ASSESSMENT REPORT

WEST WALLSEND CONTINUED OPERATIONS PROJECT
Longwalls 51 and 52 Modification
(MP 09_0203 Mod 1)

1. BACKGROUND

1.1 Introduction

Oceanic Coal Australia Pty Ltd (OCAL), a wholly owned subsidiary of Glencore Pty Ltd (previously Xstrata Coal Pty Ltd) owns and operates the West Wallsend Colliery, west of Lake Macquarie within the Newcastle Coalfield (see **Figure 1**). West Wallsend is an underground coal mine that has been operating since 1969.

Figure 1: *West Wallsend Colliery location*

The mine has been extracting coal by longwall mining methods since 1987 and from beneath what is now the Sugarloaf State Conservation Area (SCA) since 2000 (ie since before the SCA was reserved). The majority of the surface (ie 86%) within the West Wallsend project area is bushland within the Sugarloaf SCA. The approved underground mining area covers approximately 1,085 hectares (ha) and underlies 25% of Sugarloaf SCA.

All coal from West Wallsend is transferred to the Macquarie Coal Preparation Plant (MCPP) at the nearby Westside Mine via an existing private haul road. The Westside mine is located to the south of West Wallsend's pit top facilities (see **Figure 2**).

1.2 Approved Operations

In January 2012, the Department, under delegation from the then Minister of Planning and Infrastructure, approved the West Wallsend Colliery Continued Operations Project (see **Figure 2**), under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The approval allows OCAL to continue underground mining for a further 12 years using longwall mining methods, extract up to 5.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, continue using the existing mine infrastructure, construct and operate additional ventilation infrastructure and other service shafts and include all operations at West Wallsend under one project approval.

The environmental assessment (EA) for the West Wallsend Colliery Continued Operations Project predicted that there would be subsidence impacts on the steep slopes of the Sugarloaf Ranges. The project approval acts to keep these within reasonable and appropriate limits. It includes a number of strict performance measures for all natural and built features near the underground mining operations. These performance measures include specific limitations on impacts on important landscape features such as cliffs; minor cliffs and cliff terraces; and rock features and steep slopes.

Under these performance measures, OCAL must ensure that only 'minor environmental consequences' occur on these features. These measures are defined as 'occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing' that do not impact on more than 3%, 5% and 7% of the total face area of these features, respectively.

If OCAL exceeds any of these performance measures, then it is required to remediate the impact and/or the environmental consequence or provide a suitable offset as compensation.

1.3 Other Approvals

In April 2014, OCAL was granted Extraction Plan approval to mine longwalls (LWs) 42 and 43, in accordance with the mine's project approval. In light of recent environmental incidents (see **Section 1.5** below), OCAL, in its Extraction Plan, proposed a significantly reduced area to be mined in LWs 42 and 43 in order to ensure compliance with its performance measures. Other reductions were also made due to operational factors. In total, approximately 3 million tonnes (Mt) of ROM coal is no longer proposed to be extracted from these longwalls.

In June 2014, OCAL sought and was granted a variation to its Extraction Plan approval to further shorten LW 43 by 180 metres (m) due to declining seam thickness at the inbye end of the panel which would also result in a reduction to the panel's approved subsidence footprint. The reduction in panel length constitutes a loss of approximately 232,750 tonnes of ROM coal and 117,798 tonnes of saleable coal.

1.4 Sugarloaf State Conservation Area

The Sugarloaf SCA is located approximately 20 km west of the city of Newcastle in the Sugarloaf Range, extending from Seahampton in the north to Awaba in the south. The SCA covers an area of approximately 3,937 ha and contains significant biodiversity, Aboriginal and historical features. It also acts as an important ecological corridor between the Hawkesbury Ranges to the South and the Hunter Ranges to the North. The SCA lies close to the border between the Sydney Basin and NSW North Coast Bioregions and encompasses an important overlap between temperate and subtropical ecosystems.

The Sugarloaf SCA was reserved under the *National Parks and Wildlife Act 1974* (NPW Act) in 2007 as part of recommendations outlined in the Department's Lower Hunter Regional Conservation Strategy. The area was previously part of the Awaba and Heaton State Forests.

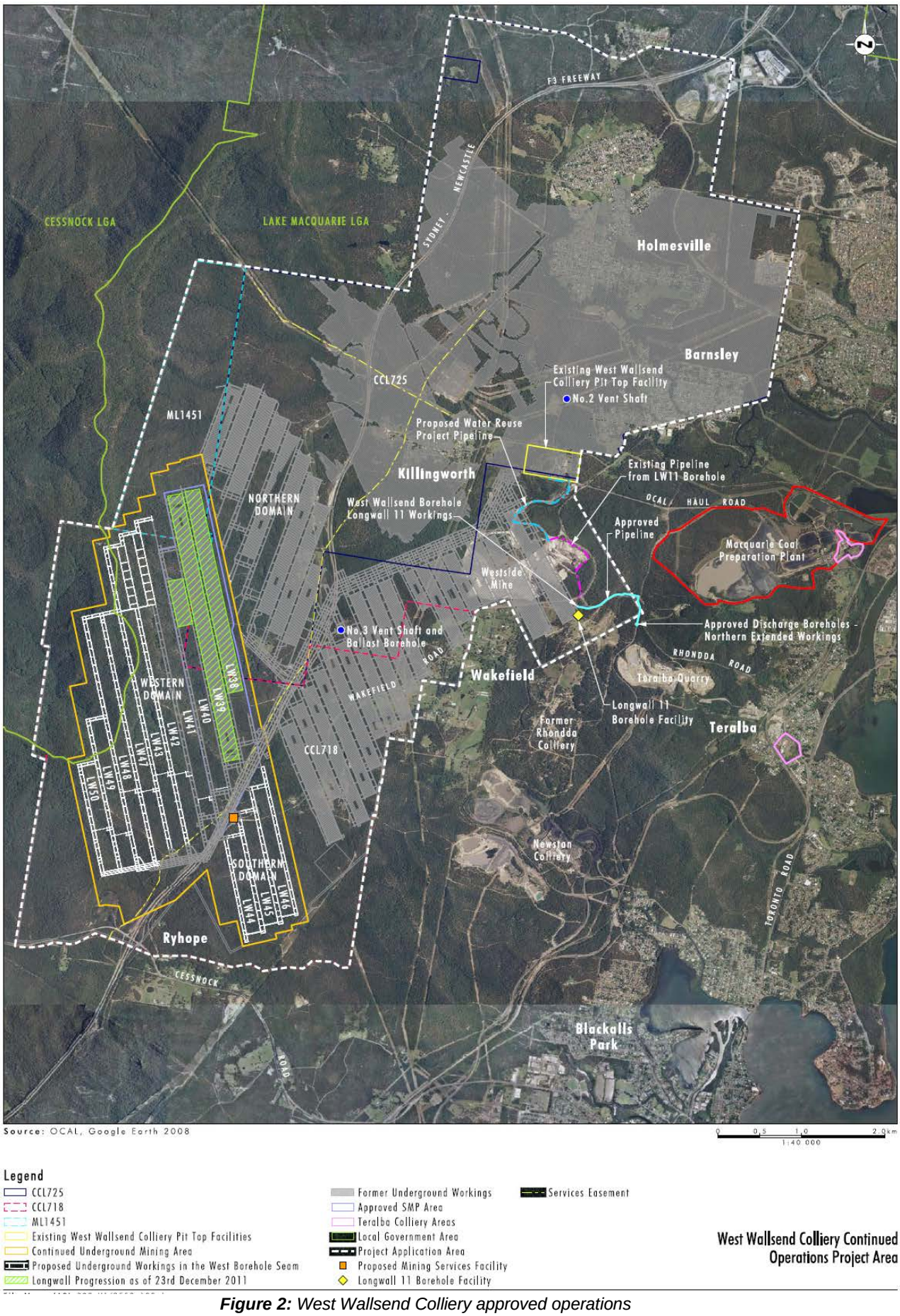


Figure 2: *West Wallsend Colliery approved operations*

The land was reserved as a State conservation area, rather than a national park, due to the area's mineral resource values (ie underground coal reserves and existing coal mining leases). Before reservation, the area was subject to timber harvesting, track making and maintenance, and other forms of surface and ecological disturbance.

Extensive disturbance to the area since the arrival of European settlers has limited the knowledge of the traditional use of the land in the Sugarloaf SCA. However, axe grinding grooves and other signs of Aboriginal presence have been found on Sugarloaf Range and adjacent to watercourses on the western side of the SCA. The Sugarloaf SCA is of high cultural importance to local Aboriginal communities and the Awabakal Traditional Owners currently have a land claim in progress over the northern section of the reserve and in lands surrounding the SCA. Of the 91 known Aboriginal sites within the SCA, 68 are found above the footprint of West Wallsend's underground mining lease. This may reflect the intensity of survey effort above the mining area.

1.5 Recent Environmental Incidents and Investigations

On 2 October 2012, OCAL identified higher-than-predicted surface subsidence impacts on a steep slope adjacent to LW 41. Three elongated blocks of land, bounded by pre-existing joints or small faults, had sunken substantially as the joints opened up in response to subsidence movements, creating three narrow, linear troughs across the surface of a steep slope. The main trough is approximately 120 m in length and up to 17 m in width. Two smaller troughs, located only a little further downslope, are approximately 50-70 m long and between 2-5 m in width. The troughs have walls of between 0.5 and 4 m in height. Together, these troughs are known as the 'vertical block movement' or VBM feature.

On 4 June 2013, OCAL identified that an incident had occurred during grouting of a surface crack, also adjacent to LW 41. OCAL has since reported that about 150 cubic metres of, cement-based grout material had flowed unnoticed from a crack at the base of a small cliff, and then flowed down an ephemeral drainage channel for approximately 280 m. The grout had solidified within the base of the drainage channel.

On 20 September 2013, OCAL identified another grouting incident, also adjacent to LW 41. This spillage of grout material apparently occurred in January 2013, during remediation of a separate surface crack. About 12 cubic metres of grout had leaked from an unpredicted exit point and flowed for about 120 m down a steep slope.

These incidents led to substantial public and media reaction. The Government formed an interagency committee to oversee management and remediation of the incidents. The committee's investigation report was publicly released on 27 March 2014, and included details of the NSW Government's actions taken as a result of the incidents. A copy of the report is available on the Department's website.

OCAL began remediating the two grouting spills in October 2013 and successfully completed its clean-up of the two sites in June 2014.

2. PROPOSED MODIFICATION

On 24 December 2013, OCAL lodged an application and supporting EA (see **Appendix A**) to modify West Wallsend's project approval under section 75W of the EP&A Act.

A summary of the approved operations and the proposed modification is provided in **Table 1** below. The proposal involves extension of the Southern Domain underground mining area to allow mining of two additional longwall panels known as LWs 51 and 52, in the West Borehole Seam (see **Figure 3**). The proposed modification would consist solely of the development and mining of the two panels with no changes proposed to the approved surface infrastructure or activities.

As significant areas of the approved mine plan are no longer to be mined (see **Section 1.3** above), the proposed modification, which would recover approximately 2.55 Mt of ROM coal, would not result in changes to the approved extraction rate of 5.5 Mtpa or the approved mine life.

Table 1: *Summary of approved operations and the proposed modification*

Aspect	***Approved Operations***	***Proposed Modification***
Project Life	• Approved to operate until 2021.	• No change.
Approved ROM Coal Production Rate	• Up to 5.5 Mtpa.	• No change.
Mining Area and Method	• Mining by longwall mining methods within an approved underground mining area.	• Additional two longwall panels in the Southern Domain underground mining area.
Coal Handling	• Coal transferred from underground to surface infrastructure area via a drift conveyor.	• No change.
Coal Transport	• All ROM coal transferred from the surface infrastructure area to the MCPP at Westside Mine via an existing private haul road. • Product coal then loaded onto trains and transported to Newcastle Port for export.	• No change.
Minewater Management	• Water management undertaken in accordance with the Surface Water Management Plan and the conditions of an Environment Protection Licence.	• No change.
Surface Infrastructure	• Utilisation of existing facilities, modified and upgraded where required.	• No change.
Hours of Operation	• 24 hours a day, 7 days a week.	• No change.
Employment	• 390 full-time employees at the mine.	• No change.
Capital Investment	• $1.5 million	• No change.

3. STATUTORY CONTEXT

3.1 Section 75W Modification

The original West Wallsend Continued Operations Project was approved under the now repealed Part 3A of the EP&A Act. However, the project remains a 'transitional Part 3A project' under Schedule 6A of the EP&A Act, and modification of the project must take place under the former section 75W of the Act.

The Department has considered the nature of the application, and is satisfied that it can be characterised as a modification to the approved project. In this respect, the Department notes that there would be no change to the surface facilities area, no change to the approved processing or transportation systems, no change to the approved extraction rate and no change to the approved life of mine. Consequently, the Department is satisfied that the application can be assessed under section 75W of the EP&A Act.

3.2 Approval Authority

Under Part 3A of the EP&A Act, the Minister for Planning is the approval authority for the proposed modification. However, under the Minister's delegation dated 27 February 2013, the Planning Assessment Commission (PAC) must determine the modification application as Lake Macquarie City Council has objected to the proposed modification.

3.3 Environmental Planning Instruments

OCAL has undertaken a full review of the relevant provisions of various Environmental Planning Instruments (EPIs), including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs), that may apply to the proposed modification, including:

- *Lake Macquarie LEP*;
- *SEPP (State and Regional Development) 2011*;
- *SEPP No. 33 – Hazardous and Offensive Development*;
- *SEPP No. 44 – Koala Habitat Protection*;
- *SEPP No. 55 – Remediation of Land*;
- *SEPP (Infrastructure) 2007*; and
- *SEPP (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP).

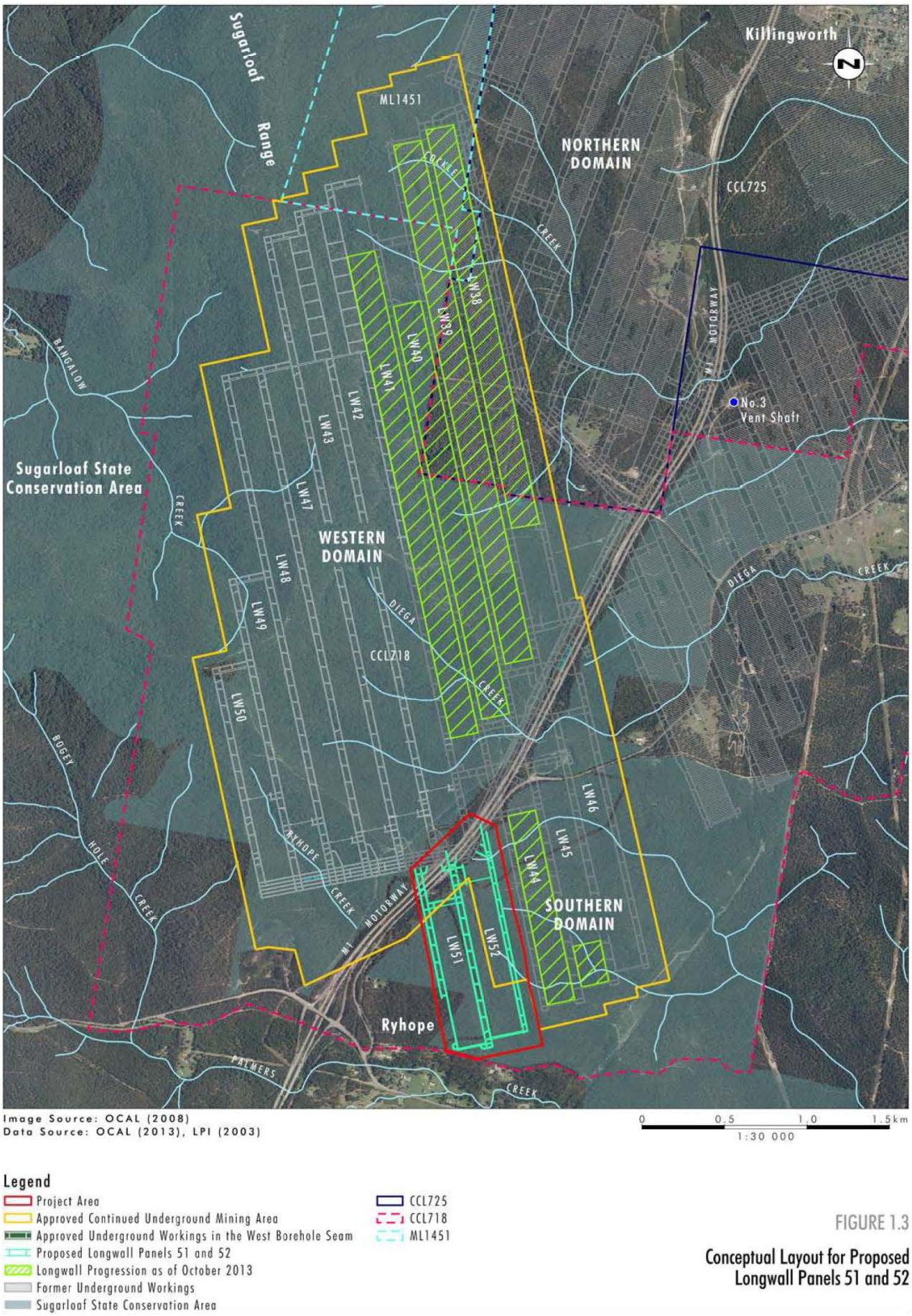


Figure 3: *Proposed modified mine plan*

The Department has considered OCAL's review of these EPIs, and has undertaken its own assessment of these matters (see **Section 5** and **Appendix B**). The Department considers that the project as proposed to be modified can be undertaken in a manner that is generally consistent with the aims, objectives and provisions of these instruments, subject to a range of mitigation, monitoring and management measures.

4. CONSULTATION

4.1 Public Exhibition

The Department:

- publicly exhibited the EA from 4 April 2014 to 21 April 2014;
- advertised the exhibition in the Newcastle Herald newspaper;
- notified relevant State government authorities and the affected Council; and
- notified relevant road authorities, in accordance with the Mining SEPP.

During the exhibition period, the Department received 16 submissions comprising:

- 10 submissions from public authorities;
- 5 from special interest groups; and
- 1 submission from a local community member.

All submissions are provided in full in **Appendix C**.

4.2 Agency Submissions

The **Environment Protection Authority**, **NSW Health – Hunter New England Local Health District**, the **Heritage Division** of the Office of Environment and Heritage, and the **Office of Agricultural Sustainability and Food Security** and **Fisheries NSW** within the Department of Primary Industries (DPI) advised that they had no comments on the proposed modification.

The **Division of Resources and Energy** (DRE) within the Department of Trade and Investment, Regional Infrastructure and Services had no objections and noted that the proposed modification does not substantially change the overall subsidence risks at the site. DRE did recommend a number of conditions in regards to rehabilitation. The Department has considered these recommendations and the existing conditions of approval in **Section 5.4**.

Crown Lands within DPI noted that some Crown road reserves occur in the predicted area of mining subsidence; however, the need to undertake remediation works is unknown at this time. Crown Lands recommended that OCAL is required to monitor subsidence impacts on Crown road reserves, notify Crown Lands immediately if impacts occur and rectify any damage. The Department notes that the existing conditions of approval require a Built Features Management Plan, to be developed in consultation with owners of such features, as part of the Extraction Plan. Crown Lands also advised that OCAL had addressed its concerns in its Response to Submissions (RTS, see **Appendix D**).

The **NSW Office of Water** (NOW), also part of DPI, did not object to the proposed modification. However, it raised concerns over the lack of a numerical groundwater model for the overall West Wallsend project, water take and licensing requirements and groundwater dependent ecosystem (GDE) mapping. NOW later advised that its concerns regarding GDEs were addressed in the RTS.

NOW accepts that a groundwater numerical model is not required to support the determination of the modification application and is satisfied with OCAL's commitment (see additional information provided by OCAL in **Appendix E**) that it will prepare a groundwater model in consultation with NOW within six months of any approval of the proposed modification. The Department is satisfied with this approach and has included a recommended condition to this effect.

NOW has also advised that the outstanding licensing issues raised in its comments on the EA are being addressed separately in consultation with OCAL. OCAL has committed to obtain a Water Access Licence for alluvial groundwater sources relevant to the project as an interim measure while the groundwater model is being developed. Existing conditions require OCAL to ensure that it has sufficient water supply for all stages of the project, and if necessary, adjust the scale of operations to match its available supply.

The **Office of Environment and Heritage** (OEH) did not object to the proposed modification, and offered general support for it, subject to recommended conditions. Nonetheless, OEH raised concerns in relation to the proposed mining method and dimensions, subsidence impacts, hydraulic connectivity, impacts on the Sugarloaf SCA (which OEH manages), public safety, impacts on threatened species, adequacy of flora and fauna surveys, Aboriginal cultural heritage impacts and ongoing consultation with registered Aboriginal parties. OEH advised that the RTS generally addressed its concerns in regards to biodiversity, threatened species and Aboriginal cultural heritage, however it maintained a number of concerns regarding subsidence impacts on the Sugarloaf SCA. The Department has considered OEH's concerns in **Sections 5.1** and **5.4**.

Lake Macquarie City Council (Council) raised a wide range of concerns and/or made comments in relation to:

- *Subsidence* – the level of vertical subsidence represents an unacceptable level of environmental risk to surface water and groundwater when alternate mining methods (ie not involving longwall mining) are available;
- *Ryhope paper subdivision* – undeveloped Council-owned land, currently being assessed by Council for use as a biodiversity offset for another development, which is located partly above the proposed LW 51;
- *Road management* – including a survey of the existing condition of Wakefield Road, preparation of a Road Management Plan and implementation of traffic control measures where subsidence is expected to occur;
- *Biodiversity* – including recommending further assessment of significant features such as creeklines, GDEs, significant owl trees and monitoring of *Grevillea parviflora subsp parviflora*; and
- *Aboriginal heritage* – including recommending revision of the existing Aboriginal Cultural Heritage Management Plan to include recently identified sites and further consultation with registered Aboriginal parties (see **Section 5.5**).

The Department notes that no clear objection was raised in the original Council submission on the EA, with the exception of one team (Council's Ecosystem Enhancement Team) not supporting the modification in its current form and another staff member objecting to subsidence on biodiversity offset lands. OCAL and the Department therefore sought clarification from Council as to whether its submission constituted an objection.

At Council's Standing Committee Meeting held on 14 July 2014, agenda item 14STRAT026 recommended that '*Council object to the proposed modification by endorsing the attached submission and convey it's position to the Department.*' Council then forwarded the relevant submission, and advised that Council resolved to endorse the submission. Having taken the wording of the agenda into account, the Department therefore considers that the submission constitutes an objection to the proposed modification from Council. Nevertheless, the Department notes that no clear objection is included in the submission itself, and that Council did not object to the original major project application.

In addition to its previous comments, Council raised further concerns in relation to:

- *Subsidence* – including impacts to threatened flora and fauna habitat and the potential for connective cracking; and
- *Ryhope paper subdivision* – concern that the existing conditions of approval do not adequately provide assurances to ensure that any damage to the land resulting from mining operations would be remediated to a standard that satisfies OEH's and Council's requirements for the land currently being considered for use as an offset site. Council provided recommended conditions to address this concern, which the Department has considered in **Section 5.4** below.

4.3 Community and Interest Group Submissions

Of the six submissions and representations from the community and special interest groups, four objected to the modification whilst two supported the proposed modification.

The five special interest groups that made submissions were:

- Nature Conservation Council;
- National Parks Association of NSW – Hunter Branch;
- Residents of the Sugarloaf Ranges;
- Sugarvalley Neighbourhood Centre; and
- Construction Forestry Mining and Energy Union.

The main grounds for objection were:

- *Water Resources:*
  - impacts on catchment areas and creeks within the Sugarloaf SCA; and
  - potential for connective cracking;
- *Biodiversity:*
  - direct and indirect impacts on the Sugarloaf SCA, including surface cracking and impacts on cliffs, steep slopes and rock features; and
  - impacts on threatened species and their habitat; and
- *Heritage:* including potential impacts on Aboriginal heritage sites.

The two submissions in support of the proposed modification focused on ongoing community group and local business support from OCAL and the minor nature of the environmental impacts predicted in the EA.

4.4 Response to Submissions (RTS)

OCAL provided a response to agency and community submissions dated June 2014 (see **Appendix D**). The RTS provided clarifications and additional information primarily relating to biodiversity, water resources, Aboriginal heritage and subsidence predictions, including the potential for connective cracking. The RTS was made publicly available on the Department's website, and was reviewed by relevant government agencies.

The key issues assessed below in **Section 5** primarily relate to the residual issues remaining after the results of the consultation process with OCAL, relevant agencies and the public.

5. ASSESSMENT

5.1 Subsidence

5.1.1 Introduction

The modification would cause surface and sub-surface subsidence impacts, which could affect a range of built and natural features. The EA includes a detailed subsidence assessment undertaken by Ditton Geotechnical Services Pty Ltd (DGS).

Subsidence monitoring has been undertaken at West Wallsend for over 20 years, providing a substantial body of detailed information from which to develop the current subsidence predictions. The Department notes that the subsidence model used in DGS's subsidence assessment for the proposed modification includes the monitoring results from the recently mined LW 39 and LW 40, and the greater-than-predicted subsidence impacts that occurred at LW 41.

5.1.2 Surface Features

The proposed longwalls are located predominantly beneath the Sugarloaf SCA, in an area dominated by native bushland with few built features (see **Figure 4**). The topography is moderately undulating with a broad-crested ridge extending across the panels from northwest to southeast. Altitude varies from a high point of 105 m AHD to a low point of 35 m AHD, with ground slopes varying between 5° and 35°. There are approximately 8.3 ha of steep slopes with gradients ranging from 18° to 35° above the two proposed longwalls. There are no cliffs, cliff terraces, minor cliffs or rock features (as defined under the current conditions of approval) above the proposed longwalls. The upper reaches of several ephemeral creeks and tributaries/gullies drain the site towards Diega Creek to the southeast, Ryhope Creek to the south and Palmers Creek to the southwest.

Built features within the vicinity of the proposed longwalls are relatively few, and include:

- M1 Motorway and Wakefield Road;
- Telstra communications tower and services easement;
- unsealed access roads and tracks;
- two buildings to the south of LW 51; and
- Aboriginal cultural heritage sites (see **Section 5.5**)

A portion of land above LW 51, owned by Council and consisting of approximately 1.04 ha of undeveloped bushland, is further considered in **Section 5.4**.

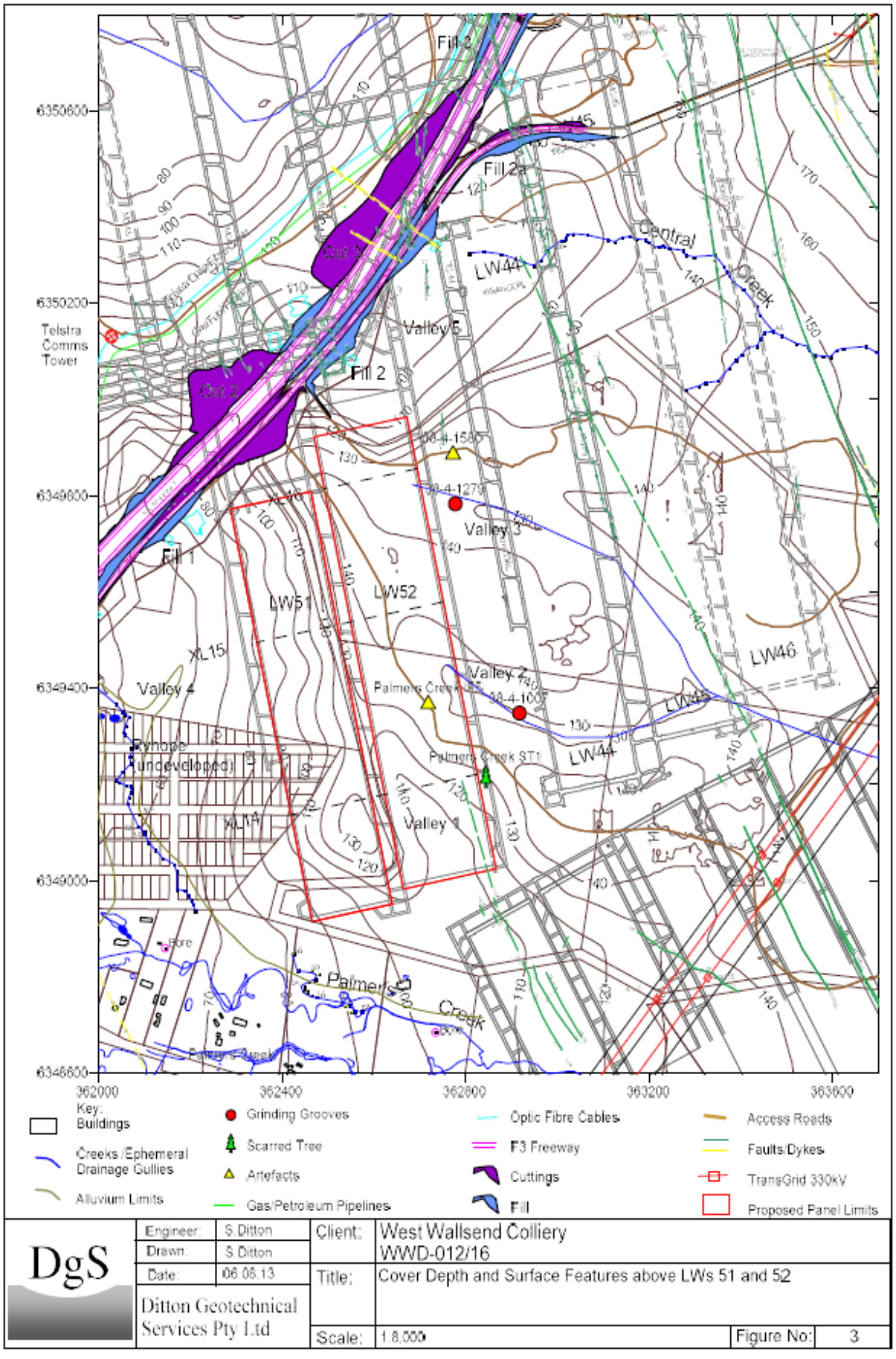


Figure 4: *Surface features above and depths of cover to the proposed longwalls*

5.1.3 Review of Previous Mining

As previously noted, the greater-than-predicted surface subsidence impacts at the VBM feature above LW 41 occurred as a result of anomalous subsurface fracturing due to previously-unknown geological conditions. Subsidence experts considered that this type of impact requires the presence of persistent, sub-parallel geological structures (faults or joints) beneath an unconfined ridge crest or spur. Furthermore, the zone between the structures would also probably be weathered and disturbed and therefore weaker than the surrounding rock mass. Underground and surface mapping near the proposed longwalls has not detected any significant geological structure of concern.

The scale and significance of the VBM feature above LW 41 exceeded OCAL's predictions of subsidence impacts. However, it is important to note that its scale and significance are still relatively limited. The overall area directly affected is around 0.2 ha, and in terms of significance it is worthy of note that the Sugarloaf SCA totals nearly 4000 ha. The greatest potential impact of the VBM feature is not in its environmental, visual or landscape significance; but in the current and future risks that it may present to public safety, through the potential for land slip or rock fall (see **Section 5.6**).

DGS notes that the surface relief and topography above the proposed longwalls are more similar to those above the adjacent LWs 44 and 45, rather than LW 41. For both these panels, measured subsidence effects and far-field movements at the built features have generally been within predicted values (see **Table 2**). Observed subsidence impacts (ie minor surface cracking) were within the limits of the performance measures specified in the existing conditions. No mining-related impacts have been observed or reported by infrastructure owners.

The Department is satisfied that the subsidence effects and impacts associated with extraction of LWs 44 and 45 were limited in scale and extent and generally limited to the footprint of the panels. They were not, in themselves, of concern.

Table 2: *Actual and predicted subsidence measurements*

Subsidence Parameter	**Longwall Panel**			
	LW 44	**LW 45**	**Proposed LW 51***	**Proposed LW 52***
Panel Width (m)	178.6	178.6	178.8	206.8
Panel Length (m)	1186	1367	876	964
Overburden Depth to West Borehole Seam (m)	110-150	120-170	80 – 140	110 – 150
Predicted maximum subsidence *(measured data)* (m)	2.11 *(1.08 – 2.14)*	1.86 *(1.49 - 1.79)*	2.44 – 2.49	2.61
Predicted maximum tilt *(measured data)* (mm/m)	28 - 63 *(30.5 - 50.1)*	29 - 44 *(21 - 35)*	97	90
Predicted maximum tensile strain *(measured data)* (mm/m)	6 - 36 *(7.1 - 32.2)*	8 - 23 *(7 - 10)*	25	22
Predicted maximum compressive strain *(measured data)* (mm/m)	2.7 - 20 *(7 - 46)*	10 - 32 *(5 – 10)*	31	36

**The maximum subsidence measurements presented for LW 51 and 52 are the predicted 95% confidence levels.*

5.1.4 Mine Plan and Panel Width

The major change to the mine plan proposed under the modification is the extraction of coal from two additional longwall panels located in the mine's southern underground domain (see **Figure 3**). The proposed panel dimensions and depths of cover are shown in **Figure 4**.

LWs 51 and 52 are adjacent to the already-extracted LW 44, 45 and 46 in the same domain. A wide barrier pillar has been left between these two groups of longwalls in order to protect two significant Aboriginal grinding groove sites (see **Figure 4**). The proposed longwalls have also been designed to:

- minimise the potential impacts to identified areas of alluvium along Palmers Creek to the south;
- reduce impacts on Wakefield Road and the M1 Motorway to the north;
- avoid an area of low cover depth (ie <80 m) to the west; and
- provide sufficient barriers to any existing and approved underground mining, both at West Wallsend and surrounding mining operations.

Nonetheless, Council and OEH both considered that it would be possible for OCAL to further revise the mine layout, including altering the mining method (ie from longwall mining to bord and pillar +/- partial pillar extraction) to further reduce the remaining subsidence impacts. In particular, OEH and Council were concerned with the proposed increase in width of LW 52, which represents an increase of 12% over the existing width of longwalls at West Wallsend.

The Department notes that the proposed 12% increase in panel width would increase the predicted vertical subsidence by up to 170 mm, which is an increase of just 5-7% over the subsidence predicted for LW 51, which maintains the current panel width of 178.8 m. Further, the maximum predicted tilts and strains for LW 52 are either less than, or not materially greater than, those predicted for LW 51.

The Department and DRE are satisfied that the proposed additional longwall width for LW 52 does not substantially change the overall subsidence risks at the site. DGS further considers that the proposed panel widths would have to be significantly decreased (ie to <50% of the current width) to achieve sub-critical panel geometries, which would result in either nil or minimal goafing and minimal surface cracking. OCAL contends, and the Department accepts, that reducing the panels to less than 50% of the current width, a width that has previously been approved and successfully mined (while noting the unpredicted VBM impacts at LW 41), does not represent an economically viable option. OCAL also considers that bord and pillar mining is not an economic mining method at West Wallsend.

Council also indicated it would be more supportive of the modification if an independent 'peer review' of subsidence impacts was undertaken, an independently-chaired 'review committee' was then convened to consider the 'peer review' and expert recommendations, and OCAL undertook to enact any recommendations of the review committee.

The Department does not consider that a peer review is warranted in this case, given:

- the history and experience of mining similar longwalls at West Wallsend;
- that DGS is an accepted and respected expert subsidence consultancy; and
- that both the Department and DRE (the primary agencies with responsibility for assessing and managing subsidence risks) are satisfied that the proposed modification does not substantially change the overall subsidence risks at the site.

The Department also notes that one of Council's main concerns relates to hydraulic connectivity, which is addressed in the EA's groundwater assessment, which has in turn been peer-reviewed by Dr Noel Merrick of HydroAlgorithmics P/L.

In addition, under its existing Statement of Commitments in the mine's project approval, OCAL is required to establish an Independent Review Committee, in consultation with the Department and OEH, to monitor the progress of mining operations within the Diega Creek catchment. This committee includes members from relevant Government agencies (including Council), OCAL, appropriate subsidence and water experts and is chaired by a subsidence expert otherwise independent of the mine's operations (Mr Don Kay, of Mine Subsidence Engineering Consultants).

The committee was formed to fulfil a commitment previously made by OCAL to monitor the progress of mining operations beneath the Diega Creek catchment in response to concerns regarding hydraulic connectivity; and to undertake further monitoring to provide increased confidence for the predicted height of fracturing within a small area of the Cockle Creek catchment with cover depth <100 m.

The committee has met twice and will continue to meet into the future. The Department considers that the functions of this committee could be expanded to include mining operations beneath Palmers Creek Catchment. OCAL has accepted this proposal and it is reflected in the proposed changes to its Statement of Commitments.

5.1.5 Subsidence Predictions and Effects

Subsidence effects refer to deformation of the groundmass due to mining, including all mining-induced ground movements. 'Conventional subsidence' includes vertical displacement, tilt, and tensile and compressive strains. Additional 'non-conventional subsidence' components include those arising in steep or incised topography (valley closure and upsidence) and far-field horizontal movements.

DGS's subsidence assessment states that subsidence effects would vary across the longwall area. Various factors would act to control overall subsidence and the resulting effects and impacts, including cover depth, interburden thickness and local geological conditions. **Table 2** summarises predicted conventional subsidence effects over LWs 44, 45, 51 and 52 and compares these to monitored subsidence (in parentheses) for LW 44 and 45. Maximum vertical subsidence over the two proposed panels is predicted to be 2.61 m; maximum tilt is predicted to be 97 mm/m; maximum tensile strain is predicted to be 25 mm/m; and maximum compressive strain is predicted to be 36 mm/m. Predicted total maximum (95% confidence) vertical subsidence contours are shown in **Figure 5**.

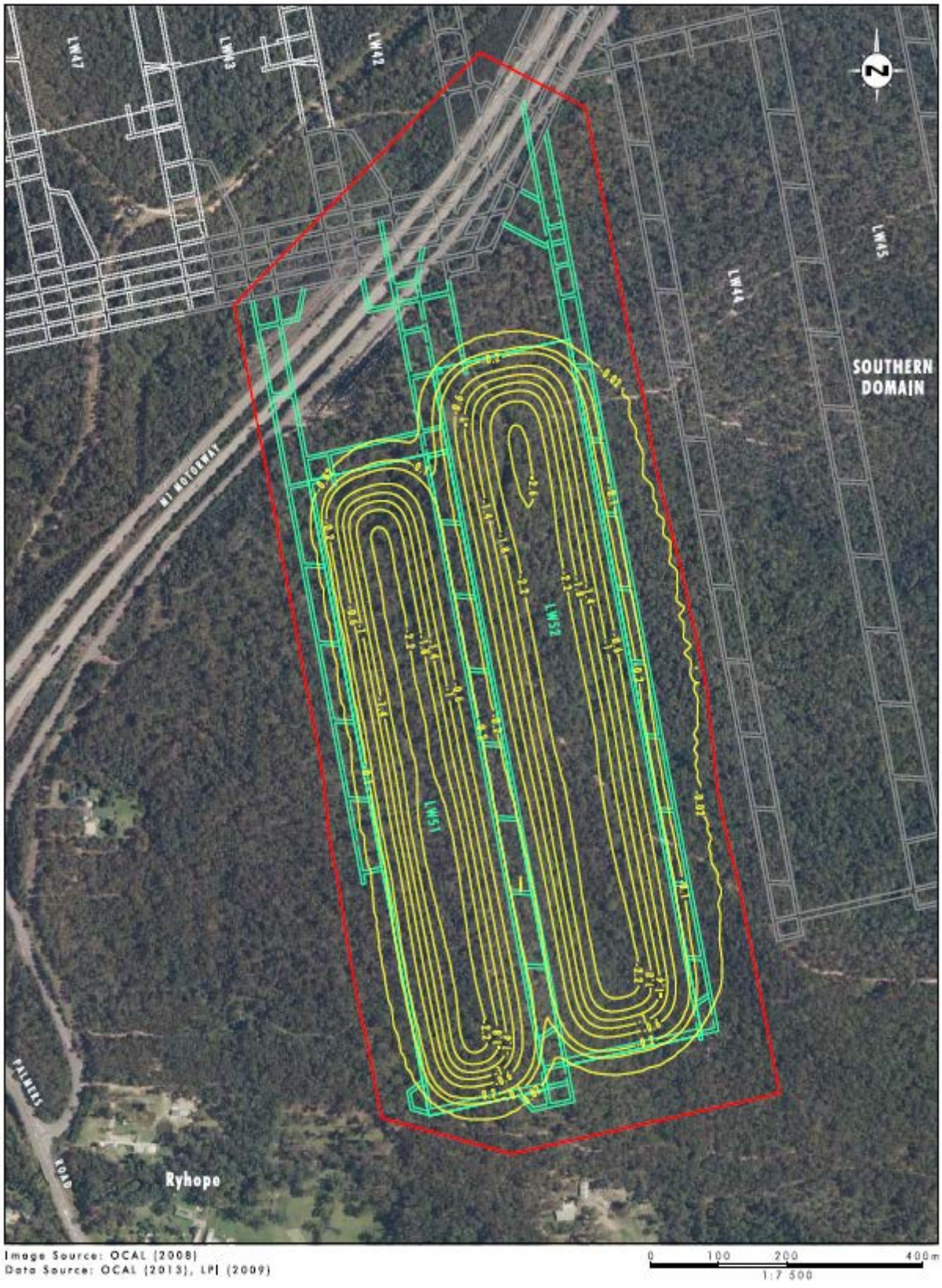


Figure 5: *Predicted total vertical subsidence contours*

Figure 5 shows that the predicted subsidence bowls are very regular in shape, with significant subsidence restricted to the panel footprints and the intervening pillar. However, these narrow, regular subsidence bowls have closely-spaced contours, reflecting relatively high tilts. Predicted tilts are in fact significantly higher than for the adjacent LWs 44 and 45 (see **Table 2**). The main cause of this difference is the lower depth of cover for the proposed longwalls.

DGS assessed vertical subsidence, tensile and compressive strains to be generally similar to the already approved project. DGS also assessed the potential for non-conventional subsidence effects (ie far-field horizontal displacement, valley closure and upsidence) on surface features above or near the proposed longwalls and concluded that impacts would be 'unlikely' to 'very unlikely' to occur.

OEH and Council questioned the application of 95% confidence-level maxima when calculating subsidence predictions, and in particular for estimating the fracture heights for LW51. The Department notes that, if a higher confidence level is applied (ie 99% confidence level), then the prediction error is likely to become too high and the model will start to predict 'false positives' regarding surface-to-seam connectivity. Experience to date also strongly infers that surface-to-seam connectivity would not occur (see **Section 5.1.7**). DRE also noted that the proposed modification does not substantially change the overall subsidence risks at the mine.

The Department is satisfied that an appropriate subsidence prediction model has been used and notes that the model is already calibrated to measured heights of fracturing for a given mining geometry and geology and therefore has allowances for natural variations built into it. The Department considers that DGS's subsidence predictions are conservative.

5.1.6 Surface Impacts

DGS assessed potential subsidence impacts on surface features from mining the proposed longwalls. In terms of overlying and nearby built features, the Department is satisfied that:

- impacts on the M1 Motorway and Wakefield Road are unlikely, given their distances from the proposed longwalls (ie both located outside the angle of draw and/or predicted 20 mm subsidence contour);
- previous monitoring of the M1 Motorway has demonstrated that closure and uplift impacts have not been significant, with measured movements similar to those related to survey accuracy and natural ground movements (ie +/- 20 mm);
- impacts on TransGrid transmission towers, a Telstra communication tower and a services easement containing buried Caltex/Jemena pipelines and Telstra/Optus/Nextgen fibre optic cables are unlikely, given the distances between the towers and the proposed longwalls (500 m, 485 m and 400 m respectively);
- impacts on two rural residential lots to the south and southwest of the proposed LW 52 starting line are unlikely, given the distance between the residences and the proposed longwalls (172 m and 321 m, giving an effective angle of draw of 60° and 73° to the structures); and
- potential impacts on Aboriginal cultural heritage sites can be appropriately managed (see **Section 5.5**).

Reflecting the steep tilts and high strains, maximum surface cracking widths of between 110 mm and 250 mm could potentially occur in areas with moderately undulating terrain (ie slopes <18°) within the limits of mining. For the same reasons, cracks of up to 830 mm width could occur on ridge crests due to rigid body rotation of steep slopes. Vertical separation across such cracks (ie small vertical shears or scarps) of the same order of magnitude could also develop on steep slopes. DGS stated that, if it occurs, differential subsidence is unlikely to generate scarps greater than 1 m in height, based on the features observed on similar terrain to the north. DGS predicts that it is 'unlikely' that there would be any large-scale instability or landslip. No such impact occurred from mining LWs 44 and 45.

Unsealed gravel access roads and tracks are likely to be subsided by up to 2.6 m. Cracking from 100 mm to 250 mm in width and/or vertical shearing and uplift up to 300 mm are expected to occur where the tensile and compressive strain zones develop above each longwall panel. Approximately 30 to 50 m of access roads or tracks above each proposed longwall may require repair to correct tensile cracking or compressive shear failures after each panel is extracted. Such repairs are considered to be straightforward, generally involving only regrading and/or filling.

The Department is satisfied that subsidence is not expected to cause significant impacts to built features, and that such impacts can be suitably managed via existing performance measures and the

Extraction Plan process. It is expected that any unforeseen impacts could be effectively remediated. Under the mine's existing approval, any damage to built features must be fully repairable, and must be fully repaired or replaced or fully compensated.

Subsidence impacts on natural features are discussed under **Sections 5.2** to **5.6**. Hydraulic connectivity is discussed in **Section 5.3**.

5.1.7 Conclusion

The Department is satisfied that DGS's subsidence assessment has used conservative assumptions, and that the resulting subsidence predictions provide a sound basis to assess the potential subsidence impacts and environmental consequences of the proposed modification. The subsidence assessment uses empirical data from the current mining operations, where the application of performance measures has proven successful (bar a single exception) in managing the risk of significant impacts, and from the Newcastle Coalfield more generally.

OCAL has already sought to protect the most significant natural and built features near the proposed mining area by submitting a mine design which:

- leaves a wide barrier pillar to protect two significant Aboriginal grinding groove sites;
- maintains a setback between LW 51 and alluvium along Palmers Creek to the south;
- reduces impacts on Wakefield Road and the M1 Motorway to the north; and
- generally avoids the area of low depth of cover (ie <80 m) to the west.

Existing conditions include strict subsidence performance measures which act to protect all natural and built features in the underground mining area and require offsets if unforeseen impacts occur which cannot be successfully remediated. The Department considers that the current performance measures remain appropriate, and that these measures would provide adequate impact protection to all significant surface features in the modification area.

A comprehensive Extraction Plan must also be prepared following consultation with relevant agencies and be approved prior to the commencement of the proposed longwalls. The Extraction Plan would detail the proposed subsidence impact assessment, monitoring and reporting frameworks for all built and natural features in the second workings area.

The potential environmental consequences on steep slopes, water resources, Aboriginal heritage, and flora and fauna are addressed in detail in **Sections 5.2** to **5.6**.

5.2 Steep Slopes

5.2.1 Introduction

The proposed longwalls underlie approximately 8.3 ha of steep slopes with rocky outcrops. These slopes have gradients ranging from 18° to 35° and shallow residual soils less than 1 m thick (see **Figure 6**). The height of the slopes ranges between approximately 30 - 40 m above the valleys. The cover depth to seam below the steep slopes ranges from about 100 m to 130 m.

5.2.2 Potential Impacts

The steep slopes above the proposed longwalls are predicted to be tilted and cracked, reflecting the relatively steep-walled subsidence bowls and subsidence of up to 2.6 m. The slopes above LW 51 are predicted to tilt towards the west by an average of 70 mm/m, a slope change of approximately 4°. The slopes above LW 52 are predicted to tilt towards the east by an average of 70 mm/m, a slope change of approximately 4°.

DGS considers it unlikely that these tilts will lead to any *en-masse* land slippage on weakened bedding planes, provided that any cracking on steep slopes is repaired. However, local instability and erosion could occur.

The subsidence assessment noted that several small scarp or VBM events (ranging in size from 0.5 m to 4 m) on the steep slopes above LW 40 and LW 41 occurred due to interactions with unpredicted geological structures. However, detailed underground and surface mapping work has not detected any significant geological structures near the proposed longwalls. If such a structure were to be present, differential subsidence is unlikely to generate scarps >1 m in height.

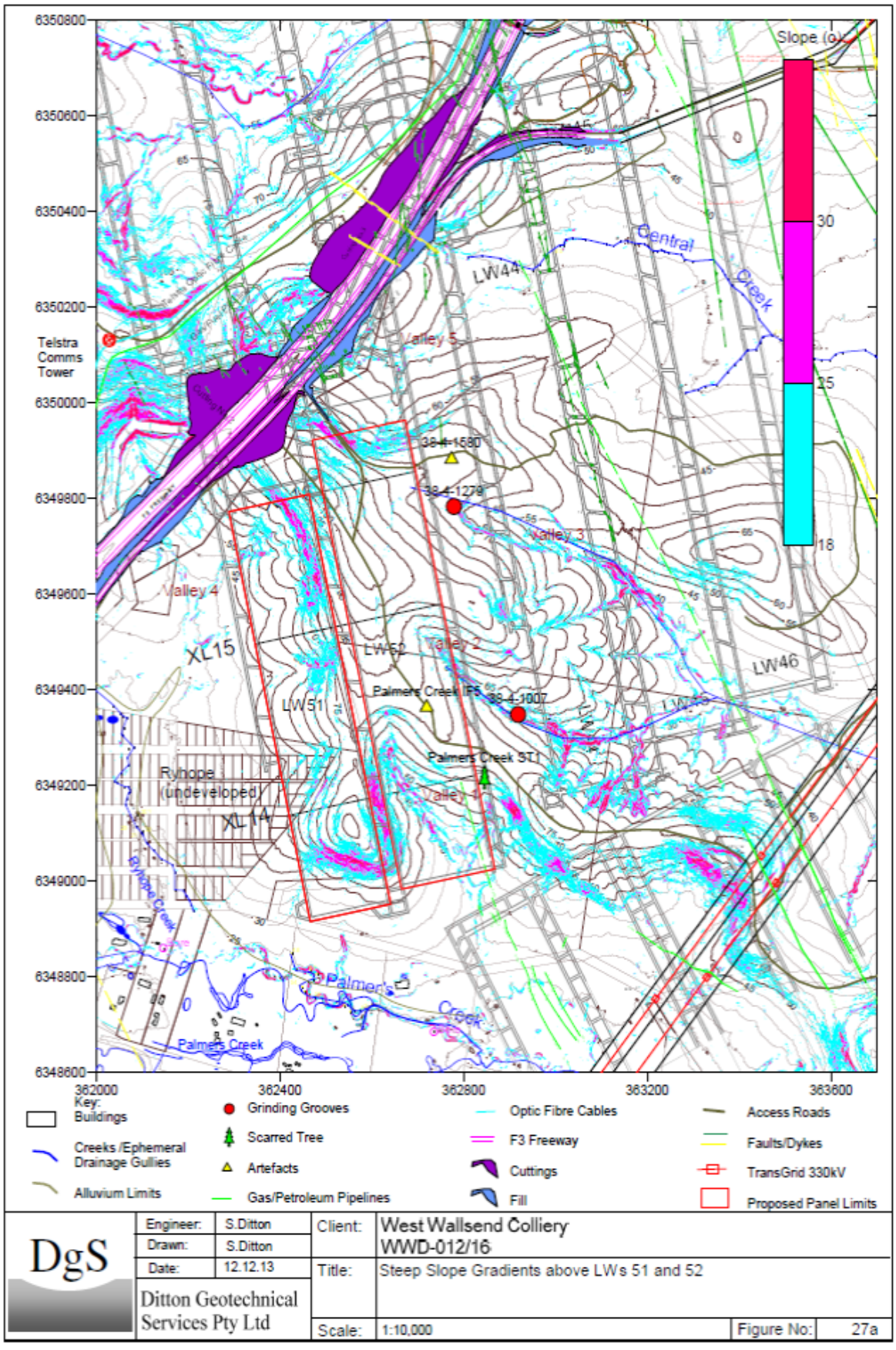


Figure 6: *Steep slopes above the proposed longwalls*

The assessment also concluded that there is a very low likelihood that rock roll-outs would occur from steep slope rock outcrops less than 1.5 m high. If it were to occur, rock roll-out would most likely occur from steep slopes at the starting end of LW 51, which could affect access tracks below.

The recent extraction of LW 44 (adjacent to LW 52) did not result in any cracking on the slopes and valleys, although gradients range from 5° to 30°. There is also no evidence that the steep slopes above the proposed longwalls were affected by mine subsidence from the previous Newstan Mine longwalls to the south.

5.2.3 Management

Existing conditions restrict OCAL to minor environmental consequences on rock face features and steep slopes, ie 'occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 7% of the total face area of such features within the mining area.' The area of steep slopes above the proposed longwalls that may be impacted is likely to be substantially less than 7%, in accordance with the existing performance measure.

The Department also notes that OCAL is required to prepare a Land Management Plan and Public Safety Management Plan as part of the LW 51 and LW 52 Extraction Plan. These plans would detail the management regime (including remediation) for potential subsidence impacts and environmental consequences on steep slopes.

5.2.4 Definitions

The OEH submission raised concerns with the definitions of cliff, cliff terrace, minor cliff and rock face feature currently in the project approval, and in particular the specification that a cliff, cliff terrace, minor cliff or rock face feature must have a minimum length of 20 m. In fact, the definition of 'minor cliff' already includes features which are less than 20 m in length, provided that they are more than 10 m in height (ie short 'cliffs'). There are also no cliffs, cliff terraces, minor cliffs or rock face features above the proposed longwalls.

OEH also noted that it considered the current performance measures for these features to 'arbitrary, unenforceable and inconsistent with the conditions of consent at other mines', specifically referring to the nearby Tasman Underground Coal Mine, which has a negligible impact condition for cliffs and steep slopes. The Department first notes that Tasman operates by bord and pillar and pillar extraction methods under imposed subsidence control zones, enabling much greater control over individual surface impacts than does longwall mining.

The Department recommends approval conditions, including performance measures, specific to each project. This is in line with Government policy whereby each project is considered on its merits. It may not be appropriate to apply the same conditions to all mining operations. The Tasman Mine contains surface and geological conditions that differ from those at West Wallsend including cliffs with high public visibility, Aboriginal sites including rock shelters, exposed walking tracks with rock roll-out risks and overlying old mine workings that affect subsidence impacts.

The subsidence report undertaken by DGS as part of the West Wallsend Continued Operations Project defined and then separately considered cliffs, minor cliffs, cliff terraces, rock outcrops, very steep slopes and steep slopes. The Department broadly supported these definitions and noted that they were generally consistent with definitions accepted by the PAC for other approved longwall mining projects, including Metropolitan Colliery and Bulli Seam Operations. OEH did not raise any concern with the definitions at the time of the major project assessment or approval.

OCAL has also advised that no features were excluded from assessment through application of the approval's definitions. All surface features were considered, with the definitions being used to determine the category where each feature is placed for assessment and monitoring purposes. Furthermore, the surface above longwall panels at West Wallsend is inspected post-mining and rehabilitated if required, regardless of the definitions in the project approval.

Nonetheless, the Department is continually working towards the development and improvement of quantifiable performance measures. It accepts that the current definitions of rock face features can be improved to take account of particular features less than 20 m in length (ie short 'minor cliffs') and that the definition of cliff terraces should be expanded to include rock face features as well as minor cliffs.

However, the Department considers that it would be unreasonable to apply the proposed changes retrospectively and therefore recommends that the expanded definitions only apply to rock features subject to impacts which are caused by mining pursuant to an Extraction Plan approved *after* 30 September 2014. The Department has proposed variations to the existing conditions to this effect.

5.2.5 Conclusion

The Department is satisfied that OCAL has conducted a thorough assessment of the steep slopes above the proposed modification area and that the existing performance measures remain appropriate. The Department is also satisfied that steep slopes in the proposed modification area would be adequately conserved and protected.

However, while the existing performance measures for cliffs and related types of rock faces are generally rigorous, OEH has identified that certain types of rock faces are not covered by the current definitions. The Department is proposing minor changes to the definitions of rock face features, minor cliffs and cliff terraces as a result.

5.3 Water Resources

5.3.1 Introduction

The EA includes a surface water impact assessment undertaken by Umwelt Australia Pty Limited which used the one-dimensional hydrodynamic model XP-Storm to model flows within Palmers Creek and its tributaries. The EA also includes a specialist Groundwater Impact Assessment undertaken by Aurecon Australia which determined the nature of the existing groundwater environment, the proposed modification's interactions with groundwater and the potential for groundwater impacts.

The water resource assessments considered whether the proposed modification would increase the project's approved subsidence impacts and environmental consequences for water resources, including:

- cracking of stream beds and banks;
- connective cracking resulting in surface and/or subsurface flow losses; and
- changes in stream geomorphology resulting in ponding.

5.3.2 Surface Catchment Context

The modification area lies within the Palmers Creek Catchment, which has a total area of about 2,630 ha, of which approximately 27 ha (1%) is within the area expected to be affected by subsidence. OEH raised concern that the RTS did not discuss impacts to Diega Creek catchment including loss of water within Diega Creek and its relationship with mining. The Department is satisfied that there would negligible impacts to Diega Creek catchment as the proposed modification lies entirely within the Palmers Creek Catchment.

Within this subsidence affectation area, drainage lines are limited to the very upper reaches of two 1st order ephemeral tributaries of Palmers Creek (see **Figure 7**), only one of which is partially located above LW 52 and which is known in the assessment as Watercourse 2. These drainage lines generally flow only for short periods following rainfall. Areas of remnant ponding are limited to small sections within the more northerly of these drainage lines (located to the north of LW 52 and known in the assessment as Watercourse 1). These tributaries are defined by small gullies approximately 1 - 2 m wide, with sandy bed and banks that are typically in good condition with limited erosion. Extensive riparian vegetation is present, which is contiguous with the surrounding forested areas.

5.3.3 Impacts to Surface Water Systems and Users

Only a very small area of Watercourse 2 would be undermined, and only by LW 52 in an area where the depth of cover is around 130 – 140 m. Previous undermining of these tributaries by LWs 44 and 45 did not lead to subsidence cracking or subsurface re-routing of water within the creeks or any significant dieback of vegetation.

Steep tilts are predicted to lead to increases or decreases in gradient of between 5° to 9° along this section of Watercourse 2, potentially resulting in increases in erosion and sedimentation after storm events until a new equilibrium is reached. The presence of extensive vegetation within the drainage line would assist in minimising erosion. OCAL also contends that any sediment load passing along the drainage line during storm events would assist in infilling any surface cracking in the stream bed.

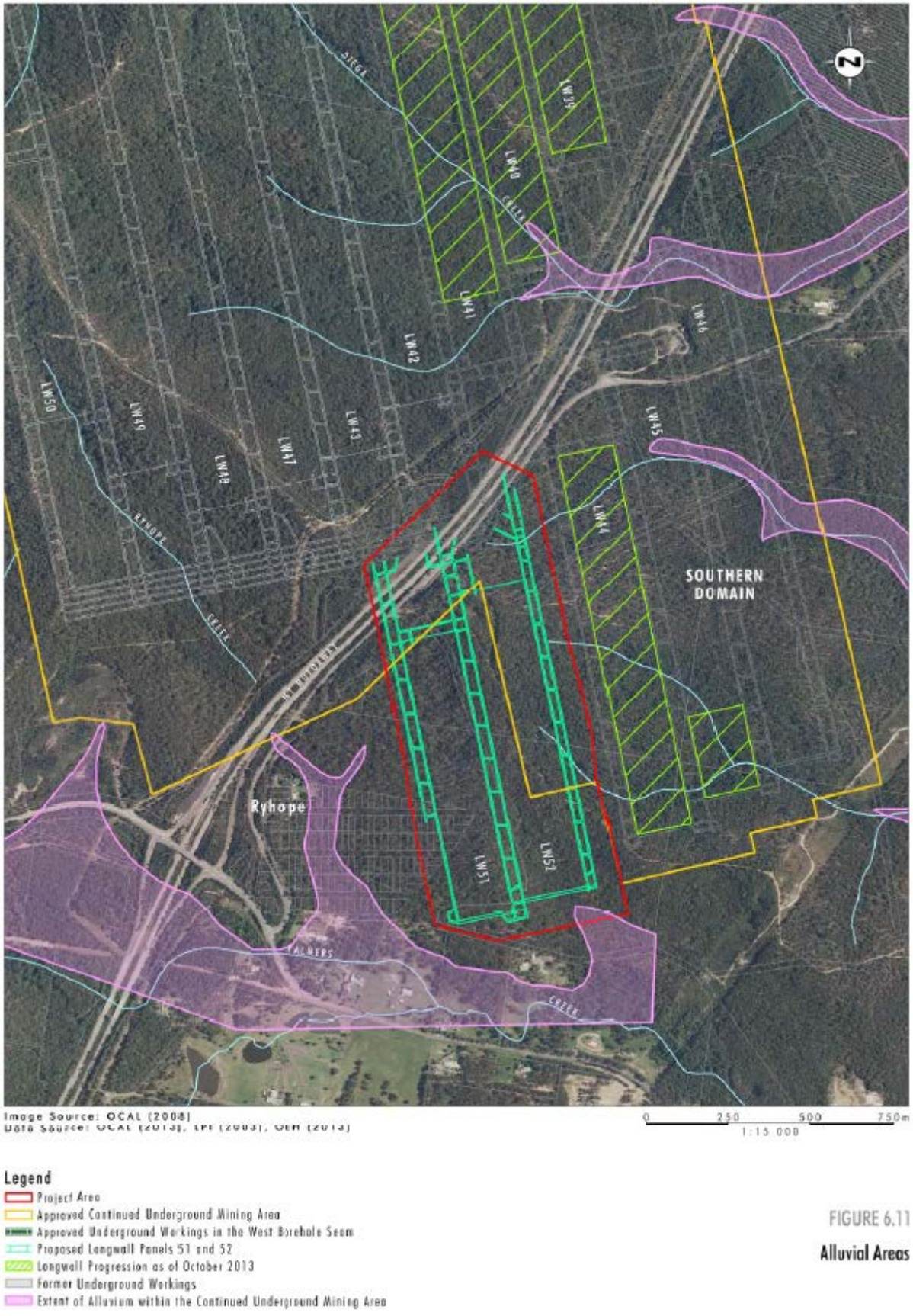


***Figure 7**: Watercourses and drainage lines, showing areas of alluvium*

The ponding analysis indicates that predicted impacts to existing ponded areas within the subsidence affectation area would be negligible. Nonetheless, minor surface cracking of rock bars within the stream beds is possible. This could result in minor localised stream flow reduction, loss of water held in pools and water quality impacts. Minor, localised, sub-surface flow re-routing could occur with subsequent downstream re-surfacing.

These potential impacts were all considered in the assessment for the original project, which found that, even if upper-bound subsidence predictions were to eventuate and subsequent impacts also exceed predictions, any impacts could be effectively remediated. The current assessment reiterates this position, and the Department considers that any unforeseen impacts from the modified project would not be significant and would be able to be effectively remediated.

Predicted subsidence is not expected to result in significant changes to ponding, flow volumes or flow characteristics within Palmers Creek. Increases in the sediment load within Palmers Creek are also considered unlikely. As a result, impacts to the existing water quality within the Palmers Creek catchment are expected to be negligible.

The Department and NOW are both satisfied that the proposed modification would not result in any significant impact on the stability, remnant ponding, flow volumes, flow characteristics, sediment load or water quality in drainage lines. The Department is further satisfied that the proposed modification would not impact on downstream water users. The Department and NOW are satisfied that OCAL has achieved a sound balance in terms of avoiding direct impacts on significant local surface water systems, with the proposed longwall extraction designed to avoid direct impacts on catchment boundaries and the drainage infrastructure of the M1 Motorway and Wakefield Road, minimise impacts on the two 1st order drainage lines and involve no surface water take.

The Department is satisfied that existing and proposed mitigation and management measures reduce impacts to acceptable levels. Existing conditions of approval require OCAL to prepare a comprehensive Water Management Plan as part of the Extraction Plan required for the proposed longwalls. This Water Management Plan must be prepared in consultation with NOW and OEH and include surface water assessment criteria and trigger levels and a surface water monitoring program.

5.3.4 Groundwater Aquifer Context

Three potential sources of groundwater have historically been utilised in the Lake Macquarie area, comprising:

- alluvial aquifers;
- near-surface weathered rock aquifers; and
- fractured rock aquifers (including coal seam aquifers).

The alluvial aquifers are the most important potential source of groundwater in the local area. The proposed modification lies within the Palmers Creek Catchment area. The valley of Palmers Creek comprises a broad alluvial terrace, which contains one major aquifer located to the south and southwest of the proposed modification. Several bores use this alluvial groundwater for stock and domestic purposes.

The Department notes that the aquifer is located outside West Wallsend's mining lease, although the proposed longwall panels lie immediately north of the aquifer, adjacent to the mining lease boundary (see **Figure 7**). There is an absence of surface alluvium along the ephemeral creeks and gullies in the proposed mining extension area.

Previous assessments have indicated that the weathered rock aquifers do not contain significant quantities of groundwater due to extremely low permeability of the rock material. These aquifers are considered to be largely non-existent or of minor significance within the approved and proposed mining area. The fractured rock aquifers have potential for higher flows, but are considered to be of poor resource potential, primarily due to the high levels of salinity in the groundwater.

5.3.5 Impacts on Surrounding Groundwater Users

The hydrological assessment indicates that fracturing of overburden strata caused by subsidence has the potential to drain aquifers in the alluvial deposits and affect groundwater discharges (ie baseflow) to local creek systems. The probability of underground mining resulting in an adverse impact on baseflow is dependent on the height of the fractured zone. As discussed previously, DGS predicted

that the risk of hydraulic connectivity, based on limiting the height of mining where depth of cover is <90 m, is 'very unlikely'.

OCAL previously committed to undertaking further monitoring to provide increased confidence of the height of fracturing above Longwall 40 within a small area of the Cockle Creek catchment with a depth of cover <100 m. The results of this monitoring are consistent with height of fracturing models, which OCAL has used to continue to justify longwall extraction to the 80 m cover depth contour.

While noting that there is the potential for small quantities of groundwater to drain horizontally from the base of the alluvial aquifer into the goaf, Aurecon states that, if a horizontal separation of at least 150 m is maintained between the goaf and the alluvial aquifer, then the probability of hydraulic connection between the alluvium and the mine should be minimal. The Department is satisfied that there is a very low probability of any adverse impacts on the normal flow rates in the alluvial aquifer given that the centre of the main alluvial aquifer is at least 170 m from the proposed longwalls.

There are no registered groundwater bores within the proposed modification area. Slattery's bore (GW064025) is the only bore within a reasonable distance of the proposed longwalls. This bore is supplied largely by a local weathered rock aquifer, which is possibly connected to the alluvium in Palmer's Creek. The proposed longwalls are located 180 m and 220 m to the north of this bore. The Department is satisfied that there would not be significant impacts to this bore. Nevertheless, should the bore be impacted, existing conditions of approval require OCAL to provide a compensatory water supply to any landowner whose water entitlements are adversely impacted by the project.

The Department and NOW are satisfied that OCAL has achieved a reasonable balance in terms of avoiding adverse impacts on groundwater systems, given that:

- there are no licensed bores or groundwater users within the proposed modification area;
- the current groundwater usage in the vicinity of the proposed modification area is minimal and limited to one bore located to the south of LW 51;
- most alluvium in the vicinity of the proposed modification contains no aquifer zones that would provide a significant groundwater source, with the exception of the alluvial aquifer in Palmers Creek, which is located south and southwest of the modification area;
- the southern extents of the proposed longwalls are located approximately 170 – 220 m (LW 51) and 280 m (LW 52) from the centre of the Palmers Creek alluvial channel; and
- the potential future use of weathered rock and fractured rock aquifers is considered to be negligible due to generally poor yield, low quality and lack of continuity.

5.3.6 Hydraulic Connectivity

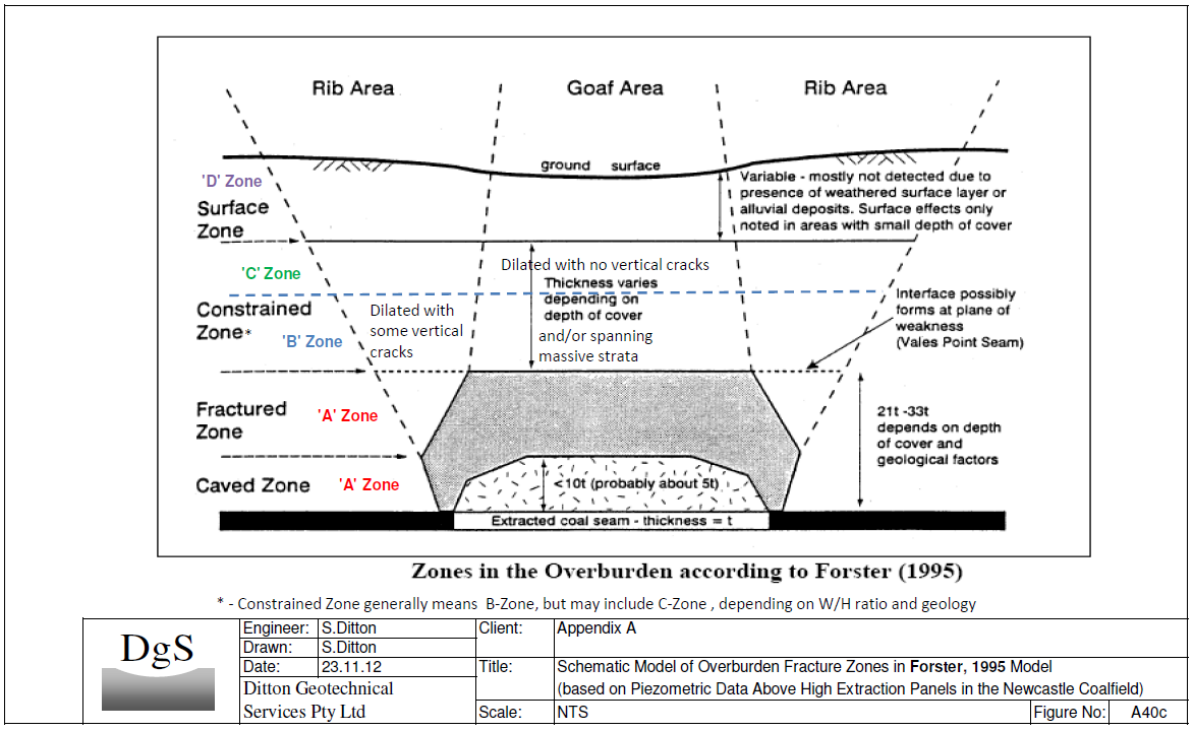
Because of the relatively low depths of cover above LW 51 and LW 52 (see **Figure 4**), sub-surface impacts and the potential for connective cracking and hydraulic connectivity from the surface to the mine workings is a key issue for assessment. However, it is important to note that there are no watercourses and a very limited length of drainage lines located above either longwall, with the nearest significant watercourse (Palmer Creek) set back about 130 m to the southwest of LW 51.

DGS's subsidence modelling considers potential sub-surface impacts in three key zones (see **Figure 8**). A summary of predicted impacts for these zones, as outlined in the EA, includes:

- *Continuous Fracture Zone (A-Zone)*: continuous fracture height is predicted to range from 55 - 66 m (for mining height in the seam of 3.6 m and cover depth of 80 m) to 99 - 118 m (for mining height in the seam of 4.5 m and cover depth of 140 m);
- *Constrained Zone (B-Zone)*: where the strata are dilated and some vertical cracks are present, thickness is estimated to range between 12 m and 44 m; and
- *Surface Cracking Zone (D-Zone)*: depths of tensile surface cracks are typically less than 15 m; and estimated to range between 10 m and 12 m along the downslope side of the panels and 15 m to 20 m along the crests of steep slopes or below the base of subsided valleys.

Due to the relatively low depth of cover, no C-Zone is likely to exist at this site (see **Figure 9**).

DGS considered that there is potential for direct hydraulic connection to the surface, due to sub-surface fracturing, between 80 m and 100 m depth of cover (ie the western edge of LW 51 – see **Figures 4** and **9**). To minimise this connective cracking potential, DGS recommended that the mining height be reduced (from the proposed maximum of 4.5 m) to 3.8 m where the depth of cover is <90 m and to 3.6 m where cover depth is <80 m.



Zones in the Overburden according to Forster (1995)

* - Constrained Zone generally means B-Zone, but may include C-Zone , depending on W/H ratio and geology

DgS	Engineer:	S.Ditton	Client:	Appendix A	
	Drawn:	S.Ditton			
	Date:	23.11.12	Title:	Schematic Model of Overburden Fracture Zones in **Forster, 1995** Model	
	Ditton Geotechnical Services Pty Ltd			(based on Piezometric Data Above High Extraction Panels in the Newcastle Coalfield)	
			Scale:	NTS	Figure No: A40c

Figure 8: *Schematic model of zones in the overburden*

By decreasing mining heights in this way, DGS considered that it would be very unlikely for the Continuous Fracture Zone to connect with the Surface Cracking Zone. DGS considered it unlikely that cracking in the A-Zone and D-Zone would intersect if the full seam height was extracted in LW 52.

DGS initially considered that connective cracking was 'unlikely' to occur above LW 51, ie that such an event is conceivable but only if adverse geological conditions are present. However, such geological conditions are also unlikely, given that:

- development headings in the LW 51 panel area did not encounter any geological structure of significance; and
- there are several tuffaceous claystone beds within 30 m of the surface, which would assist in sealing cracks and limiting hydraulic connectivity from the surface.

Based on additional information provided by OCAL and DGS (see **Appendix E**), the likelihood of occurrence of connective cracking was revised to 'very unlikely', even if adverse conditions were present, with an indicative probability of 1-5%. This revised assessment also considered that:

- actual measured heights of fracturing above LWs 39 - 41 aligned with previously predicted mean values, substantially less than predicted (95% confidence) maxima;
- recent mining in low cover depth areas above LWs 41 and 42 did not result in surface to seam connectivity; and
- downslope movements are likely to cause strains to be compressive, with a depth of cracking less than 5 m, along the toe of the slope in the low cover depth area for LW 51 (see **Figure 9**).

Groundwater inflows into current mine workings have been low, with typical conditions described as dry to damp by OCAL geologists. A review of mine water discharges in June 2013 indicated that spikes in inflows were lagging approximately 10 months behind significant rainfall events. This provides further evidence that direct hydraulic connection to the mine workings has not so far occurred in the current project area. In particular, LWs 41 and 42, which undermined several Diega Creek tributaries at average cover depths between 80 - 90 m, showed no evidence of hydraulic connectivity. DRE also considers that overall subsidence risks would not change from those already approved (ie very unlikely potential for hydraulic connectivity).

Nonetheless, OEH and Council remain concerned that the potential for hydraulic connectivity exists. The Department notes that direct connection between the surface and longwall workings has higher potential to occur in areas of very low depth of cover (ie <80 m). However, subject to a very small area on the northwestern edge of LW 51, mining is not proposed at <80 m depth of cover (see **Figure 4**). OCAL has accepted the need to reduce mining height (otherwise expected to range from 4.2 – 4.5 m)

to 3.6 m, where cover depth is <80 m, and to 3.8 m, where cover depth is <90 m. This is readily achievable by adjusting the mining height on the longwall shearer.

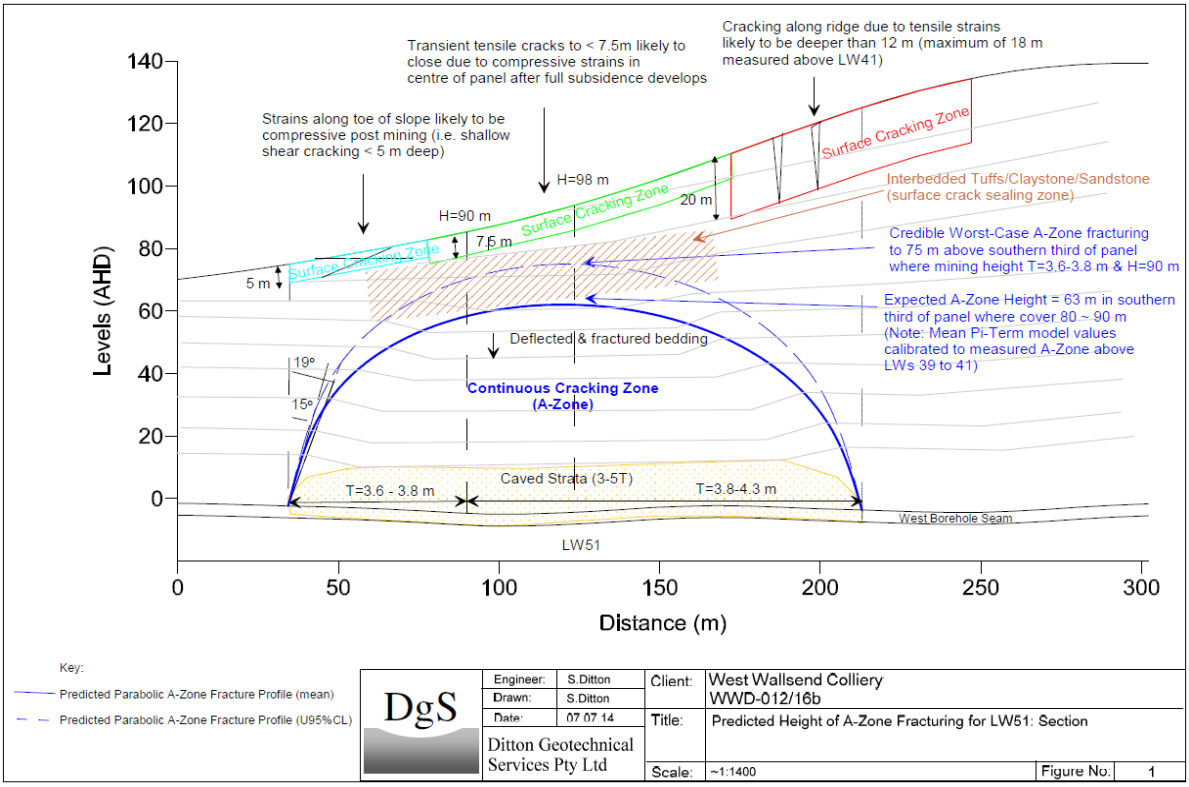


Figure 9: *Predicted height of A-Zone fracturing for LW 51*

DGS has calculated that these reductions should reduce the height of the A-Zone to 55 - 66 m and 63 - 75 m, for cover depths of 80 m and 90 m respectively. The minimum B-Zone thickness resulting from these reduced mining heights is estimated to range between 13 – 15 m where maximum surface cracking may extend to depths of 10 – 12 m along the downslope edge of the panel. The mean B-Zone thickness ranges between 21 – 24 m.

On this basis, the Department accepts DGS's assessment that it is 'very unlikely' that cracking in the A-Zone and D-Zone would intersect, and that the risk of connective cracking and hydraulic connectivity from the surface to the mine workings has been satisfactorily reduced.

Current project approval conditions also already require that no connective cracking occurs between the mine workings and Cockle, Diega, Bangalow and Palmers Creeks. This is an important performance measure which has been reflected in OCAL's proposed setback of LW 51 from Palmer Creek to the south.

OCAL's current subsidence monitoring program would be expanded to cover the modified project. This would involve a subsidence monitoring program and regular surface inspections during and after mining, as well as any necessary surface remediation. OCAL has also recently committed to develop and implement a groundwater and connective fracturing monitoring program, in consultation with OEH, within six months of approval of the modification. The Department considers that this is an important, and necessary, commitment given the relatively low depths of cover and has recommended a condition that turns this commitment into a requirement.

In the very unlikely event that hydraulic connectivity were to occur, the likely consequences would be minimal, given the very limited water resources that occur immediately above and adjacent to the proposed modification area. Any water take that did occur would be low and licensable.

5.3.7 Regional Impact

The EA assessed the potential risks to the regional hydrological regime. Regional impacts were confined to assessment of potential reductions from aquifers in the alluvium and groundwater inflows from fractured rock (ie coal seam) aquifers into the underground mine workings.

The Department is satisfied that the regional risk to coal seam aquifers from inflow rates is not significant as:

- no significant aquifers have been identified in the overburden above the mining area;
- coal seam aquifers in the region do not provide an important source of groundwater due to poor quality;
- there has already been significant groundwater extraction in this seam in the region, which has depleted the groundwater resource;
- the affected seam sub-crops immediately west of the proposed mining area, so there is minimal chance for drainage from up-dip groundwater resources; and
- the proposed mining area covers a relatively small area when compared to the total coal basin, so any additional regional impacts would be negligible.

The Department accepts that regional groundwater impacts are unlikely to be significant.

5.3.8 Water Use

The key licensable water 'used' by the project would be groundwater that flows into the mine, which would mostly consist of the entrained groundwater within the extracted coal resource itself. NOW has advised that the number of outstanding licensing issues raised in its comments on the EA are being addressed separately in consultation with OCAL (see **Section 4**).

The Department notes that, like any other significant water user in the State, the ability to maintain access to 'take' this water is a commercial risk for OCAL, subject to purchasing the necessary groundwater licences. Like any other significant water user, if OCAL is not able to secure enough water to meet its demands then its extraction operations may need to be reduced. This is consistent with the water sharing principles established under the *Water Management Act 2000*.

To demonstrate that OCAL has access to adequate water allocations, and to ensure that it uses water efficiently, the existing conditions require OCAL to ensure that it has sufficient water supply for all stages of the project, and if necessary, adjust the scale of operations to match its available supply.

5.3.9 Conclusion

The Department accepts the findings of the hydrological and surface water assessments, and is satisfied that the modification can be managed to avoid any significant impacts on water resources.

Existing conditions require a detailed water monitoring regime designed to inform OCAL whether subsidence effects are such that greater-than-negligible environmental consequences might result. The Department also notes that OCAL is required to:

- obtain appropriate water licences from NOW for all groundwater inflows to the mine; and
- develop a comprehensive Water Management Plan as part of the Extraction Plan, in consultation with relevant authorities and including:
  - a groundwater monitoring program;
  - impact assessment criteria or trigger values (within the context of a Trigger Action Response Plan (TARP)); and
  - a contingency plan that provides for adaptive management.

Subject to these measures, the Department is satisfied that the proposed mining can be managed such that it would not result in any significant impacts on water resources.

OCAL would continue to implement an adaptive management process to address any potential impacts to watercourses. This process would include identifying subsidence impacts at streams, assessing whether these impacts would result in significant consequences, and implementing appropriate control or remediation techniques (eg allowing cracks to seal naturally or remediating using artificial methods). The adaptive management process would be comprehensively detailed in a Water Management Plan, which is required to be included in each Extraction Plan.

5.4 Biodiversity

5.4.1 Threatened Flora and Fauna

The EA includes an Ecological Assessment undertaken by Umwelt Australia Pty Limited.

No threatened vegetation communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded within the proposed modification area. Furthermore, no vegetation community within the proposed modification area is considered likely to be a groundwater dependent ecosystem (GDE).

Two threatened flora species (Small-flower grevillea (*Grevillea parviflora subsp parviflora)* and Black-eyed Susan (*Tetratheca juncea*)) and seven threatened fauna species (six bats and one bird) were recorded as occurring within the proposed modification area.

5.4.2 Potential Impacts

The EA concluded that some impacts to ecological values would occur; however most vegetation and fauna habitat would remain largely undisturbed. Some impacts due to subsidence and associated remediation works within the SCA are predicted. However, the proposed modification is not predicted to result in significant loss or impact on vegetation communities; their floristic structure; fauna species or habitat; threatened species, endangered populations or their habitat; or endangered ecological communities.

OEH and Council raised concerns over potential impacts from subsidence on flora and fauna, including threatened species. OEH also raised concerns about impacts on the Sugarloaf SCA (which OEH manages), public safety, what constitutes an adverse impact that triggers the requirement for an offset and the adequacy of flora and fauna surveys. Council also raised a number of other concerns in relation to biodiversity including recommending further assessment of significant features including creeklines, GDEs and significant owl trees, and monitoring of Small-flower grevillea.

OCAL, in its RTS, has committed to monitoring Small-flower grevillea, in accordance with Council's relevant interim guidelines. The Department has included a recommended condition to this effect, as part of the Biodiversity Management Plan required under the Extraction Plan. OEH advised that the RTS generally addressed its concerns in regards to biodiversity and threatened species; however it maintained a number of concerns regarding subsidence impacts on the Sugarloaf SCA.

The proposed modification is not expected to have a significant impact on the ecological values of the Sugarloaf SCA. Sugarloaf SCA was reserved as a State conservation area due to its mineral values (ie underground coal reserves and existing mining leases), which militated against it being reserved under a different reserve category (such as a national park).

Surface cracks with widths between 110 mm and 250 mm could occur within the longwall footprints in areas of moderately undulating terrain (ie slopes <18°). Cracks of up to 830 mm in width could occur on ridge crests (see **Sections 5.1** and **5.2**). Areas of the SCA would be closed during active subsidence (see *Public Safety* below).

The Department notes that subsidence does not usually lead to significant impacts on ecological values. However, it can lead to surface impacts such as soil cracking, cracking of rock outcrops, rock falls and tree falls that may have limited impacts on ecological values. The Department is satisfied that the predicted impacts would not result in a significant loss of biodiversity or fauna habitat in the proposed modification area, the Sugarloaf SCA or the region more broadly.

The Department notes that, under existing conditions of approval, OCAL must not exceed a performance measure of 'negligible environmental consequences' for threatened species, threatened populations and endangered ecological communities. If OCAL exceeds this performance measure and the impact cannot be remediated successfully, then OCAL must provide a suitable offset to compensate for the impact. OCAL is also required to monitor and manage biodiversity under a Biodiversity Management Plan (as part of the Extraction Plan process).

OEH was provided the opportunity to comment on the recommended conditions and noted that they generally addressed its previous concerns. However, with respect to biodiversity offsetting, OEH remained of the view that OCAL's commitment to provide a compensatory habitat package if adverse impacts result from subsidence needs to be reflected within the recommended conditions.

In the event that significant impacts on identified ecological values are identified and cannot be adequately remediated within the Sugarloaf SCA, OCAL has previously committed to engage a suitably qualified and experienced ecologist to prepare a Biodiversity Offset Strategy in consultation

with OEH and the Department. OCAL is required to implement this commitment, since its Statement of Commitments forms part of the project approval.

The Department is satisfied that existing conditions of approval, in particular the performance measures and the requirement for OCAL to either remediate exceedances of these measures or else provide a satisfactory offset, would continue to adequately manage potential impacts on biodiversity values.

The Department is satisfied that the predicted subsidence impacts and associated remediation would not compromise the ecological values and integrity of the SCA. Furthermore, ecological monitoring in previously mined areas of West Wallsend indicate that, whilst some significant impacts have occurred, mining has generally not resulted in significant impacts to ecological values within the SCA. In particular, the two grouting incidents were satisfactorily remediated.

5.4.3 Remediation and Rehabilitation

OEH, in its comments on the RTS, requested that no approval which could result in surface cracking is granted until such time as the proposed remediation methods, techniques and products are proven to be effective. Since submission of the RTS, OCAL has been working on revising its remediation procedure in consultation with the Department and OEH.

At present, the mine's Subsidence Remediation Procedure comprises three documents, being the:

- *Subsidence Remediation Safe Work Procedure* – which applies in situations where subsidence impacts can be accessed safely by operators and earthworks machinery with minimal impact on the surrounding environment and contains procedures for use of inert fill material such as topsoil, gravel, stone, clay and bentonite;
- *Subsidence Remediation Grouting Procedure* – which applies in situations where subsidence impacts cannot be safely accessed by machinery and contains procedures for the use of cement-based grout product; and/or
- *Procedure for the Remediation of Subsidence Voids* – which applies in situations where subsidence impacts cannot be safely accessed by machinery and contains procedures for the use of Geofoam.

The Subsidence Remediation Grouting Procedure, previously approved under the Longwall 41 Extraction Plan, is currently under review for a further trial using cement-based grout. The Department has been advised that this procedure is not currently being implemented and will not be further implemented until such time it has been amended, in consultation with OEH.

OEH has also raised concerns that existing fractures above previously undermined longwalls have not been remediated, notwithstanding the halt to operations that took place after the grouting incidents and the subsequent review of operational procedures in consultation with it. OCAL has committed to completing a field trial of the proposed remediation procedures, in consultation with OEH, prior to commencing extraction of LWs 51 and 52. The Department understands that development of the proposed trial is now substantially underway.

DRE also provided the Department with a number of recommended conditions regarding rehabilitation. The Department carefully considered DRE's recommended conditions and is satisfied that the existing conditions adequately cover DRE's recommendations.

5.4.4 Council-owned Land

Council is the owner of the majority of the individual lots contained within the Ryhope Estate. This land is subject to a paper subdivision (see **Figures 4** and **8**), but Council is currently considering using the land as a biodiversity offset instead. The Estate totals approximately 18.8 ha, of which 1.04 ha would be undermined by the proposed modification.

OCAL considers that use as a biodiversity offset can be compatible with underground mining. The ecological assessment found that, while the modification may have some impacts on ecological values, the majority of vegetation and fauna habitat above the proposed longwalls would remain largely undisturbed.

Nevertheless, OCAL is proposing a range of mitigation measures to ensure that mining operations do not diminish the potential land use capability of the affected 1.04 ha, including:

- remediating surface cracks;

- restoring natural drainage paths; and
- removing unstable trees.

Council remains concerned that existing conditions do not provide adequate assurance that any damage to the land resulting from mining operations would be remediated to a standard that satisfies OEH's and Council's requirements for use as an offset site (should it become such). Council also considered that existing conditions do not require OCAL to provide an alternate offset that satisfies OEH's requirements, if subsidence impacts cannot be remediated to OEH's and Council's satisfaction.

The Department notes that remediation of any impact on Council land would be conducted in consultation with Council (as the landowner). Under existing conditions, should OCAL exceed the performance measures and it is not reasonable or feasible to remediate the impact/s or remediation measures fail to satisfactorily remediate impact/s, then OCAL is required to provide a suitable offset as compensation.

This must be done to the satisfaction of the Secretary. The Department considers that all offset requirements should be implemented to the satisfaction of the Secretary (as with all other mines), rather than to the satisfaction of Council and/or OEH.

5.4.5 Conclusion

The Department has carefully considered the concerns raised by Council and OEH and is satisfied that existing conditions of approval, in particular the performance measures and the requirement for OCAL to either remediate exceedances of these measures or else provide a satisfactory offset, would continue to adequately manage potential impacts on biodiversity values.

5.5 Aboriginal Cultural Heritage

5.5.1 Introduction

The EA contains an Aboriginal Cultural Heritage and Archaeological Assessment (ACHAA), focusing on the proposed modification area, undertaken by Umwelt Australia Pty Limited and prepared in consultation with registered Aboriginal parties. Previous extensive surveys of the approved overall mining area found three sites in the proposed modification mining area, including two sets of grinding grooves and an isolated artefact site (sites 38-4-1007, 38-4-1279 and 38-4-1580 respectively). The ACHAA recorded a further two sites in the proposed longwall mining area, namely a scarred tree (Palmers Creek ST1) and an isolated artefact (a silicate broken flake – Palmers Creek IF5). Palmers Creek STI is situated on an upper slope 50 m south of the spur crest. Palmers Creek IF5 is situated on the mid-slope of a spur crest in the centre of a four wheel drive track used by West Wallsend, Ausgrid, NPWS and motor bikes.

Both sets of grinding grooves had been assessed as having high archaeological significance and the mine plan was modified to avoid subsidence impacts on these sites. The isolated artefact site (38-4-1580) was identified and collected in 2013 in accordance with the mine's approved Aboriginal Cultural Heritage Management Plan. The ACHAA concluded that the two newly-identified sites had either or moderate (ST1) or low (IF5) archaeological significance.

The Department notes that the assessment of significance of Aboriginal sites has two components:

1. Aboriginal cultural significance, which is determined by the Aboriginal stakeholders; and
2. Archaeological significance, which is determined by an archaeologist based on the ability of the site to contribute to the scientific understanding of Aboriginal use of the landscape.

The ACHAA recognised that the Aboriginal community places high cultural significance on the Sugarloaf Ranges locality and that significance is not limited to the archaeological sites identified. The two components of the assessment of significance are not always interrelated, with sites potentially having different cultural and archaeological values. The registered Aboriginal parties identified each of these five sites as being of extremely high cultural significance (as they commonly do with all Aboriginal heritage sites).

5.5.2 Potential Impacts

No direct impact is predicted for the two grinding groove sites. There is potential for indirect impacts from any increased sediment load in the creeklines that could act to abrade and/or bury the grinding grooves. However, the subsidence assessment found that the proposed modification would be unlikely to result in significant impacts at the two grinding groove sites.

Potential impact to the scarred tree may result due to tree fall and/or cracking of the soil profile/sandstone bedrock and subsequent remediation. The DGS subsidence assessment identified that the subsidence impact potential at this site would be very low and therefore unlikely. Potential damage due to cracking of the soil profile near IF5 is predicted, and subsequent remediation may be required.

5.5.3 Management

The currently approved mine plan was modified from its originally proposed layout to exclude undermining of the two grinding grooves due to their high archaeological Aboriginal heritage value. The Department notes that these sites had already been recognised for their conservation value and that the existing approval requires their ongoing protection from greater-than-negligible mining impacts. OCAL has therefore designed the proposed modification to avoid direct impact on the two sets of grinding grooves. OCAL is proposing that the risk of sedimentation can be effectively managed through implementing an appropriate subsidence remediation strategy for any cracking (see **Sections 5.1** and **5.4**) that may result in sediment entering the creekline in which the grinding grooves occur.

In accordance with the approved Aboriginal Cultural Heritage Management Plan, OCAL is proposing the temporary surface collection of IF5. The artefact would be returned to the site following cessation of subsidence remediation work.

OCAL is also proposing to monitor ST1 following subsidence to assess the level of impact (if any) and to employ the most appropriate measures for the ongoing care of the tree. This could range from simple ongoing monitoring (if no subsidence impacts are identified), remediation of subsidence impacts (ie infilling of cracks) or, in the event of tree fall or death and with the assistance of a suitably qualified aboriculturalist, remove and treat the scarred section for preservation in consultation with the registered Aboriginal parties. OEH, in its submission on the EA, recommended that OCAL is required to undertake complete photographic recording of the entire tree, contextual photographs of the surrounding landscape, detailed sketches of the tree and the scar and close up photographs of the scar itself. In its RTS, OCAL committed to do this.

5.5.4 Conclusion

The Department is satisfied that the proposed management approach is acceptable for the five identified sites. OCAL has avoided the two sites rated as highly significant in archaeological terms and already protected by a 'negligible impact' performance measure. DGS assesses the chances of impact on these sites and the scarred tree as being either very low or low. Consistent with the treatment under the project approval of Aboriginal heritage sites with a similar heritage significance potentially affected by the project, the Department has recommended a condition to require that subsidence impacts at ST1 and IF5 are not greater than predicted in the EA and that the sites are managed appropriately.

OCAL would detail its impact management strategies in a revised Aboriginal Cultural Heritage Management Plan, as required under existing conditions of approval. The Department is satisfied that, subject to the implementation of the revised management plan and the proposed mitigation measures, impacts to Aboriginal cultural heritage sites would be appropriately limited and managed.

5.6 Other Environmental Impacts

The Department has assessed a number of other potential environmental impacts associated with the proposed modification. A summary of this assessment is provided in **Table 4**.

Table 4: *Assessment of other environmental impacts*

Issue	*Assessment*	*Conclusion & Recommendations*
Public Safety	• The EA indicates that surface cracks are likely to occur in the Sugarloaf SCA, including on access tracks located above the proposed longwalls. • OEH, in its comments on the RTS, requested that no approval is granted until such time as the proposed remediation methods, techniques and products are proven to be effective in reducing public safety risks due to landslip or injuries due to exposed surface cracking.	• OCAL has committed to implement a monitoring and response plan for the access tracks, based on consultation with OEH, to manage impacts and ensure safe conditions during and after mining. OEH indicated it is satisfied with this approach and the Department has recommended a condition to such effect. • Additional management measures that OCAL has committed to include:

	• OEH considers that a field trial should be conducted on existing surface cracking within the SCA to demonstrate acceptable public safety outcomes. • OCAL, in correspondence dated 1 August 2014, committed to completing a field trial of the proposed remediation procedures, in consultation with OEH, prior to commencing extraction of LWs 51 and 52.	• filling of deep, longitudinal cracks above extracted panels with an approved fill material; • warning signs along access roads and walkways with mine site contact numbers to report damage; and • restriction of access to vulnerable locations during mining. • The Department considers that these management measures are appropriate. Similar measures have been applied by OCAL at other locations, particularly when public roads and access tracks have been undermined. • The Department considers the existing public safety performance measures and the requirement for OCAL to prepare a Public Safety Management Plan as part of the Extraction Plan, remain appropriate.
Socio-Economic Benefits and Costs	• The modified project would lead to a number of economic benefits, including: o ongoing employment of approximately 390 people at West Wallsend; o continued export earnings for Australia; o $12.7 million in royalty contributions to the State; and o ongoing local expenditure through employee wages and purchase of local goods and services by OCAL, resultant indirect local employment, and social involvement by OCAL in the local community.	• The Department is satisfied that the proposed modification would provide a net community benefit.
Traffic	• Council, in its comments on the EA, requested a survey of the existing road asset condition, the preparation of a Road Management Plan and the implementation of traffic control measures. • In its comments on the RTS, Council accepted that Wakefield Road is expected to be outside the subsidence affectation area but recommended that the road is monitored for the duration of subsidence. • The Department notes that Wakefield Road has been undermined previously without affecting the safety or serviceability of the road, and that this mining was managed appropriately by OCAL in accordance with the conditions of its existing approval.	• The Department notes that the proposed modification is less likely to impact on Wakefield Road than previously extracted longwalls. • OCAL has committed to work with Council to develop an appropriate management plan prior to undermining. • The Department is satisfied that the existing conditions of approval, in particular the requirement for OCAL to prepare a Built Features Management Plan in consultation with Council and DRE, adequately addresses potential impacts on Wakefield Road and their subsequent management.

6. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of approval for the modification (see **Appendix F**). These conditions are required to:

- prevent and minimise adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

A consolidated set of conditions is provided in **Appendix G**. OCAL has reviewed and accepted these conditions. Government agencies were also provided an opportunity to comment on the recommended conditions (see **Appendix H**).

7. CONCLUSION

The Department has assessed the modification application, EA, RTS, additional information provided by OCAL and submissions on the project in accordance with the relevant statutory requirements. Based on this assessment, the Department is satisfied that OCAL has designed the project in a manner that achieves a good balance between maximising the recovery of a significant on-site coal resource and minimising the potential impacts on surrounding land users and the environment.

As part of the approval of the West Wallsend Colliery Continued Operations Project in January 2012, the Department recommended a comprehensive suite of conditions to ensure that the project complies with all relevant criteria and standards, and to ensure that the predicted residual impacts are effectively minimised, mitigated and/or at least compensated for. Only relatively minor changes are required for these conditions to reflect the modification and to update them to contemporary standards. The Department believes that the modified conditions reflect current best practice for the regulation of underground coal projects in NSW.

The Department is satisfied that the modification encourages the proper use of resources and the promotion of the orderly and economic use of the land, particularly as the coal resource subject to the application is adjacent to existing extraction operations, can be carried out using existing infrastructure, and would provide continued socio-economic and public benefits.

The Department has assessed the modification in accordance with the relevant requirements of the EP&A Act, including the objects of the Act and the principles of Ecologically Sustainable Development. On balance, the Department believes that the modification's benefits significantly outweigh its residual costs and that it is in the public interest and should be approved, subject to stringent conditions.

8. RECOMMENDATION

It is RECOMMENDED that the Planning Assessment Commission, as delegate of the Minister for Planning:

- **considers** the findings and recommendations of this report;
- **determines** that the proposed modification is within the scope of section 75W of the EP&A Act;
- **approves** the modification application 09_0203 MOD 1, subject to conditions; and
- **signs** the attached Notice of Modification (**Appendix E**).

Howard Reed 12.9.14

Howard Reed
Manager
Mining Projects

12/9/14

David Kitto
Director
Mining Projects

14.9.14

Chris Wilson
Executive Director
Development Assessment Systems and Approvals

APPENDIX A: ENVIRONMENTAL ASSESSMENT

See: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6358

APPENDIX B: CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

SEPP (Mining, Petroleum Production and Extractive Industries) 2007
Clause 7(1)(a) of the *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007* (Mining SEPP) makes development for the purposes of underground mining permissible with development consent on any land. Consequently, the proposed modification is permissible with development consent (or project approval, as this application is made under Part 3A of the EP&A Act), and the application may be granted.

Under Part 3 of the Mining SEPP, there are a number of matters that must be considered by a consent authority prior to granting development consent. These matters are:

a. significance of the mineral resource;
b. non-discretionary development standards for mining;
c. compatibility of the proposal with other land uses;
d. natural resource management and environmental management;
e. resource recovery;
f. transport; and
g. rehabilitation.

These matters do not require to be taken into consideration for modifications of existing project approvals under section 75W. Nevertheless, the Department has considered these matters in its merit assessment, and taken them into account in its recommended conditions of approval.

SEPP (Infrastructure) 2007
SEPP (Infrastructure) 2007 requires the consent authority to notify relevant public authorities about developments that may affect public infrastructure or public land. The Department has notified Roads and Maritime Services (RMS), the Office of Environment and Heritage (OEH) and Crown Lands regarding the proposed modification. None of these authorities objected to the proposed modification, and their recommendations have been considered by the Department and incorporated into the proposed notice of modification as appropriate. This satisfies the requirements of *SEPP (Infrastructure) 2007*.

SEPP (State and Regional Development) 2011
Both West Wallsend and the proposed modification meet the definition of 'development for the purposes of coal mining' under Schedule 1 of the *SEPP (State and Regional Development) 2011*. However, no separate development application is required for the proposal, since it meets the requirements of a modification to the existing project approval under section 75W.

SEPP No. 33 – Hazardous and Offensive Development
The existing West Wallsend operations are not considered as hazardous or offensive and the project does not meet the definition of a hazardous or offensive industry. The assessment applies equally to the proposed modification. Consequently, the Department is satisfied that the modified project would not pose a credible risk to surrounding land uses, and is therefore consistent with the aims, objectives, and requirements of SEPP 33.

SEPP No. 44 – Koala Habitat Protection
SEPP 44 requires a consent authority to consider the presence of any core or potential Koala habitat. The EA for the approved project and the EA for the proposed modification included fauna assessments, which did not identify Koalas within the approved or proposed mining area. There is therefore no evidence of 'core Koala habitat' in this area. The Department considers that the proposed modification would not result in any significant impacts on potential Koala habitat, and consequently the proposal is consistent with the aims, objectives, and requirements of SEPP 44.

SEPP No. 55 – Remediation of Land

The EA indicates that there are no significant contamination issues on the site, and no remediation is necessary. The Department is satisfied that the project is generally consistent with the aims, objectives and provisions of SEPP 55.

Lake Macquarie Local Environmental Plan 2004

The Department has considered the relevant provisions of the *Lake Macquarie Local Environmental Plan 2004*. The Department has also considered the compatibility of the proposed modification with the zoning objectives that apply to the site. The proposed modification is located predominantly under land zoned (8) National Park with a small section zoned 7(3) Environmental (General). Whilst mining is not a permitted use in these zones, the Mining SEPP allows underground mining to be carried out in these zones, but only with development consent.

The Department is satisfied that the proposed modification can be undertaken in a manner that is generally consistent with the aims, objectives and provisions of the LEP, subject to adherence to the recommended conditions of approval.

APPENDIX C: SUBMISSIONS

See: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6358

APPENDIX D:
RESPONSE TO SUBMISSIONS

See: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6358

APPENDIX E:
ADDITIONAL INFORMATION PROVIDED BY OCAL

APPENDIX F:
NOTICE OF MODIFICATION

APPENDIX G: CONSOLIDATED CONSENT

APPENDIX H:
RESIDUAL AGENCY COMMENTS