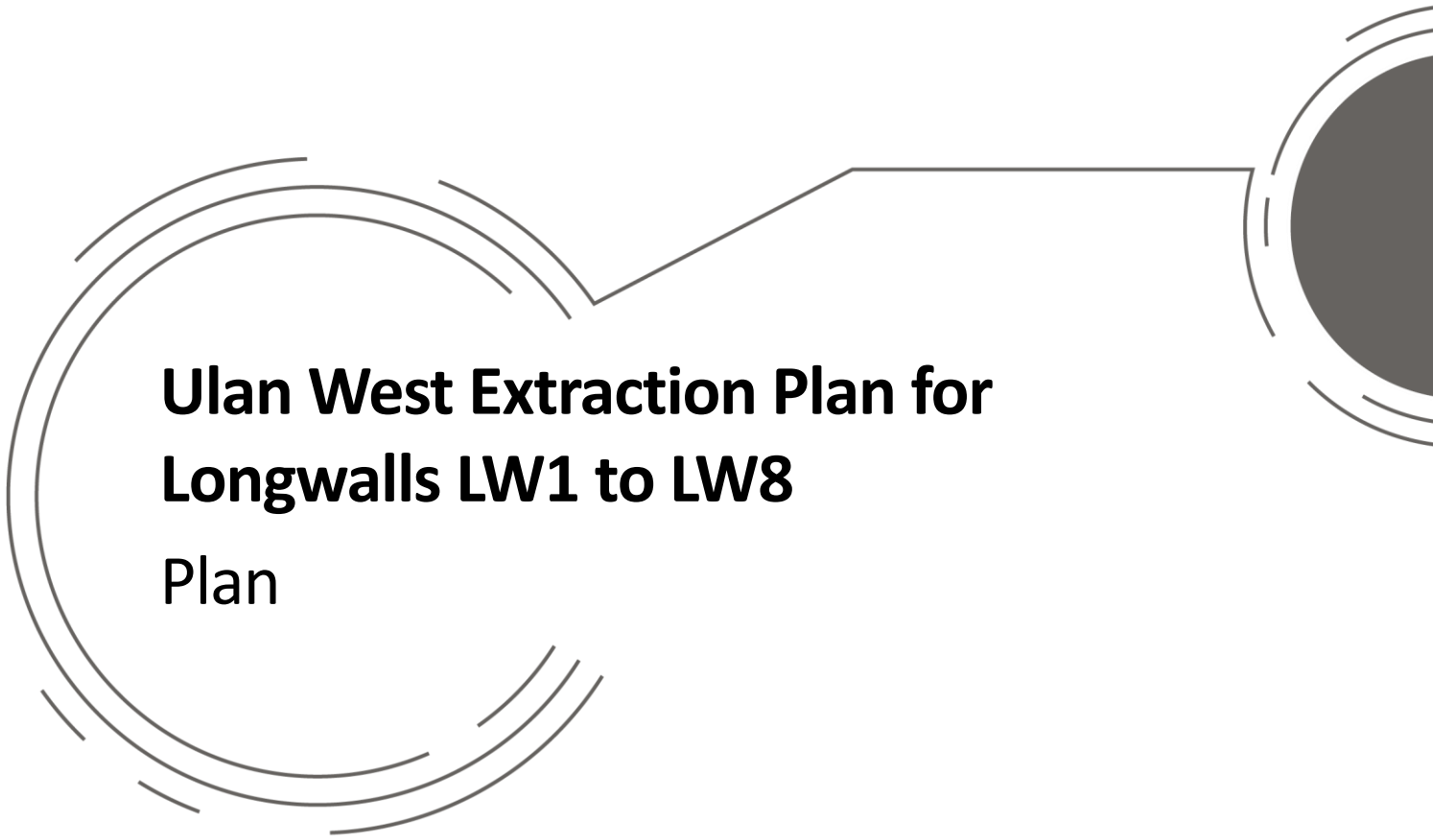


ULAN
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Ulan West Extraction Plan for Longwalls LW1 to LW8 Plan

Number: ULNCX-111515275-2811

Owner: Environment and Community Manager

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Title Block

Applicant:	Ulan Coal Mines Pty Limited
Mine:	Ulan West Underground Mine
Project Approval:	PA08_0184
Mining Leases:	ML1468, ML1341 & CCL741
Extraction Plan Title:	Ulan West Extraction Plan for Longwalls LW1 to LW8
Document Reference Number:	ULNCX-111515275-2811
Date:	March 2022
Accuracy of Information	
Authorised Representative:	Lucy Stuart
Position:	Environment & Community Manager
Date:	10 March 2022
Signature:	
Authorised Representative:	David Ribaux
Position:	Ulan West Operations Manager
Date:	10 March 2022
Signature:	

Version	Date	Review team (Consultation)	Change Summary
1.0	18/10/2013	Robyn Stoney, Ian Flood, Stephen Bragg	Original submission LW1 and LW2
2.0	30/10/2015	Robyn Stoney, Ben Anderson, Stephen Bragg	Revised to include LW3 and LW4
3.0	15/11/2017	Robyn Stoney, Rebecca Shanks, Jessica Southgate	Revised to include LW5 and LW6
4.0	30/05/2018	Robyn Stoney, Justin Russel	Revised to incorporate comments from agencies following submission.
5.0	14/06/2022	Lucy Stuart, Stephen Bragg, Tara Stokes, SCT, AGE, ELA, OzArk & Engeny	Revised to include LW7 and LW8, amendment to LW7 First Workings & incorporate comments from agencies (Refer to Appendix B).

Notes: Any 'version' discrepancies displayed in the Footer of this Document are a function of the UCMPL document control register. The actual revisions and summary of changes to this Document are provided in the table above and in **Table 39** of this Extraction Plan.

1. Introduction of the Extraction Plan

1.1 Background

The approved Ulan Coal Complex (the Mine) is situated in the central west of New South Wales. It is located in the Mid-Western Regional Council (MWRC) Local Government Area (LGA) near the village of Ulan, approximately 38 kilometres (km) north-northeast of Mudgee and 19 km northeast of Gulgong (**Figure 1**). Ulan Coal Mines Pty Limited (UCMPL) is jointly owned by Glencore Coal Assets Australia Pty Limited (Glencore) and Mitsubishi Development, with Glencore maintaining management responsibility.

The Ulan West Underground Mine (Ulan West) is a component of the Mine. Ulan West utilises the secondary extraction of coal by standard longwall mining methods, targeting only the economic portion of the Ulan Coal Seam known as the D Working Section (DWS).

Primary extraction, also known as ‘development or first workings,’ utilises continuous miners and shuttle cars to develop roadways which form the longwall panels. The extraction of coal using the mining methods described occurs within Mining Lease (ML) ML1468, ML1341 and Consolidated Coal Lease (CCL) CCL741 (**Figure 3**). First workings at Ulan West commenced in March 2012.

The potential environmental impacts of the existing and proposed mining activities were assessed in the *Ulan Coal - Continued Operations Environmental Assessment 2009* (Project EA). Project Approval 08_0184 (PA08_0184) was granted under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 15 November 2010 for the Project EA, herewith in referred to as the Project Area.

PA08_0184 authorises current and proposed mining of the Ulan Mine Complex until 30 August 2033, and production of up to 20 Mtpa (million tonnes per annum) of product coal. The approval provides for an open cut and Ulan West and Ulan Underground mines to operate twenty-four hours a day, 7 days per week.

At the time of preparing the *Ulan West Extraction Plan for Longwalls LW1 to LW8 (Version 5)* (the Extraction Plan), PA08_0184 had been modified on five occasions (**Section 1.3**). This Extraction Plan has been prepared in consideration of MOD4 Longwall Optimisation Project of PA08_0184. UCMPL have revised the Extraction Plan to include the next two approved longwall panels LW7 and LW8 (the Application Area) (**Section 3.1**) (**Figure 2**) for the Secretary’s approval from the NSW Department of Planning, Industry and Environment (DPIE).

On the 22 October 2021, UCMPL sought a minor amendment to the First Workings of the Ulan West mine plan in accordance with Condition 25, Schedule 3 of PA08_0184. The First Workings amendment involves the relocation of the installation roadway on the northern end of LW7 to the south due to unfavourable mining conditions being identified at the location of the originally planned installation roadway position, thereby reducing the overall length of LW7 by approximately 255m. Approval by the Secretary regarding this First Workings amendment was granted on the 27 October 2021 (**Attachment C**). Further information is provided in **Section 2.2**.

This Extraction Plan has also been prepared in consideration of the NSW Department of Planning and Environment (DP&E) and NSW Division of Resources and Energy (DRE) (2015) *draft Guidelines for the Preparation of Extraction Plans* (the Guidelines) (**Attachment A**).

The Extraction Plan was prepared by UCMPL, with assistance from Strata Control Technology (SCT), Eco Logical Australia (ELA), Australasian Groundwater and Environmental Consultants Pty Ltd (AGE), Engeny and OzArk Environment & Heritage (OzkArk). The appointment of the suitably qualified and experienced persons were endorsed by the Secretary of the DPIE on the 01 March 2021 and 10 June 2021 (**Attachment C**).

1.2 Purpose & Scope

This Extraction Plan outlines the proposed management, mitigation, monitoring and reporting of potential subsidence impacts and environmental consequences in the Ulan West mining area from the secondary extraction of longwalls (LW) LW1 to LW8, also referred to as the Extraction Plan Area (**Figure 3**).

The Extraction Plan was revised to include a review of subsidence assessments and environmental consequences for the proposed LW7 and LW8 (the Application Area) (**Section 3.1**) (**Figure 2**).

The initial Extraction Plan was approved on the 9 April 2014 for LW1 and LW2 (**Attachment C**) and has since been revised on several occasions by UCMPL to include:

- Longwalls LW3 and LW4 (approved 30 May 2016); and
- Longwalls LW5 and LW6 (approved 25 January 2019).

The objectives of this Extraction Plan are to:

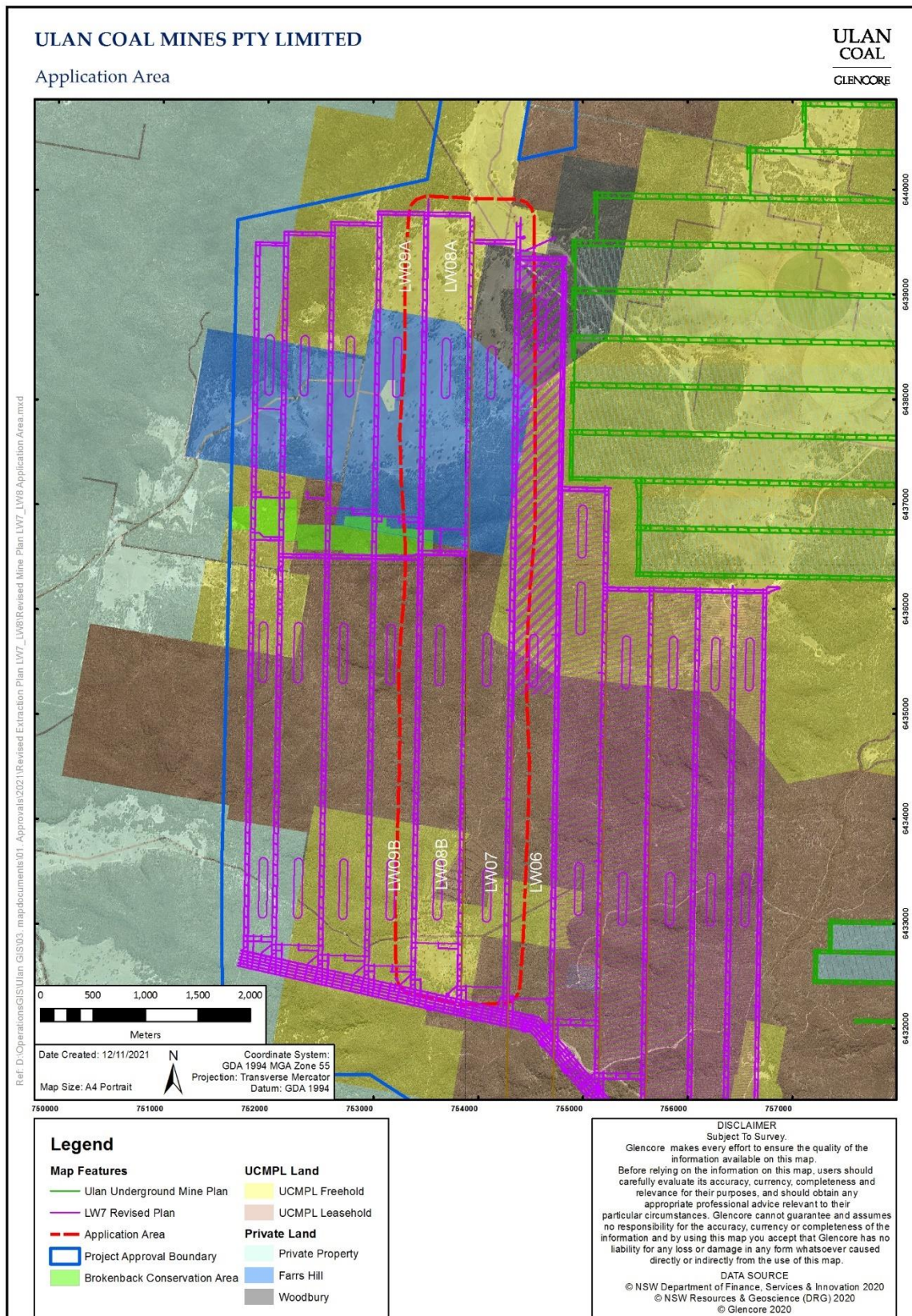
- Provide detailed mine plans of LW1 to LW8;
- Outline potential subsidence effects, subsidence impacts and environmental consequences of LW1 to LW8;
- Describe the subsidence management measures that will be implemented to ensure compliance;
- Provide the performance measures and the mitigation, management and remediation measures of potential subsidence impacts and environmental consequences;
- Detail a monitoring program for potential subsidence impacts and environmental consequences, including detailed performance indicators for subsidence performance measures; and
- Outline the adaptive management approach and contingency plans in the event of exceedances of performance measures and predicted environmental consequences.

This Extraction Plan forms part of UCMPL Environmental Management Strategy¹ (EMS). The relationship of this Extraction Plan to the EMS is shown by **Figure 4**.

¹ Condition 1, Schedule 5 of PA08_0184

The map displays the Ulan Coal Project Area in central New South Wales. The project area is highlighted in blue, with the Moolarben Mine Lease in green and the Wilpinjong Mine Lease in purple. Key towns and locations marked include Ulan, Moolarben, Wollar, Singleton, Newcastle, and Sydney. Major roads such as the Golden Highway, Putty Road, and the Great Western Highway are shown. An inset map in the top right corner provides a broader view of New South Wales, showing the project area's location relative to the state's borders with Queensland, Victoria, and the Tasman Sea. A scale bar at the bottom indicates a distance of 60 km, and a north arrow is present.

Figure 2 The Application Area



ULAN COAL MINES PTY LIMITED
Extraction Plan Area

ULAN COAL
GLENORE

WONGAROO ROAD

GOLBURN RIVER

0 1,000 2,000 3,000 4,000
Meters

Date Created: 15/11/2021
Map Size: A4 Portrait

Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994

Legend

Mine Plans		Surface Facilities	
Ulan Underground Mine Plan	Application Area	Moolarben Coal Operations	Ulan Coal Handling and Preparation Plant
Ulan West Revised Mine Plan	Extraction Plan Area	Ulan Surface Operations	Ulan Underground
UCMPL Colliery Holding Boundary	Bobadeen Quarry	Ulan Village	Ulan West Underground
CCL	Public Roads	Ulan West Underground Box Cut	
ML	UCMPL Owned Road		
Ulan Underground North 1	Goulburn River		

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1.3 Statutory Requirements

1.3.1 Regulatory Requirements

The Ulan Coal Mine currently operate under a number of regulatory approvals. Regulatory approvals relevant to this Extraction Plan include:

- PA08_0184 (as modified) granted 15 November 2010, issued under the EP&A Act;
- Approval from the Commonwealth Minister for the Environment of the *Environment Protection and Biodiversity Conservation Act 1999* (approval reference No. 2009/5252);
- Mining Leases ML1468, ML1341 and CCL741 issued under the *Mining Act 1992*; and
- Environmental Protection Licence (EPL) 394 issued under the *Protection of the Environment Operations Act 1997* (PoEO Act).

1.3.2 Project Approval (08_0184)

Project Approval (PA 08_0184) was issued by NSW Planning, Industry and Environment (DPIE), on 15 November 2010 for the Ulan Coal Continued Operations. The approval has been modified as follows:

- *Environmental Assessment: Ulan Coal Continued Operations North 1 Underground Mining Area, Minor Modification to Ulan Underground & Ulan West Mine Plans & Proposed Concrete Batching Plant* (Umwelt, 2011) - (MOD1) approved 7 December 2011.
- Land and Environment Court final orders issued on the 5 April 2012.
- *Ulan West Mine Plan and Construction Blasting* (Umwelt, 2012) – (MOD2) approved 29 May 2012.
- *Environmental Assessment: Ulan West Modification* (southern extension) (Umwelt 2015) – (MOD3) Approved 14 March 2016.
- *Environmental Assessment: Ulan Continued Operations Project, Longwall Optimisation Project* (Ecological, 2018) – (MOD4), as modified by the Response to Submissions, dated August 2018, approved 17 July 2019. This modification included the extension of LWs 30-33, W7, W8 at Ulan Underground and the extension of LW7 and LW8 at Ulan West providing access to an additional 6.4 Mt of ROM coal. MOD4 also included the provision for additional infrastructure to support mining activities including conceptual redesign of infrastructure and provision for access tracks, dewatering infrastructure (boreholes and shedding), powerlines and pipelines.
- Revision of Ulan West Operational Mine Plan – (MOD5) approved 7th August 2020. This was a minor, administrative modification under section 4.55(1) of the *Environmental Planning and Assessment Act 1979* to amend a misdescription of the approved Figures provided in Appendix 2 to 7 of Project Approval 08_0184.
- Alternative Offset Site - MOD 7. On 8 June 2021 UCMPL submitted an application to modify PA 08_0184 to permit use of the alternative offset site. This modification was approved on 23 March 2022.

1.3.2.1 Requirement for an Extraction Plan

UCMPL must prepare and implement an Extraction Plan for all secondary workings, to the satisfaction of the Secretary, as required by the PA08_0184. The Extraction Plan and the key supporting

component management Plans (**Section 3.4**), have been prepared in accordance with Condition 26, Schedule 3 of PA08_0184 and the Guidelines (**Attachment A**). The PA08_0184 requirements applicable to the preparation of the Extraction Plan and where these requirements are addressed within this document are presented in **Table 1**.

As required by the Guidelines, the Extraction Plan must comprise of a set of six key component plans which follow a specific structure to comply with the Guidelines. In consultation with the DPIE (**Section 2.1**) UCML revised structure of the Extraction Plan and key component management as provided in **Section 1.4**. For further details refer to **Section 4**.

Table 1 Project Approval Extraction Plan Conditions & Management Plan Requirements

Project Approval (PA 08_0184) Conditions	Section Addressed
Condition 26 Schedule 3, Condition 26 26. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Secretary. Each Extraction Plan must:	This Extraction Plan
a) be prepared by a team of suitably qualified persons whose appointment has been endorsed by the Secretary.	Section 1.1 & Attachment C
b) be approved by the Secretary before the Proponent carries out any of the second workings covered by the Extraction Plan.	Attachment C
c) include detailed Extraction Plans of the proposed first and second workings and any associated surface development.	Section 3.2 & Appendix I
d) included detailed performance indicators for each of the performance measures in Table 14.	Section 4
e) provide revised predictions of potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval.	Section 2.2 & Technical Report 1 & Section 4
f) describe the measures that would be implemented to ensure compliance with the performance measures in Table 14 and manage or remediate any predicted impacts and/or environmental consequences.	Section 4
g) include the following to the satisfaction of the DRE: - a subsidence monitoring program... - a Built Features Management Extraction Plan... - a Public Safety Management Extraction Plan... - a revised Rehabilitation Management Extraction Plan h) include: - revised Water, Biodiversity and Heritage Management Extraction Plans... - a Land Management Extraction Plan... - include a program to collect sufficient baseline data for future Extraction Plans.	Appendix G Appendix D Appendix F Appendix H Appendices A, C and E Appendix B Attachment D
PA08_0184 Statement of Commitments <i>Where a potential subsidence impact is predicted on private property, UCML will prepare a Private Property Subsidence Management Plan for each of the potentially affected private landholders. These plans will clearly outline impacts of mining on the property and the management and remediation measures to be implemented, by agreement with the landowner</i>	Section 2.1.2 (Not available to the general public)
Schedule 5, Condition 2 2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	Section 1.1 Attachment A
a) <i>detailed baseline data;</i>	Section 3 & 4
b) <i>a description of:</i> <i>the relevant statutory requirements (including any relevant approval, licence or lease conditions);</i> <i>the relevant limits or performance measures/criteria;</i> <i>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;</i>	Section 1.3 Section 1.3.2.2 Section 4

Table 1 Project Approval Extraction Plan Conditions & Management Plan Requirements (cont.)

Project Approval (PA 08_0184) Conditions	Section Addressed
c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 4 Appendix A-H
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 Section 5 Section 6.3
e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 6.1
f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 6.5
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; and	Section 6.3.1 Section 6.4
h) a protocol for periodic review of the plan	Section 6.5

1.3.2.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures. The performance measures specified in Table 14 of Condition 24 of Schedule 3 of the PA08_0184 are listed in **Table 2**.

A number of natural, heritage and built features listed in Table 14 of PA08_0184 are relevant to both the Application Area and Extraction Plan Area. **Table 2** provides a description of the features relevant to the subsidence impact performance measures for the Extraction Plan.

Further details in relation to assessment of subsidence performance measures are provided in **Section 2.2** and **Section 3.7**.

Table 2 Project Approval Subsidence Performance Measures

Water	Performance Measure	Relevance to the Extraction Plan	Section in EP
Ulan, Mona & Cockabutta Creeks	No greater environmental consequences than predicted in the EA	- Ulan Creek is remote from Application Area. - A section of Mona Creek is within the Application Area. - Cockabutta Creek is outside of the Application Area. - Drainage lines into Ulan Creek, Mona Creek and Cockabutta Creek are within the Application Area and Extraction Plan Area.	Section 3.1.1 Section 3.1.2 Section 4.1 (WMP) Appendix A
Biodiversity	Performance Measure	Relevance to the Extraction Plan	Section in EP
Threatened species, populations, habitat or ecological communities	Negligible impact	Endangered ecological communities and habitat for threatened species are located within the Application Area and Extraction Plan Area.	Section 3.1.6 Section 4.4 (BMP) Appendix C

Table 2 Project Approval Subsidence Performance Measures (cont.)

Land	Performance Measure	Relevance to the Extraction Plan	Section in EP
Cliffs in the Brokenback Conservation Area	Nil environmental consequences	Brokenback Conservation Area is within the Application Area.	Section 3.1.2 Section 4.3 (LMP LW1-8) Appendix B
Other cliffs	Minor environmental consequences	Cliff lines are located within the Application Area and the Extraction Plan Area.	
Heritage	Performance Measure	Relevance to the Extraction Plan	Section in EP
Aboriginal sites	Nil impact in the Brokenback Conservation Area (CA), Grinding Groove Conservation Area; and on Mona Creek Rock Shelter Sites	- Brokenback Conservation Area is within the Application Area. - Mona Creek Rock Shelter Sites are outside of the Application Area. - Grinding Groove Conservation Areas are remote from the Application Area and outside of the Extraction Plan Area.	Section 3.1.4 Section 4.6 (HMP) Appendix E
Talbragar Fish Fossil Reserve	Negligible impact	Not within Application Area or Extraction Plan Area.	
Other Heritage Sites	No greater impact than predicted in the EA	Heritage sites located within the Application Area and Extraction Plan Area.	
Built Features	Performance Measure	Relevance to the Extraction Plan	Section in EP
All built features	Safe, serviceable and repairable unless the owner agrees otherwise in writing	- A Telstra copper cable and an Essential Energy overhead powerline are located within the Application Area. - Two State Survey marks are located within the Application Area. - Other non-UCMPL owned built features on private land are within the Application Area and Extraction Plan Area.	Section 3.1.5 Section 4.5 (BFMP LW1-8) Appendix D
Public Safety	Performance Measure	Relevance to the Extraction Plan	Section in EP
Public Safety	No additional risk due to mining	Public safety is considered in the Public Safety Management Plan.	Section 4.7 (PSMP LW1-8) Appendix F

1.3.3 Mining Leases

The Application Area and Extraction Plan Area are located within mining lease (ML) ML1341, ML1365, ML1468 and Consolidated Coal Lease (CCL) CCL741 (**Figure 3**). **Table 3** outlines the mining leases conditions relating directly to subsidence management for ML1468 and CCL741, as amended by the Minister of Resources and Energy, pursuant to section 239(2) of the *Mining Act 1992*, on 30 June 2014.

Table 3 Mining Lease Extraction Plan Conditions

Mining Leases(s) Extraction Plan Condition	Section Addressed
(a) In this condition: (i) approved Extraction Plan means a plan being: A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided by the Secretary; and B. a subsidence management plan relating to the mining operations subject to this leases: I. submitted to the Secretary on or before 31 December 2014; and II. approved by the Secretary. (ii) relevant development consent means a development consent or project approval issued under the <i>Environmental Planning & Assessment Act 1979</i> relating to the mining operations subject to this lease.	This Extraction Plan Section 3.1 Section 1.3.2.1 Section 1.3
(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.	This Extraction Plan
(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.	Sections 4 & 5
(d) The lease holder must notify the Secretary within 7 days of any: (i) incident caused by subsidence which has a potential to expose any person to health and safety risks; (ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or (iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing: A. Built Features B. Public Safety; or C. Subsidence Monitoring.	Section 6.3 Section 6.1 & Section 6.2 Appendix D Appendix F Appendix G

1.3.4 Other Relevant Legislation

1.3.4.1 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the approval of the Commonwealth Minister for the Department of Agriculture, Water and the Environment (DAWE) for actions that may have a significant impact on Matters of National Environmental Significance (MNES).

The purpose of the EPBC Act is to ensure that these actions undergo a rigorous assessment and approval process. The Act also provides for the identification, conservation and protection of places of National Heritage significance and provides for the management of Commonwealth Heritage places.

The Project EA identified threatened species and communities, therefore triggering the requirement for approval under the EPBC Act. Approval from the Commonwealth Minister for the Environment was granted under Section 130 and Section 133 of the EPBC Act (approval reference No. 2009/5252) on the 30 November 2010, expiring September 2031.

1.3.4.2 State Legislation

EP&A Act

The EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP & A Regulation) provide the framework for environmental Planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and also provide opportunity for public involvement. It is administered by the DPIE.

The potential environmental impacts of the existing and proposed Ulan Coal Mine Complex were assessed in the *Ulan Coal - Continued Operations Environmental Assessment* (Project EA) (Ulan Coal, 2009). UCMPL was granted Project Approval 08_0184 (PA08_0184) under Part 3A of the EP&A Act on 15 November 2010, herewith in referred to as the Project Area.

Mining Act 1992

The *Mining Act 1992* (Mining Act) makes provision for a variety of mining authorities, including mining leases and exploration licences which are required for the prospecting and mining of minerals and coal. The Mining Act also makes provision for the protection of the environment in relation to mining activities, including rehabilitation of areas affected by mining activities.

UCMPL currently holds several mining leases over the Application Area (**Section 3.5.4**). **Table 3** outlines the Extraction Plan Condition relating directly to subsidence management for ML1468 and CCL741.

Part 11 of the Mining Act deals with the protection of the environment and provides that conditions may be imposed upon a mining authority or mineral claim requiring that land affected by mining activities be rehabilitated. Standard conditions generally imposed upon a mining lease include requirements to submit a Mining Operations Plan (MOP) prior to the commencement of mining operations.

UCMPL have prepared an integrated MOP² that covers underground, open cut and associated mining activities. The MOP was approved 16 November 2017 and expires in 2024.

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO Act) is administered by Environment Protection Authority (EPA). The PoEO Act establishes, amongst other things, the procedures for issuing of licences for environmental protection on aspects such as waste, air, water and noise pollution control.

The owner or occupier of premises that are engaged in scheduled activities is required to hold an Environment Protection Licence (EPL) and comply at all times with the conditions of that licence. UCMPL require an EPL for the Project because coal mining is a scheduled activity listed in Schedule 1 of the PoEO Act. UCMPL currently holds EPL No. 394 which applies to the Ulan Mine Complex. EPL 394

² ULNCX-111515275-1921 previously known as ULN SD PLN 0079. The MOP will be replaced by the new standard mining lease conditions for rehabilitation conditions on existing mining leases. The conditions will be implemented through the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021*, which commenced on 2 July 2021.

includes the coal mining production, processing rates, water discharge, and monitoring points (air, noise, water and meteorological) associated with the Project.

Work Health and Safety Act 2011 and Work Health and Safety Regulation 2011

The *Work Health and Safety Act 2011* (WHS Act) and the *Work Health and Safety Regulation 2011* (NSW), came into force on the 01 January 2012. The WHS Act, is the primary piece of legislation dealing with the health and safety of workers in NSW.

Work Health and Safety (Mines and Petroleum Site) Act 2013 & Work Health and Safety (Mines and Petroleum Site) Regulation 2014

The *Work Health and Safety (Mines) Act 2013* and *Work Health and Safety (Mines) Regulation 2014* apply to all mining workplaces in NSW. These laws support the WHS Act and WHS Regulation and provide additional provisions for work health and safety issues unique to mines. Notification of high risk activities, as required by WHS Regulation, will be submitted to the DPIE-RR separately to this Extraction Plan, prior to the commencement of secondary extraction.

Water Management Act 2000

The *Water Management Act 2000* (WM Act) regulates the use and interference with surface water and groundwater sources which are governed by operational water sharing plans (WSP) in NSW. The losses of baseflows from this system are compensated as required by the Project Approval 08_0184 by the discharge of water to the Goulburn River and the maintenance of licence allocation for the Hunter Unregulated and Alluvial Water Sources WSP. Base flow losses have not yet occurred relevant to the Talbragar alluvial water sources, though licence allocations are being sought to compensate for base flow loss when it occurs.

UCMPL holds licences for its extraction from the deeper aquifers within the NSW Murray Darling Basin Porous Rock groundwater sources WSP and the Coast Fractured Rock WSP. Groundwater extraction is reported in the Annual Review.

Crown Lands Act 1989

The Crown Lands Act 1989 provides for the administration and management of Crown land in the eastern and central divisions of the state. Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the *Crown Lands (Continued Tenures) Act 1989*. The Minister may grant a 'relevant interest', such as a lease, licence or permit, over Crown land for the purpose of any infrastructure, activity or other purpose.

Within the Application Area, Ulan Coal leases Crown Land for mining purposes (Licence No. LI 204946). There are no specific requirements with regards to subsidence remediation measures within the conditions of the Licence. Ulan Coal are obligated to carry out activities in an environmentally responsible manner.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NP&W Act) is the principal legislation dealing with the management of Aboriginal heritage and protection of native flora and fauna. Approval is not required under the Act for impacting on native flora or fauna where that activity is carried out in accordance with a development approval granted under the EP&A Act. Additional approvals for impacting on Aboriginal sites are not required for projects approved under Part 3A of the EP&A Act. The Project will

not require approval under sections 87 and 90 of the NP&W Act due to the exemptions outlined under section 75U of the EP&A Act.

1.4 Structure of the Extraction Plan

The Extraction Plan comprises a main text component and supporting management plans and technical studies. An overview of the Extraction Plan includes:

Section 1	Provides an introduction including purpose and scope, statutory and extraction plan requirements, subsidence performance measures and structure of the Extraction Plan.
Section 2	Describes the process of reviewing and updating subsidence predictions and impacts, environmental consequences, the risk assessment process, consultation with relevant key stakeholders.
Section 3	Provides an overview of the Application Area, land ownership and land use, natural features, groundwater, biodiversity, heritage and built features.
Section 4	Describes the mitigation and management measures, remediation and monitoring of potential subsidence impacts and environmental consequences on natural, heritage and built features.
Section 5	Describes the monitoring program for the Extraction Plan.
Section 6	Describes the contingency response and adaptive management approach, reporting, regular review and key responsibilities for personnel.
Section 7	Reference documents and abbreviations and terms used in this Extraction Plan.
Attachment A	<i>Draft Extraction Plan Guidelines</i> and where they are addressed in the Extraction Plan.
Attachment B	Relevant Consultation Records
Attachment C	Correspondence from Agencies
Attachment D	Program to collect baseline data for future Extraction Plans
Attachment E	Key Contacts
Attachment F	Environmental sensitive surface and sub-surface features checklist
Attachment G	Technical Reports (Subsidence)
Attachment H	Technical Report (Groundwater)
Attachment I	Technical Report (Biodiversity)
Attachment J	Technical Report (Heritage)
Attachment K	Technical Report (Surface water)
Attachment L	Predicted Groundwater Allocation

Appendices A to I provide the key component management and monitoring plans of the Extraction Plan, including:

Appendix A Water Management Plan (collective for SWMP, GWMP & SWGWRP)

Appendix B Land Management Plan for LW1 - 8 (LMP LW1 - 8)

Appendix C Biodiversity Management Plan (BMP)

Appendix D Built Features Management Plan for LW1 - 8 (BFMP LW1 - 8)

Appendix E Heritage Management Plan (HMP)

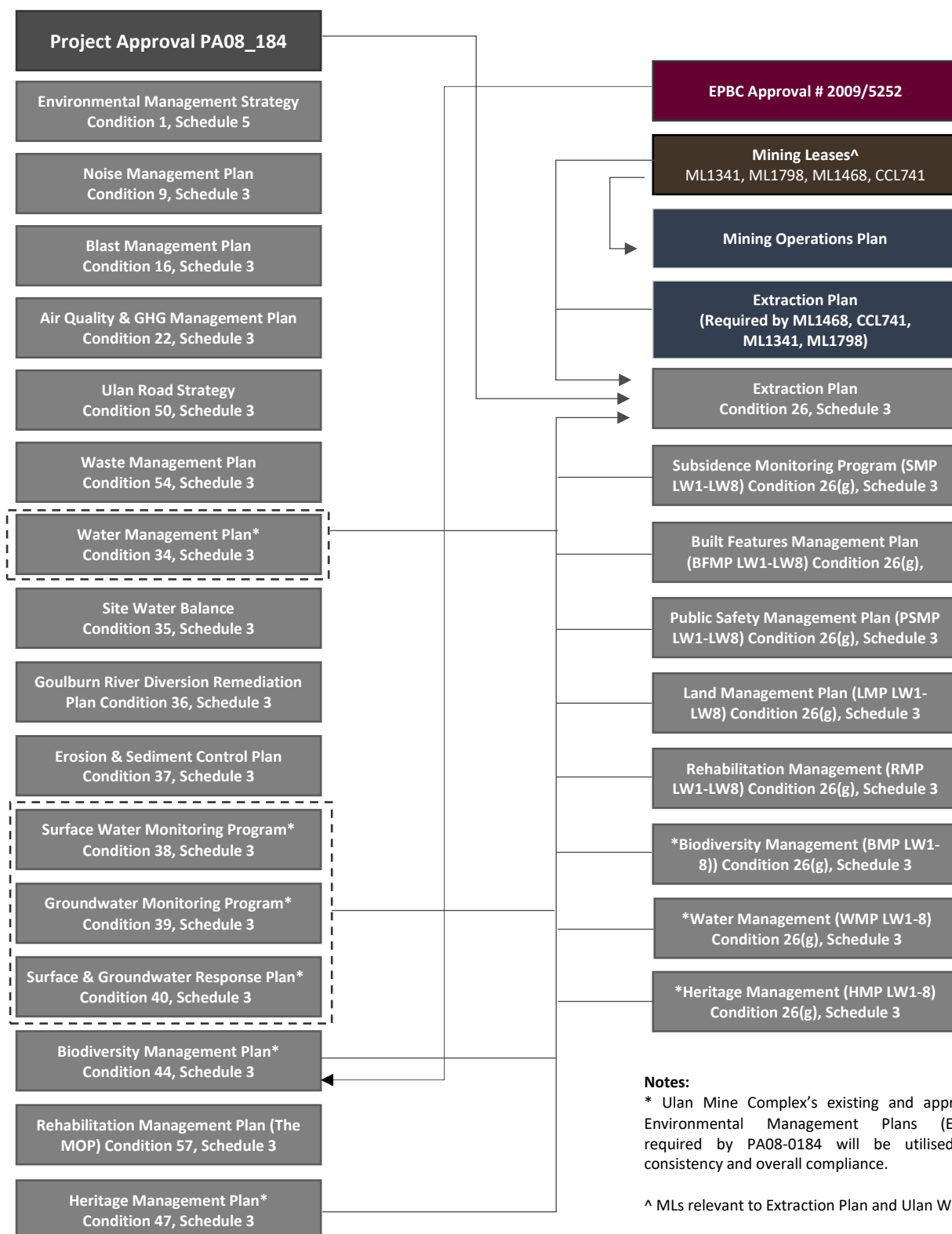
Appendix F Public Safety Management Plan for LW1 - 8 (PSMP LW1 - 8)

Appendix G Subsidence Monitoring Program for LW1 – 8 (SMP LW1 – 8)

Appendix H Rehabilitation Management Plan for LW1 – 8 (RMP LW1 - 8)

Appendix I Extraction Plans 1 to 7

Figure 4 EMS and Extraction Plan Structure



2. Development of the Extraction Plan

2.1 Consultation

Consultation with relevant government authorities and stakeholder groups has been ongoing since 2013 during preparation of the initial Extraction Plan for LW1 and LW2 and subsequent Extraction Plan revisions (**Section 1.2**). Historical consultation with relevant government authorities and stakeholder groups during revisions to the Extraction Plan are summarised in **Attachment B**.

Recent consultation with relevant government authorities and relevant key stakeholder groups during the revision of the Extraction Plan to include LW7 and LW8 is summarised below.

2.1.1 Government Agencies

Consultation with the following government agencies (**Attachment C**) during this revision of the Extraction Plan is summarised in **Table 4**.

Table 4 Summary of Consultation with Government Agencies

Government Agency	Date	Summary of Consultation	Outcomes
DPIE	15 October 2020	Phone meeting with DPIE discussed UCMPL's intention to revise the Extraction Plan to include LW7 and LW8. UCMPL also proposed a restructure to the Extraction Plan by incorporating the individual component management plans, with the intention of improving the efficiency of the document and avoid unnecessary duplication.	Section 4 Attachment A Attachment C
DPIE	1 March 2021	UCMPL received endorsement from the Planning Secretary for approval of suitably qualified specialist including subsidence, surface water groundwater, ecological & heritage.	Section 1.1 Attachment C
DPIE	6 June 2021	UCMPL received endorsement from the Planning Secretary for approval of suitably qualified specialist for heritage (change from initial consultant).	Section 1.1 Attachment C
DPIE-RR, MWRC, BCS, EPA, DPIE-Water, SA NSW, HNSW	30 June 2021	UCMPL notified relevant local government and government agencies of its intention of revising the Extraction Plan for LW7 and LW8 and sought their feedback and comments.	Comments received from BCS, EPA, SA NSW and HNSW (refer below)
DPIE	1 July 2021	Seeking approval to variate the structure of the EP to utilise existing management plans required under PA08-0184 including Water Management, Heritage Management and Biodiversity Management Plan as key component plans of the Extraction Plan ³ .	Section 4 Attachment A Attachment C
DPIE	14 July 2021	DPIE approved the revised structure. <i>Clear articulation of the extraction plan framework and structure is encouraged in the main text of the plan</i>	

³ UCMPL sought this request to reduce duplication without compromising compliance and the level of detail required to address Schedule 3, Condition 26 of PA 08-0184 or the Guidelines, as several key component plans currently rely heavily on their corresponding approved EMP.

Table 4 Summary of Consultation with Government Agencies (cont.)

Government Agency	Date	Summary of Consultation	Outcomes
BCS	19 July 2021	<i>Successful management plans include tailored quantitative performance measures, targets and completion criteria in addition to monitoring and trigger points for corrective action which adhere to the SMART principles (specific, measurable, achievable, realistic, timely). Completion and performance criteria must be measurable and expressed in a manner that assists in the evaluation of progress toward the strategic goals that define the completion criteria.</i>	Section 4.4 Attachment C
HNSW	20 July 2021	<i>HNSW is willing to meet to discuss with the proposed revision of the Extraction Plan relative to the inclusion of the 2 additional long walls. In the interim HNSW request that Ulan Coal consider the potential of harm to Aboriginal cultural heritage when revising the Plan and refer to the Management Plan for guidance on additional consultation with the Registered Aboriginal Parties.</i>	Section 2.1.3.2 Section 4.6 Attachment C
DPIE-RR	20 July 2021	<i>The Regulator will review the Extraction Plan once it has been submitted and may provide comments at that time.</i>	Attachment C
EPA	28 July 2021	<i>The EPA has no comments on the proposal and consider that all relevant matters have been addressed.</i>	Attachment C
SA NSW	5 August 2021	<i>After submitting a request for consultation with Subsidence Advisory NSW (SA). Keirn Black called to say that their interest was in relation to the Private Residency located on LW7 and that the EP is to be developed so that the property is not left unsafe. Recommended a robust inspection strategy inc. pre and post mining inspections of the Property (Woodbury) and dilapidation report post. Also to make the owner aware that they can claim for compensation and assistance through SA if required. Copy of EP to be provide for comment.</i>	Section 2.1.2 (PPSMP) Section 4
DPIE	22 & 27 October 2021	<i>UCMPL sought an amendment to the Ulan West First Workings on the 22 October 2021 in accordance with Condition 25, Schedule 3 of PA08_0184. Approval of the First Workings amendment was granted by the Secretary on the 27 October 2021.</i>	Section 1.1 Sections 2.2 Attachment G
DPIE-RR, MWRC, BCS, EPA, DPIE-Water, SA NSW, HNSW	10 December 2021	<i>UCMPL submitted the revised EPLW1-8 via the NSW Planning Portal seeking feedback.</i> <i>Minor comments received by BCS on the 20 December 2021 and have been addressed in Section 3.1.6.</i> <i>Minor comments received by DPIE Water 31 January 2022 in relation to commitment to make good provisions for impacted groundwater users and make good provisions for alternate water supplies and other agreed compensation and are addressed in Section 4.2 – Table 18 TARP.</i> <i>No issues/comments received from DPIE – RR, MWRC, EPS, SA-NSW and HNSW.</i>	Comments received from BCS, SA NSW, DPIE-Water, DPIE RR and HNSW Attachment C
DPIR & DPIE-RR	06/06/2022	Request for further information (refer to Attachment B)	Attachment C
DPIR & DPIE-RR	13/07/2022	Request for further information regarding stream health and channel stability TARPS.	Section 4.1.7

This revised Extraction Plan was issued to the DPIE-RR, BCS, MWRC, DPIE-Water and NRAR upon submission via the NSW Planning Portal.

2.1.2 Landowners

There are two private landowners above the northern portions of LW7 and LW8 referred to as the Woodbury Property and Farris Hill Property (**Figure 2**). UCMPL shall prepare in consultation with each landholder, individual Private Property Subsidence Management Plans (PPSMPs) for LW7 and LW8. The PPSMP outlines impacts of mining on the landowner's property and the monitoring, management and remediation measures to be implemented by UCMPL, in agreement with the landowner. For more information refer to **Section 4.3** and **Section 4.5**.

UCMPL will ensure the residential building and associated outbuildings on the Woodbury Property will not be left unsafe at the completion of longwall mining under this private property. Prior to the commencement of LW7 a dilapidation report⁴ will be undertaken by UCMPL. All necessary rectification works after mining on the property and the outbuildings will be completed by UCMPL. As requested by Subsidence Advisory NSW (SA NSW), UCMPL will make clear to the owner of the residential building and associated outbuildings on the Woodbury Property they can claim for compensation and assistance through SA NSW if required.

UCMPL will continue to consult with each landowner on a regular basis to inform of the development of this Extraction Plan and preparation of PPSMPs for LW7 and LW8. Further information regarding predicted subsidence impacts on private land are provided in **Section 2.2**.

2.1.3 Community and Heritage Stakeholders

2.1.3.1 Community Consultation

UCMPL undertake four Community Consultative Committee (CCC) meetings throughout each calendar year. Each meeting provides a forum to discuss the Mine's environmental performance, community performance and mining operational aspects. A summary of the ongoing consultation with CCC members, relevant to this Extraction Plan are outlined in **Table 5**. Minutes from each CCC meeting are provided on the Mine's website <http://ulancoal.com.au>

Table 5 Summary of Consultation with CCC

Date	Summary of Consultation	Outcomes
June 2020	Update to be provide stating the Extraction Plan for LW1-LW6 will be revised to include LW7 and LW8 at Ulan West.	It was asked if extraction plans are related to the MOP. It was confirmed that The Extraction Plans are specific to the extraction of coal and surface issues related to the extraction such as subsidence and water impacts.
September 2021	Update to be provide regarding preparation of the Extraction Plan for LW7 and LW8. Technical studies completed and the Extraction Plan is due for submission shortly. Outcome of technical studies confirm that predicted impacts are consistent with the EA and subsequent Modifications	No further comments from CCC

⁴ A dilapidation report is a report based on the current condition of a property.

2.1.3.2 Aboriginal Heritage Groups

UCMPL undertake two Aboriginal heritage meetings throughout each calendar year. Each meeting provides a forum to discuss environmental performance, community performance, Aboriginal Heritage and mining operational aspects. A summary of consultation with Registered Aboriginal Parties (RAPs) relevant to this Extraction Plan is outlined in **Table 6**. This revised Extraction Plan will also be issued to the RAPs for comment.

Table 6 Summary of Consultation with Aboriginal Heritage Groups

Date	Summary of Consultation	Outcomes
June 2021	Update provide regarding preparation of the Extraction Plan for LW7 and LW8. The draft plan will be provided for comment when ready for submission. Site #191 was raised due to it originally being considered part of Brokenback but has not been included in the Conservation Area. It is included in the excavation strategy and contains predominately European Heritage Items.	No further comments from RAPs
December 2021	Provision of updated Extraction Plan for comment.	No further comments from RAPs

2.1.4 Public Utilities

Public utilities within the Application Area or in locations with the potential to be affected by LW7 and LW8 include an overhead Essential Energy powerline, a Telstra telecommunications copper cable and a number of NSW State Survey control stations (**Figure 6**). UCMPL have completed consultation with each asset owner during the development of the Built Features Management Plan (**Appendix D**) with Essential Energy and Telstra (**Section 4.6**).

In accordance with the written agreements with each public utility owner, UCMPL will repair the serviceability of each built feature at the full cost of UCMPL if the serviceable of the public utility is lost during extraction of LW7 and LW8 (**Appendix D**).

The two NSW State Survey control stations will be reinstated after active subsidence, in accordance with the *Surveyor-General's Direction No. 11 – Preservation of Survey Infrastructure - Version 4.0 January 2020* as confirmed by NSW Spatial Services in March 2019.

2.2 Review of Subsidence Predictions

The potential subsidence impacts of longwall mining and environmental consequences have been undertaken by Strata Control Technology (SCT) for the Mine's Project EA⁵ and subsequent modification assessments, including but not limited to:

- *Assessment of Subsidence Impacts for Amended Ulan No 3 and Ulan West Mine Plans' SCT Report ULA3839 – 9 June 2011*
- *Ulan West Modification Environmental Assessment - Umwelt (Australia) Pty Limited, March 2015*
- *Subsidence Assessment for Proposed Ulan West Mine Modification Longwalls 3 to 12 SCT Report ULA4229A - 18 September 2015*

⁵ SCT 2009 "Part 3A Subsidence Assessment Ulan Coal - Continued Operations" SCT Report ULA3367 – 14 August 2009

- *Ulan Continued Operations Project – Modification 4 Longwall Optimisation Project Environmental assessment” – Eco Logical Australia Pty Ltd, 29 January 2018*

Revised subsidence assessments have also been conducted for each revision of the Extraction Plan by SCT. The revised subsidence assessment reports for each revision of the Extraction Plan by SCT have included:

- *Revised Subsidence Assessments Specific for Ulan West Underground Mine Longwalls 1 and 2 (SCT, 2013);*
- *The Ulan West – Longwalls 3 and 4 Update of Subsidence Assessment for Longwalls 1 – 4 Extraction Plan (SCT, 2015); and*
- *Ulan West – Longwalls 5 and 6 Update of Subsidence Assessment for Longwalls 1 – 6 Extraction Plan (SCT, 2017).*

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area *Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan* (SCT, 2021).

The results from SCT’s recent assessment of LW7 and LW8 have been summarised in **Section 2.2.1**, with the complete report provided in **Attachment G**.

To support the First Workings application to relocate the installation roadway of LW7, SCT completed a review (**Attachment G**) to assess the potential subsidence impacts associated with shortening the northern end of the longwall by approximately 255m. SCT’s review of the First Workings amendment to LW7 concluded the subsidence effects, impacts and consequences are expected to be the same or less than previously predicted (**Section 2.2.1**).

2.2.1 Predicted Subsidence Effects and Subsidence Impacts

Estimates of subsidence effects for LW7 and LW8 are consistent with the range of values previously forecast at similar overburden depths for the original Project EA or subsequent updates for modifications to the Project Approval and regular Subsidence Management Plan / Extraction Plan assessments at the Ulan Mine Complex (SCT, 2021).

Table 7 summarises the estimates of primary subsidence parameters for the maximum and minimum depth of across each longwall in the Application Area for LW7 and LW8, to be measured along subsidence monitoring lines UW-C Line, UW-D Line and the proposed UW-I Line. A summary of the forecast subsidence effects from LW7 and LW8 by SCT (2021) is provided in **Sections 2.2.1.1 to 2.2.2.6**.

Table 7 Primary Subsidence Effects

Overburden Depth (m)	150m	230m	180m	Maximum Predicted Parameters (MOD 3)
Subsidence Monitoring Lines	UW-C Line	UW-D Line	UW-I Line	
Vertical Subsidence (m)	1.9	1.7	1.8	2.1
Tilt (mm/m)	70	45	60	120
Compression Strain (mm/m)	30	25	25	50
Tensile Strain (mm/m)	25	20	20	30

2.2.1.1 Changes to Subsidence Parameters

Since the Project EA, ongoing subsidence monitoring has improved the understanding of subsidence behaviour at the Ulan Mine Complex. This understanding also includes unconventional subsidence phenomena. As opportunities arise through Project Approval modification or extraction plan processes updated forecasts of subsidence effects are able to be incorporated in impact assessments.

Increases in the magnitude of forecast subsidence parameters do not necessarily imply significantly greater subsidence impacts or greater environmental consequences from those previously forecast. None of the subsidence impacts anticipated are particularly sensitive to specific values of maximum vertical subsidence, tilt or strain. Changes to the subsidence parameters since the Project EA come from a number of sources including:

- Recognition of the behaviour of the Triassic Sandstone in the overburden sequence;
- An increase in assumed seam section thickness or mining height;
- Improved subsidence monitoring surveying technique; and
- A practical need to avoid triggering reporting processes for inconsequential exceedances.

Revised forecasts for the primary subsidence parameters were presented in SCT 2013. These forecasts recognised the affects from the presence of and thickness of Triassic Sandstone in the overburden strata. In particular, the effect on total vertical subsidence from the variable bulking characteristics, where the Triassic Sandstone is greater than 30-40m thickness, and the magnitude of vertical subsidence where the Triassic Sandstone is thinner or absent.

The vertical subsidence forecast was increased from 1.6m to 1.9m and 2.1m for the shallower areas of LW1 and LW2 to account for the overburden behaviour and variation in assumed mining height. A maximum of 1.91m vertical subsidence was measured on 'A' Line over LW1. A maximum of 2.1m vertical subsidence is forecast for the shallower areas of LW5 and LW6.

The mining section assumed for subsidence estimation for the original Project EA was 2.9m. Additional geological exploration information, changes in market conditions and mining practices for quality control have contributed to a change in maximum cutting height to 3.3m. In the deeper sections of recent panels at the Ulan Mine Complex, maximum measured subsidence has increased to slightly less than 1.6m. This increase has occurred in areas with a recorded mining height of 3.2m and where Triassic Sandstone thickness is greater than 30-40m. An upward revision in the maximum subsidence estimate from 1.6m to 1.7m is made to reflect the possibility of slightly greater maximum vertical subsidence for areas of similar depth and overburden characteristics above LW5 and LW6.

However, maximum forecast values for the primary subsidence parameters; vertical subsidence, tilt and strain from conventional subsidence behaviour are less than previous forecasts for LW1 to LW6 due to the generally greater overburden depth above LW7 and LW8. Subsidence impacts and environmental consequences from the planned mining of LW7 and LW8 are expected to be consistent with or less than assessments for the Project EA and the environment performance experienced to date.

Potential impacts from subsidence movements are not expected to constitute a principal hazard as defined by the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* under provisions

of existing and the required management plans that manage risks to the health and safety of workers and other persons from subsidence.

2.2.1.2 Vertical Subsidence

Maximum vertical subsidence in a single seam situation is naturally variable by about 15% for any given panel geometry and overburden depth. Subsidence contours shown should be regarded as indicative of the general level of subsidence rather than as precise indications of subsidence at a point. Any variations in mining heights that may occur for a range of reasons are expected to proportionally influence the maximum vertical subsidence and other subsidence parameters.

Over most of the area of Longwalls 7 and 8 vertical subsidence is expected to be less than about 1.7m for a 3.1m mining height with maximum subsidence typically in the range 1.2-1.6m (**Figure 5**). The variable magnitude of subsidence appears to be a characteristic of the bulking behaviour of the Triassic Sandstones.

2.2.1.3 Tilt

The approach outlined by Holla (1991), with the K factors derived from the Ulan Complex experience, indicates maximum tilts to be generally less than 50mm/m but up to 70mm/m in the shallower areas above the start of the Longwalls 7 and 8 in the north, in the Brokenback Creek valley and at the southern ends of the panels. Tilt is likely to be mainly transitory over the centre of each longwall panel and permanent near the goaf edges.

2.2.1.4 Horizontal Movements

Horizontal movements associated with horizontal stress relief are observed to occur outside the mining area. The magnitude of these movements is generally expected to be less than 400mm at the goaf edge tapering to less than 20mm at a distance of approximately 1.8-2km ahead of longwall mining. The gradual rate of change outside the mining area is generally so small as to be imperceptible and of no practical significance.

2.2.1.5 Strain and Surface Cracks

The Holla method, with the K factors derived for the Ulan Complex, indicates the maximum strains are likely to be generally less than 20mm/m in compression and 15mm/m in tension above most of Longwalls 7 and 8 and may be up to 30mm/m in compression and 25mm/m in tension over the shallower areas in the north, central and southern sections of the panels.

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 2-5mm/m and in bushland environments at strains of greater than about 5-10mm/m.

Cracks are typically less than about 50mm wide in deeper areas where there is flat or gently undulating terrain but may be larger, up to 100mm wide in areas of lower overburden thickness. Cracks up to 250mm wide are considered possible in the shallower areas of Longwalls 7 and 8 or where there is a significant thickness of topsoil that can erode into a narrow crack in the rock causing the sides to collapse and the crack to widen. Potholes caused by piping erosion into surface cracks may occur in areas where there are dispersive soils and overland flow during and after heavy rainfall events.

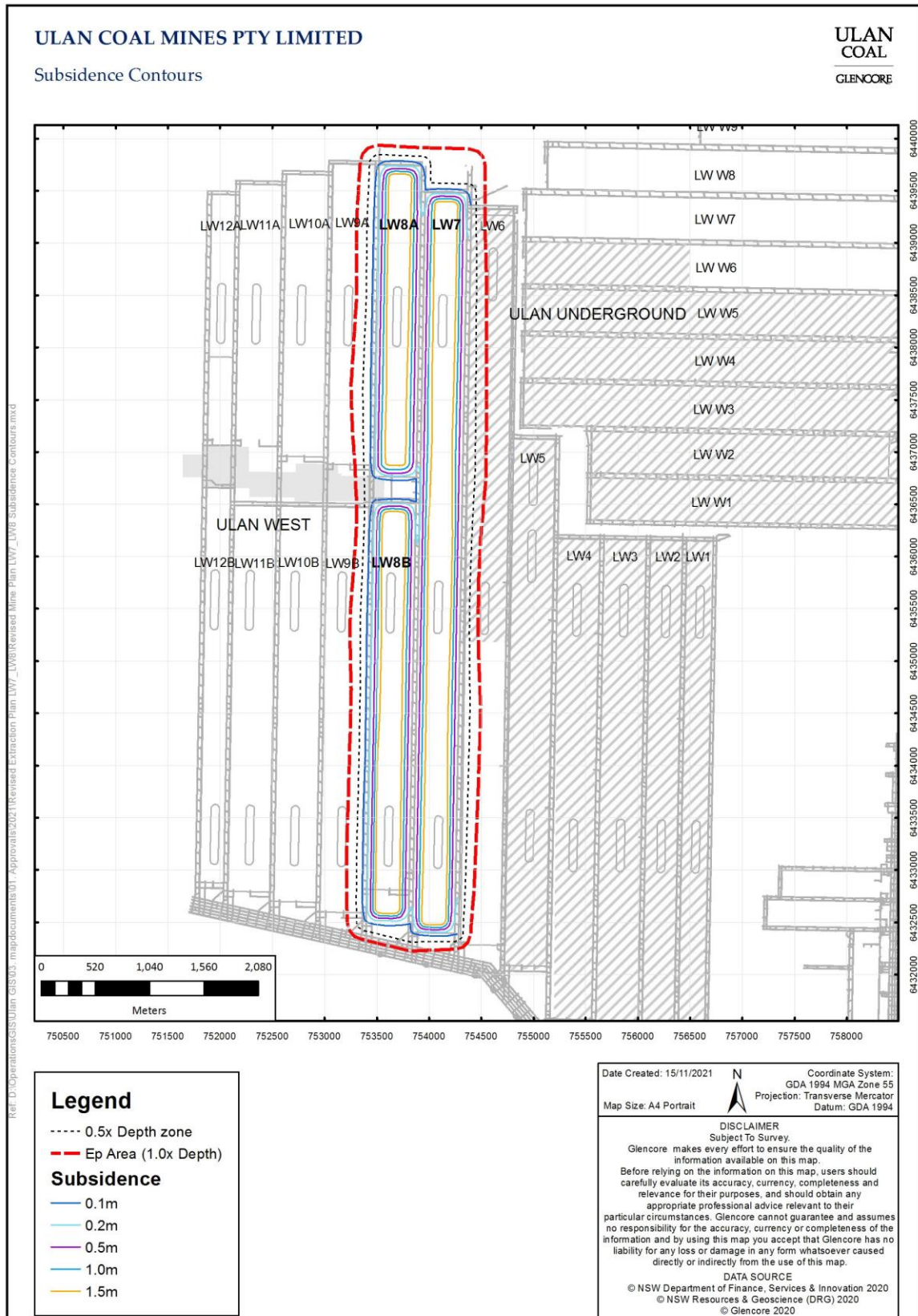
2.2.1.6 Unconventional Subsidence Effects

Unconventional subsidence movements such as valley closure, steps and compression overrides or ripples are all possible in the Application Area for Longwalls 7 and 8. These movements are more likely in the shallower areas and near the top of the Triassic Sandstones. Permanent compression humps and fracturing may become apparent at topographic lows such as drainage channels, particularly where stream channels flow directly on bedrock.

Recent experience at the Ulan Complex indicates that two different styles of unconventional subsidence may occur in the Application Area but the likelihood of either is relatively low. These include step formation and bedding plane shears leading to compression overrides or ripples.

Valley closure and concentration of far field horizontal movements may also occur at topographic low points. The magnitude of valley closure is difficult to estimate with confidence. Horizontal closure of up to about 900mm was measured in the vicinity of Bobadeen Creek above Longwall 26 at UUG. This level of closure is considered likely to be an upper limit on closure that is expected above Longwalls 7 and 8. It is recognised that unconventional subsidence movements associated with steps, compression overrides or ripples, and valley closure may locally exceed the values presented in **Table 7**. These phenomena are generally localised and can be readily identified. The impacts of any locally higher values of tilt and strain associated with these phenomena are not expected to be particularly significant in a bushland setting or in open grazing land.

Figure 5 Estimated Vertical Subsidence Contours Within the Application Area for LW7 and LW8



2.2.2 Potential Environmental Consequences

The potential environmental consequences on natural features (i.e. sandstone formations including cliffs, steep slopes, creeks and groundwater), Aboriginal and European sites, public utilities, private land and UCMPL owned infrastructure for LW7 and LW8 was assessed by SCT (**Attachment G**)⁶.

Subsidence impacts and environmental consequences from the planned mining of LW7 and LW8 are expected to be consistent with or less than assessments for the Project EA and the environment performance experienced to date.

Subsidence impacts to natural and built features on land owned or leased by UCMPL and private properties are expected to be manageable with appropriate management plans (**Section 4** and **Appendix A – I**) in place following consultation and agreement with relevant asset owners and landowners.

Detailed discussion of potential environmental consequences are provided in **Section 4** and component management plans in **Appendix A – I**). The previously assessed and approved subsidence impacts and environmental consequences have been reviewed within the Application Area for the Extraction Plan by the following suitably qualified and experienced persons:

- SCT Technical Report (Subsidence) **Attachment G**
- AGE Technical Report (Groundwater) **Attachment H**
- ELA Technical Report (Biodiversity) **Attachment I**
- OzArk Technical Report (Heritage) **Attachment J**
- Engeny Technical Report (Surface Water) **Attachment K**

The appointment of the suitably qualified and experienced persons were endorsed by the Secretary of the DPIE on the 01 March 2021 and 10 June 2021 (**Attachment C**).

2.3 Risk Assessment

As required by the draft Guidelines for the Preparation of Extraction Plans, a risk assessment workshop was completed on the 11 June 2021 for the development of this Extraction Plan to ensure that appropriate consideration was given to potential subsidence risks and risk management for natural features (including sandstone formations including cliffs, creeks and groundwater), threatened species, native vegetation, Aboriginal and European sites, public utilities, public safety, private land, privately owned built features and UCMPL owned infrastructure.

The risk assessment workshop was attended by key UCMPL personnel from Ulan West and UCMPL's environmental department. Also in attendance was Ken Mills from SCT.

The risk assessment workshop indicated that risks associated with LW7 and LW8 were in the “Low” or “Medium” category, and it was expected that the risks could be managed with implementation of the appropriate mitigation, management and/or control measures in the Extraction Plan. The outcomes from the risk assessment workshop have been incorporated into the relevant key component management plans and this Extraction Plan were applicable (**Section 4.0**).

⁶ As an outcome of the Fist Workings amendment to LW7 (**Section 1.1**) the subsidence effects, impacts and consequences for the first working amendment to LW7 would be the same as currently approved but over a smaller footprint with reduced impacts to surface features in the northern part of the panel (SCT, October 2021).

3. Overview

3.1 Application Area

The Application Area for LW7 and LW8 is shown in **Figure 2** as determined by the area within a distance equal to the overburden depth to the mining horizon (equivalent to a 45° angle of draw) around the outermost goaf edges of the planned panel voids for LW7 and LW8. The Application Area of this size is considered a conservative option for the identification of surface features and assessment of impacts to these features. Any subsidence related movements beyond this distance are expected to be insignificant for all practical purposes (SCT, 2021).

The surface topography above LW7 and LW8 is characterised by the series of ephemeral drainage lines or tributaries of the creeks either side of the Great Dividing Range. Steep slopes and sandstone formations (including cliffs) are prominent along the sides of some of these drainage channels, in particular the northern side of Brokenback Creek. The majority of the surface within the Application Area is undeveloped bushland with areas of cleared or semi-cleared land (SCT, 2021).

3.1.1 Land Ownership and Land Use

The majority of the land within the Application Area is owned by UCMPL or Crown land leased and controlled by UCMPL. The remainder is private property owned by two landholders (**Figure 2**).

The total area of the Application Area is approximately 942Ha. Approximately 30.3% of the land within the total Application Area is privately owned; 6.4% or 59.9Ha on the Woodbury Property and 23.9% or 225.4Ha on the Farris Hill Property.

The northern portions of land owned and/or leased by UCMPL within the Application Area is cleared or semi cleared land suitable for grazing purposes. The southern portions of land owned and/or leased by UCMPL is largely undeveloped bushland with no significant agricultural or mining related activity (other than environmental monitoring) currently in progress.

Around 80% of the section of Woodbury Property within the Application Area is cleared or semi-clear land suitable for grazing purposes. About 60% of the section of Farris Hill Property within the Application Area has been cleared for grazing and the remaining 40% is undeveloped bushland.

3.1.2 Natural Features

The major natural features within the Application Area include sandstone formations and a number of ephemeral watercourses and drainage lines that straddle the Great Dividing Range (**Figure 6**). In the north and central parts above LW7 and LW8, Mona Creek⁷ flows to the north into the Talbragar River and Brokenback Creek flows to the west into Cockabutta Creek and then onto the Talbragar River. In the far south of the Application Area, tributaries of Ulan Creek flow to the east toward the Goulburn River. For further information regarding drainage lines and creeks refer to **Section 4.1**.

Sandstone formation outcrops are generally more frequent in the central and southern parts of Application Area adjacent to Brokenback Creek and tributaries of Ulan Creek. These formations host

⁷ As an outcome of the Fist Workings amendment to LW7 (**Section 1.1**), there will be no physical impacts to the ground surface in the main channel of Mona Creek (SCT, Oct 2021).

a variety of Aboriginal heritage sites (**Section 3.1.3**). Most of the sandstone formations are less than 5m high and classified as steep slopes but there are areas where cliff formations are greater than 10m high. The Project EA defines continuous formations with a height greater than 10m and a slope greater than 66°, as a cliff (**Figure 6**). Steep slopes are defined as an area of land having a natural gradient of between 33° and 66°.

Sandstone cliff formations directly above LW7 and LW8 are limited to short sections above LW7 and LW8B on the northern side of Brokenback Creek. Other short areas of cliff line within the Application Area are located above LW6 adjacent to an Ulan Creek tributary and within the Brokenback Conservation Area (BCA). The section of cliff line in the BCA is outside the 0.5 depth zone for LW8A and LW8B and above the barrier of coal designed to protect specific Aboriginal heritage sites within the BCA. For further information regarding cliffs refer to **Section 4.3**.

Other sandstone outcrops within the Application Area are by definition steep slopes and occur on both private property and on areas owned or leased by UCMPL.

3.1.3 Groundwater

Panels LW7 and LW8 are within the approved mining area and thus the same description of the hydrogeological regime applies (AGE, 2021). The primary groundwater sources in the region are the:

- The unconsolidated alluvial aquifers along the creek lines in some areas host shallow unconfined aquifers of limited extent;
- The shallow regolith and weathered rock profile that hosts perched unconfined groundwater during extended wet periods. It is likely that these perched aquifers feed baseflow of the tributaries to the Goulburn and Talbragar Rivers; and
- Deeper hard rock aquifers that contain the Permian coal measures and the Triassic and Jurassic units can be unconfined, semi-confined and confined aquifers where groundwater is held predominantly as interstitial storage. There has been extensive depressurisation of these hard rock aquifers within and surrounding the Ulan Mine Complex, as a result of previous and current mining operations.

There are 45 registered private bores/wells within the vicinity of the operations (with PB02 now being owned by UCMPL). These bores vary in condition and are subject to varying degrees of use. The majority of bores are screened in the Triassic overburden units that comprise the sandstone aquifer that provides better quality groundwater, as a result, the Triassic water table aquifer is a focus of any groundwater impacts (AGE, 2021).

Ecological surveys have been undertaken on site to assess the potential for Groundwater Dependent Ecosystems (GDEs) and no significant GDEs have been mapped within the project approval boundary. The Drip is a natural feature that hosts a localised GDE; this site is located approximately 2 km east of the UUG longwall footprint. The Drip is an area of localised groundwater discharge sustained by rainfall recharge to the Triassic units that overly the Illawarra Coal Measures. Depressurisation of the Triassic strata has already occurred due to mining at Ulan and no adverse impacts at The Drip have been observed. Consequently, mining LW7-LW8 will not impact The Drip (AGE, 2021).

3.1.4 Heritage Sites

Approximately 179 Aboriginal heritage sites are within or in close proximity to the Application Area (**Figure 7**). The type of sites with the largest frequency are rock shelter sites with artefact scatters and isolated find. Grinding grooves and scarred tree sites also present Extraction Plan Area.

Four rock shelter sites and an artefact scatter within the BCA are in the Application Area but the rock shelter sites, including site (Ulan ID#192 – BB5) are outside the 0.5 depth zone for LW8A and LW8B.

The Mona Creek rock shelter sites (MC23 to MC30 also referred to as Ulan ID#180 to 187) are outside the Application Area for LW7 and LW8 (**Figure 7**)

Two European heritage sites, identified as ID191 and HS96D, are located within the Application Area. These sites are adjacent to each other, at the cliff formation and rock shelter site Ulan ID#191 (BB4), above the northeast corner of LW8B.

3.1.5 Built Features

There are two bores/wells for groundwater extraction within the Application Area. One is located on the Woodbury Property and the other is located on UCMPL land (**Figure 6**).

Public utilities⁸ or public amenities identified within the Application Area are limited to an Essential Energy overhead powerline, Telstra telecommunication cables and state survey control stations. The overhead powerline and a telecommunications cable that service the Woodbury Property and a UCMPL owned property, traverse the surface south from Blue Springs Road and enter the Application Area in the north and continue over the start of LW7 and LW8 (**Figure 6**).

Two state survey marks are located above LW 8B. A total of 13 survey marks that may be affected by subsidence movements from previous mining and the planned mining of LW7 and LW8 are within 3km of the Application Area (**Figure 6**).

The two private properties within the Application Area contain a number of features likely to be sensitive to subsidence impacts. The residential dwelling and outbuildings on the Woodbury Property are directly above the western side of Longwall 7. The residential site on the Farris Hill Property is located more than 1km to the west of Longwalls 7 and 8 well outside the Application Area. The former Petzl residence (Billir) is above Longwall 8A but the property is now owned by UCMPL and the residential building (Billir) is not currently occupied.

Other agricultural infrastructure is limited to farm dams⁹ and fencing located on the Woodbury, and Farris Hill and former Petzl properties and two bores or wells: one each on the Woodbury Property and the former Petzl property.

The major mining related infrastructure within the Application Area is a small diameter ventilation shaft located in the northeast corner of the Application Area adjacent to Longwall 7. Mine dewatering bores, with pumping equipment and other water management installations are located to the east of this shaft and primarily outside the Application Area. Other mining related infrastructure within the

⁸ As an outcome of the First Workings amendment to LW7 (**Section 1.1**), there will be a reduced impact to the overhead powerline with one less pole to be mined under and reduced impact to the Telstra cable with a shorter section of the cable mine under (SCT, Oct 2021).

⁹ As an outcome of the First Workings amendment to LW7 (**Section 1.1**), there will be no physical impacts to ground level at the high-water mark of the Etheridge dam (SCT, Oct 2021).

Application Area is limited to access roads/four wheel drive tracks, owned and maintained by UCMPL, that traverse the surface providing access to environmental monitoring installations within the area and mining infrastructure outside the area.

3.1.6 Biodiversity

Vegetation throughout the LW7 and LW8 Application Area consists of remnant woodland / forest and historically cleared grassland currently utilised for agriculture. Remnant woodland / forest throughout the LW7 and LW8 Application Area has been subject to minor historical logging, particularly of ironbark species; however, remains in a high condition state. Several Plant Community Types (PCTs) are present throughout the Application Area, including two (2) PCTs listed as a Critically Endangered Ecological Community (CEEC) under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) i.e. PCT 618 (White Box x Grey Box - red gum - Rough-barked Apple) and PCT 281 (Rough-Barked Apple - red gum - Yellow Box woodland) (**Figure 14**).

Several threatened species listed under the BC Act and / or the EPBC Act have been previously recorded (DPIE 2021) within the LW7 and LW8 Application Area, including:

- Painted Honeyeater (*Grantiella picta*) listed as vulnerable under the BC Act and the EPBC Act.
- Grey-crowned Babbler (eastern subspecies; *Pomatostomus temporalis temporalis*) listed as vulnerable under the BC Act.
- Glossy Black-cockatoo (*Calyptorhynchus lathami*) listed as vulnerable under the BC Act.
- Speckled Warbler (*Chthonicola sagitta*) listed as vulnerable under the BC Act.
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) listed as vulnerable under the BC Act.
- Scarlet Robin (*Petroica boodang*) listed as vulnerable under the BC Act.
- Little Lorikeet (*Glossopsitta pusilla*) listed as vulnerable under the BC Act.

Numerous cliff lines are present within the LW7 and LW8 Application Area. Umwelt (2009) identified a range of threatened fauna species within the greater UCMPL Project Approval area that are reliant on cliff line and cave habitat. Desktop assessment of cliff lines and other ecological values present indicates that suitable habitat exists within the Application Area for the following cliff line dependent species:

- Brush-tailed rock-wallaby (*Petrogale penicillata*), which is reliant on rocky cliff line areas as refuge habitat from predators; and,
- Threatened microbat species, in addition to the previously recorded Large Bent-wing Bat, that are reliant on caves and associated cliff line areas for breeding and roosting habitats, including the:
 - Eastern Bentwing-bat (*Miniopterus schreibersii*).
 - Little Pied Bat (*Chalinolobus picatus*).
 - Eastern Cave Bat (*Vespadelus troughtoni*).
 - Large-eared Pied Bat (*Chalinolobus dwyeri*).

Figure 6 Built and Natural Features Within the Application Area

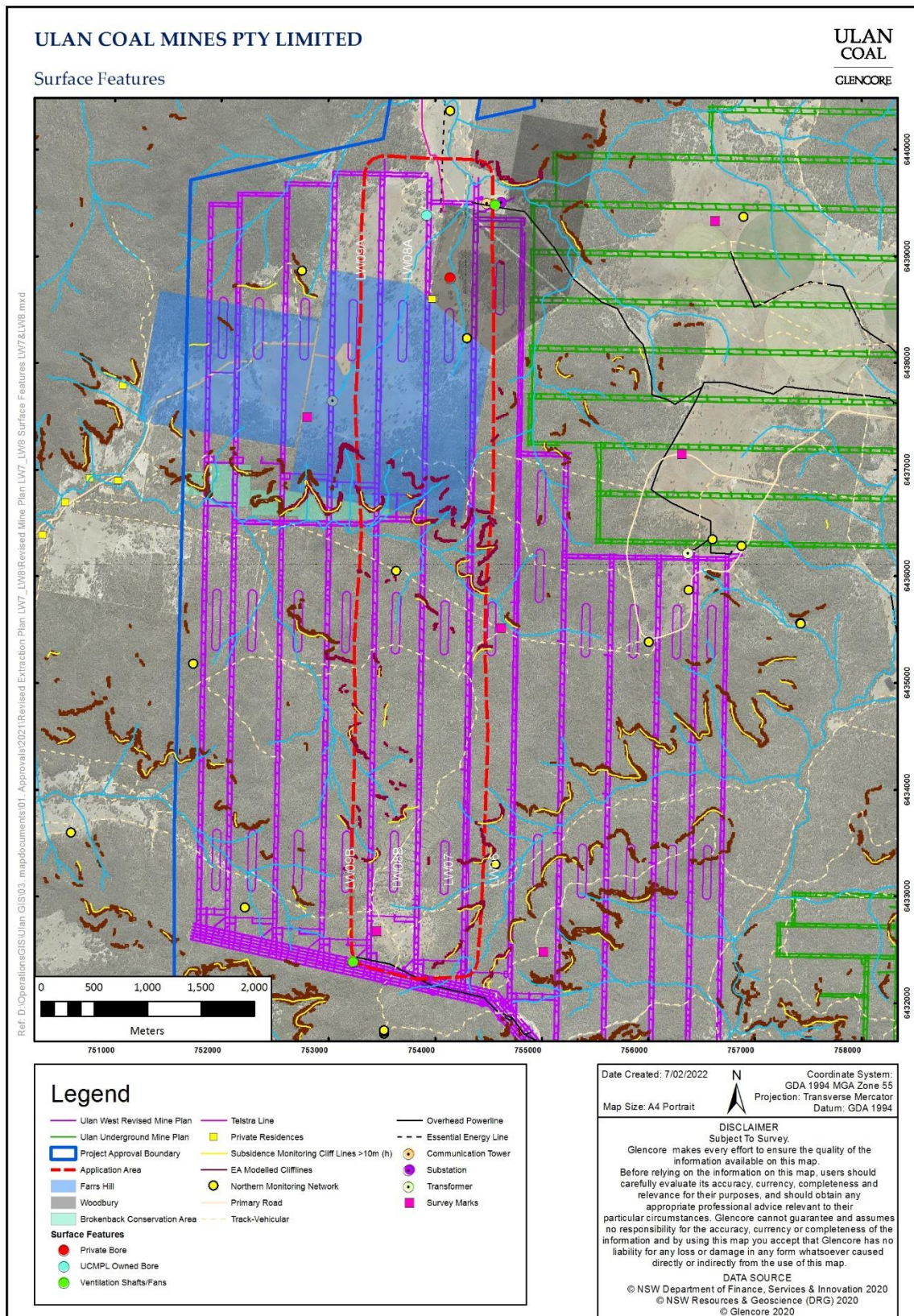
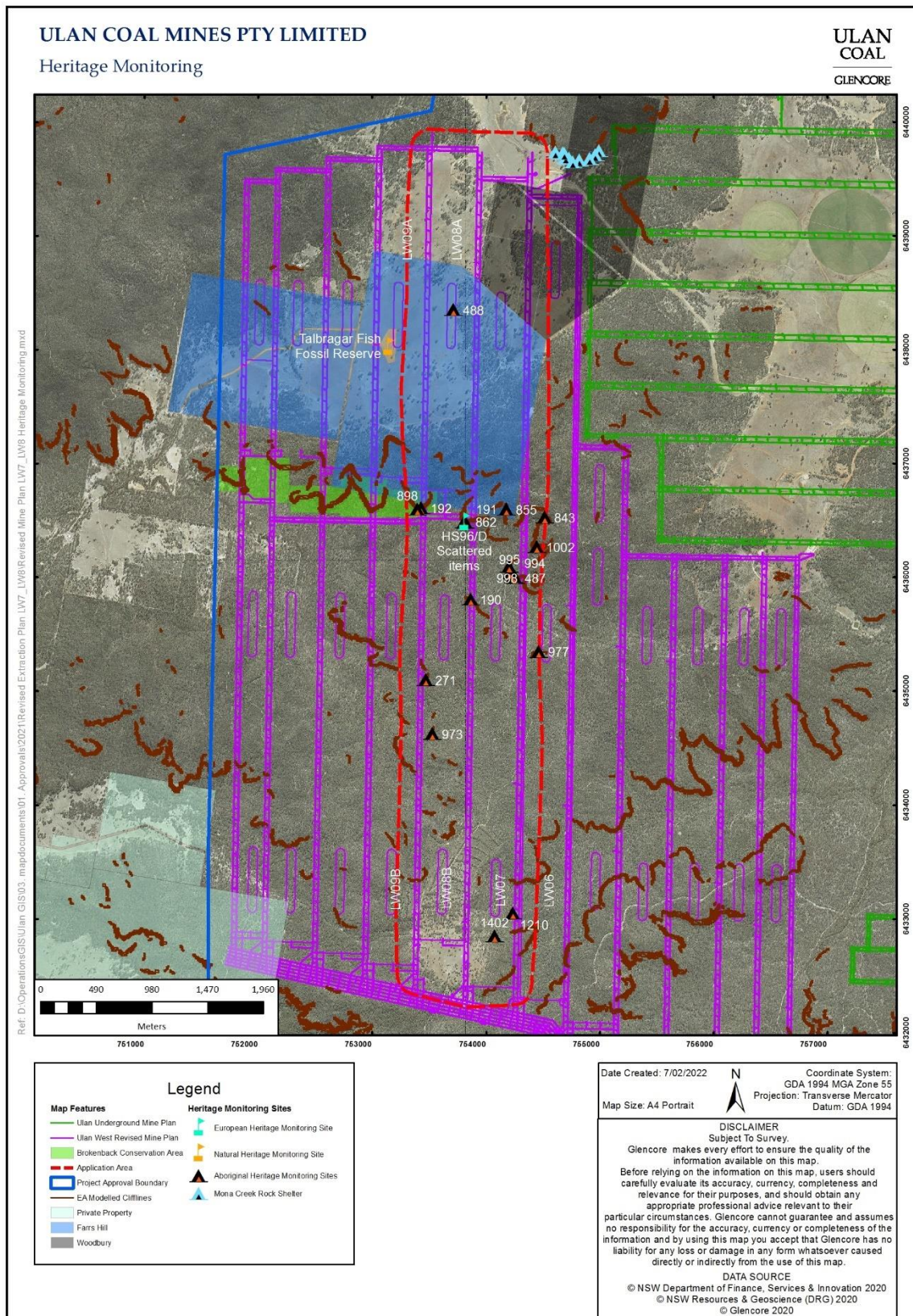


Figure 7 Heritage Features Within and in the Vicinity of the Application Area



3.2 Mine Planning and Design

The current approved Ulan West mine plan longwall panels run perpendicular to the Ulan Underground longwall panels, nominally a north-south alignment (**Figure 3**). Underground mining commenced in the most easterly panel (LW1) and progresses to the west finishing at LW12. The first four longwall panel widths (i.e. LW1 to LW4) range from approximately 250m to 400m (**Table 8**). The remaining longwall panel (i.e. LW5 to LW12) widths are approximately 400m. Access to the Ulan West mine is via a series of portals located in the highwalls of the Ulan West Box Cut.

Longwall panels LW1 – LW8 range in length from approximately 4.6km to 7.3 km. Longwall panels LW9 to LW12 range in length from 6.6km to 7.1km and are not continuous and shorter by design, providing conservation outcomes (**Figure 2**) by avoiding impacts on 58 hectares of land known as the Brokenback Conservation Area (BCA).

An exclusion zone avoids impacts to significant rock shelter sites within this area. The BCA is located above longwall panels LW8 to LW12 as shown on **Figure 2** and provides conservation outcomes for Aboriginal heritage sites and potential threatened fauna species. The Ulan West mine plan also avoids impacts to the Mona Creek rock shelter sites which are outside the maximum predicted subsidence impact zone.

The Ulan West mine plan is designed to avoid impacts to Ulan Creek and the Old Ulan Village. Ulan Creek flows as a third and fourth order creek system along the east of the goaf edge of LW1, approximately 80m at its nearest point, near the Old Ulan Village. The overburden depth in this area is approximately 70m, therefore Ulan Creek has been protected by design to be further than half depth from the goaf edge of LW1 (**Figure 3**).

3.2.1 Geology and Stratigraphy

The Ulan Mine Complex is at the western limit of the geological formation known as the Sydney Basin and at the southern end of the Gunnedah Sub-basin. Ten coal seams (nine in the west) occur within the Permian Coal Measures at Ulan Coal Mine; eight occur above (seven in the west) and one below the Ulan coal seam. These seams range in thickness from approximately 0.4 to 10 m (with the Ulan coal seam being thickest). A stratigraphic column showing the geology of the Ulan areas is provided in **Figure 8**. Other seams within the mining leases have high ash content.

The Ulan Seam consists of ten separate plies, which are consolidated into four working sections within the open cut. The working sections are separated by thin claystone horizons.

Within the project area, the Ulan Seam generally dips uniformly towards the north-east at between one and two degrees. Ulan West will mine the lower section of the Ulan Seam, which has low ash content and is mostly between 2.7 and 2.8m thick. However, the seams can be as low as 2.4 m in the northwest and up to 3.2 m thick in the south. The estimated coal resource remaining in the current approved Ulan West mine plan, at the end of 2020, was approximately 77.6Mt.

3.2.1.1 Geological Conditions

There were a number of significant geological structures identified within the Project Area. Those relevant to the Application Area, identified during the preparation of the Project EA are shown in **Figure 10**. These geological structures included:

- **Faults** (Extraction Planar rock fractures which show evidence of relative movement): Close to the western boundary of the mining lease is an east-west trending fault, that was previously interpreted as outside of the mining lease but has now been indicated as within the lease area. Faults occur over the northern portion of LW2 to LW6 but are not anticipated to impact mining of the panels.
- **Plugs** (volcanic landforms created when magma hardens within a vent on an active volcano and subsequently exposed by erosion): Two plugs are present within Ulan West, namely the Box Hill plug located along the alignment of the proposed main headings for the Ulan West mine and the Wongaroo plug located within the most westerly panel of the Ulan West mine. These plugs do not impact LW1 to LW8 as LW8 will be shortened to avoid this structure.
- **Sills** (are horizontal sheets of intrusive igneous rock): The Wombat and Echidna Sills are both located approximately 300m east of LW1 and will not impact mining in Ulan West.
- **Diatremes** (are a pipe like vertical volcanic vent filled with broken and cemented rock created by a single high pressure magmatic explosion): One diatreme has been identified in the Ulan West mine and is considered to be a high mining risk area and will be subject to further investigation. The diatreme is located over LW4 (**Figure 9**).

Geological investigations to identify, as well as characterise, any structures in the coal seam that may be related to faulting or seam intrusions common to the Ulan Coal Seam have been completed for LW1 to LW8. Geological investigations at UWO will continue for the remainder of the panels.

3.2.1.2 Floor and Roof Conditions

For Ulan West, the development roof will be to a penny band to give a 3.2m roadway height. On the longwall the working section will be to the same penny band and leave some of the DWS in the floor giving an average extraction height of 2.9m.

Available information and experience suggests that the immediate roof and floor strengths and bedding structures at Ulan West will allow the use of current Australian practices. The overburden units are conducive to good caving conditions. The extraction depths will be within the range of Australian longwall experience.

There is no evidence of low strength floor that would rule-out longwalling, with sonic derived strength values for the immediate 1m of the stone floor below the Ulan Seam generally greater than 35 Megapascals (MPa) over the majority of the Ulan West area.

Figure 8 Stratigraphic Column

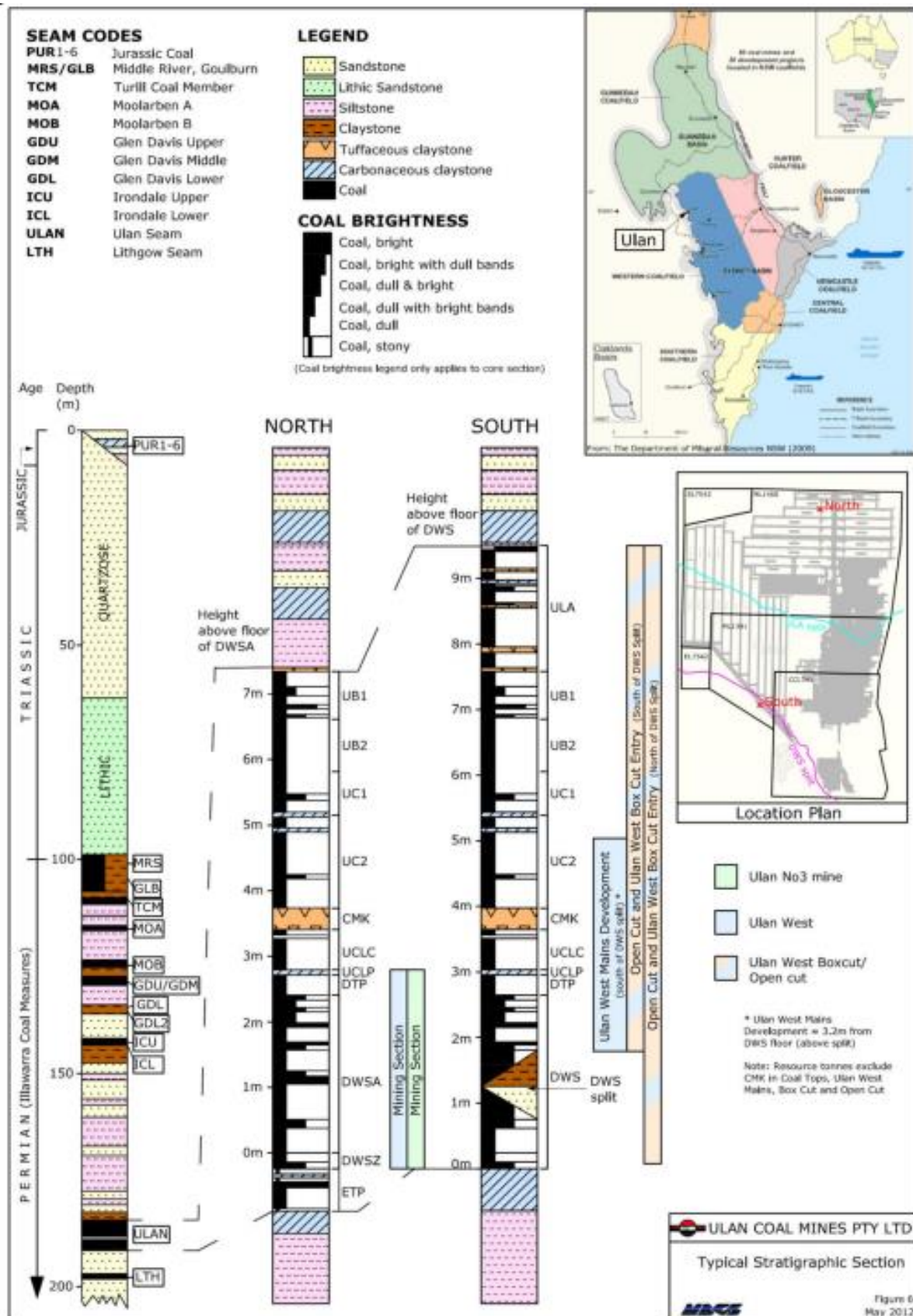
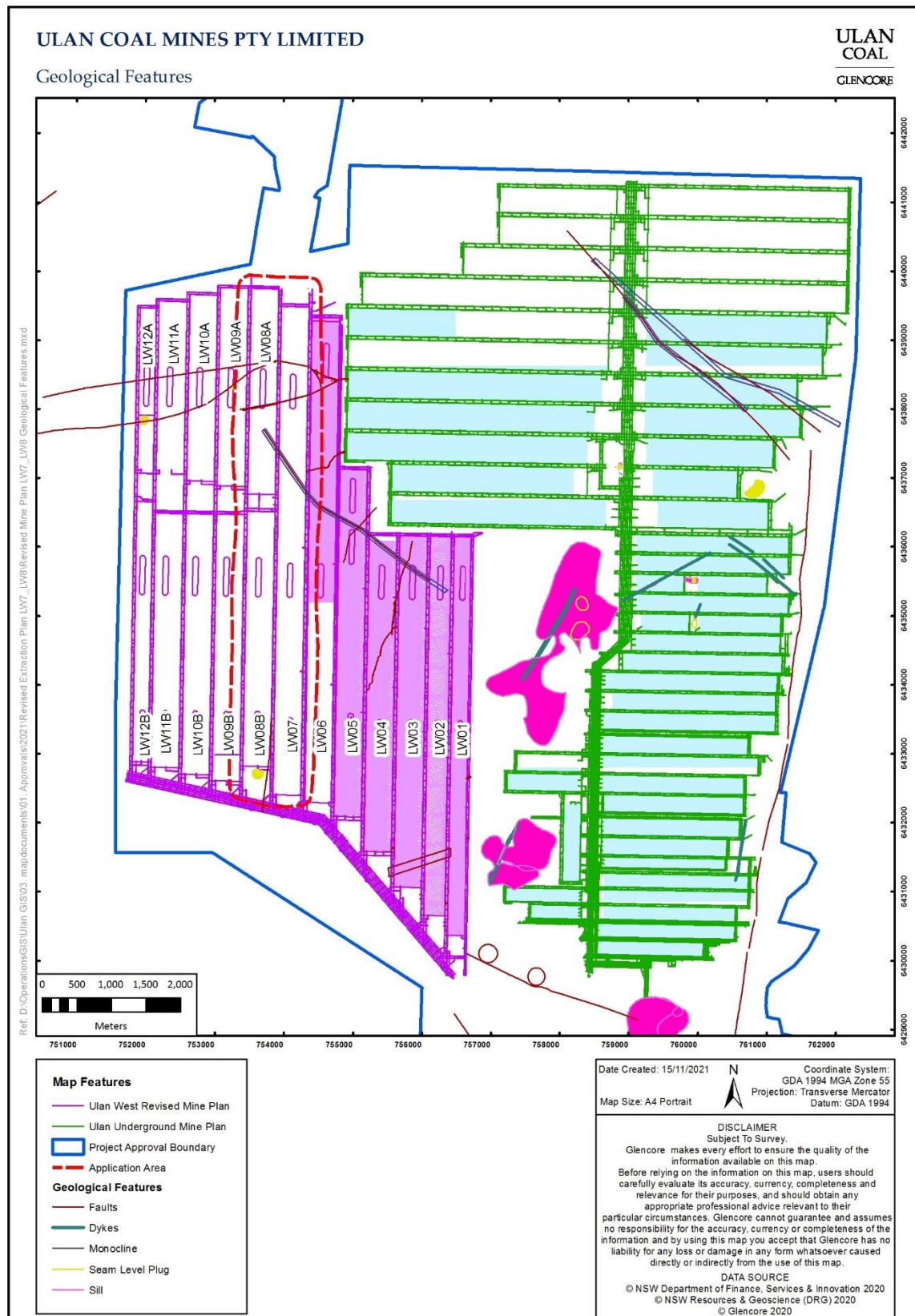


Figure 9 Geological Structures



3.2.2 Mining Geometry and Parameters

Table 8 provides information for LW1 to LW8 within the Extraction Plan Area including panel dimensions, depth of cover and Run of Mine (ROM) coal to be extracted. Detailed mine layout drawings are provided in Appendix I including the Plans 1 to 8 as required under the Draft Extraction Plan Guidelines.

Table 8 Longwall Panel Parameters

	LW1	LW2	LW3	LW4	LW5	LW6	LW7	LW8A	LW8B
Gate Road Width (m)	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Gate Road Height (m)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Maingate (MG) Chain Pillar Width (m)	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Tailgate (TG) Chain Pillar Width (m)	24.6	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
Tailgate (TG) Chain Pillar Length (m)	100	100	100	100	100	100	1000	100	100
Longwall Void Width (m) (Ribline to GOAF Edge)	240	303.7	400	400	411	411	411	411	411
Longwall Void Length (m)	5787	5504	5106	4593	5049	7032	7092	2989	4015
Longwall Extraction Height (m)	2.7-3.2	2.7-3.2	2.7-3.2	2.7-3.2	2.7-3.2	2.7-3.2	2.8-3.1	2.8-3.1	2.8-3.1
Longwall Extraction Height Average (m)	2.9	2.9	3.0	3.0	3.05	3.05	2.95	2.95	2.95
Minimum Depth of Cover (m)	65	75	85	116	130	145	155	160	170
Maximum Depth of Cover (m)	235	240	234	221	220	225	210	220	195
ROM Coal Extracted (Mt)	6.2	7.1	8.8	7.9	8.9	12.6	13.1	5.1	6.8

Notes: LW8B void length truncated approximately 450m due to Box Hill Plug (refer to **Figure 9**).

3.2.3 Mining Method

Underground mining at Ulan West uses standard longwall mining methods and targets the economic portion of the Ulan Coal Seam, known as the D Working Section (DWS). Access to the mine is via the 6 portals located in the Ulan West Box Cut.

Primary extraction, known as ‘development,’ utilises continuous miners and shuttle cars to develop roadways which form the longwall panels. First workings to develop LW1 commenced in March 2012. The development mining equipment for Ulan West typically includes, but not limited to:

- Continuous miners;
- Shuttle cars;
- Breaker feeders;
- Auxiliary fans;
- Graders;

- Underground personnel transporters; and
- Underground Load Haul Dumps.

Secondary extraction will utilise retreat longwall mining methods. The longwall extraction mining equipment for Ulan West typically includes, but not limited to:

- A shearer to cut coal from the face of the seam;
- A face conveyor to collect sheared coal and carry it to a coal sizer and stage loader;
- A panel conveyor to transfer the coal to a trunk conveyor in one of the main headings; and
- Hydraulic roof supports to support the roof in which staff and equipment operate.

3.2.3.1 Coal Handling and Processing

ROM coal from Ulan West is conveyed to the surface via a conveyor network and discharged to the ROM Hub Stockpile area, where the coal is reclaimed and surface conveyed to the Underground ROM Stockpile area.

From the Underground ROM Stockpile area the coal is reclaimed, crushed and transferred by surface conveyors directly to the product stockpile area. Underground coal requiring washing can be transferred by truck from the Underground ROM Stockpile area to the Coal Handling Preparation Extraction Plant (CHPP), where the coal enters the Open Cut conveyor system for processing in the CHPP.

Product coal is reclaimed and transferred by surface conveyors from the product stockpile area to the Rail Load Out Bin and loaded into rail coal wagons and transported to the Port of Newcastle by rail.

3.2.3.2 Previous and Future Mining

Previous underground workings in the vicinity of Ulan West within the Ulan Coal Seam have been associated with Ulan Underground (**Figure 3**). The previous workings include extracted longwall panels LWC, LWE, LWF and LWG (North 1 Panels), LW West1 (W1), LWW2, LWW3 and LWW4, LWW5, LWW6 and LWW7 (in progress). At its nearest point, a coal barrier of 60 (m) wide is between Ulan West LW6 and Ulan Underground LWW3 to LWW7.

The extracted North 1 Panels are located to the east of the Extraction Plan Area and are approximately 540m to the east from the goaf edge of LW1.

Future underground mining areas include longwall panels approved to mine at Ulan West and Ulan Underground as displayed in **Figure 3**.

3.2.4 Mining Schedule

Ulan West operates seven days a week, 24 hours a day on a rotating shift basis with production currently being undertaken on weekdays only. The completed sequence of longwall mining of the Extraction Plan and the anticipated start and completion dates of LW7 and LW8 are summarised in **Table 9**. Underground mining at the Ulan West mine is currently scheduled to conclude in 2031.

Table 9 Completed and Proposed Longwall Schedule

Ulan West Longwall	Commencement Date	Duration of Mining	Completion Date
LW1	19 May 2014*	12 Months	01 May 2015*
LW2	28 May 2015*	12 Months	25 May 2016*
LW3	03 July 2016*	15 Months	03 October 2017*
LW4	3 November 2017*	14 Months	21 December 2018*
LW5	01 March 2019*	14 Months	14 June 2020*
LW6	11 August 2020*	22 Months	07 June 2022^
LW7	11 July 2022^	21 Months	04 April 2024^
LW8	13 May 2024^	22 Months	10 February 2026^

Notes: * Actual ^ Forecast

3.3 Subsidence Management Approach

Table 10 provides a summary of how the potential environmental consequences from longwall mining LW1 to LW8 will be managed to achieve the requirements in the Project Approval 08_0184 and other relevant approvals.

Table 10 Summary of Management Measures

Summary of Management Measures		Section
Mine Design	The goaf edge of LW1 is approximately 80m from Ulan Creek.	Figure 7
	The goaf edge of LW1 is approximately 500m from the 'Valley Way' Grinding Groove Conservation Area.	Section 3.2
	The chimney at Old Ulan Village is located by mine design a distance greater than half depth from the edge of LW1 goaf edge at an overburden depth of approximately 70m.	Section 4.6
	The Mona Creek Rock Shelter Sites (ID180-187) are located approximately 75m. to the east of the Application Area of LW7 and LW8.	Figure 7
	The Brokenback Conservation Area is protected by the barrier coal below.	HMP
	LW1 to LW5 do not undermine non-UCMPL owned built features.	Technical Report
	The majority of land above Application Area and the Extraction Plan Areas is located in remote bushland, on land largely owned and/or controlled by UCMPL.	(Attachment G)
	Privately owned land located over the northern end of LW6 to LW8 will have PPSMPs prior to commencement secondary extraction.	Section 2.1.2
	Public utility owners (Telstra and Essential Energy) will have "written agreements in place" prior to commencement secondary extraction of LW7 and LW8.	Section 2.1.4
	Reinstate and resurvey the State survey marks after cessation of subsidence movements.	BFMP LW1-8
	Public access within the Application Area and the Extraction Plan is restricted by locked gates and fencing.	Section 2.1.4
	Access is also restricted due to due to the remote location.	PSMP LW1-8

Table 10 Summary of Management Measures (cont.)

Summary of Management Measures		Section
Remediation Measures	Remediation of subsidence impacts or environmental consequences or hazards to public and employee safety, detected by subsidence monitoring, will be in consideration of the potential impacts of the unmitigated impact (including potential risks to safety and the potential for self-healing or long-term degradation) and the potential impacts of the remediation.	Section 4.8 RMP LW1-8
Subsidence Monitoring	Subsidence effects monitoring in the form of visual and survey monitoring is conducted to confirm predictions of subsidence effects and identify subsidence impacts, assess against subsidence performance measures and environmental consequences.	Section 5.0 SMP LW1-8
Adaptive Management	Adaptive management approach by reviewing and evaluating the effectiveness of management strategies, and adjusting management strategies to improve performance, particularly following an exceedance of a subsidence impact performance measure or detection of an unexpected impact	Section 6.2
Contingency Plans	Implement contingency plans where a potential exceedance of a subsidence impact performance measure or an unexpected impact is detected including consideration of identified potential contingency measures.	Section 6.1

4. Key Component Management Plans

As required by the Guidelines, the Extraction Plan must comprise of a set of six key component plans which follow a specific structure to comply with the Guidelines. In consultation with the DPIE (**Section 2.1.1**), UCMPL sought to improve the structure of the Extraction Plan by incorporating several of the Ulan Mine Complex's existing and approved Environmental Management Plans (EMPs) required by PA08_0184, including the Water Management Plan¹⁰ (WMP), Biodiversity Management Plan (BMP) and Heritage Management Plan (HMP). The WMP, BMP and HMP have been developed to monitor and manage subsidence related impacts as required by PA08_0184¹¹.

The revised structure of the Extraction Plan with EMPs and key component management plans are provided in **Section 1.4**. **Section 4** summarises the main elements from the relevant EMPs and key component management plans specific to both the Application Area and the Extraction Plan Area. **Section 4** also includes the approved and revised subsidence impacts, management, monitoring, risk mitigation, performance indicators, contingency measures and figures relevant to the applicable EMP or key component plan.

4.1 Water Management Plan (Surface Water)

4.1.1 Overview

The purpose of the Surface Water Monitoring Plan (SWMP) (**Appendix A**) is to ensure compliance with the conditions of PA08_0184, provide details of the program to measure and assess changes in stream health and channel stability that could be attributable to UCMPL's mining activities and establishes the monitoring and reporting requirements to enable water quality and quantity trends to be reported against Environment Protection Licence (EPL) 394 conditions. Impacts to surface water, as predicted in the Project EA as a result of subsidence include:

- Surface cracking within watercourses reducing surface flows and the duration that pools retain water following rainfall events;
- Changes to catchment boundaries, out of channel flows and additional areas of ponding; and
- Local changes to the longitudinal slope of watercourses within the subsidence affectation zone.

Further details of local surface water systems (**Section 3.1.2**), monitoring, management and assessment criteria are provided in Section 3 of the SWMP (**Appendix A**).

4.1.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). The subsidence performance measures for water are '*no greater environmental consequences that predicted in the EA for Ulan Creek, Mona Creek and Cockabutta Creek*'. The assessment of the subsidence performance measures for water are provided in **Section 4.1.5**.

¹⁰ The WMP as a collective for the Surface Water Monitoring Program (SWMP), the Groundwater Monitoring Plan (GWMP) and the Surface Water and Groundwater Response Plan (SWGWRP) as required by PA08_0184.

¹¹ The WMP, BMP and HMP may be revised periodically as required by PA08_0184.

4.1.3 Approved Impacts

The following summary of subsidence related impacts to Ulan Creek, other waterways and ephemeral drainage lines, were described in the Project EA, which stated [extract]:

- *Predicted subsidence impacts resulting from the proposed underground mining operations of Ulan No. 3 and Ulan West may potentially affect Ulan Creek, Bobadeen Creek, Curra Creek, Mona Creek and Cockabutta Creek catchments.*
- *The subsidence affectation area includes numerous ephemeral drainage lines. As discussed in Section 5.2, the mine plan has been configured to avoid subsidence impacts on the main channel of Ulan Creek. Detailed terrain analysis to compare pre and post mining topography has confirmed that the predicted subsidence impacts will not result in any substantial ponding or drainage realignment within the project area.*
- *Ulan Creek located immediately to the east of the Ulan West mining area is protected by a barrier that is greater than 26.5° angle of draw plus 40m. Ulan Creek is considered unlikely to be significantly impacted by the proposed mining. Some small horizontal movements may occur toward the goaf, but the character and capacity of the creek to maintain flow is unlikely to be affected by these movements.*
- *There are numerous ephemeral watercourses located within the project area. Mining below ephemeral creeks is considered to have potential to reduce surface flows and the duration that pools retain water following a rainfall event. Over time, fine grained material is expected to gradually fill surface cracks and reduce the hydraulic conductivity of the immediate surface strata as observed in Ulan Creek over the medium term.*

The following summary of subsidence related impacts to waterways and ephemeral drainage lines, were described in MOD 2 which stated [extract]:

- *The proposed amendments will result in minor localised changes to subsidence predictions made as a part of the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009). These changes however, will not significantly change the subsidence impacts previously described in the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009) or the Modification of Ulan Coal Continued Operations (Umwelt 2011).*
- *Due to no changes proposed to the eastern edge of the first Longwall Panel, there are no change to the assessed impacts on Ulan Creek as a fourth order stream running parallel to the Ulan West mine plan and the European heritage site, of Old Ulan Village.*

The following summary of subsidence related impacts to waterways and ephemeral drainage lines, were described in MOD 3 which stated [extract]:

- *The proposed modification will result in an approximately 13 per cent increase in the total area of subsidence affectation associated with the UCCO Project. The range of predicted subsidence impacts within this additional area of subsidence affectation are generally consistent with those approved under Project Approval 08_0184.*
- *The predicted subsidence has the potential to impact surface cracking within watercourses, on remnant ponding, as well as changing catchment boundaries and watercourse long sections.*
- *It is considered that the proposed modification to the Ulan West mine plan will have impacts comparable to those previously assessed as a part of UCCO Project EA (Umwelt, 2009).*

The following summary of subsidence related impacts to waterways and ephemeral drainage lines, were described in MOD 4 which stated [extract]:

- *The surface water impact assessment indicates that watercourse stability is generally consistent with the approved project. Erosion and sediment controls are appropriate to ensure construction of the surface infrastructure corridor does not impact upon the quantity or quality of surface water.*
- *Remnant ponding is not predicted as a result of the additional subsidence areas, and accordingly surface water availability for downstream water users will not be impacted. The proposed Modification will not result in adverse cumulative impacts on water use, flows or qualities in the surrounding surface water systems.*

4.1.4 Revised Impacts

As required by Condition 26(e) Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area *Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan* (SCT, 2021) (**Attachment G**). The following summary of subsidence related impacts to waterways and ephemeral drainage lines within the Application Area, were described by SCT which stated [extract]:

- *Subsidence impacts to these surface watercourses have so far been consistent with expectations presented in the UCCO Project EA and subsequent modifications. Similar behaviour is expected for watercourses located over the Application Area from the planned mining of Longwalls 7 and 8.*
- *Watercourses in the Application Area are first, second, third and fourth order streams running off the Great Dividing Range. These watercourses are all ephemeral in nature, only flowing during and immediately after heavy rain. Water is observed to pond in clay bottomed pools for a period after rain, but there are no known permanent natural water holes within the Application Area.*
 - *Impacts from the mining of Longwalls 7 and 8 are expected to include¹²:*
 - *diversion of overland flow into sub-surface strata through cracks and lowering of the groundwater possibly causing potholes on flow lines;*
 - *changes to the length of time that ephemeral streams and pools located directly above longwall panels hold water after periods of heavy rain;*
 - *vertical subsidence causing ponding in the flatter areas where the stream gradients are low;*
 - *potential to locally change the course of flow lines in flatter areas;*
 - *nick-point erosion on stream channels where the gradient is locally steepened on the upstream side of longwall panels; and*
 - *compression fracturing and upsidence where sandstone rock strata is exposed in the valley floor.*

Engeny (2021) completed a review of subsidence impacts on surface water for the period from 2017 to 2021 at Ulan West. The review included actual subsidence impacts against predicated impacts and performance indicators within the Extraction Plan. Engeny's assessment of the available monitoring results for the period, concluded there has been no environmental consequences greater than predicted in the Project EA to surface waters. Refer to Engeny's Technical Report in **Attachment K**.

¹² As an outcome of the Fist Workings amendment to LW7 (**Section 1.1**), there will be no physical impacts to the ground surface in the main channel of Mona Creek (SCT, Oct 2021).

4.1.5 Subsidence Performance Indicators & Assessment

Table 11 provides a summary of the subsidence performance indicators to inform UCMPL if the subsidence performance measures for surface water are likely to be exceeded during the secondary extraction within the Application Area. **Table 11** and **Section 4.1.5.1** to **Section 4.1.5.3** also provides a summary of the monitoring from the SWMP (**Appendix A**), that will be undertaken by UCMPL to assess if any of the subsidence performance indicators have been triggered.

Table 11 Surface Water Subsidence Performance Indicators & Assessment

Parameter	Site	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Water Quality: pH EC TSS	Ulan Creek (SW04) Mona Creek (SW10) Cockabutta Creek (SW11)	Monthly and Event Based* (*>30mm in a 24hr period)	Performance indicators will be considered to have been triggered if analysis of surface water monitoring data, against the applicable water trigger values and approved impacts indicates an exceedance of trigger values for pH, EC and TSS for three consecutive months as a result of mining impacts.	The subsidence performance measure for water is exceeded if investigations completed by UCMPL's ECM confirm if any of the surface water subsidence performance indicators triggered are mining related, due to subsidence impacts within the Application Area, as outlined in Table 13 Surface Water TARP .
Stream Health: - RARC - AusRivAS - SIGNAL - Salinity Index	Ulan Creek Mona Creek Cockabutta Creek	Annually	Performance indicators will be considered to have been triggered if analysis of stream health monitoring data and approved impacts indicates a potential deterioration of stream health or data is outside of natural variability as per specialist advice as a result of mining impacts.	
Channel Stability: - Observational Assessment - Drainage Line Characteristics - Vegetation Characteristics - Bank Characteristics - Stability Rating	Representative tributaries of Ulan Creek, Mona Creek and Cockabutta Creek	Pre-mining and annually thereafter for two years	Performance indicators will be considered to have been triggered if monitoring results from the channel stability monitoring identify greater impacts than predicted and/or a deteriorating trend in channel stability compared to pre-mining condition.	

4.1.5.1 Surface Water Monitoring

The Extraction Plan has adopted the following key monitoring components from the SWMP to measure and evaluate the subsidence performance measure for water, including:

- Surface water quality;
- Channel stability; and
- Stream health.

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the monitoring program is provided in the SWMP (**Appendix A**). A summary of the surface water quality monitoring for the Extraction Plan is provided in **Table 12**. The locations of the surface water quality, channel stability and stream health monitoring for the Extraction Plan is provided in **Figure 11**.

4.1.5.2 Water Quality Assessments

UCMPL undertake surface water quality monitoring in accordance with the SWMP. An assessment of the surface water quality triggers in the SWMP (**Table 12**) will be compared against the water quality results from sites SW04, SW10 and SW11. In the event there are three consecutive exceedances of the performance indicators for water quality (**Table 12**) as required by UCMPL's Surface Water and Groundwater Response Plan (SWGWRP), UCMPL will carry out an investigation to determine if the exceedance is mining related or not, as described in **Table 13**.

Table 12 Water Quality Criteria Trigger Assessment Values

	pH	EC (µS/cm)	TSS (mg/L)
Ulan Creek (SW04)	6.5-8.5	900	47
Mona Creek (SW10)	6.4-7.5	177	123
Cockabutta Creek (SW11)	6.5-8.0	350	50

4.1.5.3 Stream Health and Channel Stability Assessments

UCMPL undertake stream health and channel stability monitoring in accordance with the SWMP and BMP. An assessment of stream health and channel stability will include a review of the annual monitoring results against historical monitoring (including the baseline data from the ecological assessments and pre-mining inspections) to identify any potential deterioration of stream health as a result of mining impacts or stability assessments indicating a greater than predicted impact. In the event monitoring identifies a potential exceedance of the performance indicators for stream health or channel stability, UCMPL will carry out an investigation to determine if the exceedance is subsidence related and/or greater than predicted impacts have occurred, as described in **Table 13**.

4.1.6 Contingency Plan

In the event the subsidence performance measures for water as summarised in **Table 11** 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 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for water have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.1.7 Trigger Action Response Plan

UCMPL have developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for

surface water, as required by the Section 4.2 of the SWMP and Section 3.1 of the Surface Water and Groundwater Response Plan (SWGWRP) (**Appendix A**).

Table 13 provides the key trigger, action, response measures for surface water from the SWGWRP that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

Table 13 Surface Water TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Water quality for pH, EC and TSS	Water quality criteria for pH, EC and TSS as displayed in Table 12 for SW04, SW10 and SW11 has been exceeded for three consecutive months.	Trigger	Analysis of surface water monitoring data, against the applicable water trigger values and approved impacts indicates water criteria trigger values (Table 12) have been potentially exceeded for three consecutive months.	Analysis of surface water monitoring data, against the applicable water trigger values and approved impacts indicates water criteria trigger values (Table 12) have been exceeded for three consecutive months.
		Action	Level 1 investigation completed by reviewing monitoring data, field notes, recent meteorological events and UCMPL operational activities to confirm if the three consecutive exceedances are mining related or natural causes. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include additional sampling sites and increase frequency of sampling at established surface water monitoring sites as required by UCMPL's surface water specialist. Investigations completed by ECM. Note: If Level 2 investigations confirm no mining related impacts then proceed to Level 1 Response. Confirmation of a mining impact proceed to Level 2 Response.
		Response	If Level 1 investigation confirms the exceedance is non-mining related, then: - Continue monitoring as required by the SWMP; - Consult with UCMPL's surface water specialist as required if exceedances continue and implement recommendations; - Provide a summary of surface water monitoring results and investigation outcomes within the Annual Review (AR) as outlined in Section 6.3.	If Level 2 investigation confirms the exceedance is mining related, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and surface water specialist to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including: a remedial action plan developed and implemented to address the investigation findings. The remedial action plan is re-assessed if continued elevated results are indicated by the investigation to be a mining source. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of surface water monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3.

Parameter	Criteria	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
				Follow up information to the EPA and DPIE where requested. Continue monitoring as required by the SWMP. If the investigation confirms material harm has been threatened or caused activate the PIRMP immediately.
Stream Health • RCE	Analysis of annual stream health monitoring data for Ulan Creek, Mona Creek and Cockabutta Creek indicating potential deterioration of stream health or data is outside of natural variability.	Trigger	Following the receipt of the annual Stream Health report indicating a decline in Riparian, Channel and Environment (RCE) condition classification at an individual site over two consecutive monitoring periods.	Following the receipt of the annual Stream Health report indicating the decline in RCE condition classification is a result of mining related impacts greater than predicted.
		Action	Level 1 investigation completed with surface water specialist by reviewing the current monitoring results against historical monitoring results (including the baseline data from the 2009 EA), recent meteorological events and UCMPL operational activities to confirm if potential deterioration of stream health are mining related or natural causes. Investigations completed by ECM. Note: If Level 1 investigations are indicating impacts are mining related and greater than predicted, then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include expand stream health monitoring program as required by UCMPL's surface water specialist and ecological specialist. Investigations completed by ECM. Note: If Level 2 investigations confirm no mining related impacts then proceed to Level 1 Response. Confirmation of a mining impact proceed to Level 2 Response.
		Response	If Level 1 investigation confirms the exceedance is non-mining related, then: - Continue stream health monitoring as required by the SWMP; - Consult with UCMPL's surface water specialist as required if deterioration of stream health continue and implement recommendations to improve stream health; and - Provide a summary of stream health monitoring results and investigation outcomes within the Annual Review (AR) as outlined in Section 6.3.	If Level 2 investigation confirms the exceedance is mining related, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and surface water specialist to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including: a remedial action plan developed and implemented to address the investigation findings. The remedial action plan is re-assessed if continued deterioration of stream health are indicated by the investigation to be a mining source.

				Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of stream health monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the EPA and DPIE where requested. Continue monitoring as required by the SWMP. If the investigation confirms material harm has been threatened or caused activate the PIRMP immediately.
Channel Stability - Observational Assessment - Drainage Line Characteristics - Vegetation Characteristics - Bank Characteristics - Stability Rating (3rd Order and above)	Analysis of annual channel stability monitoring within representative tributaries of Ulan Creek, Mona Creek and Cockabutta Creek identify greater impacts than predicted and/or a deteriorating trend in channel stability compared to pre mining condition	Trigger	Following the receipt of annual Channel Stability reports indicating that tributaries have deteriorated from the pre-mining condition assessment, or 3rd order streams within the subsidence affection area (Ulan Creek and Mona Creek) have declined in stability class (Activity Rating) when undermined for two consecutive monitoring periods based on the CSIRO <i>Ecosystem Function Analysis – Ephemeral Stream Assessment</i>.	Following the receipt of annual Channel Stability reports indicating deterioration is a result of greater than predicted mining related impacts.
		Action	Level 1 investigations initiated with UCMPL's subsidence engineer to confirm if the impacts are outside of prediction or natural causes and review the current monitoring results against historical monitoring results (including the baseline data), recent meteorological events and UCMPL operational activities. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 increase investigations to expand channel stability monitoring program as required by UCMPL's surface water specialist and subsidence engineer. Investigations completed by ECM. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.
		Response	If Level 1 investigation confirms the impacts are within prediction and deteriorating trend is natural causes, then: - Continue channel stability monitoring as required by the SWMP; - Remediate flow lines identified by UCMPL's subsidence specialist as a high risk of developing into an erosion hole for example (Refer to RMP LW1-8); and	If Level 2 investigation confirms the impacts are greater than predictions, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and surface water specialist to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the

			Provide a summary of channel stability monitoring results and investigation outcomes within the Annual Review (AR) as outlined in Section 6.3.	Contingency Response (Section 6.1) including: a remedial action plan developed and implemented to address the investigation findings. The remedial action plan is re-assessed if continued deterioration of channel stability are indicated by the investigation to be a mining source. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of channel stability monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the EPA and DPIE where requested. Continue monitoring as required by the SWMP. If the investigation confirms material harm has been threatened or caused activate the PIRMP immediately.
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4.2 Water Management Plan (Groundwater)

4.2.1 Overview

The purpose of the Groundwater Monitoring Plan (GWMP) (**Appendix A**) is to ensure compliance with the conditions of PA08_0184 and other regulatory requirements, detail the program for groundwater monitoring and confirm predicted changes to the groundwater regime as a result of UCMPL's mining activities. Impacts to groundwater, as predicted in the Project EA as a result of subsidence include:

- Groundwater inflows requiring management;
- Hardrock baseflow losses; and
- Impacts on private bore users.

Further details of groundwater systems (**Section 3.1.3**), monitoring, management and assessment criteria are provided in Section 3 of the GWMP (**Appendix A**).

4.2.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). Although there are no subsidence performance measures specific to groundwater, for the Extraction Plan UCMPL have adopted '*no greater environmental consequences that predicted in the EA*' for groundwater. The assessment of the subsidence performance measures for groundwater are provided in **Section 4.2.5**.

4.2.3 Approved Impacts

Generally, as underground mining progresses, subsidence and cracking of the overlying strata can result in the depressurisation of the strata above and below the mined section resulting in the inflow of groundwater into the mining area. This can result in potential impacts on regional groundwater systems.

An evaluation of the likely impacts of UCMPL's mining operations on the regional groundwater system was undertaken by Mackie Environmental Research (MER) as part of the EA for the Ulan Coal - Continued Operations Project (MER, 2009). This evaluation included computerised groundwater modelling based on predicted subsidence effects, extensive groundwater monitoring data and historical groundwater seepage estimates to the Ulan underground operations.

The MOD3 groundwater assessment indicated that the total cumulative groundwater seepage to mine workings from underground operations is predicted to rise from the current rate of approximately 16 ML/day to approximately 28.0 ML/day in 2022. After 2026, the inflow rate is predicted to decline.

At the close of mining it is predicted that baseflow losses from the hardrock aquifers to the Goulburn River catchment arising from the proposed mining, may be of the order of 0.039 ML/day while losses to the Talbragar River catchment may be of the order of 0.185 ML/day, for the period between 2011 and 2030 (MER, 2015).

Depressurisation of the Triassic strata in the area of 'The Drip' has already occurred as a result of historical mining operations at UCMPL and no impacts have been measured to date. No observable

impacts are likely as a result of future UCMPL operations which are moving northward and westward away from 'The Drip'.

For MOD4, the total groundwater water extraction for the project increases by 4%, compared with the approved project, a less than one percent increase in the maximum estimated site water surplus. The peak annual extraction is slightly reduced (due to scheduling changes) which maintains consistency with the current water licencing strategy, with no additional allocation required in association with Modification 4. The groundwater drawdown impacts are minimal compared with the approved project and no additional private bores would be affected. Baseflow losses are modelled to increase by 0.001ML/day for the Goulburn River and 0.003ML/day for the Talbragar River, which is not measurable in a practical sense, being less than an increase of 1 ML/year for the Goulburn River and 1.09ML/ year for the Talbragar River.

4.2.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged AGE to complete a subsidence assessment for LW7 and LW8 within the Application Area: *Groundwater Impact Assessment for Ulan West LW7-LW8 Extraction Plan* (AGE, 2021) (**Attachment H**).

The following summary of subsidence related impacts to groundwater, were described by AGE which stated [extract]:

- *A detailed groundwater impact assessment was undertaken to support the environmental assessment for MOD4. This model was recently contemporised (see AGE, 2021) to MODFLOW USG. Review of the groundwater monitoring data has shown that mining has impacted the groundwater regime; however, the impacts are within those approved as part of MOD4.*
- *The greatest risk of mining is the potential reduction of current or future utility of the water resource for third party users. The majority of the predicted impacts occur in the Permian and Triassic fractured rock units and only the Triassic sandstones are utilised for stock and domestic water supply.*
- *Of the 45 registered private bores, three are predicted to be impacted by mining of UWLW07 and UWLW08. These are PB08 which is directly undermined and is anticipated to go dry, PB21 which is considered to have a minor impact of 0.25m drawdown and PB17 which is attributed to have 2.20m. These impacts are consistent with approved impacts.*
- *The water quality of these bores will not be diminished, as the water quality of the Triassic sandstone aquifer is not dependent on recharge from the underlying Permian units. As such, mining to the end of UWLW08 is not expected to significantly reduce the availability of groundwater for private bores accessing the Triassic units.*
- *Mine inflows and baseflow losses were also considered as part of this assessment and both are likely to remain within the approved ranges of MOD4, as demonstrated by the corresponding takes from the panels compared against water sharing plans and water sources.*

Table 14 below provides the current water balance and estimated groundwater volume component included in the stated water sources. **Attachment L** provides the recently updated groundwater allocation by AGE (2021).

Table 14 Ulan Coal Complex Gross Water Source Volume

Water Source	Current Allocation	Approved Peak*	Peak from UW LW7 & LW8*
North Coast Fractured Rock Water Sharing Plan 2016	19.3ML/Day	8.7ML/Day	LW7 – 6ML/Day LW8A – 7.8ML/Day LW8B – 5.25ML/Day
Murray Darling Basin Porous Rock Water Sharing Plan 2020	19 ML/Day	15.3ML/Day	LW7 – 1.8ML/Day LW8A – 1.03ML/Day LW8B – 0ML/Day

Notes: ML = Megalitre * Source AGE (2021)

4.2.5 Subsidence Performance Indicators & Assessment

Table 15 provides a summary of the subsidence performance indicators to inform UCMPL if the subsidence performance measures for groundwater are likely to be exceeded during the secondary extraction within the Application Area. **Table 15** and **Section 4.2.5.1** to **Section 4.2.5.3** also provides a summary of the monitoring from the GWMP (**Appendix A**), that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Table 15 Groundwater Subsidence Performance Indicators & Assessment

Parameter	Site	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Groundwater Levels	Vibrating wire piezometers within the North Monitoring Network (NMN)	Download Quarterly	Performance indicators will be considered to have been triggered if the measured and projected decline in piezometric heads (assessed quarterly) exceeds the groundwater model predicted trends.	The subsidence performance measure for groundwater is exceeded if investigations completed by UCMPL's ECM confirm if any of the groundwater subsidence performance indicators triggered are mining related, due to subsidence impacts within the Application Area, as outlined in Table 18 Groundwater & Private Bores TARP .
EC and pH	Private Bores	Annually	Performance indicators will be considered to have been triggered if water quality/levels in privately owned bores is a departure of water quality/level from long term monitoring trends and guidelines.	
Groundwater Levels	Private Bores	Annually	Performance indicators will be considered to have been triggered if drawdown impacts for privately owned bores are outside groundwater modelled predictions and/or; UCMPL receive a complaint from a private bore owner in regards to groundwater supply from their private bore.	

4.2.5.1 Groundwater Monitoring

The Extraction Plan has adopted the following key monitoring components from the GWMP to measure and evaluate the subsidence performance measure for groundwater, including:

- Groundwater levels; and
- Private bore monitoring (groundwater quality and levels).

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the monitoring program is provided in Section 4 of the GWMP (**Appendix A**). A summary of the pore pressure groundwater level monitoring, utilising the vibrating wire piezometers (VWPs) within the North Monitoring Network (NMN) for the Extraction Plan is provided in **Table 16**. The locations of the VWPs, other groundwater monitoring sites within the NMN and private bore monitoring for the Extraction Plan is provided in **Figure 12** and **Figure 12a**.

Table 16 Vibrating Wire Piezometers within the NMN

Vibrating Wire Piezometers within the North Monitoring Network (NMN)									
DDH266	DDH270*	DDH293	DDH601	DDH336*	DDH598	TAL1	TAL2	UW1	UW2
UW3	UW4	R894	PZ29	EX03	EX06	EX09			

Notes: *To be undermined during mining within the Application Area and will be subject to review by UCMPL's groundwater specialist for ongoing groundwater monitoring requirements within the GWMP.

4.2.5.2 Groundwater Level Assessments

UCMPL undertake groundwater level monitoring in accordance with the GWMP. Groundwater levels in the NMN will be assessed quarterly using pore pressure data obtained from the vibrating wire piezometer network (**Figure 12a**). The assessment will include departures from predicted data trends in the (modelled) Project EA i.e. consecutive pressure monitoring data over a period of 6 months exhibit divergence in an adverse way from the predicted trends (i.e. from numerical groundwater modelling predictions). In the event there is an exceedance of the performance indicators from predicted trends, UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in **Table 18**.

4.2.5.3 Private Bore Assessments

UCMPL undertake private bore monitoring in accordance with the GWMP. An assessment of the groundwater levels in privately owned bores will include departures from the predicted drawdown levels (**Table 17**) from the updated, recalibrated groundwater model in 2021 by AGE (Technical Report in **Attachment H**).

The updated 2021 groundwater model improved upon the 2018 model for MOD4 by contemporising the software from MODFLOW SURFACT to MODFLOW USG (to ensure it meets regulatory requirements), extending the model domain to the north and east (by approximately 25 km), updating the fracture height model and recalibrating to recent monitoring data. The updated 2021 model also differed from the 2018 model in the way geological structure was modelled. The changes represented the geology in a more realistic way, resulting in PB16 triggering the Aquifer Inference Policy (AIP) minimal impact considerations (i.e., more than 2 m drawdown) in the updated model.

The revised groundwater model is currently with NRAR for review. UCMPL's GWMP will be updated to align with the most recent groundwater model update.

The current private bore monitoring program has indicated that water quality in the privately-owned bores varies widely with average EC concentrations ranging from 172us/cm to 4760uS/cm and average pH levels ranging from pH 4.5 to pH 7.6. No specific triggers have been assigned due to insufficient baseline water quality data from privately owned bores to allow accurate trigger levels to be calculated. Therefore, trigger values of +/- 10%¹³ and 15%¹⁴ divergence from baseline data will be used, unless otherwise stated within the SWGWRP. In the event there is an exceedance of the performance indicators for private bore levels and/or water quality and/or UCMPL receive a complaint in reads to private bore supply, UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in **Table 18**.

Table 17 Private Bore Predicted Levels

Private Bore Number from Groundwater Monitoring Program*	Predicted Level of Drawdown at the End of LW8 Revised, AGE 2021	Predicted Level of Drawdown at the End of Mining Revised, AGE 2021	Predicted Level of Drawdown at the End of Mining (MOD4)	To be Undermined
PB8	133.88	133.93	137.17	Yes
PB21	15.52	19.18	49.57	No
PB17	26.74	36.80	12.43	No
PB32	4.35	8.18	6.36	No
PB33	2.29	6.25	6.11	No
PB16	2.80	3.47	-	No

Notes: * Private bores located within the predicted drawdown contours (in excess of 2m)

4.2.6 Contingency Plan

In the event the subsidence performance measures for groundwater as summarised in **Table 15** 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 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for groundwater have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.2.7 Trigger Action Response Plan

UCMPL have developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for groundwater as outlined in Section 4.2 of the GWMP and in Section 3.1 of the Surface Water and Groundwater Response Plan (SWGWRP) (**Appendix A**).

Table 18 provides the key trigger, action, response measures for groundwater and private bores from the SWGWRP that UCMPL's Environment and Community Manager (ECM) or delegate, will implement

¹³ Private Bores Located within Predicted Groundwater Drawdown Contours (in excess of 2m)

¹⁴ Private Bores Located outside of Predicted Groundwater Drawdown Contours

that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

Table 18 Groundwater & Private Bore TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Private Bores pH & EC (Based on baseline data) Depth (Departure from EA predicted trends)	Water quality/levels in privately owned bores is a departure of water quality/level from long term monitoring trends and guidelines. Impacts for privately owned bores are outside groundwater modelled predictions. Private bore complaint received	Trigger	Private bores within predicted groundwater drawdown contours have potentially had three consecutive measurements of >95% baseline data or - $\pm 10\%$ divergence from baseline data collected during previous sampling events; or Private bores outside predicted groundwater drawdown contours have potentially had three consecutive measurements of >95% baseline data or - $\pm 15\%$ divergence from baseline data collected during previous sampling events; or Greater depressurisation than that predicted by numerical groundwater modelling has potentially occurred; or Unconfirmed groundwater related complaint received from private landholder.	Private bores within predicted groundwater drawdown contours have three consecutive measurements of >95% baseline data or - $\pm 10\%$ divergence from baseline data collected during previous sampling events; or Private bores outside predicted groundwater drawdown contours have three consecutive measurements of >95% baseline data or - $\pm 15\%$ divergence from baseline data collected during previous sampling events; or Greater depressurisation than that predicted by numerical groundwater modelling; or Confirmed groundwater related complaint received from private landholder.
		Action	Level 1 Investigations initiated with UCMPL's groundwater specialists to review the current monitoring results against historical monitoring results (including the baseline data); recent meteorological events; UCMPL operational activities and any other external influences; to confirm if an exceedance of the predicted drawdown or a greater depressurisation than that predicted by numerical groundwater modelling has occurred or to verify community complaint. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include additional monitoring and selected trace metals; review bore pump, bore recovery times and baseline data; conduct water quality trend analysis with adjacent bores; review groundwater model predictions, confirm model assumptions are correct/ reflect what is occurring in the mine; review recent monitoring results for adjacent bores; review recent monitoring results for the NMN; review operations and investigate for links to operational activities; investigate any external influence which may be affecting the results including climatic data. Investigations completed by ECM. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.
		Response	If Level 1 investigation confirms no exceedance of the predicted drawdowns or a greater depressurisation than that predicted by numerical groundwater modelling has occurred or the community complaint is not validated, then: Continue groundwater monitoring as required by the GWMP;	If Level 2 investigation confirms an exceedance of the predicted drawdowns or a greater depressurisation than that predicted by numerical groundwater modelling has occurred or the community complaint is validated, then: Government agency notification as outlined in the Contingency Response (Section 6.1).

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
			- Provide a summary of monitoring results and investigations to the landowner; and - Provide a summary of groundwater monitoring results and investigation outcomes within the Annual Review (AR) as outlined in Section 6.3.	Investigations initiated with UCMLP's subsidence engineer and groundwater specialist to assist with investigations and remedial action plans as required. Implement management measures* and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including: A remedial action plan is developed and implemented to address the Investigation findings. This may include; increase monitoring frequency for the bore; provide an alternative water supply for existing usage; lower/replace borehole pump; replace entire bore if required; and ensure compensatory water supply measures if required provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of the groundwater monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to DPIE where requested. Continue monitoring as required by the GWMP.
Groundwater levels in the NMN	Decline in piezometric heads exceeds the model predicted trends.	Trigger	Monitoring indicates a greater depressurisation of VWP monitoring bores than predicted by numerical groundwater modelling.	Monitoring indicates a greater depressurisation of VWP monitoring bores than predicted by numerical groundwater modelling.
		Action	Level 1 Investigations initiated with UCMLP's groundwater specialists to review the current groundwater monitoring results against historical monitoring results (including the baseline data), recent meteorological events, UCMLP operational activities and any other external influences to confirm if a greater depressurisation of the VWP than that predicted by numerical groundwater modelling has occurred. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further	In addition to Level 1 investigations, increase investigations to include review groundwater model predictions, confirm model assumptions are correct/ reflect what is occurring in the mine; review recent monitoring results for adjacent bores; review recent monitoring results for the NMN; review operations and investigate for links to operational activities; investigate any external influence which may be affecting the results including climatic data. Investigations completed by ECM. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
			investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	greater than predicted impact impacts proceed to Level 2 Response.
		Response	If Level 1 investigation confirms no greater depressurisation of the VWP than that predicted by numerical groundwater modelling, then: - Continue groundwater monitoring as required by the GWMP; - Provide a summary of groundwater monitoring results and investigation outcomes within the Annual Review (AR) as outlined in Section 6.3.	If Level 2 investigation confirms a greater depressurisation of the VWP than that predicted by numerical groundwater modelling, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and groundwater specialist to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including: A remedial action plan is developed and implemented to address the Investigation findings. This may include increase monitoring frequency for the VWP; confirm any affect this could have on private bores, baseflow losses and or groundwater extraction rates, review the groundwater model. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of the groundwater monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to DPIE where requested. Continue monitoring as required by the GWMP.

Notes: * Section 3.6 of the Water Management Plan (**Appendix A**) outlines UCMPL's commitment to a 'make good provision' for impacted registered groundwater users due to cumulative mining activities exceeds the 2m threshold as defined in the NSW Aquifer Interference Policy and the 'make good provision' i.e. alternate water supply or other agreed compensation.

4.3 Land Management Plan

4.3.1 Overview

The purpose of the Land Management Plan for Longwalls 1 to 8 (LMP LW1 - 8) (**Appendix B**) is to outline the management strategies, controls and monitoring programs to be implemented for the management of general surface and cliff features regarding potential environmental impacts from UCMPL mining activities as described in the Extraction Plan within the Application Area and Extraction Plan Area (**Figure 6**). The relationship of the LMP LW1 - 8 to the EMS is shown by **Figure 4**. The key subsidence impacts that may have potential consequences on land associated with the extraction of LW1 to LW8 within the Application Area include:

- Surface cracking (including steps, overrides and erosion holes); and
- Cliff line rock falls.

Further details for cliff lines and land features, monitoring, management and assessment criteria are provided in LMP LW1 - 8 (**Appendix B**).

4.3.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). The subsidence performance measures for land are 'nil environmental consequences for the Brokenback Conservation Area' and 'minor environmental consequences for other cliffs'. The assessment of the subsidence performance measures for land are provided in **Section 4.3.5**.

4.3.3 Approved Impacts

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.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD2) of Ulan Coal – Continued Operations (Umwelt 2012), which stated [extract]:

- *In consideration of the revised Ulan West mine plan SCT has reassessed the location of the area bounded by the 26.5 degree angle of draw and the 20 millimetre subsidence contour, with minimal changes to the impacts assessed in 2009. SCT and Umwelt have predicted that the mine plan modifications will continue to be compliant with performance measures of Project Approval 08_0184 Schedule 3, Condition 24.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD3) of Ulan Coal - Continued Operations (Umwelt 2015), which stated [extract]:

- *The subsidence affectation area for the proposed modification has been defined by the following parameters:*
 - *the conceptual mine plan for the proposed modification;*
 - *the area bounded by the 26.5 degree angle of draw (i.e. the typical angle of the line connecting the edge of the goaf and the limit of subsidence at the surface); and*
 - *the predicted vertical limit of measurable subsidence, taken as the 20 millimetre subsidence contour.*
 - *Subsidence within the proposed Ulan West underground mining area is expected to be generally consistent with subsidence experienced in the previously mined longwall panels within Ulan No.3.*

The following summary of subsidence related impacts to surface features, were described in MOD 4 which stated [extract]:

- *Subsidence effects and impacts from the proposed Modification are predicted to be similar to those modelled and predicted for previous Modifications and the original UCCO Project EA, and consistent with subsidence that has been observed post-mining at Ulan. Estimates of conventional subsidence effects for the proposed longwall extension areas are consistent with the range of values previously forecast at similar overburden depths for the original UCCO Project EA or subsequent updates for modifications and subsidence management/extraction plans.*
- *Modification 4 will increase the area of subsidence. Impacts to surface features are assessed as minor and consistent with the subsidence performance measures contained within ,Condition 24 of Schedule 3 of PA 08_0184. Existing environmental management plans will be applied to the proposed Modification and will be reviewed and updated as required.*
- *No change expected - so no impact or consequence expected for cliffs in the Brokenback Conservation Area; and*
- *No change expected - potential for rock falls on less than 20% of cliff lengths mined under and for up to 70% to be perceptibly impacted for other cliffs.*

4.3.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area *Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan* (SCT, 2020) (**Attachment G**).

The following summary of subsidence related impacts to cliff lines and land features within the Application Area, were described by SCT which stated [extract]:

- *Subsidence impacts and environmental consequences from the planned mining of Longwall 7 and 8 are expected to be consistent with or less than assessments for the UCCO Project EAs and the environment performance experienced to date.*

- *Sandstone formations, including cliffs, occur on both private property and on areas owned or leased by UCM;*
- *Sandstone cliff formations directly above Longwalls 7 and 8 are limited to short sections above Longwalls 7 and 8B on the northern side of Brokenback Creek. One section of cliff line is within the BCA but outside the 0.5 depth zone around Longwalls 8A and 8B goaf edges. In this location, this feature is fully protected from subsidence impacts by the barrier of coal below the BCA and similarly, other sandstone formations within the BCA are substantially protected by the barrier of coal.*
- *Impacts to sandstone formations are expected to be consistent with UCCO Project EA forecasts, subsidence performance measures outlined in the Approval conditions and the monitoring experience for mining since the UCCO Project Approval was granted.*
- *Rock falls can be expected on up to 20% of the length of sandstone formations located directly over longwall panels and the inter-panel chain pillar between extracted panels. No rock falls are expected outside the outermost goaf edge of longwall extraction. Perceptible cracking is expected at up to 50-70% of the length of sandstone formations located directly over extracted longwall panels or chain pillars and to a distance of up to about 0.4 times overburden depth outside the goaf edge.*
- *Impacts to sandstone formations are expected to be more noticeable along the outcrops adjacent to Brokenback and Ulan Creeks where the overburden depth is less and the formations are higher, longer and more continuous in nature.*
- *Cracks are expected near the panel edges with transient cracking over the centre of the panel as Longwalls 7 and 8A retreat. Cracking is expected to be most noticeable around the panel edges and on slopes and crests of the topographic high points where the cracking is expected to be permanent without remedial work. Cracking is expected to be generally up to 100mm wide and potentially up to 200mm wide on steeper ground and near topographic high points. Cracks may appear wider at the surface if surface soil slumps into or is washed into a subsidence crack.*
- *Potholes caused by piping erosion into surface cracks may occur in areas where there are cracks intersecting drainage or flow lines and there are dispersive soils and overland flow from heavy rainfall events.*

4.3.5 Subsidence Performance Indicators & Assessment

Table 19 provides a summary of the subsidence performance indicators to inform UCMPL if the subsidence performance measures for land are likely to be exceeded during the secondary extraction within the Application Area. **Table 19** and **Section 4.3.5.1** to **Section 4.3.5.3** also provides a summary of the monitoring from the LMP LW1-8 (**Appendix B**), that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Table 19 Land Subsidence Performance Indicators & Assessment

Parameter	Site	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Cliff lines in the Brokenback Conservation Area (BCA)	Brokenback Conservation Area	Subsidence monitoring of the D Line and GNSS units in accordance with SMP LW1-8	Performance indicators will be considered to have been triggered if subsidence monitoring identifies an exceedance (or a trend to exceedance) of the predicted subsidence values ¹ surveyed along the D Line and by GNSS units.	The subsidence performance measure for land is exceeded if investigations completed by UCMPL's ECM confirm if any of the land subsidence performance indicators triggered are mining related, due to subsidence impacts within the Application Area, as outlined in Table 20 Land Management TARP .
		Pre mining & post mining within 6 months of LW7, LW8A & LW8B	Performance indicators will be considered to have been triggered if subsidence monitoring identifies a perceptible change as a result of subsidence induced impacts (e.g. rock fall or cracking) within the Brokenback Conservation Area.	
Other cliffs [^]	Application Area	Pre mining & post mining within 6 months	Performance indicators will be considered to have been triggered if subsidence monitoring of other cliffs undermined identifies an exceedance (or a trend to exceedance) of the predicted probability of $\leq 20\%^*$ of the total sum of rock falls in the Project Area.	
Surface cracking	Application Area	Monthly	Performance indicators will be considered to have been triggered if analysis of subsidence monitoring data indicates an exceedance of subsidence predictions for land (i.e. surface cracks are greater than 250mm** wide).	

Notes: ¹ Performance indicators for conventional subsidence effects – maximum vertical subsidence, maximum tilt and maximum strain along the D Line due to its close proximity to the BCA. *No greater than 20% rock falls of the total cliff line lengths undermined mined by Ulan West and UUG within the Project Area (applies to UUG mining areas post SMP Approval LWW4-LWW5 and LW27-LW29). **Excluding cracks that appear wider as a result of surface soil slumping in or washed into a subsidence crack (SCT, 2021). [^] Cliff lines as defined by the 2009 EA are >10m in height (refer to **Figure 15**).

4.3.5.1 Brokenback Conservation Area Monitoring

Pre-mining and post mining inspection of cliff lines and rock shelters will be completed in the Brokenback Conservation Area (BCA) to monitor for any far field subsidence movements effects (**Figure 6**). The UW mine plan has been designed with a coal barrier to protect specific sections of cliff lines and Aboriginal heritage sites within the BCA. The aim is to assess if there has been a perceptible change when compared to the pre-mining baseline condition for qualitative post mining comparison and against the subsidence performance measures as provided in **Table 19**. The monitoring methodology will use photographic recordings of cliff lines and rock shelters identified within the BCA.

In addition, UCMPL will establish a continuous global navigation satellite system (GNSS) at the BCA for LW8 to provide continuous three-dimensional (3D) ground movement data with trigger alarms as described in Table 20.

4.3.5.2 Cliff Line Monitoring

Pre-mining cliff line monitoring within the Application Area will be undertaken prior to the commencement of secondary extraction of each longwall, to establish the base line condition for quantitative and qualitative post mining comparison (**Figure 6**). The aim of the cliff line monitoring program is to assess the length (m) as the sum of mining induced rock-falls on cliff formations (as a percent of the total cliff line within the zone of influence of subsidence for each longwall panel) in the Application Area, against the subsidence performance measures in **Table 19**. The monitoring methodology will use pre and post mining photographic recordings of cliff lines and rock shelters and measured rockfalls (subject to safe access during inspections).

4.3.5.3 General Surface Inspections

During longwall mining within the Application Area, UCMPL will undertake monthly inspections for subsidence affected surface areas to identify potential subsidence hazards on both UCMPL owned land and non-UCMPL owned land¹⁵.

The inspections will identify, record subsidence affected areas where cracking or other subsidence related impacts has occurred and then recommend appropriate remediation works, where necessary. If subsidence impacts are causing a potential safety risk, the area will be cordoned off and signage placed to prevent access. Remedial actions to address the subsidence impacts will be completed as soon as practicable. Remedial actions to address the subsidence impacts will be completed as soon as practicable as described in Section 6.2.2 of the LMP LW1-8 (**Appendix B**).

4.3.6 Contingency Plan

In the event the subsidence performance measures for land management as summarised in **Table 20** are considered to have been exceeded or are likely to be exceeded, response and management will undertaken in accordance with protocols for incident reporting as identified in **Section 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for land have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.3.7 Trigger Actions Response Plan

UCMPL have developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for land management.

Table 20 provides the key trigger, action, response measures for land management that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

For further information of the management, monitoring and mitigation measures for cliffs and land in general refer to Section 4 of the LMP LW1 - 8 (**Appendix B**).

¹⁵ In accordance with the relevant Private Property Subsidence Management Plan (PPSMP) for each private landowner.

Table 20 Land Management TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Cliff lines in the Brokenback Conservation Area (BCA)	Greater than nil environmental consequence to Brokenback Conservation Area (BCA)	Trigger	Subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values indicate values approaching the forecast values as present in Table 7 in adjacent longwall panel; or Horizontal and vertical movement parameters ¹ from continuous GNSS survey monitoring units for LW8 have been triggered; or Subsidence monitoring of the BCA identifies potential perceptible change to the pre-mining condition including possible subsidence induced rock falls and cracking along cliff lines from mining in adjacent longwall panels.	Subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values ¹ indicate an exceedance or potential for an exceedance above forecast values as present in Table 7 in the adjacent longwall panel; or Horizontal and vertical movement parameters ¹ from continuous GNSS survey monitoring units for LW8 have been triggered; or Subsidence monitoring of the BCA identifies a perceptible change to the pre-mining condition including subsidence induced rock falls and cracking along cliff lines from mining in adjacent longwall panels.
		Action	Level 1 Investigations initiated with UCMPL's subsidence engineer to confirm if subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values and/or trigger values from GNSS units have been exceeded; and review BCA monitoring results against historical monitoring results (including the baseline data), recent meteorological events and UCMPL operational activities to confirm if subsidence related impacts have occurred in the BCA. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include resurvey and inspection of D Line to confirm no external influences have disturbed the survey line, increase frequency of inspections in the BCA and data review of the GNSS units as required and complete site inspection of the BCA with UCMPL's subsidence engineer. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.
		Response	If Level 1 investigations confirm no exceedance of subsidence forecast values and no perceptible change to the pre-mining condition of cliff lines in the BCA, as a result of mining: - Continue monitoring subsidence effects and BCA as required by this Extraction Plan; and - Provide a summary of subsidence effects and BCA monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm the exceedance above subsidence forecast values or potential change to the pre-mining condition of the BCA cliff lines, are mining related then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including engage UCMPL's subsidence engineer and other specialist to assist development

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
				of adaptive management, mitigation and remedial strategies as required; and UCMPL implement these measures as required to stop impacts on the BCA from subsequent longwalls. Reassess subsidence impacts. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of subsidence effects and BCA monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by the Extraction Plan.
Other Cliffs (cliff lines <10m in height) ⁴	The total sum of rock falls along other cliff lines undermined within the Project Area is predicted ≤20%.	Trigger	The total sum of rockfalls of other cliff lines undermined within the Application Area, including the Extraction Plan Area and UUG Mining Area (i.e. the Project Area) has reached 18% of the allowable ≤20%.	The total sum of rockfalls of other cliff lines undermined within the Application Area, including the Extraction Plan Area and UUG Mining Area (i.e. the Project Area) has potentially reached 20%.
		Action	Level 1 Investigations initiated with UCMPL's subsidence engineer to review cliff line monitoring results (historical and baseline data) against the mine plan with remaining cliff lines to be undermined to determine if UCMPL is likely to exceed or achieve the rock fall prediction of ≤20% for the Project Area. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include subsidence engineer to reassess subsidence impacts, subsidence engineer to complete site inspection of cliff lines and expand subsidence effects monitoring program as required to determine if UCMPL is likely to exceed or achieve the rock fall prediction of ≤20% for the Project Area. Investigations completed by ECM. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.
		Response	If Level 1 investigations confirm UCMPL are not likely to exceed rock fall predictions of ≤20% for the Project Area, then: - Continue monitoring other cliffs as required by this Extraction Plan; and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm UCMPL are likely to exceed or have exceeded rock fall predictions of ≤20% for the Project Area, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer to assist with investigations and remedial action plans as required.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
				Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1). Implement management measures as outlined the LMP LW1 - 8 (Appendix B) including engaging UCMP's subsidence engineer to assist development of adaptive management strategies as required; and UCMP implement adaptive measures as required to achieve $\leq 20\%$ of rock falls along other cliffs in the Project Area from subsequent longwalls. Review the Extraction Plan and Subsidence Impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.

Notes: ¹ The proposed GNSS units for the BCA to be installed prior to the commencement of LW8 require detailed site investigations to maximise their operational efficiency. As recommended by UCMP's subsidence engineer, until an exact location for each GNSS unit has been determined, trigger levels for vertical and horizontal movements cannot be set. UCMP anticipate completing the site investigations with both the provider of the GNSS units and subsidence engineer later in 2022. UCMP will provide the DPIE the trigger values when determined and update this Extraction Plan in upcoming revisions.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Surface cracking	> 250mm wide surface cracking ³	Trigger	Analysis of subsidence monitoring data indicates a potential exceedance of subsidence predictions for land within the Application Area with surface cracks >250mm.	Analysis of subsidence monitoring data indicates an exceedance of subsidence predictions for land within the Application Area with surface cracks >250mm.
		Action	Level 1 investigations initiated with UCMPL's subsidence engineer to review subsidence monitoring results against predictions to determine if cracking is within predictions or as a result of other influences. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include subsidence engineer to reassess subsidence impacts, subsidence engineer to complete site inspection and expand subsidence effects monitoring program as required. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response
		Response	If Level 1 investigations confirm cracking width is within predictions, then: - Continue monitoring as required by this Extraction Plan; - Implement remedial measures including infilling, compaction and reprofiling as required by the Extraction Plan (refer to RMP LW1-8); and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm cracking width is outside of predictions then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including recommendations from subsidence engineer to assist development of adaptive and remedial management strategies as required; and UCMPL implement adaptive and remedial measures as required. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.

Notes: ¹Performance indicators for conventional subsidence effects – maximum vertical subsidence, maximum tilt and maximum strain along the D Line due to its close proximity to the BCA
²No greater than 20% rock falls of the total cliff line lengths undermined mined by Ulan West and UUG within the Project Area (applies to UUG mining areas post SMP Approval LWW4-LWW5 and LW27-LW29).³Excluding cracks that appear wider as a result of surface soil slumping in or washed into a subsidence crack (SCT, 2021). ⁴ Cliff lines as defined by the 2009 EA to be >10m in height (refer to **Figure 15**).

4.4 Biodiversity Management Plan

4.4.1 Overview

The purpose of the Biodiversity Management Plan (BMP) (**Appendix C**) describes the land management strategies and ecological monitoring program for the Ulan Complex. The BMP outlines the management strategies and monitoring programs to be implemented for the management of flora and fauna regarding potential environmental impacts as a result of UCMPL mining activities within the Project Area (**Figure 14**).

Impacts on flora and fauna, as predicted in the Project EA as a result of subsidence include:

- Surface cracking;
- Cliff line rock falls (e.g. potential loss of roosting habitat for micro-bats); and
- Alteration to hydrology that may be reflected in impacts on vegetation.

Further details on flora and fauna (**Section 3.1.6**), monitoring, management and assessment criteria are provided in Section 3 of the BMP (**Appendix C**).

4.4.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). The subsidence performance measures for biodiversity are ‘negligible impact on threatened species, populations, habitat or ecological communities’. The assessment of the subsidence performance measures for biodiversity are provided in **Section 4.4.5**.

4.4.3 Approved Impacts

The following summary of subsidence related impacts on biodiversity, were described in Project EA, which stated [extract]:

- *Ecological surveys have recorded three threatened flora species and 33 threatened fauna species within the project area. One TEC, White Box Woodland, has also been recorded within the project area;*
- *More than 20 years of monitoring of previous underground mining at Ulan has confirmed that ecological impacts associated with subsidence are negligible. The assessment generally concluded that the Project will not result in a significant impact on threatened species, endangered populations or TECs or their habitats within the project area, however there is potential for impact on cave-roosting bat species.*
- *There are no groundwater dependent ecosystems located in the future underground mining area and therefore no potential impact on these ecosystems.*
- *Rockfall has the potential to impact on habitat for cave-dependent species (particularly micro-bats), where this occurs.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD2) of Ulan Coal – Continued Operations (Umwelt 2012), which stated [extract]:

- *...the revised Ulan West mine plan will not result in any change in the level or extent of biodiversity impacts.*
- *Approximately 200 metres of cliff line are no longer located within the Ulan West mining footprint, due to the reduced length of Longwall and will therefore no longer be impacted by Ulan West mining. This results in a minor positive outcome and is generally in accordance with the Project Approval. No change in the level of impact on cliff lines is expected as a result of the revised mine plan.*

The following summary of subsidence related impacts on biodiversity were described in MOD 3 which stated [extract]:

- *Potential indirect impacts relate to the Ulan West underground mining area, where subsidence-related impacts may include cracking or rock fall along cliff lines, potential tree fall as a result of rock fall and possible changes to surface hydrology.*
- *There are not expected to be any impacts to the condition or viability of these vegetation communities, based on subsidence-related impacts as predicted in SCT (2014), or as has been observed during extensive ecological monitoring of previous underground mining.*
- *There have been no records of significant known GDEs from ecological surveys completed within the Ulan Coal Complex or proposed modification areas to date.*
- *Rock fall is expected to be most prevalent in weak points in the cliff line, such as existing caves, cracks and overhangs which may provide roosting habitat for cave-dependant microbat species. Any vegetation associated with rock fall areas is likely to be damaged; however this impact is likely to be confined to these specific areas only. Subsidence is not expected to cause significant cracking or alteration to hydrology that is likely to be reflected in impacts on vegetation.*

The following summary of subsidence related impacts on biodiversity, were described in MOD 4 which stated [extract]:

- *Approximately 16 hectares of TEC are present over the area of LW7 at UWO, and LW W7 and LW W8 at UUG. Areas of TEC present within the proposed Modification area will not be subject to vegetation clearing for construction of surface infrastructure and will only be subjected to subsidence. Detailed studies of ecological impacts over previously subsided areas indicate that effects on the ecology from subsidence are negligible, including on TECs. No Groundwater Dependent Ecosystems are present in the modification area, nor will they be subject to impacts due to the proposal (ELA, 2018).*

4.4.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged ELA to complete a subsidence assessment for LW7 and LW8 within the Application Area Ulan West Mine: *Flora and Fauna Impact Review for UCMPL Extraction Plan Application LW7 & LW8* (ELA, 2021) (**Attachment I**).

The following summary of subsidence related impacts to flora and fauna were described by ELA which stated [extract]:

- *Previous reviews of subsidence impacts and biodiversity monitoring data identified that no significant impact on flora, terrestrial and aquatic fauna, or microbats had occurred. All variations in data between years was attributed to factors other than subsidence, such as climatic variation.*

- *The subsidence effects for UWLW7 and UWLW8 in SCT (2020) are consistent with previously forecast at similar overburden depths for the site. Given these predictions, the environmental and ecological similarities between UWLW7-8 and the LWs monitored to date and the results recorded from biodiversity monitoring detailed in this report, it is expected that the subsidence impacts from the extraction of UWLW7 and UWLW8 are expected to have a negligible impact on threatened species, populations, habitats and ecological communities.*
- *Monitoring data for the duration of monitoring for each longwall indicate that there has not been a >10% decrease in canopy percent foliage cover and therefore the performance measure has been achieved.*
- *The monitoring of Regent Honeyeater and Swift Parrot feed trees within FBS sites has found that percent foliage cover of feed trees at monitoring sites has not declined by >10% and as such, the relevant subsidence performance measure for these two threatened bird species has been met.*
- *Whilst a minor decrease has been observed for Large-eared Pied Bat after undermining, this level of decrease is not >10% and therefore, the subsidence performance measure has been achieved for both threatened cave-roosting microbats.*

4.4.5 Subsidence Performance Indicators & Assessment

Table 21 provides a summary of the subsidence performance indicators (from the BMP) to inform UCMPL if the subsidence performance measures for biodiversity are likely to be exceeded during the secondary extraction within the Application Area. **Table 21** and **Section 4.4.5.1** also provides a summary of the monitoring from the BMP, that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Table 21 Monitoring & Assessment of Subsidence Indicators (Biodiversity)

Parameter	Site	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Floristic Based Subsidence (FBS) Monitoring	FBS Sites in accordance with BMP	Annually (Autumn and Spring) in accordance with the BMP	Performance indicators will be considered to have been triggered if analysis of FBS data indicates a >10% (percentage points) decline in percentage foliage canopy cover of a site within the subsidence zone, inconsistent with percentage foliage canopy cover in the transition zone; and/or Analysis of FBS data indicates a >10% (percentage points) decline in percentage foliage canopy cover in the selected vegetation community located above mining areas, not seen in non-mined areas of the vegetation community; and/or A reduction in abundance and/or condition of hollow bearing trees (HBTs) at FBS monitoring sites suitable for Masked Owls; and/or >10% decrease in canopy foliage cover of key feed species at FBS monitoring sites suitable for either the Regent Honeyeater and/or Swift Parrot.	The subsidence performance measure for biodiversity is exceeded if investigations completed by UCMPL's ECM confirm if any of the biodiversity subsidence performance indicators triggered are mining related, due to subsidence impacts within the Application Area, as outlined in Table 22 Biodiversity Management TARP.
Targeted Cliff Line Monitoring for Microbats	Cliff line monitoring sites in accordance with the BMP	Annually (Nov-Dec) in accordance with the BMP	Performance indicators will be considered to have been triggered if analysis of micro-bat monitoring data identifies decreasing activity levels (>10% decline) of endangered micro-bat species during cliff line monitoring within the mined areas over two or more monitoring periods, outside of seasonal variations.	

4.4.5.1 Subsidence Monitoring Biodiversity

The Extraction Plan has adopted the following management and monitoring strategies from the BMP. UCMPL have established a program to monitor species richness and abundance of flora, terrestrial and aquatic fauna and microbats in accordance with the BMP (**Appendix C**). The specific ecological monitoring to be undertaken to determine if an exceedance of the biodiversity subsidence impact performance measure has occurred, applicable to the Application Area includes (**Figure 14**):

- Microbat cliff line habitat monitoring is described in Section 8.4.3 of the BMP; and
- Floristic Based Subsidence (FBS) monitoring is described in Section 8.4.1.3 of the BMP.
 - Floristic monitoring above underground mining areas is undertaken to determine any potential subsidence-related impacts to the vegetation above Longwalls (LW). Data collected at each monitoring site is to include:
 - Projected foliage cover (5% increments) of upper canopy;
 - Canopy health and defoliation (all in 5% increments);

- Percentage of epicormic foliage in relation to total tree foliage;
- Proportion of primary branches within canopy that have died back;
- Percentage of current canopy foliage as a proportion of the estimated canopy foliage volume/potential canopy; and
- Percentage of canopy foliage discoloured.

4.4.6 Contingency Plan

In the event the subsidence performance measures for biodiversity as summarised in **Table 21** 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 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for biodiversity have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.4.7 Trigger Actions Response Plan

UCMPL have developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for biodiversity management in Section 7.21 and Appendix A of the BMP (**Appendix C**).

Table 22 provides the key trigger, action, response measures for biodiversity management that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

Table 22 Biodiversity Management TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Floristic Based Subsidence (FBS) Monitoring	>10% decline in percentage foliage canopy Reduction in abundance of hollow bearing trees (HBT) >10% decline in percentage foliage of key feed species	Trigger	Analysis of subsidence-based flora data is approaching >10% (percentage points) decline in percentage foliage canopy cover of a site within the subsidence zone inconsistent with percentage foliage canopy cover in the transition zone; and >10% (percentage points) decline in percentage foliage canopy cover in the selected vegetation community located above mining areas, not seen in non-mined areas of the vegetation community; or A potential reduction in abundance and/or condition of HBTs at FBS monitoring sites suitable for Masked Owls; or Approaching >10% decrease in canopy foliage cover of key feed species at FBS monitoring sites suitable for either the Regent Honeyeater and/or Swift Parrot.	Analysis of subsidence-based flora data indicates a >10% (percentage points) decline in percentage foliage canopy cover of a site within the subsidence zone inconsistent with percentage foliage canopy cover in the transition zone; and >10% (percentage points) decline in percentage foliage canopy cover in the selected vegetation community located above mining areas, not seen in non-mined areas of the vegetation community; or A reduction in abundance and/or condition of HBTs at FBS monitoring sites suitable for Masked Owls; or >10% decrease in canopy foliage cover of key feed species at FBS monitoring sites suitable for either the Regent Honeyeater and/or Swift Parrot.
		Action	Level 1 investigation completed by reviewing subsidence effects monitoring data, other influences, climatic conditions and UCMPL operational activities to confirm the trigger exceedance is mining related or other causes. Investigations completed by ECM. Investigations initiated with UCMPL's ecological specialists to assist with investigations. Note: If Level 1 investigations are indicating a mining impact then proceed to Level 2 Action for further investigations. If impacts are confirmed non-mining related during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to expand the FBS monitoring program as required by UCMPL's ecological specialist. Investigations completed by ECM. Note: If Level 2 investigations confirm no mining related impacts then proceed to Level 1 Response. Confirmation of a mining impact proceed to Level 2 Response.
		Response	If Level 1 investigation confirms >10% decline for canopy coverage or >10% decline for fed species or reduction of abundance/condition of HBT is non-mining related, then: - Continue monitoring as required by the BMP; - Implement recommendations provided by UCMPL's ecological specialist to improve the monitoring program and biodiversity outcomes; and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigation confirms >10% decline for canopy coverage or >10% decline for fed species or reduction of abundance/condition of HBT is mining related, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and ecological specialist to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1).

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Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
				Implement management measures as outlined the BMP (Appendix C) in consultation with UCMPL's ecological specialists including conduct investigations targeting areas of Box Gum Woodland CEEC, expand monitoring program, reassess subsidence impacts, remediate affected areas, consider impact to threatened vegetation in relation to offset commitments, if habitat is potential impacted provide additional habitat for the threatened species within the appropriate Biodiversity Offset Areas (BOAs). Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by the BMP.
Targeted Cliff Line Monitoring for Microbats	>10% decline in activity levels	Trigger	Approaching >10% decline in activity levels of endangered micro-bat species during cliff line monitoring within the mined area over two or more monitoring periods, outside of seasonal variations.	>10% decline in activity levels of endangered micro-bat species during cliff line monitoring within the mined area over two or more monitoring periods, outside of seasonal variations.
		Action	Level 1 investigation completed by reviewing subsidence effects monitoring data, other influences, climatic conditions and UCMPL operational activities to confirm the trigger exceedance is mining related or other causes. Investigations completed by ECM. Investigations initiated with UCMPL's ecological specialists to assist with investigations. Note: If Level 1 investigations are indicating a mining impact then proceed to Level 2 Action for further investigations. If impacts are confirmed non-mining related during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to expand the targeted cliff line monitoring program as required by UCMPL's ecological specialist. Investigations completed by ECM. Note: If Level 2 investigations confirm no mining related impacts then proceed to Level 1 Response. Confirmation of a mining impact proceed to Level 2 Response.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
		Response	If Level 1 investigation confirms >10% decline in activity levels of endangered micro-bat species during cliff line monitoring within the mined area over two or more monitoring periods, outside of seasonal variations are non-mining related, then; - Continue monitoring as required by the BMP; - Implement recommendations provided by UCMPL's ecological specialist to improve the monitoring program and biodiversity outcomes; and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigation confirms >10% decline in activity levels of endangered micro-bat species during cliff line monitoring within the mined area over two or more monitoring periods, outside of seasonal variations are mining related: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer and ecological specialist to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1). Implement management measures as outlined the BMP (Appendix C) in consultation with UCMPL's ecological specialists including if investigation considers lack of habitat a potential factor, provide additional habitat for the threatened species within Biodiversity Offset Areas (BOAs), reassess subsidence impacts and consider impact to threatened fauna in relation to cliff line offset areas. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by the BMP.

4.5 Built Features Management Plan

4.5.1 Overview

The purpose of the Built Features Management Plan for Longwalls 1 to 8 (BFMP LW1 - 8) (**Appendix D**) is to outline the management strategies, controls and monitoring programs to be implemented for the management of built features (either UCMPL owned land or non-UCMPL owned land) regarding potential environmental impacts from UCMPL mining activities as described in the Extraction Plan within the Application Area and Extraction Plan Area (**Figure 6**).

The relationship of the BFMP LW1 - 8 to the EMS is shown by **Figure 4**. The key subsidence impacts that may have potential consequences on built features associated with the extraction of LW1 to LW8 within the Application Area include:

- Public utilities including an overhead power line, telecommunication cable and State survey marks;
- UCMPL owned infrastructure including internal roads, residential dwelling and outbuildings, farm dams, powerlines, ventilation shaft, fences and a groundwater bore;
- Non-UCMPL owned infrastructure including a residential dwelling and outbuildings, farm dams, fences and a groundwater bore.

Further details for built features, consultation, monitoring, management and assessment criteria are provided in BFMP LW1 - 8 (**Appendix D**).

4.5.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). The subsidence performance measures for ‘*all built features are safe, serviceable and repairable unless the owner agrees otherwise in writing*’. The assessment of the subsidence performance measures for land are provided in **Section 4.5.5**.

4.5.3 Approved Impacts

The following summary of subsidence related impacts on built features were described in the Project EA, which stated [extract]:

- *Water bores and groundwater seeps are likely to be impacted by mining subsidence movements. Water bores and natural springs located directly over the mining area are expected to dry up as a result of mining.*
- *Subsidence movements from the project mining geometry are expected to change the vertical and horizontal location of Ulan Trig and other permanent survey marks in the general vicinity out to a distance of up to 2km from the mining area.*
- *Mining subsidence movements from the project mining geometry are expected to cause perceptible damage to the residential and farm buildings on privately owned properties identified as Property ID 57¹⁶ “Billir”, Property ID 254 “Woodbury”, and Property ID 80¹⁰ “The Broken Back”. Buried services such as water and sewerage pipes are likely to be damaged. Telephone and powerlines may require mitigatory work depending on their specific location*

¹⁶ UCMPL have since purchased the Billir property and The Broken Back property.

relative to mining, but in most cases, subsidence impacts on these services is easily manageable.

- *Farm dams, fences and access tracks are not expected to be significantly impacted by mining subsidence movements. However, some minor remedial work may be necessary to fill in cracks and remove compression humps.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD2) of Ulan Coal – Continued Operations (Umwelt 2012), which stated [extract]:

- *In consideration of the revised Ulan West mine plan SCT has reassessed the location of the area bounded by the 26.5 degree angle of draw and the 20 millimetre subsidence contour, with minimal changes to the impacts assessed in 2009. SCT and Umwelt have predicted that the mine plan modifications will continue to be compliant with performance measures of Project Approval 08_0184 Condition 24.*

The following summary of subsidence related impacts to built features, were described in MOD 3 which stated [extract]:

- *The proposed modification will result in an approximately 13 per cent increase in the total area of subsidence affectation associated with the Ulan Coal – Continued Operations Project (UCCO Project). The range of predicted subsidence impacts within this additional area of subsidence affectation are generally consistent with those approved under Project Approval 08_0184.*
- *The proposed modification is not anticipated to have a significant adverse impact on the land surface or natural features located within the modified Ulan West mining area, and will not have a significant adverse impact on existing land uses. Impacts of the proposed modification on built features are predicted to be consistent with the UCCO Project Environmental Assessment (EA) and PA 08_0184.*

The following summary of subsidence related impacts to surface features, were described in MOD 4 which stated [extract]:

- *Modification 4 will increase the area of subsidence. Impacts to surface features are assessed as minor and consistent with the subsidence performance measures contained within Condition 24 of Schedule 3 of PA 08_0184. Existing environmental management plans will be applied to the proposed Modification and will be reviewed and updated as required.*

4.5.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area *Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan* (SCT, 2020) (**Attachment G**).

The following summary of subsidence related impacts to UCMPL owned and non-UCMPL owned built features within the Application Area, were described by SCT which stated [extract]:

- Subsidence impacts to natural and built features on land owned or leased by UCM and private property are expected to be manageable with appropriate management plans in place following consultation and agreement with asset and landowners.
- *The power poles and cables are expected to experience the full subsidence effects for Longwalls 7 and 8A. Single power pole structures are generally tolerant of subsidence movements as maximum ground strain and tilt movements do not necessarily transfer to the poles*

themselves. Potential impacts to the three poles are expected to be manageable with mitigation measures such as placing conductors in roller sheaves and reducing guy wire or stay tensions for the period of active subsidence¹⁷.

- *Buried cables are likely to be impacted by the levels of strain expected near the panel edges but given the current period of no usage of these services the consequences from mining Longwalls 7 and 8 are expected to be negligible. Uncovering buried cables would reduce the likelihood of damage.*
- *Two state survey marks have been identified within the Application Area. The marks are PM170463 and CP88311000 located above the southern end of Longwall 8B.*
- *The planned mining of Longwalls 7 and 8 is not expected to have any greater impact to agricultural utilisation, agricultural suitability of farmland or other features, on the Woodbury Property, than those outlined in the UCCO Project EA, subsequent modifications and SMP/EPs.*
- *The planned mining of Longwalls 7 and 8 is not expected to have any greater impacts to agricultural utilisation or agricultural suitability of farm land on Farris Hill Property than those outlined in the UCCO Project EA and subsequent modifications.*
- *The private bore above Longwall 7 and other sources of near-surface groundwater on the Woodbury Property within 1km or so of the planned mining of Longwalls 7 and 8 are expected to be impacted. Physical impacts to the bore are expected by fracturing and shearing of the ground. The water table is expected to be drawn down due to depressurisation of the overburden strata above each longwall panel.*
- *Any minor impacts to dams, fences/gates, access tracks or agricultural land are expected to be manageable using the same approaches that have been adopted successfully by UCM in the past via a PPSMP and BFMP.*
- *Minor impacts to the dams are expected with cracking and water loss during the period of active subsidence but are expected to be repairable with a small amount of remediation work.*
- *Impacts to the Etheridge Dam¹⁸ are expected to be consistent with those described in SCT (2018) for MOD4. These include potential for greater holding capacity and ponding at the upstream edges but also the potential for water loss due to surface cracking from Longwall 7. The dam wall is not expected to be impacted from the planned mining.*

4.5.5 Subsidence Performance Indicators & Assessment

Table 23 provides a summary of the subsidence performance indicators to inform UCMPL if the subsidence performance measures for built features are likely to be exceeded during the secondary extraction within the Application Area. **Table 23** and **Section 4.5.5.1** to **Section 4.5.5.3** also provides a summary of the monitoring from the BFMP LW1-8 (**Appendix D**), that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Impacts monitoring and management measures to private property infrastructure, as discussed in **Section 4.5.5.4**, will be managed in accordance with each individual Private Property Subsidence Management Plan (PPSMP). Impacts, monitoring and management measures to private bores outside of the Application Area are discussed in **Section 4.2**.

¹⁷ As an outcome of the Fist Workings amendment to LW7 (**Section 1.1**), there will be a reduced impact to the overhead powerline with one less pole to be mined under and reduced impact to the Telstra cable with a shorter section of the cable mine under (SCT, Oct 2021).

¹⁸ As an outcome of the Fist Workings amendment to LW7 (**Section 1.1**), there will be no physical impacts to ground level at the high-water mark of the Etheridge dam (SCT, Oct 2021).

Table 23 Built Features Subsidence Performance Indicators & Assessment

Parameter	Site	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Public Utilities	Telstra Cable ¹ Essential Energy Powerline ¹ State Survey Marks ²	Pre mining & post mining Monthly during longwall retreat	Performance indicators will be considered to have been triggered if. A greater impact than predicted to the integrity and functionality of public utilities within the Application Area has occurred.	The subsidence performance measure for built features is exceeded if investigations completed by UCMPL's ECM confirm if any of the built features subsidence performance indicators on private property triggered are mining related, due to subsidence impacts within the Application Area, as outlined in Table 24 Built Features TARP .
Built Features on Private Property	Private Property	Pre, during and post mining and/or in accordance with PPSMP	Performance indicators will be considered to have been triggered if: A greater impact than predicted to the integrity and functionality of a privately-owned built feature within the Application Area; and/or UCMPL receive a complaint from a landowner regarding a built feature or a subsidence related impact within the Application Area.	

Notes: ¹ As agreed in writing with Telstra and Essential Energy, UCMPL will reinstate the serviceability of the Telstra cable and the Essential Energy powerline if they become unserviceable during longwall mining of LW7 and LW8. ² In accordance with *Surveyor-General's Direction No. 11 – Preservation of Survey Infrastructure - Version 4.0 January 2020*, UCMPL will reinstate and resurvey the survey marks after cessation of subsidence movements has been verified by subsidence engineer.

4.5.5.1 Telstra Line

There is telecommunications (Telstra) cable above the start of Longwalls 7 and 8A that services the UCMPL owned 'Petzl' property dwelling located as shown in **Figure 6**, however it has been terminated at the boundary of the privately-owned Woodbury property and remains insitu to the Woodbury Property dwelling at this location.

UCMPL is the final customer on this telecommunications line and as agreed by Telstra the buried cable will remain in situ during mining of LW7 and LW8. After the completion of active subsidence from LW8, the cable will be retested by Telstra for continuity. If the Telstra cable is considered unserviceable, UCMPL in consultation with Telstra will reinstate the serviceability of the Telstra cable at the full cost of UCMPL (**Section 2.1.4**). The BFMP LW1-8 (**Appendix D**) includes consultation with Telstra, proposed monitoring, mitigation and remediation measures as agreed with UCMPL.

4.5.5.2 Essential Energy

There are three poles over Longwall 7, two poles on property owned by UCMPL and one pole on the privately owned Woodbury property. The powerline to the Woodbury property terminates at a single pole near the western boundary in the northwest corner of the property above Longwall 7 and does not connect to the residence. The Essential Energy line to the UCMPL owned Petzel property remains active and is buried from the last pole to the residence.

If the Essential Energy line is considered unserviceable, UCMPL in consultation with Essential Energy will reinstate the serviceability at the full cost of UCMPL (**Section 2.1.4**). The BFMP LW1-8 (**Appendix D**) includes consultation with Essential Energy and the proposed monitoring, mitigation and

remediation measures as agreed with UCMPL. Prior to mining LW7, the electrical supply for the overhead line will be isolated by an Essential Energy Authorised Person and the three poles within the Application Area surveyed. A post mining survey will be carried out of the three poles and conductors to assess impacts. Subject to the impacts after the post mining survey, agreed rectification works by UCMPL will be carried out before the electrical supply is returned, as confirmed by Essential Energy.

4.5.5.3 State Survey Marks

Two state survey marks have been identified within the Application Area. Survey marks PM170463 and CP88311000 are located above the southern end of Longwall 8B (**Figure 6**). In accordance with Section 40 of the *Surveying Regulation 2006*, UCMPL will notify the Surveyor General when it becomes aware the survey marks have been spatially moved as a result of subsidence from mining within the Application Area.

UCMPL will reinstate and resurvey the survey marks, in accordance with the *Surveyor-General's Direction No. 11 – Preservation of Survey Infrastructure - Version 4.0 January 2020*, after cessation of subsidence movements has been verified by UCMPL's subsidence engineer and Subsidence Monitoring Program. The BFMP LW1-8 (**Appendix D**) includes consultation with NSW Spatial Services and proposed mitigation and remediation measures as confirmed by NSW Spatial Services in March 2019.

4.5.5.4 Private Property Infrastructure

Approximately 60ha of the western section of privately-owned land referred to as the Woodbury Property is located at the north end of the Application Area above Longwall 7. Farm infrastructure includes the Woodbury dwelling and associated outbuildings, fencing and gates, access tracks, several dams on the drainage lines and a groundwater bore (PB8) (**Figure 6**).

Approximately 225Ha of the eastern section of private land known as the Farris Hill Property is located in the northern part of the Application Area over Longwalls 7 and 8A. Farm infrastructure is limited to access tracks, two farm dams and fences/gates. The residential site on the Farris Hill Property is located remote from the Application Area at more than 1km to the west of Longwall 8A (**Figure 6**).

Prior to longwall mining LW7 and LW8 under both private properties, UCMPL in consultation with each landowner, will have in place individual Private Property Subsidence Management Plans (PPSMPs)¹⁹ that describes the impacts, monitoring and management measures to be implemented to maintain the relevant built features safe serviceable and repairable or as agreed to by the landowner.

The landowner of the Woodbury Property does not reside permanently at the property, including inhabiting the dwelling on the property. In consultation with the landowner of the Woodbury Property, the landowner has agreed not to enter or utilise the dwelling or the associated outbuildings during extraction of LW7, until either a structural assessment confirms it safe to do so or the necessary structural works have been completed, reviewed by an engineer to confirm the dwelling or the associated outbuildings are safe and serviceable. During which time demarcation of the dwelling and outbuildings will remain in place with appropriate warning signage. If the dwelling and associated

¹⁹ Condition 26(h), Schedule 3 of PA08_0184 include a Land Management Plan that has been prepared in consultation with the relevant landowners.

outbuildings cannot be made safe, UCMPL will provide a new dwelling and outbuildings to the satisfaction of the landowner as described in the PPSMP and at the full cost of UCMPL.

Pre-mining and during mining inspections with the landowner will be undertaken at regular intervals (as agreed with the landowner) during longwall mining activities under each respective property. Post mining inspections will be completed within one month to develop a conditional assessment reports for each landowner.

As mentioned, UCMPL will ensure the residential dwelling and associated outbuildings on the Woodbury Property will not be left unsafe at the completion of longwall. Prior to the commencement of LW7 a dilapidation report will be undertaken by UCMPL and a structural report to assess impacts and required remedial works completed by an appropriate engineer will be undertaken post mining.

All necessary rectification works, engineering reports, development approvals from local council, replacement of buildings etc after mining on the Woodbury Property will be completed at the full cost of UCMPL and to the satisfaction of the landowner.

As mentioned the residential dwelling on the Farris Hill Property is located remote from the Application Area at more than 1km to the west of Longwall 8A. There are no other structures or dwellings on the Farris Hill Property within the Application Area.

4.5.5.5 Private Bores

There is one private bore within the Application Area above LW7 referred to as PB08 (**Figure 6**). Compensatory measures for this bore will be provided in the PPSMP. An Alternative Water Supply Agreement for this property is already in place to compensate for any impact to this bore. PB08 will be monitored for impacts by UCMPL as documented in the PPSMP. For private bores outside of the Application Area, UCMPL undertake private bore monitoring in accordance with the GWMP. An assessment of the groundwater levels in privately owned bores will include departures from the predicted drawdown levels as described in **Section 4.2** of the Extraction Plan.

4.5.5.6 UCMPL Infrastructure

UCMPL will carry out monitoring and management measures on its own infrastructure within the Application Area (**Figure 6**) in accordance with the Public Safety Management Plan LW1-8 (PSMP LW1-8) (**Appendix F**). The ventilation shaft, dewatering bores and substation are adjacent to LW7 and are not expected to be greatly impacted (SCT, 2021). Other UCMPL owned infrastructure including unseal roads, monitoring sites, farm dams, fences and a dwelling with associated out buildings will be inspected routinely as required by the PSMP LW1-8 (**Appendix F**).

4.5.6 Contingency Plan

In the event the subsidence performance measures for built features as summarised in **Table 23** 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 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for built features have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.5.7 Trigger Action Response Plan

UCMPL have developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for built features management.

Table 24 provides the key trigger, action, response measures for built features management that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

For further information of the management, monitoring and mitigation measures for built features refer to Section 4 of the BFMP LW1 - 8 (**Appendix D**).

Table 24 Built Features TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Public Utilities Built Features on Private Property	Greater impacts occur to applicable public utility owners.	Trigger	A greater impact to the integrity and functionality of public utilities or a privately-owned built feature within the Application Area has potentially occurred; and/or UCMPL receive a complaint from a landowner regarding a built feature potentially impacted by subsidence within the Application Area.	A greater impact to the integrity and functionality of public utilities or a privately-owned built feature within the Application Area has occurred; and/or UCMPL receive a complaint from a landowner regarding a built feature impacted by subsidence within the Application Area.
	Greater impacts occur to applicable privately owned built features.	Action	Level 1 investigation completed by UCMPL's subsidence engineer to review subsidence effects monitoring data, other influences, climatic conditions and UCMPL operational activities to confirm the trigger exceedance is mining related or other causes. Investigations completed by ECM. Notify the applicable utility owner and land owner. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include subsidence engineer to reassess subsidence impacts and complete site inspection and expand subsidence effects monitoring program as required. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact proceed to Level 2 Response.
	A complaint from a landowner regarding a built feature	Response	If Level 1 investigation confirms the impacts to the integrity and functionality of a public utility within the Application Area are within prediction, then: - Continue monitoring as required by this Extraction Plan; - Implement the agreed management and remedial measures in consultation with both UCMPL's subsidence specialist and the applicable utility owner; - Implement the agreed management and remedial measures to privately owned built features in consultation with UCMPL's subsidence specialist, structural engineer and the applicable landowner as outlined in the PPSMP; and - Provide a summary of monitoring results and investigations to the respective utility owner and within the Annual Review as outlined in Section 6.3.	If Level 2 investigation confirms the impacts to the integrity and functionality of a public utility or privately owned built feature within the Application Area are outside of predictions: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) including engaging UCMPL's subsidence engineer to assist development of adaptive management and remedial strategies as required; and UCMPL implement adaptive and remedial measures as required. Reassess subsidence impacts and update written agreement and/or agreed management strategies with public utility owner and reassess subsidence impacts and update PPSMP with the applicable landowner.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
				Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by the Extraction Plan.

4.6 Heritage Management Plan

4.6.1 Overview

The purpose of the Heritage Management Plan (HMP) (**Appendix E**) describes the legal and ethical obligations in relation to Aboriginal heritage, the Aboriginal community, European and natural heritage associated with the Project Area. The HMP also includes management and mitigation measures of the Projects impacts on Aboriginal, European and natural heritage to be implemented regarding potential environmental impacts as a result of UCMPL mining activities within the Application Area and Extraction Plan Area (**Figure 7**).

Impacts on Aboriginal and European heritage, as predicted in the Project EA as a result of subsidence include:

- Impacts to the ground surface through underground mining induced subsidence; and
- Impacts to rock shelters can include rock falls, cracking and collapse, and may range from minor in nature to total impact.

Approximately 179 Aboriginal heritage sites have been identified within, or immediately adjacent to, the Application Area. The total sites within the Application Area includes sites above Longwall 6. These sites comprise 42 artefact scatters, 46 isolated finds, one grinding grooves, two scarred trees and 87 rock shelter sites. The location of all these sites are shown in **Figure 7**. The rock shelters sites consist of 73 with potential archaeological deposits (PAD), 12 with artefacts, 1 with art and artefacts and 1 with art, grinding grooves and artefacts.

Further details on Aboriginal and European heritage, monitoring, management and assessment criteria are provided in Section 3 and Section 4 respectively of the HMP (**Appendix E**).

4.6.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). The subsidence performance measures for heritage are 'nil impact in the Brokenback Conservation Area (CA), Grinding Groove Conservation Area; and on Mona Creek Rock Shelter Sites' and 'Negligible impact to the Talbragar Fish Fossil Reserve' and 'No greater impact than predicted in the EA for other heritage sites'. The assessment of the subsidence performance measures for heritage are provided in **Section 4.6.5**.

4.6.3 Approved Impacts

The following summary of subsidence related impacts on Aboriginal heritage, were described in Project EA, which stated [extract]:

- *Sites that are located over solid coal and remote from the longwall goaf edge will not be impacted by mining subsidence were given a zero probability for the purposes of this assessment. Subsidence movements are not expected to have any practical effect on artefact scatters and isolated finds in open terrain.*
- *There is a slight possibility of subsidence cracks causing disturbance to scar trees and stone arrangements sites located close to the edge or directly over mining areas.*

- *Grinding groove sites are by their nature located on rock outcrops. Such outcrops tend to be sensitive to surface cracking. There is some potential for subsidence movements to cause cracking as a result of both horizontal compression and tension cracking.*
- *Consistent with current approved operations, up to 20% of cliff line that are undermined are likely to experience rockfall. This process has potential impacts on Aboriginal heritage rock shelters an potential habitat for cave dwelling bats.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD2) of Ulan Coal – Continued Operations (Umwelt 2012), which stated [extract]:

- *The extent and level of protection established by the Brokenback Conservation Area and the Grinding Groove Conservation areas is the same as that provided by Project Approval 08_0184.*
- *The proposed modification which includes reconfiguration of Ulan West mine plan will not cause any additional impact upon the Talbragar Fish Fossil Reserve and will retain the performance outcome of negligible impact.*
- *As discussed in Sections 4.2.3 the impacts of the proposed modifications are not greater than those predicted in the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009).*

The following summary of subsidence related impacts to heritage were described in MOD 3 which stated [extract]:

- *The Cockabutta Creek rock shelter sites are located outside of the currently approved Ulan West mine plan, and were not previously proposed to be impacted. Impact to these sites is likely as a result of the proposed modification.*
- *The extent and level of protection established by the Brokenback Conservation Area and the Grinding Groove Conservation areas is the same as that provided by Project Approval 08_0184 As discussed in Section 5.6, the proposed modification will impact on Cockabutta Creek Rock Shelter Sites.*
- *The proposed modification which includes reconfiguration of Ulan West mine plan will not cause any additional impact upon the Talbragar Fish Fossil Reserve and will retain the performance outcome of negligible impact*
- *The revised assessment indicates that there will be an increase in probability of perceptible impacts due to subsidence to 19 rock shelter sites, the ochre quarry and two grinding groove sites within the existing and proposed Ulan West mining area. The proposed modification will result in a decrease in probability of perceptible impacts on 16 rock shelter sites, one including grinding grooves.*
- *The impacts of the proposed modifications are not greater than those predicted in the UCCO Project EA.*

The following summary of subsidence related impacts to surface features, were described in MOD 4 which stated [extract]:

- *The proposed Modification will result in a minor (almost negligible) net overall increase in impacts to Aboriginal heritage in relation to the increased subsidence and construction of the conceptual surface infrastructure corridor (SEA, 2017, Appendix H). The probability for rock fall and perceptible impacts to occur has increased for two rock shelter sites/PADs, however these sites are of low heritage significance. The overall impact of the modification to Aboriginal heritage is assessed as low (ELA, 2018).*

4.6.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area *Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan* (SCT, 2021) (**Attachment G**). The following summary of subsidence related impacts to heritage within the Application Area, were described by SCT which stated [extract]:

- *Subsidence impacts to artefact scatter and isolated find sites are expected to remain negligible consistent with expectations presented in the UCCO Project EA and subsequent modifications and the monitoring experience since those assessments were prepared.*
- *Grinding grooves, scarred trees and rock shelter sites are expected to be sensitive to subsidence movements. Impacts to these types of sites are expected to be consistent with or less than the maximum impacts forecast for these types of sites in the UCCO Project EA and subsequent modifications.*
- *Overall, the forecast of probabilities for impacts to the rock shelter sites within the Application Area have generally not changed from those presented in SCT (2009) and SCT (2015a) for the original UCCO Project and MOD3 EAs as the site location has not changed relative to the planned mining geometry of Longwalls 7 and 8.*
- *The significant rock shelter sites Mona Creek 23-Mona Creek 30 (Ulan ID# 180-187) are located approximately 75m to the east of the Application Area and not expected to be impacted by Longwalls 7 and 8. One of the 10 significant rock shelter sites within the BCA is in the Application Area. This site, Ulan ID#192 (BB5), is within the Application Area but is outside the 0.5 depth zone around Longwalls 8A and 8B and expected to be fully protected.*
- *The location of two European heritage sites; ID191 and HS96D, above the northeast corner of Longwall 8B. The position of the site has changed relative to the longwall panels since the UCCO Project assessment (SCT 2009) due to mine plan changes with lower magnitude subsidence effects now expected at this location. However, the probability of rockfalls is still considered to be 20% with a 70% chance of perceptible cracking of the sandstone formation consistent with SCT (2009). Any rock falls may impact the current condition of the artefacts.*
- *The area of Crown land set aside as the Talbragar Fish Fossil Reserve is within the boundary of the Farr Hill Property. This reserve is located to the west of the Application Area approximately 280m from the goaf edge of Longwall 8A. No impacts are expected to the fish fossil deposits at the reserve from the planned mining.*

OzArk (2021) completed an assessment to consider the specific management strategies as outlined in the Project EA, MOD4, HMP and the reassessment of potential subsidence impacts by SCT (SCT 2021) in relation to Longwalls 7 and 8. OzArk's assessment recommended continued implementation of the HMP with no further recommendations. Refer to OzArk's Technical Report in **Attachment J**.

4.6.5 Subsidence Performance Indicators & Assessment

Table 25 provides a summary of the subsidence performance indicators to inform UCMPL if the subsidence performance measures for heritage are likely to be exceeded during the secondary extraction within the Application Area. **Table 25** and **Section 4.6.5.1** also provides a summary of the monitoring from the HMP, that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Table 25 Monitoring & Assessment of Subsidence Indicators (Heritage)

Parameter	Site ¹	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Aboriginal heritage	Brokenback Conservation Area & Mona Creek Rock Shelter Sites ²	Subsidence monitoring of the D Line & GNSS units in accordance with SMP LW1-8	Performance indicators will be considered to have been triggered if subsidence monitoring identifies an exceedance (or a trend to exceedance) of the predicted subsidence values ⁴ surveyed along the D Line and GNSS units.	The subsidence performance measure for biodiversity is exceeded if investigations completed by UCML's ECM confirm if any of the heritage subsidence performance indicators triggered are mining related, due to subsidence impacts within the Application Area, as outlined in Table 27 Heritage Management TARP .
		Pre mining & post mining within 6 months of LW7, LW8A & LW8B	Performance indicators will be considered to have been triggered if subsidence monitoring identifies a perceptible change as a result of subsidence induced impacts (e.g. rock fall or cracking) within the Brokenback Conservation Area or the Mona Creek Rock Shelter Sites.	
	Other heritage sites ³	Pre mining & post mining within 6 months of LW7, LW8A & LW8B	The performance indicators will be considered to be triggered if subsidence monitoring identifies other Aboriginal sites displaying greater than predicted probability of subsidence induced impact ⁵ .	
European heritage	Other heritage sites ³	Pre mining & post mining within 6 months of LW7, LW8A & LW8B	The performance indicators will be considered to be triggered if subsidence monitoring identifies other European heritage sites displaying greater than predicted probability of subsidence induced impact.	
Natural heritage	Talbragar Fish Fossil Reserve ⁶	Pre mining & post mining within 6 months of LW8A	The performance indicators will be considered to be triggered if subsidence monitoring identifies greater than negligible impacts to the Talbragar Fish Fossil Reserve i.e. potential mining impacts are observed ⁶ .	

Note:¹ No mining related impacts expected at the Grinding Groove Conservation Area as remote from planned mining (SCT, 2021) or the Talbragar Fish Fossil Reserve as they are remote from Application Area. ² Monitoring of the Mona Creek Rock Shelter Sites will be subject to land access by the private landowner. ³ Aboriginal and European heritage sites that are required to be monitored in accordance the HMP. ⁴ Performance indicators for conventional subsidence effects – maximum vertical subsidence, maximum tilt and maximum strain along the D Line due to its close proximity to the BCA. ⁵ Technical Report by SCT (SCT, 2021) refer to Appendix 2 which provides estimated probabilities (**Table 26**) of impacts to Aboriginal heritage sites for the Longwalls 7 and 8 Extraction Plan. ⁶ This reserve is located to the west of the EP Area approximately 280m from the goaf edge of Longwall 8A. No impacts are expected to the fish fossil deposits at the reserve from the planned mining (SCT, 2021).

4.6.5.1 Subsidence Monitoring Heritage

The Extraction Plan has adopted the following management and monitoring strategies²⁰ from the HMP to measure and evaluate the subsidence performance measure for Aboriginal and European heritage sites within the Application Area. Further detailed descriptions of the management and monitoring strategies for heritage are within HMP (**Appendix H**). In addition, UCML will establish a continuous global navigation satellite system (GNSS) at the BCA for LW8 to provide continuous three-dimensional (3D) ground movement data with trigger alarms as described in **Table 27**.

²⁰ HMP – Appendix C Assessment of Significance, Potential Impacts and Appropriate Management Strategies for Aboriginal Sites

A summary of the Aboriginal and European heritage monitoring for the Application Area and approved impacts is provided in **Table 26**. The locations of Aboriginal and European heritage monitoring for the Application Area are provided in **Figure 13**. Monitoring of the Mona Creek Rock Shelter Sites, outside of the Application Area will be subject to land access from the landowner.

Table 26 Aboriginal and European Heritage Monitoring

Aboriginal & European Heritage Monitoring & Management (as required by the HMP) ¹							
Ulan ID	LW	Easting	Northing	Site Description	Management	Impact Probability ²	
						Perceptible	RF/F
190	LW8	753865	6435810	Rockshelter, with art, grinding grooves & artefacts	Monitor pre mining & within 6 months post mining & Part of Rock Shelter Test Excavation Strategy	20%	5%
191	LW8	753820	6436488	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining & Part of Rock Shelter Test Excavation Strategy	70%	20%
192	LW9	753431	6436616	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining	0%	0%
271	LW8	753473	6435104	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining	50%	10%
487	LW7	754256	6436000	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining	70%	20%
488	LW8	753713	6438358	Scarred Tree	Record in detail once access available	<1%	NA
843	LW6	754516	6436534	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	50%	10%
855	LW7	754180	6436606	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	50%	10%
862	LW8	753809	6436495	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	70%	20%
898	LW9	753399	6436604	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining	0%	0%
973	LW8	753530	6434630	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining	50%	10%
977	LW6	754464	6435352	Rockshelter with artefacts	Monitor pre mining & within 6 months post mining	20%	5%
994	LW7	754241	6436010	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	70%	20%
995	LW7	754207	6436040	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	70%	20%
998	LW7	754204	6436098	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	70%	20%
1002	LW6	754447	6436270	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	50%	10%
1210	LW7	754235	6433056	Grinding Grooves	Monitor pre mining & within 6 months post mining	70%	NA
1402 ³	LW7	754076	6432852	Rockshelter with PAD	Monitor pre mining & within 6 months post mining	70%	20%

Table 26 Aboriginal and European Heritage Monitoring (cont.)

Aboriginal & European Heritage Monitoring & Management (as required by the HMP) ¹							
Site	LW	Easting	Northing	Site Description	Management	Impact Probability	
HS96/D	LW8	753809	6436494	Natural rock overhang with occasional scattered objects - associated with site/item ID191.	No monitoring required. This site has no heritage significance and there are unlikely to be any impacts during the proposed mining period.	70%	20%

Notes: ¹ Monitoring of Aboriginal and European heritage sites within the Application Area on private land will be subject to land access by the private landowner. ² Assessment of the probabilities of impacts on all the archaeological sites identified in Project EA and updated where required in MOD1, MOD3 or MOD4. ³ Impact probability revised for LW7 and LW8. RF/F = Probability of Rock Fall or Significant Rock Fracturing with Potential for Fall, Perceptible = any changes in the rock formations that are associated with mining activity and subsidence movements. Such impacts include tensile cracking ranging from fine cracks to major fractures and shear movements on bedding planes and through intact strata (SCT, 2021).

An assessment of the probabilities of impacts on all the archaeological sites identified by South East Archaeology (SEA) for the Project EA, MOD1, MOD3 or MOD4 and considered sensitive to subsidence movements are included in SCT (2009), SCT (2011), SCT (2015a) or SCT (2018) (SCT, 2021).

As required by Condition 26e of PA08_0184, the extraction plan process requires that UCMPL must provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval.

Any changes to the probabilities of impacts at individual sites presented in these assessments are a result of changes to the mining geometry since the earlier assessments were prepared. Although the forecast level of impact at individual sites may have increased due to changes to the mining geometry, the probabilities of impact has not exceeded the maximum forecast generically for any one site." In order words, the level of impacts now predicted due to increases to the probabilities of impacts to Site #1402 are not greater than the maximum predicted for any individual Aboriginal heritage site in any EA prepared for the Project (SCT, 2021). They are consistent with the general level of impact predicted to rock shelter sites (and sandstone outcrop formations and cliffs) of 70% for impacts including rock falls of up to 20%.

4.6.5.2 Previous Heritage Monitoring Sites

A summary of the previous Aboriginal and European heritage monitoring within the Extraction Plan Area as identified in the HMP have included:

- (LW1) Site ID: 1021, 1061, 1060, 106, 1064 & 1089
- (LW1) Old Ulan
- (LW2) Site ID: 1054.
- (LW3) Site ID: 115, 114, 112, 1112, 1113, 1251 & 1353
- (LW4) Site ID: 1134, 1147, 1148 & 1149
- (LW5) Site ID: 1266, 1267 & 1263
- (LW6) Site ID: 1165

4.6.5.3 Completed Aboriginal Rock Shelter Test Excavation Sampling Strategy

Rock shelter sites in accordance with Aboriginal Rock Shelter Test Excavation Sampling Strategy, applicable to Ulan West, completed as of August 2021:

- (LW2) Site ID: 1054
- (LW3) Site ID: 112 & 1353
- (LW4) Site ID: 1134, 1148 & 1149
- (LW5) Site ID: 1266, 1267 & 1263
- (LW6) Site ID: 1165, 843 & 977
- (LW7) Site ID: 190 & 994
- (LW8) Site ID: 191 (scheduled Q4 2021)

4.6.5.4 Talbragar Fish Fossil Reserve

The Talbragar Fish Fossil Reserve (TFFR) is located within the northern part of the Ulan West mining area. Mining subsidence is not expected to cause significant disturbance to the fish fossil beds because of their already fragmented nature. The TFFR has underground historical excavations, associated with previous salvage activities by tertiary education institutions (Project EA). As stated, this reserve is located to the west of the Application Area approximately 280m from the goaf edge of Longwall 8A. No impacts are expected to the fish fossil deposits at the reserve from the planned mining (SCT, 2021).

4.6.6 Contingency Plan

In the event the subsidence performance measures for heritage as summarised in **Table 25** 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 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for heritage have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.6.7 Trigger Actions Response Plan

This Extraction Plan has developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for heritage management as Section 3 and Section 5 of the HMP (**Appendix E**).

Table 27 provides the key trigger, action, response measures for heritage management that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

Table 27 Heritage Management TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Aboriginal heritage	Greater than nil impacts to Brokenback Conservation Area (BCA) or the Mona Creek Rock Shelter Sites (MCRSS)	Trigger	Subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values indicate values approaching the forecast values as present in Table 7 in adjacent longwall panel; or Horizontal and vertical movement parameters ¹ from continuous GNSS survey monitoring units for LW8 have been triggered; or Subsidence monitoring of the BCA and MCRSS identifies potential perceptible change to the pre-mining condition, including possible subsidence induced rock falls and cracking within rock shelters in the adjacent vicinity; or Other Aboriginal sites (Table 26) potentially displaying greater than predicted probability of subsidence induced impacts.	Subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values indicate an exceedance or potential for an exceedance above forecast values as present in Table 7 in adjacent longwall panel; or Horizontal and vertical movement parameters ¹ from continuous GNSS survey monitoring units for LW8 have been triggered; or Subsidence monitoring of the BCA and MCRSS identifies a perceptible change to the pre-mining condition, including possible subsidence induced rock falls and cracking within rock shelters in the adjacent vicinity; or Other Aboriginal sites (Table 26) displaying greater than predicted probability of subsidence induced impacts.
	Other heritage sites displaying greater than predicted impacts (Table 26)	Action	Level 1 Investigations initiated with UCMPL's subsidence engineer to confirm if subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values and/or trigger values from GNSS units have been exceeded have been exceeded; and review BCA, MCRSS and other Aboriginal heritage sites monitoring results against historical monitoring results (including the baseline data), recent meteorological events and UCMPL operational activities to confirm if subsidence related impacts have the potential to exceed predictions. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include resurvey and inspection of D Line to confirm no external influences have disturbed the survey line, increase frequency of inspections in the BCA and data review of the GNSS units and MCRSS as required, and site inspections undertaken with UCMPL's subsidence engineer. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.
		Response	If Level 1 investigations confirm no exceedance of subsidence forecast values, no exceedance of subsidence probabilities for other Aboriginal sites and no perceptible change to the pre-mining condition of rock shelters in the BCA and MCRSS as a result of mining, then; Continue monitoring subsidence effects as required by this Extraction Plan;	If Level 2 investigations confirm the exceedance of subsidence forecast values or exceedance of subsidence probabilities for other Aboriginal sites or perceptible or potential change to the pre-mining condition of rock shelters in the BCA and MCRSS as mining related, then: Government agency notification as outlined in the Contingency Response (Section 6.1).

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
			- Continue monitoring the BCA and MCRSS as required by the HMP; - Provide a summary of subsidence effects monitoring and investigations on Aboriginal heritage sites to UCMPL's Registered Aboriginal Parties (RAPs) as required by the HMP; and - Provide a summary of subsidence effects monitoring and investigations on Aboriginal heritage sites within the Annual Review as outlined in Section 6.3.	Investigations initiated with UCMPL's subsidence engineer and heritage specialists to assist with investigations and remedial action plans as required. Implement management and mitigation measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1). Implement management measures including engage UCMPL's subsidence engineer and heritage specialist to assist development of adaptive management, mitigation and remedial strategies as required; and UCMPL implement these as required to stop impacts on the BCA and MCRSS from subsequent longwalls. Reassess subsidence impacts. Notify UCMPL Registered Aboriginal Parties (RAPs) as required by the HMP. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.
European heritage	Other heritage sites displaying greater than predicted impacts (Table 26)	Trigger	Other European heritage sites (Table 26) potentially displaying greater than predicted probability of subsidence induced impacts.	Other European heritage sites (Table 26) displaying greater than predicted probability of subsidence induced impacts.
		Action	Level 1 Investigations initiated with UCMPL's subsidence engineer to confirm if subsidence effects monitoring along the D Line for vertical subsidence, tilt and strain values have been exceeded; and review European heritage sites monitoring results against historical monitoring results (including the baseline data), recent meteorological events and UCMPL operational activities to confirm if subsidence related impacts have exceeded predictions. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further	In addition to Level 1 investigations, increase investigations to include resurvey and inspection of D Line to confirm no external influences have disturbed the survey line, increase frequency of inspections at required European heritage sites as required and complete site inspections with UCMPL's subsidence engineer. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
			investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	
		Response	If Level 1 investigations confirm no exceedance of subsidence forecast values, no exceedance of subsidence probabilities for other European sites and as a result of mining, - Continue monitoring subsidence effects as required by this Extraction Plan; - Continue monitoring other herniate sites as required by the HMP; and - Provide a summary of subsidence effects monitoring and investigations on European heritage sites within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm the exceedance of subsidence probabilities for other European sites are mining related, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1). Implement management measures including engage UCMLP's subsidence engineer and heritage specialist to assist development of adaptive management and remedial strategies as required; and UCMLP implement adaptive and remedial measures as required. Reassess subsidence impacts. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.
Natural heritage	Talbragar Fish Fossil Reserve (TFFR)	Trigger	Subsidence monitoring identifies greater than negligible impacts to the Talbragar Fish Fossil Reserve i.e. Potential mining impacts are observed in the land adjacent to the TFFR.	Subsidence monitoring identifies greater than negligible impacts to the Talbragar Fish Fossil Reserve i.e. Mining impacts are observed and impacted the TFFR.
		Action	Level 1 investigation by reviewing subsidence effects monitoring data, other influences, climatic conditions and UCMLP operational and the landowner activities to confirm the trigger exceedance is mining related or other causes. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If Level 1 Action confirm impacts are within prediction then proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include site inspection with UCMLP's subsidence engineer. Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact impacts proceed to Level 2 Response.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
		Response	If Level 1 investigations confirm no mining impact observed, then: - Continue monitoring as required by this Extraction Plan and cease investigations; and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm a mining impact has occurred or has the potential to occur, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1). Implement management measures including engage UCMPL's subsidence engineer to assist development of adaptive management and remedial strategies as required; and UCMPL implement adaptive and remedial measures as required. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.

Notes: ¹ The proposed GNSS units for the BCA to be installed prior to the commencement of LW8 require detailed site investigations to maximise their operational efficiency. As recommended by UCMPL's subsidence engineer, until an exact location for each GNSS unit has been determined, trigger levels for vertical and horizontal movements cannot be set. UCMPL anticipate completing the site investigations with both the provider of the GNSS units and subsidence engineer later in 2022. UCMPL will provide the DPIE the trigger values when determined and update this Extraction Plan in upcoming revisions.

4.7 Public Safety Management Plan

4.7.1 Overview

The purpose of the Public Safety Management Plan for Longwalls 1 to 8 (PSMP LW1 - 8) (**Appendix F**) is to outline the management strategies, controls and monitoring programs to be implemented for the management of public safety regarding potential environmental impacts from UCMPL mining activities as described in the Extraction Plan within the Application Area and Extraction Plan Area (**Figure 6**). The relationship of the PSMP LW1 - 8 to the EMS is shown by **Figure 4**. The key subsidence impacts that may have potential consequences on land associated with the extraction of LW1 to LW8 within the Application Area include:

- Surface cracking on land features (including steps, overriders and erosion holes); and
- Cliff line rock falls.

Further details for cliff lines and land features, monitoring, management and assessment criteria are provided in LMP LW1 - 8 (**Appendix B**).

Impacts monitoring and management measures to private property that relate to safety, will be managed in accordance with each individual Private Property Subsidence Management Plan (PPSMP) (**Section 2.1.2**).

4.7.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). The subsidence performance measures for public safety are ‘no additional risk due to mining’. The assessment of the subsidence performance measures for public safety are provided in **Section 4.7.5**.

4.7.3 Approved Impacts

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.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD2) of Ulan Coal – Continued Operations (Umwelt 2012), which stated [extract]:

- *The proposed amendments will result in minor localised changes to subsidence predictions made as part of the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009). These changes however, will not significantly change the subsidence impacts previously*

described in the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009) or the Modification of Ulan Coal Continued Operations (Umwelt 2011).

- *The revised mine plan will have no additional public safety risks to those previously addressed in the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009).*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD3) of Ulan Coal - Continued Operations (Umwelt 2015), which stated [extract]:

- *The range of predicted subsidence impacts within this additional area of subsidence affectation are generally consistent with those approved under Project Approval 08_0184. The proposed modification is not anticipated to have a significant adverse impact on the land surface or natural features located within the modified Ulan West mining area, and will not have a significant adverse impact on existing land uses. Impacts of the proposed modification on built features are predicted to be consistent with the UCCO Project Environmental Assessment (EA) and PA 08_0184.*
- *The proposed modifications will have no additional public safety impacts to those previously addressed in the UCCO Project EA.*

The following summary of subsidence related impacts to surface features, were described in MOD 4 which stated [extract]:

- *Subsidence effects and impacts from the proposed Modification are predicted to be similar to those modelled and predicted for previous Modifications and the original UCCO Project EA, and consistent with subsidence that has been observed post-mining at Ulan. Estimates of conventional subsidence effects for the proposed longwall extension areas are consistent with the range of values previously forecast at similar overburden depths for the original UCCO Project EA or subsequent updates for modifications and subsidence management/extraction plans.*
- *Modification 4 will increase the area of subsidence. Impacts to surface features are assessed as minor and consistent with the subsidence performance measures contained within Condition 24 of Schedule 3 of PA 08_0184. Existing environmental management plans will be applied to the proposed Modification and will be reviewed and updated as required.*
- *No change expected - so no impact or consequence expected for cliffs in the Brokenback Conservation Area; and*
- *No change expected - potential for rock falls on less than 20% of cliff lengths mined under and for up to 70% to be perceptibly impacted for other cliffs.*

4.7.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area *Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan* (SCT, 2021) (**Attachment G**).

The following summary of subsidence related impacts to cliff lines and land features within the Application Area, were described by SCT which stated [extract]:

- *Subsidence impacts and environmental consequences from the planned mining of Longwall 7 and 8 are expected to be consistent with or less than assessments for the UCCO Project EAs and the environment performance experienced to date.*
- *Sandstone formations, including cliffs, occur on both private property and on areas owned or leased by UCM.*

- *Sandstone cliff formations directly above Longwalls 7 and 8 are limited to short sections above Longwalls 7 and 8B on the northern side of Brokenback Creek. One section of cliff line is within the BCA but outside the 0.5 depth zone around Longwalls 8A and 8B goaf edges. In this location, this feature is fully protected from subsidence impacts by the barrier of coal below the BCA and similarly, other sandstone formations within the BCA are substantially protected by the barrier of coal.*
- *Impacts to sandstone formations are expected to be consistent with UCCO Project EA forecasts, subsidence performance measures outlined in the Approval conditions and the monitoring experience for mining since the UCCO Project Approval was granted.*
- *Rock falls can be expected on up to 20% of the length of sandstone formations located directly over longwall panels and the inter-panel chain pillar between extracted panels. No rock falls are expected outside the outermost goaf edge of longwall extraction. Perceptible cracking is expected at up to 50-70% of the length of sandstone formations located directly over extracted longwall panels or chain pillars and to a distance of up to about 0.4 times overburden depth outside the goaf edge.*
- *Impacts to sandstone formations are expected to be more noticeable along the outcrops adjacent to Brokenback and Ulan Creeks where the overburden depth is less and the formations are higher, longer and more continuous in nature.*
- *Cracks are expected near the panel edges with transient cracking over the centre of the panel as Longwalls 7 and 8A retreat. Cracking is expected to be most noticeable around the panel edges and on slopes and crests of the topographic high points where the cracking is expected to be permanent without remedial work. Cracking is expected to be generally up to 100mm wide and potentially up to 200mm wide on steeper ground and near topographic high points. Cracks may appear wider at the surface if surface soil slumps into or is washed into a subsidence crack.*
- *Potholes caused by piping erosion into surface cracks may occur in areas where there are cracks intersecting drainage or flow lines and there are dispersive soils and overland flow from heavy rainfall events.*

4.7.5 Subsidence Performance Indicators & Assessment

Table 28 provides a summary of the subsidence performance indicators to inform UCMPL if the subsidence performance measures for public safety are likely to be exceeded during the secondary extraction within the Application Area. **Table 28** and **Section 4.7.5.1 to Section 4.7.5.3** also provides a summary of the monitoring from the PSMP LW1-8 (**Appendix F**), that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Table 28 Monitoring & Assessment of Subsidence Indicators (Public Safety)

Parameter	Site ¹	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Measures
Public safety	The Extraction Plan Area	Monthly	Performance indicators will be considered to have been triggered if: Analysis of subsidence monitoring data indicates an exceedance of subsidence predictions for cliffs and land during mining within the Extraction Plan Area; and/or UCMPL become aware that a member of the general public may have entered the Extraction Plan Area without authorisation and a safety incident has potentially occurred.	The subsidence performance measure for public safety is exceeded if investigations completed by UCMPL's ECM confirm if any of the public safety subsidence performance indicators triggered are mining related, due to subsidence impacts within the Extraction Plan Area as outlined in Table 29 Public Safety Management TARP.

Note:¹. Subsidence impacts, monitoring and management measures on private land will be managed in accordance with each individual Private Property Subsidence Management Plan (PPSMP) in **Section 2.1.2**. Public access on private land is managed by the relevant landowner.

4.7.5.1 Brokenback Conservation Area Monitoring

Pre-mining and post mining inspection of cliff lines and rock shelters will be completed in the Brokenback Conservation Area (BCA) to monitor for any far field subsidence movements effects (**Figure 6**). The UW mine plan has been designed with a coal barrier to protect specific sections of cliff lines and Aboriginal heritage sites within the BCA. The aim is to assess if there has been a perceptible change when compared to the pre-mining baseline condition for qualitative post mining comparison and against the subsidence performance measures as provided in **Table 19**. The monitoring methodology will use photographic recordings of cliff lines and rock shelters identified within the BCA.

4.7.5.2 Cliff Line Monitoring

Pre-mining cliff line monitoring within the Application Area will be undertaken prior to the commencement of secondary extraction of each longwall, to establish the base line condition for quantitative and qualitative post mining comparison (**Figure 6**). The aim of the cliff line monitoring program is to assess the amount of mining induced rock-fall on cliff formations (as a percent of the total cliff line within the zone of influence of subsidence for each longwall panel) in the Application Area, against the subsidence performance measures in **Table 19**. The monitoring methodology will use photographic recordings of cliff lines and rock shelters and measured rockfalls.

4.7.5.3 General Surface Inspections

During longwall mining within the Application Area, UCMPL will undertake monthly inspections for subsidence affected surface areas to identify potential subsidence hazards on both UCMPL owned land and non-UCMPL owned land²¹. The inspections will identify, record subsidence affected areas where cracking or other subsidence related impacts has occurred and then recommend appropriate remediation works, where necessary.

If subsidence impacts are causing a potential safety risk, the area will be cordoned off and signage placed to prevent access. Remedial actions to address the subsidence impacts may include the infilling

²¹ In accordance with the relevant Private Property Subsidence Management Plan (PPSMP) for each private landowner.

of subsidence cracks with inert or locally sourced material, compacted, reprofiled and where necessary reseeded or revegetated to stabilise surrounding disturbed areas in consideration of Section 6.2 of the RMP LW1-8.

For further information regarding management measures to mitigate, remediate and monitor subsidence impacts refer to the RMP LW1-8 (**Appendix H**).

4.7.5.4 Restricted Access

UCMPL have established boundary fencing on UCMPL owned and controlled land with locked gates and warning signage which excludes the general public from accessing the Extraction Plan Area and the Application Area. Regular inspections of applicable boundary fences, gates and signage will be undertaken during longwall mining activities within the Application Area. Where required fences, gates and signage will be repaired. Refer to Figure 4 in the PSMP LW1-8 displaying the location of UCMPL's secured gates and signage (**Appendix F**).

4.7.6 Plan Contingency Plan

In the event the subsidence performance measures for public safety as summarised in **Table 28** 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 6.1** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm the subsidence performance measures for public safety have been exceeded and/or higher than predicted subsidence and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.7.7 Trigger Actions Response Plan

This Extraction Plan has developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for public safety management.

Table 29 provides the key trigger, action, response measures for public safety management that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

For further information of the management, monitoring and mitigation measures for public safety refer to Section 6 of the PSMP LW1 - 8 (**Appendix F**).

Table 29 Public Safety Management TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Public safety	Subsidence impacts of cliff lines and land in general are greater than predicted. Unauthorised access to UCMPL land resulting in a safety incident.	Trigger	Analysis of subsidence monitoring data indicates a potential exceedance of subsidence impacts as predicted for cliff lines and land within the Extraction Plan Area; or UCMPL become aware that a member of the general public may have entered the Extraction Plan Area without authorisation and a safety incident has potentially occurred.	Analysis of subsidence monitoring data indicates an exceedance of subsidence impacts as predicted for cliff lines and land within the Extraction Plan Area. UCMPL become aware that a member of the general public has entered the Extraction Plan Area without authorisation and a safety incident has occurred.
		Action	Level 1 Investigation by UCMPL for cliff lines and land in accordance with Table 20 Land Management TARP ; or Investigation by UCMPL of operational activities, site security measures including boundary fences, signage and locked gates and site personnel to confirm if an unauthorised entry into the Extraction Plan area has occurred. Investigations completed by ECM. Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If Level 1 Action confirm impacts are within prediction or no unauthorised access has occurred then proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include Level 2 Investigation by UCMPL for cliff lines and land in accordance with Table 20 Land Management TARP . Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact or unauthorised access has occurred leading to a safety incident then proceed to Level 2 Response.
		Response	If Level 1 investigations confirm no exceedance of subsidence impacts on land and cliff lines or no unauthorised entry into the Extraction Plan Area has occurred, then; - Continue monitoring as required by this Extraction Plan and cease investigations; and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm exceedance of subsidence impacts on land and cliff lines or unauthorised entry into the Extraction Plan Area that has resulted in a safety incident, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMPL's subsidence engineer to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) as described for cliff lines and land in Table 20 . Review boundary fencing and signage for adequacy and implement recommendations from investigations to improve site security.

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
				Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.

4.8 Rehabilitation Management Plan

4.8.1 Overview

The purpose of the Rehabilitation Management Plan for Longwalls 1 to 8 (RMP LW1 - 8) (**Appendix H**) outlines the rehabilitation management strategies to be implemented for the management of subsidence induced impacts on surface features from UCMPL mining activities as described in the Extraction Plan within the Application Area (**Figure 6**). The relationship of the RMP LW1 - 8 to the EMS is shown by **Figure 4**. The key subsidence impacts that may have potential consequences on land associated with the extraction of LW7 and LW8 within the Application Area include surface cracking on land features (including steps, overrides and erosion holes).

Further details for land features, monitoring, management and assessment criteria are provided in the RMP LW1 - 8 (**Appendix H**).

Subsidence impacts monitoring and management measures to private property will be managed in accordance with each individual PPSMP (**Section 2.1.2**).

4.8.2 Subsidence Performance Measures

In accordance with Condition 24 of Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (**Table 2**). However, there are no specific subsidence performance measures relevant for rehabilitation. Therefore, UCMPL have developed subsidence performance indicators for rehabilitation with consideration to the applicable rehabilitation objectives as described in the Mining Operations Plan (MOP). The assessment of the subsidence performance indicators for rehabilitation is provided in **Section 4.8.5**.

4.8.3 Approved Impacts

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.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD2) of Ulan Coal – Continued Operations (Umwelt 2012), which stated [extract]:

- *The proposed amendments will result in minor localised changes to subsidence predictions made as part of the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009). These changes however, will not significantly change the subsidence impacts previously described in the Ulan Coal – Continued Operations Environmental Assessment (Umwelt 2009) or the Modification of Ulan Coal Continued Operations (Umwelt 2011).*
- *[Other cliffs] The proposed modifications are consistent with PA08_0184 and will result in no more than minor environmental consequence.*

The following summary of revised subsidence related impacts as described in the Environmental Assessment Modification (MOD3) of Ulan Coal - Continued Operations (Umwelt 2015), which stated [extract]:

- *Surface cracks are expected to be generally isolated and increase in size inversely to overburden thickness ranging from 20mm wide in flat and gently undulating terrain and generally less than then 100mm side elsewhere but possibly up to 250mm wide in shallow cover areas.*
- *Cliff formations located directly above the mining area are likely to be impacted by mining subsidence with potential for cracking, shear displacements, and rock falls. Based on previous experience of mining under similar sandstone cliffs at Ulan, rock falls on 10-20% of the sandstone cliff formations located directly above the mining area are expected.*

The following summary of subsidence related impacts to surface features, were described in MOD 4 which stated [extract]:

- *Subsidence effects and impacts from the proposed Modification are predicted to be similar to those modelled and predicted for previous Modifications and the original UCCO Project EA, and consistent with subsidence that has been observed post-mining at Ulan. Estimates of conventional subsidence effects for the proposed longwall extension areas are consistent with the range of values previously forecast at similar overburden depths for the original UCCO Project EA or subsequent updates for modifications and subsidence management/extraction plans.*
- *Modification 4 will increase the area of subsidence. Impacts to surface features are assessed as minor and consistent with the subsidence performance measures contained within Condition 24 of Schedule 3 of PA 08_0184.*

4.8.4 Revised Impacts

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW7 and LW8 within the Application Area Ulan West Mine: Subsidence Assessment for Longwalls 7-8 Extraction Plan (SCT, 2021) (**Attachment G**).

The following summary of subsidence related impacts to cliff lines and land features within the Application Area, were described by SCT which stated [extract]:

- *Subsidence impacts and environmental consequences from the planned mining of Longwall 7 and 8 are expected to be consistent with or less than assessments for the UCCO Project EAs and the environment performance experienced to date.*
- *Cracks are expected near the panel edges with transient cracking over the centre of the panel as Longwalls 7 and 8 retreat. Cracking is expected to be most noticeable around the panel edges and on slopes and crests of the topographic high points where the cracking is expected to be permanent without remedial work. Cracking is expected to be generally up to 100mm wide and potentially up to 200mm wide on steeper ground and near topographic high points. Cracks may appear wider at the surface if surface soil slumps into or is washed into a subsidence crack.*
- *Potholes caused by piping erosion into surface cracks may occur in areas where there are cracks intersecting drainage or flow lines and there are dispersive soils and overland flow from heavy rainfall events.*

4.8.5 Subsidence Performance Indicators & Assessment

Table 30 provides a summary of the subsidence performance indicators for rehabilitation during the secondary extraction within the Extraction Plan Area. **Table 30** and **Section 4.8.5.1** also provides a summary of the monitoring from the RMP LW1-8 (**Appendix H**), that will be undertaken to assess if any of the subsidence performance indicators have been triggered.

Table 30 Monitoring & Assessment of Subsidence Indicators (Rehabilitation)

Parameter	Site	Frequency	Subsidence Performance Indicators	Assessment of Subsidence Performance Indicators
Surface cracking Erosion Holes	The Extraction Plan Area	Monthly	Performance indicator will be considered to have been triggered if: Analysis of subsidence monitoring data and approved impacts, indicates that undermined landforms present a greater than predicted impact resulting in greater than predicted remediation works within the Extraction Plan Area.	The subsidence performance indicator for rehabilitation is exceeded if investigations completed by UCMPL's ECM confirm if the rehabilitation subsidence performance indicators triggered are mining related, due to subsidence impacts within the Extraction Plan Area, as outlined in Table 31 Rehabilitation Management TARP .

4.8.5.1 General Surface Inspections

During longwall mining within the Application Area, UCMPL will undertake monthly inspections for subsidence affected landforms and cliffs to identify potential subsidence hazards on both UCMPL owned land and non-UCMPL owned land²².

The inspections will identify, record subsidence affected areas where cracking or other subsidence related impacts has occurred and then recommend appropriate remediation works, where necessary. If subsidence impacts are causing a potential safety or environmental risk, the area will be cordoned off and signage placed to prevent access. Remedial actions to address the subsidence impacts will be completed as soon as practicable.

The decision to remediate subsidence impacts will take into consideration accessibility, potential risks to public, employee and contractor safety and the environment. If assessments determine 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 assessments determine subsidence cracking requires remediation, an appropriate method will be selected to minimise the potential disturbance to the surrounding environment.

Prior to the commencement of any subsidence remediation works, a Ground Disturbance Permit (GDP) must be completed and signed by the ECM (or delegate) to identify any potential environmental and heritage issues including threatened flora and fauna, Aboriginal archaeology sites and appropriate erosion and sediment controls. All required remediation works within the Extraction Plan Area must be carried out in accordance with the GDP.

UCMPL will apply a number of potential management measures to mitigate or remediate subsidence impacts on landforms resulting from underground mining operations with the Extraction Plan Area. These may include the infilling of subsidence cracks with inert or locally sourced material, compacted, reprofiled and where necessary reseeded or revegetated to stabilise surrounding disturbed areas in consideration of Section 6.2 of the RMP LW1-8.

²² In accordance with the relevant Private Property Subsidence Management Plan (PPSMP) for each private landowner.

For further information regarding management measures to mitigate or remediate subsidence impacts refer to the RMP LW1-8 (**Appendix H**).

4.8.6 Plan Contingency Plan

In the event the subsidence performance measures for rehabilitation as summarised in **Table 30** 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 6.3** of the Extraction Plan. **Section 6.1** displays the Contingency Plan to be implemented in the event UCMPL confirm a greater than predicted impact and/or environmental consequence has occurred or in the event of a subsidence related incident.

4.8.7 Trigger Actions Response Plan

This Extraction Plan has developed Trigger Action Response Plans or TARPs which detail trigger events, investigations required, notifications to be undertaken, management and contingency actions for rehabilitation management.

Table 31 provides the key trigger, action, response measures for rehabilitation management that UCMPL's Environment and Community Manager (ECM) or delegate, will implement that relate to investigations required, notifications to be undertaken, management and contingency actions for potential subsidence related impacts for this Extraction Plan.

For further information of the management, monitoring and mitigation measures for rehabilitation refer to Section 6 of the RMP LW1 - 8 (**Appendix H**).

Table 31 Rehabilitation Management TARP

Parameter	Indicator	Trigger/ Action/Response	1st Level Trigger: Approved Impacts & Subsidence Performance Measures Are Potentially Exceeding	2nd Level Trigger: Approved Impacts & Subsidence Performance Measures Have Been Exceeded
Surface cracking and erosion holes	Greater than predicted impact resulting in greater than predicted remediation works	Trigger	Analysis of subsidence monitoring data and approved impacts, indicates undermined landforms potentially presenting a greater than predicted impact resulting in greater than predicted remediation works within the Extraction Plan Area.	Analysis of subsidence monitoring data and approved impacts, indicates undermined landforms have a greater than predicted impact resulting in greater than predicted remediation works within the Extraction Plan Area.
		Action	Level 1 Investigation by UCMLPL for land in accordance with Table 20 Land Management TARP ; or Note: If Level 1 investigations are indicating a greater than predicted impact then proceed to Level 2 Action for further investigations. If impacts are confirmed within prediction during Level 1 investigations, proceed to Level 1 Response.	In addition to Level 1 investigations, increase investigations to include Level 2 Investigation by UCMLPL for cliff lines and land in accordance with Table 20 Land Management TARP . Note: If Level 2 investigations confirm impacts are within prediction then proceed to Level 1 Response. Confirmation of greater than predicted impact then proceed to Level 2 Response.
		Response	If Level 1 investigations confirm no exceedance of subsidence impacts on land has occurred, then; - Continue monitoring as required by this Extraction Plan and cease investigations; - Implement remedial measures including infilling, compaction and reprofiling as required by the Extraction Plan (refer to RMP LW1-8); - Remediate flow lines identified by UCMLPL's subsidence specialist as a high risk of developing into an erosion hole for example (Refer to RMP LW1-8); and - Provide a summary of monitoring results and investigations within the Annual Review as outlined in Section 6.3.	If Level 2 investigations confirm exceedance of subsidence impacts on land, then: Government agency notification as outlined in the Contingency Response (Section 6.1). Investigations initiated with UCMLPL's subsidence engineer to assist with investigations and remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response (Section 6.1) as described for cliff lines and land in Table 20. Review the Extraction Plan and reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response (Section 6.1). Provide a summary of monitoring results, investigations and remedial action plans within the Annual Review as outlined in Section 6.3. Follow up information to the DPIE where requested. Continue monitoring as required by this Extraction Plan.

5. Subsidence Monitoring Program

5.1 Subsidence Effects Monitoring

Subsidence effects monitoring at Ulan West currently consists of surveys of C and D monitoring lines across the southern sections of the UW longwall panels. The current extent of the subsidence lines are shown in **Figure 10**. These existing subsidence lines are providing high resolution subsidence monitoring at a range of overburden depths (SCT, 2021). As recommend by SCT (2021) maintenance and surveys of these monitoring lines to be consistent with the recommendations in SCT (2020a). These include:

- Ongoing monitoring of the UW-C and UW-D lines;
- The addition of a new subsidence monitoring line (UW-I) to the north;
- Extensions to the lines to maintain these lines to 2km from the active panel edge where possible with pegs spaced at 50m;
- Maintaining pegs at spacings equal to 1/20th overburden depth for a distance equal to overburden depth from the western goaf edge of the active longwall panel and establishing values for infilled pegs before these marks are affected by subsidence movements;
- Surveys when longwall face is below and 0.3 times depth past the monitoring line; and
- End of panel surveys of each installed peg conducted over the full length of each line out to 2km from the nearest goaf edge or to the end of the line whichever occurs first).

A summary of the subsidence monitoring program to measure the effects of the subsidence and to evaluate against the subsidence predictions (**Table 7**) is provided in **Table 32** and displayed in **Figure 10**.

The Ulan West Technical Services Manager is responsible for ensuring the implementation of the subsidence effects monitoring program as outlined in **Table 32**. The Ulan West Registered Mine Survey is responsible for ensuring the surveys of the ground transects are completed during each longwall and the data is verified, processed and maintained as outlined in **Table 32**.

5.2 Consolidated Subsidence Monitoring Program

A summary of the consolidated environmental, heritage, land management, built features and public safety monitoring programs implemented by UCMPL to evaluate the impacts from subsidence within the Application Area and the Extraction Plan Area is provided in **Table 33** and displayed in **Figures 11 to 15**.

The Environment and Community Manager is responsible for ensuring monitoring, visual inspections and recording data of groundwater, surface water, flora and fauna and surface features (including internal roads and cliff lines) and Aboriginal and European heritage and reporting are carried out as outlined in **Table 33**.

Table 32 Ulan West Subsidence Effect Monitoring Summary

Survey Line ¹	Data Type	Parameters	Accuracy of Survey ²	Survey Frequency	Responsibilities & Reporting
UW - C UW - D UW - I³	3D Position (X, Y, Z)	- Subsidence parameters to be measured on survey monitoring marks based on three dimensional position of each peg using far field GPS control network: - Vertical subsidence; - Cross Panel Horizontal Movement. - Long Panel Horizontal Movement. - Tilt; and - Strain along Line.	As specified by <i>ULWUG-729531900-536 Survey Methodology and Accuracies – Subsidence Monitoring</i>	- Survey completed prior to commencement of longwalls. - Survey monitoring to be completed during each longwall retreat at the following stages: - LW Face is below the Monitoring Line 0.3 x depth of cover after survey the Monitoring line For further information at appropriate chainage for survey frequencies, refer to drawing: <i>No. UWO-10-0836 No. UWO-05-0277.</i>	- Survey data recorded from the subsidence line survey program will be verified, processed and maintained by the Ulan West Mine Surveyor and the Ulan West Technical Services Manager. - The responsibility of maintaining the Subsidence Management Status Report will be undertaken by the Ulan West Technical Services Manager, and provided at the request of relevant government agencies - Cliff line and internal road data recorded from the visual inspection program will be verified, processed and maintained by the Environment & Community Manager. - Incident and annual reporting requirements will be the responsibility of the Environment & Community Manager. - Reporting of subsidence monitoring program in accordance with Section 6.3 to include: - Incident Reporting: Notification with 24hrs of becoming aware of the occurrence. - Annual Report: Submitted to the Secretary within twelve months of approval date and annually thereafter (now submitted as part of the Annual Review) - Annual Review (AR): Submitted before 31 March annually. Reporting period 01 January to 31 December.
Visual Inspections: (Cliff Lines & Internal Roads)	X, Y Coordinates	- Parameters to be monitored for general surface and landscape features of internal access tracks and cliff lines include: - Length of rock falls (m) along cliff lines; - Perceptible cracking along cliff lines; - Surface cracking on access tracks; - Subsidence steps on access tracks; & - Fallen trees across access tracks.	- Equipment to record locations include: - Inspection Forms (Attachment C of SMP LW1 – 8); & - GPS digital camera accurate +/- 5m (or equivalent);	- Visual inspections of cliff lines and internal roads completed prior to commencement of each longwall. - Visual inspections to be completed monthly during each longwall for internal roads. - Visual inspections of cliff lines to be completed at the end of each longwall.	

Notes: Surveys are calculated and plotted using GDA 2020 MGA Zone 55

¹ Layout of survey lines and survey marks across the Application Area shown on **Figure 9**. Installation details of survey marks provided **Appendix I**

² In accordance with *Survey Methodology* and *Subsidence Survey Accuracies* provided in SMP LW1 – 8 (**Appendix G**)

³ Indicative location of new subsidence monitoring line UW-I in **Figure 10**. Final location will be subject to landholder access or other constraints identified in the GDP process.

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Table 33 Consolidated Subsidence Monitoring Program Summary

Management Plan	Monitoring Component	Parameters	Location/Network	Monitoring Frequency
Water Management Plan**	Surface Water Quality Monitoring (SWMP)	- TSS (mg/L) - EC - pH (µS/cm)	- Ulan Creek (SW04) - Mona Creek (SW10) - Cockabutta Creek (SW11) - Refer to Figure 11	Monthly & Event Based (i.e., >30mm in a 24hr period in accordance with the SWMP)
	Channel Stability Monitoring* (SWMP)	Monitoring to distinguish between natural erosion and erosion from mine subsidence instability along representative tributaries of Ulan, Mona and Cockabutta Creeks.	- Ulan Creek - Mona Creek - Representative tributaries of Ulan Creek, Mona Creek and Cockabutta Creek - Refer to Figure 11	- Pre-mining before longwall retreats past monitoring point; and - Post mining annually thereafter for a period of two years.
	Ponding and Erosion Monitoring* (SWMP)	Presence of surface cracking and erosion, surface ponding or out of channel flows.	- Tributaries of Ulan Creek - Tributaries of Mona Creek - Tributaries of Cockabutta Creek - Refer to Figure 11	- Pre-mining before longwall retreats past monitoring point; and - Post mining annually thereafter for a period of two years.
	Stream Health Monitoring (SWMP)	Monitoring aquatic macro invertebrates to detect potential changes in water quality.	- Ulan Creek - Mona Creek - Cockabutta Creek - Refer to Figure 11	Annually (Spring)
	Groundwater Monitoring (GWMP)	- Piezometric pore pressures (VWP network). - Standing water levels (m) and quality in private bore monitoring, including: - EC (µS/cm) & pH;	- Private Bore Monitoring Network - North Monitoring Network: - Vibrating Wire (VW) piezometers. - Refer to Figures 12 & 12a	- Quarterly download VWP data loggers; and - Annually monitoring water levels and quality pH and EC in private bores.
Land Management Plan LW1 – LW8	Surface Cracking	- Visual observation to monitor and record the condition of the ground surface including internal roads. - Notes: Handheld GPS accurate +/- 5m to record extent of surface cracking.	- General surface landforms above longwalls within Application Area during mining. - Refer to Figure 15	Monthly during longwall extraction.
	Cliff Lines^	Visual observations to record signs of surface cracking and quantify length (m) of rock falls.	- Cliff lines above within the Application Area. - Refer to Figure 15	- Pre-mining before longwall retreats past cliff lines above longwall panels. - Post mining within 6 months of longwall retreating past cliff lines above longwall panels.

Notes: *Additional sites within and in the vicinity of the Application Area to be identified during pre-mining inspections. Sites above LW1-LW3 no longer require monitoring but shown for completeness. Sites shown on **Figure 11** indicative unless otherwise stated. **Refer to SWMP and GWMP for methodologies and monitoring standards. ^ As defined by the 2009 EA.

Table 33 Consolidated Subsidence Monitoring Program Summary (cont.)

Management Plan	Monitoring Component	Parameters	Location/Network	Monitoring Frequency
Land Management Plan LW1 – LW8	Cliff Lines in the Brokenback Conservation Area (BCA)	- Visual observations to record signs of surface cracking and quantify length of rock falls. - Continuous global navigation satellite system (GNSS) (or equivalent) for LW8 to provide continuous three-dimensional (3D) ground movement data with trigger alarms.	- Cliff lines within the Brokenback Conservation Area. - GNSS unit to be installed in BCA adjacent to LW8 before mining (location to be confirmed by survey and subsidence specialist). - Refer to Figure 14	- Pre-mining before longwall retreats past the BCA. - GNSS unit data downloaded monthly during LW8 retreat and then weekly within 400m of the BCA. - Post mining within 6 months of longwall retreating past BCA.
	Cliff Lines (Targeted Cliff Lines)	Monitoring of endangered micro-bat activity levels.	- Cliff lines above Application Area, Extraction Plan Area and Project Area. - Refer to Figure 14	Before longwall mining of each panel between November and December and annually thereafter during the same period in accordance with the BMP.
Biodiversity Management Plan**	Floristic based subsidence (FBS) monitoring	Monitoring foliage canopy cover of a FBS sites within the subsidence zone with foliage canopy cover in the transition zone.	- Floristic Based Subsidence (FBS) sites located above Application Area, Extraction Plan Area and Project Area. - Refer to Figure 14	Before longwall mining of each panel in Spring and Autumn and after longwall mining during the same period for another 2 years in accordance with the BMP.
		Monitoring foliage canopy cover in the selected vegetation community located above mining areas.		
		Reduction in abundance and/or condition of hollow bearing trees (HBTs) at FBS monitoring sites suitable for Masked Owls.		
		Canopy foliage cover of key feed species at FBS monitoring sites suitable for either the Regent Honeyeater and/or Swift Parrot.		

Notes:** Refer to BMP for methodologies and monitoring standards.

Table 33 Consolidated Subsidence Monitoring Program Summary (cont.)

Management Plan	Monitoring Component	Parameters	Location/Network	Monitoring Frequency
Built Features Management Plan LW1 – LW8	UCMPL owned	Visual observations to record the general condition of UCMPL assets including serviceability and safety.	- UCMPL owned infrastructure within and in the vicinity of the Application Area - Refer to Figure 15	Visual inspections to be completed monthly during active longwall retreat for internal roads and landforms.
	Public utilities	- Monitor and if required reinstate the serviceability as agreed with Telstra and Essential Energy if they become unserviceable due to LW7 and LW8. - Reinstate and resurvey the Survey State Marks after cessation of subsidence movements with data from the Subsidence Monitoring Program.	Refer to Figure 15	- Monitor Telstra and Essential Energy assets monthly during longwall active longwall retreat. - After LW8 has retreated past the Telstra cable and the Essential Energy powerline, both assets will be tested for serviceability in consultation with the asset owners. - Cessation of subsidence movements verified by the subsidence engineer.
	Privately owned	- Visual observations to record the general condition of the assets including serviceability and safety. - Dilapidation report for residential and outbuildings associated with the Woodbury Property. - Visual observations to record the general condition of landforms.	- As agreed in the PPSMP - Refer to Figure 15	- As agreed in the PPSMP, in general: - Pre mining inspections to record the baseline condition of natural and built features. - Monthly during longwall active mining. - Post mining inspections to record subsidence related impacts for comparative assessments and develop remediation strategies.
	Private Bores (Groundwater)	- Standing water levels (m). - Water quality: - pH; and - EC (µS/cm)	- Private Bore Monitoring Network** - Refer to GWMP** for site coordinates. - Refer to Figure 12	Annually

Notes:** Refer to GWMP for methodologies and monitoring standards.

Table 33 Consolidated Subsidence Monitoring Program Summary (cont.)

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Management Plan	Monitoring Component	Parameters	Location/Network	Monitoring Frequency
Heritage Management Plan**	Aboriginal Heritage Monitoring	Visual inspections of Aboriginal heritage sites as identified for monitoring in the HMP within the Application Area.	Table 26 - Refer to Figure 13	- Pre-mining before longwall retreats below Aboriginal heritage sites. - Post mining within 6 months of longwall retreating past Aboriginal heritage sites.
	European Heritage	Photographic recording of chimneys at Old Ulan.	Old Ulan	- Visual inspections completed every 5 years. - Opportunistic photographs to record the condition of Old Ulan.
	Aboriginal heritage sites in the Brokenback Conservation Area (BCA)	- Visual inspections to record condition of rock shelters to identify for any signs of perceptible change e.g. surface cracking and/or rock falls. - Continuous global navigation satellite system (GNSS) (or equivalent) for LW8 to provide continuous three-dimensional (3D) ground movement data with trigger alarms	Table 26 - GNSS unit to be installed in BCA adjacent to LW8 before mining (location to be confirmed by survey and subsidence specialist). - Refer to Figure 13	- Pre-mining before longwall retreats past the BCA. - GNSS unit data downloaded monthly during LW8 retreat and then weekly within 400m of the BCA. - Post mining within 6 months of longwall retreating past BCA.
	Aboriginal Rock Shelter Test Excavation Sampling Strategy	Test excavation of selected rock shelters to identify the nature of deposits, site integrity and research potential, and enable a reassessment of significance.	Refer to Section 4.6.5.3	- Test excavation of selected rock shelters to be completed prior to commencement of respective longwall panels. Notes: Aboriginal Rock Shelter Test Excavation Sampling Strategy completed within the Application Area and Extraction Plan Area (Section 4.6.5.3)
Public Safety Management Plan LW1 – LW8	Internal Roads and Landforms Signage Gates and fences	- Monitoring for subsidence induced cracking on internal roads and landforms within the Application Area. - Ensure adequate signage warning of subsidence impacts are established on the boundary to UCMPL owned land. - Ensure UCMPL owned boundary fencing and gates are maintained and secures as required.	- UCMPL boundary fencing and gates - Potential internal roads within the Application affected by subsidence include: - Valley Way Road; and - Brokenback Road. - Refer to Figure 4 in the PSMP LW1-8	- Visual inspections of landforms and internal roads completed prior to commencement of each longwall. - Visual inspections to be completed monthly during active longwall retreat for internal roads and landforms. - Visual inspections of cliff lines to be completed within 6 months of longwall retreat.
Rehabilitation Management Plan LW1-LW8	Internal Roads and landforms	Monitoring for subsidence induced cracking on internal roads and landforms within the Extraction Plan Area during mining.	- Application Area - Refer to Figure 15	Visual inspections to be completed monthly during active longwall retreat for internal roads and landforms.

Notes:** Refer to HMP for methodologies and monitoring standards.

Figure 10 Ulan West Subsidence Effects Monitoring Lines C, D and I

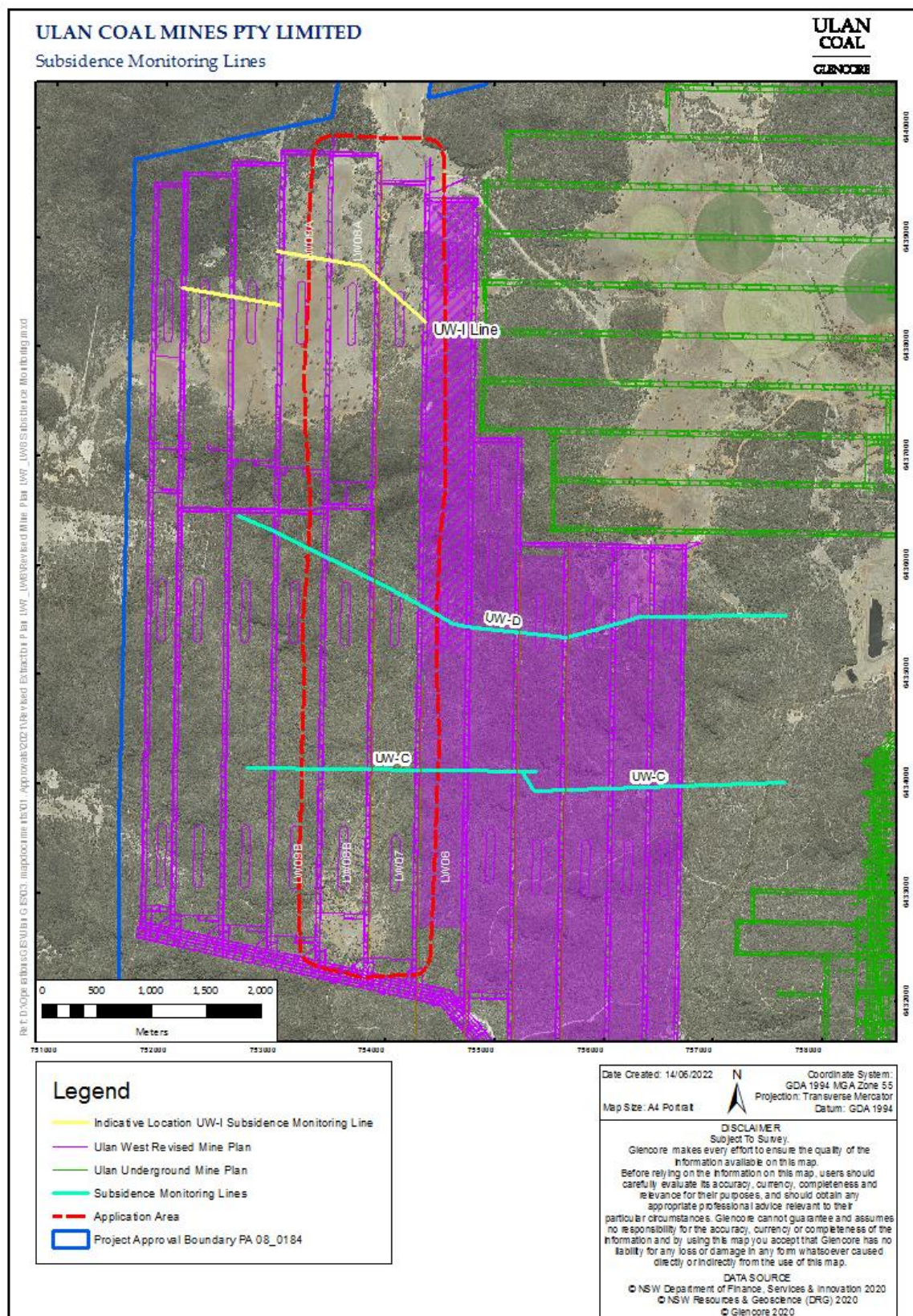


Figure 11 Surface Water Monitoring

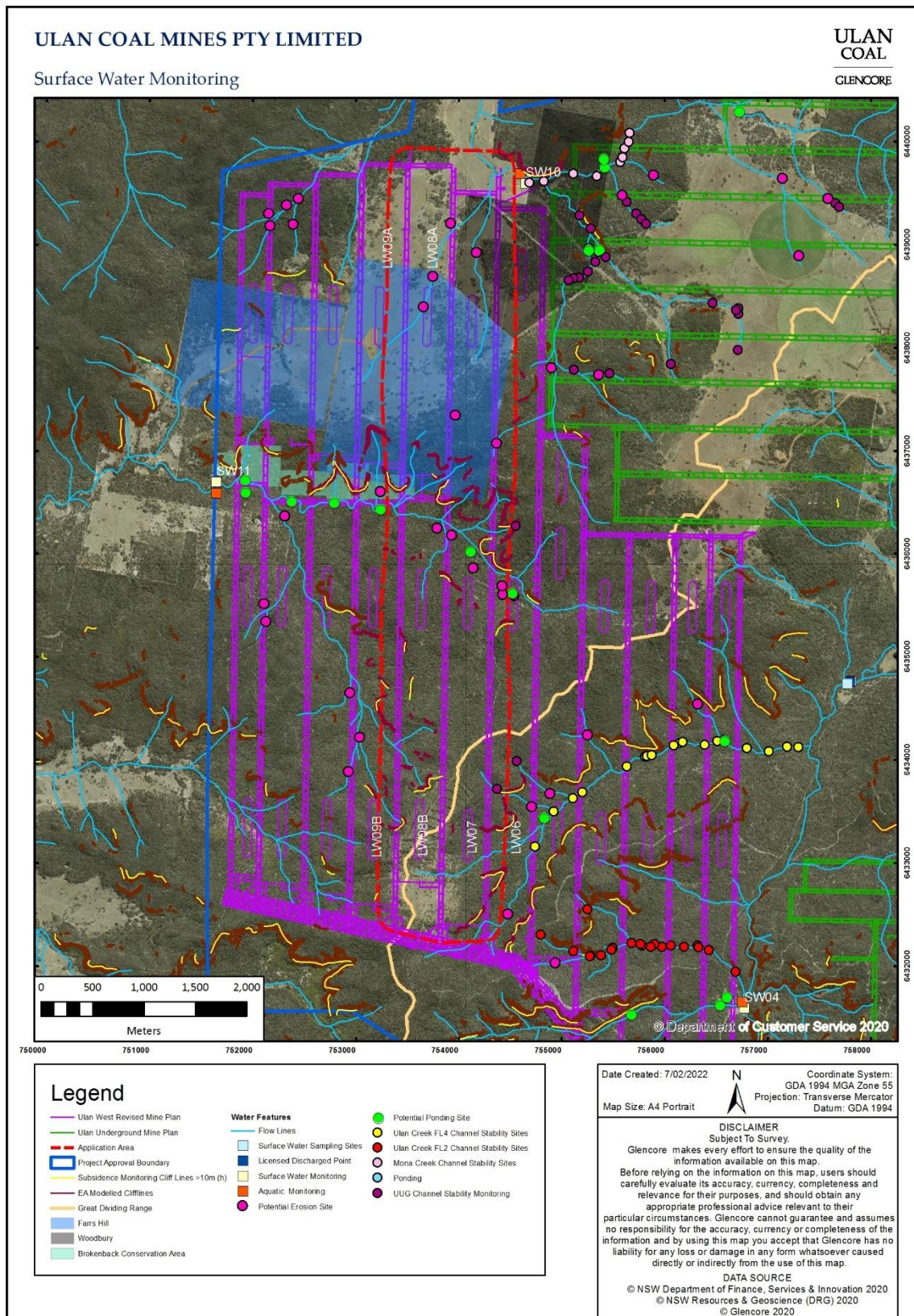


Figure 12 Private Bore Monitoring

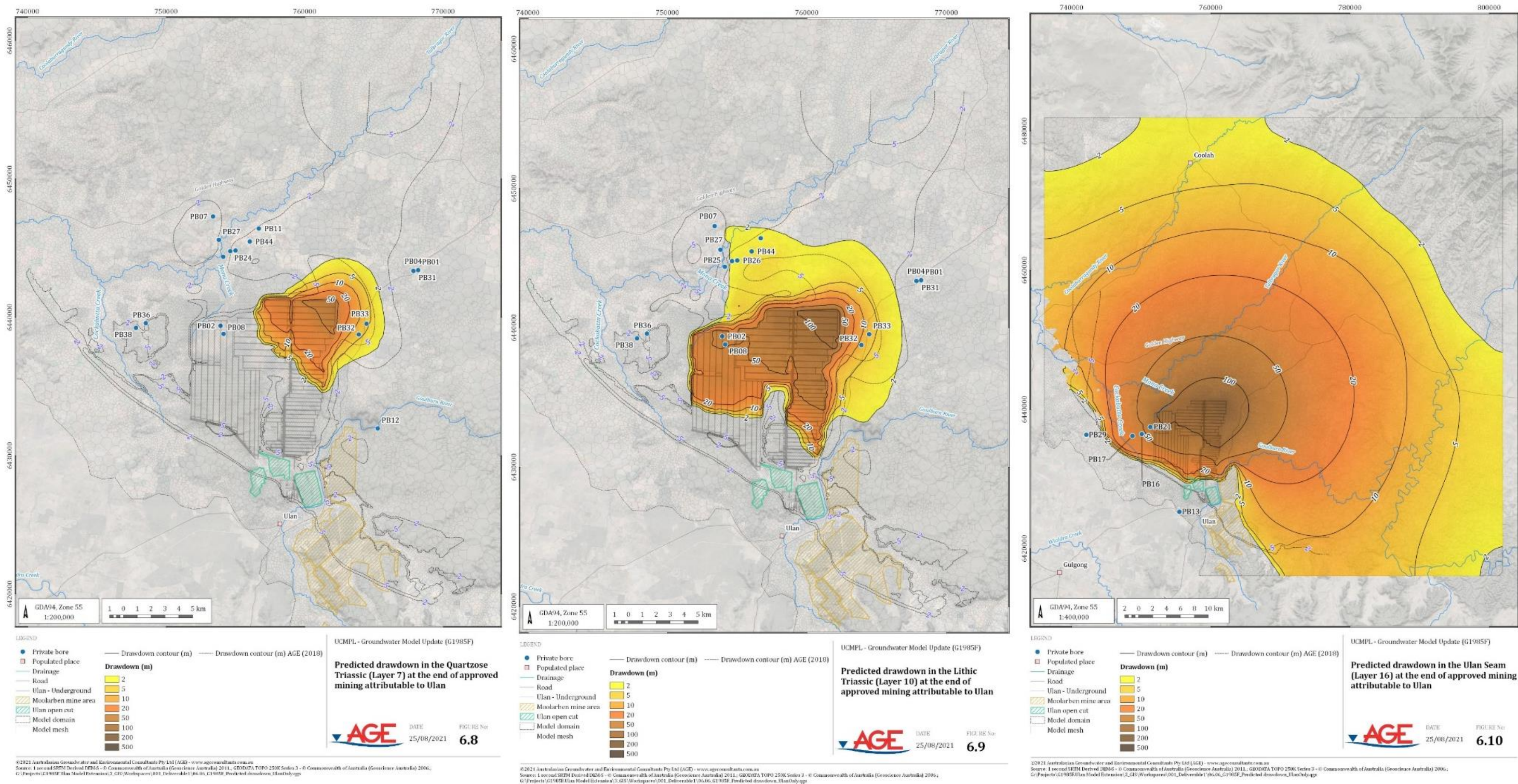


Figure 12a Groundwater Monitoring

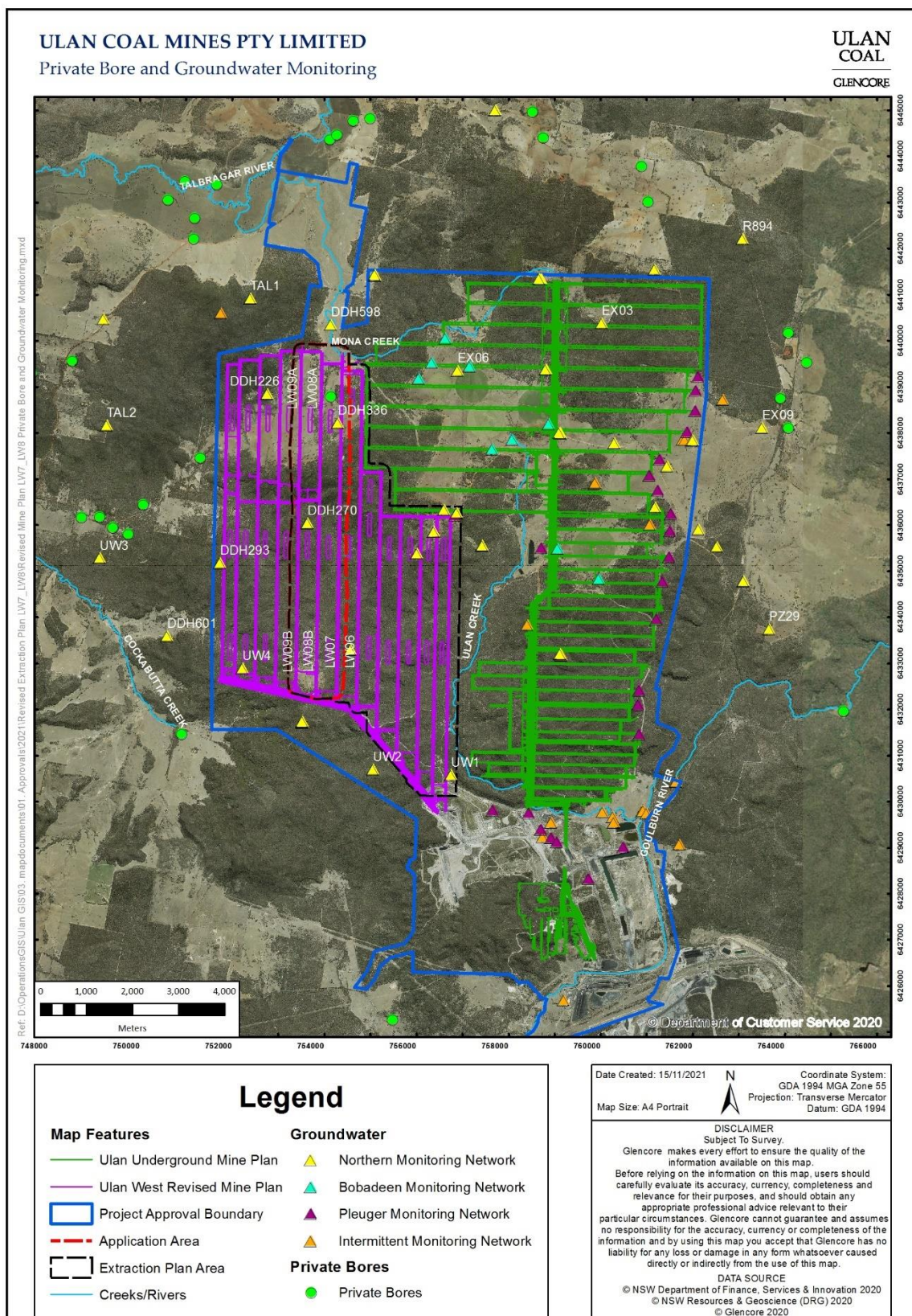


Figure 13 Heritage Monitoring

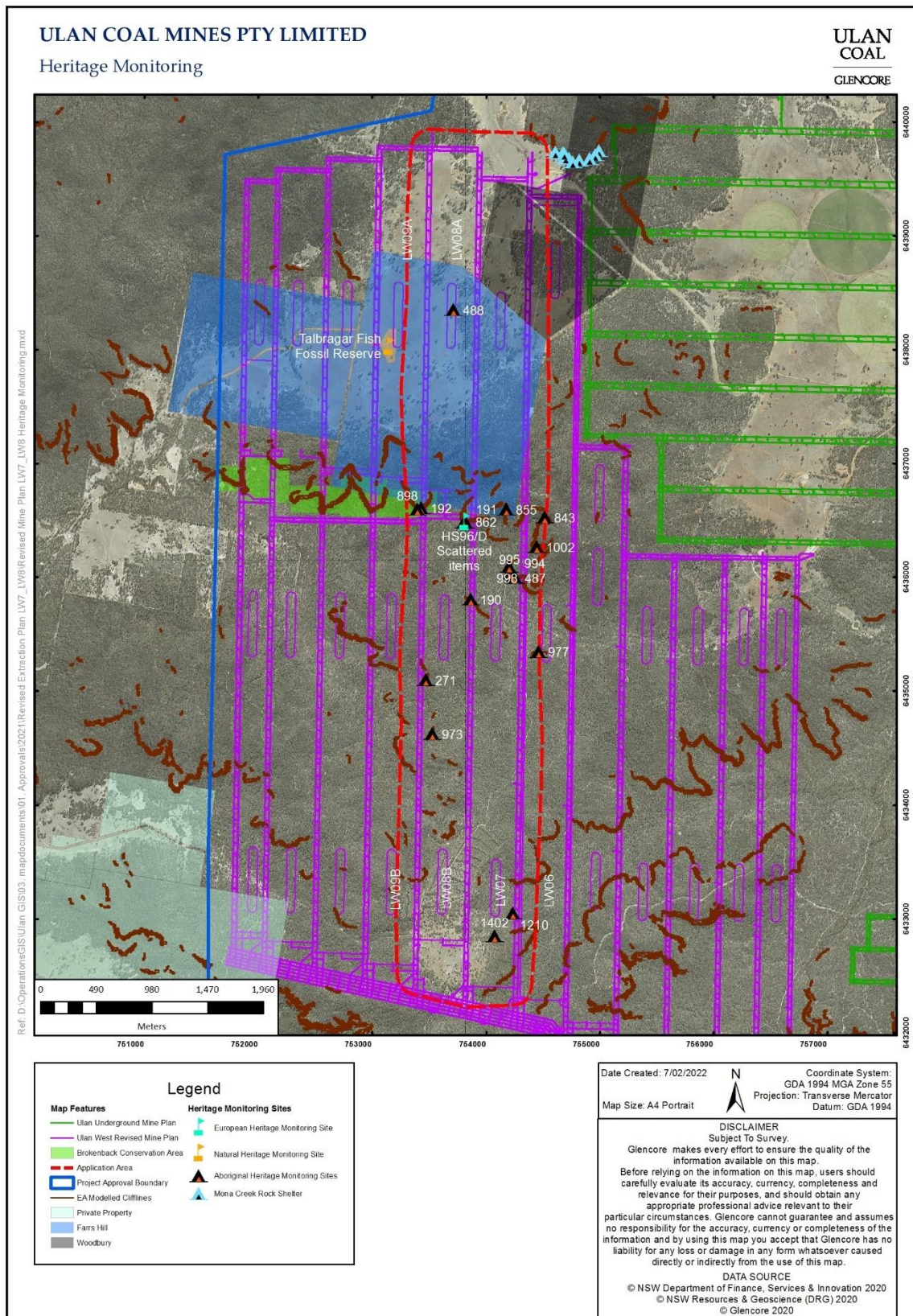


Figure 14 Biodiversity Monitoring

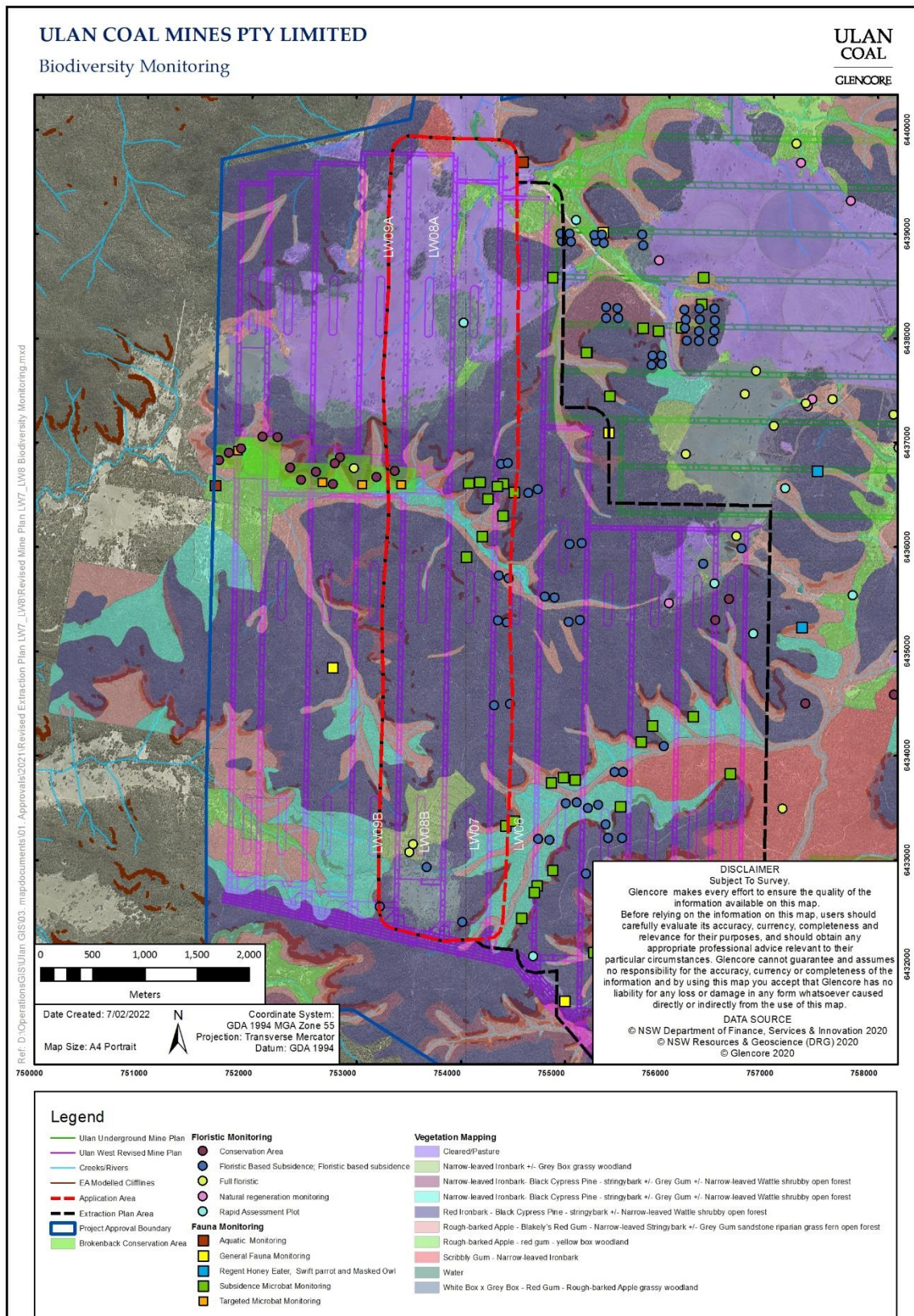
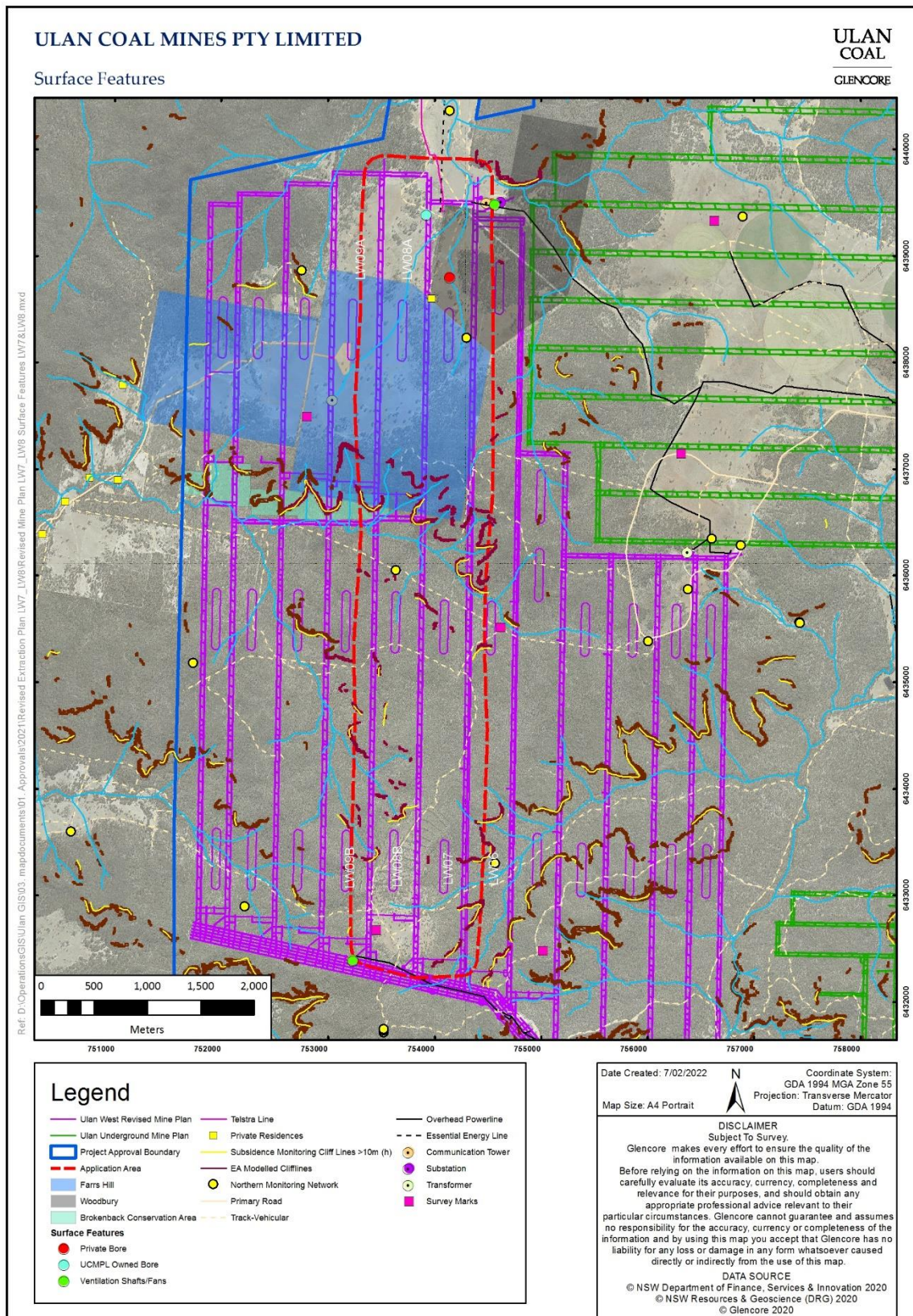


Figure 15 Built and Natural Feature Monitoring

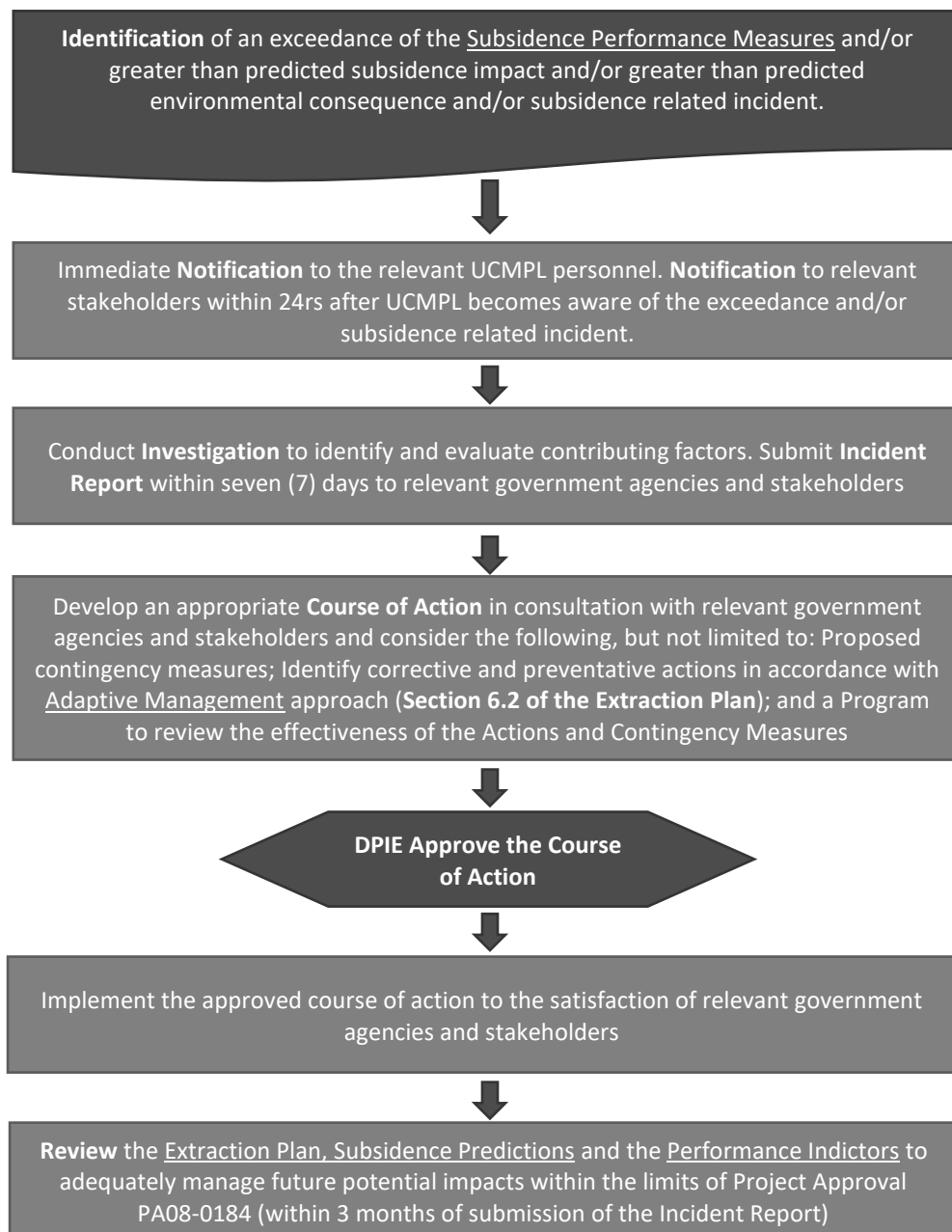


6. Implementation

6.1 Contingency Response

In the event the performance measures in **Table 2** are considered to have been exceeded, or are likely to be exceeded or higher than predicted subsidence or a subsidence related incident has occurred, Contingency Plan as displayed in **Figure 16** Contingency Plan will be implemented. Responsibilities during contingency response are outlined in **Sections 6.3 & 6.6**, to identify actions, levels of responsibility and reporting requirements of personnel.

Figure 16 Contingency Plan



6.2 Adaptive Management

The regular reviewing and evaluating the effectiveness of management strategies includes analysis of subsidence monitoring data against predicted impacts, performance indicators and performance measures (**Section 6.5**). The review process also includes, but is not limited to:

- Engaging a subsidence engineering specialist to review monitoring results against predictions;
- Engaging other specialists, for example groundwater and surface water, heritage and ecological specialists, to review monitoring results and assist development of adapt management strategies as required; and
- Adapt remediation and land management measures to reduce impacts on subsequent longwalls.

The review process as outlined in **Section 6.5** may require a revision of this Extraction Plan and its component management plans. Any revised management strategies to improve performance, particularly following an exceedance of a subsidence impact performance measure and/or an unexpected subsidence impact and/or subsidence related incident, will be undertaken in consultation with relevant government agencies.

6.3 Reporting Framework

The key elements of the external reporting framework, include:

- Incident Reporting; and
- Annual Review.

Table 34 provides the detailed reporting framework, including which government stakeholders will receive copies of each report and the method of distribution. **Attachment E** provides a list of the key government departments and contact details.

Table 34 Summary of Reporting Framework

Report	Frequency	Distribution	Distribution Method	UCMPL Responsibility
Incident Report	As required	DPIE and DPIE-RR, EPA, DPI-Water, NRAR, BCC (where relevant)	NSW Planning Portal	General Manager
Annual Review	Annually	DPIE, DPIE-RR, DPI-Water, NRAR, BCS, EPA, MWRC & CCC	NSW Planning Portal Email to MWRC & CCC	Environment & Community Manager

6.3.1 Incident Notification and Reporting

An incident is defined as a set of circumstances that causes or threatens to cause or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in Project Approval (08_0184) and EPL394.

UCMPL will notify the government agencies¹⁴, as identified in **Table 34**, of any incident associated with Ulan West which causes or threatens to cause material harm to the environment immediately after UCMPL confirms that an incident has occurred. The notification will include the Project number and name and provide the location and nature of the incident.

For any other incident or non-compliance associated with Ulan West, UCMPL will notify the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident or non-compliance. Within seven days of the date of the incident, UCMPL will provide the Secretary of the DPIE and any relevant agencies with a detailed report²³ on the incident, including:

- The Project number and name;
- The date, time and nature of the exceedance/incident;
- The condition that the Project is non-compliant with;
- Identify the likely cause of the exceedance/incident;
- Description of the response action that has been undertaken to date; and
- Description of the proposed management measures to address the exceedance/incident.

6.3.2 Annual Review

UCMPL must review the environmental performance of the Project to the satisfaction of the Secretary. UCMPL must prepare an Annual Review (AER) in accordance with Condition 3, Schedule 5 of PA 08_0184, by the end of March each year. The reporting period for the AR is 01 January to 31 December. The AR will include:

- Describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year;
- Include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria
 - the monitoring results of previous years; and
 - the relevant predictions in the EA
- Identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
- Identify any trends in the monitoring data over the life of the project;
- Identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
- Describe what measures will be implemented over the next year to improve the environmental performance of the project.

²³ In accordance with Condition 6 & 6A of Schedule 5 of PA08_0184

6.4 Community Complaints

Community complaints management includes receipt of complaints, investigation, implementation of appropriate remedial action, and feedback to the complainant as well as communication to site management or personnel and notification to external bodies, where necessary.

UCMPL maintain a 24-hour, 7 day a week community and employee information telephone line **1800 647 630** and email address UlanCommunity@glencore.com.au to:

- Manage complaints received by Ulan Coal that may be a result of mining and/or associated activities conducted within land owned or managed by UCMPL; and
- Provide access and incident information to employees during emergency situations.

Access to the Community Complaints Register is via UCMPL's internet site at <http://www.ulancoal.com.au>

Details of community complaints are also reported in the AR. Further details regarding community complaint management are described in Section 3.4.7 of the Environmental Management Strategy (ULNCX-111515275-870)

6.5 Review of the Extraction Plan

Ongoing monitoring and evaluating the performance of this Extraction Plan will be undertaken, and revised if necessary, in accordance with Section 5 of the Environmental Management Strategy (ULNCX-111515275-870). The evaluation of performance during the review process (**Section 6.2**) will examine any unpredicted subsidence impacts and/or environmental consequences, exceedance of performance measures and implementation of Contingency Plans.

This Extraction Plan and its component management plans will be reviewed and revised if necessary if there is a significant change in the operation that may affect the environment and or community.

As required by Condition 4, Schedule 5 of PA08_0184, Ulan Coal must review, and if necessary revise, the strategies, Extraction Plans, and programs required under this approval to the satisfaction of the Secretary, within 3 months of:

- The submission of the Annual Environment Review (Con 3, Sch 5 of PA08_0184);
- The submission of an incident report (Con 6 & 6A of Sch 5 of PA08_0184);
- The submission of an audit report (Con 8 of Sch 5 of PA08_0184); and
- Any modification to the conditions of this project approval, (unless the conditions require otherwise).

Where this review leads to revisions in any such document, then within 4 weeks of the review, unless the Secretary agrees otherwise, the revised documents must be submitted to the Secretary for approval.

This Extraction Plan will reflect changes in statutory requirements, regulatory requests, technology and operational procedures. The Environment and Community Manager (or delegate) will undertake the review of this Extraction Plan. Substantive changes made to this Extraction Plan as a result of the review will be made in consultation with DPIE and other relevant government agencies.

A copy of the revised Extraction Plan will be supplied to the Secretary of DPIE for approval, and supplied to the relevant government agencies. Updated versions of the approved Extraction Plan and its component management plans will be made publicly available on the UCMPL website <http://www.ulancoal.com.au>

6.5.1 Review of Other Management Plans

Ongoing monitoring and evaluating the performance of the Ulan Complex environmental management plans (EMPs) will be undertaken, and revised if necessary, in accordance with Section 5 of the EMS and as required by Condition 4, Schedule 5 of PA08_0184.

6.6 Responsibilities

Key responsibilities for this Extraction Plan are summarised in **Table 35**.

Table 35 UCMPL Responsibility for this Extraction Plan

Responsibility	Accountabilities
Ulan West Operations Manager	• Authorise the Extraction Plan and approve appropriate resources for the implementation of this Extraction Plan; and • Authorise internal and external reporting requirements of this Extraction Plan
Ulan West Technical Services Manager	• Ensure the Subsidence Effect Monitoring pertaining to the C, D and I Line are implemented, carried out within specified timeframes, are adequately checked, processed and are prepared to the required standard.
Environment and Community Manager	• Implement this Extraction Plan in 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 Extraction 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 Extraction Plan and conduct analysis of results against performance indicators as described in this Extraction Plan; • Prepare this Extraction 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.
Ulan West Registered Mine Surveyor	• Undertake subsidence effects monitoring as required by this Extraction Plan and to the required survey standard within the specified timeframes and ensure data are adequately checked, processed and recorded.

Responsibility	Accountabilities
All UCMPL Employees and Contractors	• Comply with requirements of this Extraction Plan; • Undertake all works in accordance with this Extraction Plan, the attached Management Plans and Programs and all other UCMPL 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.

7. Document Information

7.1 Definitions and Glossary

Table 36 Definitions

Term	Definition
AR	Annual Review
BFMP LW1-LW8	Built Feature Management Plan for LW1 -LW8
BMP	Biodiversity Management Plan
BCS	Biodiversity, Conservation and Science Directorate (formally OEH)
CCC	Community Consultation Committee
DPIE	Department of Planning Industry and Environment
DPI-Water	Department of Primary Industry - Water
DPIE-RR	Department of Planning Industry and Environment – Resource Regulator
DWS	D Working Section (Ulan Coal Seam)
EA	2009 Environmental Assessment for the Ulan Coal Continued Operations
EMP	Environmental Management Plans
EMS	Environmental Management Strategy
EPA	NSW Environmental Protection Authority
EPL394	Environmental Protection Licence No.394 issued by the EPA
HMP	Heritage Management Plan
HNSW	Heritage NSW (formally the NSW Office of Heritage)
LMP LW1-LW8	Land Management Plan for LW1 -LW8
LW	Longwall
MG	Maingate
ML	Mining Lease
MWRC	Mid-Western Regional Council
MOP	Mining Operations Plan
NRAR	Natural Resources Access Regulator
PA08_0184	Project Approval 08_0184
PSMP LW1-LW8	Public Safety Management Plan for LW1-LW8
SA NSW	Subsidence Advisory NSW (formally the NSW Mines Subsidence Board)
RMP LW1-LW8	Rehabilitation Management Plan for LW1-LW8
ROM	Run of Mine
SCT	SCT Operations Pty Ltd
SMP LW1-LW8	Subsidence Monitoring Program for LW1-LW8
TARP	Trigger Action Response Plan
TG	Tail Gate
WMP	A collective for Surface Water Monitoring Program, Groundwater Monitoring Program, Erosion and Sediment Control Plan and a Surface and Groundwater Response Plan.

Table 37 Glossary

Term	Definition
Adaptive Management	Adaptive management includes monitoring subsidence impacts and subsidence effects and, based on the results, modifying the mining plan as mining proceeds to ensure that the effects, impacts and/or associated environmental consequences remain within predicted and designated ranges and in compliance with the conditions of the Project Approval
Angle of Draw	Angle of draw is a measure of the distance from the edge of a mining area to the point on the surface where the subsidence is less than 20mm
Aquifer	A sub-surface rock formation containing water in recoverable quantities
Built Features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, street, path, walk, or driveway; any pipeline, water, sewer, telephone, gas or other service main.
Cover depth	The depth of coal seam from the ground surface (m).
Environmental consequences	Environmental consequences of Subsidence Impacts, including: damage to infrastructure, buildings and residential dwellings; loss of surface flows to the subsurface; loss of standing pools; adverse water quality impacts; development of iron bacterial mats; cliff falls; rock falls, damage to Aboriginal heritage sites; impacts on aquatic ecology; ponding; etc.
Far-field subsidence	Mining-induced movements of the ground surface in areas where vertical subsidence is less than 20 mm
First workings	Workings which establish access to the coal resource area and which do not result in surface subsidence. First workings do not include longwall extraction of coal.
Goaf	The mined-out area into which the immediate roof strata break.
Mitigation Measures	Subsidence management measures which aim to reduce subsidence impacts, usually implemented prior to or during mining.
Remediation Measures	Subsidence management measures which aim to repair any adverse effects of subsidence, usually implemented after mining
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of consequence and likelihood.
Safe, Serviceable and Repairable	Safe means no danger to users who are present, serviceable means available for its intended use, and repairable means damaged components can be repaired economically
Second Workings	Extraction of coal by longwall mining that may result in surface subsidence.
Strain	The change in the horizontal distance between two points at the surface and is typically expressed in units of mm/m. Tensile strain is an increase in the distance between two points (i.e. stretching) and compressive strain is a decrease in distance (i.e. squeezing).
Subsidence or subsidence effects	Deformation of the ground mass due to mining, including all mining induced ground movements, including both vertical and horizontal displacement, tilt, strain and curvature.
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs.
Tilt	The change in the slope of a land surface as a result of differential subsidence and is expressed in units of millimetre per metre (mm/m) or a change in grade where $1 \text{ mm/m} = 0.1\%$.
Vertical subsidence	Vertical downward movements of the ground surface caused by underground coal mining.

7.2 Reference Information

Reference information, listed in **Table 38** below, is *information* that is directly referred to for the development of this document.

Table 38 Reference Information

Reference	Title
Legislation	- Protection of the Environment Operations Act 1997 - Environmental Planning and Assessment Act 1979 - Environment Protection and Biodiversity Conservation Act 1999 - Mining Act 1992 - Coal Mine Subsidence Compensation Act 2017 - Work Health and Safety Act 2011 - Work Health and Safety Regulation 2011 - Work Health and Safety (Mines) Act 2013 - Work Health and Safety (Mines) Regulation 2014 - Water Management Act 2000 - Water Act 1912 - Crown Lands Act 1989 - National Parks and Wildlife Act 1974
Guidelines	Draft Guidelines for the Preparation of Extraction Plans (2015) Version 5
Ulan Coal Mines Pty Limited	- ULNCX-111515275-95 Heritage Management Plan - ULNCX-111515275-97 Social Involvement Plan - ULNCX-111515275-99 Water Management Plan - ULNCX-111515275-218 Site Security Management Plan - ULNCX-111515275-224 Erosion and Sediment Control Plan - ULNCX-111515275-225 Biodiversity Management Plan & Offset Management Program - ULNCX-111515275-2049 Bushfire Management Plan - ULNCX-111515275-235 Environmental Monitoring Program - ULNCX-111515275-870 Environmental Management Strategy - ULNCX-111515275-1642 Surface Water Monitoring Program - ULNCX-111515275-1643 Groundwater Monitoring Program - ULNCX-111515275-1644 Surface Water and Groundwater Response Plan - ULNCX-111515275-1785 Aboriginal Conservation Management Plan - ULNCX-111515275-1921 Integrated Mining Operations Plan 2017-2024 - ULNCX-111515275-3124 Bobadeen Homestead Conservation Management Plan - ULNCX-111515275-1787 Old Ulan Conservation Management Plan
Other	- Safe Production Solutions (SPS) 2012. <i>Ulan West Longwalls 1 -2 Subsidence Risk Assessment</i> - SCT Operation Pty Ltd, 2013. <i>Revised Subsidence Assessment Specific for Ulan West Underground Mine Longwalls 1 and 2</i> - SCT Operation Pty Ltd, 2015. <i>Revised Subsidence Assessment Specific for Ulan West Underground Mine Longwalls 1 and 4</i> - SCT Operation Pty Ltd, 2017. <i>Revised Subsidence Assessment Specific for Ulan West Underground Mine Longwalls 5 and 6</i> - SCT Operation Pty Ltd, 2021. <i>Ulan West Mine: Subsidence Assessment for Longwall 7-8 Extraction Plan</i> - Mackie Environmental Research (MER) Pty Ltd 2013. <i>Review of groundwater Impacts: Extraction Plan for Ulan West Longwalls LW1 – LW2</i> - Umwelt (Australia) Pty Ltd, 2009. <i>Ulan Coal – Continued Operations Environmental Assessment</i>

Reference	Title
	- Umwelt (Australia) Pty Ltd, 2012. <i>Modification to Continued Operations, Ulan West Mine Extraction Plan (Approved Panels 1 -4) Environmental Assessment</i> - South East Archaeology (SEA) Pty Ltd 2013. <i>Ulan Coal Continued Operations – Aboriginal Rock Shelter Test Excavation Sampling Strategy</i> - South East Archaeology (SEA) Pty Ltd 2017. <i>Ulan Coal Continued Operations Project –Ulan West Longwalls 5 and 6 Extraction Plan – Aboriginal Heritage</i> - Mackie Environmental Research (MER) Pty Ltd 2015. <i>Review of groundwater Impacts: Extraction Plan for Ulan West Longwalls LW1 – LW4</i> - Stedinger Associates (April 2015). <i>Robinson Homestead, Old Ulan Condition Report.</i> - Umwelt (Australia) Pty Ltd, September 2015. <i>Review of Subsidence Impacts and Environmental Consequences Longwall 1 (LW1) Ulan West - Surface Water</i> - Eco Logical Australia Pty Ltd, September 2015. <i>Biodiversity Assessment Impact Review for Ulan West Extraction Plan LW1 – 4.</i> - Eco Logical Australia Pty Ltd, November 2017. <i>Biodiversity Assessment Impact Review for Ulan West Extraction Plan LW5 – 6.</i> - Axys Consulting (August 2015). <i>Extraction Plan (EP) for Longwalls LW1 to LW4 at the Ulan West Underground Mine Risk Assessment</i> - Axys Consulting (August 2017). <i>Extraction Plan (EP) for Longwalls LW5 to LW6 at the Ulan West Underground Mine Risk Assessment</i> <i>Subsidence Data Portal User Manual v1.2</i>

7.3 Change Information

Full details of the document history are recorded in the document control register, by version²⁴. A summary of the current change is provided in **Table 39** below.

Table 39 Change Information

Version	Date	Review team (Consultation)	Change Summary
1.0	18/10/2013	Robyn Stoney, Ian Flood, Stephen Bragg	Original submission LW1 and LW2
2.0	30/10/2015	Robyn Stoney, Ben Anderson, Stephen Bragg	Revised to include LW3 and LW4
3.0	15/11/2017	Robyn Stoney, Rebecca Shanks, Jessica Southgate	Revised to include LW5 and LW6
4.0	30/05/2018	Robyn Stoney, Justin Russel	LW5 and LW6. Revised to incorporate comments from agencies following submission.
5.0	14/06/2022	Lucy Stuart, Stephen Bragg, Tara Stokes, SCT, AGE, ELA, OzArk & Engeny	Revised to include LW7 and LW8, amendment to LW7 First Workings & incorporate comments from agencies (Refer to Appendix B).

²⁴ Notes: Any 'version' discrepancies are a function of the UCMLP document control register. The actual summary of changes to this document is provided in Table 39 of the Extraction Plan.

Attachment A - Statutory Requirements

Extraction Plan Guideline	Section Detail	Section Address in this Extraction Plan
1. Title Block	A title block should be included at the beginning of the Extraction Plan, which contains the: • name of the applicant company; • name of mine; • development consent and mining lease reference numbers; • Extraction Plan title, date and reference number; • The signature(s) of person(s) taking responsibility for the accuracy and comprehensiveness of the information contained within the plan, including an authorised representative of the lease holder and the mine manager (for the purposes of relevant safety legislation).	Page v
2. Development	The process of development of the Extraction Plan should be described. Most importantly, this section should address consultation undertaken by the Applicant with affected agencies and other key stakeholders. This section should also describe the process of reviewing and updating the predictions of subsidence effects, subsidence impacts and environmental consequences	Section 2 Section 2.2
3. Overview	The overview section is an essential introduction to the Extraction Plan. It should accurately describe: • mine planning and design • subsidence predictions • performance objectives and other regulatory requirements • subsidence management strategies and measures	Section 3.2 Section 2.2 Section 1.3.2 Section 3.3.
4. Key Component Plans	The main body of the Extraction Plan primarily comprises a set of six key component plans. It is appropriate that these are presented in a particular order, even if some of the later plans deserve a particular priority due to local circumstances (e.g. the Built Features or Heritage Management Plans). The preferred order for these component plans is as follows: • Water Management Plan; • Land Management Plan; • Biodiversity Management Plan; • Heritage Management Plan; • Built Features Management Plan; and • Public Safety Management Plan. Risk Assessment: All six key component plans should give appropriate consideration to risk assessment and risk management.	Section 4 Section 2.3
5. Subsidence Monitoring Program	The key component plans should be followed by a Subsidence Monitoring Program. • The Subsidence Effects Monitoring Program • Environmental Monitoring Program Summary	Section 5.1 Section 5.2

Extraction Plan Guideline	Section Detail	Section Address in this Extraction Plan
6. Implementation	This section of the Extraction Plan should address all key elements of how the plan is going to be implemented, including reporting, regular review and key responsibilities. This section should follow the structure set out below: • Reporting Framework; • Review of the Extraction Plan; • Review of other Management Plans; and • Key Responsibilities	Section 6
7. Graphical Plans	The following plans are required as part of the application: Plan 1, Plan 2, Plan 3, Plan 4, Plan 5, Plan 6, Plan 7 & Plan 8	Appendix I
8. Attachments to the Extraction Plan	All other material necessary to support the Extraction Plan should be included as Attachments or Appendices	Technical Reports: Attachments G to L

Attachment B - Relevant Consultation Records

Government Departments	Summary of Consultation
DP&E	Year 2013
	2 May 2013 letter requesting specialist team endorsement. 23 May 2013 letter received endorsing specialist team. 26 June 2013 a meeting was held between representatives of the DP&E and representatives of Ulan Coal at the DP&E Sydney Office. The meeting was an opportunity to outline the proposed Application Area and discuss the preparation requirements of the Extraction Plan. 4 September 2013 a follow up meeting was held between representatives of the DP&E and representatives of Ulan Coal at the DP&E Sydney Office. The meeting was an opportunity to discuss reducing the original Application Area (i.e. from LW1-LW6 to LW1-LW2) and provide the DP&E draft copies of several component management Extraction Plans required by Condition 26 of PA08_0184.
	Year 2015
	30 July 2015 meeting was held between representatives of the DP&E and representatives of Ulan Coal at the DP&E Sydney Office. The meeting was an opportunity to outline the proposed additions to the Application Area (i.e. LW3 and LW4) and discuss the preparation requirements of the Extraction Plan. 5 August 2015 letter requesting Extraction Plan specialist team endorsement. 6 August DP&E provided the Draft Extraction Plan Guidelines. 17 August 2015 letter received endorsing Extraction Plan specialist team.
	Year 2017
	26 October 2017 letter requesting Extraction Plan specialist team endorsement. 13 November 2017 letter received endorsing Extraction Plan specialist.
DRE	Year 2013
	21 May 2013 a meeting was held between representatives of the DRE and representatives of Ulan Coal at the DRE Maitland Offices. The meeting was an opportunity for Ulan Coal to outline the proposed Application Area and discuss the preparation requirements of the SMP and for the DRE to ensure Ulan Coal include rehabilitation strategies to address subsidence induced impacts associated with the Application Area. 5 September 2013 a follow up meeting was held between representatives of the DRE and representatives of Ulan Coal at the DRE Maitland Office. The meeting was an opportunity to discuss reducing the original Application Area and provide adequate survey quality plans for the subsidence effects monitoring plan. 12 September 2013 email sent seeking comments regarding the preparation of management Extraction Plans.
	Year 2015
	19 August 2015 a meeting was held between representatives of the DRE and representatives of Ulan Coal at the DRE Maitland Offices. The meeting was an opportunity for Ulan Coal to outline the proposed additions to the Application Area (i.e. LW3 and LW4) and discuss the preparation requirements of the Extraction Plan. 24 September 2015 a meeting was held at the DRE's Orange office. The meeting was an opportunity to outline the proposed Application Area and discuss aspects of the Extraction Plan of interest to the DRE and the MOP.
Mid-Western Regional Council (MWRC)	Year 2013
	Councillors from the MWRC attended the 4 June 2013 and 3 September 2013 CCC Meetings. Information was presented regarding the Application Area and preparation of the SMP/Extraction Plan.

Government Departments		Summary of Consultation
	Year 2015	
	27 August 2015 letter sent to MWRC providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW2 to include the next two longwalls LW3 and LW4.	
	Year 2017	
	13 November 2017 letter sent to MWRC providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW4 to include the next two longwalls LW5 and LW6.	
NSW Environment Protection Authority (EPA)	Year 2013	
	16 September 2013 a briefing email was prepared and sent to the EPA. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to the EPA.	
	Year 2015	
	27 August 2015 letter sent to EPA providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.	
	Year 2017	
	13 November 2017 letter sent to EPA providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW4 to include the next two longwalls LW5 and LW6.	
NSW Department of Primary Industries (DPI – Water)	Year 2013	
	16 September 2013 a briefing email was prepared and sent to NOW. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to NOW.	
	Year 2015	
	27 August 2015 letter sent to NOW providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.	
	Year 2017	
	13 November 2017 letter sent to DPI providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW4 to include the next two longwalls LW5 and LW6.	
Department of Lands	Year 2013	
	17 September 2013 a briefing email was prepared and sent to the Department of Lands. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to the Department of Lands.	
	Year 2015	
	27 August 2015 letter sent to Department of Lands providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.	
NSW Mine Subsidence Board (MSB)	Year 2013	
	17 September 2013 a briefing email was prepared and sent to the MSB. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to the MSB.	

Government Departments	Summary of Consultation
	Year 2015
	27 August 2015 letter sent to MSB providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4. - Email request on the 17 September 2015 from the MSB requesting a copy of the final plan.
	Year 2017
	13 November 2017 letter sent to MSB providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW4 to include the next two longwalls LW5 and LW6.
NSW Dam Safety Committee (DSC)	Year 2013
	26 September 2013 a briefing email was prepared and sent to the DSC. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to the DSC.
	Year 2015
	27 August 2015 letter sent to DSC providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.
NSW Office of Environment & Heritage (OEH)	Year 2013
	26 September 2013 a briefing email was prepared and sent to the OEH. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to the OEH.
	Year 2015
	27 August 2015 letter sent to OEH providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW2 to include the next two longwalls LW3 and LW4. 23 September a meeting was held at the OEH's Dubbo office. The meeting was an opportunity to outline the proposed Application Area and discuss aspects of the Extraction Plan of interest to the OEH.
	Year 2017
	13 November 2017 letter sent to OEH providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW4 to include the next two longwalls LW5 and LW6.
Department of Primary Industries (DPI) - Fisheries	Year 2013
	26 September 2013 a briefing email was prepared and sent to the DPI - Fisheries. 29 October 2013 a hard copy of the submitted SMP/EP LW1 and 2 was provided to Fisheries.
	Year 2015
	27 August 2015 letter sent to DPI providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.
Sydney Catchment Authority (SCA)	Year 2013
	26 September 2013 a briefing email was prepared and sent to the SCA.
	Year 2015

Government Departments	Summary of Consultation
	27 August 2015 letter sent to SCA providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.

CCC Meetings	Summary of Ongoing Consultation During CCC Meetings
04/06/2013	Initial information was provided regarding the proposed Extraction Plan to the CCC in June 2013.
03/09/2013	The CCC have registered their interest in an opportunity to review the SMP. On submission, the SMP will be provided to them at their request. Any comments that result in proposed changes to the Extraction Plan will be provided as an addendum to the Extraction Plan and forwarded onto the relevant government agencies.
03/12/2013	
06/03/2014	To date Ulan Coal have not received any feedback from the CCC in relation to the Ulan West Extraction Plan.
05/05/2014	Ongoing information regarding Ulan West and Ulan Underground mining activities is provided in each quarterly CCC meetings.
04/09/2014	Update of the submitted SMP/EP LW1 and LW2 including TARPS, monitoring programs associated with Ulan West, including the expansion of the groundwater monitoring program and Subsidence Performance Measures.
04/12/2014	
05/03/2015	Update of proposed modification to Ulan West Mine Plan in MOD3 and key issues associated with the accompanying Environmental Assessment (EA) including subsidence, water resources, heritage, biodiversity, noise, emissions and agriculture.
04/06/2015	Information of Ulan's Community Newsletter issued on the 18 August 2015.
02/09/2015	Provide update to CCC regarding the inclusion of LW3 and LW4 into the Extraction Plan during the September 2015 meeting.
07/12/2017	Provide update to CCC regarding inclusion of LW5 and LW6 into the Extraction Plan during the December 2017 meeting.

Heritage Meetings	Summary of Ongoing Consultation During Heritage Meetings
12/03/2013	Initial information in June 2013 was provided regarding the proposed Extraction Plan for Ulan West.
12/12/2013	Ongoing information regarding Ulan West and Ulan Underground mining activities are provided in each meeting, generally held in June and December.
12/06/2014	Update of the submitted EP LW1 and LW2 in December 2013 including heritage surveys and monitoring programs associated with Ulan West.
12/12/2014	
03/06/2015	Issue for review in December 2014 proposed Rock Shelter Sampling Strategy to be undertaken at key sites located above the Ulan West Mine Plan.
31/08/2015	Commencement of Rock Shelter Sampling Strategy on 16 February 2015 at Rock Shelter Site #1054 above LW2 (Ulan West).
03/12/2015	Continuation of the Rock Shelter Sampling Strategy (sites include #646, #164, #165, #476, #651) from 31 August to 4 September and 14 September to 18 September 2015 above LWW3 (Ulan No. 3).
08/12/2016	Update of proposed modification to Ulan West Mine Plan in MOD3 and key issues associated with the accompanying Environmental Assessment (EA) including subsidence, water resources, heritage, biodiversity, noise, emissions and agriculture.
02/08/2017	Provide feedback of subsidence related impacts to Aboriginal sites.
09/11/2017	- Discussion of Cultural Heritage and Archaeological Programs. - Progression of the Safe Keeping Place. - Upcoming Heritage Survey programs. - Provide update to Heritage Groups regarding inclusion of LW5 and LW6 into the Extraction Plan during the November 2017 meeting.

Attachment C - Correspondence



Department of Planning and Environment

Lucy Stuart
Environment & Community Coordinator
Ulan Coal Mines Pty Limited

Contact: DPE Water Assessments
Email: water.assessments@dpie.nsw.gov.au
Our ref: OUT22/854

Email: lucy.stuart@glencore.com.au

31 January 2022

Dear Ms Stuart

**Re: Ulan Coal Mine Expansion - Ulan West Extraction Plan for Longwalls LW1-LW8
(MP08_0184-PA-98)**

I refer to your email of 10 December 2021 to the Department of Planning and Environment (DPE) Water about the above matter.

Department of Planning and Environment - Groundwater Management & Science Team (DPE-Water) recommends the following:

- The Water Management Plan (a sub-component of the Extraction Plan) be revised to commit to a 'make good provision' for impacted registered groundwater users where drawdown due to cumulative mining activities exceeds the 2 m threshold as defined in the NSW Aquifer Interference Policy.
- The make good provision (alternate water supply or other agreed compensation) applies until the proponent can demonstrate that any impact was not caused by their activity.

Should you have any further queries in relation to this submission please do not hesitate to contact DPE Water Assessments at water.assessments@dpie.nsw.gov.au.

Yours sincerely,

A handwritten signature in blue ink that reads "Liz Rogers".

Liz Rogers
Manager, Assessments, Knowledge Division
Department of Planning and Environment: Water

4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150 | Locked Bag 5022, Parramatta NSW 2124 | dpie.nsw.gov.au | 1

Number: ULNCX-111515275-2811
Owner: Environment and Community Manager

Status: Final
Version: Version 8

Effective: 1/10/2021
Review: 1/10/2024

Uncontrolled unless viewed on the intranet



Planning,
Industry &
Environment

Our ref: DOC21/1120892

Your ref:

Lucy Stuart
Environmental and Community Coordinator
Ulan Coal Mines Pty limited
Lucy.Stuart@glencore.com.au

Dear Lucy

Ulan West Extraction Plan Longwalls LW1 to LW8

Thank you for your email dated 09 December 2021 inviting the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning, Industry and Environment to comment on the previously approved *Ulan West Extraction Plan LW1 to LW6* which has been revised to include the two longwall (LW) panels, LW7 and LW8.

BCS has commented on previous extraction plans which have subsequently been approved. We note that Ulan Coal Mines Pty Limited has incorporated several of the Ulan Mine Complex's existing and approved Environmental Management Plans into the extraction plan. Of relevance to BCS is the Land Management Plan, Rehabilitation Management Plan and the Biodiversity Management Plan (BMP). This response does not extend to the BMP as BCS previously reviewed and commented on the BMP in August 2020.

BCS notes that the extraction plan incorporates subsidence management measures and monitoring of impacts specific to the extraction of LW7 and LW8, previously mined longwall panels for Ulan West and the recently approved amendments to first workings regarding LW7. BCS further notes that ongoing subsidence monitoring has improved the understanding of subsidence behaviour at the Ulan Mine Complex. BCS understands that over most of the area of Longwalls 7 and 8 vertical subsidence is expected to be less than about 1.7m, typically in the range 1.2 to 1.6m, consistent with or less than assessments for the project environmental assessment and the environment performance experienced to date.

BCS has reviewed the extraction plan and relevant appendices and is satisfied that it fulfills the requirements of Project Approval (PA) 08-0184, Schedule 3, Condition 26. There is, however, one small error that should be rectified. In Section 3.1.6 the PCTs are incorrectly assigned. PCT 618 should be White Box x Grey Box - red gum - Rough-barked Apple and PCT 281 Rough-Barked Apple - red gum - Yellow Box woodland. They are correctly assigned in Attachment I.

48-52 Wingewarra Street, Dubbo NSW 2830 | PO Box 2111 Dubbo NSW 2830 | dpie.nsw.gov.au | 1

Number: ULNCX-111515275-2811
Owner: Environment and Community Manager

Status: Final
Version: Version 8

Effective: 1/10/2021
Review: 1/10/2024

Uncontrolled unless viewed on the intranet

Should you require further information regarding issues that are the responsibility of the BCS please contact David Geering on 02 6883 5335 or david.geering@environment.nsw.gov.au.

Yours sincerely



Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate
20 December 2021



Subsidence Advisory

117 Bull Street, Newcastle West, NSW, 2302
T: (02) 4908 4300 | 24 Hour Emergency Service: 1800 248 083 (Free Call)

Attention: Lucy Stuart
Infrastructure Engineer
South32 Illawarra Metallurgical Coal

Via email: Lucy.Stuart@glencore.com.au
Cc: Stephen.brag-c@glencore.nsw.gov.au

Dear Lucy,

RE: Request for advice on revised Ulan West Extraction Plan Ulan West Extraction Plan LW1-LW8 Project Approval (PA) 08-0184 (our ref: EMIN21-00024)

Thank you for your request for advice regarding a revision to Ulan West Extraction plan referred to above.

It is understood that the revised proposal will impact a single residential dwelling. It is also understood that the property is unoccupied, has been acquired by the coal mine operator.

As such subsidence advisory has no comment regarding the proposed revision referred to above.

Please contact me on (02) 4908 4300 or at subsidedevelopment@customerservice.nsw.gov.au if you have any questions or wish to discuss.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'K Black'.

Kieran Black

17 January 2022

www.subsidenceadvisory.nsw.gov.au | ABN 81 913 830 179

FW: Request for advice on revised Ulan West Extraction Plan Ulan West Extraction Plan LW1-LW8 Project Approval (PA) 08-0184 (our ref: EMIN21-00024)

BS

Bragg, Stephen (Ulan No 3 - AU)

To

'subsidedevelopment@customerservice.nsw.gov.au'

Cc

Stuart, Lucy (Ulan No 3 - AU)

20220117 - EMIN21-00024 - Request for advice on extraction plan.pdf

138 KB

Reply

Reply All

Forward

Tue 18/01/2022 11:41 AM

Kieran,

Thank you for SA NSW reply regarding the preparation of the Ulan West Extraction Plan for LW7 and LW8.

After speaking with Catharin yesterday and for clarification reasons regarding the attached letter, there are two private properties within the Application Area of LW7 and LW8.

The residential dwelling and outbuildings on the Woodbury Property are directly above the western side of Longwall 7. The residential site on the Farris Hill Property is located more than 1km to the west of Longwalls 7 and 8 well outside the Application Area.

The former Petzl residence (Billir) is above Longwall 8A but the property is now owned by UCMPL and the residential building (Billir) is not currently occupied (which may be the reference in the attached letter).

Impacts to residential dwelling and outbuildings on the Woodbury Property will be managed with the agreement of the property owner in a separate Private Property Subsidence Management Plan (PPSMP).

The PPSMP outlines impacts of mining on the landowner's property and the monitoring, management and remediation measures to be implemented by UCMPL, in agreement with the landowner.

Any questions please ask.

Regards

Stephen

0459228808

From: subsidedevelopment <subsidedevelopment@customerservice.nsw.gov.au>

Sent: Monday, 17 January 2022 8:44 AM

To: Stuart, Lucy (Ulan No 3 - AU) <Lucy.Stuart@glencore.com.au>; Stephen bragg-c@glencore.nsw.gov.au

Subject: Request for advice on revised Ulan West Extraction Plan Ulan West Extraction Plan LW1-LW8 Project Approval (PA) 08-0184 (our ref: EMIN21-00024)

External sender

Hi Lucy,

Please find attached our advice on the above proposal.

Kind Regards

Kieran Black
Technical Specialist

Subsidence Advisory NSW

Better Regulation Division | Department of Customer Service

P: 4908 4300

www.subsidenceadvisory.nsw.gov.au



Subsidence
Advisory NSW

Bragg, Stephen (Ulan No 3 - AU)

From: Nicole Davis <Nicole.Davis@environment.nsw.gov.au>
Sent: Monday, 24 January 2022 7:06 AM
To: Bragg, Stephen (Ulan No 3 - AU)
Cc: Stuart, Lucy (Ulan No 3 - AU); Nicole Davis
Subject: Heritage NSW Review - Re - Ulan Coal Mines - Extraction Plan LW1-8 - Aboriginal Cultural Heritage.

External sender

Hi Stephen and Lucy,

Thank you for your email, and apologies for the delay in responding.

Heritage NSW (HNSW) has reviewed the Ulan Coal Continued Operations Project - Longwalls 7 And 8 Extraction Plan - with respect to Aboriginal Cultural Heritage as requested. HNSW understands that Ulan Coal Mines Pty Limited (UCMPL) operates the Ulan West Underground Mine (Ulan West) and the Ulan Underground Mine (Ulan Underground), at the Ulan Coal Complex (the Mine), approximately 25 kilometres (km) northeast of Gulgong, within the Mid-Western Regional Council Local Government Area.

HNSW notes that as required under Project Approval (PA) 08_0184 for UCMPL for the Ulan Coal – Continued Operations Project (UCCO Project), UCMPL are required to revise the approved *Ulan West Extraction Plan LW1 to LW6*, to include the next two longwall (LW) panels LW7 and LW8.

OzArk Environment & Heritage (OzArk) prepared the assessment and recommendations in relation to Longwalls 7 and 8, that considers potential impacts to Aboriginal cultural heritage within the additional Application Area. HNSW is satisfied that the Extraction Plan (EP) pertaining to Longwalls 7 and 8, adequately addresses the possible implications with respect to Aboriginal cultural heritage, and supports all the recommendations (1-5) that have been provided in the EP.

Should you require any further information, please contact me directly.

Kind Regards
Nicole Davis

Nicole Davis | Manager Assessments - North
Heritage NSW, Community Engagement, Department of Premier and Cabinet
Level 6, 10 Valentine Ave, Parramatta | Locked Bag 5020 Parramatta 2124
T: 02 4927 3156 M: 0409 394 343 | nicole.davis@environment.nsw.gov.au



**Premier
& Cabinet**

I acknowledge and respect the traditional custodians and ancestors of the lands I work across.
[Website](#) [Facebook](#) [Instagram](#) [LinkedIn](#)



Mr Charlie Allan
General Manager
Ulan Coal Mines Pty Limited
3935 Ulan Road
ULAN New South Wales 2850

22/10/2021

Dear Mr Allan

**Ulan Coal Continued Operations Project (MP08_0184)
Ulan West Longwall West 7 Infrastructure First Workings Amendment Request**

I refer to the Ulan West Longwall 7 Infrastructure First Workings Request dated 22 October 2021 which was submitted in accordance with Condition 25 of Schedule 3 of the Ulan Continued Operations Project approval (08_0184).

The Department notes that the proposed first workings amendment seeks to relocate the installation roadway on the northern end of Longwall 7 to the south, by 255 metres due to health and safety and financial risks to mining operations. This would reduce the northern end of Longwall 7 by 255 metres.

The Department has carefully reviewed the first workings request and supporting assessment documentation and is satisfied that the proposed amendments will not increase the risk of subsidence related impacts. Specifically, the proposed amendments are predicted to result in subsidence effects, impacts and consequences that:

- are less than or the same as those of the approved mine plan; and
- comply with the subsidence performance measures outlined in condition 24 of schedule 3 of MP08_0184.

Accordingly, the Planning Secretary has approved the amendments outlined in the Ulan West Longwall 7 Infrastructure First Workings Request dated 22 October 2021.

If you wish to discuss the matter further, please contact Jack Turner on 9995 5387.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Secretary



Planning,
Industry &
Environment

Our ref: DOC21/598223

Your ref: 40/21

Lucy Stuart
Environment and Community Coordinator
Ulan Coal Mines Pty Ltd
Lucy.stuart@glencore.com.au

Dear Lucy,

Revision of the Ulan West Extraction Plan Longwalls LW1 to LW8

Thank you for your e-mail dated 1 July 2021 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning, Industry and Environment (formerly the Office of Environment and Heritage) inviting comments on the revision of the Extraction Plan for the inclusion of LW 7 and LW8.

BCS understands that the revised extraction plan will be prepared in accordance with the DPIE *Draft Guidelines for the Preparation of Extraction Plans* and the requirements specified in the projects consent conditions (Schedule 3, Condition 26). The plan must include measurable targets.

Successful management plans include tailored quantitative performance measures, targets and completion criteria in addition to monitoring and trigger points for corrective action which adhere to the SMART principles (specific, measurable, achievable, realistic, timely). Completion and performance criteria must be measurable and expressed in a manner that assists in the evaluation of progress toward the strategic goals that define the completion criteria. They should be expressed as specific numerical targets or as a percentage of the baseline or targeted condition.

If you require any further information regarding this matter, please contact Michelle Howarth, Senior Conservation Planning Officer, via michelle.howarth@environment.nsw.gov.au or (02) 6883 5339.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Ben Ellis'.

Ben Ellis
A/Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

19 July 2021

48–52 Wingewarra Street, Dubbo NSW 2830 | PO Box 2111 Dubbo NSW 2830 | dpi.nsw.gov.au | 1

RE: UWO - Extraction Plan Update



Stephen Clipperton <steve.clipperton@planning.nsw.gov.au>
To: Stuart, Lucy (Ulan No 3 - AU)

Reply Reply All Forward ...
Wed 9/03/2022 1:34 PM

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

External sender

Hi Lucy

I've responded to the decision maker already. We have a standard response for EPs and this is forwarded onto the decision maker. I reviewed the EP and it looked satisfactory from a Mining Act point of view. We like to see references to the MOP and how rehabilitation matters that are the result of subsidence or that have been identified in the EP are linked to the MOP, or RMP going forward.

Just for your information, our standard response is as follows.

The holder of relevant mining leases is required to ensure that the rehabilitation commitments outlined in any approved Extraction Plan are included in the Mining Operations Plan / Rehabilitation Management Plan regulated by the Resources Regulator pursuant to the conditions of the mining leases under the Mining Act 1992. The holder of the mining leases must ensure the Mining Operations Plan / Rehabilitation Management Plan for the area covered by this EP is updated where necessary.

Stephen Clipperton
Senior Inspector Environment
Resources Regulator | Department of Regional NSW
T 02 6360 9529 | M 0427 107 883 | steve.clipperton@planning.nsw.gov.au
105 Prince Street, Orange NSW 2800 | Locked Bag 21, Orange NSW 2800
www.resourcesregulator.nsw.gov.au

All applications made under the Mining Act 1992, and any related correspondence or inquiries must be submitted via email to nswresourcesregulator@service-nsw.com If you require any assistance lodging applications or have a general inquiry please call 1300 814 608 (Option 2 then 5)





Robyn Stoney
Environment and Community Coordinator
Ulan Coal Mines Limited
4505 Ulan Road
Ulan NSW 2850

14/07/2021

Dear Ms Stoney

**Ulan Coal Expansion (PA 08-0184)
Revision of Ulan West Extraction Plan LW1 to LW6 to include LW7 and LW8**

I refer to your letter dated 10 December 2020 (submitted 1 July 2021) proposing a revision of the approved *Ulan West Extraction Plan LW1 to LW6* to include LW7 and LW8, as well as a change to the structure of the plan.

The Department has reviewed the proposed approach to the consolidated *Ulan West Extraction Plan LW 1 to LW 8* and is satisfied that revision of the plan to include LW7 and LW8 is appropriate.

The Department agrees that the proposed restructuring of the consolidated extraction plan would assist in reducing duplication. The proposed structure is supported by the Department on the basis that it continues to fully address the requirements of Schedule 3, Condition 26 of PA 08-0184 and the Department's *Draft Guidelines for the Preparation of Extraction Plans*. Clear articulation of the extraction plan framework and structure is encouraged in the main text of the plan.

If you wish to discuss the matter further, please contact Gabrielle Allan on 02 9585 6078 or gabrielle.allan@dpie.nsw.gov.au.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta 2150 | dpie.nsw.gov.au | 1



DOC21/623808

Environment and Community Coordinator
Ulan Coal Mine Pty Limited

Via: NSW Planning Portal

Attention: Lucy Stuart

28 July 2021

No Comment on Revision to Ulan West Extraction Plan

Dear Sir/Madam

Thank you for the request for advice from Public Authority Consultation (PAE-23392577), requesting input from the NSW Environment Protection Authority (EPA) on the revision of the Ulan West Extraction Plan Longwalls LW1 to LW8 (Application MP08_0184).

The EPA has no comments on the proposal and consider that all relevant matters have been addressed.

If you have any questions about this request, please contact Dr Sandie Jones on 6333800 or via email at EPA.Southopsregional@epa.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Sandie Jones'.

Dr Sandie Jones
Manager – Regional South Operations
Regulatory Operations Regional

Phone 131 555

Phone +61 2 9995 5555
(from outside NSW)

TTY 133 677

ABN 43 692 285 758

Locked Bag 5022

Parramatta
NSW 2124 Australia

4 Parramatta Square

12 Darcy St, Parramatta
NSW 2150 Australia

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www.epa.nsw.gov.au



Planning,
Industry &
Environment

Ms Robyn Stoney
Environment and Community Manager
Ulan Coal Mines Pty Limited
4505 Ulan Road
Ulan NSW 2850

10/06/2021

Dear Ms Stoney

**Ulan Coal Expansion (MP 08_0184)
Appointment of heritage expert – LW7 and LW8**

I refer to your request (MP08_0184-PA-76) for the Planning Secretary's approval of suitably qualified persons to prepare the Aboriginal heritage assessment for the revised Extraction Plan LW1 to LW6 to include the next two longwall panels LW7 and LW8 for the Ulan Coal Expansion (MP08_0184).

The Department has reviewed the nominations and information you have provided and is satisfied that these experts are suitably qualified and experienced. Consequently, I can advise that the Planning Secretary approves the appointment of Ms Alyce Cameron, Mr Ben Churcher, Dr Jodie Benton and Ms Stephanie Rusden from OzArk Environment & Heritage to prepare the Aboriginal heritage assessment.

If you wish to discuss the matter further, please contact Gabrielle Allan on (02) 9585 6078 or at gabrielle.allan@dpie.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to be 'S O'Donoghue'.

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta 2150 | dpie.nsw.gov.au | 1



Planning,
Industry &
Environment

Robyn Stoney
Environment and Community Manager

Ulan Coal Mines Limited

4505 Ulan Road
Ulan, NSW, 2850

01/03/2021

Dear Ms Stoney

**Ulan Coal Expansion (MP08_0184)
Appointment of experts – LW7 LW8**

I refer to your request (MP08_0184-PA-74) for the Planning Secretary's approval of suitably qualified persons to prepare the revised Extraction Plan LW1 to LW6 to include the next two longwall panels LW7 and LW8 for the Ulan Coal Expansion (MP08_0184).

The Department has reviewed the nominations and information you have provided and is satisfied that these experts are suitably qualified and experienced. Consequently, I can advise that the Planning Secretary approves the appointment of the following experts to prepare the revised Extraction Plan

- Dr Ken Mills of Strata Control Technology Limited (subsidence)
- Dr Bryce McKay of Australasian Groundwater and Environmental Consultants Pty Ltd (Groundwater)
- Mr Peter Kuskie of South East Archaeology Pty Ltd (Aboriginal heritage)
- Ms Susan Shield of Energy Management (surface water)
- Ms Rachel Murray of Eco Logical Australia Pty Ltd (biodiversity).

If you wish to discuss the matter further, please contact Jack Turner on 9995 5387.

Yours sincerely

A handwritten signature in black ink, appearing to read 'SOD'.

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

From: no-reply@majorprojects.planning.nsw.gov.au <no-reply@majorprojects.planning.nsw.gov.au>

Sent: Tuesday, 20 July 2021 11:16 AM

To: Tanswell, Bradley (Ulan Complex - AU) <Bradley.Tanswell@glencore.com.au>

Subject: Ulan Coal Mine - Expansion Revision of Ulan West Extraction Plan LW1 to LW8 - Response from NSW Resources Regulator

External sender

NSW Resources Regulator has responded to your request for advice in relation to the Ulan Coal Mine - Expansion Revision of Ulan West Extraction Plan LW1 to LW8. The response is below and/or attached. Record of this consultation has been automatically saved to the portal.

When you are ready, login to your profile to submit the final document to the Department.

Public Authority Response

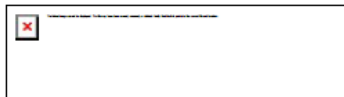
The Resources Regulator notes that Ulan Coal proposes to revise the Ulan West Extraction Plan for Longwalls LW1 to LW8. The Regulator will review the Extraction Plan once it has been submitted and may provide comments at that time.

To sign in to your account click [here](#) or visit the Major Projects Website.

Please do not reply to this email.

Kind regards

The Department of Planning, Industry and Environment



Subscribe to our [newsletter](#)



Planning Services
Resource & Energy Assessments
Contact: Paul Freeman
Tel: 9224 8587
Email: paul.freeman@planning.nsw.gov.au

Mr Charlie Allan
General Manager
Ulan Coal Mines Limited
Private Mail Bag 3006
Mudgee NSW 2850

Dear Mr Allan

Ulan Coal Mine - Longwalls 5 & 6 Extraction Plan

I refer to the Ulan West Extraction Plan for Longwalls 5 and 6 which was submitted in accordance with condition 26 of Schedule 3 of project approval 08_0184 for the Ulan Coal Mine.

The Department has carefully considered the Extraction Plan, the advice received from key government agencies and the company's responses. The Department considers the plan meets the requirements of condition 26 of Schedule 3 of the project approval.

The Secretary has accordingly approved the Ulan West Extraction Plan for Longwalls 5 and 6.

I would appreciate it if you could make the approved Extraction Plan publicly available on the company's website as soon as possible.

If you wish to discuss the matter further, please contact Paul Freeman on 9274 8587.

Yours sincerely

A handwritten signature in black ink, appearing to be 'SO', followed by the date '25/1/19'.

Steve O'Donoghue
A/Director
Resource & Energy Assessments
as nominee of the Secretary

Attachment D - Program to Collect Baseline Data for Future Extraction Plans

The monitoring proposed to be undertaken to collect baseline data for future Extraction Plans is summarised below. It includes groundwater monitoring sites, floristic monitoring plots, rock shelter sampling strategy and surface water monitoring sites, and will develop additional baseline data for use in future Extraction Plans.

Summary of Monitoring Programs to Collect Baseline Data

Aspects for Future Extraction Plans	Existing & Proposed Monitoring Programs	Ulan Coal Document Reference
Subsidence	Proposed subsidence monitoring in accordance with the Subsidence Monitoring Program (SMP LW1 – 8) (Section 5) will be used to validate and revise subsidence predictions for future Extraction Plans. Existing subsidence monitoring undertaken in accordance with the Subsidence Monitoring Program for Ulan Underground Extraction Plan LW30 & LWW6-LWW8, which commenced in 1986.	Ulan West EP LW1-8: Appendix G: SMP LW1-8 Ulan Underground EP LW30 & LWW6-LWW8: Appendix G: SMP LW30 & LWW6-LWW8
Groundwater	Groundwater monitoring (groundwater level and quality) undertaken in accordance with the Groundwater Monitoring Program (GWMP) and Section 4.2 and Section 5.1: - to enable groundwater extraction volumes to be reported against the relevant water licences; - for regional groundwater systems, in order to: - establish trends in groundwater levels in the alluvial and hardrock/coal measures aquifers - compare monitoring results with predicted groundwater depressurisation, associated groundwater inflows and impacts on baseflows to the Goulburn and Talbragar Rivers and associated creeks - assess and quantify any potential impact on private licensed bores - The Drip", a groundwater dependant natural site of cultural significance, to the east of the Ulan Mine Complex.	Groundwater Monitoring Program (GWMP) (Version 8) Water Management Plan (WMP) (Version 10)
Surface Water	Surface water monitoring (flow, quality and geomorphology) undertaken in accordance with the Surface Water Monitoring Program Section 4.1 and Section 5.1. The SWMP details the program to measure and assess changes in stream health (including base flows) and channel stability that could be attributable to mining activities and establishes the monitoring and reporting requirements to enable water quality and quantity trends to be reported against EPL 394 conditions. Monitor the effectiveness of the Erosion and Sediment Control Plan as it relates to water quality.	Surface Water Monitoring Program (SWMP) (Version 8) Water Management Plan (WMP) (Version 10) Erosion and Sediment Control Plan (ESCP) (Version 11)
Biodiversity	Monitoring of biodiversity is undertaken in accordance with the Biodiversity Management Plan (BMP) and Section 4.4 and 5.1.	Biodiversity Management Plan (BMP) (Version 5)

Aspects for Future Extraction Plans	Existing & Proposed Monitoring Programs	Ulan Coal Document Reference
	The offset areas are specifically monitored for progress toward regeneration targets. Floristic plots and bat monitoring sites are established over each longwall and monitored pre and post subsidence Research (Eco Logical Australia, 2015 for UCML) showed no statistically significant differences between vegetation and habitat over land subsided 1, 10 and 20 years previously, when compared with control sites remote from mining.	Offset Management Program
Land	Monitoring of subsidence impacts to land in general in accordance with the LMP LW1 – 8, Section 4.2 and Section 5.1 .	Ulan West EP LW1-8: Appendix B: LMP LW1-8
Aboriginal Heritage & European Heritage	Monitoring of heritage (both Aboriginal & European) in accordance with the Heritage Management Plan (HMP) and Section 4.5 and Section 5.1. Heritage monitoring in accordance with the HMP includes Aboriginal Rock Shelter Test Excavation Sampling Strategy, as prepared by South East Archaeology (SEA). Post mining inspection results are provided for consultation with heritage representatives.	Heritage Management Plan (HMP) (Version 8) Old Ulan Conservation Management Plan. Ulan Coal Continued Operations – <i>Aboriginal Rock Shelter Test Excavation Sampling Strategy</i>

Attachment E - Key Contact Register

Government Departments

Government Department	Contact	Phone	Email
Department of Planning, Industry and Environment	Stephen O'Donoghue	Ph: 0477 345 626	Stephen.ODonoghue@planning.nsw.gov.au
Department of Planning, Industry and Environment - Resources Regulator	Stephen Clipperton	Ph: 1300 814 609	nswresourcesregulator@service-now.com
NSW Subsidence Advisory	-	Ph: (02) 4908 4300	subsidenceadvisory@customerservice.nsw.gov.au
Department of Planning, Industry and Environment - Natural Resources Access Regulator	Heather Dewson	Ph: 1800 633 362	nrar.servicedesk@dpie.nsw.gov.au
Department of Planning, Industry and Environment – Biodiversity, Conservation and Science Directorate	Ben Ellis	Ph: 1300 361 967	info@environment.nsw.gov.au
Heritage NSW	-	Ph: 9873 8500	heritagemailbox@environment.nsw.gov.au
Mid-Western Regional Council	Brad Cam	Ph: (02) 6378 2850	council@midwestern.nsw.gov.au
Environmental Protection Authority	Andrew Helms	Ph: (02) 6333 3800	EPA.Southopsregional@epa.nsw.gov.au

Ulan Coal Personnel

Name	Position	Contact Details
Charlie Allan	General Manager – Ulan Coal Mines Limited	Work: 02 6372 5306 Email: charlie.Allan@glencore.com.au
David Ribaux	Operations Manager – Ulan West Underground Operations	Work: 02 6370 9301 Email: dave.ribaux@glencore.com.au
Ryan Davidson	Technical Services manager – Ulan West Underground Operations	Work: 02 6370 9200 Email: ryan.davidson@glencore.com.au
Lucy Stuart	Environment & Community Manager – Ulan Coal	Work: 02 6372 5368 Mobile: 0400 661 749 Email: lucy.stuart@glencore.com.au

Attachment F – Environmental Sensitive Checklist

Section 6.6.3 of the former SMP Guidelines (2003) provides a list of potentially environmentally sensitive areas that must be assessed as part of an SMP Application. The table below identifies each potential environmentally sensitive item, assessed by Ulan Coal with respect to the Application Area.

Assessment of Environmental Sensitive Areas

Item	Description	Method of Assessment	Items in Application Area
1	Land reserved as State Conservation Area under National Parks and Wildlife Act 1974 (NP&W Act)	Reviewed Project EA.	Nil
2	Land reserved as an Aboriginal Place under NP&W Act	Reviewed Project EA. Review of Archaeological reports, NPWS Aboriginal Heritage information Management System	Nil
3	Land identified as wilderness by the Director NPWS under the Wilderness Act 1987	Reviewed Project EA.	Nil
4	Land subject to a conservation agreement under NP&W Act	Reviewed Project EA. There are no covenants of land titles regarding conservation agreements under the Nation Parks & Wildlife Act.	Nil
5	Land acquired by Minister for the Environment under Part 11 NP&W Act	Reviewed Project EA.	Nil
6	Land within State Forests mapped as Forestry Management Zones 1, 2 or 3	Reviewed Project EA.	Nil
7	Wetlands mapped under SEPP14 – Coastal Wetlands	Reviewed Project EA. There are no wetlands mapped under SEPP14 – Coastal Wetlands	Nil
8	Wetlands listed under the Ramsar Wetlands Convention	Reviewed Project EA. There are no wetlands listed under the Ramsar Wetlands Convention	Nil
9	Lands mapped under SEPP 26 – Coastal Rainforests	Reviewed Project EA. There are no Lands mapped under SEPP 26 – Coastal Rainforests	Nil
10	Areas listed on the Register of National Estate	Reviewed Project EA.	Nil
11	Areas listed under the Heritage Act 1977 for which a Extraction Plan of management has been prepared	Reviewed Project EA.	Nil
12	Land declared as critical habitat under the Threatened Species Conservation Act 1995	Reviewed Project EA. Reviewed NSW NPWS website	Nil
13	Land within a restricted area prescribed by a controlling water authority	Reviewed Project EA.	Nil
14	Land reserved or dedicated under the Crowns Land Act 1989 for the preservation of flora, fauna, geological formations or other environmental protection purposes	Reviewed Project EA.	Nil
15	Significant surface watercourses and groundwater resources identified through consultation with relevant government agencies	Reviewed Project EA.	Section 4.1 and Section 4.2
16	Lake foreshores and flood prone areas	Reviewed Project EA.	Nil
17	Cliffs, escarpments and other significant natural features	Aerial photographs, topographical maps, landscape feature mapping. Reviewed Project EA. Ground surveys.	Section 4.3
18	Areas containing significant ecological values	Reviewed Project EA.	Section 4.4
19	Major surface infrastructure	Reviewed Project EA.	Nil
20	Surface features of community significance (including cultural, heritage or archaeological significance)	Reviewed by archaeological survey. Reviewed Project EA.	Section 4.6
21	Any other land identified by the Department to the titleholder	Reviewed Project EA.	Nil

Appendix B of the former SMP Guidelines (2003) provides a list of surface and sub-surface features that may be affected by underground mining. The table below identifies surface and subsurface features applicable to the Application Area.

Surface and Sub-surface Features Considered

Natural Features	Within Application Area	Addressed in this Extraction Plan
1) Catchment areas and declared Special Areas	N	
2) Rivers and creeks	Y	Section 4.1
3) Aquifers, known groundwater resources	Y	Section 4.2
4) Springs	N	
5) Sea/lake	N	
6) Shorelines	N	
7) Natural dams	N	
8) Cliffs / pagodas	Y	Section 4.3
9) Steep slopes	Y	Section 4.3
10) Escarpments	N	
11) Land prone to flooding or inundation	N	
12) Swamps, wetlands, water related ecosystems	N	
13) Threatened and protected species	Y	Section 4.4
14) National parks	N	
15) State recreation areas	N	
16) State forests particularly areas zoned FMZ 1, 2 and 3	N	
17) Natural vegetation	Y	Section 4.4
18) Areas of significant geological interest	N	
19) Any other feature considered significant	N	
Public Utilities		
1) Railways	N	
2) Roads (all types)	N	
3) Bridges	N	
4) Tunnels	N	
5) Culverts	N	
6) Water/gas/sewerage pipelines	N	
7) Liquid fuel pipelines	N	
8) Electricity transmission lines (overhead/underground) and associated Extraction Plants	Y	Section 4.5
9) Telecommunication lines (overhead/underground) and associated Extraction Plants	Y	Section 4.5
10) Water tanks, water and sewage treatment works	N	
11) Dams, reservoirs and associated works	N	
12) Air strips, and 13) Any other infrastructure items	N	
Public Amenities		
1) Hospitals	N	
2) Places of worship	N	
3) Schools	N	
4) Shopping centres	N	
5) Community centres	N	
6) Office buildings	N	
7) Swimming pools	N	
8) Bowling greens	N	
9) Ovals and cricket grounds	N	
10) Race courses	N	
11) Golf courses	N	
12) Tennis courts	N	
13) Visual Amenity	N	
Farm Land and Facilities		
1) Agricultural utilisation or agricultural suitability of farm land	Y	Section 4.3
2) Farm buildings / sheds	N	
3) Gas and / or fuel storages	N	
4) Poultry sheds	N	
5) Glass houses	N	
6) Hydroponic systems	N	

Surface and Sub-surface Features Considered (cont.)

Natural Features	Within Application Area	Addressed in this Extraction Plan
7) Irrigation systems	N	
8) Fences	Y	Section 4.5
9) Farm dams	Y	Section 4.5
10) Wells, bores	Y	Section 4.2
11) Any other feature considered significant	N	
Industrial, Commercial and Business Establishments		
1) Factories	N	
2) Workshops	N	
3) Business or commercial establishments	N	
4) Gas and / or fuel storages and associated Extraction Plants	N	
5) Waste storages and associated Extraction Plants	N	
6) Buildings, equipment and operations that are sensitive to surface movements	N	
7) Surface mining (open cut) voids and rehabilitated areas	N	
8) Mine infrastructure including tailings dams and emplacement areas	Y	Section 4.5
9) Any other feature considered significant	N	
Areas of Archaeological and/or Heritage Significance	Y	Section 4.6
Items of Architectural Significance	N	
Permanent Survey Control Marks	Y	Section 4.5
Residential Establishments		
1) Houses	N	
2) Flats / Units	N	
3) Caravan parks	N	
4) Retirement/aged care villages	N	
5) Associated structures such as workshops, garages, on-site waste water systems, water or gas tanks, swimming pools and tennis courts	Y	Section 2.1.2 Section 4.5
6) Any other feature considered significant.	N	

Attachment G – Technical Report (Subsidence)

Attachment H - Technical Report (Groundwater)

Attachment I - Technical Report (Biodiversity)

Attachment J - Technical Report (Heritage)

Attachment K - Technical Report (Surface Water)

Attachment L – Predicted Groundwater Allocation

	Water Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
WSP NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 - Sydney Basin MDB (Other) Management Zone	GW model predictions MOD 4 (Model Recal)													
		4759	4744	3425	5227	4991	4876	5604	4464	5091	2733	1703	1496	596
	WAL 37192 (secured under 2014 water allocation)	704	704	704	704	704	704	704	704	704	704	704	704	704
	WAL 41906 (secured under 2017 water allocation)	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215	2215
	WAL 42900 (Secured under 2018 water allocation)	4031	4031	4031	4031	4031	4031	4031	4031	4031	4031	4031	4031	4031
	UCML Allocation for this water source	6950	6950	6950	6950	6950	6950	6950	6950	6950	6950	6950	6950	6950
WSP NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 - Sydney Basin MDB - Macquarie-Oxley Management Zone Source	GW model predictions MOD 4 (Model Recal)	2.78	3.07	3.40	3.76	4.13	4.49	4.86	5.26	5.74	6.61	6.69	7.23	7.71
	WAL (Pending)													
	UCML Allocation for this water source													
Baseflow Offsets WSP Macquarie Bogan Unregulated Rivers Water Sources 2012 – Upper Talbragar River Water Source	GW model predictions MOD 4 (Model Recal)	15.3	16.18	17.25	18.23	19.31	20.39	21.43	22.58	23.54	24.5	25.52	26.42	27.28
	WAL 41817 - Upper Talbragar River Water Source (Obtained Feb 2019)	50	50	50	50	50	50	50	50	50	50	50	50	50
	UCML Allocation for this water source	50	50	50	50	50	50	50	50	50	50	50	50	50
Baseflow Offsets WSP Macquarie – Castlereagh Groundwater Sources 2020 – Talbragar Alluvial Groundwater Source	GW model prediction MOD 4 ~ (ML/water year)**	80	80	80	80	80	80	80	80	80	80	80	80	80
	GW model predictions MOD 4 (Model Recal)	1.82	2.32	2.46	2.12	2.26	2.54	2.56	2.34	2.33	2.41	2.57	2.01	2.33
	WAL 34921 - Talbragar Alluvial GW sources (Obtained Dec 2018)	30	30	30	30	30	30	30	30	30	30	30	30	30
	UCML Allocation for this water source	30	30	30	30	30	30	30	30	30	30	30	30	30
Water Act 1912 to 2016 and then WSP North Coast Fractured and Porous Rock Groundwater Sources 2016	GW model predictions MOD 4 (Model Recal)	1168	1257	2919	1108	2618	961	3061	3191	1211	729	622	566	531
	WAL41492 (2015 and 2016 water years: 20BL173821 under WM Act 1912)	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**
	UCML Allocation for this water source	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**	7060**
WSP North Coast Fractured and Porous Rock - Oxley Basin Coast Groundwater Sources 2016	GW model predictions MOD 4 (UPDATED Model)	3.76	4.09	4.5	4.95	5.4	5.89	6.56	7.36	8.22	8.97	9.77	10.45	11.13
	WAL41492 (2015 and 2016 water years: 20BL173821 under WM Act 1912)	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060
	UCML Allocation for this water source	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060	7060
Baseflow Offsets Water Sharing Plan for the Hunter unregulated and alluvial water sources 2009 Upper Goulburn River water source WAL19047 - 600ML	GW model predictions MOD 4 (Model Recal)	100	100	100	100	100	100	100	100	100	100	100	101	101
	WAL19047	600	600	600	600	600	600	600	600	600	600	600	600	600
	Consumption from water source other than baseflow losses *	240	240	240	240	240	240	240	240	240	240	240	240	240
	Available for baseflow loss under PA08_0184	360	360	360	360	360	360	360	360	360	360	360	360	360

* Estimated prediction of take from small pump extraction and riparian flow through dam wall (based on previous measured flows) and annual evaporation from Moolarben Dam (modelled)

** WSPs combined on MOD 4. New WSP in 2020 has resulted in the split now shown.

Appendix A - Water Management Plan

Appendix B - Land Management Plan for LW1-8 (LMP LW1-8)

Appendix C - Biodiversity Management Plan

Appendix D - Built Features Management Plan for LW1 - 8 (BFMP LW1-8)

Appendix E - Heritage Management Plan

Appendix F - Public Safety Management Plan for LW1 - 8 (PSMP LW1 - 8)

Appendix G - Appendix G Subsidence Monitoring Program for LW1 – 8 (SMP LW1 – 8)

Appendix H - Appendix H Rehabilitation Management Plan for LW1 – 8 (RMP LW1 - 8)

Appendix I - Appendix I Extraction Plans 1 to 7