ASSESSMENT REPORT

AUSTAR COAL PROJECT
Mine Plan Reconfiguration Modification (08_0111 Mod 2)

1 BACKGROUND

Austar Coal Mine Pty Limited (Austar), a subsidiary of Yancoal Australia Pty Limited, owns and operates the Austar Coal Mine, an underground coal mine located 10 kilometres (km) south of Cessnock, in the Lower Hunter Valley (see Figure 1). The mine is an amalgamation of the historic Ellalong, Southland and Bellbird South collieries. These operations, including coal extraction, handling, processing and transport, collectively form the Austar Coal Mine (or Austar Mine Complex).

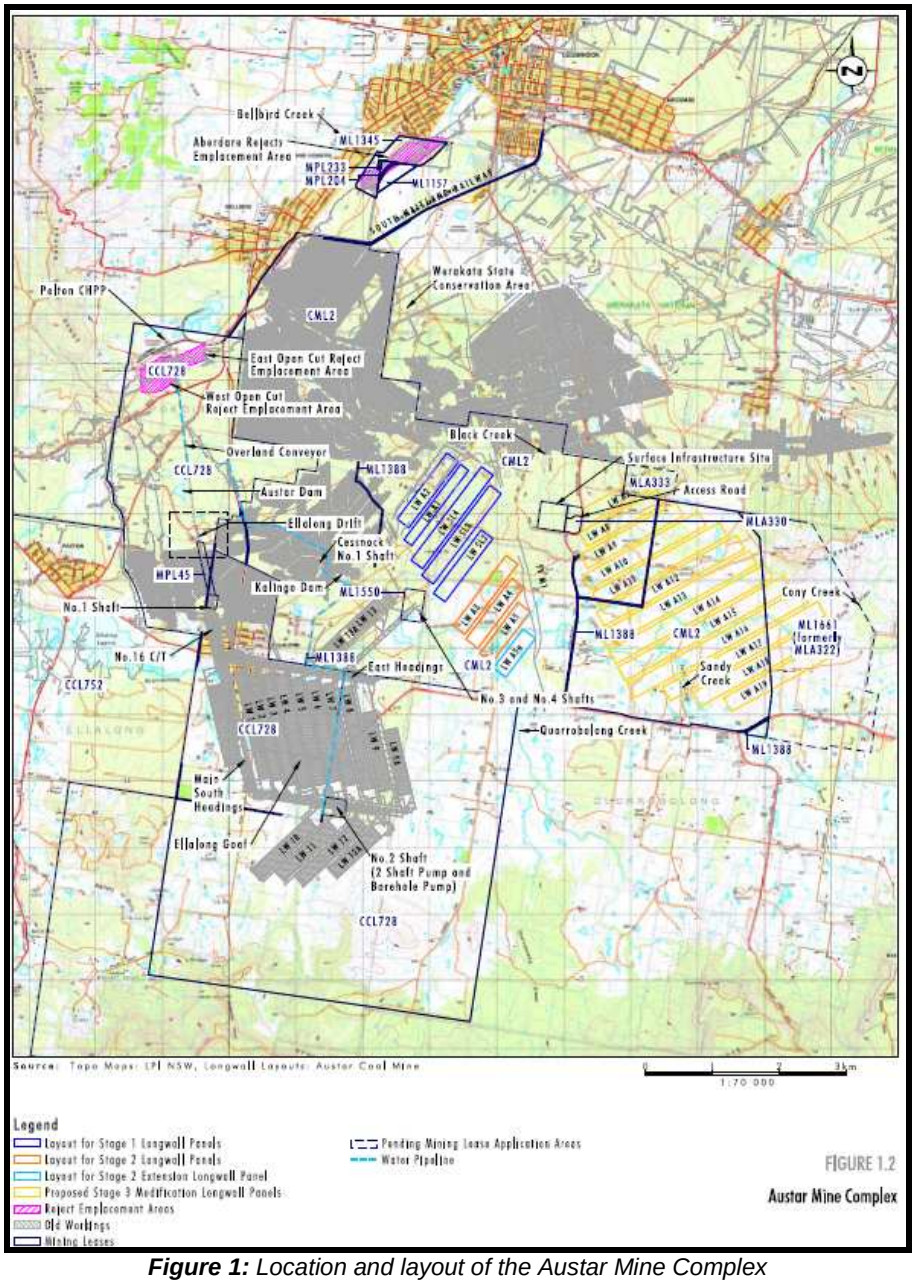

Figure 1: *Location and layout of the Austar Mine Complex*

Austar acquired the mine in 2004, after it was placed into receivership following a fire in the underground workings. The Austar Mine Complex operates within a number of mining leases, and under 12 separate development consents issued by the Minister and Cessnock City Council between 1974 and 2002. Stage 1 of mining has been completed, and longwall mining is currently being undertaken in Stage 2 (Panels A3 – A5A). The consent for Stages 1 and 2 was issued by the then Minister for Urban Affairs and Planning in 1996 (DA29/95). This Ministerial consent was modified in 2006 to allow a new longwall mining technique, Longwall Top Coal Caving (LTCC), to be applied to Panels A1 and A2, and was modified again in 2008 to allow LTCC to be applied to Panels A3 to A5.

The Stage 3 mine plan (known as the Austar Coal Project, and shown in yellow on Figure 1) was approved by the Minister in August 2009 (MP 08_0111). This approval is the "dominant" approval at the mine, allowing Austar to extract up to 3.6 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, process this coal at the nearby Pelton coal handling and preparation plant (CHPP), dispose of coal rejects and tailings, and transport coal by rail to the Port of Newcastle, and by road to specialist end users. The approval has been modified once, to amend a condition relating to subsidence impact performance measures. This approval is due to expire on 31 December 2030. A copy of the project approval (as modified) is provided in Appendix A.

2 PROPOSED MODIFICATION

Austar has lodged an application to modify MP 08_0111 under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The application seeks to reconfigure the approved mine plan for the Stage 3 mining area. This involves removing approved longwall Panel A6 from the mine plan, and placing the main headings in that location. It also involves re-orienting the remaining Stage 3 panels (see Figure 2). The modified panels would be shorter than the approved panels, but up to 10 metres (m) wider. The chain pillar widths would be increased from 45 m to 55 m. The proposed new mine plan would allow the extraction of one additional panel over that approved under the original mine plan (13 longwall panels instead of 12).

Austar recently undertook further geological assessment of the entire Stage 3 mining area. This assessment considered the impacts of geological structures (such as faults and dykes), and the quality of the coal in the western area of Stage 3. Austar found that, if the east-west longwall panels were re-oriented, and Panel A6 was removed and replaced with the Stage 3 main headings, it would lead to significant risk reductions, which include:

- reducing the risk of strata failure, due to the proposed alignment of the panels with the principal regional stress direction in the geological strata;
- reducing the risk of roadway failure and subsidence impact risks through increasing the chain pillar widths from 45 to 55 m;
- allowing access to thick, high-quality coal west of approved Panels A7 – A17, which would have otherwise been sterilised; and
- reducing the risk to coal production between the geologically constrained areas located in the area of Panel A6.

The proposed modification would therefore allow Austar to:

- maximise the recovery of valuable coal resources which would have been not as fully recovered under the approved mine plan;
- further limit the level of surface environmental impacts; and
- reduce potential mine safety risks.

Part of the proposed mining would take place within the Werakata State Conservation Area (SCA). About 90% of Panel A7, about half of Panel A8 and about 20% of Panel A9 lies within the SCA. As a consequence, the consent of the Minister for the Environment is required before the modification application can be determined (see section 3.4).

The proposed modification seeks only to reconfigure the Stage 3 mine plan. It does not seek to increase the life of the project or change the mining method, coal production rate or other approved activities. The proposed modification is described in full in the document titled *Austar Coal Mine Environmental Assessment Stage 3 Modification* (the EA, see Appendix B), dated September 2011.

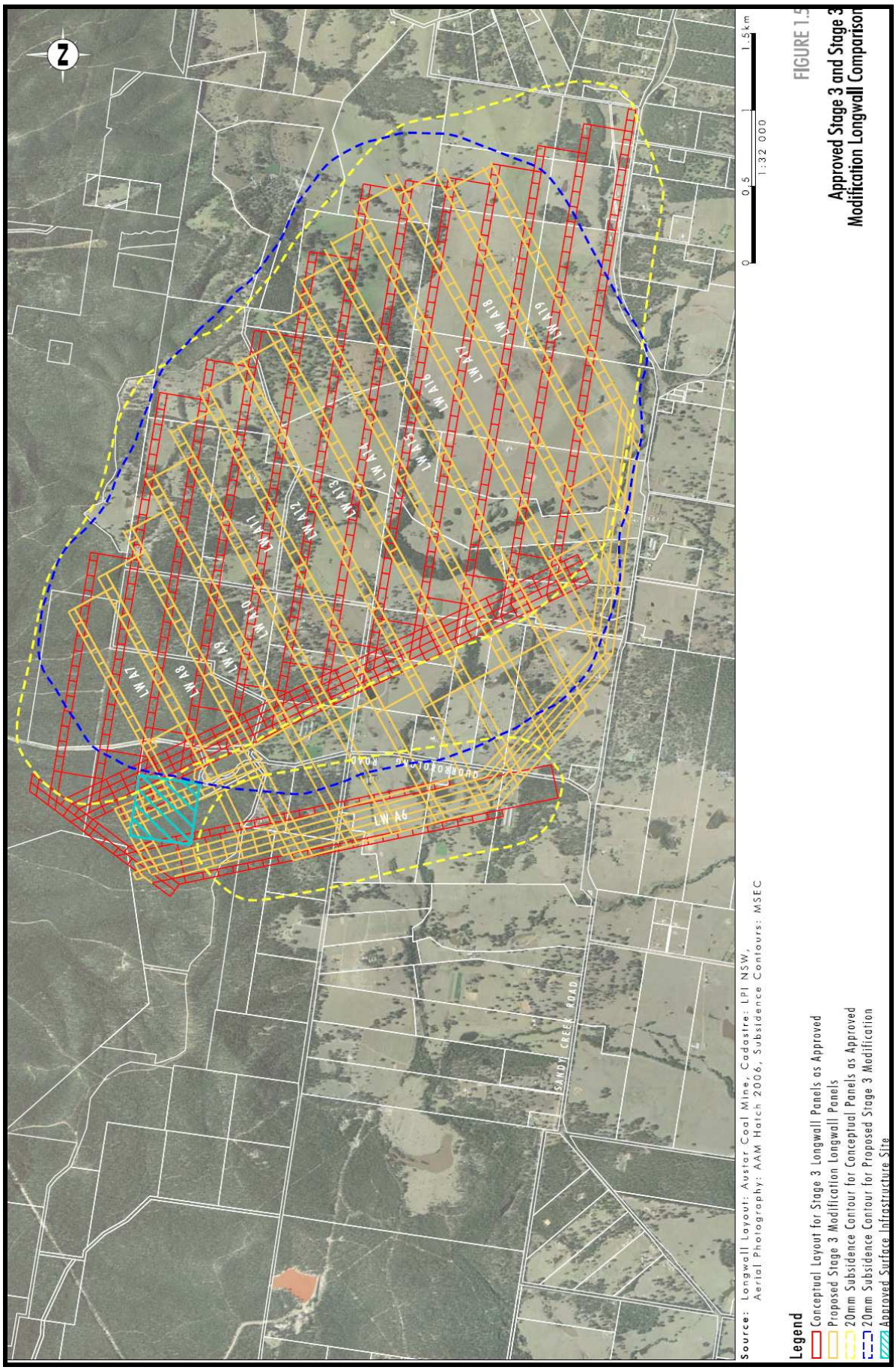

Figure 2: *Proposed modified Stage 3 mine plan*

3 STATUTORY CONTEXT

3.1 Approval Authority

Under section 75W of the EP&A Act, the Minister for Planning and Infrastructure is the approval authority for the application. However, under the Minister's delegation of 14 September 2011, the Executive Director, Major Projects Assessment may determine the application, as Austar has not reported political donations, Cessnock Council did not object, and less than 10 public objections were received.

3.2 Modification

The Department has considered the nature of the proposed modification and is satisfied that it can be characterised as a modification, under section 75W, to the approved project. The Department notes that the resulting environmental impacts would be substantially the same, or less than, the approved project, and there would be no change to the approved mining methods, no increase in coal production, and no change to coal handling and transport methods. Consequently, the Department is satisfied that that the proposed modification is within the scope of section 75W of the EP&A Act.

3.3 Environmental Planning Instruments

Section 4.0 of the EA (see Appendix B) includes an assessment of the application against relevant environmental planning instruments, including State Environmental Planning Policies (SEPPs) and the *Cessnock Local Environmental Plan 1989* and the (then) draft *Cessnock Local Environmental Plan 2011*. The Department has reviewed Austar's assessment of the application against these instruments and concurs with its assessment.

3.4 Landowner's Consent

In accordance with Clause 8F of the *Environmental Planning and Assessment Regulation 2000*, Austar requested landowner's consent from the Minister for the Environment for the underground mining activities which it plans to undertake within the Werakata SCA. Austar referred the modification application, the EA and its response to submissions document to National Parks and Wildlife Service on 10 January 2012. Landowner's consent was granted by the Minister for the Environment on 8 March 2012 (see Appendix E).

4 CONSULTATION

The Department exhibited the EA between 9 – 30 September 2011. During the exhibition period the Department received 9 submissions, which included:

- Office of Environment and Heritage (***OEH***), within the Department of Premier and Cabinet;
- *National Parks and Wildlife Service* ***(NPWS)***, within OEH;
- NSW Office of Water (***NOW***), within the Department of Primary Industries;
- the Division of Resources and Energy (***DRE***), within the Department of Trade and Investment, Regional Infrastructure and Services;
- Mine Subsidence Board (***MSB***);
- Cessnock City Council (**Council**);
- one submission from a special interest group (the Construction, Forestry, Mining and Energy Union (CFMEU)); and
- two submissions from the general public.

A summary of the issues raised during the consultation process is provided below. A copy of the submissions is provided in Appendix C. Austar subsequently provided the Department with a Response to Submissions (RTS) document, which the Department placed on its website. A copy of the RTS is provided in Appendix D.

Public Authorities

OEH determined it was able to support the proposed modification. It also stated that the conditions of approval should be modified to address the management of weed species (including Myrtle Rust) and update the mine's Aboriginal Cultural Heritage Management Plan.

NPWS raised no objection to the proposed modification. NPWS commented that Austar would require landowner's consent from the Minister for the Environment for mining it plans to undertake within the Werakata SCA (see section 3.4).

NOW emphasised the need to protect water access to existing users. It also requested that Austar develop a groundwater monitoring and contingency response program for the proposed modification. NOW also raised concerns regarding potential connective fracturing of alluvial deposits associated with Sandy Creek. It requested the preparation of a Stream Management Plan, to protect watercourses and monitor subsidence impacts.

DRE supported the proposed modification, subject to Austar providing a Mining Operations Plan, Subsidence Management Plan and Annual Environmental Management Report.

MSB did not object to the proposed modification. It requested that Austar provide its Built Features Management Plan, and stated that compensation agreements between the mine and local landowners should not impact on landowner rights under the *Mine Subsidence Compensation Act 1961*.

Council did not object to the proposed modification, but indicated that it believed that mine subsidence may impact on public infrastructure and the Ellalong Lagoon (located approximately 8 km from the proposed mining area).

Special Interest Groups

The ***CFMEU*** strongly supported the proposal, highlighting the social benefits the mine provides through employment.

Public Submissions

Two local landowners whose properties would be undermined made submissions. Both these submissions generally objected to the proposed modification, and raised concerns relating to increased flooding impacts at private properties, vibration impacts and the impact of the mine on local property values.

5 ASSESSMENT

The Department has reviewed the EA, submissions received during the exhibition of the EA, and the RTS, and considers the key environmental issues requiring assessment are:

- subsidence-induced impacts;
- surface water, flooding and groundwater impacts; and
- vibration impacts.

4.1 Mine Subsidence

Mine Subsidence Engineering Consultants Pty Limited (MSEC) re-assessed subsidence impacts for the proposed modified Stage 3 mine plan, using its recognised Incremental Profile Method. The modified mine plan would reduce the overall area of surface impact by 140 hectares, and the actual location of impacts would be altered in some cases. Subsidence would be expected to decrease in the west of the approved Stage 3 area due to the removal of Panel A6, and decrease in the southeast and northwest through the reconfiguration of the other Stage 3 panels. A minor increase in impact could potentially occur in the area between the approved Panel A6 and the western extent of the remaining panels, as this area was not previously proposed to be mined.

MSEC re-assessed potential subsidence impacts on natural and built features above and in proximity to the proposed modified panels. Key maximum (ie after all extraction has occurred) subsidence parameters predicted under both the approved project and the proposed modification are shown in Table 1 below.

Table 1: *Maximum subsidence predictions – approved and proposed*

Stage 3 Project	Maximum predicted cumulative subsidence (mm)	Maximum predicted tilt (mm)
As approved	1925	6.7
Proposed modification	1800	6.5

The predicted maximum vertical subsidence for the panels individually would vary from approximately 425 millimetres (mm) for Panel A7 to 1800 mm for Panel A19. These subsidence levels are similar to those predicted for the approved project. However, the maximum vertical subsidence for any panel under the modified mine plan would be 125 mm less than that predicted for the approved project. Maximum levels of tilts and strains are also predicted to be similar to the levels previously assessed

and approved. The resulting subsidence profiles would be similar to that of the existing approved project, albeit the subsidence troughs would be aligned in a different direction (see Figure 2).

There are 26 privately-owned residential dwellings within the proposed limit of subsidence, 6 less than the total number predicted to be impacted under the approved project (see Figure 3). MSEC re-assessed the potential for subsidence to cause damage to residences. The results indicate that no residence would experience tilts and strains greater than predicted for the approved project, and all residences would remain in safe, serviceable and easily repairable under the modified project.

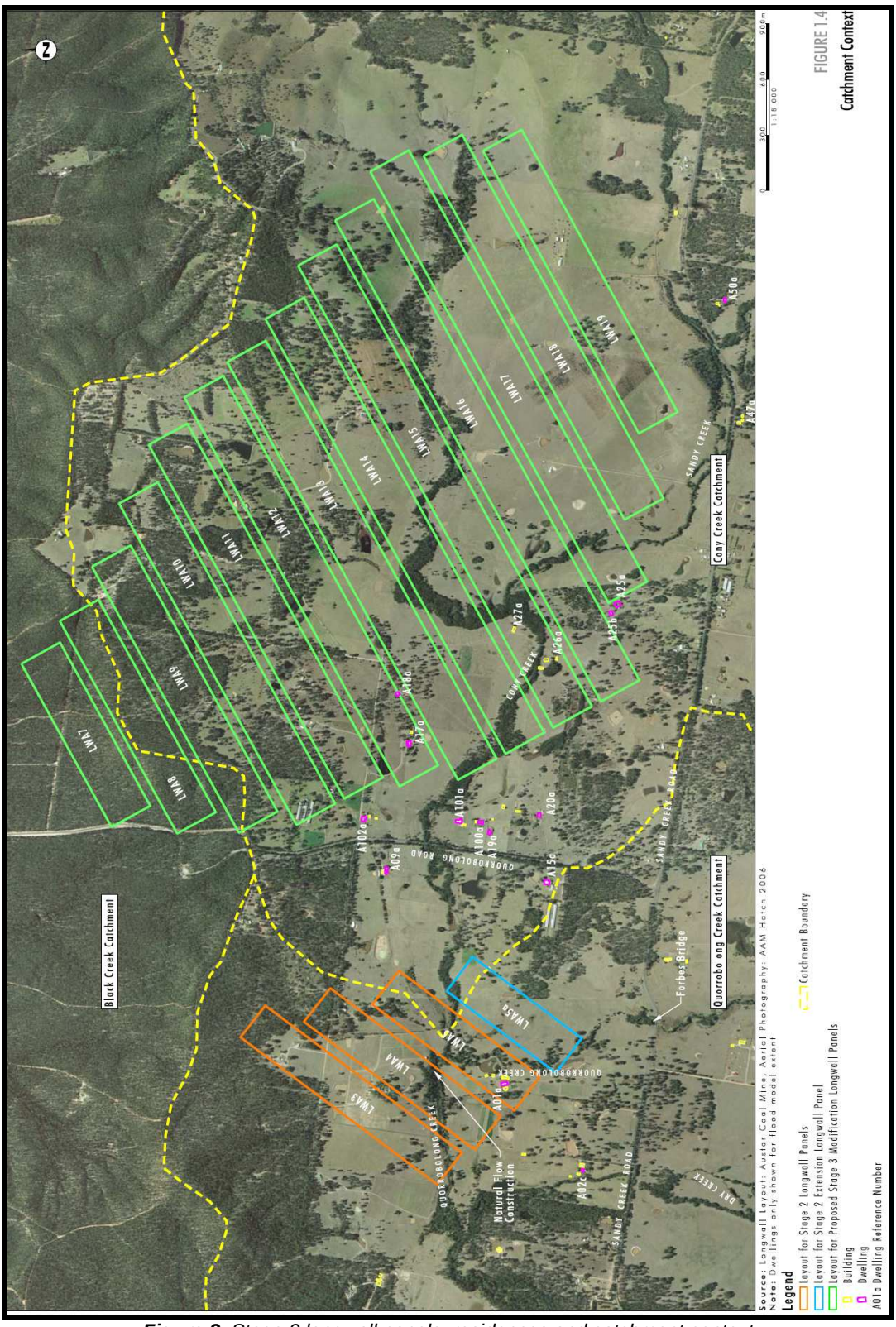

***Figure 3**: Stage 3 longwall panels, residences and catchment context*

The Department accepts that the likely subsidence impacts on residences would continue to be minor and would be appropriately managed under the existing conditions of approval. Any repairs required at the residences would be undertaken in accordance with well-established processes applicable under the *Mine Subsidence Compensation Act 1961*. The Department is satisfied that the current conditions of approval would continue to provide adequate protection to landowners from unforeseen subsidence impacts, and notes that properties would be required to be acquired on request from the landowner should mining cause the relevant safe, serviceable and repairable criteria to be exceeded.

The subsidence impact assessment reconsidered impacts to other built features, including swimming pools; agricultural land-use and associated built improvements; public infrastructure including roads, bridges and powerlines; and natural features including steep slopes and hills. The assessment found:

- reduced levels of subsidence were predicted for all swimming pools, farm buildings, roads, powerlines, steep slopes and hills; and
- a negligible increase in the predicted subsidence level at the Cony Creek Bridge.

The assessment concluded that longwall extraction of coal under the modified Stage 3 plan would not cause significant subsidence impacts at any built or natural feature. Any unpredicted impacts to built or natural features would be expected to be minor in nature and easily repaired or remediated.

Other natural features which may be impacted include Cony Creek, Sandy Creek and Aboriginal cultural heritage sites. The assessment of predicted variations to approved impacts to the creeks is considered in Section 4.3 below, and impacts to Aboriginal cultural heritage sites are discussed in Section 4.4 below.

The Department has reviewed the existing subsidence management conditions of approval, noting that Austar is required to prepare a comprehensive Extraction Plan for the Stage 3 mining area in consultation with affected Government agencies and approved by the Director-General prior to the commencement of second workings. The Extraction Plan would include detailed procedures to monitor, manage, remediate and/or compensate subsidence-related impacts on all built and natural features. No change is proposed to these conditions.

The Department is satisfied that subsidence impacts of the proposed modification are unlikely to be significant, and that existing conditions of approval would act to effectively manage, mitigate and/or compensate subsidence impacts.

4.2 Surface Water and Flooding

Austar's surface water assessment indicates that (as previously assessed and approved) some fracturing in the uppermost bedrock beneath the alluvial beds of Cony and Sandy Creeks is likely to occur. However, the thick and homogenous nature of the underlying bedrock (the Branxton Formation), would limit subsidence impacts in the creeks. Any such cracking would be minor and likely to be quickly filled with material derived from the overlying alluvial sediments. In the unlikely event that cracking extended to the surface, the cracks would be filled by sediment mobilised during subsequent flow events.

Flooding impacts were also re-assessed for the proposed modification. The results of the flooding impact assessment modelling are summarised in Table 2. Local catchments, watercourses and potential flood impacted residences are shown in Figure 3.

Table 2: *Summary of flood and drainage impact assessment*

Indicator	***Modelling Results***	***Impact Assessment***
Flood depths	• Flood levels at the junction of Cony Creek and Sandy Creek (at the western end of Panel A15) would reduce very significantly from predictions under the approved mine plan for both the 1 year and 100 year ARI storm events. • Downstream of the junction of Cony Creek and Sandy Creek (the western end of Panel A13), maximum flood levels could potentially increase by 500 mm over those previously modelled. The average increase for this area is around 200 mm for the 100 year ARI	• Flood depths would be reduced in the areas now not proposed to be undermined by the modified project. Significant flood impacts would be unlikely. • The floodplain above the Stage 3 mining area is very expansive in sections. Therefore any potential increases in flood depths are not expected to have significant impacts.

	storm event. • In the upper reaches of Cony Creek (adjacent to the modified longwall panels and within the subsidence zone), flood levels are expected to remain at similar levels, or less, than those previously assessed for a 100 year ARI storm event.	
Flood depths at dwellings and dwelling access hazards	• Flooding is predicted to extend closer to dwelling A17a (western end of Panel A12). • Flood depths and extents at dwellings A100a and A19a (west of Panel A13) would decrease. • Flood depths would negligibly increase at residence A101a. • No change to approved impact for all other properties within the extent of flooding.	• No significant additional impacts to dwellings in the Stage 3 mining area.
Flood velocities	• Marginal increase to maximum flow velocities for both the 1 year and 100 year ARI event in the lower reaches of Sandy Creek. This increase is however within the natural range of velocities for other sections of the creek. • Decrease of 0.3 m/s for the 1 year ARI storm event, and decrease by up to 1.7 m/s for a 100 year ARI storm event downstream of the junction of Cony Creek and Sandy Creek.	• Significant impacts would be unlikely. • Maximum velocities would remain within non-scouring levels for both the 1 year and 100 year ARI events. • Significantly, erosion and channel stability impacts in Quorrobolong Creek catchment would be unlikely. • Negligible impacts to in-channel and out-of-channel ponding.
Flood duration (1 in 100 year ARI event)	• No discernible change in flow rates is predicted for the downstream flow response for the 100 year ARI event. • Negligible change to surface ponding.	• Significant impacts would be unlikely. • Remnant ponding would remain confined to existing flow paths, with no predicted impact on property access routes.

The Department considers the predicted changes to the previously modelled Stage 3 flooding regimes to be relatively minor. Predicted changes to in-channel grade are small and are considered to remain within the natural variations of the creeklines. Therefore, the proposed modified mine plan would not be expected to significantly alter flow capacities or increase stream velocities during flood events.

The Department is satisfied that the impacts of the modified project on surface water and drainage would not be significant. The Department notes that the existing conditions of approval require Austar to prepare a detailed Watercourse Management Plan as a component of its Extraction Plan. The Watercourse Management Plan would set out measures to manage any environmental consequences of longwall mining on watercourses affected by the project.

Non-subsidence project-related impacts on surface water and groundwater would be managed under a Site Water Management Plan, which is required under the approval to be fully integrated with the Watercourse Management Plan. The Department considers that no additional conditions of approval are required to manage the surface water and flooding impacts from the modified project.

4.3 Groundwater

Austar also re-assessed impacts to groundwater resources. The assessment found that no additional depressurisation of the regional groundwater regime would be likely as a result of the proposed modification. The assessment found that groundwater within any water-bearing strata in the fracture zone above the longwall extraction voids would drain into these voids. However, the fracture zone is not predicted to reach the surface, and the strong strata of the overlying Branxton Formation would act to prevent significant groundwater loss from the shallow alluvial aquifers.

The Department is satisfied that the modified project would not have any significant impact on any alluvial aquifers. The Department is also satisfied that the overall impacts of the proposed modification on groundwater resources would be relatively minor, and no greater than those previously assessed and approved. The Department considers the existing conditions of approval, which include preparation of a detailed Groundwater Monitoring Program and Groundwater Response Plan for the project, would adequately outline the measures that would be undertaken to avoid and/or limit groundwater impacts throughout the modified project.

4.4 Vibration

Ground vibration can occur due to the settlement of the ground during and following the extraction of coal. Vibration events are usually of a short duration, lasting approximately one second. However, ground vibration events can be enhanced at built structures through the vibration of the building fabric (known as secondary vibration).

The two public submissions raised concerns that ground vibration can cause nuisance and may have the potential to cause damage to residences. No regulatory criteria are available to be used in the assessment of vibration from underground mining. However, the document *Assessing Vibration: a Technical Guideline* (DECC 2006) includes a number of advisory standards or goals, including both preferred vibration levels and recommended maximum vibration goals for residences, which both relate to human responses to vibration. The preferred levels are a peak velocity of 8.6 mm/s for the day period and 2.8 mm/s for the night period. The recommended maximum goals are 17.0 mm/s for the day period and 5.6 mm/s for the night period.

In respect of vibration causing structural damage, Austar referred to the *British Standard BS 7385:1993 Part 2 – Evaluation and Measurement for Vibration in Buildings*, which is also applicable to Australian conditions. The applicable guideline level for residential buildings is 15 mm/s, which is the lowest vibration level above which damage has been demonstrated.

Austar currently monitors vibration in Stage 2, and has also installed a monitor to the immediate west of proposed Panel A13. Monitoring in Stage 2 has recorded up to 10 vibration events per month between August 2009 and May 2011. These events did not result in any damage to residences. There have been a significant number of exceedances of the preferred night time level of 2.8 mm/s and some exceedances of the maximum night time level of 5.6 mm/s. All but one of the daytime events complied with the preferred daytime standard, but this event reached 15.9 mm/s, which is a minor exceedance of the minimum level at which impacts to residences have previously been demonstrated.

Austar's assessment of vibration impacts predicted that vibration levels would not be of sufficient magnitude to result in damage to any residences. Austar would expand its monitoring network in the Stage 3 mining area, and would continue to monitor vibration and publicly report its monitoring results during the modified project. Should vibration cause damage to residences, the damage would be repaired using the MSB's processes to repair subsidence damage (since it is strata stress relief associated with the process of goafing, or subsidence within and immediately above the mined seam, which appears to be causing the ground vibration).

The Department considers that vibration levels from the modified mine plan would not be sufficient as to cause damage. In the unlikely event that structural damage occurs, it is expected that this would be easily repaired. However the Department accepts that vibration is of a level which may cause some amenity or nuisance concerns to nearby residents, particularly at night.

The Department recognises that the timing and extent of vibration events are difficult to predict, as they are governed by an episodic but unpredictable release of stress in the strata immediately above the mined area. Other factors, including the depth of cover, the mining method, subsidence and geology can act to influence vibration levels. The Department believes that Austar should gather more information on this issue to enable both it and the Department to consider whether management strategies can be applied to reduce ground vibration.

The Department has therefore recommended modifying the existing Noise Management Plan requirement. The recommended modified condition would require Austar to include a continual improvement program for investigating, implementing and reporting on all reasonable and feasible measures to reduce vibration impacts from underground mining.

4.5 Other Issues

The Department has considered other potential impacts of the proposed modification. These considerations are summarised in Table 3.

***Table 3**: Assessment of other issues*

Issue	*Consideration*	*Recommendation*
Noise	• The proposed modification does not seek to change the coal production rate or any of the mine's other activities, therefore no additional noise impacts would be expected.	No change to existing conditions.

Biodiversity	• No vegetation is proposed to be cleared. • Minor impacts to habitat from subsidence may occur however any threatened fauna species would not be significantly impacted. • The mine's landscape Management Plan would guide the rehabilitation of the site. • The approved biodiversity offset area has been added to the National Park Estate.	No change to existing conditions.
Air Quality and Greenhouse Gas Emissions	• The proposed modification does not seek to change the coal production rate or any of the mine's operating processes, therefore no additional air quality impacts would be expected. • The proposed modification would not result in additional greenhouse gas emissions. • The mine's Energy Savings Action Plan would continue to apply to the modified project.	No change to existing conditions.
Aboriginal Heritage	• An additional 13 Aboriginal archaeological sites were located during the survey completed for the proposed modification. • Subsidence levels are not predicted to cause significant impacts to these sites, or to any sites previously assessed in the Stage 3 mining area. • No items of non-indigenous heritage occur within, or in proximity to, the Stage 3 mining area. • Under existing conditions, the Aboriginal Cultural Heritage Management Plan would be amended to address management of the additional sites and show the modified mine plan.	No change to existing conditions.
Socio-Economic and Community	• Recent figures provided by Austar indicate the following: • Continued employment of 275 employees for the life of the modified project. • Annual turnover between $220 million - $440 million. • $54 million in wages per annum and $68 million for the provision of goods and services per annum. • $370 million in coal royalties over the life of the project. • Austar's landholder access compensation agreements (fee per tonne of product coal extracted beneath private land) would continue to be offered to affected landowners. • Continued funding for local projects, schools and sporting groups.	No change to existing conditions.

6 CONCLUSION

The Department has assessed the proposed modification application in accordance with the relevant requirements of the EP&A Act. The proposed modification would result in similar or reduced levels of environmental impact to that already assessed and approved. The proposed modification also represents slightly increased coal production and reduced mining risks when compared with the current approved Stage 3 mine plan.

The proposed modification would have no additional impact on the other approved activities at the mine. The mine would continue to employ up to 275 workers, and also continue to make contributions to State and Commonwealth revenues.

The Department's assessment has found that subsidence impacts of the modified mine plan would be similar overall to those of the approved project. However, localised reductions in impacts would occur due to the removal of Panel A6. No additional surface water impacts would occur, and any variations in approved flooding impacts would not be significant.

The Department considers that any unpredicted impacts would be able to be successfully avoided, mitigated or otherwise managed under the existing conditions of approval, with some modified and/or additional conditions to provide for improvements to the environmental management and monitoring regime, particularly in respect of monitoring and potentially managing ground vibration impacts.

Austar applied for, and was subsequently granted, landowner's consent by the Minister for the Environment for its planned underground mining operations within the Werakata SCA.

Consequently, the Department believes the modification satisfies statutory requirements, is in the public interest, and should be approved, subject to conditions.

7 CONDITIONS

The Department believes its recommended conditions would strengthen the existing regulatory framework to avoid, limit, mitigate or compensate for the impacts of the proposed modified project. The modified conditions address agency recommendations and address residual community concerns. The Department has also taken the opportunity to make minor administrative changes to the conditions. Austar has reviewed and accepted these conditions.

8 RECOMMENDATION

It is recommended that the Executive Director, Major Projects Assessment, as delegate of the Minister for Planning and Infrastructure:

- **consider** the findings and recommendations of this report;
- **determine** that the proposed modification is within the scope of section 75W of the EP&A Act;
- **approve** the modification application, subject to conditions, under section 75W of the EP&A Act; and
- **sign** the attached notice of modification (see Appendix F).

Howard Reed 12.3.12
A/Director Mining and Industry Projects

13.3.12

Chris Wilson
Executive Director, Major Projects Assessment

APPENDIX A: PROJECT APPROVAL 08_0111 (AS MODIFIED)

APPENDIX B: ENVIRONMENTAL ASSESSMENT

See the attached CD containing a folder labelled *Austar Coal Project Section 75W Modification Environmental Assessment.*

APPENDIX C: SUBMISSIONS

See the attached CD containing a folder labelled *Austar Coal Project Modification (08_0111 MOD 2) Submissions*.

APPENDIX D: RESPONSE TO SUBMISSIONS

See the attached CD containing a folder labelled *Austar Coal Project MOD 2 RTS*.

APPENDIX E: LANDOWNER'S CONSENT

APPENDIX F: NOTICE OF MODIFICATION