)			
96*	Stage 2 (9)		1		Stage 2 (39)		Stage 2 (94)			
	Stage 3 (9)		2		Stage 3 (41)		Stage 3 (97)			
99*	Stage 2 (66)		1		Stage 2 (36)					
	Stage 3 (9)		1		Stage 3 (38)		Stage 3 (91)			
102	Stage 2 (67)		1		Stage 2 (36)					
	Stage 3 (9)		2		Stage 3 (38)					
105	Stage 2 (11)		20		Stage 2 (53)		Stage 2 (119)			
	Stage 3 (11)		44		Stage 3 (53)		Stage 3 (119)			
109*	Stage 2 (9)				Stage 2 (43)		Stage 2 (103)			
	Stage 3 (63)		1		Stage 3 (35)					
114	Stage 2 (11)		126		Stage 2 (55)		Stage 2 (123)		Stage 2 (2.8)	
	Stage 3 (11)		126		Stage 3 (54)		Stage 3 (123)		Stage 3 (2.5)	
116	Stage 2 (77)		28		Stage 2 (34)					
	Stage 3 (80)		20		Stage 3 (31)					
117	Stage 2 (58)		7		Stage 2 (28)					
	Stage 3 (58)		9		Stage 3 (27)					
118	Stage 2 (60)		7		Stage 2 (29)					
	Stage 3 (68)		9		Stage 3 (28)					

Table 5.3 Summary of modelled predictions where predicted impacts exceed assessment criteria

Assessment location / ID	PM _{2.5}		PM ₁₀		TSP		DD	
	Total ann. average		Project 24-hour average		Total ann. average		Project ann. average	Total ann. average
	Criterion 8µg/m ³		Criterion 50µg/m ³		Criterion 25µg/m ³		Criterion 2g/m ² /mth	Criterion 4g/m ² /mth
	Stage of impact (level of impact - µg/m ³)		No. of days >50µg/m ³	Stage of impact (level of impact - µg/m ³)		Stage of impact (level of impact - g/m ² /mth)		
119	Stage 2 (64)		7	Stage 2 (30)				
	Stage 3 (67)		7	Stage 3 (27)				
121	Stage 3 (53)		1					
125	Stage 3 (51)		0					
158	Stage 2 (66)		18	Stage 2 (32)				
	Stage 3 (77)		18	Stage 3 (31)				
165	Stage 2 (71)		19	Stage 2 (32)				
	Stage 3 (76)		16	Stage 3 (29)				
259	Stage 2 (58)		6	Stage 2 (29)				
	Stage 3 (69)		8	Stage 3 (27)				
264	Stage 2 (63)		1	Stage 2 (35)				
	Stage 3 (73)		1	Stage 3 (36)				
265	Stage 2 (57)		7	Stage 2 (28)				
	Stage 3 (58)		9	Stage 3 (27)				
271*				Stage 2 (28)				
				Stage 3 (28)				
302*	Stage 2 (9)	Stage 2 (56)	4	Stage 2 (43)	Stage 2 (110)			
				Stage 3 (33)				
303*	Stage 2 (9)	Stage 2 (52)	2	Stage 2 (44)	Stage 2 (112)			
				Stage 3 (33)				
304*	Stage 2 (10)			Stage 2 (51)	Stage 2 (127)	Stage 2 (4.3)		
				Stage 3 (36)	Stage 3 (94)			
305*	Stage 2 (9)			Stage 2 (41)	Stage 2 (104)			
306*	Stage 2 (9)			Stage 2 (42)	Stage 2 (107)			
				Stage 3 (31)				
307 [#]				Stage 2 (27)				
308 [#]				Stage 2 (28)				
309 [#]				Stage 2 (29)				
310 [#]				Stage 2 (26)				
312 [#]				Stage 2 (26)				
313*	Stage 2 (56)		3	Stage 2 (32)				
				Stage 3 (28)				
314				Stage 2 (27)				
	Stage 3 (78)		6	Stage 3 (28)				

Table 5.3 Summary of modelled predictions where predicted impacts exceed assessment criteria

Assessment location / ID	PM _{2.5}		PM ₁₀		PM ₁₀		TSP		DD			
	Total ann. average		Project 24-hour average		Total ann. average		Project ann. average		Total ann. average			
	Criterion 8µg/m³		Criterion 50µg/m³		Criterion 25µg/m³		Criterion 90µg/m³		Criterion 2g/m²/mth		Criterion 4g/m²/mth	
	Stage of impact (level of impact - µg/m³)		No. of days >50µg/m³		Stage of impact (level of impact - µg/m³)				Stage of impact (level of impact - g/m²/mth)			
315					Stage 2 (27)							
	Stage 3 (66)		7		Stage 3 (29)							
316					Stage 2 (29)							
	Stage 3 (83)		5		Stage 3 (31)							
319	Stage 2 (9)	Stage 2 (100)	54		Stage 2 (42)	Stage 2 (105)						
	Stage 3 (14)	Stage 3 (257)	195		Stage 3 (85)	Stage 3 (201)	Stage 3 (4.8)		Stage 3 (6.6)			
320	Stage 2 (51)		1		Stage 2 (32)							
	Stage 3 (9)	Stage 3 (113)	38		Stage 3 (39)	Stage 3 (98)						
439*#					Stage 2 (26)							
441*#					Stage 2 (26)							
442*#					Stage 2 (32)							
					Stage 3 (26)							
443*	Stage 2 (9)	Stage 2 (68)	9		Stage 2 (39)	Stage 2 (103)						
					Stage 3 (31)							
444	Stage 2 (55)		2		Stage 2 (33)							
	Stage 3 (9)	Stage 3 (102)	62		Stage 3 (42)	Stage 3 (104)						
445*#					Stage 2 (30)							
					Stage 3 (30)							
446*	Stage 2 (9)				Stage 2 (35)							
					Stage 3 (35)							
447	Stage 2 (9)	Stage 2 (108)	41		Stage 2 (38)							
	Stage 3 (9)	Stage 3 (105)	38		Stage 3 (37)							
448					Stage 2 (27)							
	Stage 3 (63)		6		Stage 3 (29)							
449	Stage 2 (9)	Stage 2 (95)	47		Stage 2 (41)	Stage 2 (103)						
	Stage 3 (15)	Stage 3 (259)	194		Stage 3 (88)	Stage 3 (206)	Stage 3 (4.7)		Stage 3 (6.5)			
450	Stage 2 (10)	Stage 2 (114)	69		Stage 2 (46)	Stage 2 (114)						
	Stage 3 (13)	Stage 3 (219)	158		Stage 3 (75)	Stage 3 (180)	Stage 3 (4.3)		Stage 3 (6.4)			
467	Stage 2 (51)		1		Stage 2 (32)							
	Stage 3 (9)	Stage 3 (100)	52		Stage 3 (41)	Stage 3 (101)						
471	Stage 2 (9)				Stage 2 (42)		Stage 2 (97)					
	Stage 3 (9)				Stage 3 (40)		Stage 3 (94)					
472#					Stage 2 (26)							

Notes: *Other mine owned property

Additional property that exceeds new 2017 Approved Methods criteria

5.3 Singleton Council

Singleton Council raised no objections to the proposed modification. The submission acknowledged that Coal & Allied had engaged with Singleton Council regarding the proposed modification.

The submission noted that the visual assessment did not predict significant visual impacts, with the implementation of micro-relief for the final landform as well as continued progressive rehabilitation and lighting management measures.

Singleton Council also noted the noise and air quality assessment outcomes were similar to those of the current operations.

We noted that the submission stated that Singleton Council is concerned to ensure the final void is minimised and end land use is compatible with agreed sustainable, economic and social outcomes. Coal & Allied recognises the importance of final voids to Singleton Council and other stakeholders in the community. The final void for HVO South as approved and for the proposed modification has been optimised over the years. The pits that make up HVO South today have been combined and consolidated with the original five voids reduced to a single void.

As outlined in Section 3.3 of the EA, HVO South underwent a mine plan review process which considered avoidance and minimisation of environmental and amenity impacts on surrounding sensitive receptors as its guiding design principles.

The development of the final void for the proposed modification, its alignment with final landform objectives and its role in post-mining water management (preventing saline water leaving the site) were important considerations in the development of the proposed mine plan.

As a result, the proposed modification achieved the following with respect to the final void:

- increased distance between the Hunter River and the proposed evaporative basin within the final void;
- minimisation of surface water catchment area draining to the final void; and
- reduction in the low-wall slope to enable greater land use optionality within the final void.

The proposed modification will have a single final void with a surface area of approximately 523ha measured at a ground surface level of 70mAHD. This compares to a surface area of approximately 404ha for the existing approval. The increase in area is due to the use of a shallower low-wall slope in the void of generally less than 10 degrees for the proposed modification compared to a slope of 14 to 18 degrees for the existing approval. This results in a better land use outcome compared to the current approved final landform.

Coal & Allied acknowledges Singleton Council's concern regarding the final void under the proposed modification. A final void management plan and mine closure plan will be prepared in consultation with the relevant agencies (including Singleton Council) at least five years prior to the completion of mining, as required by Conditions 37 and 38 Schedule 3 of the existing project approval (PA 06_0261), respectively.

5.4 DPI Water

DPI Water raised matters related to groundwater and surface water which require clarification as well as outlining post-approval considerations for an updated HVO Water Management Plan (WMP) (RTCA 2015).

These matters are addressed in the sections below.

5.4.1 Water Management Plan considerations

The DPI Water submission provided matters that Coal & Allied should consider during the preparation of the WMP which would be updated to incorporate the proposed modification should it be approved. These considerations are provided below.

In preparation of a draft update to the WMP for consultation with DPI Water, the following should be considered:

- The updated WMP should include a comprehensive monitoring and management program for Groundwater Dependent Ecosystems.
- The WMP should detail, in prescriptive manner, how the flora assessment in conjunction with surface and groundwater (water levels, flow gradients and water quality) will be used to assess and report on vegetation health of these important ecosystems such as the River Red Gum, Hunter Flood Plain Red Gum Woodland and Hunter Valley River Oak communities.
- The WMP should monitor:
 - Mine spoil leachate;
 - Salt load changes in line with conclusions made in section 6.4.4 of the surface water assessment.
- The Sediment and Erosion Control Plan should be updated as part of the WMP update. This should include detail on proposed dam decommissioning.
- Section ES6.4 of the main text notes that the proposed modification will not cause drawdown of any private bores by more than 2m. The WMP must include make good provisions whereby any mining related drawdown inhibits a private user from extracting for either licensed purposes or basic landholder right.

Coal & Allied will ensure that the matters raised by DPI Water will be addressed when updating the WMP to include the proposed modification.

5.4.2 Surface water clarifications

The sections below provide further information in response to DPI Water's matters raised regarding sediment dams under the proposed modification, surface water extractors, clean water diversions and the final landform catchment areas.

i Proposed sediment dams

Sediment dams are designed to intercept runoff generated from soil disturbance areas, and settle out suspended sediments prior to passively releasing (ie overflowing) if the runoff volume exceeds the design storage capacity of the dam. Sediment dams are used to manage runoff from overburden areas during the rehabilitation process; they are not used for catchments which contain coal handling or processing activities as these are handled by the HVO water management system (WMS). Water quality in sediment dams is monitored, and any waters found to be unsuitable for release (ie saline) are pumped and captured within the HVO WMS.

The DPI Water submission noted the water balance study within the EA (HATCH 2016) stated that the proposed modification included five nominal locations where sediment dams would be constructed. DPI Water requested further information on these sediment dams.

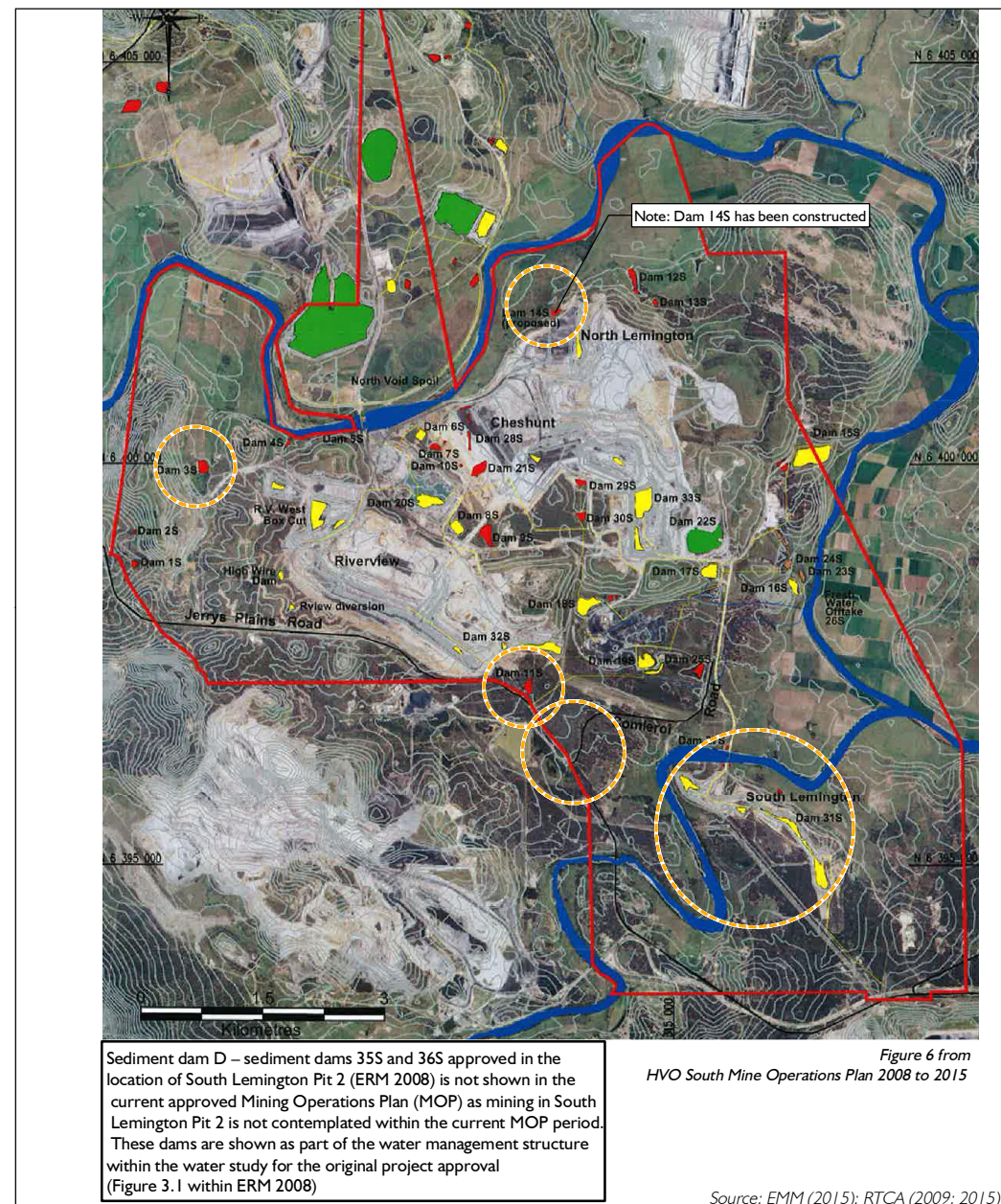
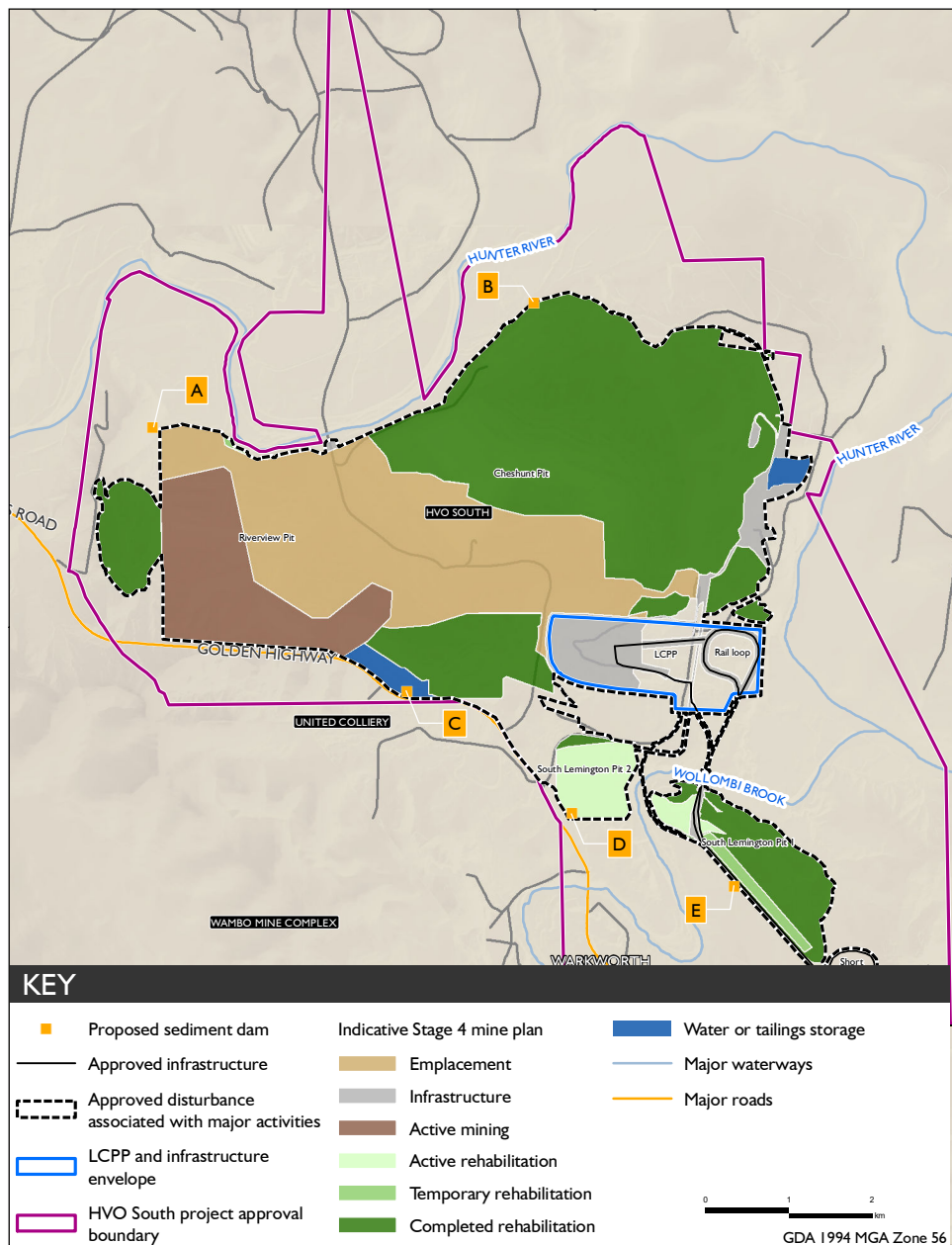
The sediment dams identified and listed in the water balance study (HATCH 2016) and referred to in the DPI submission, generally correspond to structures already approved under the existing project approval (PA 06_0291).

These structures (as presented in the proposed modification) perform the same function as structures previously presented in the approved mine plan and the approved Mining Operations Plan (MOP). This is shown in Figure 5.3 and described in Table 5.4 below.

Table 5.4 Sediment dam structures

Location (refer to Figure 5.3)	Approved mine plan	Proposed modification
A	Dam 3S	Sediment Dam A functionally corresponds to Dam 3S (approved structure), however the location will be moved to the northernmost extent of the proposed modification mine plan.
B	Dam 14S	Sediment Dam B functionally corresponds to Dam 14S (existing approved sediment basin).
C	Dam 11S	Sediment Dam C is functionally included in the approved mine plan by redirecting the Riverview Void catchment through Dam 11S or its functional replacement, if required.
D	Dam 35S/36S	Sediment Dam D functionally corresponds to either Dam 35S or 36S (both presented on Figure 6 within the MOP (refer to Figure 5.3 of this RTS) and the Final Catchment Plan in the water study (ERM 2008) of the EA for the project approval).
E	Dam 31S	Sediment Dam E functionally corresponds to management intent for Dam 31S described in the Figure 6 within the MOP associated with approved final landform).

The design, implementation and operation of sediment dams at HVO South will continue to occur in accordance with currently approved WMP (RTCA 2015).



Sediment dams under the proposed modification and approved operations

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Figure 5.3

Section 7.3.2.1 of the WMP specifies that erosion and sediment controls will be designed in accordance with the '*Blue Book: Managing Urban Stormwater: soil and construction*' (Volume 1 and 2E – Mines and Quarries) (Landcom 2004, DECC 2008). Design specifications for any sediment dams to be constructed in the future would be confirmed when finalising the design and staging of the associated overburden emplacement area rehabilitation, noting that these works would be undertaken as part of the MOP process in consultation with the relevant government agencies.

Section 7.3.2 of the WMP specifies that sediment mobilisation and erosion will be minimised by retaining runoff from disturbed areas in sediment dams to settle out suspended sediment prior to discharge back to the natural system. This section also specifies that water will be returned to the mine water system if water quality is not suitable for release.

Section 9 of the WMP describes procedures for investigating and responding in the event that a water quality measurement exceeds applicable criteria for discharge of water from a sediment dam to the natural system. Generally, procedures entail continued monitoring, assessment of potential risks to the downstream environment, and implementation of an appropriate mitigation strategy (eg intercepting and pumping the water back into the HVO WMS).

The surface water monitoring programme (Appendix C of the WMP) outlines the frequency at which water quality samples are collected and analysed. Water from dams is analysed for general indicators on a quarterly basis, and annually for a comprehensive suite of parameters. In addition to scheduled analyses, non-scheduled sampling also occurs, as required (eg during significant rainfall events), to ensure that waters not suitable for release to the environment are being identified and managed accordingly.

a. Trigger levels

The DPI Water submission requested the surface water assessment describe the trigger level and its impact on dam capacity.

Maximum operating levels for all mine water storages with potential to release water outside HVO South's mining lease are provided in the water balance study (HATCH 2016, refer Table 11-1: HVO OPSIM Operating Rules). Operating rules define how these storages are operated to meet site containment requirements. It should be noted that all HVO WMS performance results presented in the water balance study (HATCH 2016) were based on these operating rules, and that modelling results indicate there is a low likelihood of any uncontrolled release of saline water to the receiving environment (ie no simulated non-HRSTS discharges).

b. Decommissioning of sediment dams

The DPI Water submission noted that the proposed modification mine plan required the decommissioning of two sediment dams referred to as Sediment Dam and Subzero's Dam. DPI Water requested further information on these dams.

Pit advancement under the existing approved operations has resulted in both dams being decommissioned and mined through. All water from this area now reports to the pit floor and is managed via the HVO WMS.

ii Surface water extractors

DPI Water acknowledged that as basic landholder rights, extractors from surface water sources do not require an approval. DPI Water requested further information on whether a survey of surface water extractors was undertaken as part of the proposed modification. The submission also noted that the HVOCCC may be an appropriate mechanism to survey potential extractors.

The proposed modification results in predicted negligible impacts on water source catchments of the Hunter River (refer Section 5.3.2.iv below). In this context, no survey of surface water extractors was undertaken as part of the preparation of the EA. As described in Chapter 3 of this RTS, we have engaged with near neighbours and other key stakeholders regarding the proposed modification. Concerns regarding potential effects on existing surface water extraction rights were not raised during these consultation activities, however engagement activities regarding HVO are ongoing.

Further to the above, it is noted that Coal & Allied's landholdings cover both sides of the Hunter River in the vicinity of HVO, and the proposed modification does not require additional intake or additional releases of water to the river, therefore material impact on downstream users is unlikely.

iii Clean water dams and water licensing

The DPI Water submission requested detailed information describing clean water catchment dams in order to determine whether these storages require offsetting via the appropriate water access licence (WAL).

No additional clean water dams are required under the proposed modification. All water storages associated with the proposed modification are either mine water or sediment dams. The indicative mine plans for the proposed modification do not comprise any clean water dams or involve the capture of any upslope clean catchment which would require Coal & Allied to source additional WALs in connection with harvestable rights requirements. Note that additional WALs are not required to cover the take of runoff from mine workings (ie catchment reporting to the HVO WMS), as water take from these areas is exempt from licensing requirements as it is required to prevent the contamination of a water source.

It should be noted that the WMP (refer Figures 2 and 3, RTCA 2015) identifies clean water *diversion* works that are associated with the existing project approval (PA 06_0291) that do not require WALs. These diversion works are south-west of the Riverview West Pit with the clean catchment diverted west into a right bank tributary of the Hunter River.

iv Final landform and changes to water source catchment areas

The DPI Water submission requested details of the impacts of the proposed modification's final landform on water source catchment areas.

Under the existing project approval (PA 06_0291), HVO South is licensed to extract water from the Hunter River based on capture of runoff from water source catchment areas. Under the proposed final landform, all runoff would report to the Hunter River via one of the source catchment tributaries, excluding water reporting to and captured by the final void.

Under the current approved final landform, the final landform catchment area draining to the Hunter River via the source catchment tributaries is estimated at approximately 2,910ha. The proposed modification reduces the final void catchment area by approximately 45ha; and as a result, the total area draining to the Hunter River via the source catchment tributaries increases to 2,955ha.

Therefore, the proposed modification's final landform changes the water source catchment area by approximately 1.5 per cent. Considered in the context of the Hunter River catchment of approximately 13,855km² (as measured at the DPI water stream station on the Hunter River at Maison Dieu (Station No. 210128)), the proposed modification represents an area change of less than 0.1 per cent. On this basis, the changes to the Hunter River water source catchments and potential impacts on water source catchment areas downstream of HVO resulting from the proposed modification's final landform are negligible.

5.4.3 Groundwater clarifications

The DPI Water submission requested that Figure 10.3 of the EA (groundwater users) be updated to include all 43 bores surveyed, be colour coded to show different categories of bores and the target aquifers and include predicted drawdown contours. The submission also requested further information on the incremental drawdown on private extractors, including updating the relevant figures displaying drawdown to include surveyed bore and lithology details. These requests are addressed in the sections below.

i Groundwater users and lithology

Figure 5.4 shows private bores within 4 km of the proposed modification listed in the National Groundwater Information System (NGIS) database and identified during a Coal & Allied bore census in 2015.

The private bores are presented based on their use and target lithology. Bores intersecting the Permian coal measures have been divided into shallow (ie Wittingham Coal Measures above Vaux Seam) and deep (ie Wittingham Coal Measures below Vaux Seam).

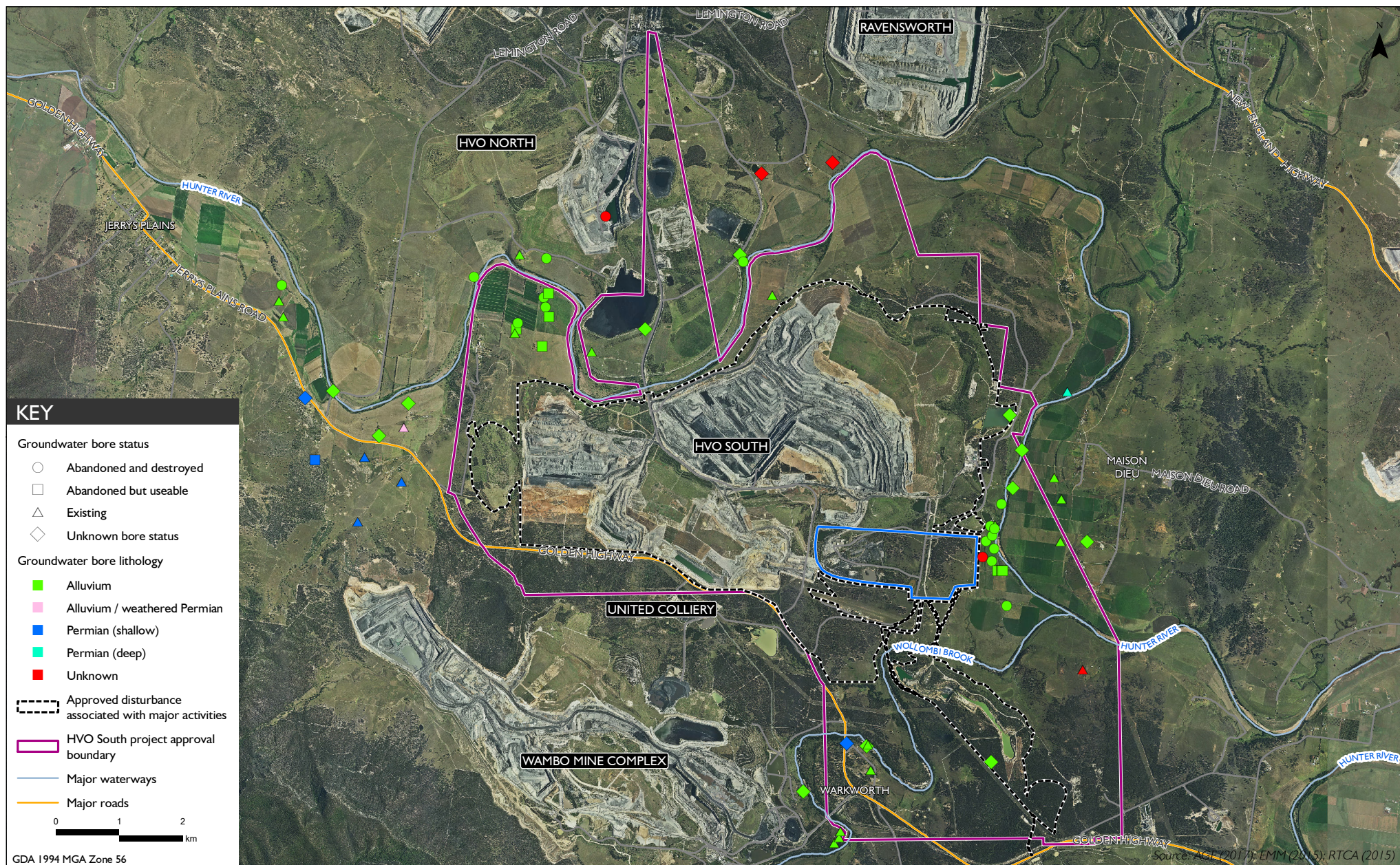
The division for the Permian coal measures was based on available bore construction details (Table A-5 of the groundwater study in Appendix G of the EA), geological model layers and the mapped subcrop of coal seams on the 1:100,000 Hunter Coalfields geological map.

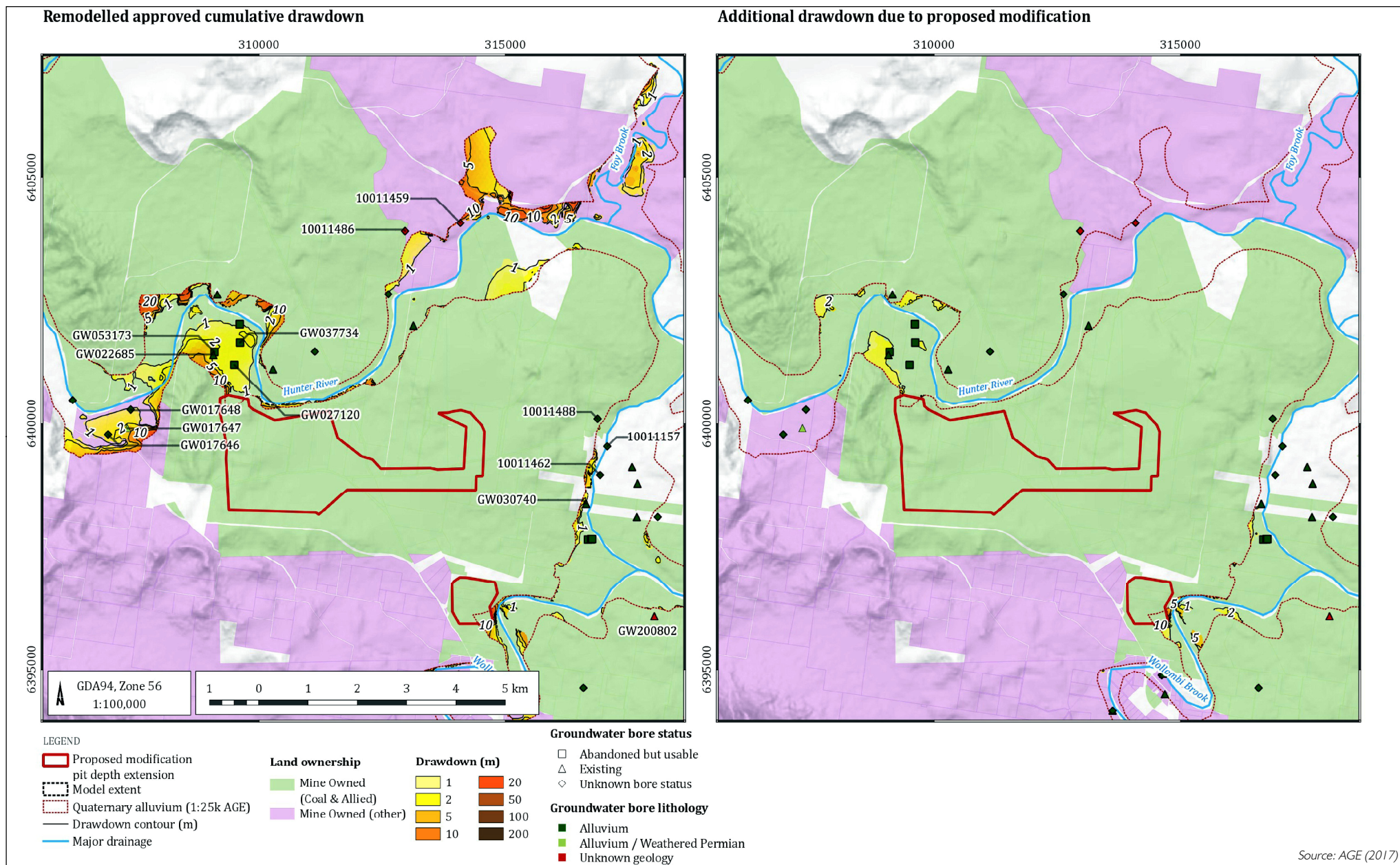
ii Groundwater level drawdown

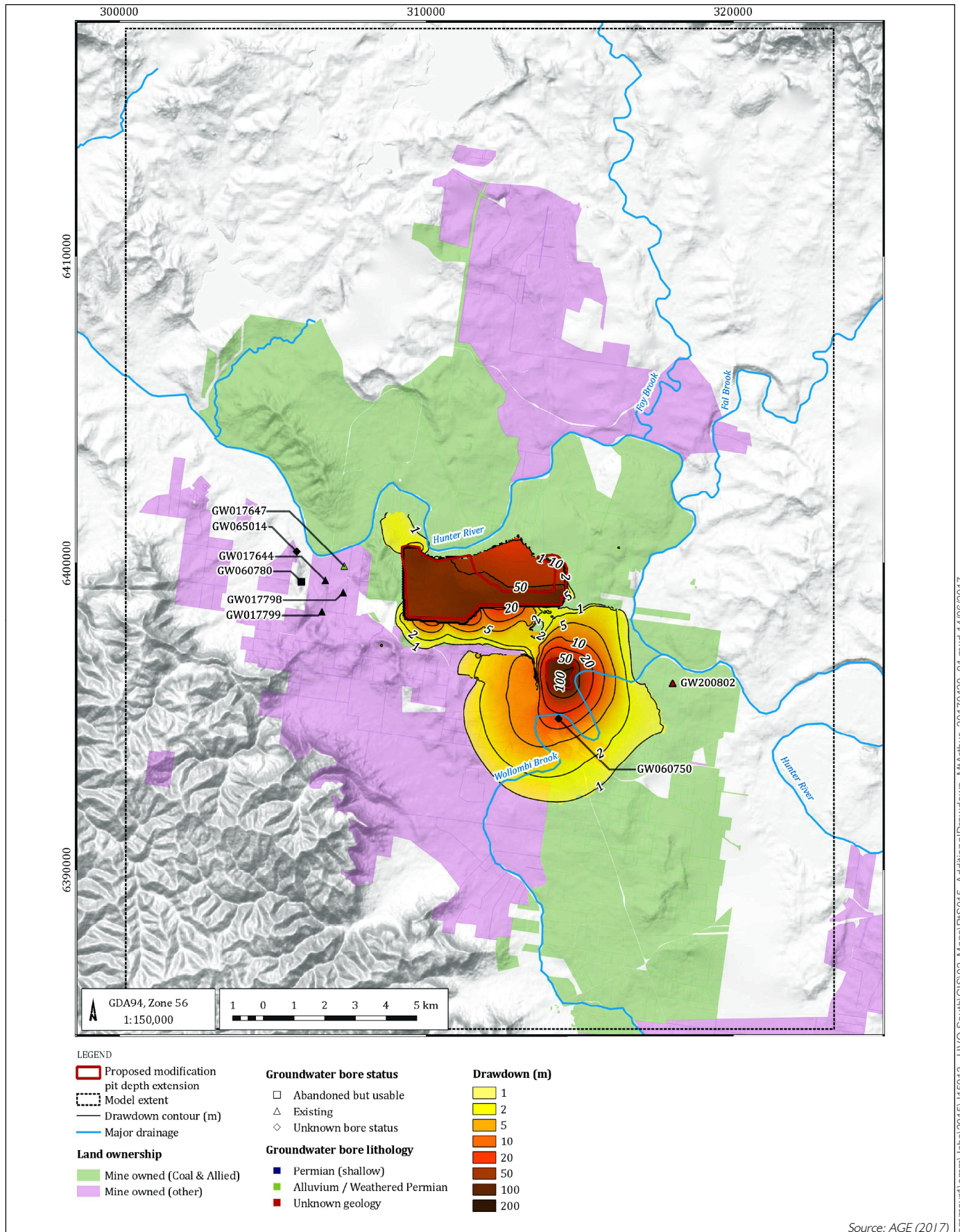
Figures 5.5 to 5.7 present the predicted groundwater level drawdown in the Quaternary alluvium, shallow Permian coal measures (Mt Arthur Seam) and deeper Permian coal measures (Bayswater Seam) due to the proposed modification. Figures 5.8 to 5.10 present cumulative drawdown predictions for the three stratigraphic sequences. Each drawdown figure includes private bores that likely occur within the relevant lithology, which has been assessed based on available bore details (ie screened lithology and bore depth) and mapped geology. Full details about each private bore are in Table A-5 of the groundwater study within Appendix G of the EA.

As shown in Figures 5.5 to 5.7, groundwater level drawdown due to the proposed modification is largely restricted within the extent of land owned by Coal & Allied.

Figure 5.5 shows that no private bores will experience a drawdown due to the proposed modification within the alluvium in excess of 1m. As shown in Figure 5.8 and discussed in Chapter 10 of the EA and the technical study (Appendix G of the EA), there is one bore (10011459) on land owned by Glencore (Ravensworth Mine) with a bore depth of around 12m with predicted drawdown due to the proposed modification and with cumulative drawdown of greater than 2m. The decline is predominately due to the cumulative impact of the approved and surrounding operations, with the proposed modification only contributing 0.3m of additional drawdown.



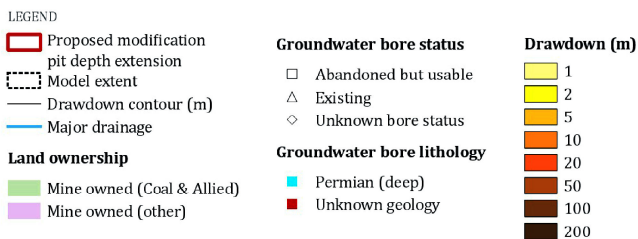
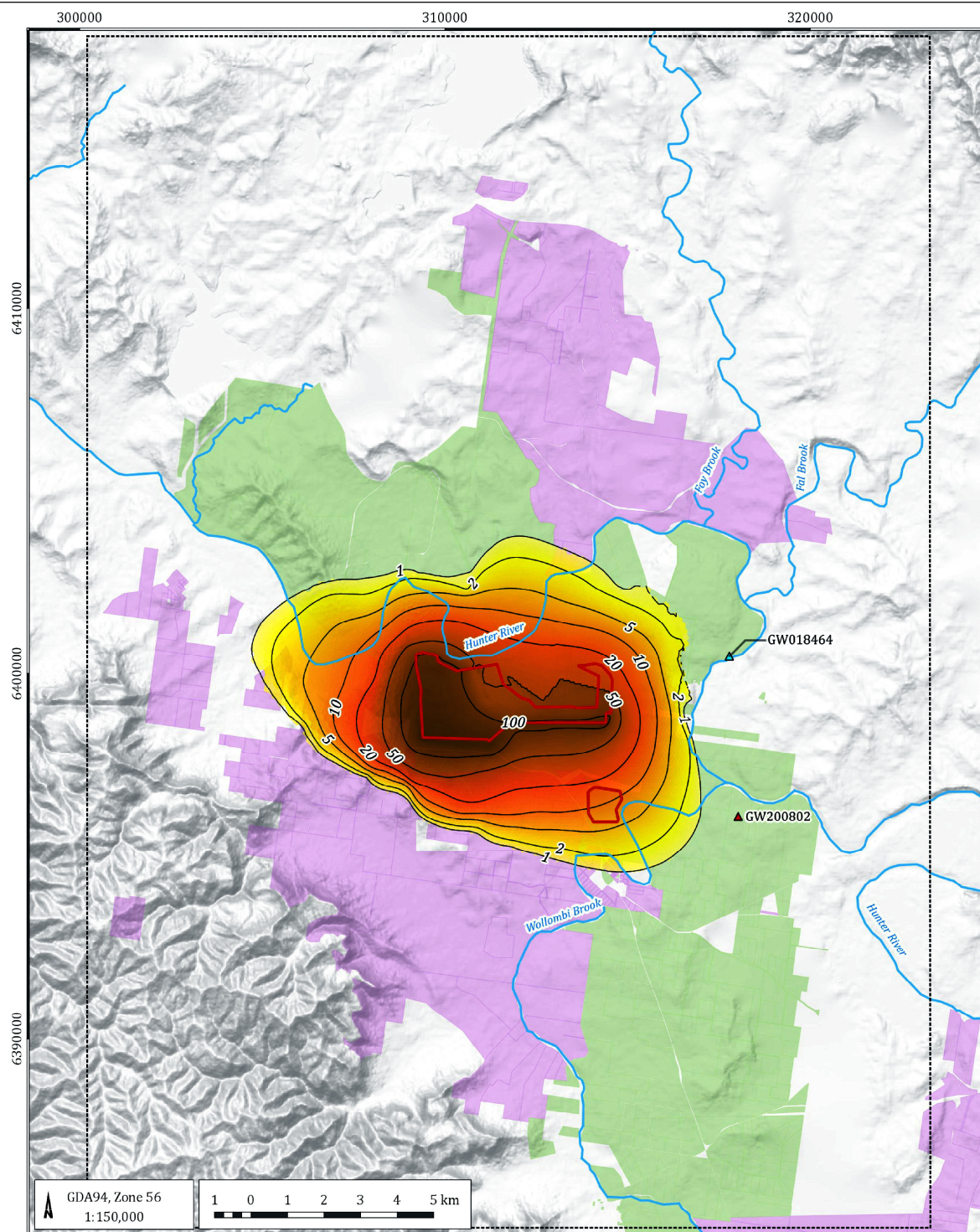




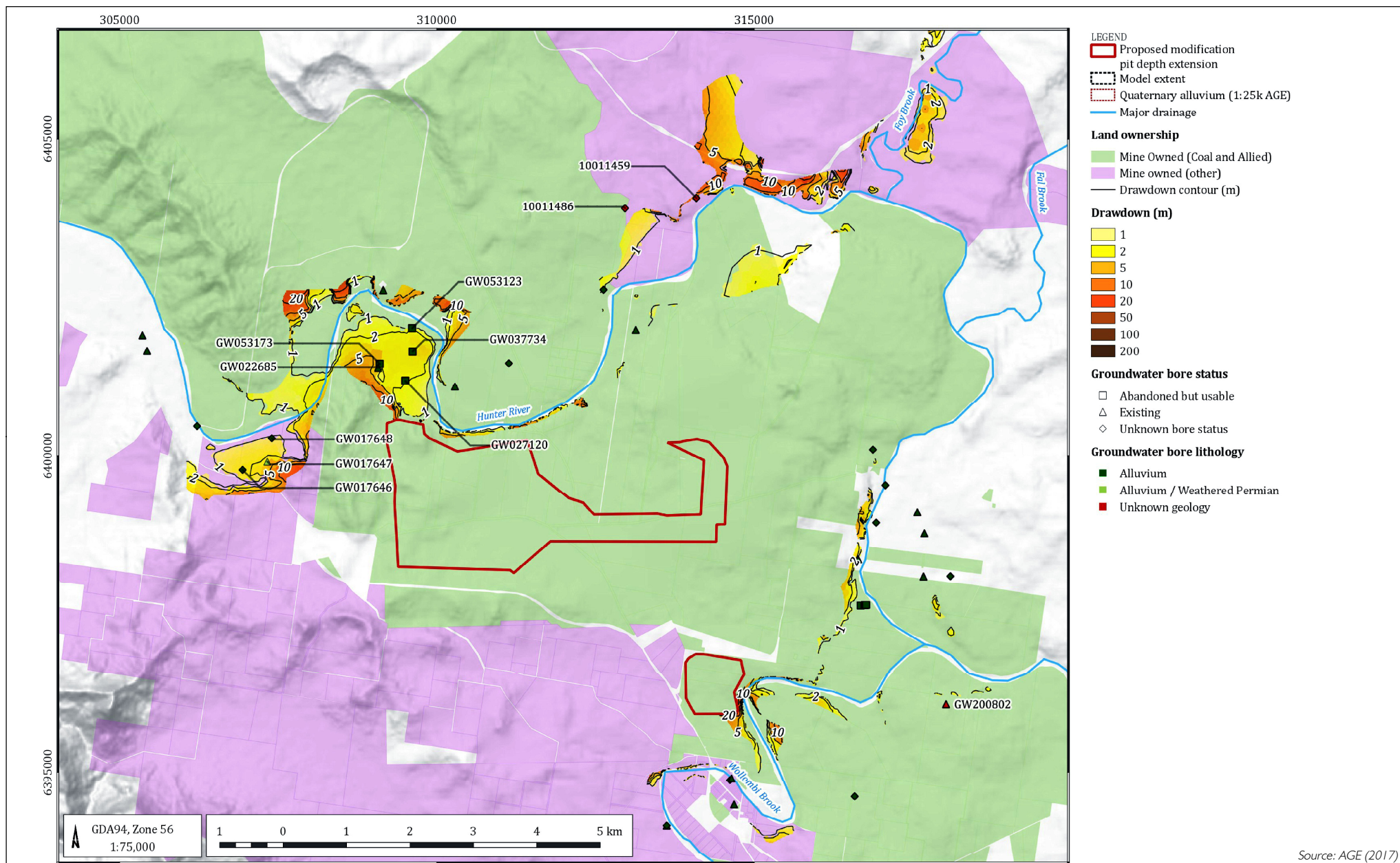
Maximum additional drawdown due to proposed modification - Mt Arthur Seam

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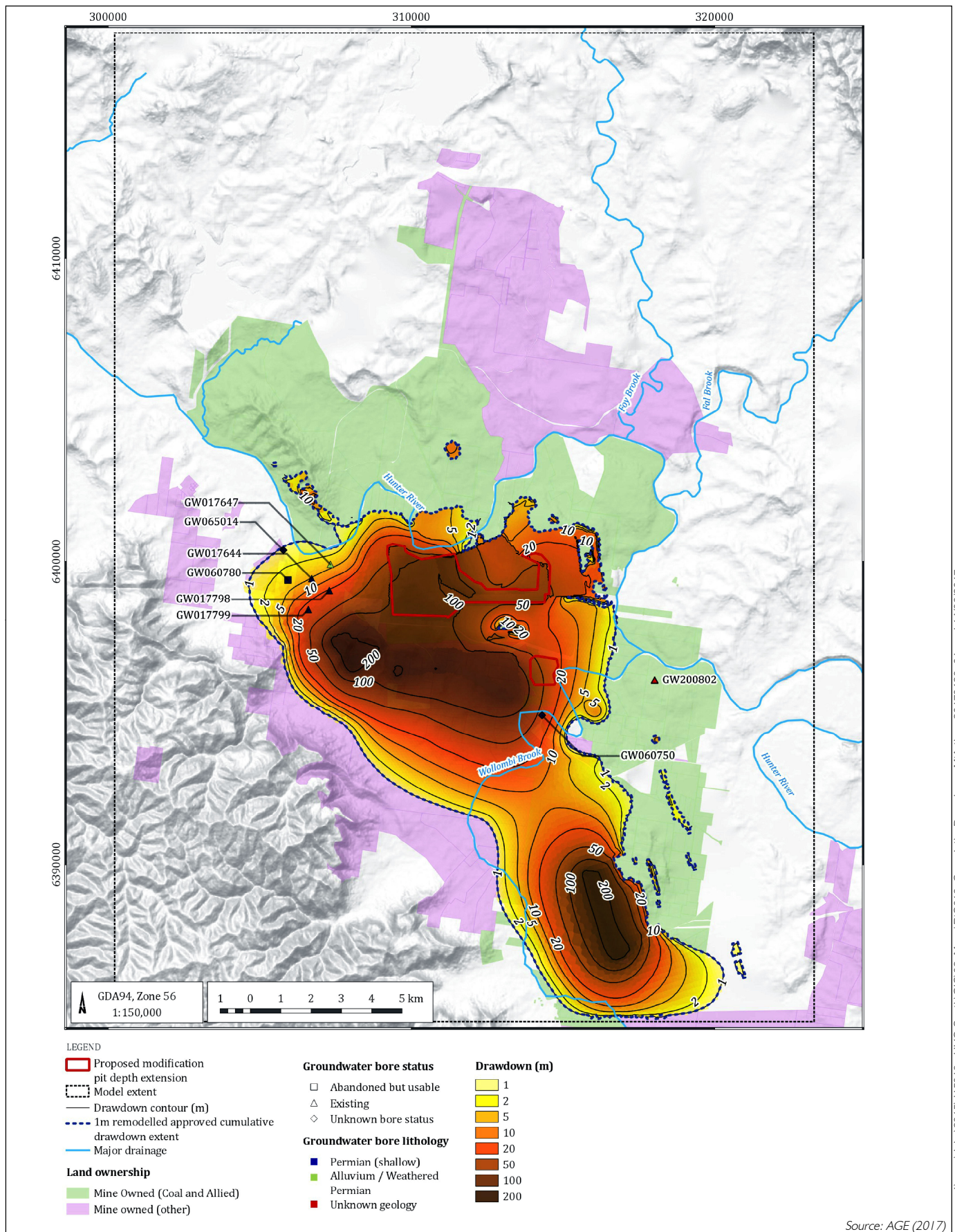
Figure 5.6



Source: AGE (2017)



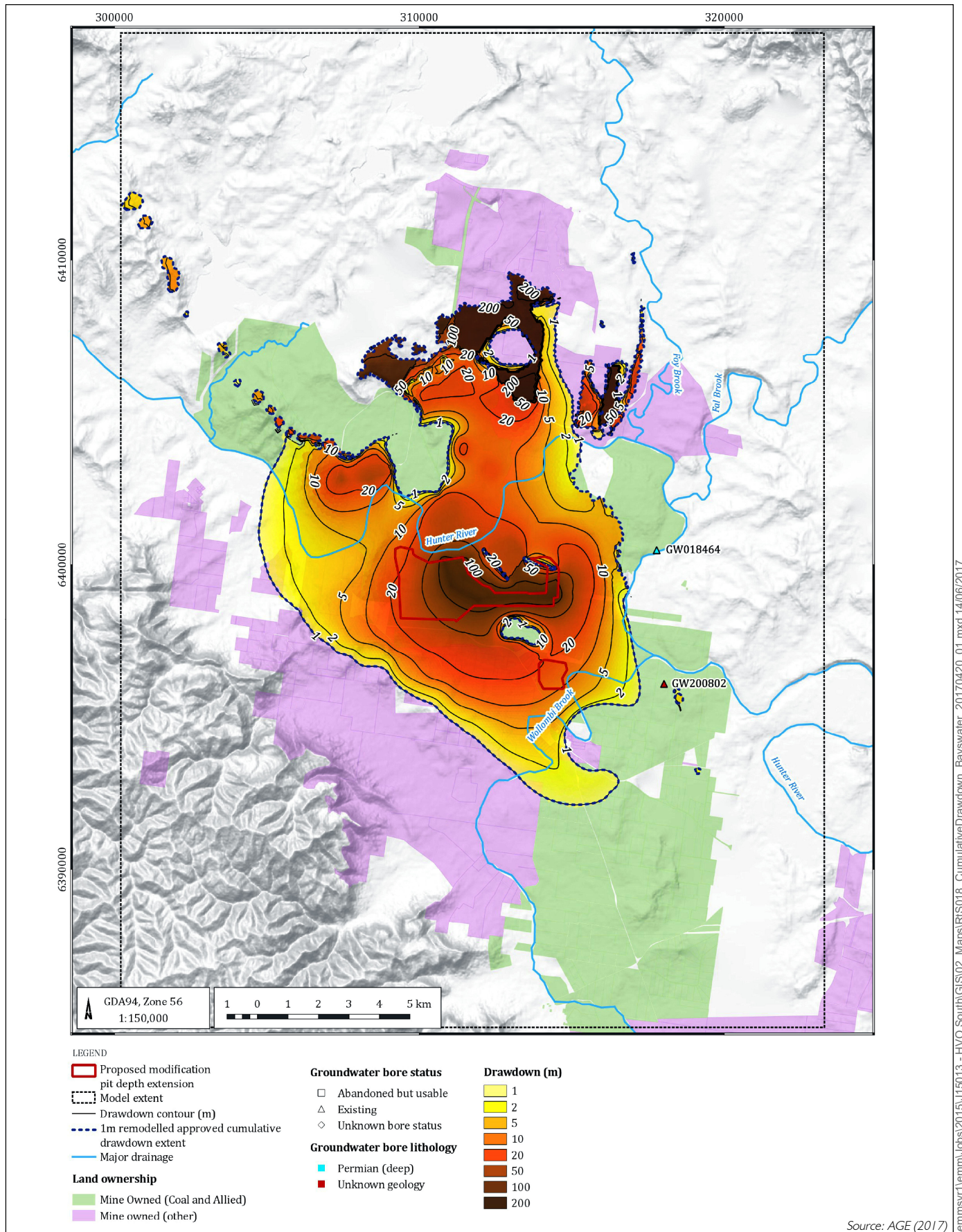
Source: AGE (2017)



Maximum cumulative drawdown due to all mines including proposed modification - Mt Arthur Seam

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 Response to submissions

Figure 5.9



The minor additional decline due to the proposed modification does not trigger the Level 1 minimal impact considerations under the *NSW Aquifer Interference Policy*. This is due to the cumulative impacts from the remodelled approved operations already exceeding 2m. The figure also shows drawdown at several concrete wells on Coal & Allied land (ie GW037734, GW053173, GW022685).

As shown in Figure 5.6, groundwater levels within the shallow Permian coal measures (Mt Arthur Seam) are predicted to decline at bore GW060750 due to the proposed modification. Bore GW060750 is on land owned by Coal & Allied in Warkworth.

5.4.4 Statement of Commitment amendments

DPI Water requested a justification for the changes to the statement of commitments regarding surface and groundwater. The main water related changes to the statement of commitments requested relate to the removal of references to the Deep Cheshunt Pit Final Void.

The proposed modification no longer requires a final void in Deep Cheshunt Pit and rather than final void will be in the Riverview Pit, further from the Hunter River. Condition 37 of the existing project approval (PA 06_0261) requires a Final Void Management Plan.

5.5 Environment Protection Authority

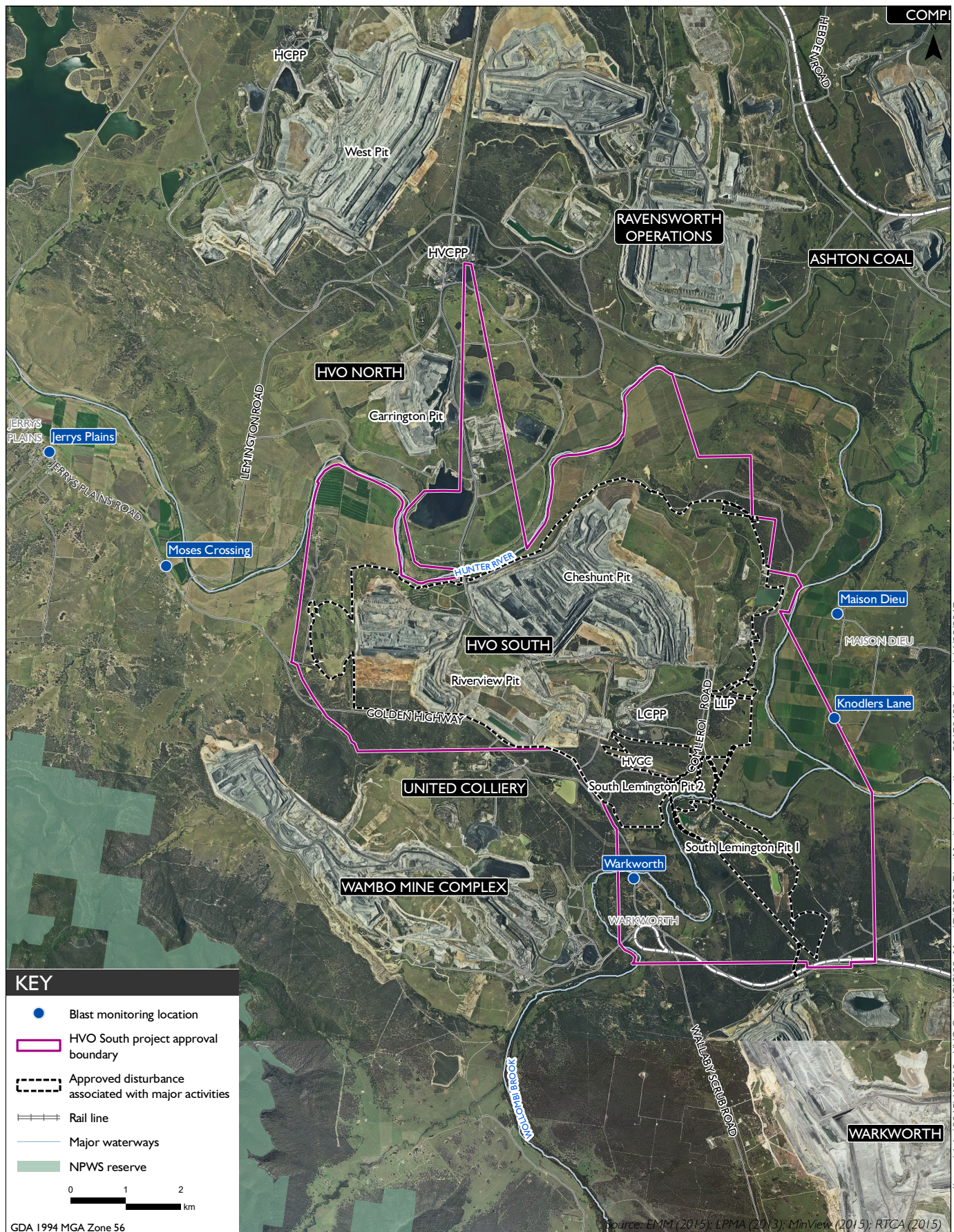
The EPA raised matters in respect to noise and vibration, air quality and surface water. A response to the matters raised are summarised and addressed in the sections below.

5.5.1 Noise and vibration

The EPA submission requested that Coal & Allied provide the location of the five proposed blast monitoring sites, confirm compliance with the noise limits during inversion conditions up to F class, demonstrate that the EPA's Industrial Noise Policy (INP) modifying factor adjustments do not apply, and provide more detail about how and where noise monitoring is undertaken. It also requests for the Coal & Allied to provide how it will detect and remedy non compliances with noise limits, including how source noise can be isolated to the Coal & Allied's activities, compared to adjoining mining operations.

i Blast monitoring locations

The blast monitoring locations are consistent with those specified in the EPL and the current network as displayed in the Monthly Environmental Reports published on the Coal & Allied website (www.riotinto.com). These locations are Jerrys Plains, Moses Crossing, Warkworth, Knodlers Lane and Maison Dieu, shown in Figure 5.11.



HVO South blast monitoring locations

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Figure 5.11

ii Compliance during inversion conditions

The noise modelling completed as part of the assessment in the EA encompasses adverse weather including atmospheric stability class F. The predicted noise emissions for the proposed modification during these conditions show the project approval limits will be satisfied.

iii INP modifying factors

The EPA requested that further information be provided regarding the INP modifying factor adjustments. The modifying factor of most relevance to the assessment of mine noise is the low frequency adjustment. The EPA also raises tonality in its submission, which is also addressed below.

a. Low frequency noise

Determination of the applicability of the INP low frequency modifying factor relies on comparison between C-weighted and A-weighted project noise emission levels. Where the difference between the site C-weighted and A-weighted levels is greater than 15 dB then a modifying factor of +5 dB would be applied to the predicted A-weighted level prior to comparison to the project specific noise level. Noise predictions provided in the EA are A-weighted levels.

To assess the C-weighted noise levels at surrounding receptors, representative assessment locations (east and west of site) were selected. These assessment locations ranged between 3.2km and 8.2km from site noise sources.

It is important to note that low frequency noise corresponds with the range 10Hz to 200Hz and assessment of such begins when noise levels are above the human hearing threshold at these frequencies. Human sensitivity to noise generally decreases as the frequency of noise decreases. For example, the hearing threshold noise levels range from 92dB at 10Hz to 34dB at 160Hz one-third octave band centre frequency.

This approach is recognised by the EPA in the draft *Industrial Noise Guideline* (ING) which, once finalised, will replace the INP. The draft ING presents a contemporary method for identifying and assessing low frequency noise. The revised method is based on the low frequency noise assessment procedure developed by the Department of Environment Food and Rural Affairs (DEFRA) (UK). The frequency based reference curve approach is based on a range of factors with a key factor being human hearing thresholds at low frequencies. Table 5.5 provides the draft ING reference curve criterion.

Table 5.5 Draft ING reference curve criterion

Frequency Hz / dB												
10 Hz	12.5 Hz	16 Hz	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz
92	89	86	77	69	61	54	50	50	48	48	46	44

The predicted C-weighted noise levels were determined through modelling for indicative mine plan Stages 3 and 4 of the proposed modification. These stages were selected as they include operation of the proposed LCPP should it be constructed; a source typically found to emit low frequency noise when observed at close range. The results are shown in Table 5.6.

When compared to the A-weighted predicted noise levels presented in the noise and vibration study, it is shown that the INP 'C minus A' difference is often above the INP 15dB threshold for screening low frequency noise.

This is not an unexpected result for assessment locations over 3km from a source. To illustrate this, the highest predicted C-weighted value satisfies the draft ING curve value at 40Hz or lower (ie 53dB at assessment location 256). Given the typical spread of noise energy for mining noise, the results provided in Table 5.6 imply mining noise would be inaudible or satisfy the draft ING criterion curve in Table 5.5. It should be noted that the 39dB predicted noise level for Stage 3 at assessment location 256 is within 5dB of its 41dB criterion value, however, the C-minus-A difference is only 14dB which satisfies the INP threshold test of 15dB, and no penalty would be applied. This assessment location is 3.2km from the source (the closest of the adopted locations) and suggests when noise levels are relatively higher in A-weighted terms, the C-minus-A differences are lower and likely not to exceed the 15dB threshold test under the INP.

An example of why the INP method is not appropriate in these situations is demonstrated through the modelling results for assessment location 434 shown in Table 5.6 (refer also to Figure 5.12). The predicted A-weighted noise level at assessment location 434 is above the corresponding criterion value and adding a 5dB penalty as per the INP would result in a perverse outcome as this would result in a higher predicted noise value for a location further away from HVO South (over 4km away compared to 3.2km for assessment location 256).

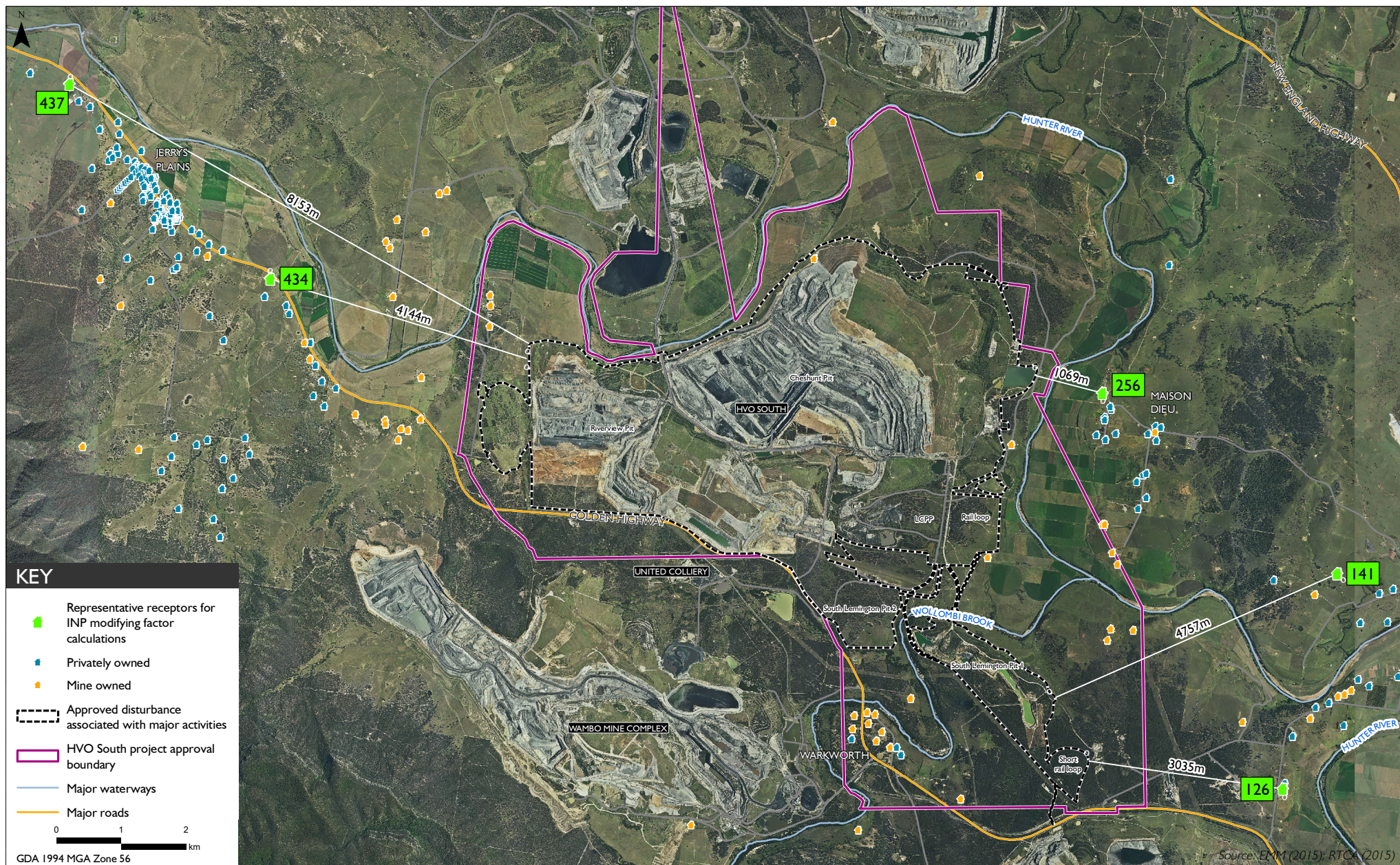
Table 5.6 Predicted C versus A weighted noise (adverse weather)

Assessment location	Predicted noise level, dB (day)						A-weighted criteria
	Stage 3			Stage 4			
	C-weighted	A-weighted	Difference	C-weighted	A-weighted	Difference	
126 (Long Point)	44	27	17	47	31	16	35
141 (Maison Dieu east)	47	30	17	44	27	17	35
256 (Maison Dieu west)	53	39	14	52	37	15	41
434 (south of Jerrys Plains)	53	37	16	53	37	16	35
437 (north of Jerrys Plains)	49	31	18	48	30	18	35

Other considerations for low frequency noise are also presented in the EPA's draft ING. The draft ING adopts the INP's C-minus-A 15dB threshold as a screening test, but penalties are not applied unless the hearing threshold based curve described above is exceeded. This method was tested for assessment location 434 by comparing the octave band centre frequency outputs from the model against the draft ING criterion curve above by evenly distributing the noise energy across the third-octave bands (basis of the model was octave as third-octave was not available). This showed that no penalty would apply according to the draft ING method.

Another relevant test is that recommended by Broner (2011) technical paper which sets a minimum (night time) limit for residences of 60dBC before impact from low frequency noise is expected to commence. As shown in Table 5.6, predicted C-weighted noise levels are well (at least 7dB) below 60dBC.

Furthermore, by way of direct measurement examples, the most recent HVO South monthly compliance reports (February and March 2017) show that the low frequency noise INP penalty did not apply at all monitoring locations due to contributions from the mine being inaudible, immeasurable or otherwise not applicable due to weather conditions present at the time of sampling. This confirms that current operations are not low frequency noise dominant at surrounding receptors.



Representative receptors and INP modifying factors

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Figure 5.12

In summary, the proposed modification exceeds the C-A threshold under the current INP, however as demonstrated above, this would result in a perverse outcome at some residences. The proposed modification satisfies the low frequency noise criteria with reference to the draft ING and the Broner method.

b. Tonicity

Coal & Allied does not currently collect third octave band centre frequency data for major noise sources or measure noise in third octaves at sensitive receivers. It is important to note that tonality has not been raised as a concern by stakeholders. However, we will amend the HVO Noise Management Plan (NMP) to ensure this data is routinely collected and will provide this data to the EPA.

iv Compliance monitoring methods

The approved NMP details the methodology, locations and the frequency of noise monitoring. Operator-attended monthly monitoring is used to determine compliance with current noise limits. Determination of contributions from HVO South operations only, excluding other mining operations, is primarily based on directional observations made by the operator. Real-time, directional noise monitors are also used to manage operations at all times as described in the NMP.

5.5.2 Surface water

i Sediment dam controls

a. Design and implementation

The EPA submission stated that the sediment dams identified within the EA may contravene the NSW *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002* (HRSTS Regulation) should they discharge saline water.

The submission also acknowledged that the sediment dams have been designed in accordance with the recommended design guidelines (Landcom 2004, DECC 2008) to capture and treat water up to five-day 90th percentile rainfall event.

No additional sediment dams are required under the proposed modification (ie all new dams specified in the EA functionally correspond to existing or proposed works approved under the existing project approval (PA 06_0291)). It should be noted that whilst sediment dams are primarily designed with purpose of settling out sediment prior to release the design capacity provides for substantial storage of water. The dams are maintained in a drawn down state in readiness for rainfall events. Water captured in the dams is returned to the HVO WMS. It should be noted that sediment dams are designed to overflow during wet periods that exceed the design standard of the sediment control system. Overflows would only occur during significant rainfall events which will also generate runoff from surrounding undisturbed catchments. Hence, it is unlikely that sediment dam overflows will have a measurable impact on receiving water quality.

With the exception of the rehabilitated final landform, sediment dams will capture surface runoff from disturbed areas ahead of mining which will still be covered with topsoil and, therefore, runoff water chemistry (particularly salinity) will be no different to the surrounding environment. Sediment dams installed to capture runoff from rehabilitated areas will temporarily receive runoff from mine spoil prior to topsoil application. This has potential to increase salinity of runoff water captured in the dam however salt levels are still expected to be in the lower range.

Water quality within sediment dams will be monitored, and runoff water that is unsuitable for release to the environment will be pumped back to the HVO WMS. Sediment dams will be allowed to passively release to the environment (ie overflow) during events in which the runoff volume exceeds the design storage capacity of the dam, after monitoring confirms that runoff water quality is within the range observed from analogue sites and does not pose a threat to downstream water quality environmental values. Therefore, the total salt load released from the proposed final conceptual landform to the receiving environment will be generally consistent with pre-mine conditions.

The HVO WMS infrastructure will be progressively developed under the proposed modification to meet the water management objectives of HVO South. The primary changes to components of water-related infrastructure (ie sediment dams) for the proposed modification are consistent with this progressive development of the HVO WMS to accommodate existing approved mining operations. This was shown in Figure 5.3 and Table 5.5 in the response to the DPI Water submission (refer to Section 5.3.2).

Section 11.2.3.ii of the EA describes the WMP, which was prepared in consultation with DPI Water and approved by DPE in May 2014 with its most recent update occurring in May 2016. The WMP fulfils the requirements of the HVO EPL and various project approvals through commitments made in the respective environmental assessments, environmental impact statements and compliance with relevant legislation, standards and guidelines.

The WMP describes procedures required to achieve compliance with conditions of the approvals relating to potential water impacts as well as the HVO WMS and the site water balance, erosion and sediment controls, water monitoring programmes, water management protocols and response procedures. It also provides a mechanism for assessing water quality and quantity monitoring results.

The HVO Surface Water Management and Monitoring Plan of the WMP specifies water quality sampling frequency, methods and impact assessment criteria (ie trigger limits for electrical conductivity, pH and total suspended solids). The design of sediment dam controls at HVO is in accordance with the relevant standards and the implementation of management measures consistent with the approved WMP to meet HVO's regulatory obligations.

The WMP will be reviewed following approval of this modification to ensure sediment dams are effectively designed and managed such that offsite flows from mine impacted areas comply with Section 120 of the POEO Act and the HRSTS Regulation.

b. Water quality

The EPA submission noted that the results of water quality monitoring presented in the EA indicated that only one sediment dam had maximum electrical conductivity levels below 400µs/cm, defined as saline water under the HRSTS Regulation. Further, the EPA submission requested Coal & Allied provide further information regarding the characterisation and sediment dam controls within the HVO WMS.

No additional sediment dams are required under the proposed modification (ie all new dams specified in the EA functionally correspond to existing or proposed works approved under the existing project approval (PA 06_0291)). Monitoring events are normally undertaken when water levels are relatively low as these dams are typically managed to maintain relatively little or no water and do not coincide with rain events. Therefore, these monitoring results are not indicative of salinity levels when water may spill once the sediment dam rainfall design event is exceeded.

Further, Section 11.3.3 of the EA states that the untreated mine water is unlikely to flow into the receiving environment. It is, therefore, likely that salt will accumulate within the WMS, and the total salt load released from HVO South to the receiving environment during operations will be less than that released by pre-mine conditions.

Sediment dams are designed to overflow during wet periods that exceed the design standard of a particular dam. In some cases these overflows will report to the pit and in other cases, depending on the status of mining and rehabilitation in the area, these overflows will flow to the surrounding environment. Overflows will only occur during significant rainfall events which will also generate runoff from surrounding undisturbed catchments. Hence, it is unlikely that sediment dam overflows will have a measurable impact on receiving water quality.

Runoff from rehabilitated areas will continue to be captured by sediment dams until water quality is within the range of water quality recorded from analogue sites and does not pose a threat to downstream water quality. Therefore, the total salt load released from the proposed final conceptual landform to the receiving environment will be generally consistent with pre-mine conditions.

ii Water balance

The EPA submission noted that the Water Balance Model Schematic Figure 6.1 within the water balance study was unclear. The EPA noted that the study did not comprise an assessment of pollutants in the discharge from these sediment dams.

A high resolution version of Figure 6.1 from the water balance study is provided as Figure 5.13.

Water balance modelling results presented in Chapter 11 of the EA and the surface water study (Appendix H of the EA) show that the HVO WMS is adequate to capture and store untreated water to be beneficially re-used later, or discharged under the HRSTS licensing provisions. Modelling results indicate that untreated mine water is unlikely to flow into the receiving environment in an uncontrolled manner. It is therefore likely that salt will accumulate within the HVO WMS and the total salt load released for HVO South to the receiving environment during operations will be less than that released during pre-mine conditions. On this basis, a specific assessment of pollutants for sediment dams was not undertaken.

5.5.3 Air quality

i Dispersion modelling

The EPA requested that analysis demonstrating why calendar year 2014 is an appropriately representative year for dispersion modelling by comparison to at least five years of contiguous and recent data.

The selection of the meteorological year for dispersion modelling considered how well it represented the general trend in the available data, but also the need for a cumulative assessment with the concurrently proposed changes to the Wambo and United coal mines.

A statistical analysis of five contiguous years of meteorological data, 2011 to 2015 inclusive, from the Scone Airport Automatic Weather Station (AWS) is shown in Table 5.8. The standard deviation of each of the recent five years of data relative to the long-term measured wind speed, temperature and relative humidity data spanning the available 14 to 19 year period recorded at the station was made.

The analysis indicates that 2012 is closest to the long-term average for wind speed followed closely by 2014 and 2015. All years are close to the long-term average for temperature with minimal inter-annual temperature variation. For relative humidity, 2015 is the closest to the long term trends.

The data in Table 5.7 show that 2012, 2014 or 2015 could be reasonably applied in the study as these years are all generally representative of the long-term measured wind speed, temperature and relative humidity. The table shows the variation from the nearest available long-term data set. As it is expected that somewhat different levels will occur at this location, the relative differences between years also needs to be considered, rather than simply the lowest value. Also, the wind speed is the more relevant parameter for consideration when selecting the most representative year. The data indicate that the 2014 and 2015 years' average wind speeds are closest to the average of the available data.

Table 5.7 Statistical analysis results of standard deviation from long-term meteorological data at Scone Airport AWS

Year	Wind speed	Temperature	Relative humidity
2011	1.4	1.1	4.3
2012	1.0	0.9	5.2
2013	1.4	0.9	5.4
2014	1.1	1.0	5.8
2015	1.1	1.0	3.8
Average	1.2	1.0	4.9

Wind direction cannot be evaluated usefully in this manner as it will (naturally) vary significantly from place to place, and hour to hour. Wind direction is considered by examining the relative variation in wind direction between the years of available data at the weather station location. This has been done using a graphical approach, as shown in Figure 5.14. The data show that very little variation in wind direction occurs between years.

Figure 5.14 also shows the monthly maximum, minimum, 25th and 75th percentile values for the recorded monthly data in each year for the various meteorological parameters.

The air quality assessment of the United Wambo Open Cut Coal Mine Project (Jacobs, 2016) was reviewed for the cumulative assessment presented in Section 8.3 of the EA and the air quality study (Appendix F of the EA). This assessment selected the 2014 calendar period for the modelling year based on:

- similar wind patterns in the years analysed;
- rainfall being slightly below the long-term average in 2014; and
- air quality conditions similar to other years.

The justification in the Jacobs (2016) assessment is consistent with this analysis which shows that 2012, 2014 or 2015 would all be suitably representative years for the purpose of modelling.

Based on these considerations, and the important need to be able to make a valid cumulative assessment with the adjacent mine, it was determined that 2014 would be the most appropriate year for the purpose of meteorological modelling.

The data for 2014 is presented as the orange line on Figure 5.14 for comparison with the longer term data set trends shown in the blue colours. The figure indicates that 2014 typically has values within the 25th and 75th percentiles of the overall data.

Annual and seasonal windroses for 2014 are in Figure 5.15 and as expected shows a similar distribution to the long-term wind patterns shown in Figure 5.16.

Based on these considerations, and the important need to be able to make a valid cumulative assessment with the adjacent mining operations, it was determined that 2014 would be the most appropriate year for use in the meteorological modelling. The chosen year is equally representative of the actual conditions at HVO South (along with 2012 and 2015), was assessed by Jacobs to be representative of nearby conditions at Wambo Mine, and is thus considered to be the most appropriate choice.

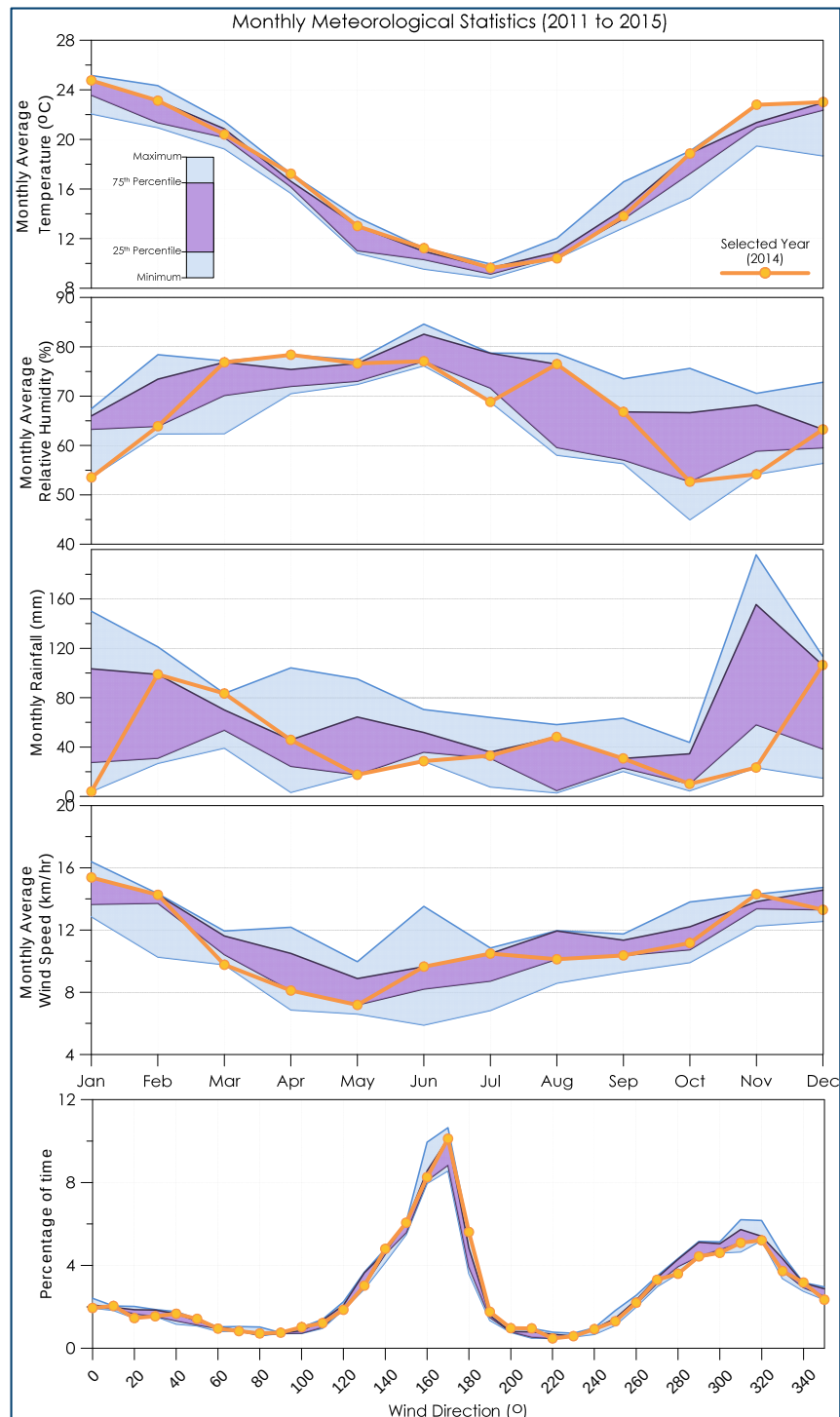


Figure 5.14 Graphical analysis of meteorological conditions at Scone Airport AWS (2014 vs all other data)

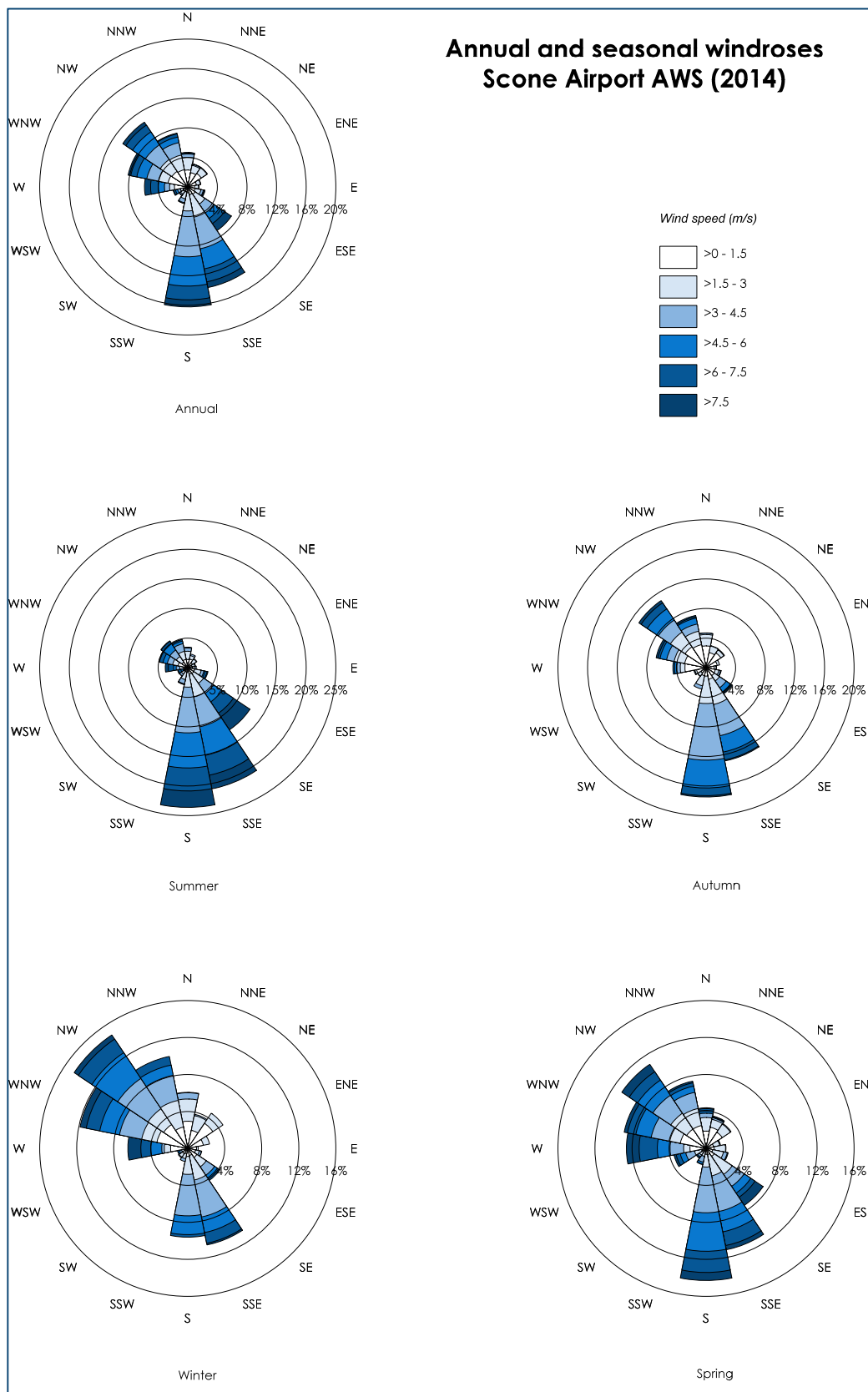


Figure 5.15 Annual and seasonal windrose for Scone Airport AWS – 2014



Figure 5.16 Long-term annual and seasonal windrose for Scone Airport AWS – 2011 to 2015

ii Cumulative assessment

The EPA requested an explanation of how current operations were accounted for in the cumulative assessment.

The modelling of the current operations was based on the actual operational data from 2014, including mine terrain and production data, and otherwise conducted in a similar fashion to the modelling for the proposed modifications.

As outlined in Section 5.3.2 of the air quality study (Appendix F of the EA), the operations of current and proposed other mining operations were also included in the model based on the available information contained in publically available air quality assessments.

iii Background reductions

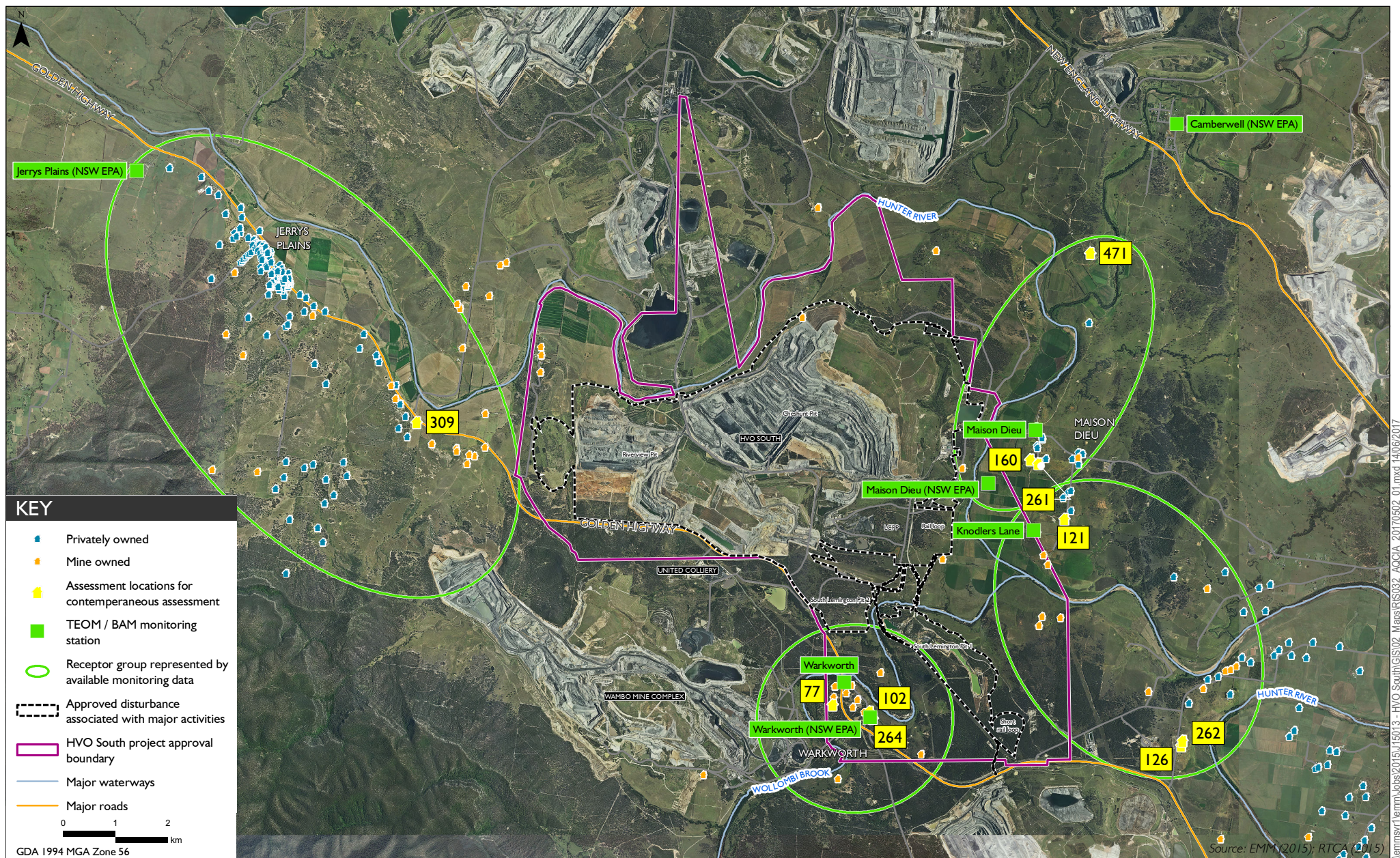
The EPA requested an explanation of the reason for background reductions represented by orange bars in the air quality study's Figures 5.5 and 6.6 within Appendix F of the EA.

As outlined in Section 6.4 of the air quality study, the orange bars shown in the time series plots in Figure 6.5 and 6.6, indicate the predicted reductions relative to the existing (2014) background dust levels due to the proposed modifications at HVO South.

The reductions occur where the proposed changes to the mine reduce its existing contribution to the background levels. For example, the reductions occur at assessment location 160, which is east of the mine. As the general progression of activity is in a westerly direction, it is reasonable to expect that air quality levels would improve in the east as the dust generating sources move further away from this area.

iv Figure label

The EPA requested a label be provided for assessment location 471 in Figure 6.4 of the air quality study. This figure has been revised and is provided below in Figure 5.17.



Locations available for contemporaneous cumulative impact assessment

HVO South Modification 5
Response to submissions

Figure 5.17

v Cumulative assessment for receptor

The EPA requested a cumulative 24-hour PM₁₀ assessment be provided for assessment location 471.

An assessment of total (cumulative) 24-hour average PM_{2.5} and PM₁₀ using the NSW EPA contemporaneous assessment method was conducted for assessment location 471 with the selected meteorological year (2014), with results summarised in Table 5.8. The full assessment results are set out in Tables 5.9 to 5.12.

Consistent with the method provided in the EA to assess cumulative impacts, each of the Tables 5.9 to 5.12 has been split into two:

- the left half shows the background levels ranked from highest to lowest; and
- the right half shows the proposed modification impacts ranked from highest to lowest.

The non-shaded red text in each table shows existing background levels above the criteria. Red text in the shaded parts shows where the proposed modification causes additional impact.

The results indicate that no additional cumulative 24-hour average PM_{2.5} or PM₁₀ level above the criterion is predicted to occur at this location due to the proposed modification.

This assessment outcome is expected, given the proximity of assessment location 471 to HVO South and not in line with HVO South and the prevailing wind direction. This can be seen by examining the modelling contours, or the right-hand side of the tables where the maximum impacts due to proposed modification are small. For example the 24-hour average PM₁₀ levels in Stage 3 shown in Table 5.10 are approximately 1µg/m³, or 2 per cent of the criterion level.

Table 5.8 Contemporaneous assessment – maximum number of additional days above 24-hour average criterion due to the proposed modification at assessment location 471

Assessment location	PM _{2.5} analysis (µg/m ³)		PM ₁₀ analysis (µg/m ³)	
	Stage 2	Stage 3	Stage 2	Stage 3
471	0	0	0	0

Table 5.9 Stage 2 (PM_{2.5} 24-hr average concentration) – assessment location 471

Background concentration - ranked highest to lowest				Predicted incremental concentration – ranked highest to lowest			
Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)	Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)
04/11/2014	32	0	32	-	-	-	-
03/11/2014	25	0	25	12/05/2014	7	1	7
16/01/2014	20	0	20	17/04/2014	4	1	4
06/10/2014	16	0	16	20/07/2014	9	1	10
04/01/2014	16	0	16	28/09/2014	8	1	8
14/11/2014	16	0	16	16/10/2014	12	1	12
15/11/2014	15	0	16	06/12/2014	5	1	5
31/10/2014	15	0	15	08/12/2014	8	1	9
24/11/2014	15	0	15	02/10/2014	8	1	9
03/01/2014	14	0	14	22/06/2014	13	1	13
26/10/2014	14	0	15	18/08/2014	5	1	5

Table 5.10 Stage 3 (PM_{2.5} 24-hr average concentration) – Assessment location 471 (µg/m³)

Background concentration - ranked highest to lowest				Predicted incremental concentration – ranked highest to lowest			
Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)	Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)
04/11/2014	32	0	32	-	-	-	-
03/11/2014	25	0	25	12/05/2014	7	1	7
16/01/2014	20	0	20	17/04/2014	4	1	4
06/10/2014	16	0	16	20/07/2014	13	1	13
04/01/2014	16	0	16	28/09/2014	6	1	6
14/11/2014	16	0	16	16/10/2014	8	1	8
15/11/2014	16	0	16	06/12/2014	5	1	5
31/10/2014	15	0	15	08/12/2014	9	1	10
24/11/2014	15	0	15	02/10/2014	7	1	8
03/01/2014	14	0	14	22/06/2014	8	1	8
26/10/2014	14	0	14	18/08/2014	7	0	7

Table 5.11 Stage 2 (PM₁₀ 24-hr average concentration) – Assessment location 471 (µg/m³)

Background concentration - ranked highest to lowest				Predicted incremental concentration – ranked highest to lowest			
Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)	Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)
21/11/2014	64	0	64	21/11/2014	-	-	-
31/11/2014	58	0	58	31/11/2014	-	-	-
27/10/2014	55	1	55	27/10/2014	-	-	-
27/05/2014	55	1	56	27/05/2014	-	-	-
02/01/2014	53	2	55	02/01/2014	-	-	-
15/11/2014	53	1	54	15/11/2014	-	-	-
17/12/2014	50	0	50	17/12/2014	19	6	25
04/01/2014	48	0	48	04/01/2014	18	5	23
01/11/2014	47	-1	46	01/11/2014	32	5	37
16/01/2014	47	0	47	16/01/2014	19	4	23
30/09/2014	46	0	47	30/09/2014	6	4	11
14/11/2014	46	0	46	14/11/2014	23	4	28
06/10/2014	45	0	45	06/10/2014	11	4	16
04/11/2014	44	0	44	04/11/2014	19	4	23
18/12/2014	42	0	42	18/12/2014	ND	4	4
23/11/2014	42	1	43	23/11/2014	18	4	22

ND – no data

Table 5.12 Stage 3 (PM₁₀ 24-hr average concentration) – Assessment location 471 (µg/m³)

Background concentration - ranked highest to lowest				Predicted incremental concentration – ranked highest to lowest			
Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)	Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)
21/11/2014	64	0	64	-	-	-	-
31/11/2014	58	0	58	-	-	-	-
27/10/2014	55	0	55	-	-	-	-
27/05/2014	55	1	55	-	-	-	-
02/01/2014	53	2	55	-	-	-	-
15/11/2014	53	1	54	-	-	-	-
17/12/2014	50	0	50	12/05/2014	19	5	24
04/01/2014	48	0	48	22/05/2014	19	5	24
01/11/2014	47	1	48	17/04/2014	18	5	22

Table 5.12 Stage 3 (PM₁₀ 24-hr average concentration) – Assessment location 471 (µg/m³)

Background concentration - ranked highest to lowest				Predicted incremental concentration – ranked highest to lowest			
Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)	Date	Measured background level (µg/m ³)	Predicted increment from proposed modification (µg/m ³)	Total cumulative 24 hour average (criterion – 50µg/m ³)
16/01/2014	47	0	47	13/07/2014	20	4	24
30/09/2014	46	0	47	20/07/2014	32	4	36
14/11/2014	46	0	46	06/12/2014	11	4	15
06/10/2014	45	0	45	28/09/2014	23	4	27
04/11/2014	44	0	44	05/04/2014	10	3	14
18/12/2014	42	0	43	15/08/2014	28	3	32
23/11/2014	42	0	42	23/07/2014	14	3	17

vi Non-mine receptors

The EPA requested that all non-mine receptors be identified that have been assessed and will experience one or more additional exceedances of cumulative impact assessment criteria. All privately-owned assessment locations (15 in total) predicted to experience any additional days above 24-hour average PM₁₀ criterion are provided in Table 5.13. No other assessment locations are predicted to experience levels above criterion.

Table 5.13 All privately-owned assessment locations predicted to experience additional days above cumulative 24-hour average PM₁₀ impact assessment criterion of 50µg/m³

Assessment location	Number of additional days above criteria	
	Stage 2	Stage 3
128	1	0
307	4	0
308	3	1
310	4	0
311	4	2
312	4	1
317	4	2
321	1	0
322	1	0
323	1	0
324	1	0
429	1	0
433	1	0
434	2	1
436	2	1

vii Mitigation of cumulative impacts

The EPA requested an assessment of the efficacy of proposed mitigation of the additional exceedances of cumulative impact assessment criteria.

As noted in the air quality study and outlined in the *Air Quality and Greenhouse Gas Management Plan for Hunter Valley Operations* (Rio Tinto Coal Australia 2014), a range of best practice management techniques are applied to reduce dust from the operation which aim to minimise additional exceedances of cumulative assessment criteria, and these would continue to be applied under the proposed modification. The measures include applying proactive and reactive measures along with staff guidance for the visual identification of dust plumes and problem dust sources.

Daily management measures involve reviewing meteorological forecast data to guide the day to day planning of mining operations and to identify potentially adverse conditions that may arise over the coming day, giving HVO South time to prepare in advance a means to mitigate dust appropriately.

HVO South operate an air quality monitoring network to manage dust levels in real time, supported by a reactive air quality management system.

The air quality monitors include alarms set to indicate potentially rising dust levels and thus also help prevent or reduce potential impacts. Operational measures such as enforcing a cessation of particular operations during periods of high dust readings provide additional assistance in reducing the potential dust impacts.

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.

In addition to the above, Coal & Allied will implement air quality management protocols consistent with contemporary conditions of consent (eg Warkworth Continuation Project) regarding mine-owned land, which include:

- Notification of the tenant and landowner (if the residence is owned by another mining or gas company) of any health risk associated with exceedances of air quality criteria. Notification requirements would be consistent with those within Schedule 4 of the existing project approval (PA 06_0261).
- The tenant of any land owned by Coal & Allied can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice and cause.
- Air quality monitoring results at the residence will be undertaken with results provided to the tenant or landowner.
- Provision of a copy of the NSW Health fact sheet entitled 'Mine Dust and You' (as may be updated from time to time) to the tenant or landowner where the dust is predicted to exceed criteria.

The EPA requested, if necessary, an assessment of the efficacy of additional mitigation measures to ensure no additional exceedances of cumulative impact criteria.

A review of the last three annual review reports for HVO indicates the real-time air quality management system is effective at triggering actions to ameliorate impacts, including shutdown of dusty plant or cessation of activity during adverse weather. A summary of the number of real-time alarms recorded and hours of equipment downtime is summarised in Table 5.14. As shown, hundreds of alarms have been triggered and thousands of plant operational hours have been curtailed to prevent and minimise dust emissions.

Table 5.14 Summary of real-time air quality management system performance

Aspect	2014	2015	2016
Real-time alarms recorded	367	429	287
Hours of equipment down-time	3,066	3,835	2,569

The resulting dust levels measured during the last three years indicate that the nine PM₁₀ monitors collectively recorded between 9 and 17 exceedances of the 24-hour average PM₁₀ criterion in any one year.

Note that in many cases more than one monitor recorded an elevated level on the same day, and in total there were five to nine separate days in any one year on which the 24-hour PM₁₀ level was above the criterion.

The contribution to these elevated levels due to HVO was assessed in each instance, and it was found that the mine was not the predominant contributor to these events, which were driven by the prevailing background levels.

Thus the existing operational systems, which trigger actions based on actual measured data, are effective at maintaining the existing operations within criteria and preventing additional exceedances due to the mining activities.

The predicted results presented in the air quality study do not factor in the reductions in short term (24-hour) impacts that would be achieved with the existing (and proposed) mitigation strategy. As there are only up to four days of potential impacts predicted, only a little above the criterion, it is reasonable to expect that the proven, existing mitigation strategy will continue to be effective at preventing these potential additional cumulative impacts when it applied to the proposed modification.

5.6 Hunter New England Population Health

5.6.1 Air quality

Hunter New England Population Health branch of the NSW Department of Health requested that the 7µg/m³ contour for annual average PM_{2.5} for Stage 2 and 3 be presented.

Figures 5.18 and 5.19 show isopleths including the 7µg/m³ value for the predicted annual average PM_{2.5} concentrations due to the proposed modification and other sources during the most active stages of the mining nearest residences, Stage 2 and Stage 3, respectively.

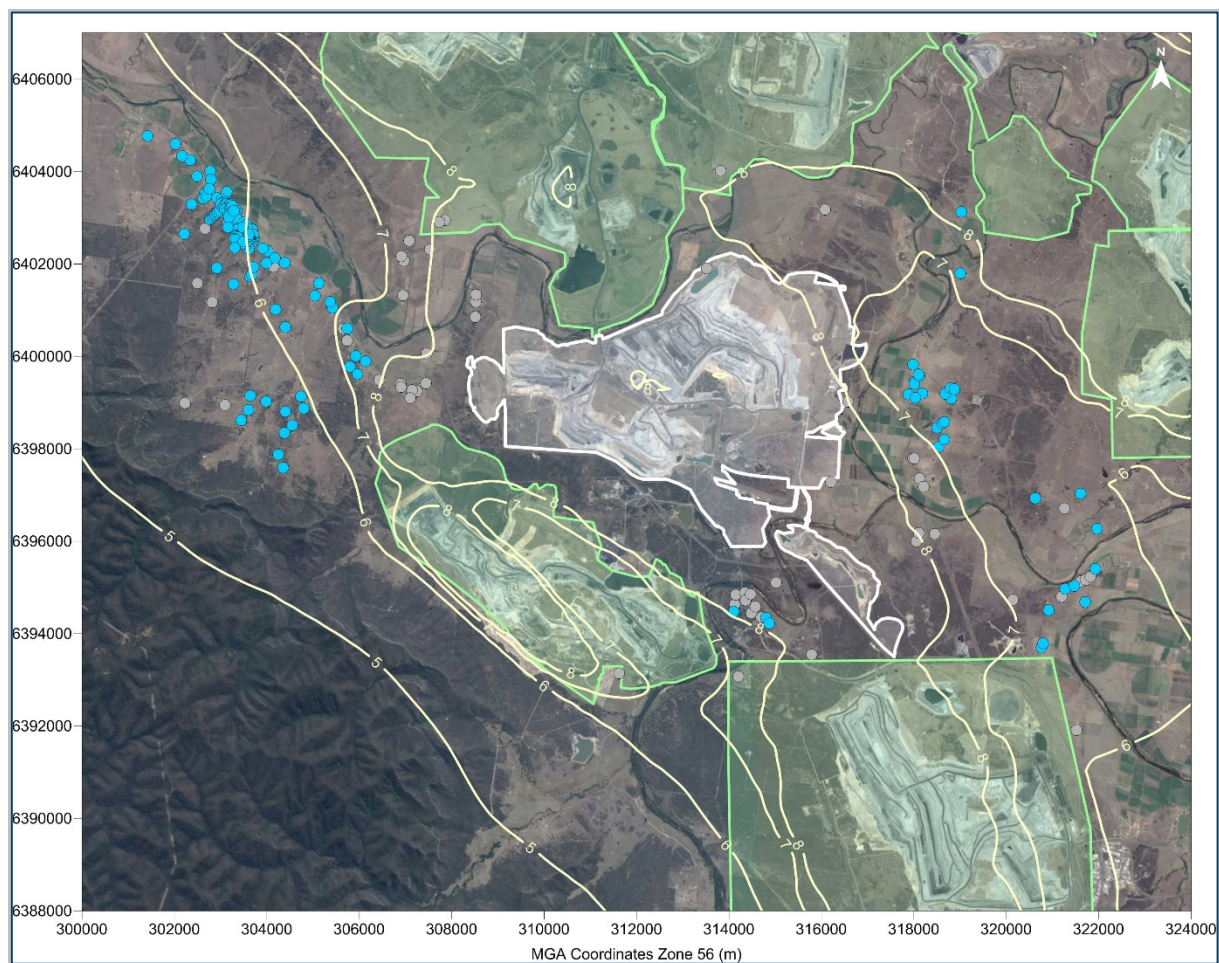


Figure 5.18 Predicted annual average PM_{2.5} concentrations due to emissions from the proposed modification and other sources in Stage 2 (µg/m³)

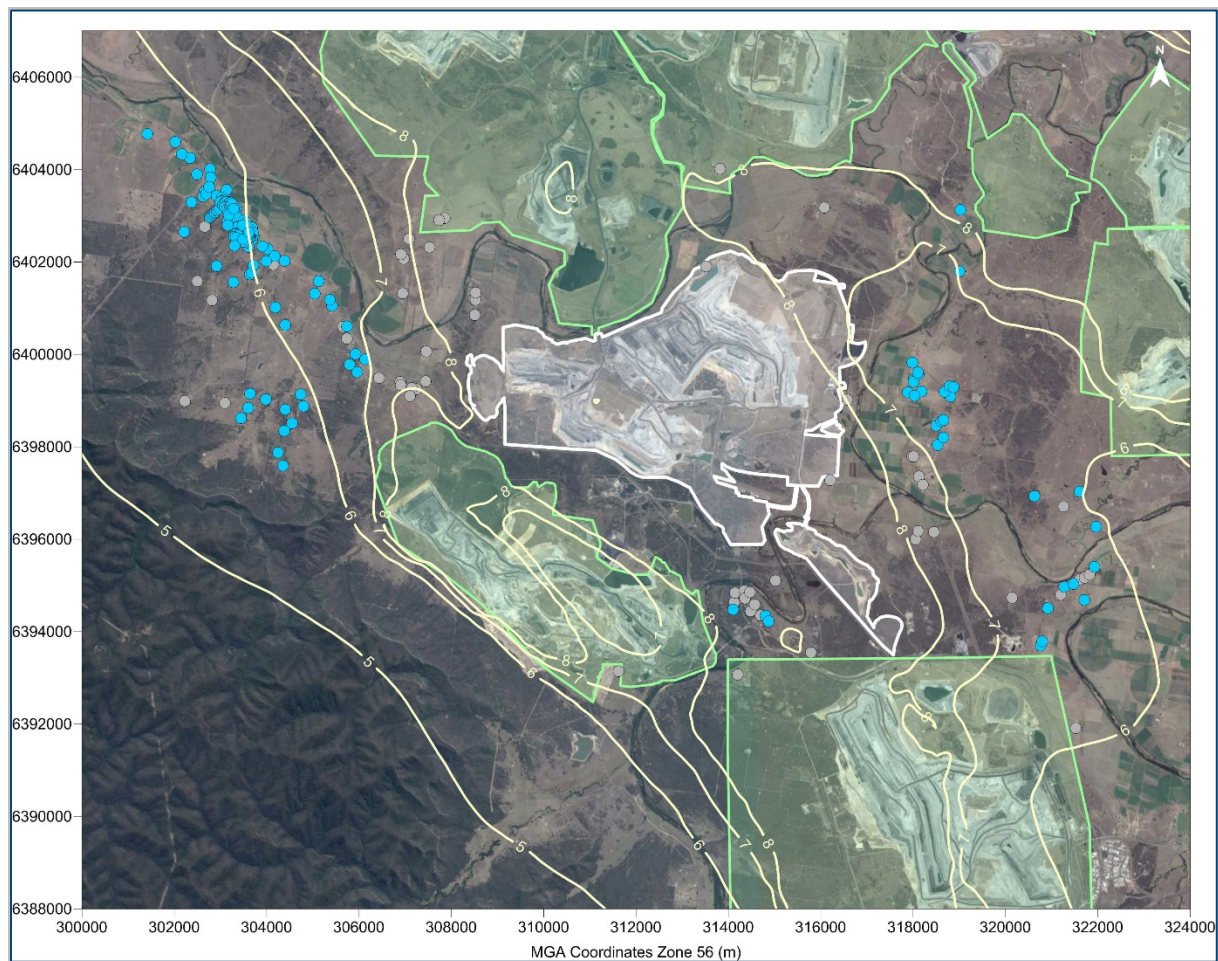


Figure 5.19 Predicted annual average PM_{2.5} concentrations due to emissions from the proposed modification and other sources in Stage 3 (µg/m³)

5.6.2 Noise and blasting

Hunter New England Health noted that the project specific noise levels (PSNL) are predicted to be exceeded at a number of residences during prevailing weather conditions and have requested that HVO engage with these residents.

As stated in Chapter 2, HVO South has evolved through the amalgamation and extension of a number of separate mines. The pits that make up HVO South today have been combined and consolidated over the years. Due to the historical nature of amalgamation and extension, mining at HVO South occurs in a number of separate pits with different rates of advancement and subsequent rehabilitation. It should be noted that the direction of mining under the proposed modification is east to west, away from Maison Dieu residences situated some 2.6km to the east.

HVO South has established a range of effective noise management measures considered to be reasonable and feasible. These include mitigation at the noise source such as use of noise model results to optimise mine plans, attenuation of the haulage fleet and relocation or shut down of fleet and equipment during adverse weather conditions. HVO South also provides mitigation at residences as necessary, which typically comprises installation of noise insulating materials on the building's facade.

HVO South has been conducting routine compliance assessments since 2009 which demonstrate that the noise management measures are effective, with non-compliances comprising only 1.16 per cent of the $L_{Aeq, 15min}$ dataset and 2.86 per cent of the $L_{A1, 1min}$. Existing management measures will continue to be implemented for the proposed modification and, as stated in the EA commitments, the existing consultation programmes will continue to be undertaken to ensure noise at potentially affected receivers is effectively managed.

Hunter New England Health noted that a maximum of 15 blasts per week are approved and strict control of blast conditions will be required to protect the public from the impacts of vibration, overpressure and blast fume emissions. HVO South's existing blast management procedures will continue to be implemented under the proposed modification, which include the management of blast design and use of appropriate charge masses.

As discussed in Chapter 3 of this RTS, we have implemented an extensive stakeholder engagement programme for the proposed modification. This programme has included direct one-on-one meetings with potentially-affected near-neighbours during the preparation of the EA and following completion of the technical studies to present the outcomes and gather feedback.

We will continue to engage with near-neighbours and stakeholders about HVO, as well as undertake specific activities to support ongoing assessment of the proposed modification.

5.7 Office of Environment and Heritage

The Office of Environment and Heritage (OEH) submission raised no objections to the proposed modification. The OEH noted that the proposed modification does not result in any additional area of disturbance and unlikely to have any additional impacts on Aboriginal cultural heritage, flooding or threatened species.

No matters were raised within the submission.

5.8 NSW Roads and Maritime Services

The NSW Roads and Maritime Services (RMS) submission raised no objections to the proposed modification. The RMS considered that there would be no significant impact on the nearby classified (State) road network.

No matters were raised within the submission.

5.9 NSW Department of Industry, Division of Resources and Energy

The NSW Department of Industry, Division of Resources and Energy (DRE) submission raised no objections to the proposed modification. The DRE considered the rehabilitation requirements had been adequately addressed in the EA.

No matters were raised within the submission.

6 Public submissions

6.1 Introduction

This chapter provides a summary and response to the public submissions objecting to and commenting on the proposed modification, including those prepared by special interest groups.

A total of 38 submissions were received as of 5pm on 10 March 2017.

Seven near neighbours from the 221 near-neighbour assessment locations made a submission. Coal & Allied appreciates the time taken from near neighbours to engage in this process and we continue to encourage direct feedback to the company while respecting the formal submissions process.

Seven submissions were received from individuals and special interest groups from within the Singleton LGA. The balance of submissions (25) was received from individuals and specialist interest groups outside the Singleton LGA.

Air quality (29 submissions), noise (24 submissions), final landform and rehabilitation (22 submissions), visual amenity (21 submissions) and water resources (20 submissions) were most commonly raised.

The following sections provide a summary and response to the matters raised.

6.2 Matters raised

6.2.1 Water resources

Water resources are summarised in Chapters 10 (groundwater) and 11 (surface water) of the EA with the respective technical studies provided in Appendices G and H.

A total of 20 submissions in objection referenced water resources, representing 63 per cent of objectors. Matters raised with respect to water resources included discharges/releases to the Hunter River, impact of the final void on groundwater, increased groundwater drawdown, cumulative groundwater impacts, low-wall design influences on drainage and general impacts on water resources.

The number of submissions received on matters relating to water resources is shown in Figure 6.1. It is noted that a number of submissions referenced more than one matter related to water resources and, therefore, the number of matters raised as shown in Figure 6.1 totals more than 20.

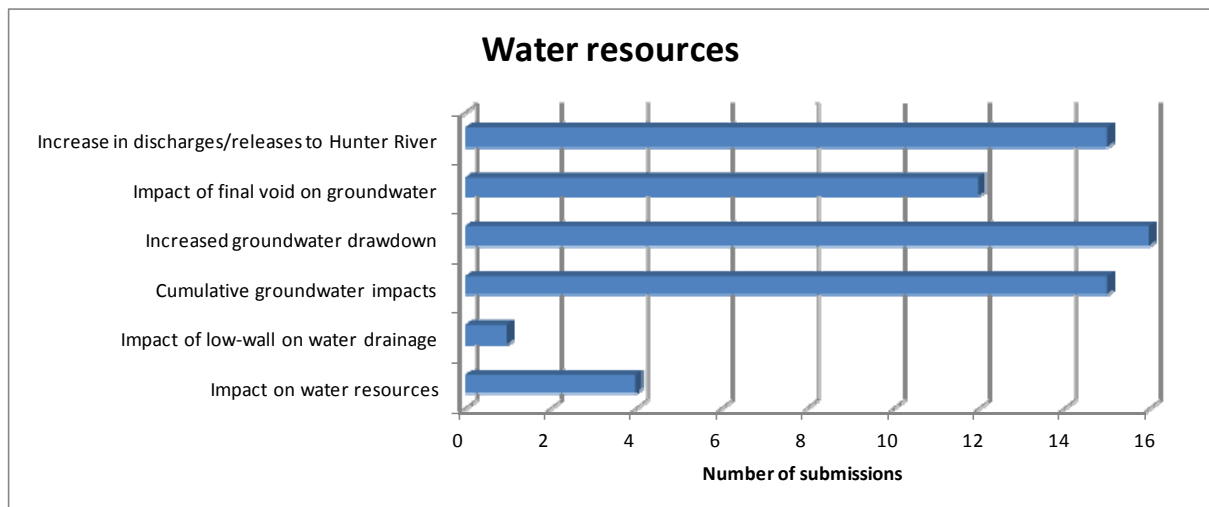


Figure 6.1 Water resources matters raised within submissions of objection

i Discharges/releases to Hunter River

Of the submissions referencing water resources, 15 related to discharges/releases to the Hunter River.

The majority of these were concerned that discharges of mine water into the Hunter River will increase under the proposed modification and that the pollution from mine water will be to the detriment of water quality in the Hunter River.

The Hunter Communities Network submission referenced its involvement in the EPA's review of the HRSTS. It was concerned about the discharge of heavy metals and other toxic pollutants in mine water and believes these are not captured by the regulation of the HRSTS.

The sections below provide further information on the nature of discharges/releases to the Hunter River from HVO South under the proposed modification.

a. Hunter River Salinity Trading Scheme

The framework for discharges from mines in the Hunter River catchment is regulated under the HRSTS. The proposed modification would continue the controlled releases of mine water in accordance with the rules and regulations of the HRSTS.

Water balance modelling (refer to Appendix H of the EA) showed that the proposed modification is not predicted to significantly change the frequency or magnitude of releases under the HRSTS.

b. Off-site releases

As described in Section 11.3.3 of the EA, the results of the water balance modelling indicate that under the model assumptions and configuration, mine-water dams are managed with sufficient freeboard capacity to prevent overflow during extreme rainfall events.

Mine water is held in storage dams and only released in a controlled manner under the HRSTS. Storing water in pits is a contingency should storage dams reach their capacity in rare climatic events. Sediment dams are designed to capture runoff from soil disturbance areas (not mine water which is contained and pumped to mine storages).

Sediment dams are primarily designed with purpose of settling out sediment prior to release. Their design capacity provides for substantial storage of water. The dams are maintained in a drawn down state in readiness for rainfall events. Water captured in the dams is returned to the HVO WMS. Overflows would only occur during significant rainfall events which will also generate runoff from surrounding undisturbed catchments. Hence, it is unlikely that sediment dam overflows will have a measurable impact on receiving water quality.

The WMS will be reviewed and updated for the proposed modification to protect the environmental values of receiving waters.

ii Impact of final void on groundwater

Of submissions referencing water resources, 12 related to impacts of the final void on groundwater.

The majority of submissions related to groundwater interactions with the final void state that the final void will be a perpetual groundwater sink with highly saline water and that this is unacceptable.

The assessments undertaken for the EA agree with the submissions insofar as the final void will remain as a groundwater sink that is highly saline. The sink ensures that this saline water cannot be released into the external environment. The findings of the EA studies are summarised below.

Mining removes overburden and interburden material to enable the extraction of the Permian coal seams. The coal seams store water which is typically saline and of poor quality. The removal of interburden and coal seams draws groundwater into the pit and reduces groundwater pressures, referred to as depressurisation.

As per the currently approved mine design, a final void is necessary for the viability of the mine. Degradation of the surrounding environment from the movement of saline groundwater from mining under the proposed modification does not accord with current NSW Government policy and is unacceptable to Coal & Allied. Accordingly, the final void was designed to be a perpetual groundwater sink with its primary objective to prevent saline water entering the surrounding environment. Water engineers performed an important role in the mine design optimisation process working with mine planning engineers to ensure that this objective was achieved.

The long-term equilibrium water level for the proposed evaporative basin (the area of water stored in the final void) will be reached approximately 300 years after mining and be approximately 30mAHD. This long-term equilibrium water level is predicted to be about 20 to 30m below pre-mining groundwater levels and about 40m below natural surface levels of 70mAHD, and 42.5m below the minimum crest level of the pit in the proposed final landform. This manages the risk of the saline water 'overtopping' the final void. Further, the evaporative basin at its equilibrium level for the proposed modification is approximately 500m from the Hunter River compared with the currently approved location which is approximately 250m from the river at its closest point.

The final void acting as a groundwater 'sink' also reduces upward seepage of groundwater from the Permian strata to the alluvium around the mine. Reduction in upward leakage of the more saline groundwater from the Permian coal measures has the potential indirect benefit of improving water quality within alluvium and, in turn, Hunter River and Wollombi Brook under natural gaining conditions.

iii Increased groundwater drawdown

Of the submissions referencing water resources, 16 related to discharges to the Hunter River.

Submissions raised concerns regarding the increased groundwater drawdown under the proposed modification, particularly the cumulative drawdown. Some submissions considered that a regional study should be conducted to understand the impacts on groundwater. The Hunter Communities Network submission also noted that the nearby Wambo and United coal mines impact upon the same water sources as HVO South and suggested there was a need for an independent review of the groundwater study.

The assessments undertaken for the EA agree with the submissions that there will be groundwater drawdown that has the potential for cumulative impact. For these reasons the EA contained a regional study of mines that cumulatively interact on groundwater and it was peer reviewed.

The findings of the EA are summarised below.

a. Incremental and cumulative groundwater drawdown

As described in Section 10.3.3 of the EA, approved coal mines within the region operate below the water table and therefore extract groundwater. When mines are in close proximity to each other the zone of drawdown generated by each can overlap. Within these overlapping areas, the drawdown from each project combines to create a larger cumulative footprint on the groundwater system. Cumulative impacts were accounted for in the groundwater model by representing all currently approved and foreseeable mining operations, along with the proposed modification. As described in the previous section, the surrounding mines within the modelling domain include HVO North, United Wambo Project, MTW, Cumnock, Ashton and Ravensworth Operations that mine the same economic coal seams of the Wittingham Coal Measures.

The outcomes of the groundwater numerical modelling for the proposed modification indicated the below:

- Groundwater level drawdown due to the proposed modification is largely restricted within the extent of land owned by Coal & Allied.
- No private bores will experience a drawdown due to the proposed modification within the alluvium in excess of 1m (refer to Figure 10.8, Section 10.3.6 of the EA and the groundwater study within Appendix G of the EA).
- One bore (10011459) on land owned by Glencore (Ravensworth Mine) with drawdown due to the proposed modification and with cumulative drawdown of greater than 2m.
- Drawdown from the proposed modification is predicted to not exceed 0.5m at any of the assessed locations within the Hunter River alluvium in close proximity to mining activities (refer to Figure 10.8, Section 10.3.3 of the EA and the groundwater study within Appendix G of the EA).
- In areas adjacent to South Lemington Pit 2 (which is north of Wollombi Brook) where the existing approved operations are expected to result in drawdown of up to 7m, the proposed modification is predicted to further decrease groundwater levels by up to an additional 2.8m.
- Groundwater levels within alluvium south of Wollombi Brook are predicted to decrease by less than 1m due to the proposed modification.

These groundwater level drawdown predictions satisfy the requirements of the *NSW Aquifer Interference Policy*. Chapter 12 of the EA assessed the potential impacts of predicted alluvial drawdown on ecosystems within the alluvium of the Hunter River and Wollombi Brook. This assessment concluded that the proposed modification would not have a significant impact on these ecosystems.

Groundwater is managed at HVO through the implementation of the WMP. As previously described, the WMP fulfils the requirements of the HVO EPL and project approvals together with commitments made in the respective environmental assessments, environmental impact statements and relevant legislation, standards and guidelines.

The WMP includes the HVO groundwater monitoring programme described in Section 10.2 of the EA. Results of the monitoring are reported annually in the HVO annual review. The annual review (which includes an annual groundwater impact review as an appendix to the main report) considers if any additional monitoring sites are required, or if optimisation of the existing monitoring sites, frequency of sampling and analytical suite should be undertaken. Every five years, the validity of model predictions will be assessed and, if the data indicates significant divergence from the model predictions, an updated groundwater model will be constructed for simulation of mining.

Groundwater will continue to be managed in accordance with the WMP under the proposed modification.

b. Numerical groundwater model and independent review

As described in Chapter 10 of the EA and within the groundwater study (Appendix G of the EA), a numerical groundwater model was developed and remodelled the existing approval and proposed modification. This numerical model extended approximately 27km from east to west, and 39 km from north to south and comprises up to 71,049 cells per layer, representing one of the largest and complex numerical models within the Hunter Valley. The model incorporated the extensive mining within the region including all currently approved and foreseeable mine plans within the region (ie HVO North, United Wambo Project, MTW, Cumnock, Ashton and Ravensworth Operations) allowing the assessment of cumulative impacts.

The model was calibrated with a pre-mining steady state run (1970 to 2003), and a transient run for the period (2003 to 2015) using existing groundwater levels at representative bores. In accordance with the requirements of the *NSW Aquifer Interference Policy*, the groundwater model was independently peer reviewed. The peer review was undertaken by Dr Frans Kalf of Kalf and Associates Pty Ltd (KA) who has over 47 years of experience in hydrogeological investigations and specialises in peer reviews. The peer review concluded that the model is fit for purpose.

iv Cumulative groundwater impacts

Of the submissions referencing water resources, 15 related to cumulative impacts on groundwater.

One submission raised concerns that the EA did not consider water loss to the void and the cumulative impact with other voids approved in the Hunter Valley.

Section 10.3.5 of the EA assessed water loss (referred to as 'water take') 'water take' to the void and the cumulative impact with other voids, where relevant, in the Hunter Valley. The groundwater study within the EA was undertaken to contemporary standards in accordance with the *NSW Aquifer Interference Policy* and included the development of a sophisticated numerical groundwater flow model. The model was developed using a comprehensive dataset and incorporated the extensive mining in the region including all currently approved and foreseeable mine plans, including any associated voids, within the region (ie HVO North, United Wambo Project, MTW, Cumnock, Ashton and Ravensworth Operations) allowing the assessment of cumulative impacts. As noted in the preceding section, the model was independently peer reviewed and deemed fit for purpose (eg sufficient to assess cumulative impacts on groundwater).

It noted that the final void has been designed to minimise surface water catchment draining to the void, which has resulted in a reduction from 1,190ha to 1,145ha when compared to the approved design, despite enabling access to the deeper seams.

Water take under the proposed modification compared to the approved development is addressed in Section 10.3.5 of the EA. Groundwater numerical modelling predicted that the proposed modification accounts for less than 12 per cent of the peak water take. This is because the proposed modification is entirely within the same footprint as the approved mining. The total maximum and annual water take is within previously predicted maximum water take volumes for the approved operations.

With respect to the final void, post-mining conditions inclusive of other neighbouring mining operations were modelled. The long-term equilibrium water level for HVO South under the proposed modification post-mining would be approximately 30mAHD after 300 years. This long-term equilibrium water level is about 20m to 30m below pre-mining groundwater levels and about 40m below natural surface level.

v Impacts of low-wall on water drainage

One submission raised the need for the low-wall to be free-draining and prevent the infiltration of water to the final void.

As described in Chapters 9 and 13 of the EA, the indicative final landscape across HVO South is planned to be an undulating, free-draining landform with a post mining land capability which supports land for predominately cattle grazing and native habitat. The proposed landform aims to reflect the natural features and complement the previously created landforms. This is consistent with the requirements of the Synoptic Plan which aims to integrate biodiversity enhancement with sustainable agricultural practices.

As described in previous sections of this RTS the development of the final void, its alignment with final landform objectives and its role in post-mining water management (preventing saline water leaving the site) were important considerations in the development of the proposed mine plan. Although not required for the proposed modification, the void optimisation process considered the *Indicative Secretary's Environmental Assessment Requirements (SEARs) Guideline for State Significant Mining Developments* (DP&E 2015a) and *Mine Application Guideline* (DP&E 2015b).

In accordance with contemporary development consent conditions, the final void has been designed, where reasonable and feasible to:

- act as a groundwater sink and maximise groundwater flow across back-filled pits to the final void;
- minimise the size, depth, catchment and highwall instability; and

- have flood protection.

The proposed void has been successfully designed to achieve its primary objective of functioning as a groundwater sink, maximising groundwater flow across back-filled pits to the final void, preventing release of saline water into the surrounding environment. This has the indirect benefit of reducing the inflow of saline Permian water into the Hunter River and Wollombi Brook under natural gaining conditions.

The proposed indicative final landform has been shaped to minimise the surface water catchment draining to and infiltrating the void. As a result, whilst the proposed mine plan enables access to the deeper seams, the surface water catchment area draining to the final void under the proposed modification is smaller than under the approved mine plan.

The design of the final void also aimed at reducing the slope angle of the low-wall to increase the area of useable land post-mining. The approved final void assessed by ERM (2008) has a low-wall slope of 14 to 18 degrees with an area of approximately 404ha from natural surface level of approximately 70mAHD. The proposed final void, with a low-wall slope of generally less than 10 degrees has an area of approximately 523ha from natural surface level of approximately 70mAHD.

The land on the low-wall slope may continue to be used in accordance with the indicative final rehabilitated landform. At the completion of mining, the proposed modification will provide approximately 400ha of useable land with a slope generally less than 10 degrees compared with 120ha under the current approval. This represents an increase of approximately 280ha of useable land immediately post mining and about 298ha some 30 years post mining.

This useable area gradually reduces over the 300 year period where groundwater modelling (AGE 2016) predicts that the water level in the evaporative basin will slowly recover, resulting in a long-term useable area with a slope generally less than 10 degrees under the proposed modification of an additional 150ha compared with the current project approval.

In summary, the design of the final void inclusive of the reduced low-wall slope angle reduces the surface catchment draining to the final void as well as providing for a significant increase in useable land within the final void with a reduction in overall slope angle of the low-wall.

6.2.2 Air quality

Air quality is described in detail in Chapter 8 of the EA with a technical study provided in Appendix F.

The majority of submissions in objection referenced air quality, raising matters including accuracy of the air quality study, increased dust emissions (including cumulative increases), increased greenhouse gas emissions and inadequate consideration of emission types at HVO.

The number of submissions received on matters relating to air quality is shown in Figure 6.2. It is noted that a number of submissions referenced more than one air quality matter and, therefore, the number of matters raised as shown in Figure 6.2 totals more than 29.

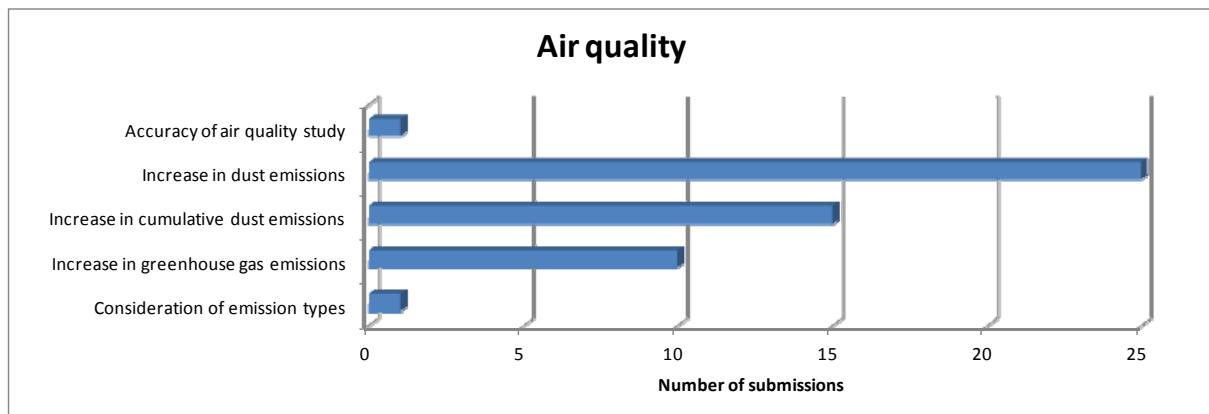


Figure 6.2 Air quality matters raised within submissions of objection

i Accuracy of air quality study

One submission disputed the accuracy of the air quality study results, stating that air quality impacts would be greater than predicted.

The concerns raised by the submitter are acknowledged. Coal & Allied engaged expert air quality consultants to undertake the air quality study and this study has been assessed by experts in the government agencies. The government agencies have requested further information and this information is provided in Sections 5.2.6, 5.5.3 and 5.6.1 of this RTS for DPE, EPA and Hunter New England Population Health, respectively.

The air quality study relies upon modelling as the best available predictive tool with existing data from the operations. The air quality model uses is a combination of the CALPUFF Modelling System for dispersion modelling and The Air Pollution Model (TAPM), which is used for modelling the upper air meteorology. The CALPUFF model is an advanced 'puff' model that deals with the effects of complex local terrain on dispersion meteorology. It allows for spatial variation of meteorology, such as wind patterns, over a three-dimensional modelling domain in an hourly varying time step. The CALPUFF approach is accepted by the NSW EPA as an appropriate modelling system for open cut coal mines in NSW.

ii Increase in dust emissions (including cumulative increases)

Of the submissions referencing air quality, 25 related to the increase in dust emissions due to the proposed modification.

The air quality study utilised an air quality model as the best available tool predict the emissions from the proposed modification. These emissions can be compared to existing emissions.

The proposed modification will move more dust-generating material than the existing operations due to the additional overburden emplacement activities and increased mining rate, however it is important to note that there would not generally be an equivalent increase in dust impacts. Of note, some of HVO's closest receptors (near neighbours) will experience less impact as the mine moves further away or activity moves deeper below the surface to access the deeper seams.

The modelling results within the air quality study (Appendix F of the EA) demonstrated that the proposed modification will satisfy the Mining SEPP non-discretionary standards for the privately owned dwellings which are not already entitled to acquisition from neighbouring mines. As the VLAMP significant impact criteria correspond with the Mining SEPP non-discretionary standards, no additional private residences will be impacted which are not already afforded acquisition rights from neighbouring mines.

The model predictions were overlaid with the results of the approved year of maximum extraction to assess the consistency of the proposed modification with existing approved operations. This demonstrated that the predicted dust emissions will be generally similar to the approved operations and, therefore, the proposed modification will not result in significant change.

The model predicted that the VLAMP and Mining SEPP non-discretionary annual average cumulative PM₁₀ criterion will be exceeded at four properties in Warkworth and Camberwell villages. Two of the properties are non-residences and are not entitled to voluntary acquisition. The privately owned residences are entitled to acquisition from other mines; one by Wambo and Warkworth mines and the other by Ashton Coal's South East Open Cut project.

However while modelling results satisfy the Mining SEPP standard and indicate that the mine will operate within compliance requirements, HVO recognises that even low levels of dust may concern our closest neighbours. Near neighbours have raised concerns about dust affecting their homes, drinking water supply and property. As discussed further in Chapter 4 of this RTS Coal & Allied has instigated a Near Neighbour Amenity Resource Fund to help reduce the affects felt by our neighbours in Long Point, Maison Dieu and Jerrys Plains. We are implementing other voluntary mitigation measures, and will continue to engage with our neighbours and understand if there are other activities we could consider to help address their concerns relating to dust and air quality.

Following feedback from our neighbours Coal & Allied is exploring other mitigation and management measures to implement during emplacement construction. Community members raised concerns about impacts during this period, and reflected on experienced during previous emplacement development periods. Measures being considered include development of a specific environmental management during emplacement construction and supplementary environmental monitoring within the Maison Dieu area.

Matters related to dust and health are addressed in Section 6.2.7.ii of this RTS.

iii Increase in greenhouse gas emissions

Of the submissions referencing air quality, ten related to the increase in greenhouse gas (GHG) emissions due to the proposed modification.

The proposed modification is predicted to generate on average the following GHG per year:

- Scope 1 (emissions from sources that are owned or controlled by the organization) – 570,807 tonnes carbon dioxide equivalent (t_{CO2-e});
- Scope 2 (emissions from the consumption of purchased electricity, steam, or other sources of energy generated upstream from the organization) – 137,231 t_{CO2-e}; and
- Scope 3 (emissions that are a consequence of the operations of an organization, but are not directly owned or controlled by the organization) – 41,318,571 t_{CO2-e}. Scope 3 emissions are not reported under the National Greenhouse Energy and Reporting scheme.

The estimated scope 1 and 2 emissions represent an approximate 0.13 per cent and 0.5 per cent contribution of Australia's and NSW's 2015 GHG emissions, respectively.

Due to differences in the GHG estimation methods, a direct comparison with the previous GHG assessment for HVO South (PAE Holmes 2008) cannot be easily demonstrated.

However, a comparison of the GHG estimates for the maximum production year (Scenario B1) in the previous assessment with the annual average contribution due to the proposed modifications indicate an increase in GHG emissions of approximately 0.03 per cent over HVO South's approved emissions when compared to the estimated annual greenhouse emissions for Australia.

iv Consideration of emission sources

One submission raised concerns that diesel emission sources had not been considered.

Coal & Allied recognises this concern and that it is an industry-wide matter of interest to the community. The experts for the EA considered in Section 8.2.3 that carbon monoxide (CO), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂) from diesel powered equipment at coal mines as generally considered too low to generate any significant off-site concentrations for surrounding sensitive receptors.

Particulate emissions from diesel engines are included as part of the emissions applied in the modelling (the emissions factor equations inherently include the engine exhaust emissions). Also, there is some degree of double counting of the truck diesel exhaust emissions in the assessment, at the request of the NSW EPA.

6.2.3 Noise and vibration

Noise and vibration is described in detail in Chapter 7 of the EA with a complete technical study provided in Appendix E.

Twenty-three submissions in objection referenced noise and vibration. Matters raised included the accuracy of the noise and vibration study, increased noise emissions, increased blasting impacts, increased cumulative noise impacts, increased traffic noise impacts, criteria not met at one assessment location and dissatisfaction with noise mitigation measures currently implemented.

The number of submissions received on matters relating to noise and vibration is shown in Figure 6.3. It is noted that a number of submissions referenced more than one noise and vibration matter and, therefore, the number of matters raised as shown in Figure 6.3 totals more than 23.

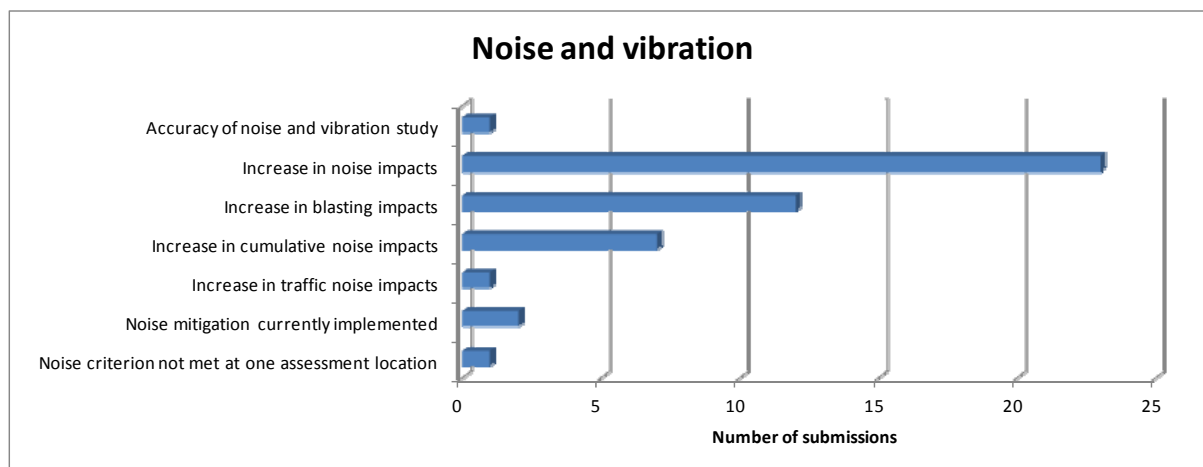


Figure 6.3 Noise and vibration matters raised within submissions of objection

One submission raised concerns regarding the accuracy of the noise and vibration study results.

The concerns raised by the submitter are acknowledged. Coal & Allied engaged expert acoustical consultants to undertake the noise and vibration study and this study has been assessed by experts in the relevant government agencies. The government agencies have requested further information and this information is provided in Sections 5.5.1 and 5.6.2, responding to the EPA and Hunter New England Health, respectively.

The noise and vibration study relies upon computer modelling as the best available predictive tool with existing data from the operations. Modelling completed as part of the noise and vibration study was based on three-dimensional digitised ground contours for the surrounding land, mine pits and overburden emplacement areas. The indicative mine plans represent worst case snapshots with equipment placed at various locations and heights to reflect realistic operating conditions in each of these mining stages.

i Increase in noise impacts

Of the submissions referencing noise and vibration, 23 related to the increase in noise impacts due to the proposed modification.

The noise and vibration study utilised a model as the best available tool to predict the emissions from the proposed modification. These emissions can be compared to existing emissions as shown in Table 7.10 of the EA, which shows an expected reduction in noise to easterly neighbours and, through best practice mitigation and management, similar noise levels at western neighbours.

The VLAMP classifies predicted noise levels above PSNL into the following categories:

- 0 -2dB(A) above – negligible;
- 3-5dB(A) above (but contributes less than 1dB(A) to total noise level) – marginal;
- 3-5dB(A) above (and contributes more than 1dB(A) to total noise level) – moderate; and
- Greater than 5dB(A) above – significant.

As described in Section 7.3.1 of the EA, the proposed modification is predicted to significantly exceed noise criteria at one property and have moderate exceedances at 12 properties as follows:

- One property in Warkworth village could experience noise levels more than 5dB above the PSNL, which is entitled to voluntary acquisition upon request due to impacts from Wambo and Warkworth mines.
- Twelve properties could be moderately impacted with noise levels between 3dB to 5dB above PSNLs. These properties would be entitled to noise treatments such as double glazed windows. However, six of these properties will be entitled to voluntary acquisition rights if the United Wambo Project is approved.
- Four properties are predicted to experience noise levels 0-2dB above PSNLs, which will not be audible to the average listener.
- The Mining SEPP non-discretionary standard for acceptable night time noise is not met at one property, which is in Warkworth village. This property is already entitled to voluntary acquisition rights from Wambo Mine.

HVO manages noise emissions through the implementation of a number of mitigation strategies. This includes the development of the mine plan design to minimise off-site emissions received at receptors, operational management controls during particular weather conditions which may include relocation or shutdown of equipment, and the attenuation of haul trucks.

We also conduct routine attended monthly and real-time noise monitoring at representative residences. The real-time monitoring network is linked to the HVO Mine Monitoring and Control Team, which implements a series of actions to ensure noise levels are managed below regulatory criteria.

ii Increase in blasting impacts

Of the submissions referencing noise and vibration, 12 related to the increase in blasting impacts due to the proposed modification.

One submission noted effects at their property due to blasting activities at HVO South from 1998 to 2015.

Coal & Allied recognises that blasting, which is essential to mining, can be a nuisance or concern to the community.

Blasting activities are carefully managed under blasting procedures in HVO's Blast Management Plan (BMP) HVO-10-ENVMP-SITE-E6-004. These include detailed assessment of potential ground vibration damage due to the operations with independent reports for neighbours within the notification radius of 2km.

Under the proposed modification, off-site noise and vibration from blasting will not be materially different to the approved operations. The most recently available Annual Review for 2015 calendar year noted that there were 304 blast events at HVO (Rio Tinto 2016). The Annual Review stated that one blast event in July 2015 exceeded airblast overpressure criteria, however no community complaints were received in relation to this blast. The Annual Review confirms that HVO complied with all other blasting-related project approval and EPL conditions during the reporting period. Analysis of available monitoring data of blasts at HVO South since 2009 indicates only one other occasion of an exceedance of overpressure experienced at the Knodlers Lane (Maison Dieu) monitor (refer to Figure 5.10) in July 2012.

The exceedance was investigated in accordance with the appropriate protocols and reported in the Annual Review. No community complaint was received regarding the blast event.

Potential blasting impacts were considered for the extremities of approved disturbance areas as detailed in the noise and vibration study in Appendix E of the EA.

HVO's existing blast management procedures include the active management of blast design and use of appropriate charge masses to minimise airblast overpressure and ground vibration. Additional blasting impacts under the proposed modification are considered highly unlikely and current blasting management practices will continue to be implemented. Further, the Mining SEPP (clauses 12AB(5) and (6)) non-discretionary standards for acceptable air-blast overpressure and ground vibration, respectively, are satisfied at all privately owned residences under the continued implementation of blasting management practices.

Notwithstanding the above, mining activities under the proposed modification will be progressing in an east to west direction away from residences in Maison Dieu. Similarly, the modification is not seeking to alter the bounds of the approved blasting area and hence blasting will not be any closer to neighbours than what is currently approved. We will continue to engage with near neighbours and the broader Singleton community regarding the proposed modification and the ongoing HVO South operations.

iii Increase in cumulative noise impacts

Of the submissions referencing noise and vibration, seven related to the increase in cumulative noise impacts due to the proposed modification.

The noise and vibration study prepared for the proposed modification provided an assessment of cumulative impacts with other industrial sources, to enable assessment against the Mining SEPP's non-discretionary standards.

The results show that the INP's (and Mining SEPP non-discretionary standards) acceptable night time criterion (ie 40dB $L_{Aeq,9hour}$) is satisfied at most locations. The exception is location 77 (Warkworth), where current approved mining at Wambo mine dominates expected noise levels, with relatively insignificant contributions from the proposed modification.

iv Increase in traffic noise impacts

One submission raised increased traffic noise as a matter of concern.

Changes to internal traffic along haul roads were considered as part of the noise and vibration study for the proposed modification.

An increase in external traffic is not anticipated for the proposed modification. As a result, an increase in traffic noise is not anticipated for the proposed modification.

v Noise mitigation currently implemented

Of the submissions referencing noise and vibration, two related to the adequacy of existing noise mitigation measures, and the ongoing adequacy of these under the proposed modification.

Coal & Allied appreciates feedback on its noise mitigation measures and welcomes ongoing feedback to continuously improve noise amenity.

Chapter 7 of the EA outlined the existing NMP for HVO. The NMP incorporates all relevant conditions of the project approval (PA 06_0261), together with relevant legislation and relevant standards and guidelines and includes noise control considerations, operational management options and monitoring requirements. It was prepared in consultation with relevant government agencies and was approved by DPE in August 2015.

Compliance monitoring for HVO South is undertaken via a routine compliance assessment programme (Global Acoustics). In more recent years, monitoring has included low frequency noise assessment.

An assessment of monitoring data (publically available via the Rio Tinto Coal Australia website www.riotintocoalaustralia.com.au) demonstrates that operations have predominantly been compliant with noise criteria in the period since the granting of the project approval (PA 06_0261).

Non-compliant noise measurements account for a small percentage of the monitoring dataset at 1.16 per cent ($L_{Aeq,15min}$, seven non-compliances measured from 601 individual assessments undertaken) and 2.86 per cent ($L_{A1,1min}$, 16 non-compliances measured from 560 individual assessments undertaken). The available monitoring data presented in the EA demonstrates that there are no sustained exceedances.

Notwithstanding HVO's strong compliance performance Coal & Allied is aware that mine noise is audible to our neighbours. As a result, a number of noise improvements are planned to reduce noise received by our neighbours. The most significant of these is the completion of the sound attenuation of HVO's truck fleet which will effectively halve the truck noise. During construction of the proposed emplacement lift HVO plans to supplement its noise monitoring programme with additional attended monitoring in the Maison Dieu area. This will increase verification of the effectiveness of HVO's site based operational controls for noise while the emplacement is being constructed.

vi Noise criterion not met at one assessment location

One submission raised concerns regarding noise criteria not being met at assessment location 77.

The noise and vibration study in the EA utilised the best available predictive tool, being a noise model to compare the noise emissions from the proposed modification with noise criteria.

The modelling predicted for the one remaining residence in Warkworth village (location 77, which is currently within the voluntary acquisition zone for a neighbouring mine) that the noise emissions are predicted to exceed the noise criteria by more than 5db(A) which entitles the residence to voluntary acquisition rights. Twelve additional assessment locations (eight on Jerrys Plains Road and four in Maison Dieu) are predicted to exceed noise criteria by 3-5dB(A) and these will be entitled to voluntary mitigation rights.

6.2.4 Visual amenity

Visual amenity is described in detail in Section 9 of the EA.

Twenty-one submissions in objection referenced visual amenity. Matters raised with respect to visual amenity included increased light pollution, increased amenity impacts and increased cumulative visual impacts.

The number of submissions received on matters relating to visual amenity is shown in Figure 6.4. It is noted that a number of submissions referenced more than one visual amenity matter and, therefore, the number of matters raised as shown in Figure 6.4 totals more than 20.

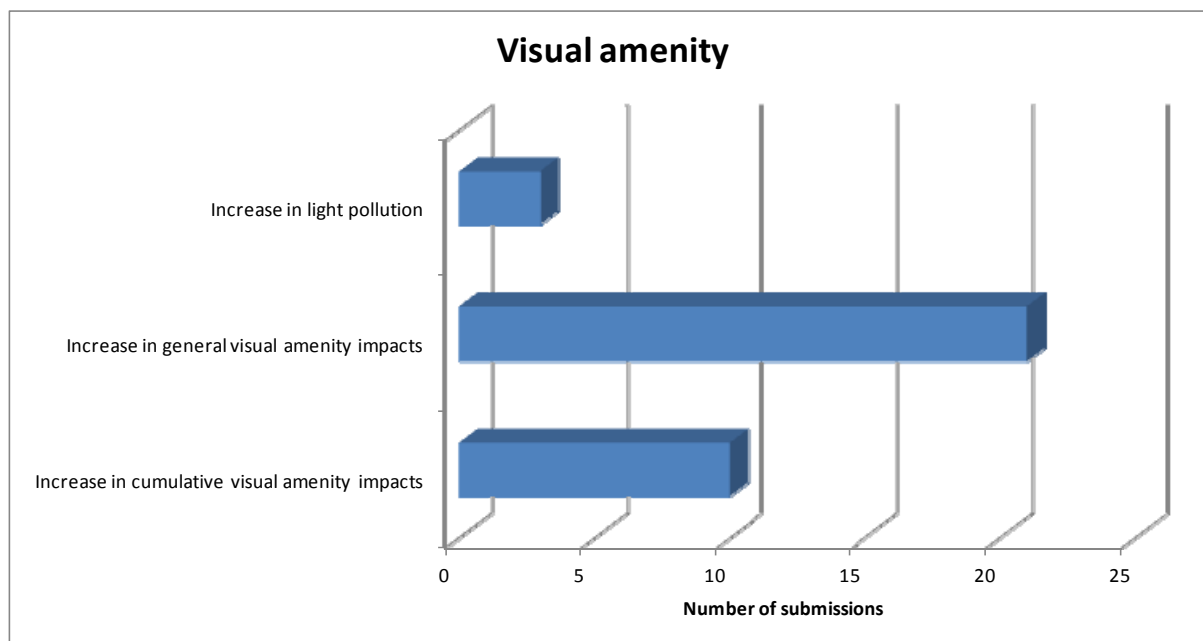


Figure 6.4 Visual amenity matters raised within submissions of objection

i Increase in light pollution

Of submissions referencing visual amenity, three related to increased light pollution due to the proposed modification.

Submissions raised general concerns regarding light pollution and visibility of lighting within the mining area and that this will continue under the proposed modification.

As HVO South operates 24 hours per day, we acknowledge lighting has the potential to cause a nuisance. To minimise this nuisance, we implement a number of visual and lighting management procedures in accordance with the existing project approval (PA 06_0261), the approved Rio Tinto Coal Australia's accredited ISO 14001 EMS which forms part of the HSEQ Management System, relevant plans, procedures and monitoring programmes. One tool available for neighbours is the 24-hour complaints hotline. When lighting complaints are received via this method, operational staff are able to identify the concerning light source, and look at options to adjust this.

The approved visual and lighting management procedures would continue to be implemented under the modification to minimise impacts associated with lighting. We are also planning to implement specific lighting controls during overburden emplacement area construction including boundary inspections for intrusive lights.

ii Increase in general visual amenity impacts

Of submissions referencing visual amenity, 21 related to an increase in impacts on visual amenity due to the proposed modification.

Submissions raised concerns regarding the loss of visual amenity associated with overburden emplacement and general visual amenity impacts associated with the visible mining activities.

We acknowledge these concerns which reaffirm feedback obtained from the community early in the process and has formed a key design criteria for the proposed modification (refer to Section 3.4). We have carefully considered the potential for visual impact, as further described below, and commissioned a visual fly-through model to assist us and external stakeholders in visualising the proposed modification.

The proposed modification will introduce an increase in the elevation of parts of the currently approved final landforms. In the short-term, this would also result in an increase in the visible associated mining activity to establish the increased elevations. As reiterated through submissions, some residences will observe higher overburden emplacements of up to approximately 240mAHD (compared to the existing height of 155mAHD) in some areas.

As outlined in Section 2.2 of this RTS, a guiding principle of the preliminary mine plan design was the avoidance and minimisation of impacts, including on visual amenity to surrounding residences. This process considered the potential views of overburden emplacement areas from surrounding residences, particularly those at Maison Dieu to the east and Jerrys Plains to the west. Preservation of existing views of dominant natural features within the visual catchment, such as the Wollemi National Park, was a key principle. As shown in Figures 9.2 to 9.11 of the EA, existing views of these dominant natural features were maintained at these representative locations. The proposed modification has also provided an opportunity to redesign the overburden emplacement strategy to incorporate micro-relief design techniques, as demonstrated in the photomontages presented in Chapter 9 of the EA.

It should also be noted that additional visual assessments have been undertaken for near neighbours following exhibition of the EA as part of Coal & Allied's ongoing engagement programme. Further information regarding the final landform was also presented to the HVOCCC (shown in Appendix D of the EA). Coal & Allied presented additional cross-sections of the proposed final landform as well as the conceptual build of the Cheshunt overburden emplacement area.

Rehabilitation would continue to be progressive with disturbed land rehabilitated as soon as it is practical. With the incorporation of micro-relief, the final landform will look more consistent with natural landforms in the area when compared with the assessed 2008 final landform. An important design consideration to be implemented with the proposed modification includes the emplacement of material setback from the existing rehabilitated eastern face of the Cheshunt emplacement area. The existing rehabilitated face of the emplacement area will be retained. Further, the majority of height establishment activities will be undertaken in the northern areas within the current disturbance footprint to preserve existing views of the Wollemi National Park and associated escarpments for residents in Maison Dieu. Micro-relief has been incorporated into overburden emplacement area design with consideration given to sensitive residences to the west (Jerrys Plains) and east (Maison Dieu) as well as the Hunter Valley Gliding Club.

These design considerations were incorporated into the mine plan to minimise visual amenity impacts on receivers, principally to the east in Maison Dieu and Long Point.

A detailed rehabilitation plan will be developed and communicated to near neighbours describing how and when the overburden emplacement area will be progressively constructed and rehabilitated including the landform design.

iii Increase in cumulative visual amenity impacts

Of submissions referencing visual amenity, 10 related to increased cumulative visual amenity impacts due to the proposed modification.

Submissions raised cumulative impacts on visual amenity associated with the increased elevation of the overburden emplacement as well as exposure to views of active mining areas.

We agree with this submission and carefully considered minimising the impact on visual amenity to near neighbours as a key design criteria and commissioned a visual fly-through model to assist stakeholders in visualising the proposed modification.

As stated above, the proposed modification will introduce an increase in the elevation of parts of the currently approved final landforms. In the short-term, this would also result in an increase in the exposure to active mining in some areas to establish the increased elevations. Rehabilitation would continue to be progressive with disturbed land rehabilitated as soon as it is practical.

The design of the proposed final landform is consistent with the objectives of the Synoptic Plan (Department of Mineral Resources 1999). The Synoptic Plan was developed specifically to minimise cumulative environmental impacts of mining in the Hunter Valley. Rehabilitation will continue to be progressive, providing for the development of a more natural landscape that includes large areas of connected native vegetation and grassland to support land suitable for agriculture and native fauna movement.

In the longer term, the proposed modification will present moderate/low visual impact at viewpoints in Maison Dieu, Long Point, Jerrys Plains and Camberwell village. Changes to visual amenity are considered to be generally consistent with the 2008 assessed final landform. However, it is considered that the continued implementation of visual and lighting management measures, inclusive of progressive rehabilitation as soon as practical, along with the inherent design and mitigation measures for the post mining landform (as well as being consistent with the Synoptic Plan) will reduce potential impacts on visual amenity associated with the proposed modification.

6.2.5 Final landform, rehabilitation and landuse

Final landform, rehabilitation and landform is described in detail in Sections 9 and 13 of the EA.

A total of 23 submissions in objection referenced final landform, rehabilitation and landuse. Matters raised with respect to final landform, rehabilitation and landuse included the requirement for a final void, the increase in void size under the proposed modification, the void low and highwalls, legacy issues associated with a void in perpetuity and void end-use, long-term void management, progress of rehabilitation and disturbance of rehabilitated land.

The number of submissions received on matters relating to final landform, rehabilitation and landform is shown in Figure 6.5. It is noted that a number of submissions referenced more than one final landform, rehabilitation and landform matter and, therefore, the number of matters raised as shown in Figure 6.5 totals more than 23.

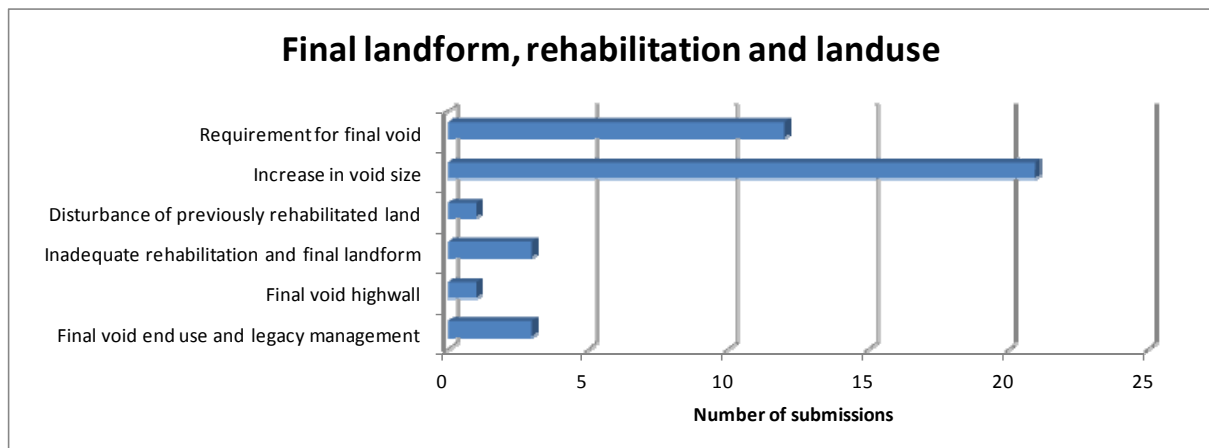


Figure 6.5 Final landform, rehabilitation and landuse matters raised within submissions of objection

i Final void

Of submissions which raised the final landform, rehabilitation and landuse, 12 questioned the requirement for a final void within HVO South and 21 questioned the void size.

We recognise the importance of final voids to the submitters which is an industry wide matter of interest to the community. The final void for HVO South as approved and for the proposed modification has been optimised over the years. The pits that make up HVO South today have been combined and consolidated with the original five voids reduced to a single, optimised void.

As outlined in Section 3.3 of the EA, HVO South underwent a mine plan review process which considered avoidance and minimisation of environmental and amenity impacts on surrounding sensitive receptors as its guiding design principles.

The development of the final void for the proposed modification, its alignment with final landform objectives and its role in post-mining water management (preventing saline water leaving the site) were important considerations in the development of the proposed mine plan.

As a result, the proposed modification achieved the following with respect to the final void:

- increased distance between the Hunter River and the proposed evaporative basin within the final void;
- minimisation of surface water catchment area draining to the final void; and
- reduction in the low-wall slope to enable greater land use optionality within the final void.

The proposed modification will have a single final void with a surface area of approximately 523ha measured at a ground surface level of 70mAHD. This compares to a surface area of approximately 404ha for the existing approval. The increase in area is due to the use of a shallower low wall slope in the void of generally less than 10 degrees for the proposed modification compared to a slope of 14 to 18 degrees for the existing approval. This results in a better land use outcome compared to the current approved final landform.

We acknowledge the submitters concerns regarding the final void under the proposed modification. A final void management plan and mine closure plan will be prepared in consultation with the relevant agencies at least five years prior to the completion of mining, as required by Conditions 37 and 38 Schedule 3 of the existing project approval (PA 06_0261), respectively.

ii Disturbance of previously rehabilitated land

One submission noted that the proposed modification would re-disturb up to 100ha of already established rehabilitation. This submission correctly identifies that 100ha of rehabilitation will be required for the proposed modification. The area of rehabilitation identified is temporarily rehabilitated for dust control, soil stability and visual amenity and it was always intended to emplace overburden over this area under the existing approval and proposed modification. This is described in Section 3.2.2 of the EA.

The proposed modification does not disturb already established rehabilitation on the outer slopes of the Cheshunt overburden emplacement area.

iii Inadequate rehabilitation and final landform

Of submissions which raised the final landform, rehabilitation and landuse, three considered the rehabilitation plans and final landform inadequate.

One submission stated that the external slopes and face of the Cheshunt overburden emplacement area could be improved with additional micro-relief, which may require an increase in overall height. The Hunter Communities Network submission stated that progressive rehabilitation was too slow and created visual impacts on the landscape.

Coal & Allied appreciates feedback on the rehabilitation plans from submitters and near neighbours that provided feedback direct to the company through consultation.

As described in Section 2.2.3 of this RTS, to accommodate greater variation to the external slopes of emplacement areas able to be seen by sensitive receptors at distances of approximately 3km (such as receptors within Maison Dieu), the overburden emplacement design would require either a substantial increase in maximum height or an increase in surface area (moving closer to surrounding sensitive receptors) to emplace more overburden at lower heights. These disturbance activities would result in additional noise, dust and visual amenity impacts in short to medium term for marginal long-term improvements compared to the final landform of the proposed modification.

We have genuinely attempted to strike a balance between disposing the additional volume of overburden material within the constraints of the existing approved footprint of disturbance while minimising visual impacts on near neighbours.

Progressive rehabilitation at HVO South is implemented in accordance with the existing project approval (PA 06_0261), which will continue under the proposed modification. Section 3.2.2 of the EA states that there is a general increase in the rehabilitation to mining disturbance area ratio over time under the proposed modification, however, there is a minor reduction from Stage 1 to Stage 2. This is a result of accessing the deeper seams in Riverview Pit and the time required for the overburden emplacement area to reach its final height prior to being rehabilitated. It should be noted that the ratio of rehabilitation to total disturbance increases for each progressive stage of the mine plan.

It is considered that the continued management of rehabilitation under the proposed modification will assist in the minimisation of short-term visual impacts experienced by surrounding receptors. Section 9.4 of the EA described some of these operational management controls, reproduced below:

- Progressively reshape, topsoil and rehabilitate completed overburden emplacement areas. Temporary cover crops will be used to stabilise rehabilitation areas if sowing of long-term species is unlikely to occur within four weeks (waiting for more favourable sowing conditions in autumn/spring).
- Temporary stabilisation of unused areas or dump slopes will be undertaken annually by way of aerial seeding or similar. It is preferred that this occur during either autumn or spring to increase the potential for vegetation establishment success. Review of operating areas will be conducted in the weeks leading up to each seeding event. Seed will be applied to any area foreshadowed to be inactive for six months or more.
- Cleared vegetation is mulched and incorporated into topsoil.

Coal & Allied welcomes ongoing feedback on our rehabilitation practices.

iv Final void highwall

One public submission referenced the proposed final void highwall. It states that it is higher than that approved and the project approval will need mining to cease with enough room from the boundaries to allow an adequate highwall treatment for safety and post mining land uses.

The submission states that learnings from the Drayton mine closure process should be implemented at HVO South to accommodate an agreed highwall landform in the assessment and determination process, rather than the best fit possible at the time of closure.

The DPE submission for the proposed modification raised a similar matter. Rather than reproduce the response, please refer Sections 2.2.3 and 5.2.3 of this RTS.

v Final void end use and legacy management

Of submissions which raised the final landform, rehabilitation and landuse, three questioned the end use of the final void within HVO South.

The Hunter Communities Network submission stated that the current rehabilitation bond system does not provide funding to manage final voids into the future after mine closure and that this legacy will be passed onto the taxpayer or to future landowners, at their own financial risk. The end use of the final void was also raised by other submissions, including the provision of community facilities such as water skiing or sailing opportunities which may support the local tourism industry.

The submission also stated that increasing the size of the void is likely to create far greater effort and expense for rehabilitation in the future, which would need to be a consideration for Yancoal should they purchase the operations.

It is important to note that the pre-mining environment of HVO South and immediate surrounds comprised agricultural and natural land uses such as cultivation, improved pastures, selectively cleared land for grazing, remnant native vegetation and riparian vegetation (ERM 2008). The current approved final land use objectives are consistent with the Synoptic Plan (Department of Mineral Resources 1999), which was developed with a particular focus on minimising cumulative environmental impacts of mining in the Hunter Valley. The proposed modification does not seek to change these final end use objectives of the current approved operations. The Synoptic Plan comprises the following vision statements to guide mine rehabilitation:

1. By application of the Synoptic Plan, the mining industry, together with local and state governments, will demonstrate an integrated approach to natural resource management of lasting benefit to the region.
2. Rehabilitation and land management practices in relation to coal mining can provide significant regional contributions to the Government biodiversity initiatives and greenhouse emission reduction targets.
3. By integrated planning, mine site rehabilitation can realise a diversity of post-mining landscapes based on sustainable land use including commercial timber plantations and management of biodiversity and visual amenity.
4. Given fundamental criteria of stability, safety and sustainability, rehabilitated mine sites and their surrounding mine holdings can provide alternative land uses integrating with and contributing to regional economics.
5. A coordinated approach amongst stakeholders to the monitoring of vegetation management will provide the necessary evaluation of vegetation reforms generally in the Hunter Region, and particularly in the coalfield.

As described in Chapters 9 and 13 of the EA, the indicative final landscape across HVO South is planned to be an undulating, free-draining landform with a post-mining land capability which supports predominantly cattle grazing and native habitat. The proposed landform aims to reflect the natural features and complement the previously created landforms. This is consistent with the requirements of the Synoptic Plan which aims to integrate biodiversity enhancement with sustainable agricultural practices.

Notwithstanding the above, we acknowledge that changes may result from neighbouring mining operations and their rehabilitation, surrounding agricultural activities and changes to existing remnant vegetation. The existing project approval (PA 06_0261) requires Coal & Allied to prepare a Mine Closure Plan (refer to Condition 38, Schedule 3). This plan will be prepared in consultation with DPI Water, DRE and Singleton Council and include investigations for the future use of the site, including the final void. These investigations may include consideration of opportunities such as those referenced within the submissions for the proposed modification.

In addition to regulatory requirements stated above, all Rio Tinto operations are required to implement the Mine Closure Standard (Rio Tinto 2009). The Mine Closure Standard covers the design, development, operation and closure of all operations to ensure that a positive legacy is left following completion of mining. Stakeholder consultation is a key element to ensure that Mine Closure Plans deliver sustainable development outcomes. The Mine Closure Standard requires operations to engage with stakeholders, including employees, traditional land owners, local communities as well as government agencies. The intent of the engagement is to seek development of a preferred sustainable development option for closure and endorsement of the options. This process will be undertaken by HVO South during the preparation of the Mine Closure Plan.

Also of note, DRE require a security deposit from mining leaseholders to ensure that the community is not left with a potential liability for the cost of mine closure. The security deposit is calculated in accordance with relevant accounting standards and DRE guidelines. The release of the security deposit is determined by DRE following an assessment that the rehabilitation obligations have been met.

In summary, the indicative final land use inclusive of the final void under the proposed modification is consistent with the objectives of the Synoptic Plan. However, the details of the final land use will be determined through the preparation of the Mine Closure Plan with the input of key stakeholders including the local community. As required by DRE, HVO South will ensure that the rehabilitation security deposit is in accordance with DRE requirements.

6.2.6 Ecology

Ecology is described in detail in Section 12 of the EA.

Fourteen submissions in objection referenced ecology. Matters raised with respect to ecology included impacts on ephemeral wetlands (specifically Carrington Billabong), impacts on threatened populations and communities and general impacts on biodiversity.

The number of submissions received on matters relating to ecology is shown in Figure 6.6. It is noted that a number of submissions referenced more than one ecology matter and, therefore, the number of matters raised as shown in Figure 6.6 totals more than 14.

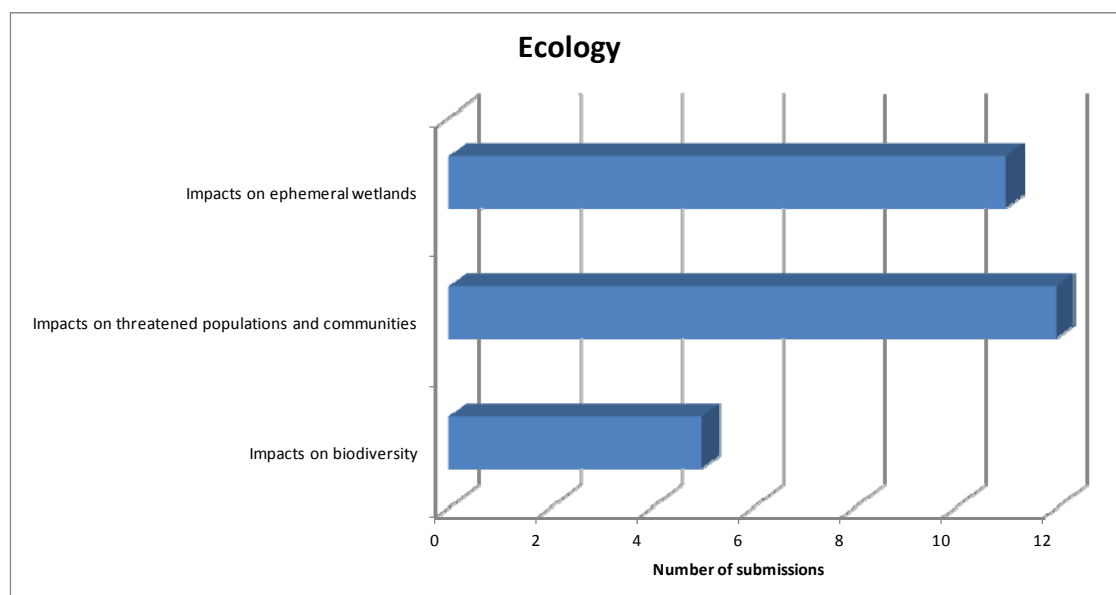


Figure 6.6 Ecology matters raised within submissions of objection

i Impacts on ephemeral wetlands

Of the submissions referencing ecology, 11 related to potential impacts on ephemeral wetlands with specific reference to Carrington Billabong. Carrington Billabong is adjacent to HVO North within the Hunter River alluvium and floodplain comprising Hunter Floodplain Red Gum Woodland.

Carrington Billabong, identified as Ecosystem E1 in the EA and shown in Figure 6.9, is in proximity to the approved historical and ongoing mining activities, where previous assessments have predicted alluvial groundwater drawdown. The EA identified Hunter Floodplain Red Gum Woodland, present at Carrington Billabong, as an ecosystem which potentially uses groundwater. As stated in Section 12.3 of the EA, monitoring data indicates alluvial groundwater levels have remained relatively stable within the alluvium despite active mining at adjacent pits. This indicates that there is limited hydraulic connection between the alluvium and the underlying depressurised coal measures in these areas, and that the system is largely recharged by rainfall and stream flow events.

River Red Gums (including Hunter Floodplain Red Gum Woodland) are dependent on relatively high levels of water availability. Historic groundwater monitoring undertaken in these areas of the Hunter River adjacent to active mining has demonstrated that although groundwater levels fluctuate, the alluvium has remained saturated during mining. Section 12.3 of the EA demonstrates that the ongoing water supply for these ecosystems is provided by rainfall and flooding events, such as the 1 in 10 year average recurrence interval (ARI). Due to the large storage capacity and relatively low leakage rates (MER 2005) the alluvium can remain saturated for prolonged periods between recharge events.

As stated in Section 12.2.2 of the EA, due to the proximity of historical and currently approved mining activities within HVO North, we have undertaken regular investigations on the condition of the Carrington Billabong as part of the Umwelt (2010) River Red Gum Restoration Strategy (the Strategy). The Strategy was initially a management commitment and development consent condition for HVO North (DA 450-10-2003) and then subsequently included within the current conditions of the project approval (PA 06_0261). The Strategy applies to the whole of HVO in accordance with the relevant conditions of both approvals rather than for the separate mining operations.

The groundwater drawdown predicted for the proposed modification is largely contained within the extent of the predicted drawdown for the approved operations. As described in Chapter 10 of the EA, drawdown from the proposed modification is predicted to not exceed 0.5m at any of the locations within the Hunter River alluvium. Due to the high frequency of recurring saturation of the alluvial aquifers (ie rainfall and flooding) no impacts on the Hunter Floodplain Red Gum Woodland or the River Red Gums are predicted due to drawdown attributable to the proposed modification. Further, the EA stated that the Hunter Floodplain Red Gum Woodland in Carrington Billabong would only use groundwater on an opportunistic basis to fulfil its water requirements. River Red Gums within Hunter Floodplain Red Gum Woodland are reliant on flooding regimes for natural seedling recruitment. As the proposed modification will not alter flooding regimes, it will not impact River Red Gum seedling recruitment.

The existing Rehabilitation and Biodiversity Management Plan for HVO South and the relevant aspects of the MTW Biodiversity Offset Strategy will continue to be implemented for the proposed modification. These plans were prepared in consultation with DPI Water, DRE and Singleton Council. The River Red Gum endangered population (and Hunter Floodplain Red Gum Woodland) in Carrington Billabong is currently managed in accordance with the Strategy, required under Condition 30 Schedule 3 of the project approval (PA 06_291) for HVO South as well as part of the existing HVO North development consent (DA 450-10-2003). River Red Gums at HVO South (and HVO North, including Carrington Billabong) will also continue to be managed in accordance with the measures identified in the Strategy. It is noted that DPI Water, in its submission, has required some updates to the existing WMP, which will be considered by Coal & Allied (refer to Section 5.3.1 within this RTS).



ii Impacts on threatened populations and communities

Of submissions referencing ecology, 12 related to impacts on threatened populations and communities from the proposed modification. These include ecosystems that potentially use groundwater, and terrestrial vegetation communities (ie non-groundwater dependent vegetation types) previously identified within and surrounding the HVO South project approval boundary. These matters are addressed below.

a. Ecosystems that potentially use groundwater

There are no GDEs in the vicinity of the project area as mapped in the *National Atlas of Groundwater Dependent Ecosystems* (refer to Section 12.2.2 of the EA).

Ecosystems that potentially use groundwater have been identified at six locations from surveys in the area by Coal & Allied as part of previous assessment processes. These comprise the vegetation communities and populations of River Red Gums, Hunter Flood Plain Red Gum Woodland and Hunter Valley River Oak, as well as the ephemeral wetland, Carrington Billabong. These are referred to in the EIS as E1 to E6. E1 to E3 are within Hunter River alluvium north of Riverview Pit (E1 represents Carrington Billabong), while E4 to E6 are within alluvium along Wollombi Brook, near South Lemington Pits 1 and 2.

The approved mining activities in Cheshunt and Riverview Pits are in proximity to E2 and E3, and Carrington Pit (HVO North) in proximity to E1. Similarly, the approved mining at South Lemington Pit 1 is adjacent to E5. Approved mining has commenced in the vicinity of these ecosystems.

Approved mining of South Lemington Pit 2 (adjacent to E4 and E6) has yet to commence and, therefore, the associated predicted drawdown has yet to occur.

Ecosystems E1 and E3 (refer to Figure 6.9) are in proximity to the approved historical and ongoing mining activities, where previous assessments have predicted alluvial groundwater drawdown. Monitoring data shows that measured groundwater levels have remained relatively stable within the alluvium during active mining in adjacent pits. The stability of groundwater levels indicates that there is limited hydraulic connection between the alluvium and the underlying depressurised coal measures in the areas and that the system is largely recharged by rainfall. Therefore, the modelling predictions of drawdown are considered to be conservative. Drawdown from the proposed modification is predicted to not exceed 0.5m at any of the locations within the Hunter River alluvium.

In the vicinity of South Lemington Pit 2 (E4 and E6) within the Wollombi Brook alluvium, groundwater levels are predicted to decrease by up to an additional 2.8m due to the modification, where the existing approved operations are expected to result in drawdown of up to 7m. Groundwater levels within alluvium south of Wollombi Brook are predicted to decrease by less than 1m due to the proposed modification. Minor additional drawdown is predicted at E5.

As identified in Section 6.2.6.i above, the Hunter Floodplain Red Gum Woodland (an endangered ecological community listed under the *NSW Threatened Species Conservation Act 1995* (TSC Act)) in Carrington Billabong (E1) and the isolated stands and scattered occurrences of River Red Gums (an endangered population of the species in the Hunter Catchment, listed under the TSC Act) north of Riverview Pit (E2 and E3, respectively) are reliant on flooding regimes for recruitment, with opportunistic use of groundwater only. Due to the high frequency of recurring saturation of the alluvial aquifers (ie rainfall and flooding) no impacts on the Hunter Floodplain Red Gum Woodland or the River Red Gums are predicted due to the proposed modification.

The proposed modification is predicted to result in additional drawdown at isolated stands of River Red Gums (E4 and E6) within the Wollombi Brook alluvium. As with the River Red Gums at Carrington Billabong, the River Red Gums on Wollombi Brook would make opportunistic use of groundwater.

The Wollombi Brook alluvium is hydraulically connected to Wollombi Brook. When the flows in Wollombi Brook are high, water is transmitted into the adjacent alluvium replenishing the alluvial aquifers (Rust PPK 1997). Monitoring data shows that groundwater levels in Wollombi Brook alluvium are relatively stable and recharge in response to rainfall events. Therefore, the River Red Gum stands on Wollombi Brook will continue to have access to alluvial groundwater for opportunistic use, and are unlikely to be adversely impacted by the proposed modification.

As identified in Section 12.4 of the EA and Section 6.2.6.i above, the existing Rehabilitation and Biodiversity Management Plan for HVO South and the relevant aspects of the MTW Biodiversity Offset Strategy will continue to be implemented for the proposed modification. River Red Gums at HVO South (and HVO North, including Carrington Billabong) will also continue to be managed in accordance with the measures identified in the Strategy.

b. Terrestrial vegetation

Terrestrial vegetation communities (ie non-groundwater dependent vegetation types) previously identified within and surrounding the HVO South project approval boundary represent endangered ecological communities listed under the TSC Act and EPBC Act. There are no changes to the State-approved footprint of disturbance associated with the proposed modification. The proposed modification will therefore have no additional impacts on terrestrial vegetation from direct disturbance other than those already approved and offset for the existing operations.

Existing management and monitoring measures will continue to be implemented. No additional management and monitoring measures will be required under the proposed modification.

iii Impacts on biodiversity

Further impacts on biodiversity were referenced in general terms in five submissions. Potential impacts on biodiversity are addressed in the responses above.

6.2.7 Socio-economic

Socio-economic matters are described in detail in Section 15 of the EA.

A total of 14 submissions in objection referenced socio-economic matters. Matters raised included the economic contributions of HVO and the coal industry, decreased value of nearby properties, impacts to surrounding agricultural land uses, project justification, impacts on health and incompatibility with surrounding rural and residential land uses.

The number of submissions received on socio-economic matters is shown in Figure 6.8. It is noted that a number of submissions referenced more than one socio-economic matter and, therefore, the number of matters raised as shown in Figure 6.8 totals more than 14.

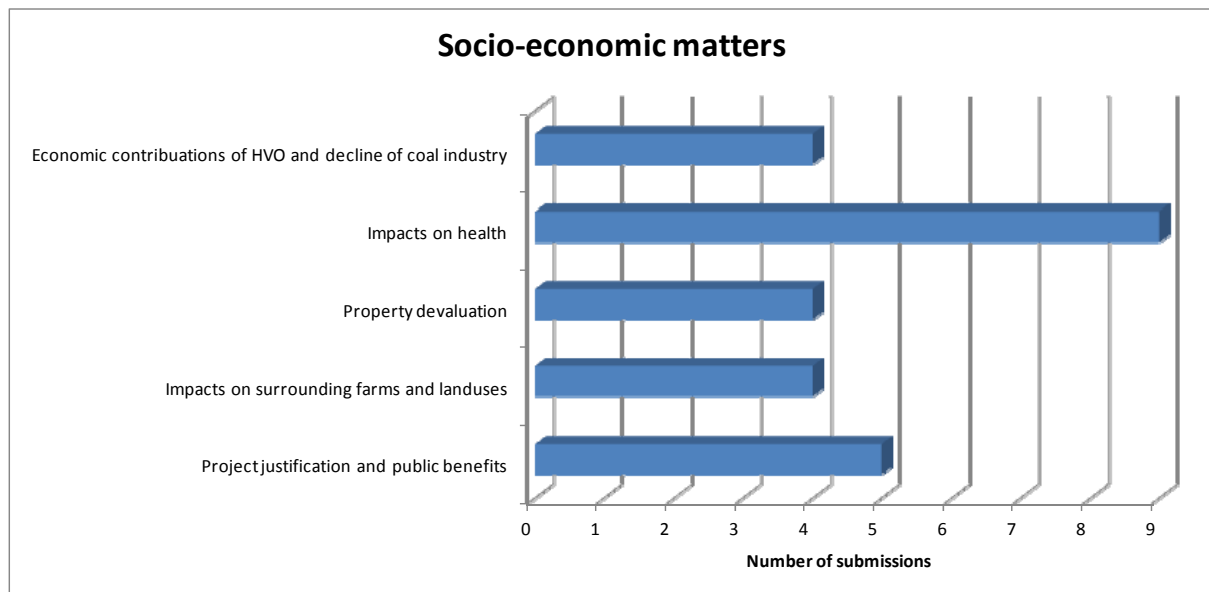


Figure 6.8 Socio-economic matters raised within submissions of objection

i Economic contributions of HVO and decline of the coal industry

Of submissions referencing socio-economic matters, four related to the economic contributions of HVO and the decline of the coal industry. Submissions referenced that the coal industry is in decline, with significant job losses in recent years.

The coal industry has been through a difficult period of lower prices in recent years following the boom years leading up to 2011. To remain viable during suppressed prices has required a reduction in operating costs. HVO is a longer serving, major employer in the Singleton region, having commenced operations in 1949 and employing some 1,500 employees and contractors.

The proposed modification seeks to optimise the existing operations, retain flexibility if market conditions change and enable the mine's socio-economic benefits to be maintained. This includes:

- sustaining mine employment at current levels and additional direct economic benefits and flow-on economic effects including \$243 million in royalties and \$160 million in taxes (discounted at 7 per cent); and
- continued community engagement and investment through the HVO CCC and programmes such as the Coal & Allied Community Development Fund, sponsorships and donations, with current community contributions commitments being approximately \$4 million for the period between January 2015 and December 2017.

ii Impacts on health

Of the submissions of objection related to socio-economic matters, 11 were concerned that the health of the community would be adversely impacted under the proposed modification. Perceived health impacts related to dust emissions and associated respiratory disease, and mental health such as depression from stress and uncertainty.

As reported in Section 8.3.2 of the EA, health and well-being impacts need to be considered at a community level. A study of the health of Hunter Valley communities in proximity to coal mining and power generation was undertaken (Merritt et al (2013)) with results published in the NSW Public Health Bulletin. The results concluded that:

- no significant differences in management rates of mental health conditions in the Hunter Valley region compared with the rest of rural NSW. Similarly, management rates of depression and anxiety were not higher, nor were prescription rates of antidepressants.
- no evidence of a significant difference in problems managed or medications prescribed by [general practitioners] GPs for residents of communities potentially affected by heavy industrial activity (coal mining and power generation) in the Hunter Valley region of NSW compared with residents in the remainder of rural NSW during the period 1998 to 2010.

As discussed in Section 5.5.3 of this RTS, the air quality assessment criteria within the Approved Methods (EPA 2016) have recently been amended for annual average PM₁₀ and PM_{2.5}. These criteria provide benchmarks, which are intended to protect the community against the adverse effects of air pollutants, and generally reflect current Australian community standards for the protection of health and against nuisance effects. Therefore, compliance with these would suggest that general health and amenity are being protected.

Air quality goals/criteria established under government policies are benchmarks set to protect the general health and amenity of the community in relation to air quality. This is reflected in the development of the VLAMP air quality criteria, which was developed by the NSW Government to protect the amenity, health and safety of people.

The proposed modification is predicted to comply with the VLAMP at all privately-owned properties not already entitled to acquisition from neighbouring mine operations. Three properties, of which two are non-residences, in Warkworth village, and a fourth south-west of Camberwell village are predicted to exceed the VLAMP annual average cumulative PM₁₀ criteria.

As described earlier in Section 6.2.2.ii, we recognise that near neighbours have raised concerns dust affecting their homes, drinking water supply and property. As discussed further in Chapter 4 of this RTS Coal & Allied has instigated a Near Neighbour Amenity Resource Fund to help reduce the affects felt by our neighbours in Long Point, Maison Dieu and Jerrys Plains. We will continue to engage with our neighbours and understand if there are other activities we could consider to help address their concerns relating to dust and air quality.

iii Property devaluation

Of submissions referencing socio-economic matters, five related to property devaluation from the proposed modification.

We recognise that maintaining property values relative to the market is highly important to near neighbours. Properties within areas where modelling predicts air or noise quality emissions to exceed VLAMP criteria will have the ability to be acquired by Coal & Allied on request. The proposed modification would enable the continuation of mining at HVO, its workforce and the use of local and regional businesses and suppliers which contribute to the market value of properties in the locality.

Of the submissions referencing socio-economic matters, six related to impacts on surrounding farms and landuses, including a local dairy.

The general area surrounding HVO South is comprised of various open cut coal mining operations, agriculture, woodland, national park and rural residential areas. Existing open cut pits, mine-related infrastructure and rehabilitated former mining areas are to the north, south-east and south-west of HVO South. Mine operations include HVO North, Ravensworth Operations (inclusive of Ravensworth West, Ravensworth South and Narama), Warkworth Mine, Wambo Mine and United Colliery. Bayswater power station is to the north-west of HVO North.

Grazing and cropping land are to the north-east and west and vegetated areas are immediately to the south of Riverview Pit and south of South Lemington Pit 1 and further afield to the south of Warkworth village. The closest residences are in Maison Dieu to the east, Long Point to the south-east, Warkworth village to the south and Jerrys Plains to the west.

As previously described, the proposed indicative final landform end use is consistent with the approved operations which was intended to meet the requirements of the Synoptic Plan (Department of Mineral Resources 1999) to integrate biodiversity enhancement with sustainable agricultural practices.

To achieve the Synoptic Plan's regional planning vision, the landscape and rehabilitation planning process must actively link with neighbouring mine plans and consider surrounding and regional land uses and ecosystems for sustainability and compatibility of final land uses.

Progressive rehabilitation is an important aspect of mining and establishment of the post-mining landform and land uses. The primary objective of final rehabilitation at HVO South is to create a stable, free draining landform able to maintain viable land uses where the post-mining rehabilitated areas are integrated with the surrounding landscape. Land capability will support both agriculture and native habitat. Rehabilitation will continue to be progressively undertaken across the mined area under the proposed modification.

The indicative final landscape across HVO South is planned to be an undulating, free-draining landform with a post mining land capability which supports land for predominately cattle grazing and native habitat. The proposed landform aims to reflect the natural features and complement the previously created landforms. This is consistent with the requirements of the Synoptic Plan which aims to integrate biodiversity enhancement with sustainable agricultural practices.

The proposed indicative final landform has also been shaped to minimise the surface water catchment draining to the void, resulting in a surface water catchment area under the proposed modification smaller than under the current approval.

The slope of the final void has been substantially reduced from 14 to 18 degrees to generally less than 10 degrees, enabling greater land use optionality. This design consideration allows for an increase of 150ha of useable land with a slope of generally less than 10 degrees compared to the approved landform.

Rehabilitation and final landform development will continue to be undertaken in accordance with the HVO South MOP and the HVO South Rehabilitation and Landscape Management Plan. A final void management plan and mine closure plan will also be prepared in consultation with the relevant agencies at least five years prior to the completion of mining, as required by Conditions 37 and 38 Schedule 3 of the existing project approval (PA 06_0261), respectively.

It is considered that the proposed modification is appropriate having regard to the existing and approved uses of land in its vicinity.

One submission raised concern regarding dust emissions with potential to affect the local dairy. Predicted increased dust emissions are discussed in Section 6.2.2.ii. The predicted dust levels associated with the proposed modification would be of a similar extent to the current approved operations. Potential impacts to dairy operations in proximity to coal mines have been previously investigated which demonstrated that milk production is not effected when dairy cattle eat pasture comprising dust generated from nearby coal mines (Minfo 1994).

Notwithstanding the above, we acknowledge the concerns raised by near neighbours and will continue to engage and to understand if there are other reasonable activities we could consider to help address concerns relating to dust and air quality.

v Project justification and public benefits

Of the submissions referencing socio-economic matters, five considered that project justification and information related to public benefits due to the proposed modification is inadequate.

The Hunter Communities Network submission stated that the EA was not clear on the royalties and taxes directly attributable to the proposed modification. The submission also questioned whether the proposed modification was in the public interest.

Section 17 of the EA demonstrates the proposed modification's alignment with the objects of the EP&A Act, including ESD principles. ESD principles are considered further in Section 6.3.8iii. A summary of the proposed modification's justification is presented in Section 7 of this RTS.

With respect to the Hunter Communities Network, the proposed modification will enable the mine to remain economically viable supporting the maintenance of existing jobs. The additional benefits resulting from the proposed modification's implementation, discounted at 7 per cent, include \$243 million in royalties and \$160 million in taxes. Therefore, it is considered that the proposed modification assists in the valuation and pricing of environmental resources.

Through the provision of the aforementioned taxes and royalties, the proposed modification will enhance community resources by providing additional public revenues through royalties and taxes.

In this way it will contribute to improvements in the local, State and National economies and contribute to an overall increase in quality of life. Also, the proposed modification will continue to conserve community resources indirectly through effective impact mitigation.

6.2.8 Other matters

A total of 19 submissions in objection referenced matters that were outside of the categories addressed in the preceding sections of Chapter 6. The majority of these raised concerns with cumulative impacts of mining in the Hunter Valley.

Other matters raised were the failure to meet the Mining SEPP non-discretionary standards, failure to meet ESD principles, increased duration of mining, inadequate consideration of highwall alternative designs and change in HVO ownership.

The number of submissions received on other matters is shown in Figure 6.9. It is noted that a number of submissions referenced more than one matter and, therefore, the number of matters raised as shown in Figure 6.9 totals more than 19.

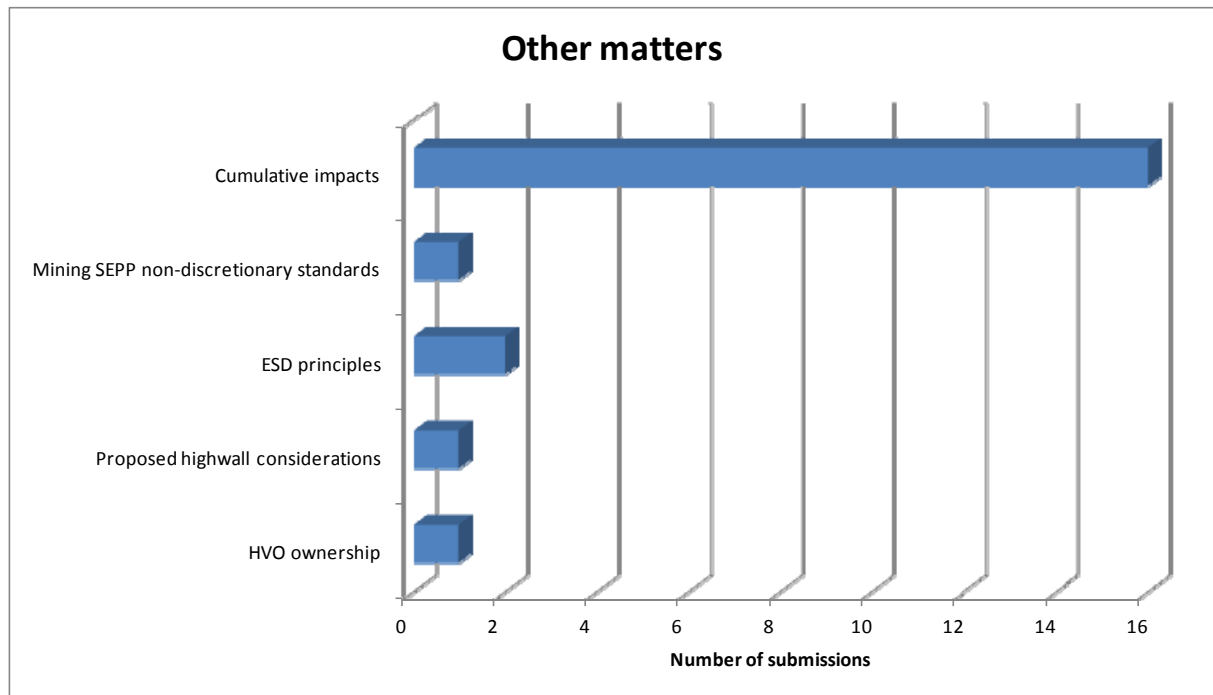


Figure 6.9 Other matters raised within submissions of objection

i Cumulative impacts

Eighteen submissions referenced cumulative impacts of mining in the Hunter Valley and that they should be included in the assessment of the proposed modification.

Where relevant and as required by government policy and guidelines, the EA and its technical studies included cumulative assessments with other nearby mines. These cumulative assessments formed a fundamental part of the proposed modification's potential impacts, particularly for elements including water, groundwater, air quality and noise.

However, we recognise the concerns about cumulative impacts extend beyond these areas of assessment. For this reason, Coal & Allied is an active participant in programmes such as the NSW Minerals Council Upper Hunter Mining Dialogue which aims to work together with local miners, community and business leaders, environment groups and residents to minimise the cumulative impacts of mining.

ii Mining SEPP non-discretionary standards

One submission contended that the Mining SEPP non-discretionary standards were not met at all assessment locations.

As noted in Section 4.3.3(ii), the non-discretionary standards under clause 12AB of the Mining SEPP apply to development applications for the purposes of mining. As this is an application to modify a project approval under section 75W of the EP&A Act, the non-discretionary development standards do not strictly apply to the application and are not a mandatory relevant consideration that the consent authority is bound to consider. However, the non-discretionary development standards remain relevant considerations that the consent authority may take into account in determining the application.

The proposed modification satisfies the non-discretionary standards for privately owned residences not already entitled to acquisition from surrounding mine operations. The proposed modification will not result in any additional exceedances of cumulative noise levels and air quality criteria. Airblast overpressure, ground vibration and aquifer interference each meet appropriate criteria set out under the Mining SEPP non-discretionary standards.

iii ESD principles

Of submissions referencing other matters, two contended that the proposed modification was inconsistent with the principles of ESD.

The principles of ESD were addressed in Section 17.3 of the EA. The principles of ESD are outlined in Section 6(2) of the *Protection of the Environment Administration Act 1991* and clause 7(4) of Schedule 2 of the *NSW Environmental Planning and Assessment Regulation 2000*. The consistency of the proposed modification with each of these principles is discussed below.

- Precautionary Principle: the proposed modification applied avoidance as a guiding principle for the proposed modification's development wherever possible. A number of design options were considered for the proposed modification, with the preferred option chosen to provide an appropriate balance between environmental, social and economic impacts and development of an efficient and flexible mine plan.

A range of environmental management plans are implemented at HVO South which have been prepared in consultation with relevant government agencies and are regularly reviewed and revised as required. These plans include contingencies to manage any unpredicted impact and their consequence. Any residual impacts will be balanced against the provision of a cost effective and efficient means of energy generation which provides for humanity's current and future needs.

For these reasons, the proposed modification is consistent with the precautionary principle.

- Social equity including intergenerational equity: the proposed modification contributes to social equity by providing a viable operation that will allow for continued direct and indirect employment. Further, it will:
 - enable the additional extraction of approximately 56.8Mt of ROM coal over the remaining project approval period within the existing State-approved disturbance footprint;
 - result in the efficient development of a geological resource into physical and human capital through investment in infrastructure and workforce training; and

- establish a Near Neighbour Amenity Resource which will fund works and services to improve amenity for near neighbours.

Taking the above matters into account, it is considered that the proposed modification will generally promote social equity including intergenerational equity.

- Conservation of biological diversity and maintenance of ecological integrity: the proposed modification is within the State-approved disturbance footprint of an existing mine and will not require clearing of additional land. The mine's existing offset strategy fully meets contemporary government policies and provides a significant ecological benefit in the long-term and, accordingly, will provide for the conservation of biological diversity and maintenance of ecological integrity.
- Improved valuation and pricing of environmental resources: the proposed modification will enable the mine to remain economically viable supporting the maintenance of existing jobs. The additional benefits, discounted at 7 per cent, include \$243 million in royalties and \$160 million in taxes.

Therefore, it is considered that the proposed modification assists in the valuation and pricing of environmental resources.

The general conclusion is that the proposed modification is consistent with ESD and its principles.

iv Project duration

A submission raised concerns with a further extension to the duration of mining at HVO South.

Operations at HVO South are approved until 23 March 2030. The proposed modification would not extend the duration of approved operations at HVO South.

v Proposed highwall considerations

This matter was also raised by the DPE and is addressed in Section 5.2.3.

vi HVO ownership

Submissions stated that the application for the proposed modification should be submitted by Yancoal Australia Ltd (Yancoal), rather than Coal & Allied, as the new owner of HVO South.

As specified in the Australia Stock Exchange (ASX) release dated 24 January 2017 regarding the sale of HVO South, the transaction of sale of HVO South from Coal & Allied to Yancoal will not be complete until approximately the second half of 2017. As such, Coal & Allied remains the current owner.

7 Conclusion

Coal & Allied seeks a modification to project approval (PA 06_0261) for its HVO South mine. The proposed modification will enable:

- the Cheshunt Pit to continue mining through the Riverview Pit, extracting the deeper Bayswater seam below the Vaux seam; and
- mining down to the base of the Vaux seam below the Bowfield seam in South Lemington Pit 2.

This RTS report formally responds to a letter from the DPE dated 21 May 2017, requesting Coal & Allied address the issues raised during the public exhibition of the Environmental Assessment (EA) for the proposed modification.

During the exhibition period (from 9 February to 10 March 2017) submissions were received from six community organisations, seven near neighbour, a further seven residents of the Singleton LGA, 18 individual members of the general public, Singleton Council and other government agencies. This report also considers other questions and concerns raised about the proposed modification during consultation, particularly by neighbours and nearby community members. While not formally captured in the submission process, Coal & Allied recognises these matters as equally important and, accordingly, these have been considered and addressed in this report.

The proposed modification will enable mining of the deeper seams within the existing State-approved disturbance footprint. This will avoid any direct impacts on aspects such as biodiversity and Aboriginal heritage. Design of the proposed modification within the constraints of the existing State-approved disturbance footprint necessitates an increase in height in some areas of the overburden emplacement up to 240mAHD, or an additional 80m to accommodate the additional volume of overburden material. The proposed modification has provided an opportunity to redesign the overburden emplacement strategy to incorporate micro-relief design techniques. Although the overburden emplacement will be higher in places, the final landform has been designed to look more consistent with natural landforms in the area.

Concerns about changes to the mine design, specifically the overburden emplacement, have been raised by the community since early engagement, and visual amenity formed a key design criterion for the proposed modification. Chapter 3 of this report outlines the design options considered, and the assessment of each against key criteria. The proposed modification attempts to find a balance, avoiding and minimising environment and amenity impacts as much as possible for our surrounding neighbours and communities.

Our neighbours and community members have also raised concerns about air quality and noise impacts, noting that even small amounts of dust or noise can affect their lifestyles or homes. Coal & Allied is keen to help reduce this effects where possible, and have commenced a number of programmes including:

- the HVO Near Neighbour Amenity Resource Plan – based on community feedback, this programme is currently targeting water tank cleaning for near neighbours;
- provision of voluntary noise mitigation for identified properties in the Maison Dieu area; and
- implementation of proactive mitigation measures at identified properties.

We will continue to seek feedback from our neighbours and identify if there are other ways of reducing concerns.

Coal & Allied recognises the concerns raised about the proposed modification both through our engagement programme as well as public submissions. We acknowledge that we will be unable to eliminate all effects and concerns, particularly for our neighbours and local communities. We have closely assessed options and designed the proposed modification to minimise impacts wherever practicable. We believe the proposed modification offers a balanced option, with the following justification:

- it will enable the implementation of an efficient and flexible mine plan;
- it will add to the important regional and local economic and social benefits from the mine's operation;
- the site is suitable for the proposed modification given that it is an existing mining operation and there will be no change to the State-approved disturbance footprint;
- it meets the Mining SEPP's non-discretionary standards for noise and air quality amenity at all privately owned residences not already entitled to acquisition from surrounding mine operations;
- potential environmental and social impacts are largely consistent with those approved under the existing project approval (PA 06_0261) such that the existing management controls implemented by HVO South require only minor amendments; and
- it is aligned with the principles of ecologically sustainable development, consistent with the contemporary legislative requirements and meets all relevant government policies.

The proposed modification will facilitate the extraction, processing and transportation of a state resource by an existing mining operation. This can be efficiently achieved by Coal & Allied because of the hundreds of millions of dollars invested in the operation and its existing access to product transport and distribution infrastructure such as road, rail and port.

The proposed modification will add to the important regional and local economic and social benefits from the mine's operation. It would add to the economic benefits to the NSW Government in the form of royalties, and to the Commonwealth Government in the form of company and income taxes.

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Submission summary

Appendix A

Submission summary

Summary of matters raised														
Respondent type (I - individual, O-organisation)		I	I	I	I	I	I	I	I	I	I	I	I	
No.		1	2	3	4	5	6	7	8	9	10	11	12	13
Name														
LGA	Newcastle	Singleton	Muswellbrook	Hornsby	Newcastle	?	Newcastle	Singleton	Singleton	Singleton	Singleton	Singleton	Maitland	Newcastle
Postcode	2291	2330	2333	2119	2300	?	2297	2330	2330	2330	2330	2330	2323	2300
Identifier	193969	193993	193871	194163	194292	194298	192787	194966	194339		183003	194300	193931	192874
Matter														
Socio-economics														
Economic viability of coal industry				1										
Impacts on value of surrounding property								1	1					
Impacts on potential agricultural land and surrounding farms												1		
Poor justification / incorrect information on public benefits														
Impacts on health				1					1					
Incompatibility with surrounding rural and residential land uses														
HVGC recreational use of area inaccurately categorised as infrequent														
Noise														
Noise impacts - general		1	1				1	1	1			1	1	
Noise impacts - blasting		1						1					1	
Noise impacts - cumulative						1				1		1		
Ongoing dissatisfaction with noise mitigation at local residences								1						
Dispute accuracy of noise assessment														
Noise criterion are not met at one assessment location														
HVGC property has not been adequately considered as a sensitive receptor														
Increase in traffic noise impacts														
Air quality														
Increase in dust emissions - general impacts	1	1	1			1	1	1	1			1	1	
Increase in dust emissions - cumulative impacts		1			1	1				1		1	1	
Increase in greenhouse gas emissions		1	1	1	1									1
Cumulative impact assessment used inappropriate scope														
EA has not considered diesel emissions														

Summary of matters raised														
Respondent type (I - individual, O-organisation)		I	I	I	I	I	I	I	I	I	I	I	I	
No.		1	2	3	4	5	6	7	8	9	10	11	12	13
Name														
LGA	Newcastle	Singleton	Muswellbrook	Hornsby	Newcastle	?	Newcastle	Singleton	Singleton	Singleton	Singleton	Singleton	Maitland	Newcastle
Postcode	2291	2330	2333	2119	2300	?	2297	2330	2330	2330	2330	2330	2323	2300
Identifier	193969	193993	193871	194163	194292	194298	192787	194966	194339		183003	194300	193931	192874
Matter														
Dispute accuracy of air quality assessment														
Relevant air quality criteria are not met at two assessment locations														
HVGC property has not been adequately considered as a sensitive receptor														
Ecology														
Impacts to ephemeral wetland (Carrington Billabong)			1	1		1		1					1	
Impacts to threatened vegetation populations and communities			1	1		1		1					1	
Biodiversity - general impacts													1	
Visual amenity														
Light pollution		1								1				
General visual amenity impacts		1	1			1	1			1		1	1	
Cumulative visual impacts		1				1	1			1		1		
Water														
Increase in discharges to Hunter River			1					1				1	1	
Impact of final void on ground and surface water			1										1	
Impact on general water resources														
Impact of low wall on water drainage														
Increase groundwater and aquifer drawdown			1				1	1				1	1	
Groundwater - cumulative impacts			1				1					1	1	
Final landform, rehabilitation and landuse														
Disturbance to previously rehabilitated area		1												
Size of final void			1	1			1	1				1	1	
Increased cost of future rehabilitation														
Inadequate rehabilitation plans														
Increased height of landform may pose aviation hazards														

Summary of matters raised														
Respondent type (I - individual, O-organisation)		I	I	I	I	I	I	I	I	I	I	I	I	
No.		1	2	3	4	5	6	7	8	9	10	11	12	13
Name														
LGA	Newcastle	Singleton	Muswellbrook	Hornsby	Newcastle	?	Newcastle	Singleton	Singleton	Singleton	Singleton	Singleton	Maitland	Newcastle
Postcode	2291	2330	2333	2119	2300	?	2297	2330	2330	2330	2330	2330	2323	2300
Identifier	193969	193993	193871	194163	194292	194298	192787	194966	194339		183003	194300	193931	192874
Matter														
Other matters														
Proposal fails to meet Mining SEPP non-discretionary development standards for mining														
Proposal is not congruent with ESD principles														
Increased duration of mining at the site will extend duration of impacts														
Impacts of proposed highwall have not been adequately assessed														
General cumulative impacts of mining in the region			1	1			1	1					1	
Application should be submitted by new owners														
Project approval boundary in EIS encroaches on land held by Glencore, CFMEU and the Wambo Coal Mine project														

Submission in support

Summary of matters raised															
Respondent type (I - individual, O-organisation)		I	I	I	I	I	I	I	I	I	I	I	I	I	
No.		14	15	16	17	18	19	20	21	22	23	24	25	26	27
Name															
LGA		Janet Fenwick	John Van Der Kallen	Judith Leslie	Katrin Gustafson	Margaret Edwards	Megan Benson	Michael Campbell	Name Withheld 1	Name Withheld 2	Name Withheld 3	Name Withheld 4	Robert Hayes	Robert McLaughlin	Ron Fenwick
Postcode		Singleton 2330	Newcastle 2298	Singleton 2330	Newcastle 2300	Maitland 2323	Sutherland 2230	Central coast 2259	Singleton 2330	Singleton 2335	Sydney 2000	Singleton 2330	Singleton 2330	Singleton 2330	Singleton 2330
Identifier		193714	194226	193483	194311	193917	194230	192711	192512	193437	193728	193571	193877	193983	192914
Matter															
Socio-economics															
Economic viability of coal industry				1	1		1								
Impacts on value of surrounding property				1			1								
Impacts on potential agricultural land and surrounding farms				1						1					
Poor justification / incorrect information on public benefits				1			1					1			
Impacts on health			1	1			1					1			
Incompatibility with surrounding rural and residential land uses															
HVGC recreational use of area inaccurately categorised as infrequent															
Noise															
Noise impacts - general		1		1		1	1		1		1		1	1	1
Noise impacts - blasting		1		1		1	1							1	1
Noise impacts - cumulative				1					1						
Ongoing dissatisfaction with noise mitigation at local residences													1		
Dispute accuracy of noise assessment															
Noise criterion are not met at one assessment location															
HVGC property has not been adequately considered as a sensitive receptor															
Increase in traffic noise impacts															
Air quality															
Increase in dust emissions - general impacts		1		1		1	1		1	1	1	1		1	1
Increase in dust emissions - cumulative impacts		1		1					1	1		1		1	
Increase in greenhouse gas emissions			1				1							1	
Cumulative impact assessment used inappropriate scope												1			
EA has not considered diesel emissions												1			

Summary of matters raised															
Respondent type (I - individual, O-organisation)		I	I	I	I	I	I	I	I	I	I	I	I	I	I
No.		14	15	16	17	18	19	20	21	22	23	24	25	26	27
Name															
LGA	Singleton	Newcastle	Singleton	Newcastle	Maitland	Sutherland	Central coast	Singleton	Singleton	Sydney	Singleton	Singleton	Singleton	Singleton	Singleton
Postcode	2330	2298	2330	2300	2323	2230	2259	2330	2335	2000	2330	2330	2330	2330	2330
Identifier	193714	194226	193483	194311	193917	194230	192711	192512	193437	193728	193571	193877	193983	192914	
Matter															
Dispute accuracy of air quality assessment															
Relevant air quality criteria are not met at two assessment locations															
HVGC property has not been adequately considered as a sensitive receptor															
Ecology															
Impacts to ephemeral wetland (Carrington Billabong)		1		1										1	
Impacts to threatened vegetation populations and communities		1		1		1								1	
Biodiversity - general impacts												1			
Visual amenity															
Light pollution															
General visual amenity impacts		1		1		1	1				1	1		1	1
Cumulative visual impacts		1												1	
Water															
Increase in discharges to Hunter River		1		1		1	1	1						1	1
Impact of final void on ground and surface water		1		1			1					1		1	1
Impact on general water resources							1				1				
Impact of low wall on water drainage															
Increase groundwater and aquifer drawdown		1		1			1	1						1	1
Groundwater - cumulative impacts		1		1			1	1				1		1	1
Final landform, rehabilitation and landuse															
Disturbance to previously rehabilitated area															
Size of final void		1		1		1	1	1			1	1		1	1
Increased cost of future rehabilitation								1				1			
Inadequate rehabilitation plans															
Increased height of landform may pose aviation hazards															

Summary of matters raised															
Respondent type (I - individual, O-organisation)		I	I	I	I	I	I	I	I	I	I	I	I	I	
No.		14	15	16	17	18	19	20	21	22	23	24	25	26	27
Name															
LGA	Singleton	Newcastle	Singleton	Newcastle	Maitland	Sutherland	Central coast	Singleton	Singleton	Sydney	Singleton	Singleton	Singleton	Singleton	Singleton
Postcode	2330	2298	2330	2300	2323	2230	2259	2330	2335	2000	2330	2330	2330	2330	2330
Identifier	193714	194226	193483	194311	193917	194230	192711	192512	193437	193728	193571	193877	193983	192914	
Matter															
Other matters															
Proposal fails to meet Mining SEPP non-discretionary development standards for mining															
Proposal is not congruent with ESD principles				1											
Increased duration of mining at the site will extend duration of impacts															
Impacts of proposed highwall have not been adequately assessed															
General cumulative impacts of mining in the region		1		1			1	1		1	1			1	1
Application should be submitted by new owners															
Project approval boundary in EIS encroaches on land held by Glencore, CFMEU and the Wambo Coal Mine project															

Submission in support

Summary of matters raised											
Respondent type (I - individual, O-organisation)	I	I	I	I	O	O	O	O	O	O	I
No.	28	29	30	31	32	33	34	35	36	37	38
Name											
LGA	Singleton	Mid-coast	Singleton	Muswellbrook	Singleton	Maitland	Singleton	Singleton	Newcastle	Singleton	Singleton
Postcode	2330	2430	2330	2333	2330	2323	2330	2330	2303	2330	2330
Identifier	188045	192734	192908	193873	194274	193919	194129	194167	194290	194387	199565
Matter											
Socio-economics											
Economic viability of coal industry										1	
Impacts on value of surrounding property										1	
Impacts on potential agricultural land and surrounding farms					1	1				1	1
Poor justification / incorrect information on public benefits					1	1					
Impacts on health		1	1			1	1			1	
Incompatibility with surrounding rural and residential land uses					1						
HVGC recreational use of area inaccurately categorised as infrequent							1				
Noise											
Noise impacts - general		1	1	1	1	1	1		1	1	1
Noise impacts - blasting		1	1		1	1			1	1	
Noise impacts - cumulative						1	1		1		
Ongoing dissatisfaction with noise mitigation at local residences											
Dispute accuracy of noise assessment					1						
Noise criterion are not met at one assessment location					1						
HVGC property has not been adequately considered as a sensitive receptor							1				
Increase in traffic noise impacts										1	
Air quality											
Increase in dust emissions - general impacts		1	1	1	1	1	1		1	1	1
Increase in dust emissions - cumulative impacts		1			1	1	1		1		
Increase in greenhouse gas emissions				1	1						
Cumulative impact assessment used inappropriate scope											
EA has not considered diesel emissions											

Summary of matters raised											
Respondent type (I - individual, O-organisation)	I	I	I	I	O	O	O	O	O	O	I
No.	28	29	30	31	32	33	34	35	36	37	38
Name											
LGA	Singleton	Mid-coast	Singleton	Muswellbrook	Singleton	Maitland	Singleton	Singleton	Newcastle	Singleton	Singleton
Postcode	2330	2430	2330	2333	2330	2323	2330	2330	2303	2330	2330
Identifier	188045	192734	192908	193873	194274	193919	194129	194167	194290	194387	199565
Matter											
Dispute accuracy of air quality assessment					1						
Relevant air quality criteria are not met at two assessment locations											
HVGC property has not been adequately considered as a sensitive receptor							1				
Ecology											
Impacts to ephemeral wetland (Carrington Billabong)		1			1	1					
Impacts to threatened vegetation populations and communities		1			1	1					
Biodiversity - general impacts				1	1	1					
Visual amenity											
Light pollution										1	1
General visual amenity impacts	1	1	1		1	1	1			1	1
Cumulative visual impacts		1			1	1	1			1	
Water											
Increase in discharges to Hunter River		1		1	1	1					
Impact of final void on ground and surface water	1	1			1	1					
Impact on general water resources					1				1		
Impact of low wall on water drainage	1										
Increase groundwater and aquifer drawdown		1		1	1	1			1		
Groundwater - cumulative impacts		1			1	1			1		
Final landform, rehabilitation and landuse											
Disturbance to previously rehabilitated area											
Size of final void	1	1		1	1	1			1		
Increased cost of future rehabilitation					1						
Inadequate rehabilitation plans	1				1				1		
Increased height of landform may pose aviation hazards							1				

Summary of matters raised											
Respondent type (I - individual, O-organisation)		I	I	I	I	O	O	O	O	O	O
No.		28	29	30	31	32	33	34	35	36	37
Name											
LGA		Singleton	Mid-coast	Singleton	Muswellbrook	Singleton	Maitland	Singleton	Singleton	Newcastle	Singleton
Postcode		2330	2430	2330	2333	2330	2323	2330	2330	2303	2330
Identifier		188045	192734	192908	193873	194274	193919	194129	194167	194290	194387
Matter											
Other matters											
Proposal fails to meet Mining SEPP non-discretionary development standards for mining						1					
Proposal is not congruent with ESD principles						1					
Increased duration of mining at the site will extend duration of impacts								1			1
Impacts of proposed highwall have not been adequately assessed		1									
General cumulative impacts of mining in the region			1			1	1	1		1	1
Application should be submitted by new owners											
Project approval boundary in EIS encroaches on land held by Glencore, CFMEU and the Wambo Coal Mine project									1		

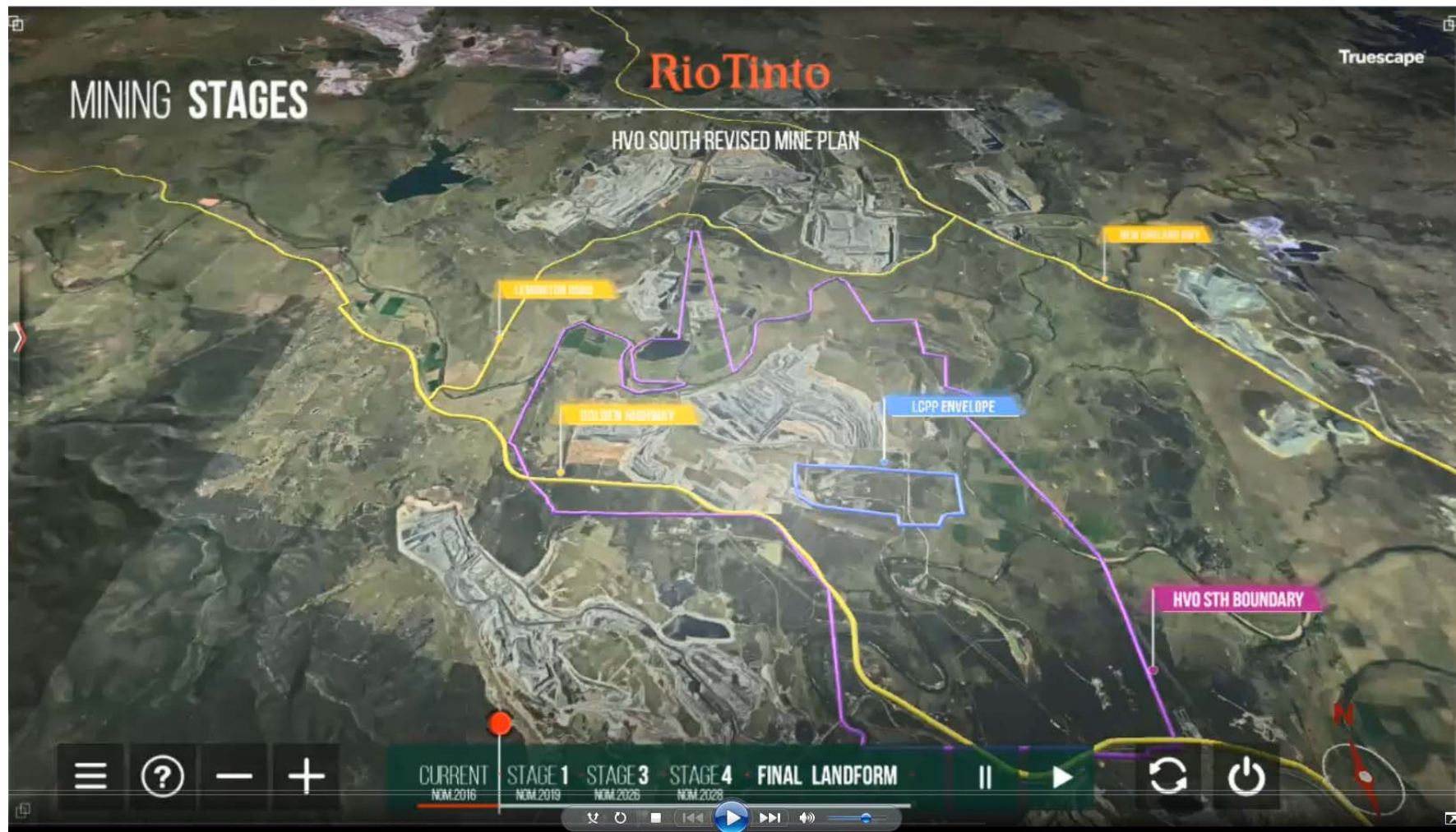
Submission in support

Truescape video

Appendix B

Truescape video

Link for accessing the Truescape video - http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8223



Final landform considerations with no mining of South Lemington Pit 2

Appendix C

Final landform considerations with no mining of South Lemington Pit 2

Mining of South Lemington Pit 1 and South Lemington Pit 2 would occur concurrently under the proposed modification. This is shown in the indicative mine plans within Figures 3.4 to 3.6 in the HVO South Modification 5 Environmental Assessment (EMM 2017). These indicative mine plans were used as a worst case scenario to assess the potential impacts from dust and noise for our near neighbours. These pits may however be mined separately if required or if the economic assumptions change between now and the predicted start date. Impacts from mining these pits separately would be within the envelope of the maximum impacts presented in EMM 2017.

The proposed pit shells for mining of South Lemington Pits 1 and 2 are shown in Figure C.1.

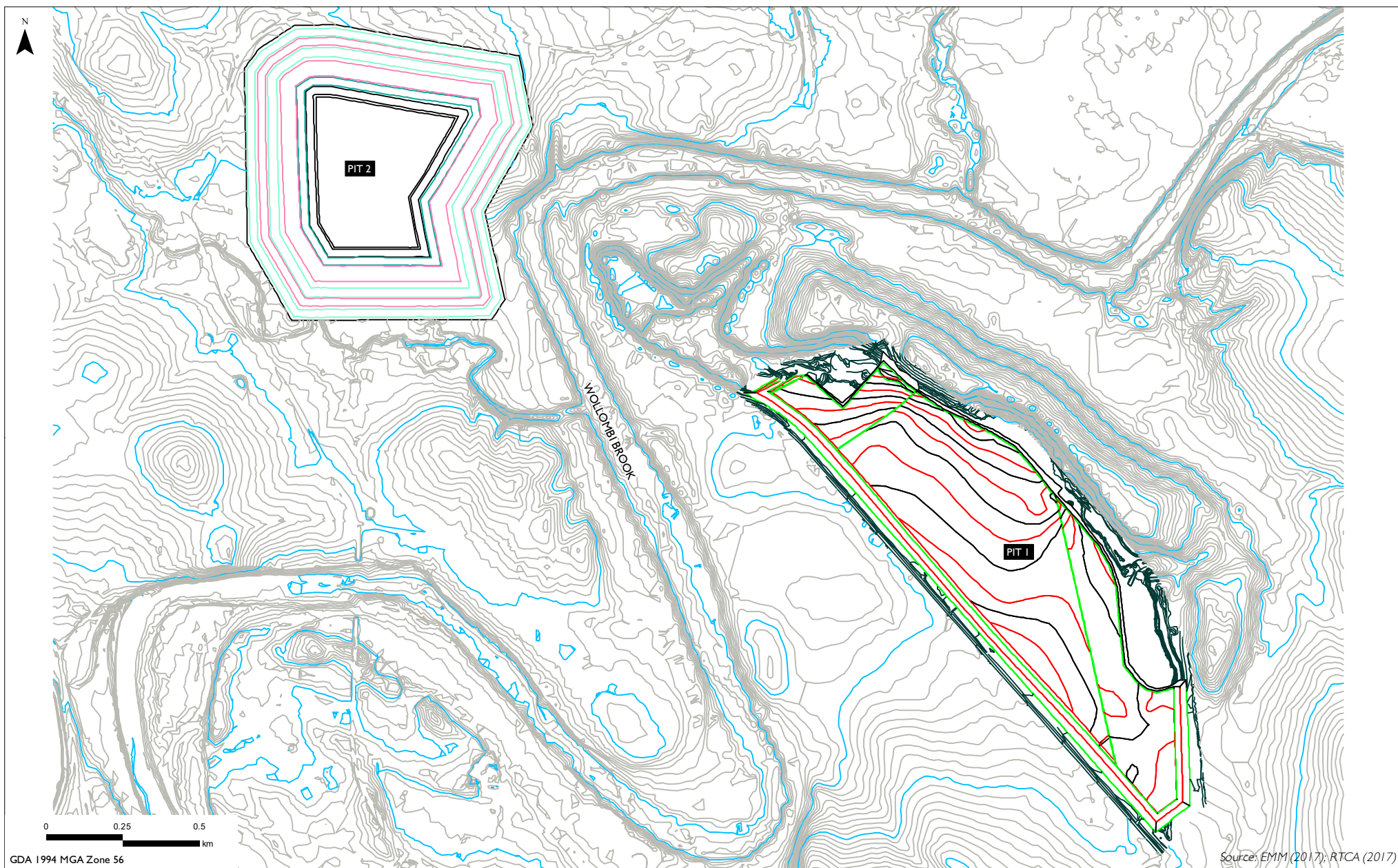
Under the proposed modification, a total overburden volume of approximately 83M Loose Cubic Metres (LCM) would be dug to extract approximately 11Mt ROM coal in South Lemington Pit 2. This overburden would be used to create the landform in South Lemington Pit 1 with overburden later coming from South Lemington Pit 1 to assist with creating the landform in South Lemington Pit 2. The proposed landform also allows for material from Riverview /Cheshunt Pits to be emplaced in South Lemington Pit 2 and South Lemington Pit 1.

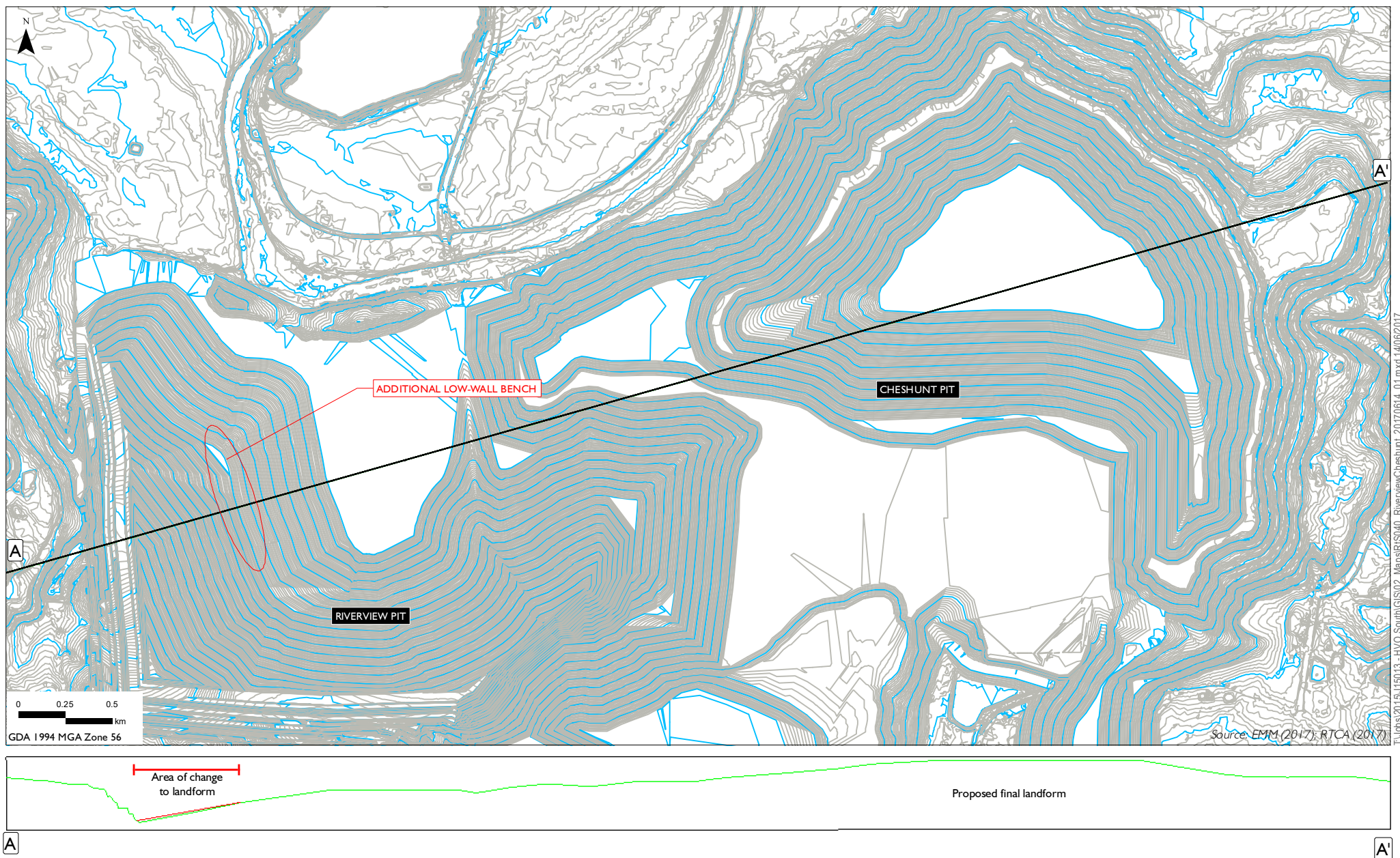
In a situation where mining of South Lemington Pit 2 was not progressed, less overburden from Riverview/Cheshunt Pits would be required for emplacement. This would increase the volume within the Cheshunt/ Riverview final landform by approximately 8.3M LCM.

This increased volume is approximately 0.58 per cent of the proposed overburden material movement within the Riverview/ Cheshunt areas and is not considered a significant change. Further, it is unlikely to make a significant or readily visible physical change to the proposed final landform.

The most likely and feasible final landform outcome for the additional 8.3M LCM would be a 7-10m bench on the bottom half of the westernmost face of the Cheshunt final void's internal low-wall.

Figure C2 shows a contour map of the proposed final landform, without micro-relief applied. Beneath the contour map is a cross section of the same proposed final landform. The length of the potential additional low-wall bench is shown on the map (refer to ellipse shape within Riverview Pit). The cross-section shows the proposed final landform in green and the potential additional bench in red. Reference points between the map and section are provided to assist with scale. Note the bench would likely be unrecognisable and integrated into the landscape once micro-relief and vegetation is applied to the proposed final landform. It would also not alter the useable land available in the long term.





Cross-section of landform change with no mining in South Lemington Pit 2

HVO South Modification 5

Response to submissions

Figure C.2

