



SCT Operations Pty Ltd

ABN 23 078 328 953

www.sct.gs

19 January 2021

Robyn Stoney
Environment and Community Manager
Ulan Coal Mines Pty Ltd
Private Mail Bag 3006
MUDGEES NSW 2850

HEAD OFFICE

Cnr Kembla & Beach Streets Wollongong NSW 2500 Australia
PO Box 824 Wollongong NSW 2520 Australia
Telephone +61 2 4222 2777 Fax: +61 2 4226 4884
Email: sctnsw@sct.gs

BRISBANE OFFICE

Telephone 0428 318 009 (international +61 428 318 009)
Email: p.cartwright@sct.gs

BENDIGO OFFICE

Telephone: +61 3 5443 5941
Email: s.macgregor@sct.gs

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Dear Robyn

SUBSIDENCE ASSESSMENT FOR ALTERNATIVE OFFSET AREA

Ulan Coal Mines Pty Ltd (UCM) owns and operates two underground longwall mines at the Ulan Complex located approximately 25km northeast of Gulgong in the Central West of New South Wales. Under the project approval conditions for these mines, UCM is required to secure biodiversity offset areas in perpetuity to compensate for project impacts and, if unable to do so, must seek agreement from the Federal Department of Agriculture, Water and Environment for an alternative offset area and then apply to the NSW Department of Planning, Industry and Environment to modify the project approval. UCM commissioned SCT Operations Pty Ltd (SCT) to summarise the subsidence impacts within a proposed alternative offset area to support these processes. This letter report presents a summary of the subsidence effects and impacts experienced within the proposed alternative offset area.

1. BACKGROUND

UCM operates Ulan Underground (UUG) Mine and Ulan West (UW) Mine under Project Approval (PA) 08_0184 (as modified) and Federal EPBC approval (EPBC 2009/5252) granted in 2010. Conditions within these approvals requires biodiversity offset areas to be secured in perpetuity to compensate for impacts from the project.

EPBC 2009/5252 requires that if UCM is unable to secure the offset areas relevant to EPBC 2009/5252 in perpetuity, an alternative offset proposal must be submitted to the Federal Department of Agriculture, Water and Environment by 30 January 2021. If the alternative offset area is then approved by the Federal Minister, UCM can then apply to NSW Department of Planning, Industry and Environment to modify PA 08_0184 to include this proposed alternative offset area. This subsidence impact assessment was commissioned to support these processes.

Offset areas approved to compensate for project impacts to biodiversity include:

- Spring Gully Cliff Line Management Area.
- Brokenback Conservation Area (BCA) comprising:
 - an area owned by UCM
 - an area that is located on Crown Land leased by UCM
 - a 10-hectare area that is privately owned.
- Bobadeen Vegetation Offset Area and Bobadeen East Corridor.
- Highbett Road Acacia Ausfeldii (Ausfeld's Wattle) Management Area.

These offset areas are secured in perpetuity, except for the 10-hectare privately owned portion of the BCA. UCM were unable to reach agreement with the landowner to purchase this portion. An alternative offset area located over Longwalls W3 and W4 at UUG is proposed as an alternative to the much smaller area of privately owned land located within the BCA which cannot be secured.

Significant parts of the currently approved biodiversity offset areas are located over areas of bushland that have been previously subsided. The proposed alternative offset area has also been previously subsided. SCT understands UCM has commissioned Eco Logical Australia Pty Ltd to assess whether subsidence has impacted on the biodiversity values of the proposed alternative offset area and this is to be addressed in a separate report.

2. PROPOSED ALTERNATIVE OFFSET AREA

Figure 1 shows the location of the proposed alternative offset area located predominantly above Longwalls W3 and W4 at UUG.

A subsidence monitoring line known as H Line is located approximately 1.6km east of this area. Measurements on this subsidence line provides the best indication of subsidence movements likely to have occurred in the proposed alternative offset area. Contours of surface subsidence shown in Figure 1 are estimated based on the results of H Line monitoring.

Subsidence measured on H Line indicates the area above Longwall W3 subsided 1.54m, with maximum tilt of 15mm/m and maximum strains of 4mm/m in tension and 6mm/m in compression and the area above Longwall W4 subsided 1.47m with maximum tilt of 20mm/m and maximum strains of 6mm/m in tension and 7mm/m in compression. These levels of subsidence movement are consistent with experience elsewhere at UUG and UW.

Subsidence movements for Longwalls W3 and W4 predicted in the Subsidence Management Plan (SMP) were 1.6m of vertical subsidence, 10-20mm/m of tilt and 5-10mm/m of strain in both tension and compression. The measured subsidence movements are consistent with predictions.

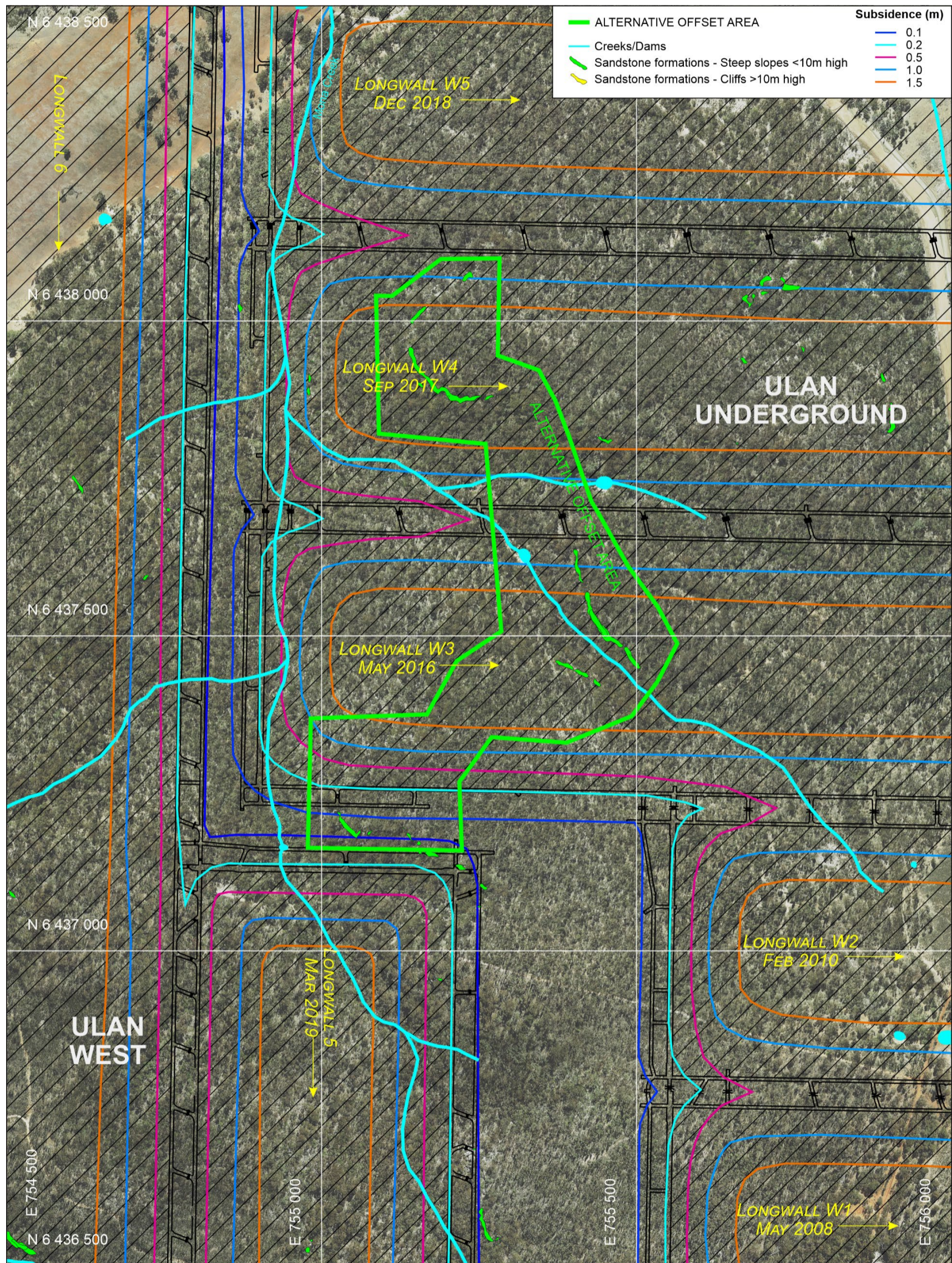


Figure 1: Alternative Offset Area.

Mining of Longwall W3 commenced on 9 May 2016 and finished on 21 July 2017. Mining of Longwall W4 commenced on 4 September 2017 and finished on 10 December 2018. Mining of the adjacent panels: Longwall W5 at UUG and Longwall 5 at UW is complete. Longwall W6 at UUG and Longwall 6 at UW are currently being mined. As a result, subsidence movements within the proposed alternative offset area are effectively complete with no further subsidence impacts expected.

3. OBSERVED IMPACTS

Physical subsidence impacts observed at the time of post mining inspections were generally minor in nature and imperceptible over large parts of the panel footprint. Minor surface cracking was evident in some places, particularly on hard surfaces around the panel edges and along sections of some drainage lines. Minor rock falls and perceptible cracking was evident on some sandstone outcrop formations, but, in general, there were few impacts to sandstone formations and other features.

Surface cracks were infrequent, typically only a few centimetres wide and generally located along panel edges. Figure 2 shows an example of a crack observed along the southern edge of Longwall W4 on bare ground. Similar cracks are generally difficult to detect in a bushland environment.



Figure 2: Crack parallel to southern edge of Longwall W4.

A site walkover by UCM personnel in January 2021 did not identify any additional impacts other than to a small portion of a sandstone formation adjacent to Aboriginal heritage rock shelter site Ulan ID#483.

Figures 3a and 3b show some examples of minor rock falls along sandstone formations located within the proposed alternative offset area and other adjacent formations mined under where there has been no perceptible impact



Figure 3a: Rock fall at Aboriginal heritage site Ulan ID# 663 (MC175) above Longwall W4.



Figure 3b: Top photo shows sandstone outcrop formation with no perceptible impacts and bottom photo shows another section of the same formation with rock fall at Aboriginal heritage site Ulan ID#479 (MC45A) above Longwall W3.

If you have any queries or require further clarification of any of the issues raised, please don't hesitate to contact me directly.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Ken Mills', with a large loop at the top.

Ken Mills
Principal Geotechnical Engineer