ULAN UNDERGROUND

GLENCORE

Appendix B: Land Management Plan Longwalls 30 & LWW6-LWW8

Ulan Underground

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1 Introduction

1.1 Extraction Plan Application Area

Ulan Coal Mines Pty Limited (UCMPL) has Extraction Plan approval for longwall (LW) panels LW30 & LWW6, LWW7 and LWW8, herein referred to as the Application Area (**Figure 1**), for the Ulan Underground Mine (UUG).

1.2 Purpose and Scope

The purpose of this Land Management Plan for Longwalls 30 & LWW6 - LWW8 (LMP LW30 & LWW6-LWW8) is to outline the management strategies, controls and monitoring programs to be implemented for the management of landforms, including general surface features, in relation to potential environmental impacts resulting from secondary extraction within the Application Area.

This LMP LW30 & LWW6-LWW8 (this Plan) has been amended to incorporate the approved MOD4¹ mine plan which extend² the longwall panel lengths of LW30, LWW7 and LWW8. Amendments to this Plan are identified by red text. A summary of the predicted changes to potential subsidence effects, subsidence impacts and environmental consequences, as a result of the revised mine plan layout at UUG is provided in **Section 3.0**. There are no significant changes to the monitoring or management measures previously proposed, as a result of the revised layout of LW30, LWW7 and LWW8.

This Plan applies to the general land surface and sandstone features potentially impacted as a result of mining within the Application Area (**Figure 1**). A description of the landform features specific to the Application Area are summarised in **Section 1.4** and are shown in **Figure 2**.

The appointed team of suitably qualified and experienced experts which included representatives from Strata Control Technology Pty Ltd (SCT), was endorsed by the Secretary of NSW Department of Planning, Industry and Environment (DPIE) on 27 June 2016 (Attachment 2 of the Extraction Plan).

¹ Ulan Continued Operations Project - Modification 4 Longwall Optimisation Project Environmental Assessment (ELA, 2018) ² As a result of MOD4, length of approximate extensions for LW30, LWW7 and LWW8 are 195m, 220m, 155m respectively.



Figure 1 Extraction Plan LW30 & LWW6-LWW8 Application Area

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Figure 2 Landform Features within the Application Area

1.3 Description of Landforms within the Application Area

The Application Area is a combination of undeveloped bushland, gently undulating open grazing and irrigation agricultural lands. The Application Area is split by the Great Dividing Range with land in the east in the Goulburn River Catchment and land in the west in the Talbragar River catchment. Bushland in the east is gently undulating while bushland in the west is a little steeper with sandstone outcrops and partially cleared valleys. Most of the land within the Application Area is owned by UCMPL with the exception of one private property in the west of the Application Area and a section of the Durridgere State Conservation Area (DSCA) in the east (**Figure 1**). There are no privately owned dwellings within the Application Area.

UCMPL owned and controlled land within the Application Area is used for mining related activities (e.g. underground mining and surface support infrastructure) and agricultural purposes (e.g. grazing and cropping) including the Bobadeen Irrigation Scheme (BIS). Privately owned land within the Application Area is used for cattle grazing. The DSCA is State-owned land controlled by the NSW National Parks and Wildlife Services (NPWS).

The main soil units found within the Application Area are the Turill and Goonoo soil landscapes. The Goonoo Landscape, of Jurassic sandstone origin, and the Turill landscape, of Jurassic or Triassic origin, are composed of earthy and siliceous sands that drain well, have low fertility, high erosivity and slight to strongly acidic topsoil.

The major natural features within the Application Area include sandstone formations, a number of ephemeral watercourses, a spring fed dam and the DSCA. The spring is located within a dam located on privately owned land. All water courses within the Application Area are ephemeral in nature comprising of drainage lines and occasional pools that form after rain. Flow lines in the east of the Application Area report to Curra Creek and Bobadeen Creek in the Goulburn River catchment. Flow lines in the west report to Mona Creek in the Talbragar River catchment (**Figure 2**).

Approximately 2.8ha of the DSCA is located directly above the eastern portion of LW30. The revised Application Area that extends over the DSCA is predominately undeveloped bushland. There are no features of specific conservation values known to exist within the Application Area over DSCA. (**Figure 2**).

There are two cliff formations within the Application Area (**Figure 2**). The cliff line in the north-west corner of the Application Area across both UCMPL owned land and privately owned land and contains the Mona Creek Aboriginal rock shelter sites (Ulan ID#180 to 187) which are protected from subsidence impacts by an offset from mining. The cliff line over LWW7 is approximately 300m in length, is less than 20 meters high and has no recorded Aboriginal rock shelter sites. This cliff line extends from UCMPL owned land onto privately owned land.

1.3.1 Surrounding Land Use

The Project Area is situated in a rural region, primarily surrounded by rural landholdings, native bushland and primary industries including agriculture, forestry, mining and extractive industries. The area to the south and south-west of the Project Area is dominated by rural residential landholdings. The approved Stage 1 and Stage 2 of the Moolarben Coal Mine (MCM) is located adjacent to the southern and eastern boundaries of the Project Area and comprises underground and open cut mining operations. The Wilpinjong Coal Mine (WCM) is an open cut operation, located approximately 7 km to the south-east of the project area (Figure 1 in the Extraction Plan).

Other extractive industries in the region include rock and clay mining including the adjacent Kaolin clay and sandstone mine and council road base quarry. Other minerals mining activities in the Mid-Western Regional Council (MWRC) Local Government Area (LGA) include mining for magnetite, limestone, dolomite and ironstone.

Grazing is wide spread throughout the surrounding region. Land capability of the Application Area is of low to moderate grazing lands with varying soil quality, depth/rockiness and erosion hazard (i.e. mostly Class VI and Class VII)³. Better quality soils are on land associated with the BIS.

1.3.2 Bushfire Hazard

As discussed in **Section 1.3**, the Project Area is predominately surrounded by native bushland. To manage the risk of potential threat of bushfires, UCMPL have developed a Bushfire Management Plan (BFMP), a component of the Biodiversity Management Plan (BMP).

The BFMP has been prepared by a specialist bushfire consultant in consultation with representatives of the NSW National Parks and Wildlife Service (NPWS), the Rural Fire Service (RFS), and the Department of Lands. The following details are included in the BFMP, including:

- Emergency response details and contacts;
- Key stakeholder details and contacts;
- Fire season information relevant to the current area;
- Land management details of specific asset protection zones (APZs), vegetation communities and biodiversity thresholds, and threatened species fire ecology information;
- Hazard reduction;
- Water access points; and
- Fire intensity details.

A copy of the BFMP is available on the UCMPL website at:

https://www.ulancoal.com.au/en/environment/EnvironmentManagementPlan/2020%20Bushfire%20Ma nagement%20Plan%20(ann).pdf

1.4 Structure of the LMP LW30 & LWW6-LWW8

Table 1 identifies where the requirements of Condition 2, Schedule 5 of PA 08_0184 are addressed in this Plan. The main text sections and attachments of this Plan are:

- Section 1 Provides an introduction to this Plan, including the purpose and scope and the document structure.
- **Section 2** Describes the regulatory requirements, the subsidence performance measures relevant to this Plan, provides a summary of relevant legislation, stakeholder consultation and dispute resolution.
- **Section 3** Summarises the predicted subsidence impacts and environmental consequences resulting from the extraction of this Plan.
- **Section 4** Describes the management, monitoring and evaluation measures that will be implemented and how monitoring data will be used to assess the relevant performance indicators and performance measures.
- **Section 5** Provides a Contingency Plan to manage any unpredicted impacts and their consequences. Provides a Trigger Action Response Plan (TARP), which is a simple and transparent snapshot of the monitoring of environmental performance and where required the implementation of management and/or contingency measures.
- Section 6 Provides a summary of the review and improvement process and reporting requirements.
- **Section 7** Outlines the roles and responsibilities for this Plan.
- **Section 8** Provides the document information.
- Section 9 Attachment 1 Environmental Inspection Form

³ Class VI – Productivity will vary dur to soil depth and fertility. Comprises the less productive grazing lands. Class VII - Generally comprises of steep slopes, shallow soils and/or rock outcrop.

2 Statutory Requirements

2.1 **Project Approval**

This Plan is a component of the Ulan Underground Extraction Plan Longwalls LW30 & LWW6-LWW8 (the Extraction Plan)⁴ and has been prepared specifically to address Condition 26 of Schedule 3 which states:

26. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Director-General. Each Extraction Plan must:

...include:

• ...a Land Management Plan that has been prepared in consultation with relevant landowners, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on land in general;

The structure of this Plan also follows the draft *Guidelines for the Preparation of Extraction Plans* (EP Guidelines) provided by DPIE. **Table 1** Supporting Documents – Reference Summary identifies where the requirements of PA 08_0184 and the EP Guidelines are addressed in this Plan.

EP Guidelines for Extraction Plan Management Plans	PA 08_0184 Requirements for Management Plans Condition 2, Sch 5	This Plan	Section Description
Overview of landscape features, heritage sites and environmental values to be managed under the component plan; and Description of landscape features, heritage sites and environmental values to be managed under the component plan and their significance.	Condition 2(a) <i>detailed baseline data</i>	Section 1.3 Figure 2.	Provides descriptions of the existing environmental setting and surface features.
	 Condition 2(b) a description of: the relevant statutory requirements (including any relevant approval, licence or lease conditions); 	Section 2.3	Provides descriptions of legislation applicable to this Plan including <i>Mining Act 1992</i> and the <i>Environmental Planning &</i> <i>Assessment Act 1979</i> .
Performance measures relevant to the landscape features, heritage sites and environmental values to be managed under the component plan	 Condition 2(b) a description of: any relevant limits or performance measures/ criteria; 	Section 2.2	Provides the subsidence performance measures for land.
Performance indicators to establish compliance with these performance measures	 Condition 2(b) a description of: the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures 	Section 4.3	Outlines performance indicators to assess the subsidence performance measures for land.
	Condition 2(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria	Section 4	Describes the subsidence management measures relevant to cliff lines and general surface features.

Table 1 Supporting Documents – Reference Summary

⁴ PA08_0184, Schedule 3, Condition 26(h)

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EP Guidelines for	PA 08_0184 Requirements for		Section Description	
Extraction Plan Management Plans	Management Plans Condition 2, Sch 5	This Plan		
Currently predicted subsidence impacts and environmental consequences relevant to the features, sites and values to be managed.		Section 3	Provides a summary of the approved subsidence impacts and revised impacts.	
Measures planned to remediate these impacts and/or consequences		Section 4.1	Provides a summary of the subsidence management measures.	
Existing baseline monitoring network and baseline monitoring results. Proposed monitoring of subsidence impacts and environmental consequences.	 Condition 2(d) a program to monitor and report on the: impacts and environmental performance of the project effectiveness of any management measures (see c above) 	Section 4.2	Describes the existing and proposed monitoring and evaluation program.	
Proposed monitoring of the success of remediation measures following implementation		Section 4.1	Provides a summary of the subsidence management measures and remediation measures for land.	
Adaptive management proposed to avoid repetition of unpredicted subsidence impacts and/or environmental consequences Contingency plans proposed to remediate unpredicted subsidence impacts and/or environmental consequences Trigger, Action, Response Plan	Condition 2(e) a contingency plan to manage any unpredicted impacts and their consequences	Section 5.1	Provides a Contingency Plan in the event performance measures are exceeded, higher than predicted subsidence or subsidence related incident has occurred. The Contingency Plan outlines UCMPL requirement to develop the appropriate course of actions, including corrective and preventative actions. Provides a TARP for to identify the appropriate response measures and responsibilities.	
Responsibilities for implementation of the component plan		Section 7	Responsibilities for implementation of this Plan is listed.	
	Condition 2(f) a program to investigate and implement ways to improve the environmental performance of the project over time	Section 6.1	Describes the review mechanism for improvement.	
	 Condition 2(g) a protocol for managing and reporting any: incidents; complaints; non-compliances with statutory requirements; and exceedances of the impact assessment criteria and/or performance criteria Condition 2(h) a protocol for periodic 	Section 5 and 6.2 Section 6.1	Describes the reporting and community response process.	
	review of the plan		this Plan.	

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2.2 Subsidence Performance Measures

This Plan outlines the management strategies, controls and monitoring programs to be implemented for the management of landforms potentially impacted from the proposed secondary extraction workings within the Application Area as described in the Extraction Plan. UCMPL must ensure that there is no exceedance of the subsidence impact performance measures⁵ for land as provided in **Table 2**.

Table 2 Land Performance Measures

Land	Subsidence Performance Measure		
Cliffs in Brokenback Conservation Area ¹	Nil Environmental Consequence		
Other Cliffs	Minor Environmental Consequence		

Notes: ¹The Brokenback Conservation Area contains those cliff lines afforded the greatest protection under Project Approval 08_0184 (i.e. performance measure of Nil Environmental Consequence). The Brokenback Conservation Area is located approximately 2.5 km south-west of the Application Area. It is considered that there is no potential for subsidence related ground movements at this site as a result of longwall mining within the Application Area (**Technical Report 1**). Annual monitoring of the Brokenback Conservation Area is undertaken in accordance with the Ulan West Extraction Plan for Longwalls W1 to LW6.

2.3 Relevant Legislation

2.3.1 Mining Act 1992

The NSW Mining Act 1992 (Mining Act) places controls on methods of exploration and mining, the disposal of mining waste, land rehabilitation, and environmental management activities. The extraction of coal using the mining methods described in the Extraction Plan occurs within the subsurface Mining Lease (ML) ML1468, granted approval under the Mining Act on the 18 May 2000.

2.3.2 Environmental Planning and Assessment Act 1979

Project Approval 08_0184 (PA08_0184) under Part 3A of the *Environmental Extraction Planning and Assessment Act 1979* (EP&A Act) was granted on 15 November 2010. As required by PA08_0184 UCMPL are required to prepare an Extraction Plan, to the satisfaction of the Secretary of DPIE. A component of the Extraction Plan is the preparation of a Land Management Plan in accordance with Condition 26(h), Schedule 3 of PA08_0184.

2.4 Consultation

Consultation was undertaken during the Project EA⁶. Consultation specific to the Extraction Plan was undertaken with government agencies, UCMPL's Community Consultative Committee (CCC) and registered Aboriginal stakeholders, public notices placed in local and state newspapers⁷ and information provided on the company website⁸.

Consultation with owners of land within the subsidence affectation area of LW30 & LWW6 - LWW8 has occurred since development of the Extraction Plan in 2016. Detailed consultation history is provided in the Private Property Subsidence Management Plans (PPSMP),⁹ which is a sub-plan to this plan. Through the PPSMP, UCMPL will seek to reach agreement with the landholder on the monitoring and mitigation that will be implemented. If agreement cannot be reached within a reasonable time prior to the longwall commencing, the following dispute resolution process may be followed (**Figure 3**).

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⁵ PA08_0184, Schedule 3, Condition 24, Table 14.

⁶ Ulan Coal - Continued Operations Environmental Assessment (Umwelt 2009).

⁷ Advertisement Mudgee Guardian 21 June 2013 and Sydney Morning Herald 26 June 2013

⁸ www.ulancoal.com.au

⁹ PA08_0184, Appendix 9, 6.3.1

Figure 3 Landholder Dispute Resolution Process

Landholder Dispute Resolution Process



3

Predicted Subsidence Impacts and Environmental Consequences

The approved subsidence impacts and environmental consequences relating to general surface features and cliff lines are described in the Project EA and subsequent modifications.

The revised subsidence impact assessment¹⁰ was completed by SCT Operations Pty Ltd (SCT) specifically for the Application Area (**Technical Report 1**). The SCT assessment concluded that no significant changes in subsidence impacts are expected from those described in the Project EA (Umwelt 2009).

Section 3.1 provides a brief summary of approved subsidence impacts from the Project EA and subsequent modifications on general surface and cliff line features.

Section 3.2 provides a summary from the revised subsidence assessments by SCT in August 2016 and describing surface impacts within the Application Area.

Section 3.3 provides a summary of the revised subsidence impacts as they relate to MOD4 from *the Ulan Continued Operations Project - Modification 4 Longwall Optimisation Project Environmental Assessment 2018 (ELA, 2018)* and *Subsidence Assessment for Amendment to LW30 and LWW6 - LWW8 Extraction Plan (SCT, 2019).*

3.1 Approved Subsidence Impacts and Environmental Consequences

The following summary of subsidence related impacts on general surface and cliff line features, were described in Project EA, which stated [*extract*]:

Surface cracks are expected to be generally isolated and increase in size inversely to overburden thickness ranging from 40mm wide where the overburden is 250m thick, 100mm wide where the overburden is 150m thick, and up to 250mm wide where the overburden is 80m thick.

There are numerous sandstone cliff formations located within the project area. Based on previous experience of mining under similar sandstone cliffs at Ulan, mining subsidence is expected to cause rock falls on 10-20% of the sandstone cliff formations located directly above the mining area. In general, cliff formations that are high, overhanging, re-entrant and laterally extensive are likely to experience perceptible changes the most.

Agricultural utilisation or agricultural suitability of farm land is not expected to be significantly impacted by mining subsidence movements.

The following summary of revised subsidence related impacts as a result of modifying the Ulan Continued Operation Mine Plan within the Interaction Zone were described in the Environmental Assessment Modification (MOD3) of Ulan Coal - Continued Operations (Umwelt 2012), which stated [*extract*]:

The environmental impacts within the Interaction Zone were assessed as part of the UCCO Project EA and subsequently approved within PA 08_0184. The potential environmental impacts associated with the proposed modification within the Interaction Zone are consistent with the approved operations.

¹⁰ PA08_0184, Schedule 3, Condition 26(e).

3.2 Revised Subsidence Impacts and Environmental Consequences

A summary of the revised subsidence assessment relevant this Plan and the Application Area by SCT (**Technical Report 1**) is provided below. The revised subsidence assessment by SCT (SCT 2016) concluded [extract]:

No significant changes in subsidence impacts for Longwalls 30 & W6-W8 are expected from those described in the EA (notwithstanding that the maximum predicted subsidence has increased slightly in the revised EP).

The proposed mining of Longwall 30 and Longwalls W6, W7 and W8 is not expected to have any greater impact to agricultural utilisation or agricultural suitability of farm land than those outlined in the UCCO Project EA.

The impacts of mining subsidence on the tracks are expected to be essentially similar to impacts previously observed over Ulan No 3 Mine, there is some potential for cracks and steps to form.

Subsidence induced rock fall could occur on up to 20% of the length of sandstone formations, perceptible cracking is expected along up to 50-70% of the length of sandstone formations within the footprint of extracted longwall panels and to a distance of 0.4 times overburden depth outside the goaf edge. The cliff formation over LWW7 would be directly undermined and is expected to experience the full range of subsidence movements with rock falls consistent with UCCO Project EA predictions likely.

The eastern portion of the Cliffline containing the Mona Creek rock shelters 23-27 is located within the EP area but well beyond the area where any impacts are expected.

Tension cracks occur in areas of tensile strain. Cracks are expected to develop over the longwall panels and remain in the vicinity of panel edges and along the tops of topographic highs once mining is complete. Tension cracks are expected to be most perceptible at the start of each panel and at the top of steep slopes and cliffs that are directly mined under. Tension cracks typically align with natural joint directions in the rock mass and may form en echelon type cracks along goaf edges. Transient tension cracks may also occur at regular intervals above the centre of the panel typically just behind the longwall face. Over recent panels on the eastern side of the main headings, perceptible cracking has been limited to only a few small areas.

The magnitude of tensile strain at which surface cracking is detectable is sensitive to the nature of the surface terrain. Cracks are typically evident on hard surfaces such as roads and bare rock outcrops at strains of greater than 2-5 mm/m and in bushland environments at strains of greater than about 5-10 mm/m. Cracks are typically less than about 20 mm wide in flat or gently undulating terrain but may be larger, generally less than 100 mm wide but possibly up to 200 mm wide, in shallower areas.

Permanent compression humps and fracturing may become apparent at topographic lows such as drainage channels, particularly where stream channels flow directly on bedrock.

The impacts of mining subsidence on the tracks are expected to be essentially similar to impacts previously observed over the UUG, all of which have been managed successfully in the past. There is some potential for cracks to form and a much lower probability of steps forming. These impacts would not be significantly out of context with the general nature of the terrain and other hazards that might exist.

3.3 Revised Subsidence Impacts (MOD4)

A summary of the revised subsidence assessment relevant to this Plan and the Application Area by SCT (**Technical Report 1a**) is provided below. The revised subsidence assessment by SCT concluded [extract]:

Subsidence effects at the edge of the DSCA are expected to increase with vertical subsidence up from around 0.1m to approximately 1.0m as a result of the proposed extension to LW30.

Subsidence impacts to features in and within the vicinity of the revised Extraction Plan Application Area are expected to be consistent with those presented in SCT (2018a) for MOD4.

Impacts are expected to be largely imperceptible given the large overburden depth and manageable under existing subsidence management plans. Minor impacts in the form of cracking on hard surfaces, including the access road, are considered possible but easily manageable.

4 Management, Monitoring & Evaluation

The key subsidence impacts that may have potential consequences on land associated with the extraction of LW30 & LWW6-LWW8 include:

- Surface cracking (including steps, overrides and erosion holes¹¹);
- Agricultural utilisation or agricultural suitability of farm land; and
- Rock falls and cracking on cliff lines.

4.2 Subsidence Management Measures

The need to address and remediate subsidence impacts will be assessed on a case by case basis. The decision to remediate subsidence impacts will take into consideration accessibility, potential risks to public, employee and contractor safety and the environment. If subsidence cracking does not present a safety risk or risk to the environment, the crack will be left to self-remediate to prevent further clearing/disturbance works associated with the remediation. If a crack does require remediation, the method of remediation will be selected to minimise the potential disturbance to the surrounding environment.

A Ground Disturbance Process (GDP), required by UCMPL's EMS, will be completed prior to the commencement of all subsidence remediation works to identify any potential environmental constraints (threatened flora and fauna, Aboriginal archaeology sites) and to ensure all relevant approvals have been obtained and the works are undertaken in an environmentally sustainable manner.

Section 3.8 of the Extraction Plan also describes the rehabilitation management strategies to be implemented for the management of subsidence induced impacts on surface features from the proposed secondary extraction workings as described in the Extraction Plan within the Application Area.

4.2.1 General Surface Management Measures

There are several unsealed internal access roads located within the Application Area. General subsidence movements are not expected to cause significant impacts to these roads.

Subsidence steps are possible in those areas that outcrop within the Triassic sandstone. Subsidence steps were recorded during the mining of Longwalls C, E and F at UUG; there is considered to be potential for these features to develop where there is Triassic Sandstone at the surface. Access tracks affected by subsidence steps identified during mining inspections (**Section 4.2**), will be barricaded off and accompanied by warning signs to alert track users of the hazard until appropriate road repairs are completed. Remediation of any subsidence steps in accessible areas will be undertaken in a timely manner. Remediation will be undertaken using an excavator to break up the sandstone overhang followed by re-grading of the area.

In the event that cracking is observed on land (including access tracks) that requires remediation, the remediation will proceed in accordance with Rehabilitation Management Plan LW30 & LWW6-LWW8 and in consultation with relevant stakeholders. This will generally involve the filling of subsidence cracks with inert material, compaction and re-grading of the surface to prevent ponding or as required, to maintain safe access.

Subsidence impacts identified in drainage lines within the Application Area will be managed in accordance with the Water Management Plan LW30 & LWW6-LWW8. Subsidence impacts to farm dams and fences will be managed in accordance with the Built Features Management Plan LW30 & LWW6-LWW8.

¹¹ A coincidence of mining induced cracking at the commencement of LWW5, a drainage line and recent heavy rainfall events, approximately 14 months after the area was mined led to flow into subsidence cracks and localised erosion of surface soils.

4.2.2 Cliff Line Management Measures

The Mona Creek rock shelter cliff line is not predicted to be impacted by subsidence due to secondary extraction within the Application Area. The monitoring of this cliff line is detailed in the HMP LW30 & LWW6-LWW8.

A portion of the cliff line over LWW7 is on UCMPL land and private property. SCT predict mining induced subsidence is expected to cause rock falls on up to 20% of the sandstone formations located directly above the mining area. Subsidence warning signs will also be installed in the vicinity of active subsidence areas and the entry points to the private property. Subject to landholder approval, subsidence warning signs will be installed in the vicinity of the cliff line feature over LWW7 on private property during undermining to inform of the potential for mine subsidence movements and the potential for rock falls in active mining areas as a precautionary measure. UCMPL will also install subsidence warning signs on UCMPL land in the vicinity of the cliff line feature.

Except where a rock fall represents a safety hazard, no specific corrective action will be taken to correct subsidence impacts resulting from the subsidence of cliff features (i.e. rock falls). Where safe to do so, and in order to reduce the need for further environmental disturbance, these features will be left in situ. Where remediation is required, a specific remediation strategy will be developed in accordance with the Contingency Plan process. Should impacts be greater than predicted, the Contingency Plan will apply (Section 5).

UCMPL have established two conservation management areas that provide an immediate heritage and ecological outcome to offset the identified impacts of the Project. Both the Brokenback Conservation Area and the Spring Gully Cliff Line Management Area (Figure 3 of the BMP LW30 & LWW6-LWW8) protect a number of rock shelters and potential micro-bat cave habitat from possible subsidence induced rock falls. For more information about these conservation areas, please refer to the UCMPL's BMP.

4.2.3 Private Property Surface Management Measures

Subsidence management measures on private property will be undertaken in accordance with Section 4 of the Private Property Subsidence Management Plan (PPSMP) (Appendix J of the Extraction Plan). Surface management measures outlined in the PPSMP are consistent with those in **Sections 4.1, 4.1.1** and **4.1.2**.

4.2.4 Durridgere State Conservation Area Management Measures

Subsidence management within the Durridgere State Conservation Area (DSCA) will be undertaken in consultation with the Mudgee Branch of the NSW National Parks and Wildlife Service (NPWS). Subsidence warning signs will be installed on the single access track potentially impacted by subsidence within the DSCA to inform persons entering that they are entering a mine subsidence area. Subsidence warning signs will inform persons entering of possible surface cracking within the impacted area.

The NPWS will also be kept informed by UCMPL of the progress of longwall mining beneath the DSCA.

4.3 Subsidence Monitoring

4.3.1 Cliff Line Monitoring within Application Area

Pre-mining inspections of the cliff line above LWW7 within the Application Area will be undertaken prior to the commencement of secondary extraction of the longwall, to establish the base line condition for quantitative post mining comparison.

A post mining inspection of the cliff line above LWW7 will be undertaken. The aim of the cliff line monitoring program for LWW7 is to assess the amount of mining-induced rock-fall on cliff formations as

a percent of the total cliff lines within the zone of influence of subsidence¹² against the performance measures as provided in **Table 2**.

The monitoring methodology will use physical inspections and photographic recordings of all cliff lines identified within the Application Area.

Table 3 provides a summary of the cliff line monitoring and frequency of monitoring applicable to the Application Area.

4.3.2 General Surface Inspection

UCMPL undertake monthly environmental inspections. A component of the monthly environmental inspection is physical inspections of landscape features potentially affected by subsidence within the active secondary extraction areas. Features to be inspected include cliff formations, access tracks, flow lines and agricultural lands, including the Bobadeen Irrigation Scheme (BIS).

The inspections will seek to identify and record subsidence affected areas where cracking or other subsidence related impacts are present and then where necessary, recommend appropriate remediation works. If subsidence impacts are causing a potential safety risk, the area will be cordoned off and/or signage placed to either prevent access or identify the hazard.

Remedial actions to address the subsidence impacts will be completed as soon as practicable. If subsidence impacts are causing a potential environmental risk, the management measures as provided in relevant component management plans of the Extraction Plan will apply.

Inspections of private property and the DSCA will be undertaken pre and post mining in accordance with the PPSMP (Appendix J of the Extraction Plan) and this Plan. **Table 3** provides a summary of the land monitoring program to be completed before, during and after secondary extraction within the Application Area.

Monitoring Parameters Component		Location/Network	Monitoring Frequency	Monitoring Type ¹³
Surface cracking inspection on UCMPL owned land and Durridgere State Conservation Area (DSCA)	 Visual observations to monitor the condition of the ground surface; Handheld GPS accurate +/- 5m or GPS equivalent camera to record subsidence impact to lands. 	 Monitoring of UCMPL's internal access tracks within the active subsidence zones of LW30, LWW6 to LWW8. Monitoring of the DSCA will be undertaken within the active subsidence zone of LW30. Refer to Figure 2 	 During mining: visual inspections to be completed monthly during the extraction of the longwall; and Post-mining: visual inspections to be completed at the end of each longwall (at least 3 months after cessation of mining, within 12 months of cessation of mining). 	EP
Cliff formation inspection on UCMPL owned land	 Visual observations and photographic record to record signs of surface cracking and quantify length (m) of rock falls. 	 Cliff formation located above LWW7 Refer to Figure 2 	 Pre-mining visual inspection. Post-mining: visual inspection to be completed upon the completion of LWW7 secondary extraction (at least 3 months after cessation of mining, within 12 months of cessation of mining). 	EP
Surface cracking/ cliff formation inspection on privately owned land*		 Cliff formation located above LWW7 Monitoring of landholders existing access tracks within subsidence zones of LWW6 to LWW8; Monitoring of agricultural land within subsidence zones of LWW6 to LWW8; and 	 Pre-mining visual inspection. During mining: visual inspections to be completed monthly during the extraction of the longwall under the property. Landholder to contact UCMPL immediately if surface cracking is observed. UCMPL will conduct visual verification inspections¹⁴; Post-mining: visual inspections to be completed within one month of the 	EP

Table 3 Land Monitoring Program within Application Area

¹² Subsidence induced rock fall could occur on up to 20% of the length of sandstone formations, within the footprint of extracted longwall panels and to a distance of 0.4 times overburden depth outside the goaf edge (SCT, 2016).

¹³ EMS = Monitoring in accordance with PA_0184 Environmental Management Plans; EP - Monitoring specific this Extraction Plan.
 ¹⁴ No Inspection of cliff line during mining, no persons (including landholder) to enter the vicinity of this area during active undermining.

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Monitoring Component	Parameters	Location/Network	Monitoring Frequency	Monitoring Type ¹³
	 length (m) of rock falls; and Handheld GPS accurate +/- 5m or GPS equivalent camera to record subsidence impact to lands. 	 Monitoring of bushland within subsidence zones of LWW6 to LWW8. Refer to Figure 18 of the Extraction Plan 	 longwall leaving the boundary of the property. Private Property Conditional Assessment Report to be completed at least 3 months after cessation of mining and no later than within 12 months of cessation of mining. 	

Notes: *Access to cliff line and land for monitoring on Private Property will be subject to approval by the landowner.

4.4 Assessment of Subsidence Performance Measures

Subsidence impact performance measures listed in Table 14 of the Project Approval¹⁵ relevant to land are provided in **Table 4**. UCML have developed a range of performance indicators to inform the operations if the performance measures are likely to be exceeded during secondary extraction within the Application Area.

Table 5 provides a summary of the analysis of the monitoring data that will be undertaken to evaluate the potential impacts using the performance indicators against the performance measures.

Land	Subsidence Performance Measures	Performance Indicators
Other Cliffs	Minor environmental consequences	 This performance indicator will be considered to be triggered if: Subsidence monitoring identifies an exceedance (or a trend to exceedance) of the predicted probability of subsidence induced impacts to cliffs within Application Area i.e. rock falls >20% of total cliff length.

Table 4 Land Performance Measures and Performance Indicators

¹⁵ PA08_0184, Schedule 3, Condition 24.

Performance Measure	Monitoring Site	of Environmenta Parameter	al Consequence Frequency	Data Analysis to Assess against Performance Indicator(s)	Performance Indicator(s)	Assessment of Performance Indicator(s)	Assessment of Performance Measure	Relevant Management and Contingency Measure
Minor environmental consequences	Cliff lines within the Application Area* (i.e. LWW7) (Figure 2)	Visual observations and photographic record to record signs of surface cracking and quantify length in metres (m) of rock falls.	Pre-mining: Visual inspection of the cliff line prior to the commencement of longwall mining. Post Mining: Visual inspection within one month of the longwall passing under the cliff line.	Analysis pre and post mining of cliff line inspections and photographic recordings.	Secondary extraction within the Application Area is predicted to experience mining- induced rock fall of less than 20% of the total length of cliff lines.	 This performance indicator will be considered to be triggered if: Subsidence monitoring identifies an exceedance (or a trend to exceedance) of the predicted probability of subsidence induced impacts to cliffs within Application Area i.e. rock falls >20% of total cliff length. If data analysis indicates the performance indicators have been triggered, an assessment will be made against the performance measure. 	The performance measure will be considered to have been exceeded if subsidence monitoring of cliff lines, indicates the secondary extraction within the Application Area have resulted in greater than minor environmental consequence.	If the assessment of performance indicators determine an exceedance of the performance measures is due to subsidence related impacts as a result of mining within the Application Area, the Contingency Plan would include: • Notify relevant government agencies; • Conduct investigations; • Additional monitoring (increases in frequency or additional sites); and • Reassess subsidence impacts.

Notes: *Access to cliff line and land for monitoring on Private Property will be subject to approval by the landowner.

5 Contingency Plan

5.1 Adaptive Management

In the event the subsidence performance measures for land as summarised in **Table 5** are considered to have been exceeded or are likely to be exceeded, response and management will be undertaken in accordance with protocols for incident reporting as identified in Section 4.3.1 of the Extraction Plan (**Section 6.2**).

Section 4.1.2 of the Extraction Plan describes the process for handling and investigating nonconformances, including allocation of responsibility, external and internal reporting requirements, and initiating and completing corrective and preventative actions.

Figure 4 displays the Contingency Plan to be implemented in the event the land performance measures are exceeded, higher than predicted subsidence or environmental consequence has occurred or in the event of a subsidence related incident.



Figure 4 Contingency Plan

5.1.1 Trigger Action Response Plan

Table 6 displays how the various predicted subsidence impacts, monitoring components, performance measures and responsibilities are structured to achieve compliance with the relevant statutory requirements and the framework for management and contingency actions.

	Normal State Predicted Impacts	Level 1 Response Management Measures	Level 2 Response Contingency Phase
Trigger	• As predicted, subsidence impacts on land are consistent with Section 3 of this Plan.	• Subsidence monitoring identifies an exceedance (or a trend to an exceedance) of the predicted probability of subsidence induced impacts to cliffs within Application Area i.e. rock falls are greater than 20% of total cliff length.	 Results from cliff line monitoring have been confirmed that the performance measure for land has been exceeded or is likely to be exceeded.
Action	 Continue monitoring in accordance with Section 4.3 of this Plan. 	 Implementation of management actions to assess if exceedances are due to mining related activities within the Application Area as described in Section 5 of this Plan. 	 Implementation of management and contingency measures responses as identified in the Contingency Plan and reporting requirements as described in Section 5.1. Review this Plan.
Frequency	 Continue monitoring in accordance with Section 4.2 of this Plan. 	Continue monitoring in accordance with Section 4.2 of this Plan.	Review monitoring methodology and frequency for this Plan in accordance with Contingency Plan.
Responsibility	Environment and Community Manager	 Environment and Community Manager UUG Technical Services Manager 	 Environment and Community Manager UUG Technical Services Manager UUG Operations Manager

Table 6 Land Management Plan Trigger Action Response Plan

6 Review and Improvement

6.1 Review

Ongoing monitoring and review on the performance and implementation of this Plan will be undertaken in accordance with Section 4.6 of the Extraction Plan. Any changes made to this Plan will be made in consultation with DPIE. A copy of the revised management plan will be supplied to the Secretary of the DPIE for approval.

6.2 **Reporting Requirements**

External reporting requirements, including incident and annual reporting, for this Plan will be in accordance with Section 4.3 of the Extraction Plan.

In the event of an incident, UCMPL will notify the government agencies as identified in Section 4.3.1 of the Extraction Plan within 24 hours of becoming aware of the incident (**Figure 4**). Within seven days of becoming aware of the incident, a detailed report of the incident will be provided and include, but not limited to, the following details:

- The date, time and nature of the exceedance/incident;
- The process to identify and investigate the likely cause of the exceedance/incident;
- Description of the response action undertaken to date; and
- Description of the proposed measures to address the exceedance/incident.

6.3 Community Complaints

Community complaints are managed in accordance with Section 4.4 of the Extraction Plan, including receipt of complaints, investigation, implementation of appropriate remedial action, and feedback to the complainant, communication to site management or personnel and notification to government agencies where necessary.

7

Roles and Responsibilities

The key responsibilities of UCMPL personnel in relation to this Plan are summarised in **Table 7**. Please note that responsibilities may be delegated as required.

Table 7 Key Responsibilities

Responsibility	Accountabilities		
Operations Manager (Ulan Underground)	 Authorise the Extraction Plan and approve appropriate resources for the implementation of this Plan; and Authorise internal and external reporting requirements of this Plan. 		
Technical Services Manager (Ulan Underground)	 Ensure the Subsidence Monitoring Program; Ensure monitoring and required under the Subsidence Effects Monitoring Program and the Extraction Plan are carried out within specified timeframes, are adequately checked and processed and are prepared to the required standard; and Ensure appropriate controls are in place to manage subsidence impacts upon surface operational infrastructure; 		
Environment and Community Manager	 Review this Plan in accordance with Section 4.5 and Section 4.6 and other legal requirements and operation standards; Ensure the effective implementation of strategies designed to reduce impacts from the operation; Ensure any potential or actual issue is reported in accordance with the Extraction Plan and other legal requirements and corporate standards; Review and prepare internal and external reports as identified in the reporting framework; Approve subsequent revisions of this Plan; Instigate response in the event the performance indicators, TARP and/or Contingency Plan are triggered; and Allocate resources for monitoring and review of subsidence monitoring survey results. 		
Environment and Community Coordinator	 Implement monitoring programs as required by this Plan and conduct analysis of results against performance indicators as described in this Plan; Prepare this Plan and subsequent revisions for approval by the Environment and Community Manager; Assist in the preparation of reports as identified in reporting framework; and Assess any triggers as described in performance indicators and provide advice to implementation of TARPS and the Contingency Extraction Plan. 		
Environment and Community Officer	Assist the Environment and Community Coordinator in the implementation of monitoring programs and analysis of results against performance indicators as described in this Plan; Assist in the preparation of reports as identified in reporting framework; and Assist the Environment and Community Coordinator in the assessment of triggers as described in performance indicators and provide advice to implementation of TARPS and the Contingency Plan.		
Mine Surveyor (Ulan Underground)	 Undertake subsidence effects monitoring as required by the Extraction Plan and to the required survey standard within the specified timeframes and ensure data are adequately checked, processed and recorded. 		
All employees and contractors	 Comply with all requirements of this Plan; Undertake all works in accordance with this Extraction Plan and all other Ulan Coal Mine Complex systems; Report all potential environmental incidents to their supervisor immediately; and Seek Ground Disturbance Permits (GDP) approval from the Environment and Community Manager prior to any surface disturbance activities. 		

8 **Document Information**

Relevant legislation, standards and other reference information must be regularly reviewed and monitored for updates and should be included in the site management system. Related documents and reference information in this section provides the linkage and source to develop and maintain site compliance information.

8.1 **Definitions**

Definitions as provided in Section 5.1.1 of the Extraction Plan.

8.2 Accountabilities

Accountabilities are described in Section 7 of this Plan.

8.3 References

References as provided in Section 5.2 of the Extraction Plan.

8.4 Attachments

Attachment 1 Environmental Inspection Form

8.5 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 8** below.

Table 8 Change Information

Version	Date	Review Team	Change Summary
0.1	October 2016	Tara Stokes	Document Development
1.0	May 2019	Lucy Stuart	Document updated to include dispute resolution protocol. Provided to effected land holder for comment.
2.0	April 2020	Stephen Bragg, Lucy Stuart	This EP was amended regarding extension of longwall panels to align with the approved MOD 4
3.0	December 2020	Robyn Stoney, Lucy Stuart, Stephen Bragg	This EP was resubmitted on the 21/12/2020 to address the requirements from the DPIE Water feeback

9 Attachments

9.1 Attachment 1 - Environmental Inspection Form