

ASSESSMENT REPORT Angus Place Colliery Extension of Longwalls 980 and 900W (06_0021 MOD 3)

BACKGROUND

Centennial Angus Place Pty Ltd (Centennial) operates Angus Place Colliery (Angus Place), located 5 kilometres (km) northeast of the village of Lidsdale and 15 km north of Lithgow (**see Figure 1**).

Angus Place comprises an underground longwall mine and a range of surface infrastructure at the pit top. The underground workings are mainly situated under the Newnes State Forest which is managed by the Forestry Corporation of NSW for timber production.

Angus Place is adjacent to the underground workings of several former mines, such as Kerosene Vale, as well as operating mines, such as Springvale. Coal produced at Angus Place is transported via private haul roads to the Wallerawang and Mount Piper Power Stations.



Figure 1: Location Plan

Angus Place operates under a project approval (06_0021) granted by the then Minister for Planning on 13 September 2006 which authorises the extraction of Longwalls 920 to 980. The approval was modified in 2011 (MOD 1) to permit the extraction of two additional longwalls (Longwall 900W and Longwall 910) which are shown in yellow on **Figure 2**.

The Project Approval was further modified in April 2013 (MOD 2) to permit the construction of a ventilation facility and to allow underground trial mining in the area shown outlined in red on **Figure 2**.

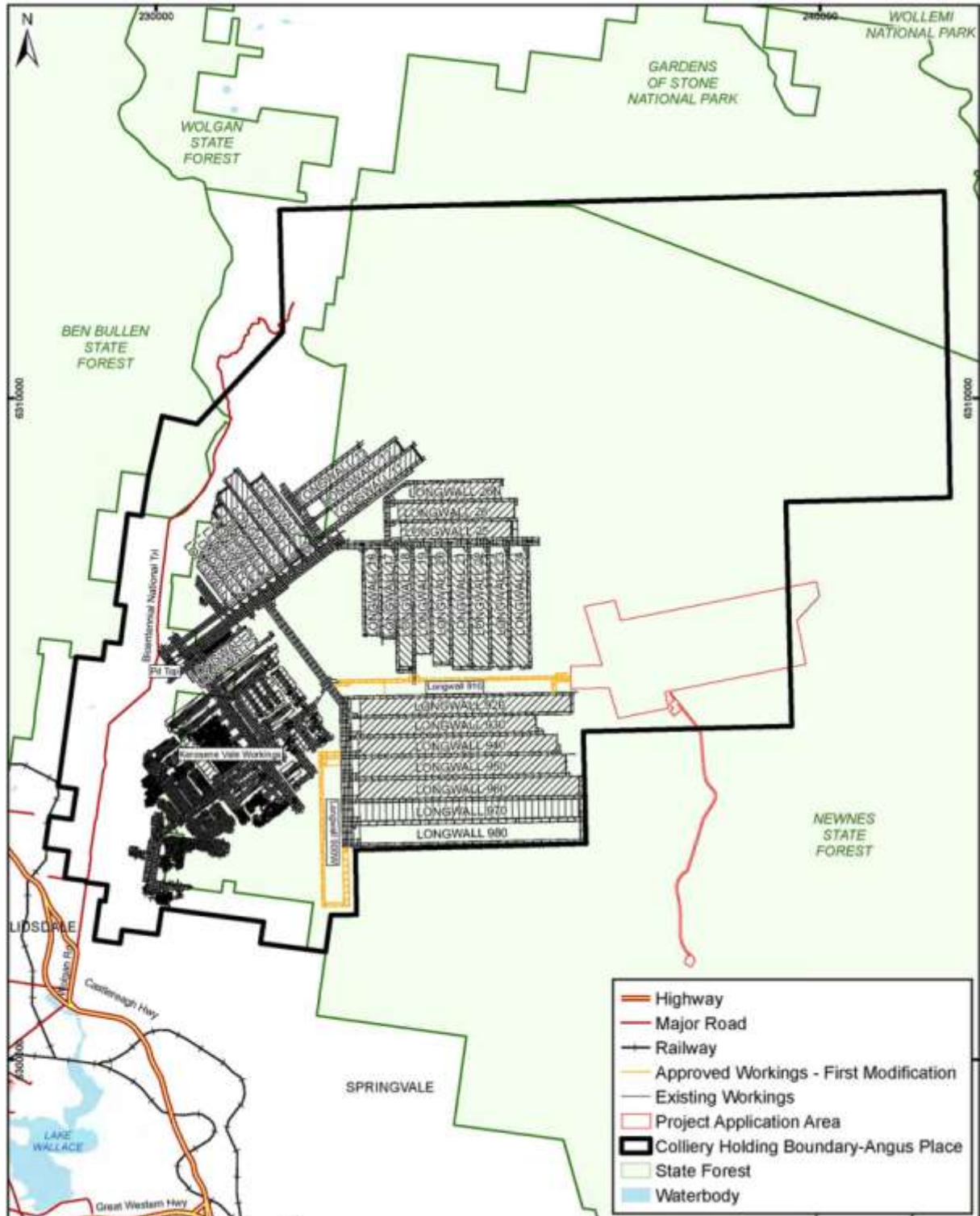


Figure 2: Existing and Approved Mine Layout

The Department has considered the nature of the proposed modification and is satisfied that it can be characterised as a modification of the original project. In this respect, the Department notes that there would be no change to the approved mining methods, no increase in annual coal production and no change to processing or transportation systems. Consequently, the Department is satisfied that the proposed modification is within the scope of section 75W of the EP&A Act.

Approval Authority

Under section 75W of the EP&A Act the Minister for Planning and Infrastructure is the approval authority for this modification application. However, under the Minister's delegation of 14 September 2011, the Planning Assessment Commission (PAC) must determine the modification application, since Centennial has made reportable political donations.

CONSULTATION

Due to its minor nature, the Department did not publicly exhibit this modification application. However, it was made publicly available on the Department's website and was referred to relevant agencies for comment. Submissions were received from the following seven agencies.

Lithgow City Council (LCC) considered that the modification application had adequately highlighted the relevant issues and requested that Centennial enter into a Voluntary Planning Agreement (VPA) with LCC, based on the cost of the development. As the proposed modification is of a minor nature and would not involve any capital expenditure, the Department does not consider that a VPA should be considered.

The **Forestry Corporation of NSW** requested that the project approval recognise that the surface lands above Angus Place's mining operations are State Forests managed by the Corporation and that it be informed, and compensated if appropriate, should mining operations affect any of its assets, such as surface roads. Centennial has an existing agreement with the Corporation that would apply to the minor extension areas of proposed longwall mining.

The **Division of Resources and Energy (DRE)**, part of the Department of Trade and Investment, Regional Infrastructure & Services, supported the proposed modification as it would allow for a greater recovery of the valuable coal resource in the area. It also considered that no sensitive surface features would be affected by the proposed modification and expected that Angus Place's existing SMP covering Longwall 980 would need to be amended to expand the monitoring of the area.

Fisheries NSW, part of the Department of Primary Industries, noted that the proposed changes to the mining configuration of Longwalls 980, 900W and 910 would be further assessed during consideration of an Extraction Plan and SMP, without requiring any change to existing conditions of approval.

NSW Office of Water, part of the Department of Primary Industries, considered that the impacts due to the proposed modification are expected to remain within the approved range of environmental consequences on surface and groundwater resources and that the current Water Management Plan is adequate for the proposed extension of longwalls.

Neither **Agriculture NSW**, part of the Department of Primary Industries, nor the **Office of Environment and Heritage**, offered any specific comments on the proposed modification application.

ASSESSMENT

The Department has reviewed the modification request and supporting documents and considers that the principal issue that requires assessment is subsidence as well as the potential surface water or groundwater impacts resulting from that subsidence.

Proposed Extension of Longwall 980

The area in which Longwall 980 is proposed to be extended by 43.4 m is located below the Newnes State Forest. The land above the area of the proposed extension is gently undulating with slopes of less than 10 degrees and is vegetated with native trees and shrubs. As shown on **Figure 4**, there are no sensitive features (cliff lines, rock features, watercourses, access roads, Aboriginal Heritage Sites, or endangered ecological communities (EECs) listed under the *Threatened Species Conservation Act 1995 (TSC Act)*) on, or near, the land above the proposed extension area.

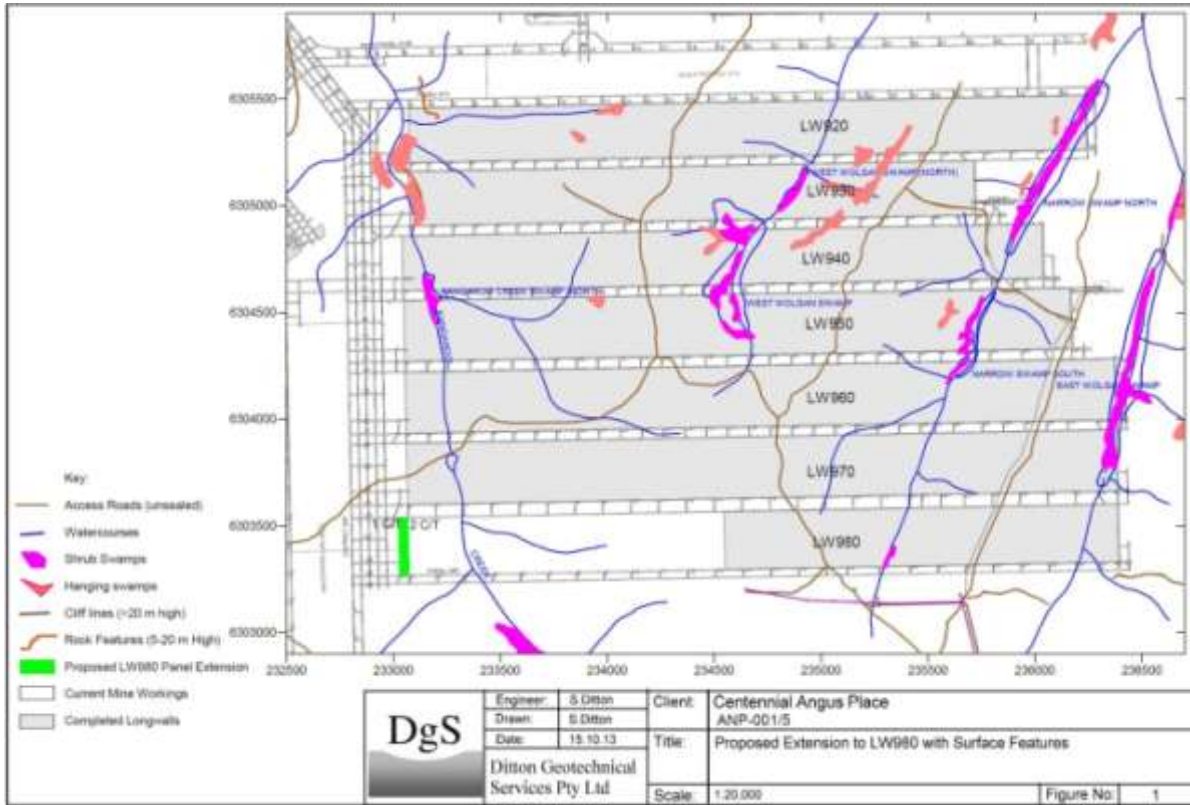


Figure 4: Proposed Longwall 980 Extension showing key surface features

Longwall 980 has a void width of 277 m and is currently being extracted towards the west. The increase in mining height to 3.425 m, from the previously approved height of 3.25 m, has been previously assessed and approved by DRE as an SMP variation on 4 October 2013 for the western portion of Longwall 980 between Cut Through 10 (10CT) and 2CT.

A Subsidence Impact Assessment (SIA) for the proposed extension of Longwall 980 at an extraction height of up to 3.425 m was prepared by Ditton Geotechnical Services Pty Ltd (DgS). The maximum subsidence predictions for the extension, including a comparison between mining heights of 3.25 m and 3.425 m, are shown in **Table 1**. Maximum vertical subsidence values within the extension area are predicted to increase by between 30 to 100 millimetres (mm). The maximum subsidence predictions within the rest of Longwall 980 (ie between 10CT and 2CT) resulting from the proposed increase in mining height are shown in **Table 2**.

Table 1 – Maximum Subsidence Predictions for the Extension to Longwall 980

LW#	Mining Height (m)	Cover Depth (m)	Subsidence S_{max} (m)	Tilt T_{max} (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)	Surface Cracking width (mm)	CL Angle of draw (°)
980	3.25	310	0.07 - 0.1	0.5 - 2	0.5 - 1	nil	<50	21.9
Extended	3.425	310	0.1 - 0.2	2 - 6	1.0 - 1.5	nil	<50	22.2
Change	0.175	nil	0.03 - 0.1	1.5 - 4	<0.5	nil	nil	0.3

Table 2 – Maximum Subsidence Prediction for Increased Mining Height in Longwall 980 (10CT - 2CT)

LW#	Mining Height (m)	Cover Depth (m)	Subsidence S_{max} (m)	Tilt T_{max} (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)	Surface Cracking width (mm)	CL Angle of draw (°)
980*	3.25	310	0.86 - 1.20	6 - 9	2.8 - 4.2	3.5 - 5.3	<50	21.9
10 - 2CT	3.425	310	0.90 - 1.25	6 - 9	2.9 - 4.4	3.7 - 5.5	<50	22.2
Change	0.175	nil	0.040 - 0.050	nil	<0.2	<0.2	nil	0.3

Tables 1 and 2 show that the increased mining height results in only very minor changes to the predicted subsidence, tilt, tensile strain and compressive strain, with the vertical subsidence as a result of the increased height being in the order of 40-50 mm.

DgS modelled the net maximum subsidence that could occur as a result of the 43.4 m extension of Longwall 980 in conjunction with the increase in mining height from 3.25 m to 3.425 m. The model showed an increase of 50 mm of subsidence between 10CT and 2CT with the subsidence contours moving a distance of approximately 43 m to the west, in response to the extended panel length.

Prior to mining, the subsidence effects of Longwall 920 to 980 were predicted to include:

- minor surface cracking (1 – 20 mm) above the extracted panels;
- tapered vertical cracks of up to 90 mm in some areas where surface rock exposures exist;
- minor changes to the gradient of ephemeral watercourses that exist about the longwall panels;
- minor changes to ponding depth in creeks and flatter areas above the longwalls; and
- minor changes to groundwater seepage flows where shallow surface rocks exist.

The observed subsidence effects following the extraction of these longwalls (as shown on **Figure 5**) are in line with these predictions. Based on the minor nature of predicted increases, the Department considers the impacts associated with the extension of Longwall 980 by 43 m and increasing its extraction height to 3.425 m are acceptable and would remain within the range of environmental consequences already approved, albeit extending into a slightly larger area.

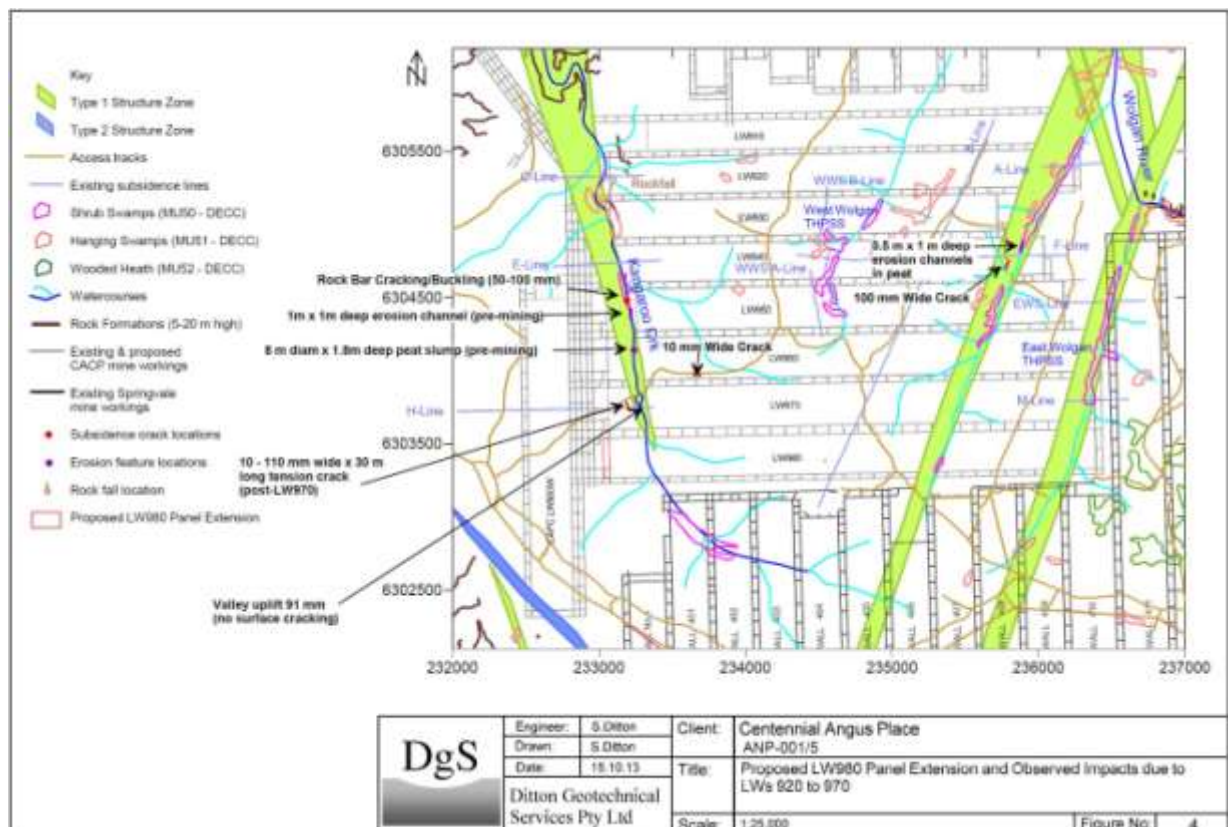


Figure 5: Observed Subsidence Impacts following the mining of Longwall 920 to 970

Proposed Extension of Longwall 900W by 104.8 m

The area in which Longwall 900W is proposed to be extended is also located beneath the Newnes State Forest. The land surface in this area is gently undulating with slopes of generally less than 10 degrees and is vegetated with native trees and shrubs.

Longwall 900W has been approved with a void width of 293 m and a length of 2087 m. Centennial proposes to undertake extraction of Longwall 900W at a maximum mining height of 3.425 m. As shown on **Figure 5**, there are no sensitive natural features (cliff lines, rock features, Aboriginal Heritage Sites, access roads or EECs listed under the TSC Act) in the area above the proposed extension area. There is, however, one first order tributary of Kangaroo Creek in this area.

A Subsidence Assessment of the proposed extension of Longwall 900W by 104.8 m at an extraction height ranging between 3.25 m and 3.425 m was prepared by Ditton Geotechnical Services Pty Ltd (DgS). The currently approved Longwall 900W has a void width of 293 m and a length of 2,087 m. Centennial proposes to undertake extraction of the currently approved longwall at a mining height of 3.425 m, following the completion of extraction of Longwall 980.

The maximum subsidence effect predictions for the 104.8 m extension, including a comparison of a mining height of 3.25 m to a mining height of 3.425 m, are shown in **Table 3**. Maximum vertical subsidence values within this 'extension' area are predicted to increase by 65 to 110 mm. The maximum subsidence effect predictions for the increase in mining height of 3.25 m to 3.425 m between 20CT and 3CT are shown in **Table 4**.

Table 3 – Maximum Subsidence Predictions for the Extension to Longwall 900W

Location	Mining Height (m)	Cover Depth (m)	Subsidence S_{max} (m)	Tilt T_{max} (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)	Surface Cracking width (mm)
900W^	3.25	295	0.15 - 0.04	2.5 - 0	3.2 - 0.5	0	<50
Extended	3.425	295	0.80 - 0.15	13 - 2.5	3.5 - 2.5	0 - 1	<50
Change	0.175	-	0.65 - 0.11	10.5 - 2.5	0.3 - 2.0	<1	nil

Table 4 – Maximum Subsidence Prediction for Increased Extraction Height in Longwall 900W

Location	Mining Height (m)	Cover Depth (m)	Subsidence S_{max} (m)	Tilt T_{max} (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)	Surface Cracking width (mm)
900W*	3.25	310	0.98 - 1.31	7 - 10	2.9 - 4.3	3.6 - 5.4	<50
20 - 3 CT	3.425	310	1.03 - 1.38	7 - 11	3.0 - 4.5	3.8 - 5.7	<50
Change	0.175	-	0.06 - 0.08	<1	<0.2	<0.3	nil

DgS modelled the net maximum subsidence resulting from a 104.8 m extension of Longwall 900W and an increase in mining height from 3.25 m to 3.425 m. The model showed an increase of 60 mm to 80 mm in maximum subsidence between 20CT and 3CT. The model also shows that the subsidence contours would extend approximately 100 m to the north, in response to the extended panel length.

The subsidence effects of Longwall 900W are predicted to include:

- minor surface cracking and shearing (1 – 20 mm wide) within the tensile and compressive strain zones above the extracted panels;
- possible localised cracking of up to 90 mm where near surface bed rock is exposed near the predicted strain peaks;
- cracks in the vicinity of roads and public access areas which may require repairs;
- some remediation of creek beds may be required;
- minor changes to the gradient of ephemeral watercourses as well as potential for minor increases in erosion and sedimentation along creek beds; and
- minor changes to ponding depth in creeks and flatter areas above the longwalls.

The SIA states that there would be no changes to these predictions as a result of the increase in length of the longwall or increase in its height.

Based on the minor nature of the predicted increases to the subsidence effects and the subsidence impacts observed to date above Longwalls 920 – 970, the Department considers that the environmental impacts of the proposed extension to Longwall 900W are acceptable and would remain within the predicted range of environmental consequences already approved, albeit extending a slightly larger area.

Proposed Increased Mining Height in Longwall 910

The area in which Longwall 910 would be mined is to the north of the already extracted Longwall 920 (see **Figures 4 and 6**). Surface features within the predicted subsidence zone of this longwall include a second order watercourse, an access track, and a hanging swamp, although the swamp is also located directly over Longwall 920 which was mined about 10 years ago. The proposed underground access to the planned Angus Place Extension mining area would be adjacent to Longwall 910.

Extraction of Longwall 910, at a mining height of 3.25 m, was approved as part of MOD 1. Where the height of the Lithgow Seam would allow, Centennial is also seeking to use a mining height up to 3.425 m for Longwall 910. A component of Centennial's mine plan has always been to fully extract the Lithgow Seam. The change in mining height that is being sought is in response to improved geological information about the local variations in the height of the coal seam.

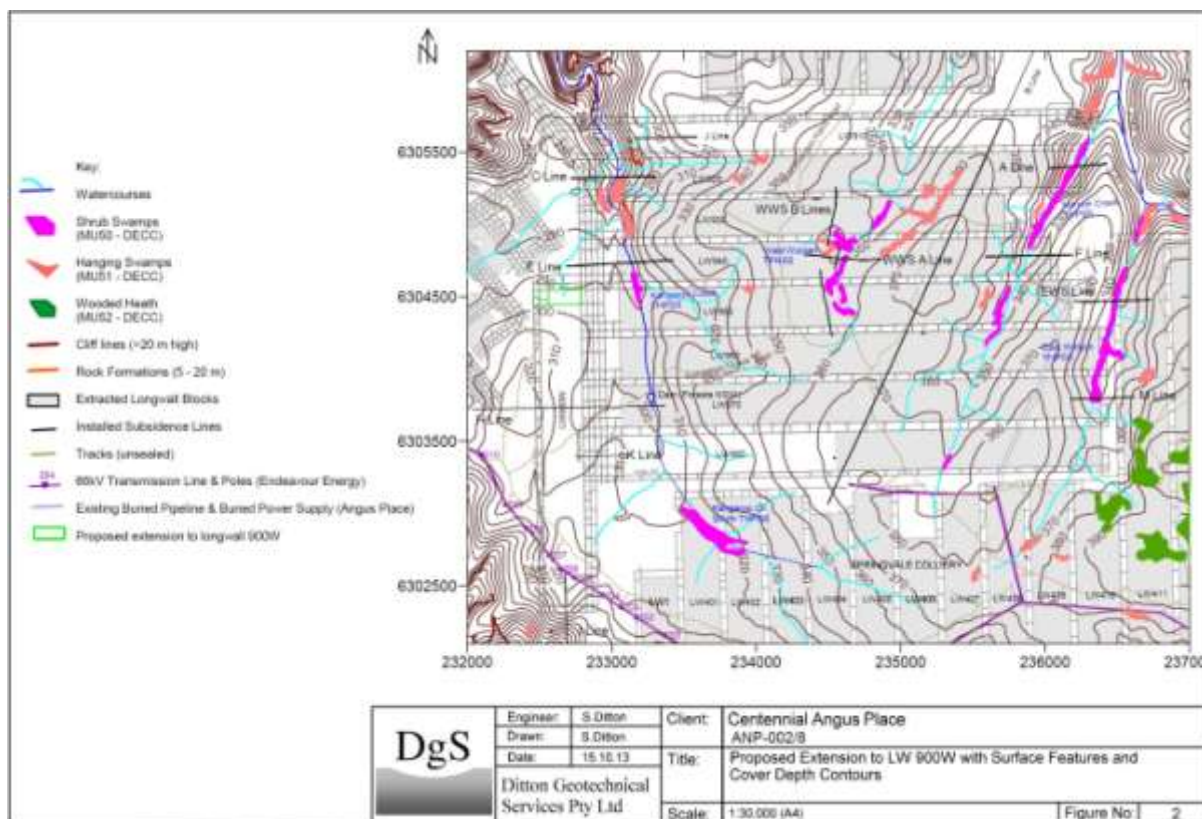


Figure 6: Proposed Longwall 900W Extension showing the surface features in the area

Centennial did not provide a specific subsidence assessment of the effects of an increase in maximum mining height for Longwall 910 from 3.25 to 3.425 m. However, as has been demonstrated in the SIA which covers the effects of increased mining height in the other two longwalls subject to this modification application, an increase in maximum mining height of 175 mm is quite small in both absolute and relative terms, being a 5% increase. The depth of cover above Longwall 910 varies between 300 – 350 m.

The Department considers that it is reasonable to conclude that an increase in mining height of 175 mm for Longwall 910 would produce an increase in vertical subsidence of 50-60 mm, given the similar terrain and depth of cover, the extensive subsidence monitoring that has been conducted for Longwall 920 to 970, and the predictions in the SIA for Longwalls 980 and 900W.

Such an increase would produce substantially the same outcome in terms of potential impacts to the second order stream and access road as predicted for similar features above Longwall 980 and Longwall 900W. Impacts would be little changed from those previously assessed and within the range of earlier predictions.

In terms of the hanging swamp located over Longwall 920, there would be a negligible increase in subsidence, very much less than the “minor” increase in subsidence that was assessed at the time of the MOD 1 application that led to the approval of Longwall 910, with a planned extraction height of 3.25 m. The possible 5% increase in mining height does not have the potential to noticeably increase subsidence impacts for this swamp. The Department is satisfied that the proposed increase in mining height for Longwall 910 would not materially increase subsidence impacts or environmental consequences compared to those previously assessed and that the existing conditions of approval are adequate to manage environmental impacts of mining this longwall.

CONCLUSION

The proposed modification is for the extension of two longwalls (Longwalls 980 and 900W) in an established colliery and an increase in mining height in the same two longwalls from 3.25 m to 3.425 m, with a similar increase in mining height proposed for a third longwall (Longwall 910).

The SIAs submitted with the modification application predict that the increased mining height would result in additional vertical subsidence of 40-50 mm for Longwall 980 and 64-80 mm for Longwall 900W. As well, the extensions in the length of the two longwalls would result in the already approved subsidence footprint and associated environmental consequences being extended by approximately 40 m for Longwall 980 and 100 m for Longwall 900W. The proposed increase in mining height for Longwall 910 is predicted to increase vertical subsidence by 50-60 mm.

The Department has assessed the environmental impacts of the proposed modification in accordance with the requirements of the EP&A Act and found it would not cause any additional environmental impacts that could not be mitigated or otherwise managed under the existing conditions of approval. The existing conditions require that an Extraction Plan is prepared to support longwall extraction. Centennial is currently preparing an Extraction Plan to support extraction of Longwall 900W and 910. The increased mining height and panel length would be fully reflected in this Extraction Plan, and the associated subsidence impacts and environmental consequences must be appropriately managed.

The Department believes that the proposed modification is in the public interest and should be approved, subject to conditions.

RECOMMENDED CONDITIONS

The Department considers that existing conditions of approval in respect of environmental standards, monitoring and reporting should apply to the additional mining area. There is no need to vary the existing approval, other than to include the modification application and associated documentation in the existing approval.


Centennial has reviewed and accepted the recommended conditions.

The Department has prepared recommended conditions of approval for the modification (see **Appendix A**). The proposed notice of modification would vary the existing approval to the form shown in **Appendix B** (the "consolidated approval").

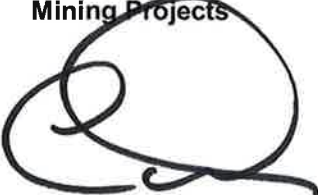
RECOMMENDATION

It is RECOMMENDED that the Planning Assessment Commission exercise the powers and functions delegated to it in the Instrument of Delegation from the Minister for Planning and Infrastructure, dated 14 September 2011, and:

- **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 (Tagged A).


Howard Reed 29.11.13
Manager
Mining Projects


David Kitto 29/11/13
Director
Mining Projects



2.12.13

Chris Wilson
Executive Director
Development Assessment Systems and Approvals

APPENDIX A: NOTICE OF MODIFICATION

APPENDIX B: CONSOLIDATED APPROVAL

APPENDIX C: MODIFICATION APPLICATION AND ACCOMPANYING REPORTS
