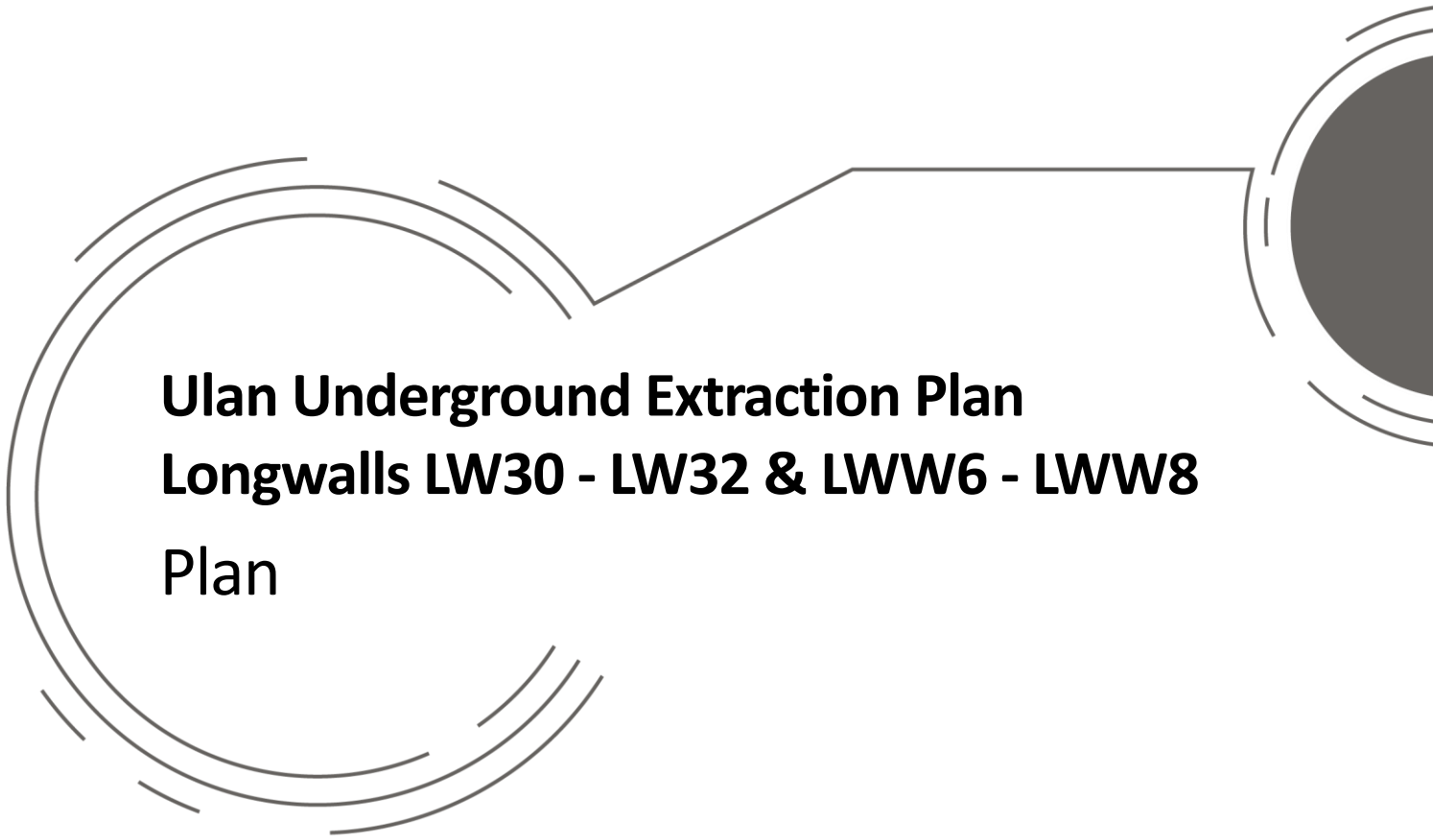


ULAN
COAL

GLENCORE



Ulan Underground Extraction Plan Longwalls LW30 - LW32 & LWW6 - LWW8 Plan

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

Table of Contents

1.	Introduction	1
1.1	Background	1
1.2	Purpose & Scope	6
1.3	Structure of the Extraction Plan.....	1
1.4	Revised Trigger Action Response Plans.....	3
2.	Plan Development and Consultation	4
2.1	Plan Requirements	4
2.1.1	Regulatory Requirements	4
2.1.2	Project Approval (08_0184)	4
2.1.2.1	Requirement for an Extraction Plan	5
2.1.2.2	Subsidence Performance Measures	6
2.1.3	Mining Leases.....	8
2.1.4	Other Relevant Legislation	11
2.1.4.1	Commonwealth Legislation	11
2.1.4.2	State Legislation.....	11
2.2	Specialist Assessments.....	13
2.2.1	Subsidence	13
2.2.2	Groundwater	13
2.2.3	Biodiversity.....	14
2.2.4	Heritage.....	14
2.2.5	Surface Water.....	14
2.3	Review of Previous Subsidence Predictions.....	14
2.4	Risk Assessment	15
2.4.1	Avoidance and Mitigation Strategies	16
2.5	Consultation	16
2.5.1	Government Agencies	16
2.5.2	Landowners	18
2.5.3	Community and Heritage Stakeholders	19
2.5.3.1	Community Consultation	19
2.5.3.2	Aboriginal Heritage Groups	20
2.5.4	Public Utilities.....	20
2.5.5	Landholder Dispute Resolution Process.....	21
3.	Subsidence Assessment	22
3.1	Description of The Extraction Plan Area	22
3.2	Mining Geometry, Parameters and Schedule	23
3.3	Predicted Subsidence Effects and Impacts	24
3.4	Technical Specialists Reviews.....	27
3.4.1	Surface Water.....	27

3.4.2	Groundwater	27
3.4.3	Biodiversity	27
3.4.4	Heritage	28
4.	Monitoring Programs	29
4.1	Subsidence Effects Monitoring	29
4.2	Environmental Monitoring Program	32
4.2.1	Surface Water Monitoring	32
4.2.1.1	Baseline	32
4.2.1.2	Objectives	34
4.2.1.3	Surface Water Monitoring	34
4.2.2	Groundwater Monitoring	38
4.2.2.1	Baseline	38
4.2.2.2	Objectives	39
4.2.2.3	Groundwater Monitoring	39
4.2.3	Landform Monitoring	44
4.2.3.1	Baseline	44
4.2.3.2	Objectives	44
4.2.3.3	Landform Monitoring	45
4.2.4	Biodiversity Monitoring	49
4.2.4.1	Baseline	49
4.2.4.2	Objectives	50
4.2.4.3	Biodiversity Monitoring	51
4.2.5	Built Features	54
4.2.5.1	Baseline	54
4.2.5.2	Objectives	54
4.2.5.3	Built Features Monitoring	55
4.2.6	Heritage Monitoring	60
4.2.6.1	Baseline	60
4.2.6.2	Objectives	61
4.2.6.3	Heritage Monitoring	61
4.2.7	Public Safety Monitoring	65
4.2.7.1	Baseline	65
4.2.7.2	Objectives	65
4.2.7.3	Public Safety Monitoring	65
4.3	Consolidated Subsidence Monitoring Program	69
4.4	Ongoing Baseline Data Collection Program	77
5.	Management, Mitigation, Remediation and Reporting Measures	79
5.1	Performance Measures and Performance Indicators	79
5.2	Management and Mitigation Measures	82
5.3	Remediation and Rehabilitation Measures	85
5.3.1	General Landforms	85

5.3.2	Rehabilitation Management Plan (RMP).....	87
5.3.3	Cliff Lines	87
5.4	Rehabilitation Monitoring.....	87
5.5	Master Trigger Action Response Plan (MTARP).....	88
5.6	Adaptive Management and Contingency Planning.....	104
5.6.1	Adaptive Management.....	104
5.6.2	Contingency Plan.....	105
5.7	Incidents, Complaints, Exceedances and Non-Compliances.....	106
5.7.1	Incident, Exceedances and Non-Compliances.....	106
5.7.2	Community Complaints.....	106
5.8	Reporting Framework	107
5.8.1	Annual Review.....	108
6.	Plan Administration and Responsibilities	109
6.1	Review of the Extraction Plan	110
6.1.1	Review of Other Management Plans	110
7.	Document Information	111
7.1	Definitions and Glossary	111
7.2	Reference Information.....	113
7.3	Change Information	114
	Attachment A – Guideline Requirements	1
	Attachment B - Relevant Consultation Records	3
	Attachment C - Correspondence	18
	Attachment D - Key Contact Register	32
	Attachment E – Environmental Sensitive Checklist	33
	Attachment F – Technical Report (Subsidence).....	36
	Attachment G - Technical Report (Groundwater)	37
	Attachment H - Technical Report (Biodiversity).....	38
	Attachment I - Technical Report (Heritage)	39
	Attachment J - Technical Report (Surface Water)	40
	Attachment K – Predicted Groundwater Allocation	41
	Appendix A - Water Management Plan	42
	Appendix B - LMP LW30 – LW32 & LWW6 – LWW8	43
	Appendix C - Biodiversity Management Plan.....	44
	Appendix D - BFMP LW30 – LW32 & LWW6 – LWW8.....	45
	Appendix E - Heritage Management Plan	46
	Appendix F - PSMP LW30 - LW32 & LWW6 - LWW8.....	47
	Appendix G - SMP LW30 – LW32 & LWW6 – LWW8.....	48

Appendix H - Extraction Plans 1 to 7 49

Appendices

Appendix A Water Management Plan	
Appendix B Land Management Plan for LW30-LW32 & LWW6-LWW8	
Appendix C Biodiversity Management Plan	
Appendix D Built Features Management Plan for BFMP LW30-LW32 & LWW6-LWW8	
Appendix E Heritage Management Plan	
Appendix F Public Safety Management Plan for LW30-LW32 & LWW6-LWW8	
Appendix G Subsidence Monitoring Program for LW30-LW32 & LWW6-LWW8	
Appendix I Extraction Plans 1 to 7	

Figures

Figure 1 Regional Location	3
Figure 2 The Application Area	4
Figure 3 The Extraction Plan Area	5
Figure 4 EMS and Relationship to the Extraction Plan.....	7
Figure 5 Applicable Mining Leases within the Extraction Plan Area.....	10
Figure 6 Estimated Contours of Vertical Subsidence for LW30 to LW32 & LWW6 to LWW8	26
Figure 7 Subsidence Effects Monitoring Lines F and H	30
Figure 8 Surface Water Monitoring	37
Figure 9 Private Bores Predicted Drawdown Contours & Groundwater Monitoring	43
Figure 10 Landform Monitoring.....	48
Figure 11 Biodiversity Monitoring	53
Figure 12 Built Features Monitoring	59
Figure 13 Heritage Monitoring.....	64
Figure 14 Public Safety Monitoring.....	68
Figure 15 Contingency Plan.....	105

Tables

Table 1 Performance Indicators and TARP Multilevel Response	3
Table 2 Project Approval Extraction Plan Conditions & Management Plan Requirements	5
Table 3 Project Approval Subsidence Performance Measures.....	7
Table 4 Mining Lease Extraction Plan Conditions	8
Table 5 Summary of Consultation with Government Agencies.....	17

Table 6 Summary of Consultation with CCC	20
Table 7 Summary of Consultation with Aboriginal Heritage Groups.....	20
Table 8 – The Extraction Plan Longwall Panel Parameters	23
Table 9 – Proposed and Actual Longwall Mining Schedule	24
Table 10 - Assessment against MOD4 & EP Maximum Forecast Subsidence Values	25
Table 11 - Summary of Subsidence Effects Monitoring Program	31
Table 12 Surface Water Monitoring	35
Table 13 Surface Water Quality Trigger Assessment Values	35
Table 14 Groundwater Monitoring Program	40
Table 15 Landform Monitoring Program	45
Table 16 Biodiversity Monitoring Program.....	51
Table 17 Built Features Monitoring Program	55
Table 18 Aboriginal and European Monitoring Program.....	61
Table 19 Public Safety Monitoring Program	66
Table 20 Consolidated Subsidence Monitoring Program Summary	70
Table 21 Summary of Monitoring Programs to Collect Baseline Data	77
Table 22 Subsidence Performance Measures and Performance Indicators.....	79
Table 23 Summary of Management and Mitigation Measures	83
Table 24 Master TARP Multilevel Response	89
Table 25 Summary of Reporting Framework.....	107
Table 26 UCMPL Responsibility for this Extraction Plan	109
Table 27 Definitions	111
Table 28 Glossary	112
Table 29 Reference Information	113
Table 30 Change Information	114

Title Block

Applicant:	Ulan Coal Mines Pty Limited
Mine:	Ulan Underground Mine
Project Approval:	PA08_0184
Mining Leases:	ML1468, ML1554, ML1656
Extraction Plan Title:	Ulan Underground Extraction Plan for Longwalls LW30 - LW32 & LWW6 - LWW8
Document Reference Number:	ULNCX-111515275-2811
Date:	30 November 2022
Accuracy of Information	
Authorised Representative:	Lucy Stuart
Position:	Environment & Community Manager
Date:	12 December 2022
Signature:	

Version	Date	Review team (Consultation)	Change Summary
0.1	October 2016	Tara Stokes, Robyn Stoney, Ben Anderson	Document Development.
0.2	October 2017	Jessica Southgate	Document formatting updated in accordance with Dept. of Planning feedback. Included statement of commitments summary.
1.0	May 2019	Robyn Stoney, Lucy Stuart and Brad Tanswell	Review and update in response to feedback received from DPIE, DPI Water and OEH in October 2018.
2.0	August 2019	Tara Stokes	Updated correspondence for DPIE Approval of plan 19/08/2019.
3.0	April 2020	Robyn Stoney, Lucy Stuart, Stephen Bragg	This EP was amended to align with the approved MOD4 for the extension of longwall panels.
4.0	December 2020	Robyn Stoney, Lucy Stuart, Stephen Bragg	This EP was resubmitted on the 21/12/2020 to address the requirements from the DPIE Water feedback.
5.0	December 2022	Lucy Stuart, Tara Stokes, Stephen Bragg, SCT, AGE, ELA, OzArk & Engeny	Revised EP to include: new Guidelines for an Extraction Plan (October 2022), inclusion of LW31 and LW32, amendment to LW32 and LW33 First Workings and incorporate comments from agencies as recieved on the 13 April 2023 after submission of draft EP on the 3 March 2023 and as received on the 23 June 2023.

Notes: Any 'version' discrepancies displayed in the Footer of this Document are a function of the UCML document control register. The actual revisions and summary of changes to this Document are provided in the table above and in **Table 30** of this Extraction Plan.

Executive Summary

Ulan Coal Mines Pty Limited (UCMPL) have amended the approved *Ulan Underground Extraction Plan Longwalls LW30 and LWW6 to LWW8* (Version 4) to include LW31 and LW32 (the Application Area). The amended *Ulan Underground Extraction Plan Longwalls LW30 to LW32 and LWW6 to LWW8* (Version 5) is herein referred to as the Extraction Plan. The Extraction Plan has also been prepared in consideration of the NSW Department of Planning and Environment (DPE) recent *Extraction Plan Guidelines – October 2022* (the Guidelines) and the First Workings Amendment to LW32 and LW33.

At the time of preparing the Extraction Plan (Version 5), UCMPL had completed secondary extraction of LWW6, LWW7 and partial secondary extraction of LW30 with no exceedances of the subsidence performance measures as outlined in PA08_0184. Subsidence behaviour has been consistent with expectation and subsidence effects are less than forecasts made by Strata Control Technology (SCT) to inform the initial and subsequent amendment to the Extraction Plan for LW30 and LWW6-LWW8.

Subject to approval of the Application Area, the current approved Extraction Plan Area for LW30 & LWW6 to LWW8 would therefore include LW31 and LW32 as displayed in **Figure 3**, herein referred to the Extraction Plan Area. The Extraction Plan Area is determined as the area within a distance equal to one times the overburden depth to the mining horizon (equivalent to a 45° angle of draw) around the outermost goaf edges of the planned longwall panel voids.

The Extraction Plan Area covers a surface area of approximately 1398ha. Within the Extraction Plan Area approximately 75ha of the Durrigere State Conservation Area (DSCA) (part of the Curryall State Forest) is located at the eastern end of longwalls LW30 to LW32 and approximately 97ha of privately-owned land referred to as “Woodbury” is located at the western end of longwalls LWW6 to LWW8.

One private landowner is within the Extraction Plan Area located above the western portions of LWW6 to LWW8. Longwall mining of LWW6 and LWW7 has now been completed. Subsidence behaviour observed on the private property has been consistent with expectation. UCMPL have been mitigating impacts and risks associated with LWW6 and LWW7 in consultation with the landowner and in accordance with the Extraction Plan and written agreements, including Private Property Subsidence Management Plans.

There is one public utility within the Extraction Plan Area. An overhead 12.7kW Single Wire Earth Return (SWER) line owned by Essential Energy has been managed without issue, in accordance with the Extraction Plan. Consultation and management measures of the SWER line have been ongoing since 2011 with Essential Energy (formally Country Energy) regarding previous Extraction Plans. No significant impacts are expected to this powerline from the planned mining in LW30, LW31 and LW32.

LW30 commenced in July 2022 under the Durrigere State Conservation Area without issue, in consultation with National Parks and Wildlife Service. Impacts observed to date have been minor as expected due to the greater overburden depth. The area of potential impacts and consequences in the Durrigere State Conservation Area is now reduced from that previously approved by MOD4 to PA08_0184 due to the shortening of LW32.

The Extraction Plan was prepared by UCMPL, with assistance from various technical specialists. The appointment of the suitably qualified and experienced persons were endorsed by the Secretary of the DPE on the 10 May 2022. A summary from each technical review is provided.

Subsidence

Estimates of subsidence effects for Longwalls 31 and 32 are consistent with the range of values previously forecast at similar overburden depths for the original UCCO Project EA, subsequent updates for modifications to the UCCO Project Approval and regular Subsidence Management Plan/Extraction Plan assessments at the Ulan Complex (SCT, 2022).

Forecast values for the primary subsidence effects parameters from conventional subsidence behaviour are at the lower end of the range of previously forecast maxima due to the greater overburden thickness above Longwalls 31 and 32. Maximum values for the primary subsidence parameters are forecast as: vertical subsidence of less than 1.7m, tilt of less than 35mm/m, compressive strain of less than 20mm/m and tensile strain of less than 15mm/m (SCT, 2022).

The area of potential impacts and consequences in the Durrigere State Conservation Area is reduced from that previously approved by MOD4 to PA08_0184 due to the shortening of Longwall 32 (SCT, 2022).

Subsidence effects and impacts from the remaining mining in Longwalls 30 and W8 and from the planned mining of Longwalls 31 and 32 are expected to be consistent with or less than the previously forecast maxima and compliant with the subsidence performance measures for PA08_0184 (as modified), notwithstanding the input of other specialists (SCT, 2022).

Surface Water

Based on an assessment of the available monitoring results there have been no environmental consequences greater than predicted in the EA to the surface waters of Curra Creek, Bobadeen Creek or Mona Creek. Monitoring results suggest there have been minimal subsidence impacts on surface waters as a result of previous underground mining operations at Ulan West and impacts are consistent with EA predictions (Engeny, 2022).

Groundwater

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. With the exception of PB24, in which groundwater levels have recovered following an abrupt decline between 2012 and 2014, impacts to groundwater levels are consistent with, or less than those predicted, occurring in the Permian and Triassic fractured rock units. Only the Triassic sandstones are utilised for stock and domestic water supply. The water quality of private 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 LW32 is not expected to significantly reduce the availability of groundwater for private bores accessing the Triassic units (AGE, 2022).

Mine inflows 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 (AGE, 2022).

Biodiversity

The subsidence effects for UGLW31 and UGLW32 in SCT (2022) are consistent with previously forecast at similar overburden depths for the site. Given these predictions, based upon the environmental and ecological similarities between UGLW31-32 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 UGLW31 and UGLW32 are expected to have a negligible impact on threatened species, populations, habitats and ecological communities (ELA, 2022).

Heritage

Examination of the UCMPL Aboriginal site database indicates that three Aboriginal sites have been identified within the Application Area, all of which are isolated finds (refer to Section 3.1.1). As noted by SCT (2020 and 2022) impacts to artefact sites such as isolated finds from subsidence, are generally negligible (OzArk, 2022).

Provisions relating to Aboriginal heritage in the UCMPL HMP for approved UCCO Project will continue to be implemented where relevant for the Application Area. No further revisions or actions need to be implemented as no further survey is required (OzArk, 2022).

In accordance with Table 4.1 of the HMP which provides the subsidence performance measures for PA08-0184, there will be nil impact within the Brokenback Conservation Area, the Bobadeen Grinding Groove Conservation Area, the Valley Way Grinding Groove Conservation Area and the Mona Creek rock shelter sites. These areas should continue to be protected in accordance with the HMP (OzArk, 2022).

In accordance with Table 4.1 of the HMP which provides the subsidence performance measures for PA08-0184, there will be negligible impact to the Talbragar Fish Fossil Reserve. Monitoring as described in Table 4-1 is not required as it is >6 km from the goaf edge of LW31 and LW32 (OzArk, 2022).

1. Introduction

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 Underground Mine (UUG) is a component of the Mine. UUG 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 (**Figure 5**).

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 (UW) and Ulan Underground (UUG) mines to operate twenty-four hours a day, 7 days per week.

At the time of preparing the *Ulan Underground Extraction Plan for Longwalls LW30-LW32 & LWW6-LWW8 (Version 5)* (the Extraction Plan):

- PA08_0184 had been modified on six occasions (**Section 1.3**). The Extraction Plan has been prepared in consideration of MOD4 Longwall Optimisation Project of PA08_0184; and
- Under the approved *Ulan Underground Extraction Plan for Longwalls LW30 & LWW6 to LWW8 (Version 4)*, the extraction of LWW6 and LWW7 had been completed, with partial extraction of LW30, commencing in July 2022.

UCMPL have revised the Extraction Plan to include two additional approved longwall panels under PA08-0184 i.e. LW31 and LW32 (the Application Area) (**Section 3.1**) (**Figure 2**), for the Secretary’s approval from the NSW Department of Planning and Environment (DPE).

Subject to approval of the Application Area, the current approved Extraction Plan Area for LW30 & LWW6 to LWW8 would therefore include LW31 and LW32 as displayed in **Figure 3**, herewith in referred to the Extraction Plan Area.

Both the Extraction Plan Area and the Application Area has been chosen to include any area that is likely to be perceptibly impacted by mining subsidence as well as the surrounding area within a distance equal to the overburden depth from the outermost goaf edges of the six longwall panels

(**Figure 2** and **Figure 3**). Subsidence movements occur predominantly within the limits of the longwall panels. Subsidence impacts are generally within a distance of half depth of overburden cover from the longwall panels

On the 10 May 2022, UCMPL sought a minor amendment to the First Workings of the UUG mine plan in accordance with Condition 25, Schedule 3 of PA08_0184. The first workings amendment involves relocation of the installation roadway at the eastern end of LW32 and LW33 to the west by approximately 415m due to an increased risk of roof instability, higher ash product and a reduced working section within the eastern end of LW31 and LW32. Approval by the Secretary regarding this First Workings amendment was granted on the 18 May 2022 (**Attachment C**). Further information is provided in **Section 2.2**.

This Extraction Plan has also been prepared in consideration of the DPE's most recent *Extraction Plan Guidelines – October 2022* (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 DPE on the 10 May 2022 (**Section 2.2 & Attachment C**).

Figure 1 Regional Location

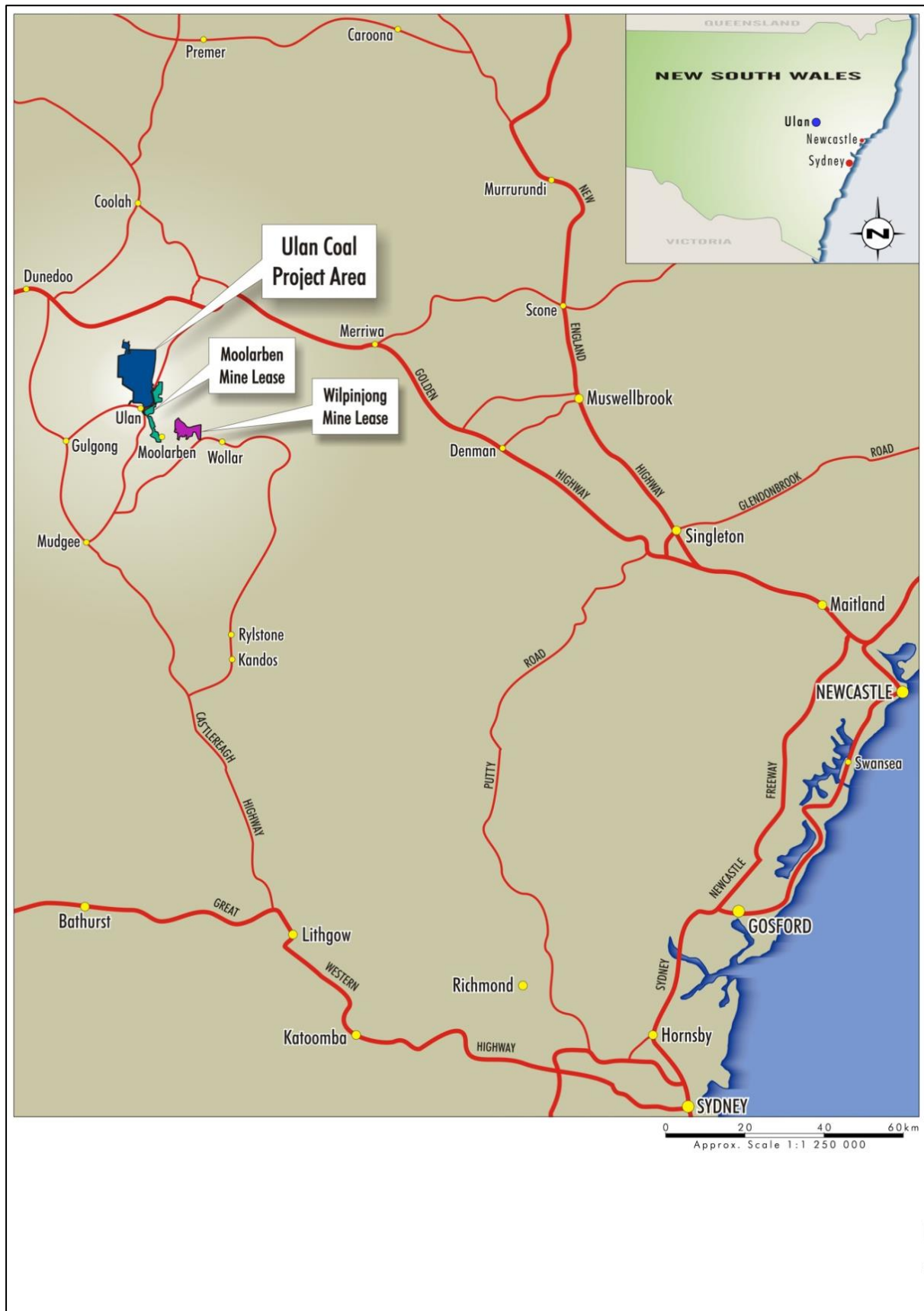
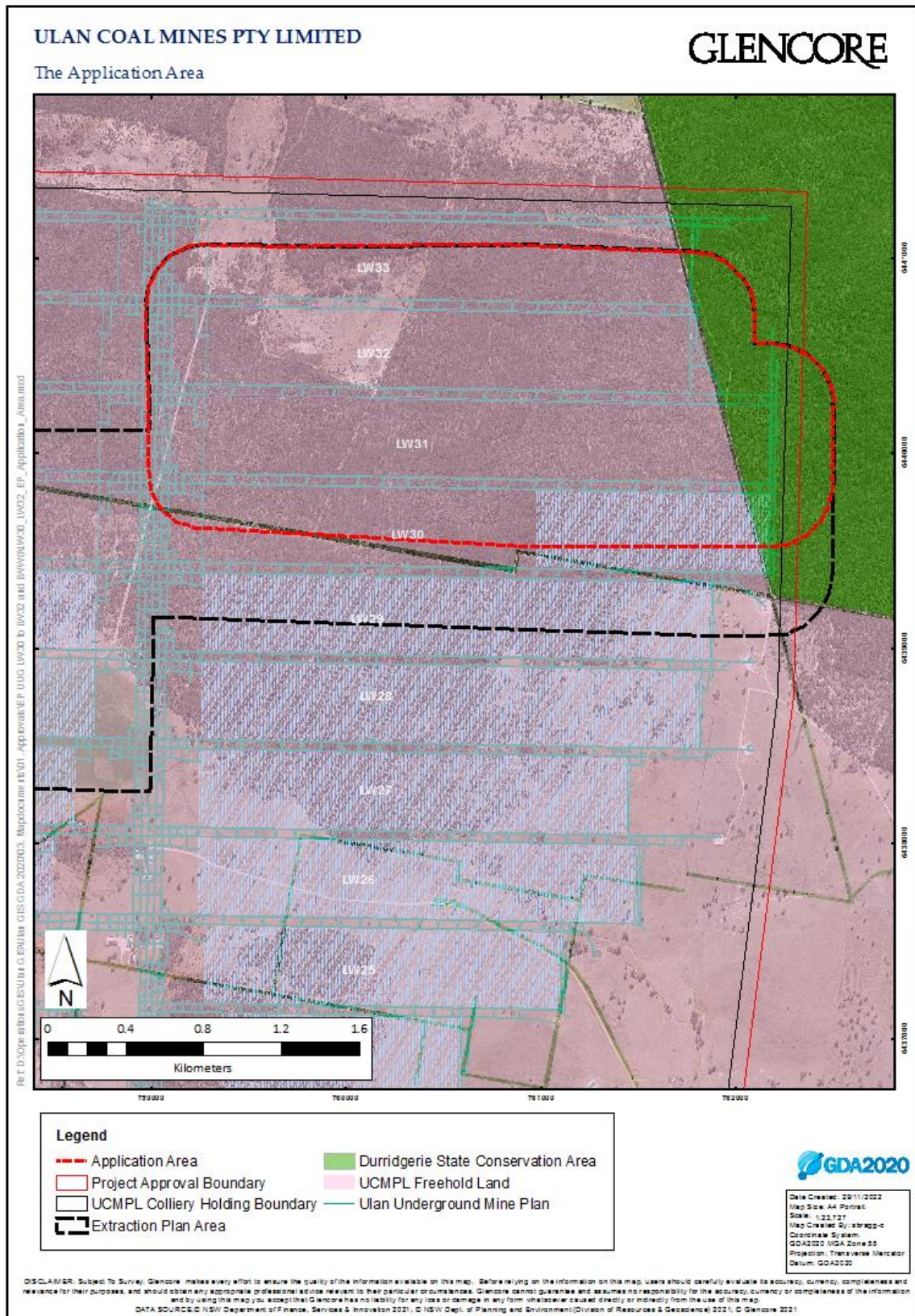


Figure 2 The Application Area



Notes: Longwall progress for LW30 as of 29 November 2022

Figure 3 The Extraction Plan Area



Notes: Longwall progress for LW30 as of 29 November 2022

1.2 Purpose & Scope

This Extraction Plan outlines the proposed management, mitigation, monitoring and reporting of potential subsidence impacts and environmental consequences in the UUG mining area from the secondary extraction of longwalls (LW) LW30-LW32 and LWW6-LWW8, 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 LW31 and LW32 (the Application Area) (**Section 3.1**) (**Figure 2**), and in consideration of the remaining approved longwall panels LWW8 and LW30. LW30 was only partially extracted at the time of this revision to the Extraction Plan, whilst extraction of LWW8 had not yet commenced.

The initial Extraction Plan was approved on the 19 August 2019 (**Attachment C**) and has since been revised on several occasions, including:

- The Extraction Plan (Version 3) revised to align with MOD 4 (approved November 2020); and
- The Extraction Plan (Version 4) revised to address feedback from DPE-Water (approved February 2021).

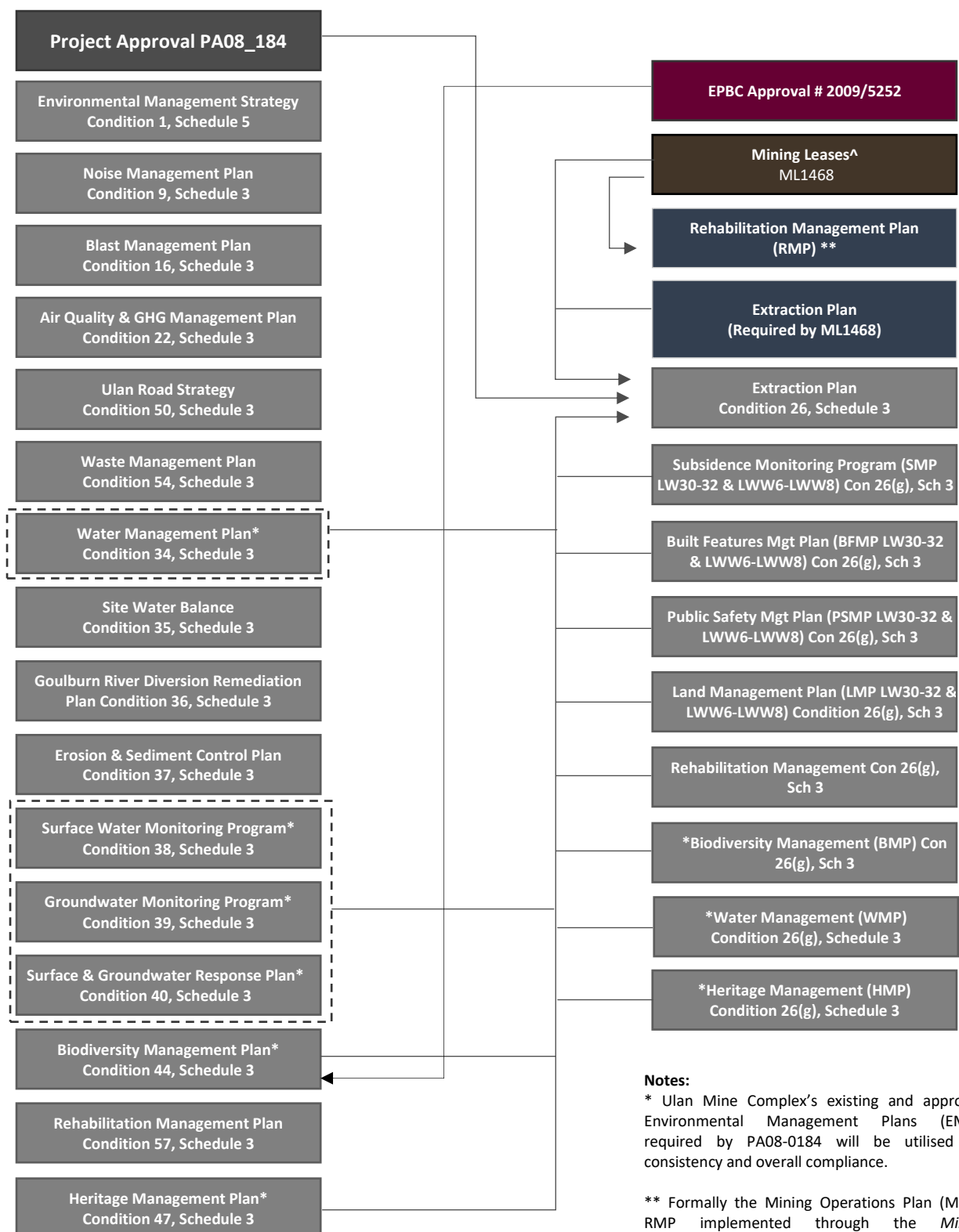
The objectives of this Extraction Plan are to:

- Provide detailed mine plans of LW30-LW32 & LWW6-LWW8;
- Outline potential subsidence effects, subsidence impacts and environmental consequences of LW30-LW32 & LWW6-LWW8;
- 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

Figure 4 EMS and Relationship to the Extraction Plan



1.3 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, surface development and the underground mining area to which applies, structure of the Extraction Plan and development of the Master Trigger Action Response Plan (MTARP).
Section 2	Describes the process of the Extraction Plan regulatory requirements, specialist assessments, review of subsidence predictions, summary of risks identified through the risk assessment process, avoidance and mitigation strategies and consultation.
Section 3	Provides an overview of the subsidence assessment.
Section 4	Describes the subsidence monitoring program and environment monitoring programs. Also provides summary of UCMLPL ongoing baseline data collection program.
Section 5	Describes the performance measures and indicators, management and mitigation measures, rehabilitation and remediation measures, MTARP, adaptive management and contingency planning, process to manage incident, community complaints, exceedances, non-compliances, reporting and review for the Extraction Plan.
Section 6	The Extraction Plan Responsibilities
Section 7	Reference Documents and Abbreviation
Attachment A	Extraction Plan Guidelines
Attachment B	Relevant Consultation Records
Attachment C	Correspondence from Agencies
Attachment D	Key Contacts
Attachment E	Environmental Sensitive Surface and Sub-surface Features Checklist
Attachment F	Technical Reports (Subsidence)
Attachment G	Technical Report (Groundwater)
Attachment H	Technical Report (Biodiversity)
Attachment I	Technical Report (Heritage)
Attachment J	Technical Report (Surface water)
Attachment K	Predicted Groundwater Allocation

Appendices A to H provide the key-sub plans and existing management and monitoring plans required by PA08_0184 of the Extraction Plan, including:

Appendix A	Water Management Plan (WMP) (collective for SWMP, GWMP & SWGWRP)^
Appendix B	Land Management Plan for LW30-LW32 & LWW6-LWW8 (LMP LW30-32 & LWW6-LWW8)*
Appendix C	Biodiversity Management Plan (BMP)^

Appendix D	Built Features Management Plan for LW30-LW32 & LWW6-LWW8 (BFMP LW30-32 & LWW6-LWW8)*
Appendix E	Heritage Management Plan (HMP)^
Appendix F	Public Safety Management Plan for LW30-LW32 & LWW6-LWW8 (PSMP LW30-32 & LWW6-LWW8)*
Appendix G	Subsidence Monitoring Program for LW30-LW32 & LWW6-LWW8 (SMP LW30-32 & LWW6-LWW8)*
Appendix H	Extraction Plans 1 to 7

Notes: * Key Sub-Plans as required by the Guidelines. ^ Alternate structure of the Extraction Plan by incorporating several of UCMPL existing and approved Environmental Management Plans (EMPs) required by PA08_0184, including the Water Management Plan² (WMP), Biodiversity Management Plan (BMP) and Heritage Management Plan (HMP). Alternate structure approved by the DPE on 14 July 2021.

² 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.

1.4 Revised Trigger Action Response Plans

UCMPL have developed a Master Trigger Action Response Plan (MTARP) (**Section 5.5**) which details the UCMPL's monitoring and performance indicators for each of the relevant surface and sub-surface features, via escalating triggers and levels of investigation, action and responses, in accordance with the relevant performance indicator levels provided in **Section 5.1**.

The MTARP was updated to consider the Application Area for LW31 and LW32. The MTARP is applicable to longwall mining activities within the Extraction Plan Area. The MTARP utilises the results from UCMPL subsidence monitoring program (**Section 4**) to:

- Inform if the subsidence performance measures are likely to be exceeded during the secondary extraction within the Extraction Plan Area;
- Monitor, evaluate and validate subsidence effects against the maximum subsidence predictions;
- Allow analysis of the relationship between subsidence effects and subsidence impacts and any ensuing environmental consequences; and
- Provide ongoing subsidence data to improve predictive methods and understanding subsidence related ground movements.

UCMPL's Environment and Community Manager (ECM) or delegate, will implement the MTARP to ensure the necessary investigations, notifications, management and contingency actions for potential subsidence related impacts for this Extraction Plan are completed as required.

Table 1 Performance Indicators and TARP Multilevel Response

Performance Levels	General Description	Action/Response
Level 1 (Condition Green)	Operations within predictions, and within approved impacts.	Continued operations and monitoring as required by the Extraction Plan.
Level 2 (Condition Amber)	Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures.	Review and investigation processes are engaged, with adaptive management as required.
Level 3 (Condition Red)	Operations exceed approved subsidence impact performance measures.	In addition to Level 2 actions and responses adaptive management measures are fully initiated as outlined in the MTARP.

As required by the DPE, a specific trigger action response plan for the MCRSS must be submitted by UCMPL and approved by the DPE prior to the commencement of extraction in LWW8.

2. Plan Development and Consultation

2.1 Plan Requirements

2.1.1 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 Lease ML1468 issued under the *Mining Act 1992*; and
- Environmental Protection Licence (EPL) 394 issued under the *Protection of the Environment Operations Act 1997* (PoEO Act).

2.1.2 Project Approval (08_0184)

Project Approval (PA 08_0184) was issued by NSW Planning, Industry and Environment, 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.
- Modification 6 (MOD 6) was submitted on the 18 November 2022. The proposed modification includes extension and widening of longwall panels and minor changes to surface infrastructure.

2.1.2.1 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 sub-plans (**Appendix B, Appendix D, Appendix F and Appendix G**), 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 2**.

As required by the Guidelines, the Extraction Plan must comprise of a set of six key sub-plans which follow a specific structure to comply with the Guidelines. In previous consultation with the DPE for the Ulan West Extraction Plan, UCMPL have similarly revised the structure of this Extraction Plan by utilising both key sub-plans and existing management plans, as required by PA08_0184 (**Section 1.3**).

Table 2 Project Approval Extraction Plan Conditions & Management Plan Requirements

Project Approval (PA 08_0184) Conditions	Section Addressed
Condition 26 Schedule 3, Condition 26 26. The Applicant 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 2.2 & Attachment C
b) be approved by the Secretary before the Applicant 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 H
d) include detailed performance indicators for each of the performance measures in Table 14.	Section 5.1
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 consent.	Section 2.2 & 3.3 Technical Report 1 in Attachment F
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 Section 5 Section 6
g) include the following to the satisfaction of the Resources Regulator: - 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.	Section 4 & Appendix G Section 4.2.5 Appendix D Section 4.2.7 Appendix F Section 5.3 Section 4.2.1 & Section 4.2.2, Section 4.2.4 & Section 4.2.6 and Appendices A, C and E Appendix B Section 4.4

Notes: This condition does not apply to the second workings for longwalls 26, West 2 and West 3 which are covered by an existing Subsidence Management Plan. The Applicant must implement the plan as approved by the Secretary

Project Approval (PA 08_0184) Conditions	Section Addressed
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 2.5.2 (Not available to the general public)
Schedule 5, Condition 2 2. The Applicant 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>	Sections 3.1 & 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 2 Section 2.1.22 & Table 3 Section 5.1 & Table 23
c) <i>a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</i>	Section 4 Section 5 Section 6
d) <i>a program to monitor and report on the:</i> <i>impacts and environmental performance of the project;</i> <i>effectiveness of any management measures (see c above);</i>	Section 4 Section 5 Section 6.3
e) <i>a contingency plan to manage any unpredicted impacts and their consequences;</i>	Section 5.6.1
f) <i>a program to investigate and implement ways to improve the environmental performance of the project over time;</i>	Section 6.1
g) <i>a protocol for managing and reporting any:</i> <i>incidents;</i> <i>complaints;</i> <i>non-compliances with statutory requirements; and</i> <i>exceedances of the impact assessment criteria and/or performance criteria; and</i>	Section 5.7
h) <i>a protocol for periodic review of the plan</i>	Section 6.0

2.1.2.2 Subsidence Performance Measures

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

A number of natural, heritage and built features listed in Table 14 of PA08_0184 are relevant to the Extraction Plan Area. **Table 3** 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 4.2** and **Section 5.1**.

Table 3 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	- The main channel of Ulan Creek is remote from the Extraction Plan Area. - A section of Mona Creek is within the Extraction Plan area. - The main channel of Cockabutta Creek is remote of the Extraction Plan Area. - Drainage lines into Mona Creek are within the Extraction Plan Area.	Section 4.2.1 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 Extraction Plan Area.	Section 4.2.4 Appendix C
Land	Performance Measure	Relevance to the Extraction Plan	Section in EP
Cliffs in the Brokenback Conservation Area	Nil environmental consequences	Brokenback Conservation Area is remote from the Extraction Plan Area.	Section 4.2.3 Appendix B
Other cliffs	Minor environmental consequences	- One cliff line is located within the western part of the Extraction Plan Area above LWW7 and has been undermined with recorded impacts in accordance with predictions. - The other cliff line is associated with the Mona Creek Rock Shelter Sites is outside of the active mining area but within 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 remote from the Extraction Plan Area. - Mona Creek Rock Shelter Sites are outside of the active mining area but within the Extraction Plan Area. - Grinding Groove Conservation Areas are remote from the Application Area and outside of the Extraction Plan Area.	Section 4.2.6 Appendix E
Talbragar Fish Fossil Reserve	Negligible impact	Remote from the Extraction Plan Area.	
Other Heritage Sites	No greater impact than predicted in the EA	Heritage sites are 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	- Essential Energy as the owner of the 12.7KW powerline that crosses through the Extraction Plan Area. There have been no recorded impacts to the powerline as a result of mining LWW6 and LWW7. - NPWS as the land owner for the DSCA within the eastern portion of the Extraction Plan Area. Mining is now complete under the DSCA for LW30. Impacts have been minor in accordance with predictions. Consultation with NPWS is ongoing. - Several State Survey marks are located within the Extraction Plan Area. - Other non-UCMPL owned built features on private land are within the Extraction Plan Area include a small timber shelter, boundary an internal fencing and two farm dams. The built features have been undermined by LWW6 and LWW7 with recorded impacts in accordance with predictions.	Section 4.2.5 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. - The land in the Extraction Plan Area is majority owned by UCMPL with exception of one private land owner to the west and the DSCA to the east.	Section 4.2.7 Appendix F

2.1.3 Mining Leases

The proposed secondary extraction within the Extraction Plan Area is located within sub surface mining lease (ML) ML1468³. The surface mining leases within the Extraction Plan Area are ML1554 and ML1656 (**Figure 5**). **Table 4** outlines the mining leases conditions relating directly to subsidence management for ML1468, as amended by the Minister of Resources and Energy, pursuant to section 239(2) of the *Mining Act 1992*, on 30 June 2014.

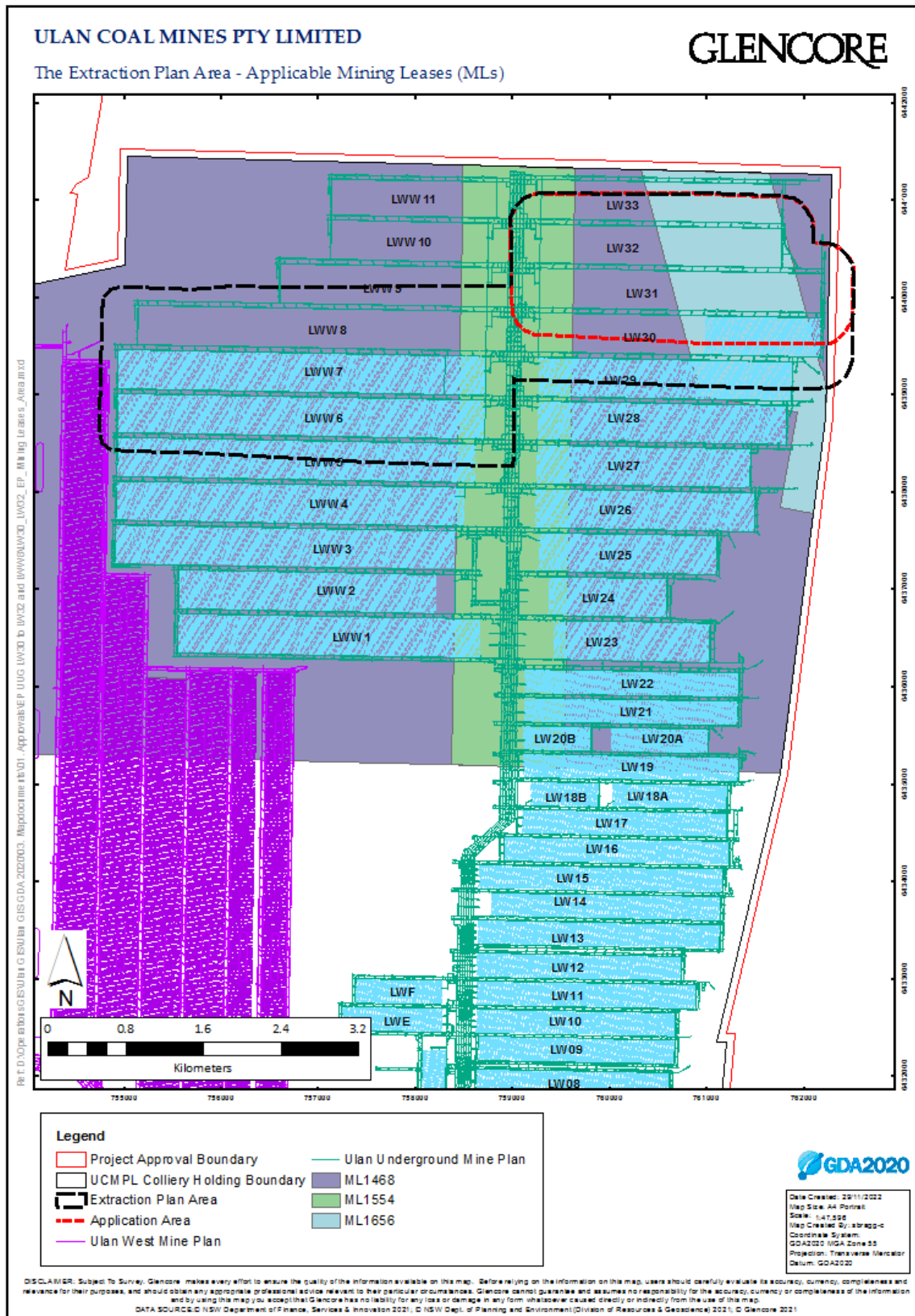
Table 4 Mining Lease Extraction Plan Conditions

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

³ In accordance with the provisions of Section 239(2) of the *Mining Act 1992*, the Minister has amended the Subsidence Management Plan (SMP) Condition on this lease by imposing an alternative Extraction Plan Condition.

Mining Leases(s) Extraction Plan Condition	Section Addressed
(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

Figure 5 Applicable Mining Leases within the Extraction Plan Area



Notes: Longwall progress for LW30 as of 29 November 2022

2.1.4 Other Relevant Legislation

2.1.4.1 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.

2.1.4.2 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 DPE.

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 Extraction Plan Area (**Section 2.1.3**). **Table 4** outlines the Extraction Plan condition relating directly to subsidence management for ML1468.

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 Rehabilitation Management Plan (RMP)⁴ that covers underground, open cut and associated mining activities.

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 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 DPE-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.

⁴ ULNCX-111515275-1921 previously known as the MOP ULN SD PLN 0079. The MOP has been 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 2022.

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.

There are no leases of Crown Land within the Extraction Plan Area for UUG. UCMPL leases Crown Land for mining purposes (Licence No. LI 204946) which are primarily associated with Ulan West. 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.

2.2 Specialist Assessments

The Extraction Plan was prepared by UCMPL, with assistance from the following suitably qualified technical specialist. The appointment of the suitably qualified and experienced persons were endorsed by the Secretary of the DPE on the 10 May 2022 (**Attachment C**).

2.2.1 Subsidence

Strata Control Technology (SCT) were engaged by UCMPL to estimate the likely subsidence effects from LW31 and LW32, assess the expected impacts from these two longwall panels and prepare a subsidence assessment report to support the Extraction Plan to include Longwalls 31 and 32 (**Section 3.3**). SCT have previously provided subsidence assessment reports to support the initial Extraction Plan for LW30 and LWW6-LWW8 and its revision to align with MOD4 (**Section 7.2**). A detailed summary of the subsidence assessment by SCT for LW31 and LW32 is provided in **Section 3** with their complete technical report provided in **Attachment F**.

2.2.2 Groundwater

Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) were engaged by UCMPL to review the groundwater modelling to estimate the impact of mining LW31 and LW32 on the groundwater system surrounding the Ulan Coal Complex (**Section 3.4.2**). AGE have previously provided groundwater technical reports to support the initial Extraction Plan for LW30 and LWW6-LWW8 and its revision to align with MOD4 (**Section 7.2**). A summary of the groundwater assessment by AGE for LW31 and LW32 is provided in **Section 3.4** with their complete technical report provided in **Attachment G**.

2.2.3 Biodiversity

Eco Logical Australia (ELA) were engaged by UCMPL to undertake a review of subsidence impacts on flora and fauna. This report forms the review required to support the preparation of the Extraction Plan. The review has analysed data collected through the biodiversity monitoring program, and included monitoring data for flora, terrestrial fauna (including microbats), macroinvertebrate aquatic fauna and aquatic environments (including stream health) (**Section 3.4.3**). ELA have previously provided biodiversity technical reports to support the initial Extraction Plan for LW30 and LWW6-LWW8 and its revision to align with MOD4 (**Section 7.2**). A summary of the flora and fauna assessment by ELA for LW31 and LW32 is provided in **Section 3.4**, with the complete report provided in **Attachment H**.

2.2.4 Heritage

OzArk Environment & Heritage (OzArk) were engaged by UCMPL to prepare a review for the Extraction Plan for Longwalls 31 and 32 Application Area, which considers Aboriginal, European and natural heritage (**Section 3.4.4**). South East Archaeology (SEA) provided in the initial heritage technical report for Extraction Plan for LW30 and LWW6-LWW8 and its revision to align with MOD4 (**Section 7.2**). A summary of the heritage assessment by OzArk for LW31 and LW32 is provided in **Section 3.4** with the complete report provided in **Attachment J**.

2.2.5 Surface Water

Engeny Water Management (Engeny) were engaged by UCMPL to undertake a review of actual subsidence impacts on surface water against the impacts predicted in the EAs (Umwelt 2009 and 2015) (ELA, 2018) and performance indicators within the Extraction Plan. These performance indicators consider surface water quality, creek stability and erosion and ponding (**Section 3.4.1**). Engeny have previously provided surface water technical reports to support the initial Extraction Plan for LW30 and LWW6-LWW8 and its revision to align with MOD4 (**Section 7.2**). A summary of the surface water assessment by Engeny for LW31 and LW32 is provided in **Section 3.4**, with the complete report provided in **Attachment K**.

2.3 Review of Previous Subsidence Predictions

Subsidence monitoring has been conducted routinely at the Ulan Complex since the commencement of longwall mining at UUG in 1987. The results of this subsidence monitoring and implications for mining are presented in end of panel reports, compilation reports for previous longwall panels at the site and annual subsidence reports. These results from subsidence monitoring of over 40 longwall panels are considered to provide a strong basis for forecasting the subsidence behaviour within the Application Area for Longwalls 31 and 32 (SCT, 2022).

The Extraction Plan process provides an opportunity to update subsidence forecast and assessment of impacts based on additional information and understanding gained since the original Ulan Coal Continued Operations (UCCO) Project Approval was granted (SCT, 2022).

Most of the subsidence parameters forecast in the UCCO Project EA subsidence assessment have provided conservative estimates of the subsidence parameters subsequently measured. The exceptions are mainly a result of improved subsidence monitoring that has allowed more accurate

estimation of goaf edge subsidence, angle of draw, and far field horizontal movements. Observations of unconventional subsidence movements and measurement of subsidence at shallow depth where the Triassic Sandstones are no longer present in the overburden has also occurred since the UCCO Project EA assessment was undertaken (SCT, 2022).

Estimates of subsidence effects for Longwalls 31 and 32 are consistent with the range of values previously forecast at similar overburden depths for the original UCCO Project EA (SCT 2009) or subsequent updates for modifications (SCT 2011, SCT 2015a and SCT 2018) and SMP/EP assessments at the Ulan Complex (SCT, 2022).

The SMP/EP subsidence assessments include:

- For UUG:
 - *EP assessment for LW30 and LWW6-8 presented in SCT Report ULA4560_Rev1 (SCT 2016)*
 - *EP assessment for amendment to LW30 and LWW6-8 presented in SCT Report ULA5059 (SCT 2019)*
- For UW:
 - *SMP/EP assessment for LW1-2 presented in SCT Report ULA4130 (SCT 2013)*
 - *EP assessment for LW1-4 presented in SCT Report ULA4467 (SCT 2015b)*
 - *EP assessment for LW5-6 presented in SCT Report ULA4755 (SCT 2017)*
 - *EP assessment for LW7-8 presented in SCT Report ULA5196 (SCT 2021)*

Previous subsidence monitoring indicates that Longwalls 31 and 32 are likely to be at critical width with the maximum subsidence controlled primarily by overburden caving behaviour and less by panel geometry. The presence of the Triassic Sandstones in the overburden strata across all the Application Area is recognised to influence subsidence behaviour and reduce the magnitude of maximum subsidence particularly where the thickness of Triassic Sandstone is greater than approximately 30-40m (SCT, 2022).

Improved estimates of secondary subsidence parameters (including goaf edge and chain pillar subsidence, angle of draw and horizontal movements) has been possible since the original UCCO Project EA because of the improvement in survey technique associated with the far-field survey control network (SCT, 2022).

2.4 Risk Assessment

A risk assessment for the initial Extraction Plan and Application Area was completed on 7 July 2016 for LW30 and LWW6-LWW8. The risk assessment was facilitated by AXIS Consulting and attended by relevant UCMPL personnel and subsidence specialists. The potential consequences raised during the risk assessment process included natural features (i.e. sandstone cliff formations, 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. All hazards were ranked as low with the implementation UCMPL's existing and additional controls

As required by the Guidelines, a risk assessment workshop was completed on the 28 July 2022 for the inclusion of LW31 and LW32 to ensure that appropriate consideration was given to potential

subsidence risks and risk management for natural features, threatened species, native vegetation, Aboriginal and European sites, public utilities, public safety, private land, privately owned built features and UCMPL owned infrastructure.

UCMPL's risk assessment process for each Extraction Plan also considers the former SMP Guidelines (2003) list of potentially environmentally sensitive areas and surface and sub-surface features that may be affected by underground mining in the risk assessment (**Attachment E**).

The risk assessment workshop was attended by key UCMPL personnel from UUG and UCMPL's environmental department and Steve Wilson from SCT. The risk assessment workshop indicated that risks associated with LW31 and LW32 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 2.4.1**).

2.4.1 Avoidance and Mitigation Strategies

The risk assessment for LW31 and LW32 identified several additional treatment plans for public safety and Aboriginal heritage including:

- *Consider weekly inspection of the DSCA during mining of LW31 in the development of the revised Extraction Plan; and*
- *Add GNSS continuous monitoring sensors to monitor impacts to Mona Creek Rock Shelters to ensure "nil impact". Installation of several GNSS units (one at the base and one above the heritage sites)- in place for LWW8 into the future.*

Section 4.2 of the Extraction Plan provides a consolidation of the various environmental monitoring programs either presented in key sub-plans or existing management plans required by PA08_0184. Both treatment plans identified in the risk assessment for LW31 and LW32 have been included in their respective monitoring programs for heritage and public safety in **Section 4.2.6** and **Section 4.2.7**.

Section 5.2 also provides a summary of the management and mitigation measures from longwall mining in the Extraction Plan Area, to achieve the requirements in the Project Approval 08_0184 and other relevant approvals.

2.5 Consultation

Consultation with relevant government authorities and stakeholder groups has been ongoing and extensive since 2016 during preparation of the initial Extraction Plan and subsequent amendments (**Section 1.2**). This historical consultation with relevant government authorities and stakeholder groups is provided in **Attachment B** and **Attachment C**.

Recent consultation with relevant government authorities and relevant key stakeholder groups during the revision of the Extraction Plan to include LW31 and LW32 is summarised below in **Table 5**.

2.5.1 Government Agencies

Consultation with the following government agencies (**Attachment C**) during this revision of the Extraction Plan is summarised in **Table 5**.

Table 5 Summary of Consultation with Government Agencies

Government Agency	Date	Summary of Consultation	Outcomes
DPE	10 May 2022	UCMPL prepared and submitted letter to the Secretary notifying the Mine's intention to revised the Extraction Plan to include LW31 and LW32, the proposed First Workings Amendment to LW32 and LW33, seeking endorsement of qualified and experienced specialists and seeking any comments from the Secretary for inclusion in the revised Extraction Plan.	Section 4 Attachment A Attachment C
DPE	18 May 2022	UCMPL received endorsement from the Planning Secretary for approval of suitably qualified specialist including subsidence, surface water groundwater, ecological & heritage. UCMPL also received approval for the First Working Amendment to LW32 and LW33. DPE also requested UCMPL to consider relevant comments from the Department and relevant government agencies made on the original Extraction Plan for LW30 & LWW6-8 during the preparation of the revised Extraction Plan.	Section 1.1 Attachment C
DPE	11 August 2022	UCMPL received acknowledgement from DPE that the revision of the Extraction Plan for LW31 and LW32 should follow the most recent draft Extraction Plan Guidelines (May 2022).	Section 1.1
DPE-RR, MWRC, BCS, EPA, DPE-Water, SA NSW, HNSW	13 December 2022	UCMPL uploaded the draft Extraction Plan to the NSW Planning Portal for consultation and feedback from relevant Local and State government agencies.	Comments received from BCS, EPA, SA NSW, MWRC, DPE Water and HNSW.
BCS	5 January 2023	UCMPL received confirmation the BCS had no further comments. In summary BCS 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.	Attachment C
HNSW	17 December 2022	UCMPL received confirmation the HNSW had no further comments. In summary HNSW agrees with the management recommendations outlined in the assessment, and as such, has no additional comments, and does not require any further agency consultation in relation to this this extraction plan.	
DPE-RR	16 December 2022 1 February 2023	The Resources Regulator (RR) will review and comment on the extraction plan when it is formally submitted as a final copy. In response a meeting on 1 February 2023 was held with DPE-RR. The meeting was an opportunity to provide RR a detailed summary of the Extraction Plan to include LW31 and LW32. RR had no further comment. UCMPL confirmed that High Risk Notification will be submitted separately.	
EPA	21 December 2022	UCMPL received confirmation the EPA had no further comments. In summary the EPA has however reviewed the Plan on this occasion and advises it has no specific comments to make.	
SA NSW	13 January 2023	UCMPL received confirmation the SA NSW had no further comments. In summary the extraction plan proposal is located within undeveloped land and as such will not impact privately owned surface development or surface infrastructure. Given the above, Subsidence Advisory NSW has no further advice or comment to make on the proposal.	
DPE Water	24 January 2023	DPE-Water requested another copy of the Extraction Plan. Extraction Plan provided again on the 24 January 2023. At the time of submission of the final version of the Extraction Plan, no comments from DPE-Water had been received after correspondence on the 7 February 2023.	

Government Agency	Date	Summary of Consultation	Outcomes
DPE	3 February 2023	This revised and final version of Extraction Plan, post consultation with relevant Local and State government agencies, was issued to the DPE via the NSW Planning Portal for approval.	
DPE & NPWS	13 April 2023	Both the DPE and NPWS provided comments and requested additional information. DPE sought clarification between Level 2 and Level 3 conditions in the TARP, additional information in the TARP for stream health, channel stability, cliff line monitoring and built features. Also included was the acceptance letter from Essential Energy, responses to NPWS and additional requirement for a site-specific TARP for the MCRSS prior to LWW8. NPWS sought confirmation from UCMPL all required subsidence monitoring to be undertaken whilst mining beneath the DSCA, including clarifying NPWS assets in the DSCA, applicable standards to fire trail repairs if required, reference to drone usage policy, inclusion of VENM certified material and appropriate PCTs if remedial works are required. The Extraction Plan was also updated to clarify incident reporting and add NPWS to the notification list if an incident was to occur within DSCA.	TARPs updated in Section 5.5 Commitment to develop specific TARP for MCRSS in Sections 1.4 & 5.5 Essential Energy letter provided in appendix of BFMP NPWS required updates provided in Section 2.5.2, Section 4.2.3.3, Section 4.2.5.1, Table 22 and Section 5.3.1.
DPE	23 June 2023	Identify specific options for adaptive management that could be implemented in response to level 2 triggers, particularly regarding impacts on the Drip, cliffs lines, surface water and groundwater; and Provide notification to National Parks and Wildlife Service for level 2 triggers relating to built features and public safety in the Durrigere State Conservation Area.	DPE's requests addressed in revised Sections 5.6.1, 5.6.2 and 5.7.1.
DPE Water	15 June 2023	That the proponent provides additional evidence to support validation of the numerical modelling for the most recent monitoring data. That the proponent provides a reason for the discrepancy in the modelling results. That the proponent explains the future impacts detailed in Figure 5. That the proponent clarifies future plans for updating the groundwater model and demonstrates it is appropriate to support future mining operation and regulatory requirements. That the proponent incorporates outcomes of the groundwater modelling issues raised in this letter into the monitoring and management requirements of the site's Water Management Plan.	DPE Water requests addressed in the revised WMP

2.5.2 Landowners

The majority of land above the Extraction Plan Area is owned by UCMPL with the exception of one private landowner to the west and DSCA managed by the NSW National Parks and Wildlife Service (NPWS) to the east. The one private landowner above the western portions of LWW6 to LWW8 is referred to as the "Woodbury Property" (**Figure 3**).

Under the approved *Ulan Underground Extraction Plan for Longwalls LW30 & LWW6 to LWW8 (Version 4)*, the extraction of LWW6 and LWW7 beneath the Woodbury Property was completed during August 2020 and October 2021 respectively. The subsidence impacts from LW6 and LWW7 to natural features and built features on the Woodbury Property are consistent and less than the maxima forecast.

The management, monitoring and remediation measures required by the relevant Private Property Subsidence Management Plans (PPSMPs) for LWW6 and LWW7 continues to be carried out by UCMPL. Consultation with the landowner of the Woodbury Property at all stages of mining i.e. pre, during and post, has been extensive and remains ongoing.

As detailed by Statement of Commitments (SoC) 6.3.1, “...Where a potential subsidence impact is predicted on private property, UCMPL 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”.

UCMPL have prepared individual PPSMPs for each longwall which 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. There are no residential buildings and associated outbuildings on the Woodbury Property within the Extraction Plan Area. Prior to mining LWW8, UCMPL and the landowner will have in place a PPSMP for LWW8.

During mining under the approved *Ulan Underground Extraction Plan for Longwalls LW30 & LWW6 to LWW8 (Version 4)*, UCMPL was granted a Licence for Works and Occupations (Occupation Licence) by the Minister administering the *National Parks and Wildlife Act 1974* for the DSCA on the 1 March 2020. The Occupation Licence permits installation, operation and maintenance of three dewatering bores, associated infrastructure and tracks (**Figure 12**). The Occupation Licence expires on the 28 February 2025.

Prior to the commencement of LW30, a pre-mining inspection above LW30 was carried out by UCMPL with a Senior NPWS representative on the 24 May 2022. Two inspections of the DSCA were undertaken by UCMPL representatives during the active mining stage, on 27 July 2022 and 11 August 2022. In consultation with NPWS, the post-mining inspection was undertaken with a Senior NPWS representative on the 6 September 2022. The minor subsidence impacts recorded within the DSCA from LW30 are consistent with forecasts.

UCMPL will continue to consult with NPWS on a regular basis to inform of the development of this Extraction Plan and complete the necessary site inspections with a NPWS Authorised Officer in attendance and reporting requirements for LW30, LW31 and LW32 to the NPWS regarding the DSCA. Further information regarding predicted subsidence impacts on private land and the DSCA are provided in **Section 3.3**.

2.5.3 Community and Heritage Stakeholders

2.5.3.1 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 6**. Minutes from each CCC meeting are provided on the Mine’s website <http://ulancoal.com.au>

Table 6 Summary of Consultation with CCC

Date	Summary of Consultation	Outcomes
11 July 2016	CCC Meeting scheduled 7 July 2016 was adjourned due to insufficient members being present to hold a forum. The presentation which included an outline of the features of the Application Area and a timeline for the preparation of the proposed Extraction Plan for LW30 & W6-W8 was distributed via email to the CCC members on 11 July 2016	No further comments from the CCC
19 March 2020	CCC Meeting on the 19 March 2020 provided details regarding the amendments required to the Extraction Plan to align with MOD 4	No further comments from the CCC
24 March 2022	UCMPL provided an update regarding the revision of the Extraction Plan for LW30 and LWW6-8 for UUG to include LW31 and LW32.	No further comments from the CCC
29 September 2022	UCMPL provided an update regarding the revision of the Extraction Plan for LW30 and LWW6-8 for UUG to include LW31 and LW32. Technical studies completed and the Extraction Plan is due for submission in late October/early November 2022.	CCC sought clarification of the Application Area, MOD4, correct name for the DSCA and general inquiries regarding the mine schedule for UUG. No further comments from the CCC

2.5.3.2 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 7**. This revised Extraction Plan will also be issued to the RAPs for comment.

Table 7 Summary of Consultation with Aboriginal Heritage Groups

Date	Summary of Consultation	Outcomes
14 July 2016	An outline of the features of the Application Area and a timeline for the preparation of the proposed Extraction Plan for LW30 & W6-W8 was provided to the Traditional Owner Groups at the Heritage Meeting.	No further comments from RAPs
11 July 2019	MOD4 updates provided at the Heritage Meeting within no issues were raised in regards to MOD4 or with the Extraction Plan.	No further comments from RAPs
Date	Summary of Consultation	Outcomes
9 July 2020	Extraction Plan amendment discussed at Heritage Meeting with no issues raised in regards to the amended Extraction Plan.	No further comments from RAPs
7 July 2022	UCMPL provided an update regarding the revision of the Extraction Plan for LW30 and LWW6-8 for UUG to include LW31 and LW32.	No further comments from RAPs
15 December 2022	UCMPL provided a copy of the draft Extraction Plan (Version 5) for their review and consideration.	No further comments from RAPs

2.5.4 Public Utilities

Public utilities within the Extraction Plan Area potentially affected by subsidence include an overhead Essential Energy Single Wire Earth Return (SWER) 12.7 kV power line and several NSW State Survey control stations (**Figure 12**).

UCMPL commenced consultation with Essential Energy in May 2016 during the development of the initial Extraction Plan. Under the approved *Ulan Underground Extraction Plan for Longwalls LW30 & LWW6 to LWW8 (Version 4)*, there has been no recorded impacts to the SWER line as a result of mining LWW6 and LWW7. The initial BFMP LW30 & LWW6-LWW8 was accepted by Essential Energy on the 26 October 2016.

No significant impacts are expected to this powerline from the planned mining in LW30, LW31 and LW32 as provided by SCT's subsidence assessment (**Section 3**). Further consultation with Essential Energy on the 31 August 2022 was undertaken for LW31 and LW32. Information provided to Essential Energy included SCT's *Ulan Underground Mine: Subsidence Assessment for Longwalls 31-32 Extraction Plan* report and a commitment to provide the updated Built Features Management Plan for LW30-LW32 & LWW6-LWW8 (BFMP LW30-32 & LWW6-LWW8). The revised BFMP LW30-32 & LWW6-LWW8 was issued on the 28 October 2022 for Essential Energy's review and consideration.

In accordance with BFMP LW30-LW32 & LWW6-LWW8, UCMPL will repair the serviceability of the SWER line at the full cost of UCMPL if the serviceable of this public utility is lost during extraction, as a result of subsidence (**Appendix D**).

Several state survey control marks are located within the Extraction Plan Area and a further eighteen marks within three kilometres of the Extraction Plan Area. Some of these state survey controls marks are already reported as 'disturbed' by mining. The disturbed 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.

2.5.5 Landholder Dispute Resolution Process

Through the PPSMP process, UCMPL will seek to reach agreement with the landowner on the monitoring and mitigation that will be implemented. If agreement cannot be reached within a reasonable time prior to the longwall commencing, the following dispute resolution process may be followed Figure 4 in the *Land Management Plan for LW30-LW32 & LWW6-LWW8 (Appendix B)*.

3. Subsidence Assessment

3.1 Description of The Extraction Plan Area

The Extraction Plan Area covers a surface area of approximately 1398ha. Within the Extraction Plan Area approximately 75ha of the Durridgere State Conservation Area (DSCA) (part of the Curryall State Forest) is located at the eastern end of longwalls LW30 to LW32 and approximately 97ha of privately-owned land referred to as Woodbury is located at the western end of longwalls LWW6 to LWW8.

Descriptions of all relevant surface, built, heritage, landform and natural features within the Extraction Plan Area have been provided by SCT to support the initial Extraction Plan for LW30 and LWW6-LWW8 (SCT, 2016), again to include MOD4 amendment (SCT, 2019) and longwalls LW31 and LW32 (SCT, 2022).

The Extraction Plan Area is a combination of undeveloped bushland, gently undulating open grazing and irrigation agricultural lands. The Extraction Plan Area is split by the Great Dividing Range with land in the east in the Goulburn River Catchment, and land in the west in the Talbragar River catchment. Bushland in the east is gently undulating, bushland in the west is a little steeper dominated by sandstone outcrops and partially cleared valleys.

There are no privately-owned dwellings within the Extraction Plan Area. The majority of land above the Extraction Plan Area is owned by UCML with the exception of one private landowner and NPWS as the land manager for the DSCA (**Figure 3**).

The depth of cover as measured from the top of seam varies from 165 meters to 344 meters. The depth of cover increases in northeast direction as the seam dips between 1 and 3 degrees along this orientation. Therefore, the depth, in general terms, ranges from 165 meters to 275 meters for western panels (LWW6 to LWW8) and from 268 meters to 334 meters in the east (LW30).

The major natural features within the Extraction Plan Area include sandstone formations to the west, a number of ephemeral watercourses, a spring and the DSCA. The spring is located within a dam located on the Woodbury Property above LWW6. All water courses directly above the longwall mining areas of the Extraction Plan Area are ephemeral in nature comprising drainage lines and occasional pools that form after rain. Flow lines in the east of the Extraction Plan Area report to Bobadeen Creek in the Goulburn River catchment. Flow lines in the west report to Mona Creek in the Talbragar River catchment.

The surface topography within the Application Area for Longwalls 31 and 32 is characterised by the series of ephemeral drainage lines or tributaries of the creeks either side of the ridgeline of the Great Dividing Range. Tributaries of the Mona Creek catchment are located in the west and tributaries of Curryall, Curra and Bobadeen Creeks are located in the north, east and south. Mona Creek flows west into the Talbragar River and, the Curryall, Curra and Bobadeen Creeks flow east into the Goulburn River.

The outcropping strata is of Jurassic age and higher in the stratigraphic sequence than the Triassic strata associated with large sandstone outcrop formations. The surface topography is undulating with sections of steeper ground but no substantial sandstone outcrop formations that would be described as steep slopes or cliffs by definitions in PA08_0184.

The majority of the surface within the Application Area for Longwalls 31 and 32 is undeveloped bushland with a small area of cleared or semi-cleared land. This undeveloped bushland includes the southwestern section of the DSCA. The Ulan Seam dips gently to the northeast. Above Longwalls 31 and 32, the overburden depth to the mining horizon ranges from approximately 275m to 335m. The depth varies from approximately 275m in the west, to 335m in the central section and back down to 325m in the east. Variations in overburden depth are mainly a result of changes in the surface topography (SCT, 2022).

3.2 Mining Geometry, Parameters and Schedule

Access to the mine is via the drift located near the UUG Office Complex. UUG longwall panels run in an east-west alignment (**Figure 3**). Underground mining commences in the main headings progressing north in the centre of the mine plan with longwall panels to the east and west of the main headings. The longwall panel widths dimensions are provided in **Table 8**. Detailed mine layout drawings are provided in **Appendix H** including the **Plans 1 to 7**, as required under the Guidelines. The UW mine is located to the west panels of UUG, with longwall panels running perpendicular to the UUG mine plan in a north-south alignment (**Figure 3**).

Table 8 – The Extraction Plan Longwall Panel Parameters

Parameter	LW30	LWW6	LWW7	LWW8	LW31	LW32
ROM Coal Extracted (tonnes)	5,285,891	6,677,545	6,672,161	6,310,507	5,216,472	4,251,942
Gate Road Width (m)	5.2	5.2	5.2	5.2	5.2	5.2
Gate Road Height (m)	3.2	3.2	3.2	3.2	3.2	3.2
Maingate (MG) Chain Pillar Width (m)	45	39.8	47.5	45	45	45
Tailgate (TG) Chain Pillar Width (m)	47.5	39.8	39.8	47.5	45	45
Tailgate (TG) Chain Pillar Length (m)	130	130	130	130	130	130
Longwall Void Width (m) (ribline of goaf edge)	410.4	410.4	410.4	410.4	410.4	410.4
Longwall Void Length (m)	2907	3778	3787	3599	2,904	2,491
Longwall Extraction Height (m)	3.1 – 3.26	2.75 – 3.15	2.85 – 3.12	2.82 – 3.15	2.85-3.22	2.85-3.08
Minimum Depth of Cover (m)	268	165	167	166	275	285
Maximum Depth of Cover (m)	344	275	274	261	340	340

UUG currently operates five days a week (approved to operate seven days a week), 24 hours a day with support operations on weekends. The proposed sequence of longwall mining under the Extraction Plan and anticipated start and completion dates are summarised in **Table 9**.

Table 9 – Proposed and Actual Longwall Mining Schedule

Longwall	Estimated Start Date	Estimated Duration	Estimated Completed Date
LWW6	February 2020 (Actual)	15 months	April 2021(Actual)
LWW7	June 2021(Actual)	14 months	June 2022 (Actual)
LW30	July 2022 (Actual)	13 Months	July 2023 (Forecast)
LW31	July 2023 (Forecast)	14 Months	August 2024 (Forecast)
LWW8	August 2024 (Forecast)	15 Months	October 2025 (Forecast)
LW32	October 2025 (Forecast)	12 Months	September 2026 (Forecast)

Note: Proposed longwall mining schedule may be subject to change due to operational requirements.

3.3 Predicted Subsidence Effects and Impacts

The potential subsidence impacts of longwall mining and environmental consequences have been undertaken by Strata Control Technology (SCT) for the Mine's Project EA (Umwelt, 2009), 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.*
- *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:

- The initial *Subsidence Assessment for Extraction Plan LW30 and LWW6 - LWW8 at Ulan Underground Mine (2016)* was prepared by SCT.
- A revised *Subsidence Assessment for Amendment to LW30 and LWW6 - LWW8 Extraction Plan (2019)* was prepared by SCT to align with MOD4.
- *Ulan Underground Mine: Subsidence Assessment for Longwalls 31-32 Extraction Plan (2022)* was prepared by SCT for LW31 and LW32.

As required by Condition 26(e), Schedule 3 of PA08_0184, UCMPL engaged SCT to complete a subsidence assessment for LW31 and LW32 within the Application Area. A summary of the subsidence predictions for the Extraction Plan Area and the Application Area against MOD4 subsidence predictions is provided in **Table 10**.

Table 10 - Assessment against MOD4 & EP Maximum Forecast Subsidence Values

Longwall Panels	LW30	LWW6	LWW7	LWW8	LW31	LW32	MOD4
Overburden Depth (m)	270-335	165-270	170-270	165-255	275-335	275-335	165-335
Subsidence (m)	1.6 - 1.7	1.7	1.7	1.7	1.6 - 1.7	1.6 - 1.7	1.6 - 1.7
Tilt (mm/m)	30-35	50-55	50-55	50-55	30-35	30-35	30-55
Tensile Strain (mm/m)	10-15	15-20	15-20	15-20	10-15	10-15	10-20
Compressive Strain (mm/m)	15-20	20-25	20-25	20-25	15-20	15-20	15-25

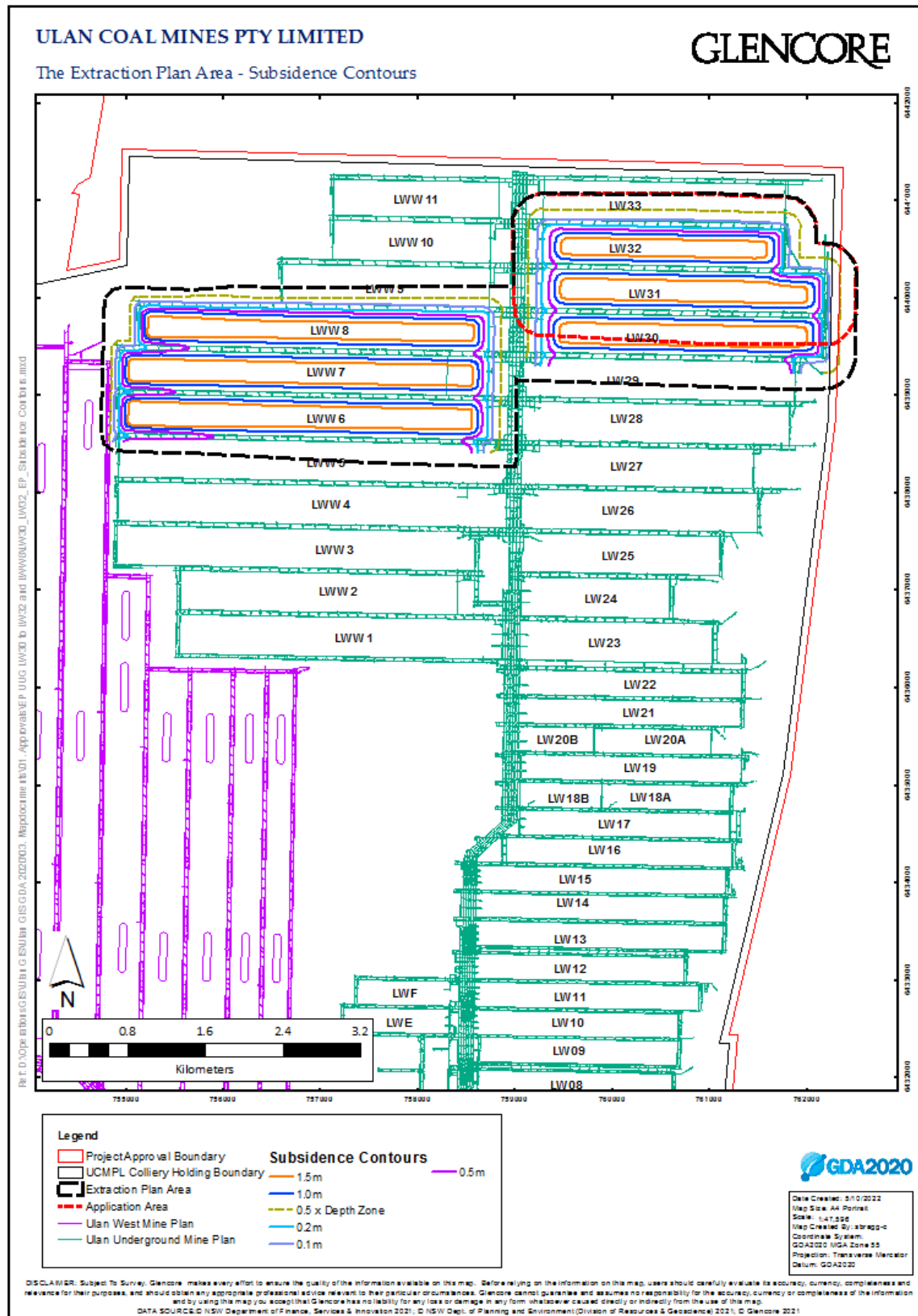
The revised *Subsidence Assessment for Amendment to LW30 and LWW6 - LWW8 Extraction Plan (ULA5059)*, the following summary of the subsidence assessment includes:

- The proposed longwall extensions represent a marginal increase in the overall mining and subsidence footprint but subsidence effects are expected to be the same for the approved Extraction Plan and the impacts are expected to be similar to those presented in SCT (2016) and consistent within those described in SCT (2018a) for the MOD 4 extension areas.
- The suggested values of performance indicators for conventional subsidence behaviour for the proposed amendment to LW30 and LWW6-LWW8 Extraction Plan remain the same as those recommended in SCT (2016).
- The predictions for maximum subsidence effects within the revised Extraction Plan Application Area for the amendment to LW30 and LW6-LW8 Extraction Plan have not changed. The maximum values for subsidence parameters are the same as in SCT (2016) and consistent with those presented in SCT (2018a) for MOD4.
- Although subsidence estimates are likely to represent the maximum values of subsidence, tilt and strain, it should be recognised that some unconventional subsidence movements including steps, compression overrides and high compression zones at low topographic points may locally exceed the estimated conventional parameters. It is not possible to estimate the occurrence of unconventional subsidence movements with a high degree of certainty, but such movements are not expected to have a particularly significant impact in a bushland environment or in open grazing land.

The *Ulan Underground Mine: Subsidence Assessment for Longwalls 31-32 Extraction Plan* was prepared by SCT for LW31 and LW32, the following summary of the subsidence assessment includes:

- Estimates of subsidence effects for Longwalls 31 and 32 are consistent with the range of values previously forecast at similar overburden depths for the original UCCO Project EA, subsequent updates for modifications to the UCCO Project Approval and regular Subsidence Management Plan/Extraction Plan assessments at the Ulan Complex.
- Forecast values for the primary subsidence effects parameters from conventional subsidence behaviour are at the lower end of the range of previously forecast maxima due to the greater overburden thickness above Longwalls 31 and 32. Maximum values for the primary subsidence parameters are forecast as: vertical subsidence of less than 1.7m, tilt of less than 35mm/m, compressive strain of less than 20mm/m and tensile strain of less than 15mm/m.
- The area of potential impacts and consequences in the Durridgere State Conservation Area is reduced from that previously approved by MOD4 to PA08_0184 due to the shortening of Longwall 32.
- Subsidence effects and impacts from the remaining mining in Longwalls 30 and W8 and from the planned mining of Longwalls 31 and 32 are expected to be consistent with or less than the previously forecast maxima and compliant with the subsidence performance measures for PA08_0184 (as modified), notwithstanding the input of other specialists.

Figure 6 Estimated Contours of Vertical Subsidence for LW30 to LW32 & LWW6 to LWW8



3.4 Technical Specialists Reviews

The Extraction Plan was prepared by UCMPL, with assistance from suitably qualified technical specialists. A summary of the environmental and heritage consequences from each technical specialist including surface water, groundwater, biodiversity and heritage review is provided.

3.4.1 Surface Water

Based on an assessment of the available monitoring results there have been no environmental consequences greater than predicted in the EA to the surface waters of Curra Creek, Bobadeen Creek or Mona Creek. Monitoring results suggest there have been minimal subsidence impacts on surface waters as a result of previous underground mining operations at Ulan West and impacts are consistent with EA predictions (Engeny, 2022).

Future monitoring of Mona Creek for both watercourse stability and erosion/ponding, as part of pre and post mining monitoring programs as well as monitoring in both Ulan Underground and Ulan West mining areas will assist with future surface water impact reviews. It is suggested that TSS monitoring at SW08 continues so that site specific triggers can be established (Engeny, 2022).

3.4.2 Groundwater

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. With the exception of PB24, in which groundwater levels have recovered following an abrupt decline between 2012 and 2014, impacts to groundwater levels are consistent with, or less than those predicted, occurring in the Permian and Triassic fractured rock units. Only the Triassic sandstones are utilised for stock and domestic water supply. The water quality of private 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 LW32 is not expected to significantly reduce the availability of groundwater for private bores accessing the Triassic units (AGE, 2022).

Mine inflows 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 (AGE, 2022).

3.4.3 Biodiversity

The subsidence effects for UGLW31 and UGLW32 in SCT (2022) are consistent with previously forecast at similar overburden depths for the site. Given these predictions, based upon the environmental and ecological similarities between UGLW31-32 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 UGLW31 and UGLW32 are expected to have a negligible impact on threatened species, populations, habitats and ecological communities (ELA, 2022).

3.4.4 Heritage

Examination of the UCMPL Aboriginal site database indicates that three Aboriginal sites have been identified within the Application Area, all of which are isolated finds (refer to Section 3.1.1). As noted by SCT (2020 and 2022) impacts to artefact sites such as isolated finds from subsidence, are generally negligible (OzArk, 2022).

Provisions relating to Aboriginal heritage in the UCMPL HMP for approved UCCO Project will continue to be implemented where relevant for the Application Area. No further revisions or actions need to be implemented as no further survey is required (OzArk, 2022).

In accordance with Table 4.1 of the HMP which provides the subsidence performance measures for PA08-0184, there will be nil impact within the Brokenback Conservation Area, the Bobadeen Grinding Groove Conservation Area, the Valley Way Grinding Groove Conservation Area and the Mona Creek Rock Shelter Sites. These areas should continue to be protected in accordance with the HMP (OzArk, 2022).

In accordance with Table 4.1 of the HMP which provides the subsidence performance measures for PA08-0184, there will be negligible impact to the Talbragar Fish Fossil Reserve. Monitoring as described in Table 4-1 is not required as it is >6 km from the goaf edge of LW31 and LW32 (OzArk, 2022).

4. Monitoring Programs

4.1 Subsidence Effects Monitoring

UUG offers the opportunity to measure full subsidence movements over two monitoring lines H and F using a continuation of the high confidence subsidence monitoring currently undertaken in accordance with the current Subsidence Monitoring Program (SMP) in **Appendix G**. These measurements not only provide confidence in the predictions but also provide data to assist in the management of risks associated with subsidence and allow analysis of the relationship between the subsidence effects and environmental impacts of extraction.

Subsidence monitoring at UUG currently consists of surveys on H and F monitoring lines that cross the longwall panels in the western and eastern domains, respectively. The current extent of these lines is shown in **Figure 7**. These existing subsidence lines are providing high resolution subsidence monitoring at a range of overburden depths (SCT, 2022). Plan 7 in **Appendix H** provides an A0 size plan of the subsidence monitoring lines H and L.

A summary of the subsidence monitoring program to measure the effects of the subsidence and to evaluate against the maximum subsidence predictions is provided in **Table 11** and displayed in **Figure 7**.

As recommend by SCT in 2022, maintenance and surveys of these monitoring lines is to be consistent with previous recommendations by SCT (SCT 2016, 2019). These include:

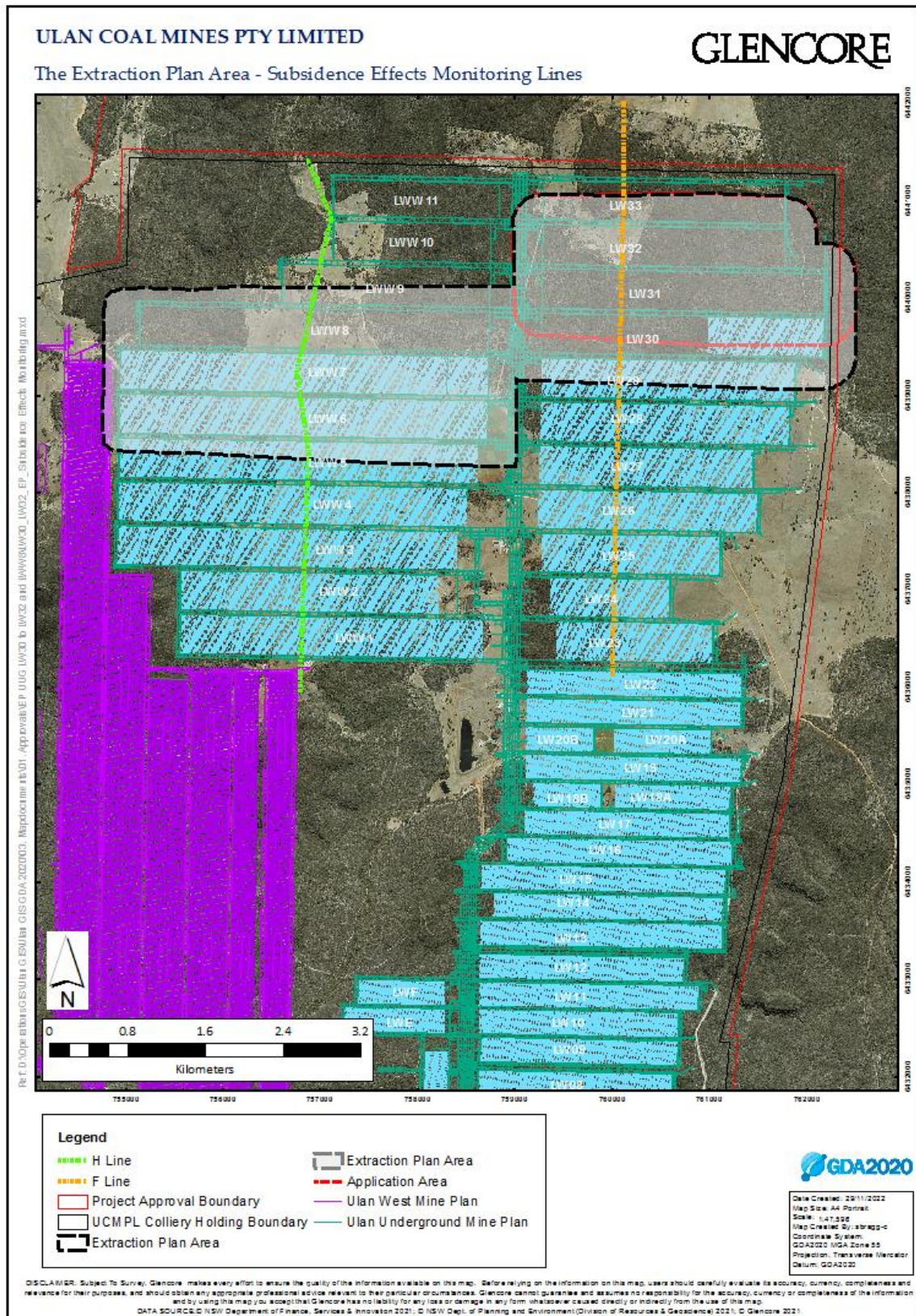
- Ongoing monitoring of the H and F lines;
- This extension of F Line would be approximately 1km long and should include pegs at spacings of:
 - A maximum of 1/20th of overburden depth from near the centre of Longwall 33 to approximately one times the overburden depth beyond the panel edge (a distance of approximately 550m).
 - A minimum of 50m apart from 550m to 1000m (to UCMPL property boundary).
- 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.

It is recommended the end of panel surveys for Longwalls 30-32 are conducted using each installed peg over the extended length of F Line out to the extent of UCMPL land from the current panel goaf edges or to the end of the line, whichever occurs first (SCT, 2022).

The UUG Technical Services Manager is responsible for ensuring the implementation of the subsidence effects monitoring program as outlined in **Table 11**.

The UUG 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 11**.

Figure 7 Subsidence Effects Monitoring Lines F and H



Notes: Longwall progress for LW30 at the UUG as of 29 November 2022

Table 11 - Summary of Subsidence Effects Monitoring Program

Survey Line ¹	Data Type	Parameters	Accuracy of Survey ²	Survey Frequency	Responsibilities & Reporting
F & H Lines	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; - Tilt; & - Strain along Line.	Appendix A of the SMP: As specified by <i>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 Plan 7 in Appendix H.	- Survey data recorded from the subsidence line survey program will be verified, processed and maintained by the UUG Surveyor and the UUG Technical Services Manager. - The responsibility of maintaining the Subsidence Management Status Report will be undertaken by the UUG 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 ECM. - Incident and annual reporting requirements will be the responsibility of the ECM. - Reporting of subsidence monitoring program in accordance with Section 5.7 and Section 5.8 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 ⁴ & 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); & - GPS digital camera accurate +/- 5m (or equivalent);	- Visual inspections of cliff lines and internal roads proposed for undermining completed prior to commencement of each longwall. - Visual inspections to be completed monthly during each longwall for internal roads. - Visual inspections of undermined 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 Extraction Plan Area and the Application Area shown on **Figure 7**. Installation details of survey marks provided **Appendix H**.

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

³ Pegs on these subsidence lines will be installed at intervals of approximately 1/20th depth of cover across each longwall block or generally 10m where 1/20th depth of cover is greater than 10m. In non-rock areas galvanised steel star pickets driven to approximately 0.1m above ground RL or refusal. In solid rock areas a hole is drilled to 0.2m and brass or stainless steel threaded rod or bolt installed with approximately 0.01m above ground RL.

⁴ For LWW7: Impacts to the sandstone outcrop formations were within the expectations and less than the maxima forecast (SCT, March 2022).

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

Status: Final
Version: Version 8

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

Page 31 of 110

4.2 Environmental Monitoring Program

The following section provides a detailed summary and consolidates the various environmental and heritage monitoring programs either presented in key sub-plans or within UCMPL's existing management plans⁵. As required by the Guidelines, each of the environmental monitoring programs for the Extraction Plan has a description of:

- The existing baseline of natural features, biodiversity, heritage and built features as provided in either the Project EA, subsidence assessments by SCT (**Section 3**) and other specialist technical reviews;
- Objectives of the monitoring program; and
- Proposed monitoring program.

The consolidated environmental and heritage monitoring program implemented by UCMPL to record and evaluate the impacts from subsidence within the Extraction Plan Area is provided in **Section 4.3** and displayed in **Figures 8 to 14**.

The ECM is responsible for ensuring the environmental and heritage monitoring programs (**Section 4.2**), incident notification and reporting requirements (**Section 5.7** and **Section 5.8**) for this Extraction Plan are implemented and carried out.

4.2.1 Surface Water Monitoring

4.2.1.1 Baseline

Four surface water creek catchment areas are present within the Extraction Plan Area. Ulan Creek, Curra Creek and Bobadeen Creek are tributaries of the Hunter River system. Mona Creek is located in the Murray Darling Basin system.

The main channel of Bobadeen Creek is remote from the Extraction Plan Area. Longwall mining and monitoring beneath Bobadeen Creek was completed in 2014, two years after LW26 was completed in April 2012. The main channel of Ulan Creek is remote from the Extraction Plan Area, with only a small portion of the catchment within the Extraction Plan Area. A first order section of Curra Creek is in the DSCA but not above Longwalls 31 and 32. Sections of the main channel of Mona Creek and lower order flow lines will be undermined by LWW8.

Mona Creek is an ephemeral creek system with flows only occurring in the creek during storm events or after prolonged rainfall. The bed of Mona Creek is typically sandy with some sandy/clay sections within the upper reaches. There are no known rock bars within the creek in the project area. Generally, the creek system experiences very low flows, with some pools of permanent or semi-permanent water present in the downstream reaches. Based on site inspection and aerial photograph interpretation, the creek appears to be in good condition. There are also isolated sparse pockets of riparian vegetation along the creek (Project EA).

⁵ UCMPL were granted approval to vary the structure of the Ulan West Extraction Plan in July 2021 to utilise existing management plans required under PA08-0184 including Water Management, Heritage Management and Biodiversity Management Plan as key component plans of the Ulan West Extraction Plan. This Extraction Plan for UUG utilises the same structure of the aforementioned management plans.

The 2020 pre-mining baseline utilising the *CSIRO Ecosystem Function Analysis Ephemeral Stream Assessment* activity classification for the stream reach above the western portion of LWW8, ranged from active to stable.

Ulan Creek is a fourth order stream (third order within the subsidence affectation area) and flows in a southerly then easterly direction through the project area before joining the Goulburn River approximately 250 metres north-east of the mine water management system. Ulan Creek is an ephemeral creek system with flows occurring during storm events or after prolonged rainfall. The flow in Ulan Creek is augmented by water discharged under licence from Environmental Protection Licence No.394 (EPL394) from the Bobadeen Water Treatment Facility (BWTF). There are isolated areas of erosion along the banks, which UCML has stabilised as part of previous licensed discharge commitments. The soil landscape in the southern part of the catchment is predominantly the Ulan soil landscape with very low relief, gentle slopes, low fertility and slightly acidic topsoils. The catchment is predominantly forested with areas of pasture associated with the Bobadeen Irrigation Scheme. The area is imperfectly drained and has a moderate to high erosion potential. Ulan Creek and the in-channel rock bars are outside of the predicted subsidence affectation zone for the Project (Project EA).

Curra Creek is an ephemeral creek system with flows only occurring in the creek during storm events or after prolonged rainfall. The bed of Curra Creek is typically sandy with some sandy/clay sections within the project area. There are no known rock bars in the creek within the project area. Generally, the creek system experiences very low flows, with some pools of permanent or semi-permanent water present in the downstream reaches. The catchment is predominantly used for grazing with some areas of other rural land use. The catchment has low undulating hills with gentle slopes. Soils have low fertility, are well drained but are highly susceptible to erosion (Project EA).

Bobadeen Creek is an ephemeral waterway that contains some semi-permanent pools of water. The majority of Bobadeen Creek and its floodplains have been cleared and used for cattle grazing and the main channel of Bobadeen Creek has been incised through erosion. The bed of Bobadeen Creek is typically sandy with some sandy/clay sections within the project area. There are no known rock bars in the creek within the project area. Generally, the creek system experiences very low flows, with some pools of permanent or semi-permanent water present in the downstream reaches. Based on site inspection and aerial photograph interpretation, the creek appears to be in good condition in the upstream reaches with some minor erosion of the creek bed and banks in the lower reaches (Project EA).

Pre and post mining channel stability monitoring of Bobadeen Creek indicate the creek is largely degraded as a result of past practices (pre-mining). The creek is largely at risk of instability and ongoing bank erosion due to minimal riparian and bank vegetation and ground coverage. There are areas of natural regeneration occurring. The bank erosion hazard index (BEHI) for sites monitored within Bobadeen Creek ranged from highly stable to unstable (Barnson, 2015).

The surface above the EP Area⁶ straddles the Great Dividing Range with a number of tributaries of Mona Creek in the north and west and drainage lines to Bobadeen Creek in the south east (**Figure 8**). The majority of the surface area above the EP Area drains into Mona Creek. These watercourses represent headwater catchments and are ephemeral in nature only flowing during and immediately

⁶ EP Area refers to LW30 and LWW6 to LWW8 (SCT, 2016)

after heavy rain. Water ponds in clay bottomed pools for a period after rain, but there do not appear to be any permanent natural water holes apart from the spring fed dam above the start of Longwall W6. Above the proposed longwall panels the main channel of Mona Creek traverses the northwest corner of Longwall 30 as well as the northeast and northwest corners of Longwall W8. Within the EP Area, there are first, second, and third order sections of Mona Creek and its tributaries. There is also a short fourth order section right on the western edge of the EP Area which is well outside the mining area. This creek has an alluvial base, so some of the base flow is likely to occur below the surface (SCT, 2016).

Only the first and second order tributaries of Mona Creek are above the planned mining in Longwall 31 and 32 where the maximum natural gradients are approximately 1in 40. The first order section of Curra Creek within the Application Area is in the DSCA but not above Longwalls 31 and 32. A first order drainage line associated with Bobadeen Creek is located over Longwall 30. First order drainage lines of Curryall Creek are over Longwall 33 to the north and outside the Application Area. These drainage lines 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 spring feed, permanent natural water holes within the Application Area (SCT, 2022).

4.2.1.2 Objectives

The objectives of the surface water monitoring program in the WMP (**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 establish 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 monitoring, management and assessment criteria are provided in Section 3 of the WMP (**Appendix A**).

4.2.1.3 Surface Water Monitoring

To evaluate the impacts from subsidence on surface waterways within the Extraction Plan Area, the Extraction Plan has adopted the applicable key monitoring components from the WMP 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 surface water monitoring program is provided in the WMP (**Appendix A**). A summary of the surface water monitoring relevant for the Extraction Plan Area is provided in **Table**

12. The locations of the surface water quality sites, Mona Creek channel stability sites, flowline channel stability sites and stream health monitoring sites for the Extraction Plan Area is provided in **Figure 8**.

Table 12 Surface Water Monitoring

Parameter/Methodology	Site	Frequency
Water Quality: - pH - Electrical Conductivity (EC) $\mu\text{S}/\text{cm}$ - Total suspended solids (TSS) mg/L	Curra Creek (SW07) Bobadeen Creek (SW08) Mona Creek (SW10) <i>(refer to Figure 8)</i>	Monthly (when flowing) and Event Based* (*>30mm in a 24hr period)
Stream Health: - Riparian Channel and Environmental (RCE) Inventory scores. - AusRivAS and SIGNAL2. - Water Quality: pH, EC ($\mu\text{S}/\text{cm}$), TSS (mg/L), Dissolved Oxygen, Turbidity (NTU) and Alkalinity).	Mona Creek (AQ15) Bobadeen Creek (AQ13) <i>(refer to Figure 8)</i>	Annually
Channel Stability: - Visual observations and photographic monitoring with GPS camera watercourses to record potential impacts. - Monitoring to distinguish between natural instabilities and instabilities from mine subsidence, including the presence of surface cracking, nick point erosion, surface ponding or out of channel flows.	Mona Creek Channel Stability Sites (main channel) <i>(refer to Figure 8)</i>	Pre-mining and annually thereafter for two years
	Representative lower order flow lines of Mona Creek, Curra Creek and Bobadeen Creek <i>(refer to Figure 8)</i>	Pre-mining and annually thereafter for two years

Surface Water Quality

UCMPL undertake surface water quality monitoring in accordance with the WMP. An assessment of the relevant surface water quality triggers in the WMP (**Table 13**), will be compared against the water quality results from monitoring sites SW07, SW08 and SW10 (**Table 12**).

In the event the performance indicators for surface water quality have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related or not, as described in the MTARP **Table 24**.

Table 13 Surface Water Quality Trigger Assessment Values

	pH	EC ($\mu\text{S}/\text{cm}$)	TSS (mg/L)
Bobadeen Creek (SW07)	6.8 – 7.4	205	150
Curra Creek (SW08)	6.5 – 8.0	30 – 350	50
Mona Creek (SW10)	6.5 – 7.4	214	92

Channel Stability & Stream Health

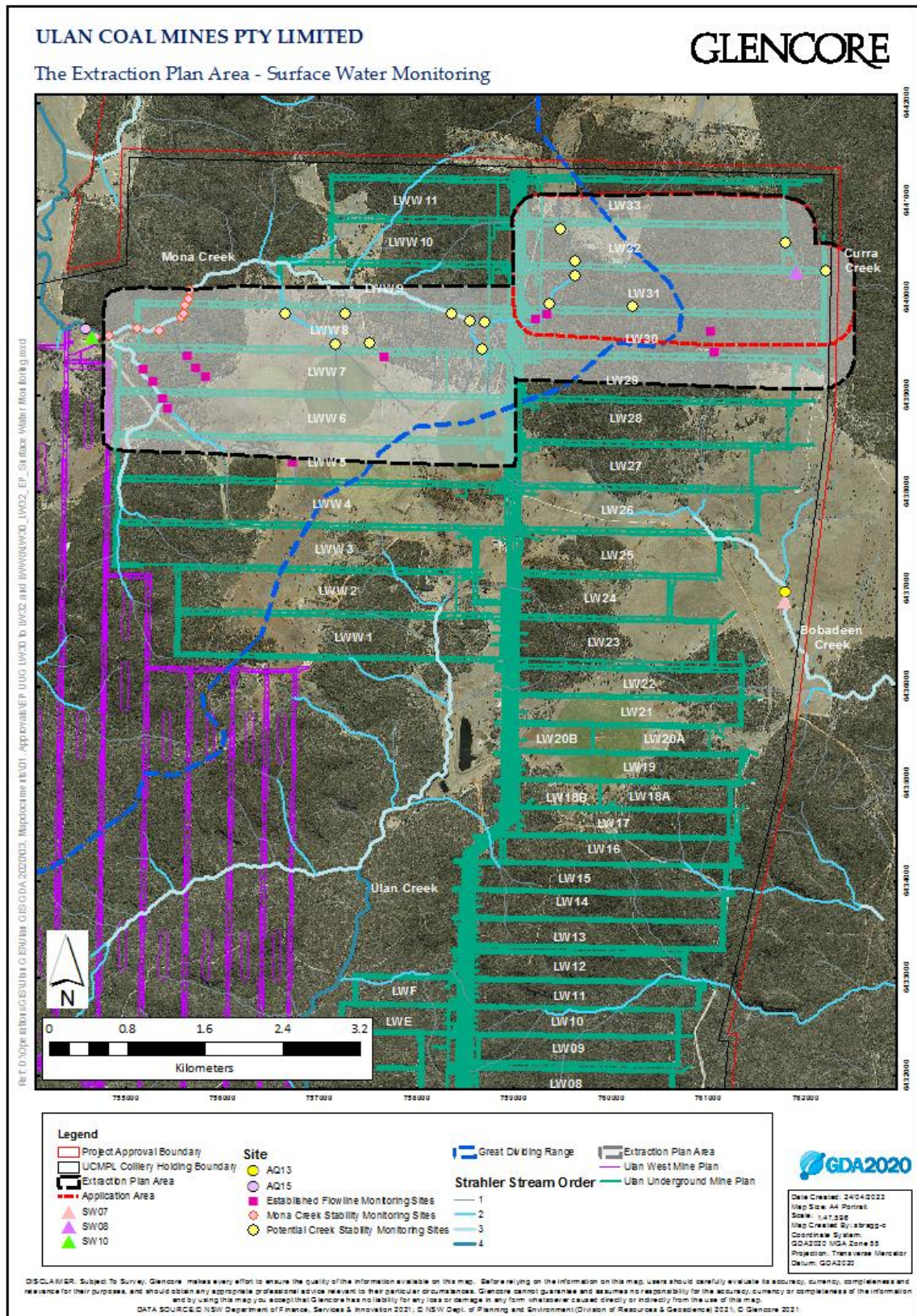
UCMPL undertake channel stability monitoring in accordance with the WMP and the BMP. For monitoring subsidence impacts on watercourses directly in the Extraction Plan Area, UCMPL have established the Mona Creek Channel Stability Sites and numerous channel stability sites in lower order flow lines identified during pre-mining inspections (**Table 12**) (**Figure 8**). Additional channel stability monitoring sites for LWW8, LW31 and LW32 within the Extraction Plan Area will be established in Mona Creek and lower order flow lines prior to mining LW8, LW31 and LW32.

UCMPL undertake stream health monitoring in accordance with the WMP and the BMP utilising aquatic macroinvertebrate sampling (AusRivAS and SIGNAL2), water quality monitoring and geomorphic assessments. For the Extraction Plan Area, relevant stream health monitoring sites from the WMP and BMP include Mona Creek and Bobadeen Creek (**Figure 8**).

An assessment of stream health and channel stability will include a review of the annual monitoring results against historical monitoring (including historical data from ecological assessments and pre-mining inspections) to identify any potential deterioration of stream health as a result of subsidence impacts or stability assessments indicating a greater than predicted subsidence impact.

In the event the performance indicators for stream health and/or channel stability has been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

Figure 8 Surface Water Monitoring



4.2.2 Groundwater Monitoring

4.2.2.1 Baseline

The baseline data for the groundwater monitoring program consist of various datasets dating back as far as 1998⁷. During this period the groundwater monitoring program has been expanded, with a comprehensive network of groundwater level and water quality monitoring being undertaken since 2001.

The regional groundwater systems were described in detail in the Groundwater Assessment prepared as part of the Project EA. An overview of the regional groundwater systems is provided below. The regional groundwater system comprises two general aquifer types:

- Alluvial aquifers associated with major drainage lines; and
- Hardrock/coal aquifers associated with the coal measures

The properties of the two aquifer systems vary significantly. The alluvial aquifers within the region include alluvial deposits along the Goulburn River and Ulan Creek. These deposits are generally a mix of clayey silts and sands with occasional coarser gravel layers. The alluvial deposits within the region are considered shallow and of limited extent. The hardrock/coal aquifers comprise Jurassic sandstones and siltstones overlying Triassic sandstones with Permian coal measures underlying the Triassic layer. These geological units form relatively discrete layers dipping to the north-east at a shallow angle and overlie a relatively impermeable granite basement (Project EA).

There are no identified groundwater dependant ecosystems (GDE) (for example no hanging swamps and limestone cave systems) or associated springs within the Project Area. Potential examples of these ecosystems within the boundary of the Ulan Mine Complex are generally not well-defined and blend into adjacent drier communities (Project EA).

There have been no identified springs or seeps, except for “The Drip”, within the predicted groundwater impact area. ‘The Drip’ is sustained by surficial and relatively shallow groundwater storage which is governed mostly by short term rainfall events that surcharge the regolith, weathered rock and vertical joints in the area. Rainfall recharge and downwards percolation is intercepted at horizontal bedding planes which then transmit the groundwater to the unconfined rock faces above the Goulburn River, where it emanates as seeps and drips. During dry periods some seeps cease to flow (WMP).

The Goulburn River and Talbragar River act as regional drainage sinks. Groundwater discharge into rivers is termed ‘baseflow’ and typically takes longer to reach a river than rainfall-runoff across the land surface. Flow analysis of the Goulburn River (MER, 2009) indicates that the upper reaches of the Goulburn River exhibit fast recession of stream flows with flows sustained only for short periods of time. This suggests that the upper reaches of the Goulburn River have modest to poor storage characteristics in the shallow aquifer systems which contribute to baseflow. As stated by MER (2009), “Minor contributions of baseflows from slightly deeper hardrock systems (as upward leakage possibly via springs), are more likely to dominate the extended dry periods when flows are frequently less than 0.5 ML/day” (Project EA).

⁷ Although groundwater sampling data has been collected for more than 10 years, the annual water quality monitoring rounds from 2002 to 2008 reveal distinctive water types for the Jurassic, Triassic, Permian strata and the Ulan seam with respect to EC and pH (MER 2009).

UCMPL has been undertaking annual surveys of bore water level and water quality since 2009. Data collected during the surveys comprises bore coordinates (acquired with a hand-held positioning device), bore water level (where access has allowed), observation of fittings, and evaluation of bore use. A summary of the current private bore monitoring program has indicated that water quality in the privately-owned bores (and also in the different strata) varies widely, for example:

- The average EC in private bores from 2009 to 2014 range from 172 us/cm to 4760 uS/cm; and
- The average pH in private bores from 2009 to 2014 range from pH 4.5 to pH 7.6.

The results suggest the water quality in 20% of the bores for EC is above the water quality values for human consumption. The results also suggest the water quality in 50% of the bores for pH is below water quality values for human consumption. Standing water levels in the bores were also reviewed, with 83% of the bores displaying stable water levels whilst the remaining 17% of the bores were unable to be assessed due to unavailable data (WMP).

These bores vary in condition and are subject to varying degrees of use. Most 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. However, this unit is known to have a saturated thickness of three metres or less of low permeability sandstone across the mine area. This implies that bore yield will likely be very low; as such the value of this water resource is minimal (MER 2014).

4.2.2.2 Objectives

The objectives of the groundwater monitoring program in the WMP (**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 3.4.2**), monitoring, management and assessment criteria are provided in the WMP (**Appendix A**).

4.2.2.3 Groundwater Monitoring

To evaluate the impacts from subsidence on groundwater systems within the Application Area and the Extraction Plan Area, the Extraction Plan has adopted the following key monitoring components from the WMP to measure and evaluate the subsidence performance measure for groundwater, including:

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

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the groundwater monitoring program is provided in the WMP (**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 14**. The locations of the VWPs, other groundwater monitoring sites within the NMN and private bore monitoring network for the Extraction Plan is provided in **Figure 9**.

Table 14 Groundwater Monitoring Program

Parameter/Methodology	Site	Frequency
Vibrating wire piezometers (VWPs) Pore pressure groundwater level monitoring.	VWPs: DDH266, DDH270 ¹ , DDH293, DDH601, DDH598, TAL1, TAL2, UW1, UW2, UW3, UW4, R894, PZ29, EX03, EX06, EX09 and DDH598 ² (refer to Figure 9)	VWPs downloaded quarterly ³
Private Bore Monitoring - Water quality: pH and Electrical Conductivity (EC) μS/cm - Groundwater level (mbgl)	Private Bore Monitoring Network (PBMN) (refer to Figure 9)	Annually ³
Parameter/Methodology	Site	Frequency
The Drip - Pore Pressure Monitoring (VWP) - Water Quality: - pH, EC and TDS. - Major ions: Ca; Mg; Na; K; CO₃; HCO₃, Cl and SO₄. - Nutrinets: Nitrates, nitrites and nitrogen ammonia. - Fluoride. - Total alkalinity as CaCO₃, HCO₃, CO₃ - Dissolved Metals; [Al, Sb, Ag, As, B, Ba, Cd, Cr, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sr, Zn] +Hg. - Visual observations and photographic monitoring.	The Drip and Pore pressure data from VWP PZ29 (refer to Figure 9)	Water quality and photographic monitoring every two months and/or Event Based ³ (*>30mm in a 24hr period) VWP downloads quarterly ³

Notes: ¹ To be undermined by Ulan West and will be subject to review by UCMPL's groundwater specialist for ongoing groundwater monitoring requirements within the WMP. ² Mona Creek Alluvium Monitoring (MCAM) added to the groundwater monitoring program as required by MOD4. ³ When access is available.

Groundwater Levels

UCMPL undertake groundwater level monitoring in accordance with the WMP. For the Extraction Plan, groundwater levels in the NMN will be assessed quarterly using pore pressure data obtained from the vibrating wire piezometer network (**Figure 9**).

The WMP identifies the adopted trigger levels for NMN bores where relevant to the operations in order to detect potential variances to groundwater model predications, noting that not all piezometers in the NMN have a relevant trigger value. Baseline data is still being collected for the

MCAM and triggers may be established once there is sufficient baseline information. The trigger values as provided in the WMP may change over time in response to updates of the groundwater model.

In the event the performance indicators for groundwater monitoring have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

The Drip

The Drip Monitoring Program consists of water quality, pore pressure and visual monitoring.

Hydro geochemical monitoring was implemented in 2012 to assist in characterising the nature of The Drip and its true modes(s) of recharge. If the source is perched, flow paths could be relatively short and the species (and concentrations) may differ from Triassic groundwaters, reflecting conditions nearer to rainwater following rainfall periods. Further monitoring will provide a temporal assessment of the relationship and an indication of changes in 'The Drip' over time.

Water samples are collected from two separate locations at 'The Drip' on a 2-monthly basis (**Figure 9**). Additional sampling will be conducted after significant rainfall event (30 mm in 24 hrs). Temperature, pH and electrical conductivity (EC) are recorded in the field and samples collected for laboratory analysis which include (same analysis as NMN):

- Physical parameters: reactive silica and total dissolved solids (TDS);
- Major ions: Calcium (Ca); Magnesium (Mg); Sodium (Na); Potassium (K); Carbonates (CO₃); Bicarbonate (HCO₃), Chloride (Cl) and Sulfate (SO₄);
- Nutrients: nitrates, nitrites and nitrogen ammonia;
- Fluoride;
- Total alkalinity as CaCO₃. HCO₃, CO₃; and
- Dissolved metals (filterable): 19 Dissolved Metals; [Al, Sb, Ag, As, B, Ba, Cd, Cr, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sr, Zn] +Hg.

Water quality monitoring has identified differences in major ion proportions between Triassic bores and The Drip which suggests the influence of differing recharge sources and varying water-rock interactions / residence times between the two groundwater systems (AGE, 2022b).

In late 2015, UCMPL installed VWP PZ29 consisting of 8 transducers was installed approximately 400m north of The Drip (**Figure 9**). The purpose of this VWP is to gain a further understanding of the recharge source of The Drip. Pore pressure readings are recorded daily using a data logger and analysed on a 3-monthly basis, as part of the NMN. Pore pressure monitoring remains the most direct way of measuring such impacts (WMP).

In consultation with Natural Resources Access Regulator (NRAR) during the preparation of the amended Extraction Plan (Version 4) (**Attachment B**), UCMPL commenced regular visual inspections and qualitative assessments of the 'The Drip' utilising photographic monitoring during the collection of The Drip water samples every two months. This monitoring is in addition to the current pore pressure monitoring program and water quality monitoring program. The purpose of the photographic monitoring is for determining any notable physical changes at The Drip over time.

In the event the performance indicators regarding The Drip have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP (**Table 24**).

Private Bores

UCMPL undertake private bore monitoring annually, including groundwater levels and water quality (pH and EC) in accordance with the WMP, where access to the bore is possible (**Figure 9**).

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 4760 µS/cm and average pH levels ranging from pH 4.5 to pH 7.6.

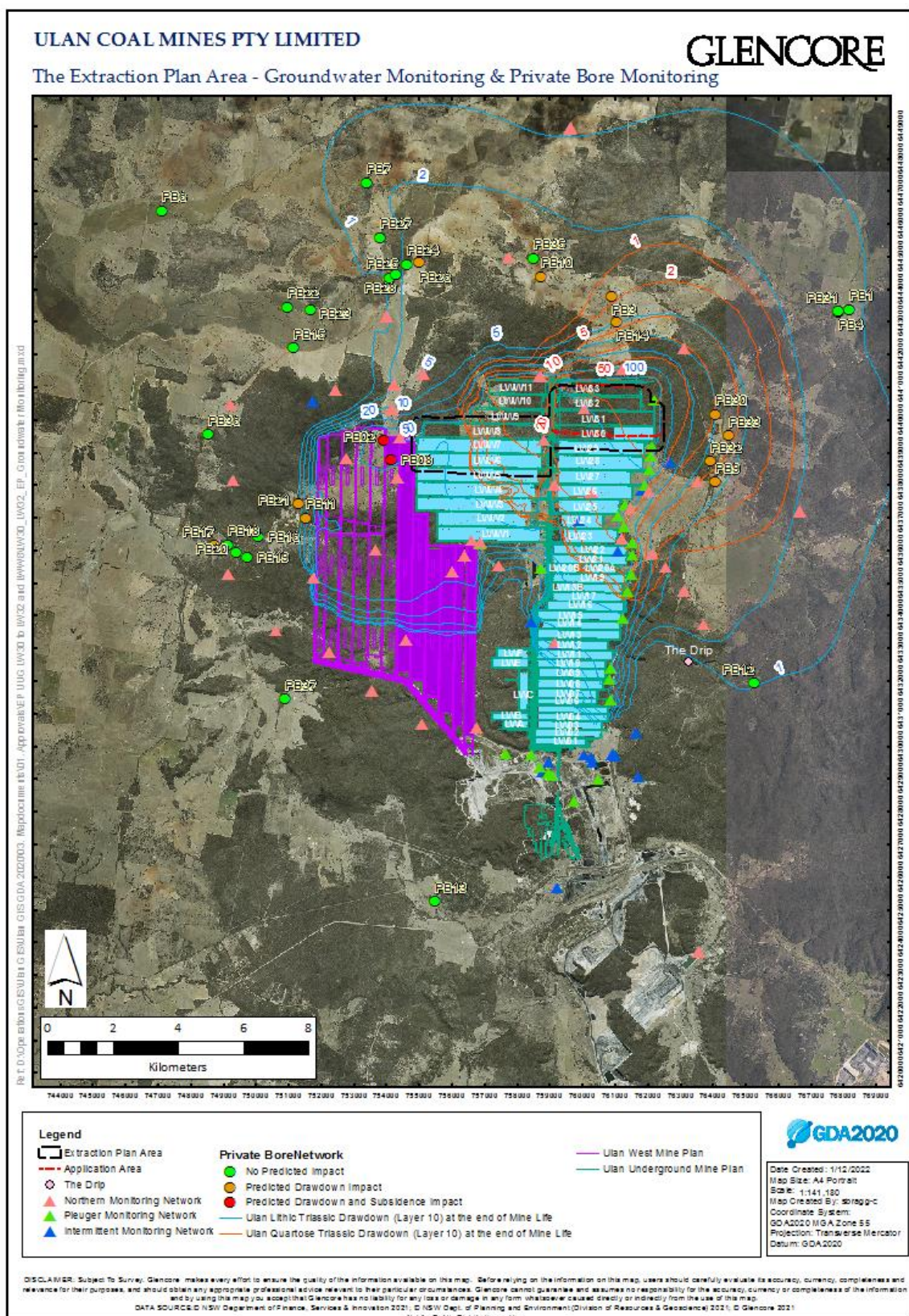
Groundwater quality trigger values are indicator values used to compare the results of groundwater quality monitoring. The trigger values will be used to initiate investigations into the groundwater quality. Setting appropriate trigger values is a key issue in identifying and managing changes in groundwater quality.

Quality triggers for private bores have been developed on baseline data. There is insufficient baseline data for some bores recently added to the program. Where there is sufficient baseline data trigger levels have been developed for pH and EC in the WMP. The trigger value that has been adopted for water quality in privately owned bores is a departure of water quality from long term monitoring trends and guidelines. Establishing comprehensive water quality baseline data will continue, subject to voluntary access arrangements to the private property and the relevant bore (WMP).

The groundwater levels in privately owned bores will be monitored annually. As provided in the WMP, the assessment of data will include departures from predicted data trends and trigger values based on the predictions of the Groundwater Model and the long-term monitoring undertaken. Establishing comprehensive groundwater level baseline data will continue for privately owned bores, subject to voluntary access arrangements to the private property and the bore itself.

In the event the performance indicators regarding private bores have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP (**Table 24**).

Figure 9 Private Bores Predicted Drawdown Contours & Groundwater Monitoring



Notes: Longwall progress for LW30 as of 29 November 2022. PB02 is owned by UCMPL. PB08 has now been impacted, as predicted from LW7. Compensatory measures for PB08 including an Alternative Water Supply Agreement for this property is already in place to compensate for any impact to this bore. Further details and management measures for PB08 are provided in the Ulan West Extraction Plan.

4.2.3 Landform Monitoring

4.2.3.1 Baseline

The EP Area includes undeveloped bushland over Longwall 30 and the eastern parts of Longwalls W6, W7, and W8 with open grassland used for grazing in the central portion of Longwalls W6, W7 and W8. UCML owned pivot irrigation systems are used across some of the open grassland areas (SCT, 2016).

The EP Area for Longwall 30 and Longwalls W6, W7 and W8 covers a surface area of about 1076ha. The majority of this land is owned by UCML. Approximately 97ha of privately-owned land referred to as Woodbury is located at the western end of Longwalls W6, W7 and W8. Approximately 17ha of the Durridgere State Conservation Area (part of the Curryall State Forest) is located at the eastern end of Longwall 30 (SCT, 2016).

The major natural features within the EP Area include sandstone formations, a number of ephemeral watercourses, a spring and the Durridgere State Conservation Area. The sandstone formations are mainly located in the west in areas where the overburden depth is less than about 210m. These formations host a variety of Aboriginal heritage sites. The sandstone formations within the EP area are generally less than 5m high but there are formations greater than 10m high. These are referred to as cliff formations (SCT, 2016).

Two cliff formations are located within the EP Area. One cliff is located on the western edge of the EP Area and contains the Mona Creek sites identified above. The other cliff line is located within the subsidence zone above Longwall W7. The formation above Longwall W7 is about 300m long and ranges in height up to about 18m high. There are significant sections higher than 10m. This formation is located substantially within the Woodbury property. The overburden depth to the Ulan Seam in this area is about 175m. Significant formations associated with Aboriginal heritage sites Mona Creek 23 to Mona Creek 27 (Ulan ID#180-184) are located west of Longwall W8. The eastern portion of this cliff formation is within the EP Area but well beyond the area where any impacts are expected (SCT, 2016).

The outcropping strata is of Jurassic age and higher in the stratigraphic sequence than the Triassic strata associated with large sandstone outcrop formations. The surface topography is undulating with sections of steeper ground but no substantial sandstone outcrop formations that would be described as steep slopes or cliffs by definitions in PA08_0184. The majority of the surface within the Application Area for Longwalls 31 and 32 is undeveloped bushland with a small area of cleared or semi-cleared land. This undeveloped bushland includes the southwestern section of the Durridgere State Conservation Area (DSCA) (SCT, 2022).

4.2.3.2 Objectives

The objectives of the *Land Management Plan for LW30-LW32 & LWW6-LWW8* (LMP LW30-32 & LWW6-LWW8) (**Appendix B**) is to outline the management strategies, controls and monitoring programs to be implemented for the management of landforms, (either UCML owned land or non-UCML owned land) regarding potential impacts from UCML mining activities, as described in the Extraction Plan within the Extraction Plan Area (**Figure 11**).

The relationship of the LMP LW30-32 & LWW6-LWW8 to the EMS is shown by **Figure 4**. The key subsidence impacts that may have potential consequences on land associated with the extraction of longwalls within the Extraction Plan Area include:

- Surface impacts (including cracking, 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 LW30-32 & LWW6-LWW8 (**Appendix B**).

4.2.3.3 Landform Monitoring

To evaluate the impacts from subsidence on landforms within the Extraction Plan Area, the Extraction Plan has developed the following key monitoring components to measure and evaluate the subsidence performance measure for land, including:

- Surface impacts (including cracking, steps, overrides and erosion holes); and
- Cliff line rock falls associated with cliff lines >10m in height, as defined by the Project EA.

Cliff line monitoring of the Mona Creek Rock Shelter Sites (MCRSS) is also provided in **Section 4.2.6**.

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the landform monitoring program is provided in **Figure 10** and **Table 15**.

Table 15 Landform Monitoring Program

Parameter/Methodology	Site	Frequency
Surface Impacts • Visual observations and photographic monitoring with GPS camera of landforms to record potential impacts including surface cracking, steps, overrides and erosion holes.	Landforms associated with UCMPL property, private property and the DSCA within the Extraction Plan Area. <i>(refer to Figure 10)</i>	UCMPL Land • Pre-mining • During mining (monthly) • Post mining (within three months) Private Property ¹ • Pre-mining • During mining (monthly) • Post mining (within one month) DSCA • Pre-mining • During mining (weekly)³ • Post mining (within one month)
Cliff Line Monitoring (>10m) • Visual observations and photographic monitoring with GPS camera of cliff lines to record potential impacts including surface cracking and length of rock falls in meters (m).	Cliff line formations >10m in height within the Extraction Plan Area ² . <i>(refer to Figure 10)</i>	UCMPL Land & Private Property ¹ • Pre-mining • Post mining (within one month)

Notes: ¹ For private land 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 under privately owned land. Post mining inspections within one month to record subsidence related impacts for comparative assessments and develop remediation strategies. Annual inspection with UCMPL's subsidence specialist. ² Undermining of the cliff line associated with LWW7 on the Woodbury Property occurred in October 2021. This cliff line was impacted by isolated, minor rockfalls and perceptible cracking consistent with predictions (**Section 5.3.3**). ³ Weekly inspection in the DSCA during longwall retreat of LW31 and LW32 as required from the risk assessment (Section 2.4 of the Extraction Plan).

Cliff Line Monitoring

Pre-mining and post mining of cliff lines, as defined by the Project EA with a height >10m, within the Extraction Plan Area will be undertaken, to establish the base line condition for quantitative and qualitative post mining comparison (**Table 15**) (**Figure 10**). The aim of the cliff line monitoring program is to record the sum of identified rock-falls (in meters), induced by subsidence on cliff formations, as a percent of rock falls against the total sum of cliff line lengths within the zone of subsidence influence for Ulan West and UUG⁸, against the subsidence performance measures in **Section 5.1**. The cliff line monitoring methodology will use pre and post mining photographic recordings of cliff lines and associated rock shelters, and measured rockfalls, subject to safe access during post mining inspections.

Undermining of the cliff line associated with LWW7 on the Woodbury Property occurred in October 2021. This cliff line was impacted by isolated, minor rockfalls and perceptible cracking consistent with predictions (**Section 5.3.3**). If subsidence monitoring identifies a potential safety risk associated with a cliff line, the area may be cordoned off and/or additional warning signage placed to either alert or to prevent access.

In the event the performance indicators for cliff lines has been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

Surface Impacts

During longwall mining and after mining within the Extraction Plan Area, UCMPL will undertake monthly and post mining inspections respectively, for subsidence impacted landforms to record any observed surface impacts which may include cracking, steps, overrides and erosion holes (**Table 15**). This monitoring data will confirm if there has been a potential exceedance of subsidence predictions or subsidence performance measures for land or if the observed impacts are within prediction. The inspections will also identify potential subsidence hazards on both UCMPL owned land and non-UCMPL owned land.

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/or warning signage placed to either alert or to prevent access. Remedial actions to address the subsidence impacts on non-UCMPL owned land will be completed as soon as practicable, in consultation with the relevant land owner. Remedial measures proposed on UCMPL owned land and on non-UCMPL owned land are provided in further detail in **Section 5.3** of the Extraction Plan.

Remedial actions and measures to address the subsidence impacts on privately owned land are provided within the individual PPSMP associated with LWW6 and LWW7. 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. The PPSMP for LWW8 will be developed in consultation prior to the commencement of that longwall.

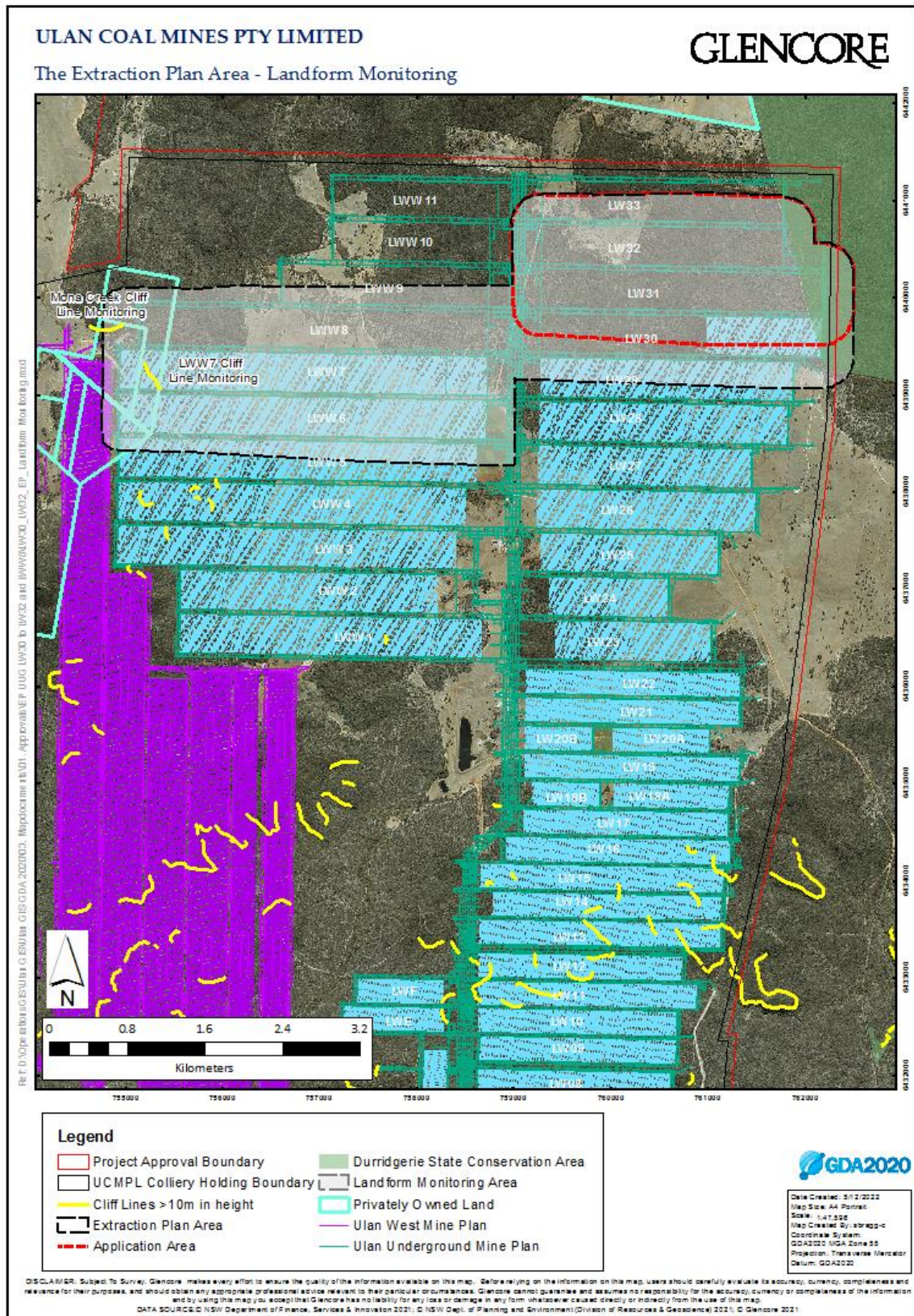
⁸ No greater than 20% rock falls of the total cliff line lengths undermined mined by Ulan West and UUG within the Project Area (applies to UUG mining areas post SMP Approval LWW4-LWW5 and LW27-LW29).

Longwall mining of LWW6 and LWW7 has now been completed. Subsidence behaviour observed on the private property and UCMPL property has been consistent with expectation.

In the event the performance indicators for land have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

If required, the use of unmanned aerial vehicles (UAVs), otherwise known as drones, outside of UCMPL owned land to monitor for subsidence impacts will be in consultation and agreement with the applicable landholder. The use of drones by UCMPL within the DSCA and Golburn River National Park (GRNP) will be in consultation and with approval from NPWS, in accordance with NPWS Policy – Drones in Parks Policy.

Figure 10 Landform Monitoring



Notes: Longwall progress for LW30 as of 29 November 2022.

4.2.4 Biodiversity Monitoring

4.2.4.1 Baseline

Vegetation throughout the Application Area and Extraction Plan Area consists of remnant and historically cleared woodland / forest vegetation. Remnant woodland / forest throughout the Application Area and Extraction Plan Area has been subject to minor historical logging, particularly of ironbark species; however, remains in a high condition state (ELA, 2022).

Review of historical aerial imagery (1964, 1971 and 1980; NSW Government Spatial Services 2022) indicates that historically cleared areas throughout the Application Area were likely historically used for low intensity agricultural pursuits, such as livestock grazing and cropping. These areas are now undergoing significant natural regeneration of canopy and midstorey strata, validated by mapping of natural regeneration undertaken by ELA during 2020. Historically cleared areas are not currently mapped to a Plant Community Type (PCT), as insufficient woody species were present to accurately assign a PCT at time of mapping; however, it is likely that these areas are derived native grasslands (DNG) of adjoining PCTs (PCT 481, PCT 478 and PCT 618) (ELA, 2022)

Three (3) PCTs are present throughout the Application Area. There are no Threatened Ecological Communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* and / or the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) present within the Application Area (ELA, 2022).

Seven (7) PCTs are present throughout the Extraction Plan Area. The BC Act and EPBC Act Critically Endangered Ecological Community (CEEC) White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (hereafter referred to as Box Gum Woodland) is present within the Extraction Plan Area (PCT 281 and PCT 618) (ELA, 2022).

A NSW BioNet Atlas Search undertaken within a 10 km radius of the Application Area determined that seven (7) threatened bird species and three (3) threatened mammal species have been previously recorded within the Application Area (DPE 2022), and 13 threatened bird species and four (4) threatened mammal species have been previously recorded within the Extraction Plan Area (DPE 2022). A further nine (9) threatened fauna species have been recorded within 10 km of the Extraction Plan Area (DPE 2022) (ELA, 2022).

A Protected Matters Search Tool (PMST) search was undertaken for Matters of National Environmental Significance (MNES) predicted to occur within the Application Area and the Extraction Plan Area. This search resulted in an additional 12 birds, four (4) mammals, two (2) reptiles and two (2) aquatic threatened species for which species habitat is known to occur, is likely to occur or may occur within the Application Area and the Extraction Plan Area (DAWE 2022) (ELA, 2022).

Umwelt (2009) identified a range of threatened fauna species within the greater UMC area that are reliant on cliff line and cave habitat. The EA (Umwelt 2009) did not identify any cliff lines or cave structures within the Application Area and review of 1 m contour datasets for the UMC indicates further that cliff lines and cave structures are absent from the Application Area (UCMPL 2019). Cliff lines are present within the Extraction Plan Area (ELA, 2022).

The following cliff line dependent microbat species may utilise habitat within the Application Area for foraging and the Extraction Plan Area for foraging and breeding habitat:

- Eastern Bentwing-bat (*Miniopterus schreibersii*).
- Little Pied Bat (*Chalinolobus picatus*).
- Eastern Cave Bat (*Vespadelus troughtoni*).
- Large-eared Pied Bat (*Chalinolobus dwyeri*).

Brush-tailed Rock-wallaby (*Petrogale penicillata*), which is reliant on rocky cliff lines as refuge habitat from predators may also utilise cliff lines present within the Extraction Plan Area.

The Application Area and the Extraction Plan Area are highly likely to contain the following habitat attributes due the intact nature of the vegetation:

- Hollow-bearing trees for roosting and nesting habitat for hollow dependent diurnal and nocturnal bird species (e.g. Masked Owl, Turquoise Parrot).
- Intact vegetation structure for foraging, shelter and nesting for threatened woodland bird species (e.g. Brown Treecreeper).
- Presence of mistletoe species such as *Amyema miquelii* (Box Mistletoe) and *Amyema quandang* (Grey Mistletoe) for honeyeater foraging habitat (e.g. Painted Honeyeater).

No threatened flora species have been previously recorded within the Application Area; however, based on ELA's knowledge, regional records (DAWE 2022, DPE 2022), suitable habitat may be present within the Application Area for several threatened flora species. *Acacia ausfeldii* (Ausfeld's Wattle) and *Commersonia procumbens* have been previously recorded within 10 km of the Extraction Plan Area (ELA, 2022).

Review of the Department of Primary Industries (DPI) Fisheries Spatial Data Portal indicates that there is Key Fish Habitat (KFH) present along Mona Creek in the western section of the Application Area (DPI 2022). Mona Creek is a Strahler Stream Order 3 stream, and is ephemeral, so is unlikely to support threatened aquatic species, including the Flathead Galaxias and Murray Perch as identified by the PMST (DAWE 2022). Tributaries associated with Mona Creek are present within the Extraction Plan Area (Strahler Stream Orders 1, 2 and 3) are also unlikely to support threatened aquatic species. Furthermore, Mona Creek and associated tributaries are not mapped as habitat for any freshwater threatened species (DPI 2022) (ELA, 2022).

4.2.4.2 Objectives

The objectives 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 11**). 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 monitoring, management and assessment criteria are provided in Section 3 of the BMP (**Appendix C**).

4.2.4.3 Biodiversity Monitoring

To evaluate the impacts from subsidence on biodiversity within the Extraction Plan Area, the Extraction Plan has adopted the following key monitoring components from the BMP to measure and evaluate the subsidence performance measure for biodiversity, including:

- Floristic Based Subsidence (FBS) Monitoring; and
- Targeted Cliff Line Monitoring for Microbats;

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the monitoring program is provided in **Figure 11** and **Table 16**.

Table 16 Biodiversity Monitoring Program

Parameter/Methodology	Site	Frequency
Floristic Based Subsidence (FBS)¹ Monitoring • Monitoring foliage canopy cover of a FBS sites within the subsidence zone with foliage canopy cover in the transition zone. • 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.	Established FBS sites located within the Extraction Plan Area and Project Area as required by the BMP. <i>(refer to Figure 11)</i>	Annually during spring and autumn and thereafter for at least two years post mining as required by the BMP.
Targeted Cliff Line Monitoring for Microbats • Monitoring of endangered micro-bat activity levels utilising Anabat detection devices and harp trap set where appropriate.	Established cliff line monitoring sites within the Project Area as required by the BMP. <i>(refer to Figure 11)</i>	Annually between September and December and thereafter for at least two years post mining as required by the BMP.

Notes: ¹ New FBS Monitoring Sites will be established in accordance with the BMP.

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 Extraction Plan Area includes (**Table 16**) and (**Figure 11**):

- 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.

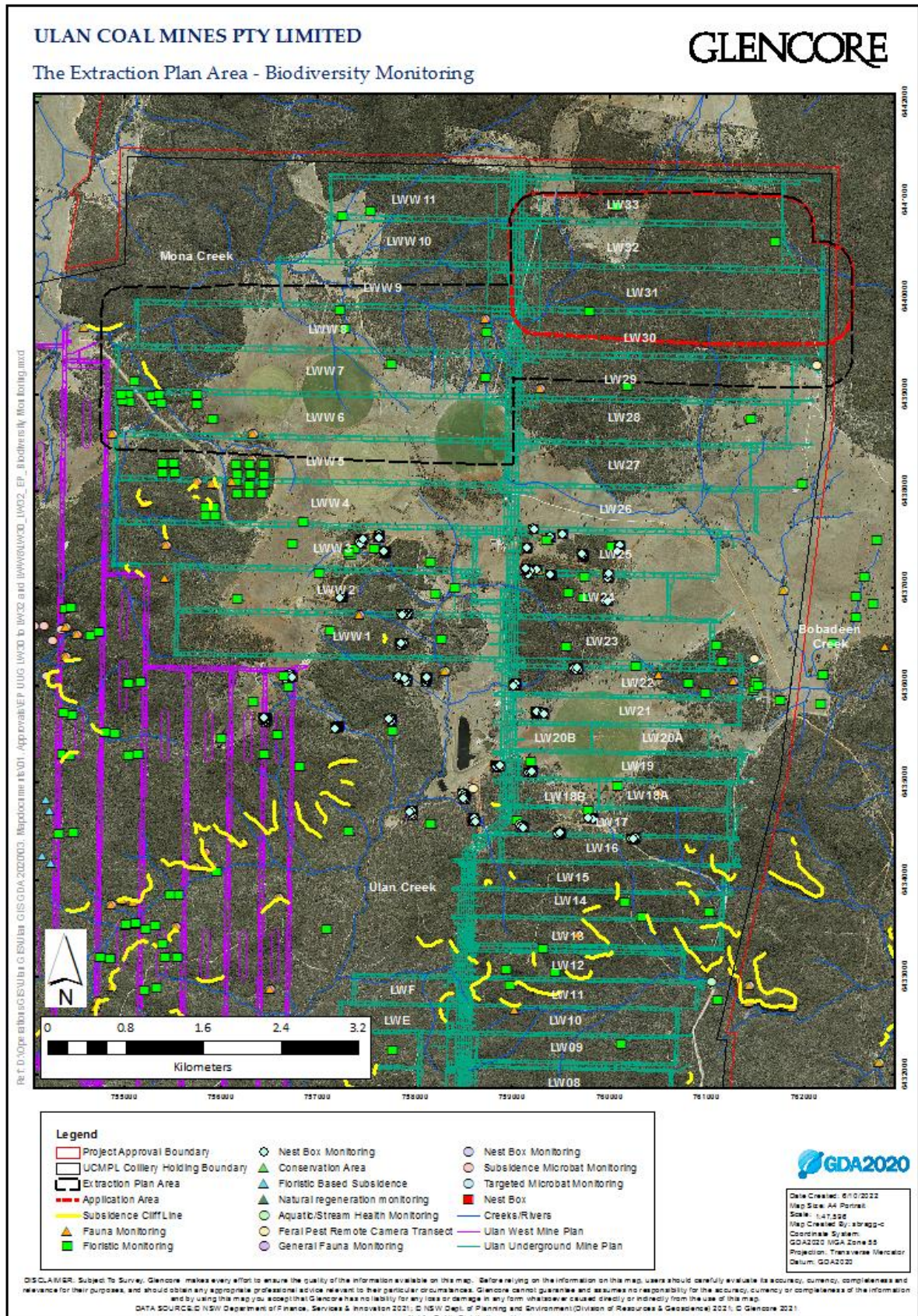
Microbat cliff line habitat monitoring is implemented in the Bobadeen and Bobadeen East Biodiversity Offset Areas (BOAs), as well as the Brokenback Conservation Area and Spring Gully Cliff Line Management Area. All sites will be monitored between the months of September and December. Each site will be surveyed with an Anabat device/s, with a harp trap to be used at selected sites to collect data on Large-eared Pied Bat activity and demographics at the site. Data will be analysed for Large-eared Pied Bat presence/absence and may be used for other analyses such as activity indexing.

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.

In the event the performance indicators have been triggered for threatened species, populations, habitat or ecological communities (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

Figure 11 Biodiversity Monitoring



4.2.5 Built Features

4.2.5.1 Baseline

The majority of built features within the Extraction Plan Area are owned by UCMPL. Privately owned infrastructure includes a small shelter, farm dam, fences and tracks located on private property. Public utilities include an overhead power line owned and managed by Essential Energy and state-owned survey control marks. A four-wheel drive track along the western boundary of the DSCA is also located within both the Extraction Plan Area (**Figure 12**).

UCMPL owned infrastructure located within the Extraction Plan Area includes permanent irrigation pivots, an overhead power line and polyethylene water pipeline servicing the Bobadeen Irrigation Scheme (BIS), MG29 Dewatering Station (including surface equipment, power supply and surface polyethylene pipeline), a services monitoring site, several groundwater monitoring piezometers, farm dams and farm fences. A new service corridor installed by UCMPL is positioned diagonally across the western corners of LWW6 - LWW7 and consists of an unsealed road, powerline and pipelines to service UWO's small bore ventilation shaft and dewatering installations to the west of the Extraction Plan Area. Changes to the location of UCMPL owned infrastructure as a result of MOD4 include the mine dewatering systems at the eastern end of LW30. The UCMPL infrastructure within the service corridor and mine dewatering systems above LW30, LW32 and LW33⁹ have been designed to accommodate the subsidence movements forecast in these areas.

A small shelter made of timber and corrugated iron is located on Private Property at the western end of LWW6. Agricultural built features of the private property within the Extraction Plan Area include boundary and internal farm fences, tracks and two farm dams (**Figure 12**).

An Essential Energy Single Wire Earth Return (SWER) 12.7 kV power line is located in a north-south alignment over the main headings of UUG within the Extraction Plan. The power line services one rural property to the north of the Project Area (**Figure 12**).

Several state survey control marks are located within the Extraction Plan Area and a further ten marks within a two-kilometre radius. Some of these state survey controls marks are already reported as 'disturbed' by mining. Public amenities identified are limited to NPWS assets including a section of four-wheel drive track (also known as Curryall Perimeter Fire Trail), a section of NPWS park boundary fencing and access gates, DSCA signage and a single waterhole¹⁰ (otherwise known as a water supply dam) on Curra Creek within the DSCA (**Figure 12**).

There are no Private Bores located within the Extraction Plan Area and Application Area. The location of all known private bores within approximately a ten kilometre radius of UUG and their predicted drawdown impacts are displayed in **Figure 9**.

4.2.5.2 Objectives

The objectives of the *Built Features Management Plan for LW30-LW32 & LWW6-LWW8* (BFMP LW30-32 & LWW6-LWW8) (**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-

⁹ Mine dewatering systems above LW30, LW32 and LW33 to be constructed (if required) prior to longwall extraction.

¹⁰ Confirmation the waterhole is actually a small farm dam constructed within the creek line (Refer to BFMP LW30-32 & LWW6-LWW8).

UCMPL owned land) regarding potential impacts from UCMPL mining activities, as described in the Extraction Plan within the Extraction Plan Area (**Figure 12**).

The relationship of the BFMP LW30-32 & LWW6-LWW8 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 longwalls within the Extraction Plan Area include:

- Public utilities and amenities including an overhead power line, State survey marks and four a wheel drive track in the DSCA;
- UCMPL owned infrastructure including internal roads, farm dams, powerlines, dewatering sites, pipelines, fences and irrigation pivots; and
- Private property infrastructure includes a small shelter, farm dams, fences and tracks.

Further details for built features, consultation, monitoring, management and assessment criteria are provided in BFMP LW30-32 & LWW6-LWW8 (**Appendix D**).

4.2.5.3 Built Features Monitoring

To evaluate the impacts from subsidence on built features within the Extraction Plan Area, the Extraction Plan has developed the following key monitoring components to measure and evaluate the subsidence performance measure for built features, including:

- Public utilities and amenities monitoring;
- Built features owned UCMPL property monitoring; and
- Built features on private property monitoring.

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the monitoring program is provided in **Figure 12** and **Table 17**.

Table 17 Built Features Monitoring Program

Parameter/Methodology	Site	Frequency
Public Utilities and Amenities • Essential Energy Powerline: Surveyor to record the 3D Position (X, Y, Z) of each pole for pre and post mining comparisons. • Visual observations and photographic monitoring with GPS camera to record general condition of each pole.	Power poles located within the Extraction Plan Area and with pole identification numbers: 69305 ⁴ , 69309 ⁴ , 69310 ³ , 69311 ³ , 69312 ³ , 69313 ³ , 69314 ³ , 69315 ³ , 107616 ⁴ and 107617 ⁴ . <i>(refer to Figure 12)</i>	• Pre-mining survey and visual inspection • During mining visual inspection (monthly) • Post mining survey and visual (within one month¹)
• State Survey Marks: Reinstate and resurvey the Survey State Marks as required by the <i>Surveyor-General's Direction No. 11 – Preservation of Survey Infrastructure - Version 4.0 January 2020</i>.	Reinstate and resurvey the Survey State Marks within 3km of the Extraction Plan Area. <i>(refer to Figure 12)</i>	• After cessation of subsidence movements has been verified by UCMPL's subsidence engineer and Subsidence Monitoring Program.

Parameter/Methodology	Site	Frequency
DSCA: Visual observations and photographic monitoring with GPS camera to record general condition of the four-wheel drive track in the DSCA for serviceability and safety.	Four-wheel drive track associated with the Extraction Plan Area within the DSCA. <i>(refer to Figure 12)</i>	- Pre-mining. - During mining (weekly) when longwall retreat is under DSCA. - Post mining (within one month after longwall has retreated from DSCA)
Built Features on UCMPL Property Visual observations and photographic monitoring with GPS camera to record the general condition of the built feature assets including serviceability and safety.	UCMPL owned built features associated with the Extraction Plan Area on UCMPL land. <i>(refer to Figure 12)</i>	- Pre-mining - During mining (monthly) - Post mining (within three months)
Built Features on Private Property Visual observations and photographic monitoring with GPS camera to record the general condition of the built feature assets including serviceability and safety.	Privately owned built features associated with Extraction Plan Area on private property. <i>(refer to Figure 12)</i>	- Pre-mining² - During mining (monthly)² - Post mining (within one month²)

Notes: ¹ Survey completed prior to the commencement of the next longwall. ² 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 under privately owned land. Post mining inspections within one month to record subsidence related impacts for comparative assessments and develop remediation strategies. Annual inspection with UCMPL's subsidence specialist. ³ Visual inspections, photographic recordings and survey of the nearest poles to actively retreating longwalls will be undertaken before, during and after mining. ⁴ Monitoring of poles no longer required as mining has now already occurred.

Essential Energy SWER Line

The Essential Energy owned 12.7kV single wire earth return (SWER) type minor power line passes through the Extraction Plan Area over the main headings in a north-south alignment and no poles will undermined within the Application Area. The power line services one rural property to the north of the Project Area. A total of 6 timber poles have been identified for monitoring with the inclusion of the Application Area (**Figure 12**).

In the unlikely event the Essential Energy line is considered unserviceable as a result of subsidence, UCMPL in consultation with Essential Energy will reinstate the serviceability at the full cost of UCMPL (**Section 2.5.4**). The BFMP LW30-32 & LWW6-LWW8 (**Appendix D**) includes consultation with Essential Energy and the proposed monitoring, mitigation and remediation measures as agreed with UCMPL.

Pre and post mining 3D positional surveys will be carried out of the poles and conductors to monitoring for subsidence related impacts. Visual inspections and photographic recordings of the nearest poles to actively retreating longwalls will be undertaken before, during and after mining (**Table 17**). If monitoring identifies a subsidence related impact, UCMPL will develop a plan to undertake the necessary repairs in consultation Essential Energy.

State Survey Marks

Several state survey control marks are located within the Extraction Plan Area and an additional 18 marks, likely to have been affected by the previous mining at the Ulan Complex or located within

approximately 3km of the planned mining in Longwalls 31 and 32 and having potential to be affected by the far-field subsidence movements measured at the site, have been identified (**Figure 12**).

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.

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 reinstatement was confirmed during consultation with NSW Spatial Services and proposed mitigation and remediation measures by NSW Spatial Services in March 2019.

Four Wheel Drive Track and Small Farm Dam in DSCA

There is an unsealed access roads/four-wheel drive track positioned along the boundary of the DSCA and UCMPL owned land cross over LW30 to LW32. This NPWS asset is referred to as the Curryall Perimeter Fire Trail (**Figure 12**). A section of NPWS park boundary fencing, access gates and DSCA signage are also within the Extraction Plan Area.

In consultation with the NPWS for LW30, UCMPL have commenced visual and photographic monitoring of the section of the four-wheel drive track and surrounding bushland above LW30 (**Table 17**). UCMPL will continue to consult with NPWS and complete the necessary pre-mining, during mining (weekly whilst under the DSCA) and post mining inspections within the DSCA affected by LW30 to LW32. If monitoring identifies a subsidence related impact requiring remedial works, UCMPL will develop a plan to undertake the necessary repairs in consultation NPWS.

The small farm dam, or waterhole constructed in the flow line of Curra Creek, will be monitored before, during and after mining of LW31 in the DSCA.

Private Property Infrastructure

Privately owned land referred to as the Woodbury Property is located at the western ends of LWW6, LWW7 and LWW8 within the Extraction Plan Area. The Woodbury Property consists primarily of sparsely timbered land with some sections of open grazing land. Farm infrastructure includes a small timber shelter, two farm dams, tracks and farm fences (**Figure 12**). At the time of updating the Extraction Plan for LW31 and LW32, secondary extraction of LWW6 and LWW7 beneath the Woodbury Property had been completed. Subsidence behaviour observed on this private property has been consistent with expectation.

Prior to longwall mining under the Woodbury Property, UCMPL in consultation with the landowner, will have in place a Private Property Subsidence Management Plan (PPSMP)¹¹ 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.

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 the Woodbury Property (**Table**

¹¹ Condition 26(h), Schedule 3 of PA08_0184 include a Land Management Plan that has been prepared in consultation with the relevant landowners.

17). Post mining inspections will be completed within one month to develop a conditional assessment reports for the landowner.

If monitoring identifies a subsidence related impact that has the potential to create a risk to the landowner, UCMPL will immediately notify the landowner once becoming aware of the impact and develop a plan to undertake the necessary repairs in consultation with landowner.

All necessary land and infrastructure rectification work after mining on the Woodbury Property will be completed at the full cost of UCMPL and to the satisfaction of the landowner, as described in the PPSMP.

Private Bores

There are no private bores within the Extraction Plan Area, however a number of private bores could be affected by groundwater drawdown. For private bores outside of the Extraction Plan Area, UCMPL undertake private bore monitoring in accordance with the WMP (**Section 4.2.2**) (**Figure 9**). An assessment of the groundwater levels and water quality in privately owned bores will include departures from baseline data and exceedance of applicable trigger valves as described in **Section 4.2.2** of the Extraction Plan.

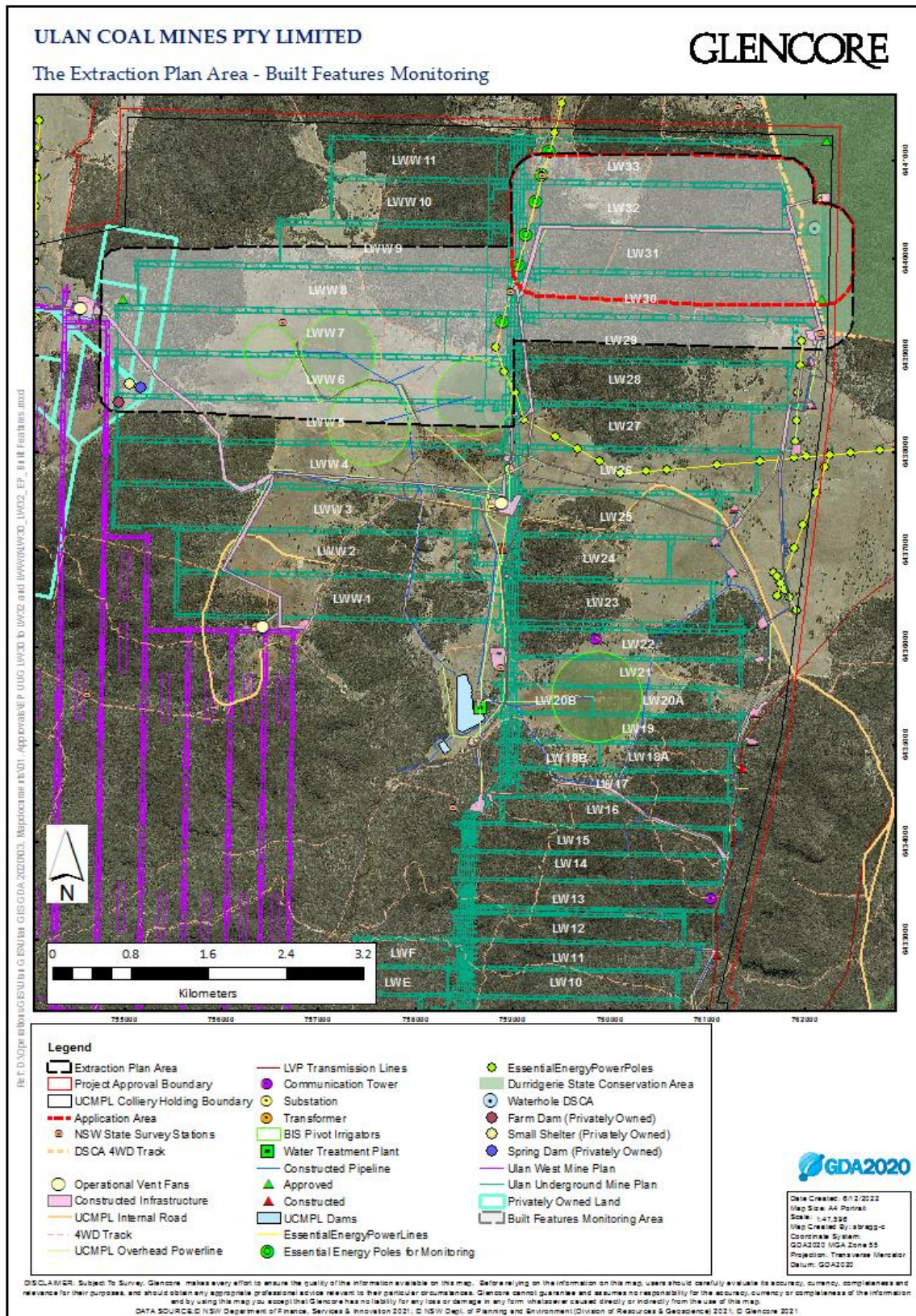
In the event the performance indicators regarding built features have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP (**Table 24**).

UCMPL Infrastructure

UCMPL will carry out monitoring and management measures on its own infrastructure within the Extraction Plan Area (**Figure 12**) in accordance with the Public Safety Management Plan PSMP LW30-32 & LWW6-LWW8 (**Appendix F**).

Pre-mining and during mining inspections will be undertaken monthly during longwall mining activities on UCMPL owned land. Post mining inspections will be completed within three months. If monitoring identifies a subsidence related impact requiring remedial works, UCMPL will develop a plan to undertake the necessary repairs as described in **Section 5.4**.

Figure 12 Built Features Monitoring



4.2.6 Heritage Monitoring

4.2.6.1 Baseline

There are approximately 127 recorded Aboriginal archaeological sites identified within the Extraction Plan Area, and a further 31 sites are located within 50 metres of the Extraction Plan Area. These are a subset of those discussed in the Project EA and include scatter sites, isolated finds, rock shelters and scar trees.

The UCMPL database of Aboriginal sites contains over 1,600 recorded sites. Three of these Aboriginal heritage sites are within the Application Area, all isolated finds (Ulan ID #532, #533 and #534). An additional two sites (Ulan ID#1601 and #1602) are located within 115 metres (m) of the Application Area (OzArk, 2022).

UCMPL have also established three Conservation Areas, the Brokenback Conservation Area and the Grinding Groove Conservation Areas (Bobadeen Grinding Groove Conservation Area and the Valley Way Grinding Groove Conservation Area), to protect specific Aboriginal heritage sites. These Conservation Areas will be managed in accordance with the Aboriginal Conservation Management Plan (ACMP) (ULNCX- 111515275- 1785). In addition, the mine plan has been designed to ensure no impact on the Mona Creek Rock Shelter Sites area (includes Ulan ID# 180 to 187) (OzArk, 2022).

The Brokenback Conservation Area and the Valley Way Grinding Groove Conservation Area are located 6.2 km and 5.8 km southwest of the Application Area, respectively. The Bobadeen Grinding Groove Conservation Area located approximately 1.7 km south of the Application Area. The Mona Creek rock shelter site area is approximately 4 km west of the Application Area (OzArk, 2022). The Mona Creek Rock Shelters Sites (MCRSS) sites Ulan Site ID#180 - 187 are located in the north-west of the Extraction Plan Area, and outside of active mining (**Figure 13**).

Approximately 25 ha area of the Extraction Plan Area, in which subsidence impacts could occur, has not been subject to heritage survey¹² due to a restriction of access by the landholder for the survey.

Approximately 97.2% (486 hectares [ha]) of the Application Area has been subject to systematic Aboriginal heritage survey to current standards (refer to data in Kuskie 2009). The unsurveyed portion of the Application Area is located within the Durrigere State Conservation Area. The unsurveyed portion of the DSCA which is outside of the 0.5 times depth boundary but within the Application Area is expected to have low magnitude movements and no perceptible impacts (SCT, May 2022). As such, the requirement to survey this portion of land is not required as no impacts are expected/predicted (OzArk, 2022).

The European and natural heritage assessment completed by Umwelt (2009b) for the UCCO Project recorded 26 potential sites/items. None of the recorded historic heritage sites or natural heritage sites are located within the Application Area. The closest European heritage item (CI33 'Calbunya') is located 190 m north of the Application Area. One significant natural heritage site, the Talbragar Fish Fossil Reserve, is approximately 6.1 km to the southwest of the Application Area. The area of Crown Land set aside as the Talbragar Fish Fossil Reserve is within the boundary of the Farris Hill property. The Talbragar Fish Fossil Reserve is listed as being of state/national significance (Umwelt 2009b) (OzArk, 2022).

¹² For further information and in accordance with the requirement of Section 3.7.5 of Ulan Coal's HMP ULNCX-111515275-95.

4.2.6.2 Objectives

The objectives 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 Extraction Plan Area (**Figure 13**).

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.

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**).

4.2.6.3 Heritage Monitoring

To evaluate the impacts from subsidence on Aboriginal heritage and European heritage within the Extraction Plan Area, the Extraction Plan has adopted the following key monitoring components from the HMP to measure and evaluate the subsidence performance measure for heritage, including:

- Aboriginal heritage monitoring, including the Mona Creek Rock Shelter Sites; and
- European heritage monitoring;

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the monitoring program is provided in **Figure 13** and **Table 18**.

Table 18 Aboriginal and European Monitoring Program

Parameter/Methodology	Site	Frequency
Aboriginal Heritage Monitoring • Visual observations and photographic monitoring with GPS camera of rock shelters to record pre-mining and post mining condition for comparative analysis to identify for any signs of perceptible change e.g. surface cracking and/or rock falls from potential subsidence.	Rock shelter Ulan ID #599 associated with LWW6 on UCMPL land ³ . Rock shelters Ulan ID# 730 ⁴ , 735 and 741 associated with LWW8 on both private land and UCMPL land. Rock shelters Ulan ID# 173 and 171 associated with LWW9 on UCMPL land. <i>(refer to Figure 13)</i>	• Pre-mining¹ • Post mining (within one month¹)
European Heritage Monitoring • Visual observations and photographic monitoring with GPS camera of timber getting site to record pre-mining and post mining condition for comparative analysis to identify for any signs of perceptible change e.g. surface cracking from potential subsidence.	Timber getting site CC6 associated with LWW8 on UCMPL land. <i>(refer to Figure 13)</i>	• Pre-mining • Post mining (within three months)

Parameter/Methodology	Site	Frequency
Mona Creek Rock Shelter Sites (MCRSS) - Visual observations and photographic monitoring with GPS camera of rock shelters to record pre-mining and post mining condition for comparative analysis to identify for any signs of perceptible change e.g. surface cracking and/or rock falls from potential subsidence. - Continuous global navigation satellite system (GNSS) to provide continuous three-dimensional (3D) ground movement data with trigger alarms². GNSS units to be installed before mining of LWW8 (locations to be confirmed by survey and subsidence specialist).	MCRS Sites Ulan ID # 180-187^ to the west of the Extraction Plan Area on both private property and UCMPL land. <i>(refer to Figure 13)</i>	- Pre-mining¹ - Post mining (within one month¹) - Continuous GNSS unit data during LWW8 retreat.

Notes: ¹ For private land 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 under privately owned land. Post mining inspections within one month to record subsidence related impacts for comparative assessments and develop remediation strategies. Annual inspection with UCMPL's subsidence specialist. ² The proposed GNSS units for the MCRS to be installed prior to the commencement of LWW8. ³ No perceptible impacts to rock shelter site Ulan ID #599 associated with longwall mining of LWW6. ⁴ Access to rock shelter site Ulan ID #730 and MCRSS on private land subject to permission by the landowner.

Mona Creek Rock Shelter Sites (MCRSS)

Pre-mining and post mining photographic monitoring (**Table 18**) of the MCRSS will be completed to monitor for any far field subsidence movements effects (**Figure 13**). The MCRSS and associated cliff line are protected by a mining setback. The monitoring 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 **Section 5.1**. The monitoring methodology will use photographic recordings of the MCRSS, as identified within the HMP.

In addition, UCMPL will establish a continuous global navigation satellite system (GNSS) at the MCRSS prior to commencing LWW8, to provide continuous three-dimensional (3D) ground movement data with trigger alarms as described further in **Section 4.3**.

The proposed GNSS units for the MCRSS are to be installed prior to the commencement of LWW8 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 in 2023. UCMPL will provide the DPE the trigger values when determined and update this Extraction Plan in upcoming revisions.

In the event the performance indicators for the MCRSS has been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

Subsidence Monitoring Heritage

The Extraction Plan has adopted the following management and monitoring strategies¹³ from the HMP to measure and evaluate the subsidence performance measure for Aboriginal and European heritage sites within the Extraction Plan Area. Further detailed descriptions of the management and monitoring strategies for heritage are within HMP (**Appendix H**).

Pre-mining and post mining photographic monitoring of required Aboriginal and European heritage sites within the Extraction Plan Area will be undertaken to compare the pre-mining baseline condition against the post mining condition (**Table 18**). The locations of required Aboriginal and European heritage monitoring sites from the HMP are provided in **Figure 13**.

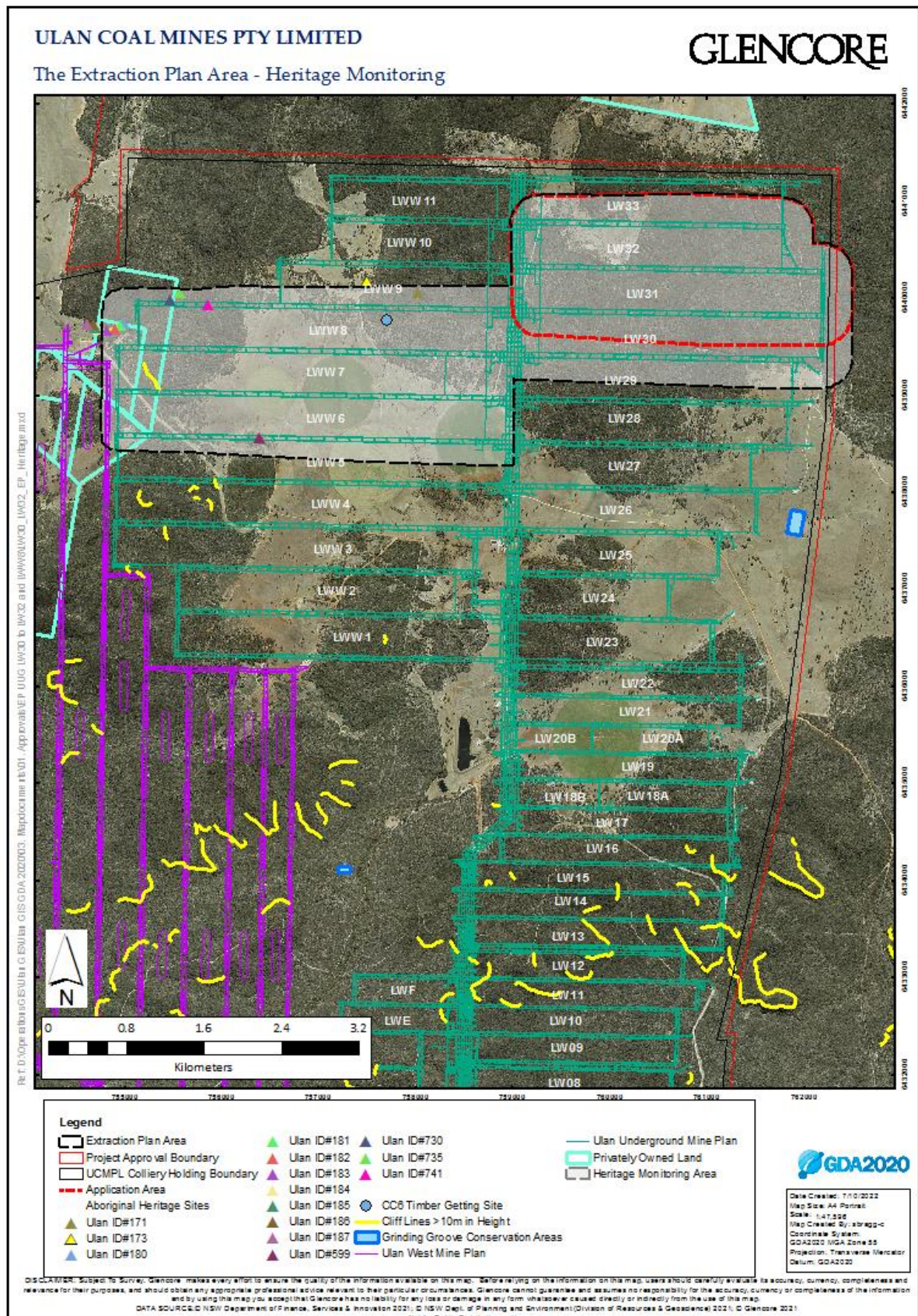
Monitoring frequency of the MCRSS and Aboriginal heritage sites (Ulan ID#730) on private property will be subject to land access from the landowner.

Subsidence monitoring of heritage sites including the Grinding Groove Conservation Area, the Talbragar Fish Fossil Reserve and the Brokenback Conservation Area are not considered in this Extraction Plan as all of these sites are remote from Extraction Plan Area.

In the event the performance indicators for heritage has been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP **Table 24**.

¹³ HMP – Appendix C Assessment of Significance, Potential Impacts and Appropriate Management Strategies for Aboriginal Sites

Figure 13 Heritage Monitoring



4.2.7 Public Safety Monitoring

4.2.7.1 Baseline

The Extraction Plan Area and Application Area is a combination of undeveloped bushland, gently undulating open grazing and irrigation agricultural lands. The Extraction Plan Area is split by the Great Dividing Range with land in the east in the Goulburn River Catchment, and land in the west in the Talbragar River catchment. Bushland in the east is gently undulating, bushland in the west is a little steeper dominated by sandstone outcrops and partially cleared valleys.

There are no privately-owned dwellings within the Extraction Plan Area or Application Area. The majority of land above the Extraction Plan Area and Application Area is owned by UCMPL with the exception of a private landowner to the west and NPWS to the east. There is one private landowner above the western portions of LWW6 to LWW8 referred to as the Woodbury Property and NPWS as the other landowner for the DSCA above the eastern portions of LW30 to LW32 (**Figure 3**).

Two cliff formations are located within the Extraction Plan Area. One cliff line is located to the west of LWW7 and LWW8 and contains the Mona Creek Rockshelter Sites (MCRSS). The MCRSS are fully protected from subsidence impacts by a mining setback barrier equal to greater than 0.5 times overburden depth. The MCRSS are located within both private property and UCMPL land. The other cliff line is located within the subsidence zone above LWW7 within private property (**Figure 14**).

4.2.7.2 Objectives

The purpose of the *Public Safety Management Plan for LW30-LW32 & LWW6-LWW8* (PSMP LW30-32 & LWW6-LWW8) (**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 Extraction Plan Area.

The relationship of the PSMP LW30-32 & LWW6-LWW8 to the EMS is shown by **Figure 4**. The key subsidence impacts that may have potential consequences on public safety associated with the extraction of longwalls within the Extraction Plan Area include;

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

Further details for cliff lines and landform monitoring, management and assessment criteria are provided in PSMP LW30-32 & LWW6-LWW8 (**Appendix F**).

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 2.5.2**).

4.2.7.3 Public Safety Monitoring

To evaluate the impacts from subsidence on public safety within the Extraction Plan Area, the Extraction Plan has developed the following key monitoring components to measure and evaluate the subsidence performance measure for public safety, including:

- Surface impacts on land features (including cracking, steps, overrides and erosion holes);

- Cliff line rock falls; and
- Site security and signage.

A detailed description of the monitoring locations, frequency and parameters measured for each of these components of the public safety monitoring program for the Extraction Plan Area is provided in **Figure 14** and **Table 19**.

Table 19 Public Safety Monitoring Program

Parameter/Methodology	Site	Frequency
Surface Impacts Visual observations and photographic monitoring with GPS camera of landforms to record potential impacts including surface cracking, steps, overriders and erosion holes.	Landforms associated with UCMPL property, private property and the DSCA within the Extraction Plan Area. <i>(refer to Figure 14)</i>	UCMPL Land - Pre-mining - During mining (monthly) - Post mining (within three months) Private Property ¹ - Pre-mining - During mining (monthly) - Post mining (within one month) DSCA - Pre-mining - During mining (weekly)³ - Post mining (within one month)
Cliff Line Monitoring (>10m) Visual observations and photographic monitoring with GPS camera of cliff lines to record potential impacts including surface cracking and length of rock falls in meters (m).	Cliff line formation >10m in height within the Extraction Plan Area ² . Mona Creek cliff line formation, to the west of LWW6-LWW8 on both private property and UCMPL land within the Extraction Plan Area. <i>(refer to Figure 14)</i>	UCMPL Land & Private Property ¹ - Pre-mining - Post mining (within one month)
Site Security and Signage - Ensure adequate signage warning of subsidence impacts are established and remain along the boundary and within UCMPL owned land, on private property and DSCA. - Ensure UCMPL owned boundary fencing is adequate and gates are secured as required.	UCMPL boundary signage, fencing and gates. Private property signage and gates. DSCA signage. <i>(refer to Figure 14)</i>	UCMPL Land - Pre-mining - During mining (monthly) - Post mining (within three months) Private Property ¹ - Pre-mining - During mining (monthly) - Post mining (within one month) DSCA - Pre-mining - During mining (weekly)³ - Post mining (within one month)

Notes: ¹ For private land 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 under privately owned land. Post mining inspections within one month to record subsidence related impacts for comparative assessments and develop remediation strategies. Annual inspection with UCMPL's subsidence specialist. ² Undermining of the cliff line associated with LWW7 on the Woodbury Property occurred in October 2021 without incident. ³ Weekly inspection in the DSCA during longwall retreat of LW31 and LW32 as required from the risk assessment (Section 2.4 of the Extraction Plan).

Cliff Line Monitoring

Pre-mining and post mining inspections of the cliff line associated with the MCRSS and the cliff line associated with LWW7 will be completed as required by **Table 19 (Figure 10 and Figure 14)**. The cliff line monitoring methodology will use photographic recordings taken during pre-mining and post mining inspections for qualitative comparisons to identify instabilities, including rock falls.

In addition, UCMPL will establish a continuous global navigation satellite system (GNSS) at the MCRSS prior to commencing LWW8, to provide continuous three-dimensional (3D) ground movement data with trigger alarms as described further in **Section 4.2.3** and **Section 4.3**.

If subsidence monitoring identifies a potential or an immediate safety risk associated with a cliff line within the Extraction Plan Area, the impacted area may be cordoned off and/or additional warning signage placed to either alert or to prevent access.

Surface Impacts Monitoring

The frequency of pre-mining inspections, during mining inspections and post mining inspections on UCMPL land and non-UCMPL land will occur as displayed in **Table 19**. Inspections during longwall mining and post longwall mining within the Extraction Plan Area will record subsidence impacts which may include cracking, steps, overrides and erosion holes. This monitoring data will confirm if there has been a potential exceedance of subsidence predictions or subsidence performance measures for public safety or if the observed impacts are within prediction. The inspections will also identify potential subsidence hazards on both UCMPL owned land and non-UCMPL owned land.

If subsidence monitoring identifies a potential or immediate safety risk, the area will be cordoned off and/or warning signage placed to either alert or to prevent access in consultation with the relevant land owner.

Remedial actions to address the subsidence impacts on non-UCMPL owned land will be completed as soon as practicable, in consultation with the relevant landowner (**Section 4.2.3**). Remedial measures proposed on UCMPL owned land and on non-UCMPL owned land are provided in further detail in **Section 5.3**.

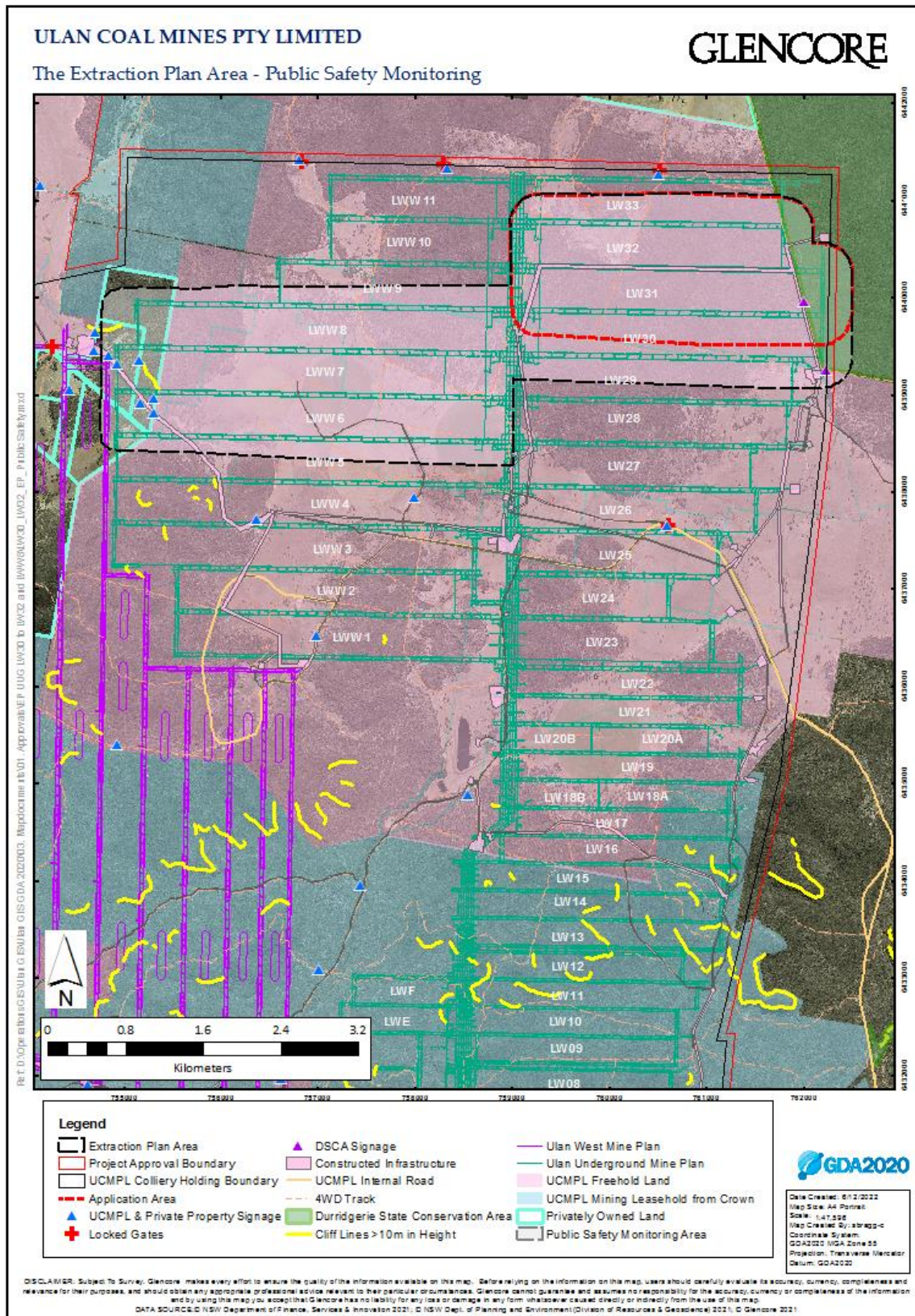
Site Security and Signage

UCMPL have established and utilised existing boundary fencing on UCMPL owned and controlled land with locked gates on main entry points displaying warning signage. The fencing, locked gates and signage restricts and informs the general public of potential subsidence hazards within the Extraction Plan Area. Refer to **Figure 14** displaying the location of UCMPL's secured gates and signage, private property signage and signage associated with the DSCA.

Regular inspections within the Extraction Plan Area will be undertaken during and post mining as provided in **Table 19** to ensure existing fences and gates are maintained and signage remains adequate.

In the event the performance indicators regarding public safety have been triggered (**Section 5.1**), UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the MTARP (**Table 24**).

Figure 14 Public Safety Monitoring



4.3 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 Extraction Plan Area is provided in **Table 20** and displayed in **Figures 7 to 14**.

The Environment and Community Manager (ECM) is responsible for ensuring all monitoring, visual inspections and recording data of groundwater, surface water, flora and fauna, landforms, built features, public safety and Aboriginal and European heritage is carried out as outlined in **Table 20**.

Table 20 Consolidated Subsidence Monitoring Program Summary

Management Plans	Parameter/Methodology	Site	Frequency
Water Management Plan (WMP)	Water Quality: - pH - Electrical Conductivity (EC) $\mu\text{S}/\text{cm}$ - Total suspended solids (TSS) mg/L	Curra Creek (SW07) Bobadeen Creek (SW08) Mona Creek (SW10) (refer to Figure 8)	Monthly (when flowing) and Event Based* (*>30mm in a 24hr period)
	Stream Health: - Riparian Channel and Environmental (RCE) Inventory scores. - AusRivAS and SIGNAL2. - Water Quality: pH, EC ($\mu\text{S}/\text{cm}$), TSS (mg/L), Dissolved Oxygen, Turbidity (NTU) and Alkalinity).	Mona Creek (AQ15) Bobadeen Creek (AQ13) (refer to Figure 8)	Annually
	Channel Stability: - Visual observations and photographic monitoring with GPS camera watercourses to record potential impacts. - Monitoring to distinguish between natural instabilities and instabilities from mine subsidence, including the presence of surface cracking, nick point erosion, surface ponding or out of channel flows.	Mona Creek Channel Stability Sites (main channel) (refer to Figure 8)	Pre-mining and annually thereafter for two years
		Representative sites within lower order flowlines of Mona Creek, Curra Creek and Bobadeen Creek (refer to Figure 8)	Pre-mining and annually thereafter for two years
Water Management Plan (WMP)	Vibrating wire piezometers (VWPs) Pore pressure groundwater level monitoring.	VWPs: DDH266, DDH270 ¹ , DDH293, DDH601, DDH598, TAL1, TAL2, UW1, UW2, UW3, UW4, R894, PZ29, EX03, EX06, EX09 and DDH598 ² (refer to Figure 9)	VWPs downloaded quarterly ³
	Private Bore Monitoring - Water quality: pH and Electrical Conductivity (EC) $\mu\text{S}/\text{cm}$ - Groundwater level (mbgl)	Private Bore Monitoring Network (PBMN) (refer to Figure 9)	Annually ³

Management Plans	Parameter/Methodology	Site	Frequency
Water Management Plan (WMP)	The Drip - Pore Pressure Monitoring (VWP). - Water Quality: - pH, EC and TDS. - Major ions: Ca; Mg; Na; K; CO₃; HCO₃, Cl and SO₄. - Nutrinets: Nitrates, nitrites and nitrogen ammonia. - Fluoride. - Total alkalinity as CaCO₃, HCO₃, CO₃ - Dissolved Metals; [Al, Sb, Ag, As, B, Ba, Cd, Cr, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sr, Zn] +Hg. - Visual observations and photographic monitoring.	The Drip and Pore pressure data from VWP PZ29 (refer to Figure 9)	Water quality and photographic monitoring every two months and/or Event Based* ³ (*>30mm in a 24hr period) VWP downloads quarterly ³
Land Management Plan for Longwalls 30 to 32 and W6 to W8	Surface Impacts Visual observations and photographic monitoring with GPS camera of landforms to record potential impacts including surface cracking, steps, overrides and erosion holes.	Landforms associated with UCMPL property and the DSCA within the Extraction Plan Area. (refer to Figure 10)	UCMPL Land - Pre-mining - During mining (monthly) - Post mining (within three months) Private Property ⁴ - Pre-mining - During mining (monthly) - Post mining (within one month) DSCA - Pre-mining - During mining (weekly) - Post mining (within one month)
	Cliff Line Monitoring (>10m) Visual observations and photographic monitoring with GPS camera of cliff lines to record potential impacts including surface cracking and length of rock falls in meters (m).	Cliff line formations ⁵ >10m in height within the Extraction Plan Area. (refer to Figure 10)	UCMPL Land & Private Property ⁴ - Pre-mining - Post mining (within one month)

Management Plans	Parameter/Methodology	Site	Frequency
Biodiversity Management Plan (BMP)	Floristic Based Subsidence (FBS)⁴ Monitoring - Monitoring foliage canopy cover of FBS sites within the subsidence zone with foliage canopy cover in the transition zone. - 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.	Established FBS sites located within the Extraction Plan Area and Project Area as required by the BMP. <i>(refer to Figure 11)</i>	Annually during spring and autumn and thereafter for at least two years post mining as required by the BMP.
	Targeted Cliff Line Monitoring for Microbats Monitoring of endangered micro-bat activity levels utilising Anabat detection devices and harp trap set where appropriate.	Established cliff line monitoring sites within the Project Area as required by the BMP. <i>(refer to Figure 11)</i>	Annually between September and December and thereafter for at least two years post mining as required by the BMP.

Management Plans	Parameter/Methodology	Site	Frequency
Built Features Management Plan for Longwalls 30 to 32 and W6 to W8	Public Utilities and Amenities - Essential Energy Powerline: Surveyor to record the 3D Position (X, Y, Z) of each pole for pre and post mining comparisons. - Visual observations and photographic monitoring with GPS camera to record general condition of each pole.	Power poles located within the Extraction Plan Area and with pole identification numbers: 69305 ⁷ , 69309 ⁷ , 69310 ⁸ , 69311 ⁸ , 69312 ⁸ , 69313 ⁸ , 69314 ⁸ , 69315 ⁸ , 107616 ⁷ and 107617 ⁷ . <i>(refer to Figure 12)</i>	- Pre-mining survey and visual inspection - During mining visual inspection (monthly) - Post mining survey and visual (within one month⁹)
	State Survey Marks: Reinstate and resurvey the Survey State Marks as required by the <i>Surveyor-General's Direction No. 11 – Preservation of Survey Infrastructure - Version 4.0 January 2020</i>.	Reinstate and resurvey the Survey State Marks within 3km of the Extraction Plan Area. <i>(refer to Figure 12)</i>	After cessation of subsidence movements has been verified by UCMPL's subsidence engineer and Subsidence Monitoring Program.
	DSCA: Visual observations and photographic monitoring with GPS camera to record general condition of the four-wheel drive track in the DSCA for serviceability and safety.	Four-wheel drive track associated with the Extraction Plan Area within the DSCA. <i>(refer to Figure 12)</i>	- Pre-mining. - During mining (weekly) when longwall retreat is under DSCA. - Post mining (within one month after longwall has retreated from DSCA)
	Built Features on UCMPL Property Visual observations and photographic monitoring with GPS camera to record the general condition of the built feature assets including serviceability and safety.	UCMPL owned built features associated with the Extraction Plan Area on UCMPL land. <i>(refer to Figure 12)</i>	- Pre-mining - During mining (monthly) - Post mining (within three months)
	Built Features on Private Property Visual observations and photographic monitoring with GPS camera to record the general condition of the built feature assets including serviceability and safety.	Privately owned built features associated with Extraction Plan Area on private property. <i>(refer to Figure 12)</i>	- Pre-mining¹⁰ - During mining (monthly) ¹⁰ - Post mining (within one month¹⁰)

Management Plans	Parameter/Methodology	Site	Frequency
Heritage Management Plan (HMP)	Aboriginal Heritage Monitoring Visual observations and photographic monitoring with GPS camera of rock shelters to record pre-mining and post mining condition for comparative analysis to identify for any signs of perceptible change e.g. surface cracking and/or rock falls from potential subsidence.	Rockshelter Ulan ID #599 associated with LWW6 on UCMPL land¹¹. Rock shelters Ulan ID# 730¹², 735 and 741 associated with LWW8 on both private land and UCMPL land. Rock shelters Ulan ID# 173 and 171 associated with LWW9 on UCMPL land. <i>(refer to Figure 13)</i>	- Pre-mining⁴ - Post mining (within one month⁴)
	European Heritage Monitoring Visual observations and photographic monitoring with GPS camera of timber getting site to record pre-mining and post mining condition for comparative analysis to identify for any signs of perceptible change e.g. surface cracking from potential subsidence.	Timber getting site CC6 associated with LWW8 on UCMPL land. <i>(refer to Figure 13)</i>	- Pre-mining - Post mining (within three months)
	Mona Creek Rock Shelter Sites (MCRSS) - Visual observations and photographic monitoring with GPS camera of rock shelters to record pre-mining and post mining condition for comparative analysis to identify for any signs of perceptible change e.g. surface cracking and/or rock falls from potential subsidence. - Continuous global navigation satellite system (GNSS) to provide continuous three-dimensional (3D) ground movement data with trigger alarms¹³. GNSS units to be installed before mining of LWW8 (locations to be confirmed by survey and subsidence specialist).	MCRS Sites Ulan ID # 180-187 to the west of the Extraction Plan Area on both private property and UCMPL land. <i>(refer to Figure 13)</i>	- Pre-mining⁴ - Post mining (within one month⁴) - Continuous GNSS unit data during LWW8 retreat.

Management Plans	Parameter/Methodology	Site	Frequency
Public Safety Management Plan for Longwalls 30 to 32 and W6 to W8	Surface Impacts Visual observations and photographic monitoring with GPS camera of landforms to record potential impacts including surface cracking, steps, overrides and erosion holes.	Landforms associated with UCMLP property and the DSCA within the Extraction Plan Area. <i>(refer to Figure 14)</i>	UCMLP Land - Pre-mining - During mining (monthly) - Post mining (within three months) Private Property ⁴ - Pre-mining - During mining (monthly) - Post mining (within one month) DSCA - Pre-mining - During mining (weekly)¹⁵ - Post mining (within one month)
	Cliff Line Monitoring (>10m) Visual observations and photographic monitoring with GPS camera of cliff lines to record potential impacts including surface cracking and length of rock falls in meters (m).	Cliff line formation >10m in height associated with LWW7 on private property within the Extraction Plan Area ¹⁴ . Mona Creek cliff line formation, to the west of LWW6-LWW8 on both private property and UCMLP land within and immediately outside of the Extraction Plan Area. <i>(refer to Figure 14)</i>	UCMLP Land & Private Property ⁴ - Pre-mining - Post mining (within one month)
	Site Security and Signage - Ensure adequate signage warning of subsidence impacts are established on the boundary to UCMLP owned land and on private property. - Ensure UCMLP owned boundary fencing is adequate and gates are secured as required.	UCMLP boundary signage, fencing and gates. Private property signage and gates. DSCA signage <i>(refer to Figure 14)</i>	UCMLP Land - Pre-mining - During mining (monthly) - Post mining (within three months) Private Property ⁴ - Pre-mining - During mining (monthly)

Management Plans	Parameter/Methodology	Site	Frequency
			- Post mining (within one month) DSCA - Pre-mining - During mining (weekly)¹⁵ - Post mining (within one month)

Notes:

¹ To be undermined by Ulan West and will be subject to review by UCMPL's groundwater specialist for ongoing groundwater monitoring requirements within the WMP.

² Mona Creek Alluvium Monitoring (MCAM) added to the groundwater monitoring program as required by MOD4.

³ When access is available.

⁴ For private land 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 under privately owned land. Post mining inspections within one month to record subsidence related impacts for comparative assessments and develop remediation strategies. Annual inspection with UCMPL's subsidence specialist.

⁵ Undermining of the cliff line associated with LWW7 on the Woodbury Property occurred in October 2021. This cliff line was impacted by isolated, minor rockfalls and perceptible cracking consistent with predictions (**Section 5.3.3**).

⁶ New FBS Monitoring Sites will be established in accordance with the BMP.

⁷ Visual inspections, photographic recordings and survey of the nearest poles to actively retreating longwalls will be undertaken before, during and after mining.

⁸ Monitoring of poles no longer required as mining has now already occurred.

⁹ Survey completed prior to the commencement of the next longwall

¹⁰ 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 under privately owned land. Post mining inspections within one month to record subsidence related impacts for comparative assessments and develop remediation strategies. Annual inspection with UCMPL's subsidence specialist.

¹¹ No perceptible impacts to rock shelter site Ulan ID #599 associated with longwall mining of LWW6.

¹² Access to rock shelter site Ulan ID #730 and MCRSS on private land subject to permission by the landowner.

¹³ The proposed GNSS units for the MCRS to be installed prior to the commencement of LWW8 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 2023. UCMPL will provide the DPE the trigger values when determined and update this Extraction Plan in upcoming revisions.

¹⁴ Undermining of the cliff line associated with LWW7 on the Woodbury Property occurred in October 2021 without incident.

¹⁵ Weekly inspection in the DSCA during longwall retreat of LW31 and LW32 as required from the risk assessment (**Section 2.4** of the Extraction Plan).

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

Status: Final
Version: Version 8

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

Page 76 of 110

4.4 Ongoing Baseline Data Collection Program

The various monitoring programs currently undertaken by UCMPL to collect baseline data for future Extraction Plans is summarised below in **Table 21**. These monitoring programs as described in **Section 4.2** include subsidence monitoring, groundwater monitoring, floristic monitoring plots, threatened species monitoring, heritage monitoring, land monitoring and surface water monitoring. These continued monitoring programs are providing additional baseline data for use in future Extraction Plans.

Table 21 Summary of Monitoring Programs to Collect Baseline Data

Aspects for Future Extraction Plans	Existing & Proposed Monitoring Programs	Document Reference
Subsidence	Proposed subsidence monitoring in accordance with the <i>Subsidence Monitoring Program LW30 to 32 & LWW6 to LWW8 (Section 4)</i> 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 to LW32 & LWW6 to LWW8, which commenced in 1986. Continuous global navigation satellite system (GNSS) to provide continuous three-dimensional (3D) ground movement data with trigger alarms have been installed at the Brokenback Conservation Area and are proposed for installation at the Mona Creek Rock Shelter Sites. GNSS units will provide real time data during mining.	<i>Subsidence Monitoring Program LW30 to 32 & LWW6 to LWW8</i> This Extraction Plan
Groundwater	Groundwater monitoring (groundwater level and quality) undertaken in accordance with the WMP and the Extraction Plan has adopted key monitoring components from the North Monitoring Network (NMN) within the WMP. The WMP monitoring programs includes: - 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 - Monitoring at The Drip: a groundwater dependant natural site of cultural significance, to the east of the Ulan Mine Complex.	<i>Water Management Plan (WMP) as approved</i>
Surface Water	Surface water monitoring (flow, quality and geomorphology) undertaken in accordance with the WMP and the Extraction Plan has adopted key monitoring components from the SWMP. The SWMP details the program to measure and assess changes in stream health (including base flows) and channel stability that could be attributable to subsidence from mining activities and establishes the	<i>Water Management Plan (WMP) as approved</i> <i>Erosion and Sediment Control Plan (ESCP) as approved</i>

Aspects for Future Extraction Plans	Existing & Proposed Monitoring Programs	Document Reference
	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.	
Biodiversity	Monitoring of biodiversity is undertaken in accordance with the Biodiversity Management Plan (BMP) and the Extraction Plan has adopted key monitoring components from the BMP. Threatened species (flora and fauna), endangered populations and EEC/CEECs monitoring within the Project Area as required by the BMP. The offset areas are specifically monitored for progress toward regeneration targets. Floristic plots and bat monitoring sites are established over representative longwalls 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.	<i>Biodiversity Management Plan (BMP) as approved</i> <i>Offset Management Program</i>
Land	Monitoring of subsidence impacts to land in general in accordance with the LMP LW30 to 32 & LWW6 to LWW8.	<i>LMP LW30 to 32 & LWW6 to LWW8.</i>
Aboriginal Heritage & European Heritage	Monitoring of heritage (both Aboriginal & European) in accordance with the Heritage Management Plan (HMP) and the Extraction Plan has adopted key monitoring components from the HMP. Heritage monitoring in accordance with the HMP includes Aboriginal Rock Shelter Test Excavation Sampling Strategy, as prepared by South East Archaeology (SEA). Pre and post mining inspection of heritage sites and results are provided for consultation with heritage representatives. Continuous global navigation satellite system (GNSS) to provide continuous three-dimensional (3D) ground movement data with trigger alarms have been installed at the Brokenback Conservation Area and are proposed for installation at the Mona Creek Rock Shelter Sites.	<i>Heritage Management Plan (HMP) as approved</i> <i>Old Ulan Conservation Management Plan.</i> <i>Ulan Coal Continued Operations – Aboriginal Rock Shelter Test Excavation Sampling Strategy</i>

5. Management, Mitigation, Remediation and Reporting Measures

5.1 Performance Measures and Performance Indicators

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 3**). **Table 22** provides a summary of the subsidence performance indicators developed by UCMPL to inform if the relevant subsidence performance measures are likely to be, or potentially have been exceeded, during the secondary extraction within the Extraction Plan Area.

Although there are no subsidence performance measures specific to groundwater for the Extraction Plan, UCMPL have adopted '*no greater environmental consequences than predicted in the EA*' for groundwater.

UCMPL will compare and evaluate the results of the subsidence monitoring program against the performance measures and performance indicators. In the event that a subsidence performance indicator has been triggered, UCMPL will carry out investigations as described in the MTARP (**Section 5.5**) to determine if the exceedance is subsidence related.

Table 22 Subsidence Performance Measures and Performance Indicators

Subsidence Performance Measure		Subsidence Performance Indicator	Assessment of Performance Measure
Water			
Ulan, Mona & Cockabutta Creeks	No greater environmental consequences than predicted in the EA	Performance indicators for water quality will be considered to have been triggered if analysis of data from the surface water monitoring program (Section 4.2.1) indicates: - An exceedance of the applicable water trigger values for pH, EC and TSS for three consecutive months as a result of mining impacts; and/or - A potential deterioration of stream health or data is outside of natural variability (refer to Section 5.2.3.2 of the WMP) as a potential result of mining impacts; and/or - Greater impacts than predicted and/or a deteriorating trend in channel stability when compared to pre-mining condition as a potential result of mining impacts.	The subsidence performance measure for water is exceeded if investigations completed by the ECM confirm any of the surface water subsidence performance indicators triggered are mining related, due to subsidence impacts, as outlined in the MTARP (Section 5.5).
Groundwater			
	No greater environmental consequences than predicted in the EA	Performance indicators for groundwater levels and privately-owned bores will be considered to have been triggered if analysis of data from the groundwater monitoring program (Section 4.2.2) indicates: - Review of the VWP data from the NMN confirms depressurisation is greater than predicted by numerical groundwater modelling or exceedance of an applicable trigger value; and/or	The subsidence performance measure for groundwater is exceeded if investigations completed by the ECM confirm any of the groundwater subsidence performance indicators triggered are mining related, due to subsidence impacts, as

Subsidence Performance Measure		Subsidence Performance Indicator	Assessment of Performance Measure
		- Photographic monitoring at The Drip notes a physical change that may not be attributed to seasonal variability; and/or - Three consecutive measurements of >95% baseline data or $\pm 10\%$ deviation from baseline data for those bores within the predicted 2 m drawdown zone; and/or - Three consecutive measurements of >95% baseline data or $\pm 15\%$ deviation from baseline data for those bores outside the predicted 2 m drawdown zone. - Review of the water level data from the PBMN confirms depressurisation is greater than predicted by numerical groundwater modelling or exceedance of an applicable private bore level trigger value; and/or - A community complaint received from a private landholder in regards to their bore.	outlined in the MTARP (Section 5.5).
Biodiversity			
Threatened species, populations, habitat or ecological communities	Negligible impact	Performance indicators will be considered to have been triggered if analysis of FBS data from the monitoring program (Section 4.2.4) indicates: - >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 - >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. 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.	The subsidence performance measure for biodiversity is exceeded if investigations completed by the ECM confirm any of the biodiversity subsidence performance indicators triggered are mining related, due to subsidence, as outlined in the MTARP (Section 5.5).

Subsidence Performance Measure		Subsidence Performance Indicator	Assessment of Performance Measure
Land			
Cliffs in the Brokenback Conservation Area	Nil environmental consequences	Cliff lines in the Brokenback Conservation Area (BCA) are remote from this Extraction Plan and therefore are not considered in this Extraction Plan. Applicable subsidence performance indicators are provided in the Ulan West Extraction Plan.	The subsidence performance measure for land is exceeded if investigations completed by the ECM confirm if any of the land subsidence performance indicators triggered are mining related, due to subsidence impacts as outlined in the MTARP (Section 5.5).
Other cliffs	Minor environmental consequences	Performance indicators will be considered to have been triggered if subsidence monitoring of other cliff lines (Section 4.2.3) undermined in the Extraction Plan Area, identifies: The total sum of rockfalls from other cliff lines >10m in height undermined within the Project Area is >18% of the allowable ≤20% maximum.	
Heritage			
Aboriginal sites	Nil impact in the Brokenback Conservation Area, Grinding Groove Conservation Area; and on Mona Creek Rock Shelter Sites	Aboriginal heritage sites including the Grinding Groove Conservation Area, the Talbragar Fish Fossil Reserve and the Brokenback Conservation Area are remote from this Extraction Plan and therefore are not considered in this Extraction Plan. Applicable subsidence performance indicators are provided in the Ulan West Extraction Plan. Performance indicators for the Mona Creek Rock Shelter Sites will be considered to have been triggered if analysis of data from the heritage monitoring program (Section 4.2.6) indicates: - A trigger alarm from the LWW8 GNSS units has been received; and/or - A perceptible change to the pre-mining condition of the MCRSS (e.g. recent rock fall or cracking) within the Mona Creek Rock Shelter Sites.	The subsidence performance measure for heritage is exceeded if investigations completed by the ECM confirm any of the heritage subsidence performance indicators triggered are mining related, due to subsidence impacts, as outlined in the MTARP (Section 5.5).
Talbragar Fish Fossil Reserve	Negligible impact	The Talbragar Fish Fossil Reserve is remote from this Extraction Plan and therefore are not considered in this Extraction Plan. Applicable subsidence performance indicators are provided in the Ulan West Extraction Plan.	
Other Heritage Sites	No greater impact than predicted in the EA	The performance indicators will be considered to be triggered if analysis of data from the heritage monitoring program (Section 4.2.6) indicates: - Other Aboriginal sites displaying greater than predicted impacts; and/or - European heritage sites displaying greater than predicted impacts.	

Subsidence Performance Measure		Subsidence Performance Indicator	Assessment of Performance Measure
Built Features			
All built features	Safe, serviceable and repairable unless the owner agrees otherwise in writing	Performance indicators will be considered to have been triggered if analysis of data from the built features monitoring program (Section 4.2.5) indicates. - A greater impact than predicted to the integrity and functionality of applicable public utility has occurred within the Extraction Plan Area (e.g. loss of electrical supply from the SWER line or 4WD access track in the DSCA not safe to use or impacts to water supply dam); and/or - A greater than predicted impact to the integrity and functionality of a privately-owned built features (e.g. significant impacts to farm dams i.e. non-repairable, extensive damage to stock fencing, tracks unsafe to use or complete structural failure of the small shelter) within the Extraction Plan Area ; and/or - UCMPL receive a complaint from a landowner regarding a built feature that may have been potentially impacted by subsidence.	The subsidence performance measure for built features is exceeded if investigations completed by the ECM confirm any of the built features subsidence performance indicators are mining related, due to subsidence impacts, as outlined in the MTARP (Section 5.5).
Public Safety			
Public Safety	No additional risk due to mining	Performance indicators will be considered to have been triggered if analysis of data from the public safety monitoring program (Section 4.2.7) indicates. - Surface impacts on landforms and cliff lines within the Extraction Plan Area are greater than predictions; and/or - Confirmation the general public have entered UCMPL land without authorisation and a safety incident has potentially occurred as a result of subsidence.	The subsidence performance measure for public safety is exceeded if investigations completed by the ECM confirm any of the public safety subsidence performance indicators triggered are mining related, due to subsidence impacts as outlined in the MTARP (Section 5.5).

5.2 Management and Mitigation Measures

As described in **Section 2.1.2**, MOD4 allowed changes to the approved mine plans at both UUG and UW mines, and for associated infrastructure. As a result of the minor amendment to the First Workings of the UUG mine plan for LW32 and LW33 (**Section 1.1**), the area of potential impacts and consequences in the DSCA is reduced from that previously approved by MOD4, due to the shortening of these two longwalls by approximately 415m.

The majority of the surface within both the Extraction Plan Area and the Application Area for Longwalls 31 and 32, is undeveloped bushland with a small area of cleared or semi-cleared land. The overburden depth within the Application Area to the mining horizon ranges from approximately 275m to 335m. The depth varies from approximately 275m in the west, to 335m in the central section and back down to 325m in the east.

The only public utilities and public amenities identified within the Extraction Plan Area or in positions with potential to be affected by the planned mining of Longwalls 31 and 32 are an overhead powerline, an unsealed four-wheel drive track in the DSCA and a number of state survey control stations. UCMPL have developed the BFMP LW30-32 & LWW6-LWW8 for the ongoing management of these utilities and remains in consultation with each asset owner.

Table 23 provides a summary of how the potential environmental consequences from longwall mining LW30-LW32 & LWW6-LWW8 will be managed to achieve the requirements in the Project Approval 08_0184 and other relevant approvals.

Table 23 Summary of Management and Mitigation Measures

Summary of Management and Mitigation Measures		Section
Mine Design	The UUG Mine Plan completely avoids the 'Valley Way' Grinding Groove Conservation Area. The Extraction Plan Area is approximately 1.2km to the north of the 'Valley Way' Grinding Groove Conservation Area.	Section 3.4.4 Section 4.2.6
	The Brokenback Conservation Area and Talbragar Fish Fossil Reserve are remote from the UUG Mine Plan.	
	The Mona Creek Rock Shelter Sites (ID180-187) are located approximately 75m west of LWW7 and LWW8, protected by a barrier. UCMPL will install GNSS units prior to LWW8 commencing to provide real time subsidence monitoring data.	Section 3.4.4 Section 4.2.6
	The majority of land above the Extraction Plan Area and Application Area is located undeveloped bushland, on land largely owned and/or controlled by UCMPL. The majority of infrastructure is owned by UCMPL.	Attachment F (Technical Report Subsidence)
	Privately owned land located over the western end of LWW6 to LWW8 will have PPSMPs prior to commencement secondary extraction, to the satisfaction of the landowner.	Section 2.5.2
	Essential Energy have endorsed the built features management plan for their asset regarding the management of the SWER line. To date the integrity of the SWER line has been maintained.	Section 2.5.4 Section 4.2.5
	Reinstate and resurvey the State survey marks after cessation of subsidence movements as required by the <i>Surveyor-General's Direction No. 11 – Preservation of Survey Infrastructure - Version 4.0 January 2020</i>.	Appendix D
	Public access within the Application Area and the Extraction Plan is restricted by locked gates and fencing. Additional warning signage has been installed along the boundary of the DSCA in consultation with NPWS prior to LW30 commencing.	Section 4.2.7 Appendix F
	UCMPL was granted a Licence for Works and Occupations (Occupation Licence) by the Minister administering the National Parks and Wildlife Act 1974 for the DSCA on the 1 March 2020.	Section 2.5.2
	Access is also restricted due to due to the remote location.	
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 5.3
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 4.0

Summary of Management and Mitigation Measures		Section
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 5.6
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 5.6

5.3 Remediation and Rehabilitation Measures

The key subsidence impacts that may have potential consequences on land associated with the extraction of longwalls within the Extraction Plan Area include rockfalls along one cliff line, surface impacts on landforms including cracking, steps, overrides and erosion holes.

The following remediation and rehabilitation measures outlined in the following sections, provide for the management of subsidence induced impacts on surface features from UCMPL mining activities within the Extraction Plan Area (**Figure 3**).

At the time of preparing the Extraction Plan (Version 5), UCMPL had completed secondary extraction of LWW6, LWW7 and partial secondary extraction of LW30 with no exceedances of the subsidence performance measures as outlined in PA08_0184. Remediation and rehabilitation measures implemented to date within the Extraction Plan Area have been considered effective.

During longwall mining within the Extraction Plan Area, UCMPL will undertake monthly inspections for subsidence affected landforms and cliff lines to identify potential subsidence hazards on both UCMPL owned land and non-UCMPL owned land. Weekly inspections are proposed whilst LW31 and LW32 retreat directly under the DSCA.

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/or warning signage placed to either alert or to prevent access. Remedial actions to address the subsidence impacts on non-UCMPL owned land will be completed as soon as practicable, in consultation with the relevant land owner (**Section 4.2.3**) and a summary provided in the Annual Review.

5.3.1 General Landforms

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 risk-based approach when considering potential management measures to mitigate or remediate subsidence impacts on landforms resulting from underground mining operations with the Extraction Plan Area. These remediation measures may include the following:

- **Internal roads & DSCA four-wheel drive track:** Remediation will be undertaken in the event surface cracking presents a high risk for safe vehicular access along the 4WD track or an

ongoing safety risk to the general public within the DSCA. This will generally involve the infilling of subsidence cracks with inert or local material sourced, compacted, reprofiled and where necessary reseeded with appropriate endemic species, consistent with the confirmed and predominate NSW Plant Community Types – NSW BioNet in the locality, to stabilise surrounding disturbed areas.

If required, the use of external material must be certified virgin excavated natural material (VENM), consistent with the SCA's geology (visually consistent), applying hygiene protocols consistent with the Saving our Species - Hygiene guidelines (DPIE, 2020).

Prior to any remediation and rehabilitation measures being carried out in the DSCA, consultation and endorsement of the proposed remediation and rehabilitation measures in consideration of applicable NSW Rural Fire Service Fire Trail Standards, must be granted by the NPWS.

- **Agricultural areas:** Remediation and rehabilitation measures on private land will be undertaken in the event surface impacts present a risk to safety of people and a risk to livestock and utilising agricultural areas. This will generally involve the infilling of subsidence cracks with inert or local material sourced, compacted, reprofiled and where necessary reseeded with appropriate endemic species or pasture species to stabilise disturbed areas. Prior to any remediation and rehabilitation measures being carried out on private land, consultation and endorsement of the proposed remediation and rehabilitation measures must be granted by the property owner in accordance with the relevant PPSMP.
- **Flow lines:** Remediation and rehabilitation measures will be undertaken in the event surface cracking in a flow line has been identified by UCMPL's subsidence specialist as a high risk of developing into an erosion hole. This will generally involve the infilling of subsidence cracks with inert or local material sourced, compacted, reprofiled and where necessary reseeded with appropriate endemic species or pasture species to stabilise disturbed areas in consultation with UCMPL's subsidence specialist.
- **Significant cracking:** Remediation will be undertaken in the event surface cracking has exceeded predictions and/or presents a potentially high safety and/or environmental risk. This will generally involve the infilling of subsidence cracks with inert or local material sourced, compacted, reprofiled and where necessary reseeded with appropriate endemic species or pasture species to stabilise disturbed areas, in consultation with UCMPL's subsidence specialist.
- **Erosion holes:** Subsidence cracking that has formed into an erosion holes after a high flow event will be remediated. This will generally involve developing remediation measures in consultation with UCMPL's subsidence engineer and may involve the use of geotextiles to line the erosion hole prior to infilling of the erosion hole with inert or local material sourced, compacted, reprofiled and where necessary reseeded with appropriate endemic species or pasture species to stabilise disturbed areas.
- **Minor cracking:** Surface cracking that presents a low safety and/or environmental risk will be left to natural geomorphologic processes to fill these cracks over time.

5.3.2 Rehabilitation Management Plan (RMP)

Rehabilitation objectives and management measures to mitigate or remediate subsidence impacts on landforms resulting from underground mining operations, as described above, will be carried out in accordance with the Rehabilitation Management Plan (RMP).

Schedule 3 Condition 57 of PA 08-0184 outlines the requirement to prepare an RMP. The RMP for UCMPL covers both the requirement of the Project Approval 08_0184, whilst also being set out in the Resources Regulator format for the *Form and Way Document: Rehabilitation Management Plan – Large Mines*.

5.3.3 Cliff Lines

One cliff line within the Extraction Plan Area is associated with LWW7 on the Woodbury Property. The other cliff line is associated with the MCRSS, located on both UCMPL land and on the Woodbury Property. Both cliff lines are located within bushland and considered remote to access.

Undermining of the cliff line associated with LWW7 on the Woodbury Property occurred in October 2021. This cliff line was impacted by isolated, minor rockfalls and perceptible cracking consistent with predictions. Prior to the commencement of LWW7, the installation of signage in the vicinity of cliff line to warn of the potential for mine subsidence movements and for the potential of rock falls in active mining areas as a precautionary measure was undertaken (**Figure 15**).

Additional signage may be installed on UCMPL land and privately-owned land in the vicinity of the cliff lines associated with the MCRSS as a precautionary measure, to warn UCMPL employees and contractors of the potential for mine subsidence movements prior to LWW8 commencing.

In the event cliff line instabilities present an immediate safety hazard on privately owned land (e.g. high potential for rock falls), no specific corrective action will be taken to mitigate the impact. Where safe to do so, and in order to reduce the need for further environmental disturbance, these features will be left in situ until the appropriate mitigation measures are considered and developed. Signage and barricades will be installed to cordon off the area as necessary.

Where mitigation measures are required, a specific mitigation strategy will be developed in accordance with the MTRAP for Land. Should impacts to cliff lines be greater than predicted, the Contingency Response and Adaptive Measures will apply (**Section 5.7**).

5.4 Rehabilitation Monitoring

Visual monitoring of remediated subsidence impacts will be completed to identify if any maintenance actions or further remedial works are required. The monitoring will be carried out until UCMPL is satisfied the area is stable and functioning as required by the RMP.

If required, the following additional measures may be considered to assist in the remediation of the subsidence impacts, including:

- Fencing to prevent access to stock, animals, vehicles or people;
- Signage to identify significant ecological features and protect rehabilitation, regeneration and revegetation areas;

- Soil conservation measures (i.e. erosion and sediment controls); and
- Weed management.

5.5 Master Trigger Action Response Plan (MTARP)

UCMPL have developed a Master Trigger Action Response Plan (MTARP) (**Table 24**) which details the UCMPL's performance indicator triggers for each of the relevant subsidence performance measures for surface and sub-surface features, via escalating triggers and levels of investigation, action and responses, in accordance with the relevant performance indicator levels described in **Section 5.1**.

As required by the DPE, a specific trigger action response plan for the MCRSS must be submitted by UCMPL and approved by the DPE prior to the commencement of extraction in LWW8.

In the event the subsidence performance measures as summarised in **Table 3** are considered to have been exceeded or are likely to be exceeded, response and management measures in the MTARP (**Table 24**) will be undertaken in accordance with the relevant protocols for:

- Adaptive management (**Section 5.6**);
- Incident reporting (**Section 5.7**);
- Reporting framework (**Section 5.8**); and
- Review of the Extraction Plan (**Section 6.0**).

Table 24 Master TARP Multilevel Response

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Subsidence				
F & H Subsidence Monitoring Lines	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; - Tilt; & - Strain along Line	Level 1: Operations within predictions, and within approved impacts	Review of the subsidence monitoring data by UCMPL's subsidence engineer, confirms predicted subsidence values (Table 10) and approved/predicted impacts have not been exceeded.	Continue subsidence monitoring during all TARP Levels as required by Section 4.1 of the Extraction Plan and the SMP LW30-32 & LWW6-LWW8. Provide a summary of subsidence monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of the subsidence monitoring data by UCMPL's subsidence engineer, indicates one or more predicted subsidence values (Table 10) has potentially been exceeded and/or a potentially greater than approved/predicted impact has occurred.	Investigation completed by UCMPL's subsidence engineer to include monitoring data, field notes, recent meteorological events, resurvey of the applicable subsidence line and UCMPL's operational activities to confirm if exceeded values/approved impacts are mining related or influenced by other causes. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of the subsidence monitoring data by UCMPL's subsidence engineer, confirms one or more predicted subsidence values (Table 10) has been exceeded and/or a greater than approved/ predicted impact that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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 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 and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Water				
Curra Creek (SW07) Bobadeen Creek (SW08) Mona Creek (SW10)	Water Quality: - pH - Electrical Conductivity (EC) $\mu\text{S}/\text{cm}$ - Total suspended solids (TSS) mg/L	Level 1: Operations within predictions, and within approved impacts	Review of surface water monitoring data, against the applicable water trigger values and approved impacts, indicates the applicable water criteria trigger values for pH, EC and TSS have not been exceeded.	Continue surface water monitoring during all TARP Levels as required by Section 4.2.1 of the Extraction Plan and the WMP. Provide a summary of surface water monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of surface water monitoring data, against the applicable water trigger values and approved impacts indicates water criteria trigger values for pH, EC and TSS have been potentially exceeded for three consecutive months.	Investigation completed by reviewing monitoring data, field notes, recent meteorological events and UCMPL operational activities to confirm if the three consecutive exceedances are subsidence related or influenced by other causes. If Level 2 investigations confirm water quality exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of surface water monitoring data, against the applicable water trigger values and approved impacts confirms water criteria trigger values for pH, EC and TSS have been exceeded for three consecutive months that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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 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 and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Bobadeen Creek (AQ13) Mona Creek (AQ15)	Stream Health. Annual Aquatic Monitoring including: - Riparian Channel and Environmental (RCE) Inventory scores - AusRivAS and SIGNAL2 - Water Quality: pH, EC (µS/cm), TSS (mg/L), Dissolved Oxygen, Turbidity (NTU) and Alkalinity).	Level 1: Operations within predictions, and within approved impacts	Following the receipt of the Annual Aquatic Monitoring Report indicating no declining RCE, AusRivAS, SIGNAL2 scores and no declining water quality results at an individual site.	Continue stream health monitoring for during all TARP Levels as required by Section 4.2.1 of the Extraction Plan and the WMP. Provide a summary of stream health monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Following the receipt of the Annual Aquatic Monitoring Report indicating declining RCE, AusRivAS, SIGNAL2 scores (i.e. outside of natural variation – refer to Section 5.2.3.2 of the WMP) and declining water quality results at an individual site are potentially subsidence related.	Investigation completed with surface water specialist by reviewing the current monitoring results against historical monitoring results, recent meteorological events and UCMPL operational activities to confirm if potential deterioration of stream health are subsidence related or influenced by other causes. If Level 2 investigations confirm declining scores/water quality are non-mining related proceed to Level 1. If Level 2 investigations confirm declining scores/water quality are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of a greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Following the receipt of the Annual Aquatic Monitoring Report indicating declining RCE, AusRivAS, SIGNAL2 scores (i.e. outside of natural variation – refer to Section 5.2.3.2 of the WMP) and declining water quality results at an individual site is subsidence related that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Investigations initiated with UCMPL's subsidence engineer and surface water specialist to assist with investigations and remedial action plans as required. Expand stream health monitoring program as required by UCMPL's surface water specialist and ecological specialist. If the investigation confirms material harm has been threatened or caused activate the Pollution Incident Response Management Plan (PIRMP) immediately. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response 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 is 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 and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Mona Creek Channel Stability Sites (main channel) and Representative sites within lower order flowlines of Mona Creek, Curra Creek and Bobadeen Creek	Channel Stability: - Visual observations and photographic monitoring with GPS camera watercourses to record potential impacts. - Monitoring to distinguish between natural instabilities and instabilities from mine subsidence, including the presence of surface cracking, nick point erosion, surface ponding or out of channel flows.	Level 1: Operations within predictions, and within approved impacts	Review of the post mining condition of undermined flowlines indicates surface cracking, surface ponding or out of channel flows are within predictions and instabilities are comparable to pre-mining condition.	Continue channel stability monitoring during all TARP Levels as required by Section 4.2.1 of the Extraction Plan and the WMP. Provide a summary of channel stability monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of the post mining condition of flowlines indicates surface cracking, surface ponding or out of channel flows are potentially greater than predictions.	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, recent meteorological events and UCMPL's operational activities to confirm if exceeded approved impacts are mining related or influenced by other causes. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of the post mining condition of flowlines confirms surface cracking, surface ponding or out of channel flows are greater than predictions that result in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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 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 is 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 and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Groundwater				
DDH266, DDH270, DDH293, DDH601, DDH598, TAL1, TAL2, UW1, UW2, UW3, UW4, R894, PZ29, EX03, EX06, EX09 & DDH598 The Drip	Vibrating wire piezometers (VWPs): - Pore pressure groundwater level monitoring (NMN) - Pore pressure groundwater level monitoring (PZ29) - Visual and photographic monitoring of The Drip.	Level 1: Operations within predictions, and within approved impacts	Review of the VWP data indicates depressurisation is consistent as predicted by numerical groundwater modelling and/or visual monitoring at The Drip notes a physical change can be attributed to seasonal variability.	Continue groundwater monitoring during all TARP Levels as required by Section 4.2.2 of the Extraction Plan and the WMP. Provide a summary of groundwater monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of the VWP data indicates depressurisation is potentially greater than predicted by numerical groundwater modelling and/or visual monitoring at The Drip notes a physical change that is potentially not attributed to seasonal variability.	Investigations initiated with UCMPL's groundwater specialists to review the current groundwater monitoring results against historical monitoring results, recent meteorological events and UCMPL operational activities to confirm if exceeded groundwater predictions or physical changes to The Drip are mining related or influenced by other causes. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3..
		Level 3: Operations exceed approved subsidence impact performance measures	Review of the VWP data indicates depressurisation is greater than predicted by numerical groundwater modelling and/or visual monitoring at The Drip notes a physical change that is not attributed to seasonal variability, that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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 including a remedial action plan is developed and implemented to address the Investigation findings. This may include increase monitoring frequency for the VWPs and The Drip; 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 and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Private Bore Monitoring Network (PBMN)	Private bore water quality monitoring: - pH - Electrical Conductivity (EC) $\mu\text{S}/\text{cm}$	Level 1: Operations within predictions, and within approved impacts	Review of the private bore groundwater quality data for pH and EC indicates no three consecutive measurements of >95% baseline data or $\pm 10\%$ deviation from baseline data for those bores within the predicted 2 m drawdown zone has occurred; and/or no three consecutive measurements of >95% baseline data or $\pm 15\%$ deviation from baseline data for those bores outside the predicted 2 m drawdown zone has occurred; and/or no community complaint has been received from a private bore owner.	Continue groundwater monitoring during all TARP Levels as required by Section 4.2.2 of the Extraction Plan and the WMP. Provide a summary of groundwater monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of the private bore groundwater quality data for pH and EC indicates three consecutive measurements of >95% baseline data or $\pm 10\%$ deviation from baseline data for those bores within the predicted 2 m drawdown zone has occurred; and/or three consecutive measurements of >95% baseline data or $\pm 15\%$ deviation from baseline data for those bores outside the predicted 2 m drawdown zone has occurred; and/or a community complaint has been received from a private bore owner.	Investigations initiated with UCMPL's groundwater specialists to review the current monitoring results against historical monitoring results, additional monitoring of the bore including trace metals and elements, conduct water quality trend analysis with adjacent bores, review recent meteorological events and UCMPL's operational activities to confirm if exceeded values/approved impacts are mining related or influenced by other causes. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of the private bore groundwater quality data for pH and EC confirms exceedance of water quality and/or review of the community complaint regarding a bore confirms a subsidence related impact, that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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 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 and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Private Bore Monitoring Network (BPMN)	Private bore water level monitoring: - Groundwater level (mbgl)	Level 1: Operations within predictions, and within approved impacts	Review of the private bore groundwater levels indicates: depressurisation is not greater than that predicted by numerical groundwater modelling and site derived Private Bore Trigger Values in the WMP; no community complaint has been received from a private bore owner.	Continue groundwater monitoring during all TARP Levels as required by Section 4.2.2 of the Extraction Plan and the WMP. Provide a summary of groundwater monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of the private bore groundwater levels indicates: depressurisation may be greater than that predicted by numerical groundwater modelling and site derived Private Bore Trigger Values in the WMP and/or a community complaint has been received from a private bore owner.	Investigations initiated with UCMPL's groundwater specialists to review the current monitoring results against historical monitoring results (including the baseline data), review the operation of bore pump and recovery times, review model predictions and confirm model assumptions, review results from adjacent bores and from the NMN, review recent meteorological events and UCMPL's operational activities to confirm if exceeded values/approved impacts are mining related or influenced by other causes. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of the private bore groundwater levels confirms exceedance of groundwater level predictions and/or review of the community complaint regarding a bore confirms a subsidence related impact, that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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 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, reassess subsidence impacts and Performance Indicators as outlined in the Contingency Response and Section 5.6.2 .
Notes: * PA08_0184 Schedule 3 Condition 30 outlines UCMPL's commitment to a 'make good provision' for impacted private landholders.				

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Land				
Cliff Line Monitoring	Cliff line monitoring: Monitoring the sum of total rocks falls as a percentage of cliff lines >10m in height undermined in the Project Area. Visual observations and photographic monitoring with GPS camera of cliff lines to record potential impacts.	Level 1: Operations within predictions, and within approved impacts	The total sum of rockfalls from other cliff lines >10m in height undermined within the Project Area is <18% of the allowable ≤20% maximum.	Continue landform monitoring during all TARP Levels as required by Section 4.2.3 of the Extraction Plan and the LMP LW30-32 & LWW6-LWW8 (LMP). Provide a summary of landform monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	The total sum of rockfalls from other cliff lines >10m in height undermined within the Project Area is >18% of the allowable ≤20% maximum.	Investigations initiated with UCMLP'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 UCMLP is likely to exceed or achieve the rock fall prediction of ≤20% for the Project Area and expand the subsidence monitoring program as required. If Level 2 investigations confirm subsidence related impacts will remain ≤18% in prediction then proceed to Level 1. If Level 2 investigations confirm rock falls are >18% with a probability of exceeding regarding future mining of remaining longwalls but operations currently remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	The total sum of rockfalls from other cliff lines >10m in height undermined within the Project Area has exceeded the allowable ≤20% maximum that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Investigations initiated with UCMLP'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. Implement management measures as outlined the LMP (Appendix B) including engaging UCMLP's subsidence engineer to assist development of adaptive management strategies as required; and UCMLP implement adaptive measures as required to achieve ≤20% of rock falls along other cliff lines >10m in height in the Project Area from subsequent longwalls. Review the Extraction Plan and reassess the subsidence Impacts and Performance Indicators as outlined in the Contingency Response in Section 5.6.2.

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Land				
Landforms associated within the Extraction Plan Area	Surface impacts: - Cracking - Steps - Overrides Visual observations and photographic monitoring with GPS camera of landforms to record potential impacts including surface cracking, steps, overrides and erosion holes.	Level 1: Operations within predictions, and within approved impacts	Surface cracking is <250mm* and steps or overrides are within prediction. * Excluding cracks that appear wider as a result of surface soil slumping in or washed into a subsidence crack.	Continue landform monitoring during all TARP Levels as required by Section 4.2.3 of the Extraction Plan and the LMP LW30-32 & LWW6-LWW8 (LMP). Provide a summary of landform monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Surface cracking is potentially >250mm* and steps or overrides are potentially outside of predictions. * Excluding cracks that appear wider as a result of surface soil slumping in or washed into a subsidence crack.	Investigations initiated with UCMPL's subsidence engineer to reassess subsidence impacts, complete site inspection, expand subsidence effects monitoring program as required and review UCMPL's operational activities to confirm if exceeded predictions/approved impacts are within or outside of predictions. If Level 2 investigations confirm exceedances remain within predictions proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Confirmation surface impacts within the Extraction Plan Area have exceeded predictions that result in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Investigations initiated with UCMPL's subsidence engineer to assist with remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response. Implement management measures as outlined the LMP (Appendix B) 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/or agreed management strategies and update written agreements with private landowners e.g. PPSMP with the applicable landowner. Review the Extraction Plan and reassess the subsidence impacts and Performance Indicators as outlined in the Contingency Response in Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Biodiversity				
Floristic Based Subsidence (FBS)	FBS monitoring of foliage canopy cover: - Foliage canopy cover within the subsidence zone with foliage canopy cover in the transition zone. - Foliage canopy cover within selected vegetation community located above mining area. - Canopy foliage cover of key feed species suitable for either the Regent Honeyeater and/or Swift Parrot. FBS monitoring of hollow bearing trees (HBTs): - Condition of HBTs suitable for Masked Owls.	Level 1: Operations within predictions, and within approved impacts	Review of FBS monitoring data indicates decline with foliage canopy cover is <10% and no reduction in abundance for HBT suitable for Masked Owls.	Continue all biodiversity monitoring during all TARP Levels as required by Section 4.2.4 of the Extraction Plan and the BMP. Provide a summary of biodiversity monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of FBS monitoring data indicates either; a potential >10% decline with foliage canopy cover in either the subsidence zone, transition zone or selected vegetation community; a potential reduction in abundance for HBT suitable for Masked Owls; and/or a potential >10% decline in canopy foliage cover of key feed species suitable for either the Regent Honeyeater and/or Swift Parrot.	Investigations initiated with UCMPL's ecological specialists and subsidence engineer. Investigation completed by reviewing biodiversity and subsidence effects monitoring data, other influences, climatic conditions and UCMPL operational activities to confirm the trigger exceedance is mining related or other causes. Increase investigations to expand the FBS monitoring program as required by UCMPL's ecological specialist. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of FBS monitoring data confirms either; a >10% decline with foliage canopy cover in either the subsidence zone, transition zone or selected vegetation; a reduction in abundance for HBT suitable for Masked Owls; and/or a >10% decline in canopy foliage cover of key feed species suitable for either the Regent Honeyeater and/or Swift Parrot that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Investigations initiated with UCMPL's subsidence engineer and ecological specialist to assist with remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response. 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 Subsidence Impacts and Performance Indicators as outlined in the Contingency Response and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Biodiversity				
Targeted Cliff Line Monitoring for Microbats	Targeted cliff line monitoring for microbats: Monitoring of endangered micro-bat activity levels utilising Anabat detection devices and harp trap set where appropriate.	Level 1: Operations within predictions, and within approved impacts	Review of targeted cliff line monitoring for endangered micro bats indicates no decline in activity levels over two or more monitoring periods, outside of seasonal variations.	Continue all biodiversity monitoring during all TARP Levels as required by Section 4.2.4 of the Extraction Plan and the BMP. Provide a summary of biodiversity monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of targeted cliff line monitoring for endangered micro bats indicates a potential >10% decline in activity levels over two or more monitoring periods, outside of seasonal variations.	Investigations initiated with UCMPL's ecological specialists and subsidence engineer. Investigation completed by reviewing biodiversity and subsidence effects monitoring data, other influences, climatic conditions and UCMPL operational activities to confirm the trigger exceedance is subsidence related or other causes. Increase investigations to expand the targeted cliff line monitoring program as required by UCMPL's ecological specialist. If Level 2 investigations confirm exceedances are non-mining related proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Review of targeted cliff line monitoring for endangered micro bats confirms a >10% decline in activity levels over two or more monitoring periods, outside of seasonal variations, that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Investigations initiated with UCMPL's subsidence engineer and ecological specialist to assist with remedial action plans as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response. 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 Subsidence Impacts and Performance Indicators as outlined in the Contingency Response and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Built Features				
Built Features on Private Property	Built Features on Private Property: Visual observations and photographic monitoring with GPS camera to record the general condition of the assets including serviceability and safety	Level 1: Operations within predictions, and within approved impacts	No greater impact than predicted to the integrity and functionality of a privately-owned built features within the Extraction Plan Area and no community complaints from landowners regarding a built feature.	Continue all built feature monitoring during all TARP Levels as required by Section 4.2.5 of the Extraction Plan and the BFMP LW30-32 & LWW6-LWW8 (BFMP). Provide a summary of built features monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	A greater impact than predicted to the integrity and functionality of a privately-owned built features (e.g. significant impacts to farm dams i.e. non-repairable, extensive damage to stock fencing, tracks unsafe to use or complete structural failure of the small shelter) within the Extraction Plan Area; and/or UCMPL receive a community complaint from a private landowner regarding a built feature potentially impacted by subsidence.	Investigation completed by UCMPL's subsidence engineer to review subsidence effects monitoring data, other influences, climatic conditions and UCMPL's operational activities to confirm if exceeded predictions/approved impacts are within or outside of predictions. If Level 2 investigations confirm exceedances remain within predictions proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	A greater than predicted impact to the integrity and functionality of privately-owned built feature has occurred within the Extraction Plan Area that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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. Implement management measures as outlined the BFMP (Appendix D) including engaging UCMP'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/or agreed management strategies with public utility owner and reassess subsidence impacts and update PPSMP with the applicable landowner. Review the Extraction Plan and Subsidence Impacts and Performance Indicators as outlined in the Contingency Response in Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Built Features				
Public Utilities and Amenities - SWER Line - DSCA 4WD track - Waterhole	Public Utilities and Amenities: Survey the 3D Position (X, Y, Z) of each powerline pole for pre and post mining comparisons. Visual observations and photographic monitoring with GPS camera to record the general condition of the assets including serviceability and safety	Level 1: Operations within predictions, and within approved impacts	No greater impact than predicted to the integrity and functionality of public utilities/amenities within the Extraction Plan Area.	Continue all built feature monitoring during all TARP Levels as required by Section 4.2.5 of the Extraction Plan and the BFMP LW30-32 & LWW6-LWW8 (BFMP). Provide a summary of built features monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	A greater impact than predicted to the integrity and functionality of applicable public utility has occurred within the Extraction Plan Area (e.g. loss of electrical supply from the SWER line or 4WD access track in the DSCA not safe to use or impacts to water supply dam).	Investigation completed by UCMPL's subsidence engineer to review subsidence effects monitoring data, other influences, climatic conditions and UCMPL's operational activities to confirm if exceeded predictions/approved impacts are within or outside of predictions. If Level 2 investigations confirm exceedances remain within predictions proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	A greater than predicted impact to the integrity and functionality of public utilities/amenities has occurred within the Extraction Plan Area that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). 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. Implement management measures as outlined the BFMP (Appendix D) including engaging UCMP'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/or agreed management strategies with public utility owner and reassess subsidence impacts and update PPSMP with the applicable landowner. Review the Extraction Plan and Subsidence Impacts and Performance Indicators as outlined in the Contingency Response in Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Heritage As required by the DPE, a specific trigger action response plan for the MCRSS must be submitted by UCMPL and approved by the DPE prior to the commencement of extraction in LWW8				
Cliff Line Monitoring (Mona Creek Rock Shelter Sites Ulan ID # 180-187) Other Aboriginal heritage sites European heritage sites	Heritage monitoring: Visual observations and photographic monitoring with GPS camera of heritage sites to record pre-mining and post mining condition for comparative analysis e.g. surface cracking and/or rock falls. GNSS units to provide continuous 3D ground movement data with trigger alarms for the Mona Creek Rock Shelter sites.	Level 1: Operations within predictions, and within approved impacts	Review of the heritage monitoring data indicates no perceptible change to the pre-mining condition of the Mona Creek Rock Shelter sites (MCRSS), no trigger alarms from the LWW8 GNSS units and impacts within predictions for other Aboriginal and European heritage sites.	Continue landform monitoring during all TARP Levels as required by Section 4.2.6 of the Extraction Plan and the HMP. Provide a summary of heritage monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Review of the heritage monitoring data indicates a potential perceptible change to the pre-mining condition of the MCRSS (e.g. recent rock fall or cracking), and/or a trigger alarm from the LWW8 GNSS units has been received and/or impacts potentially greater than predictions for other Aboriginal and European heritage sites.	Investigations initiated with UCMPL's subsidence engineer to confirm if subsidence effects monitoring along the H Line for vertical subsidence, tilt and strain values and/or trigger values from GNSS units have been exceeded; and review rock shelter 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. If Level 2 investigations confirm no subsidence related impacts to MCRSS and impacts to other Aboriginal and European sites are within predictions then proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	A greater than predicted impact has occurred to the MCRSS (e.g. recent rock fall or cracking) and/or subsidence impacts are greater than predictions for other Aboriginal and European heritage sites that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Investigations initiated with UCMPL's subsidence engineer to assist with investigations and develop adaptive management, mitigation and remedial strategies as required. Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response. UCMPL to implement the agreed management, mitigation and remedial strategies as required to stop impacts on the MCRSS from subsequent longwalls. Reassess subsidence impacts for other Aboriginal and European heritage sites. Notify UCMPL Registered Aboriginal Parties (RAPs) as required by the HMP. Review the Extraction Plan and Subsidence Impacts and Performance Indicators as outlined in the Contingency Response and Section 5.6.2 .

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Public Safety				
Cliff lines, surface impacts on landforms, site security and signage associated with the Extraction Plan Area	Surface impacts and cliff line monitoring: Visual observations and photographic monitoring with GPS camera of cliff lines and landforms to record potential impacts including rockfalls, surface cracking, steps, overrides and erosion holes. Visual monitoring of site security and signage.	Level 1: Operations within predictions, and within approved impacts	Surface impacts on landforms and cliff lines within the Extraction Plan Area are within predictions; and/or no reports of the general public entering without authorisation onto UCMPL land; and/or no safety incident as a result of subsidence has occurred.	Continue public safety monitoring during all TARP Levels as required by Section 4.2.3 of the Extraction Plan and the PSMP LW30-32 & LWW6-LWW8 (PSMP). Provide a summary of public safety monitoring results and if triggered, the investigation outcomes and remedial actions plans as completed also within the Annual Review as outlined in Section 5.8.1 .
		Level 2: Operations exceeding Extraction Plan predictions but within approved subsidence impact performance measures	Surface impacts on landforms and cliff lines within the Extraction Plan Area are potentially greater than predictions; and/or evidence the general public are entering UCMPL land without authorisation and/or a safety incident has potentially occurred as a result of subsidence.	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 initiated with UCMPL's subsidence engineer to reassess subsidence impacts and complete site inspection and expand subsidence effects monitoring program as required. If Level 2 investigations confirm subsidence related impacts remain in prediction and no unauthorised access has occurred leading to a safety incident then proceed to Level 1. If Level 2 investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures initiate the Adaptive Management Measures (Section 5.6.1) and Incident Notification (Section 5.7.1). Confirmation of an exceedance or greater than predicted subsidence impact that results in an exceedance of a subsidence performance measure then proceed to Level 3.
		Level 3: Operations exceed approved subsidence impact performance measures	Surface impacts on landforms and cliff lines within the Extraction Plan Area are greater than subsidence predictions and/or a safety incident has occurred and is subsidence related that results in an exceedance of a subsidence performance measure.	Government agency notification and maintain correspondence as outlined in the Contingency Response (Section 5.6.2). Implement management measures and corrective plans in consultation with government agencies as outlined in the Contingency Response. Implement management measures as outlined the PSMP (Appendix F) including engaging UCMP's subsidence engineer to assist development of adaptive management and remedial strategies as required; and UCMPL implement adaptive and remedial measures as required. the agreed management, mitigation and remedial strategies as required. Review boundary fencing and signage for adequacy and implement recommendations from investigations to improve site security. Review the Extraction Plan and Subsidence Impacts and Performance Indicators as outlined in the Contingency Response in Section 5.6.2 .

5.6 Adaptive Management and Contingency Planning

5.6.1 Adaptive Management

The regular reviewing and evaluating the effectiveness of management strategies includes analysis of subsidence effects and impacts data (**Section 4.1**) and environmental monitoring data (**Section 4.2**), against predicted impacts (**Section 3.3** and **Section 3.4**), performance indicators (**Section 5.1**) and performance measures (**Section 2.1.2.2**).

In addition to the existing mitigation measures outlined in **Section 5.2**, UCMPL will implement adaptive management measures where performance indicators identify a Level 2 TARP condition has occurred (**Table 24**), to ensure the subsidence impact performance measures (**Table 3** and **Table 22**) are not exceeded by UUG. In the event a Level 2 TARP condition has been confirmed (**Table 24**), UCMPL will immediately:

- Notify applicable landowners and public utilities that a Level 2 TARP condition associated with their property or built feature has occurred.
- Notify NPWS that a Level 2 TARP condition associated with a built feature or public safety within the DSCA has occurred.
- Engage UCMPL's subsidence engineering specialist and other specialists (for example groundwater and surface water, heritage and ecological specialists) as required, to review and evaluate (as described above), the subsidence effects monitoring results, subsidence impacts and environmental monitoring data and the adequacy of the performance indicators.
- Subject to the review outcomes from the specialists, the following adaptive management measures available to UCMPL include:
 - Additional monitoring of subsidence effects and impacts and environmental monitoring.
 - For example, but not limited to Level 2 TARP condition associated with groundwater, the Drip, surface water, cliff lines, UCMPL will increase and adapt the monitoring as recommended by UCMPL's subsidence engineering specialist, groundwater specialist, surface water specialist and ecological specialist. The revised monitoring program will remain in place until such time UCMPL's subsidence engineering specialist and other specialists have confirmed operations at UUG are within predictions and/or within approved impacts.
 - Modifying the UUG mine plan as mining proceeds to ensure that the effects, impacts and/or associated environmental consequences remain within predictions and/or designated ranges and/or do not exceed a subsidence performance measures.
 - For example but not limited to Level 2 TARP conditions associated with groundwater, the Drip, surface water, cliff lines, UCMPL will review the UUG mine plan. If the review identifies a Level 2 TARP condition is likely to progress to a Level 3 TARP condition, UCMPL in consultation with the DPE may consider modifying the UUG mine plan as required to mitigate this risk and ensure UCMPL's subsidence performance measures are not exceeded.

An incident or a Level 3 TARP condition will initiate the review process as outlined in **Section 6.1** and a revision of this Extraction Plan and its component sub-plans. Any revised management strategies for the Extraction Plan 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.

5.6.2 Contingency Plan

In the event the subsidence performance measures in **Table 3** are considered to have been exceeded (i.e. Level 3 TARP condition **Table 24**), or are likely to be exceeded and/or a subsidence related incident has occurred (**Section 5.7.1**), the Contingency Plan as displayed in **Figure 15** will be implemented. Responsibilities during contingency response are outlined in **Section 6.0** to identify actions, levels of responsibility and reporting requirements of personnel.

Figure 15 Contingency Plan



5.7 Incidents, Complaints, Exceedances and Non-Compliances

5.7.1 Incident, Exceedances and Non-Compliances

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

UCMPL will notify the Secretary and any other relevant government agencies¹⁴, as identified in **Table 25**, as soon as practicable after becoming aware of the incident exceedance and/or if a Level 3 TARP condition has been determined (i.e. a subsidence performance measure is considered to have been exceeded, or is likely to have been exceeded). The notification must be in writing to compliance@planning.nsw.gov.au and identify the Project (including the project number and name) and set out the location and nature of the incident.

For other exceedances and/or non-compliances associated with the Extraction Plan that result in a Level 2 TARP determination (i.e. does not exceed a subsidence performance measure) and/or does not causes or threatens to cause material harm to the environment and remains compliant with PA08_0184, then as required by Condition 3, Schedule 5 of PA08_0184, these exceedances and/or non-compliances with the Extraction Plan will be reported in the Annual Review (**Section 5.8.1**).

UCMPL will also notify applicable landowners, public utility owners and NPWS of a Level 2 or 3 TARP condition, associated with either their property, built feature or is public safety related.

Within seven days of the date of the incident or determination of a Level 3 TARP condition, UCMPL will provide the Secretary of the DPE and any relevant agencies with a detailed report¹⁴ on the incident and/or Level 3 TARP condition, 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.

5.7.2 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

¹⁴ In accordance with Condition 6 & 6A of Schedule 5 of PA08_0184

- 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 Annual Review. Further details regarding community complaint management are described in Section 3.4.7 of the Environmental Management Strategy.

5.8 Reporting Framework

The key elements of the external reporting framework, include:

- Incident Reporting; and
- Annual Review.

Table 25 provides the detailed reporting framework, including which government stakeholders will receive copies of each report and the method of distribution.

Attachment D provides a list of the key government departments and contact details.

Table 25 Summary of Reporting Framework

Report	Frequency	Distribution	Distribution Method	UCMPL Responsibility
Incident Report	As required Section 5.7.1	DPE and DPE-RR, EPA (where relevant) DPE-Water, BCS (where relevant), NPWS (where relevant)	Email NSW Planning Portal	General Manager
Annual Review	Annually	DPE, DPE-RR, DPE-Water, NRAR, BCS, EPA, MWRC & CCC	NSW Planning Portal Email to MWRC & CCC Website (post approval)	Environment & Community Manager

5.8.1 Annual Review

UCMPL must review the environmental performance of the Project to the satisfaction of the Secretary. UCMPL must prepare an Annual Review 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 Annual Review 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.

A copy of the Annual Review and its associated reports and results regarding subsidence monitoring and evaluation of impacts are provided on the UCMPL website <http://www.ulancoal.com.au>

6. Plan Administration and Responsibilities

Key responsibilities for this Extraction Plan are summarised in **Table 26**.

Table 26 UCML Responsibility for this Extraction Plan

Responsibility	Accountabilities
Ulan Underground 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 Underground Technical Services Manager	• Ensure the Subsidence Effect Monitoring pertaining to the H and F Line are implemented, carried out within specified timeframes, are adequately checked, processed and are prepared to the required standard.
Environment and Community Manager (ECM)	• 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 investigation and response in the event the performance indicators, TARP Levels and/or Contingency Plan are triggered; and • Allocate resources for monitoring and review of subsidence monitoring survey results.
Environment and Community Coordinator (ECC)	• 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 Underground 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.
All UCML 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 UCML 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.

6.1 Review of the Extraction Plan

Ongoing monitoring and evaluating the performance of this Extraction Plan will be undertaken, and revised if necessary. The evaluation of performance during the review process (**Section 6.1**) 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, UCMPL 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 (ECM) (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 DPE and other relevant government agencies.

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

6.1.1 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.

7. Document Information

7.1 Definitions and Glossary

Table 27 Definitions

Term	Definition
AR	Annual Review
BFMP LW30-LW32 & LWW6-LWW8	Built Feature Management Plan for LW30-32 and LWW6-LWW8
BMP	Biodiversity Management Plan
BCS	Biodiversity, Conservation and Science Directorate (formally OEH)
CCC	Community Consultation Committee
DPE	Department of Planning and Environment (formally DPIE)
DPIE	Department of Planning Industry and Environment
DPE-Water	Department of Planning and Environment - Water
DPE-RR	Department of Planning 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 LW30-LW32 & LWW6-LWW8	Land Management Plan for LW30-32 and LWW6-LWW8
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 LW30-LW32 & LWW6-LWW8	Public Safety Management Plan for LW30-32 and LWW6-LWW8
SA NSW	Subsidence Advisory NSW (formally NSW Mines Subsidence Board)
RMP	Rehabilitation Management Plan
ROM	Run of Mine
SCT	SCT Operations Pty Ltd
SMP LW30-LW32 & LWW6-LWW8	Subsidence Monitoring Program for LW30-32 and LWW6-LWW8
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 28 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 29** below, is *information* that is directly referred to for the development of this document.

Table 29 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	- Extraction Plan Guideline (October 2022) - Saving our Species - Hygiene guidelines, protocols to protect priority biodiversity areas in NSW from <i>Phytophthora cinnamomi</i>, myrtle rust, amphibian chytrid fungus and invasive plants (DPIE 2020).
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-111515275-3700 Rehabilitation Management Plan - ULNCX-111515275-3124 Bobadeen Homestead Conservation Management Plan - ULNCX-111515275-1787 Old Ulan Conservation Management Plan
Other	- Umwelt (Australia) Pty Ltd, 2009. <i>UCMPL– Continued Operations Environmental Assessment</i> - Umwelt (Australia) Pty Ltd, 2012. <i>Modification to Continued Operations, Ulan West Mine Extraction Plan (Approved Panels 1 -4) Environmental Assessment</i> - Umwelt (Australia) Pty Ltd, 2015. <i>Modification to Continued Operations, Ulan West Modification Environmental Assessment</i> - Barnson Pty Limited (March 2015) – <i>UCML Creek Stability Assessments, 2014</i> - AXYS Consulting, 2016. <i>Extraction Plan (EP) for the Mining of UUG Longwalls 30 and W6 to W8</i> - SCT Operation Pty Ltd, 2016. <i>Subsidence Assessment for Extraction Plan LW30 and LWW6-LWW8 at Ulan Underground Mine</i> - Mackie Environmental Research (MER) Pty Ltd 2016. <i>Review of groundwater Impacts: Extraction Plan for Underground 3</i> - Umwelt (Australia) Pty Ltd, 2016. <i>Review of Subsidence Impacts on Surface Water UUG Longwall 30 & W6-W8.</i> - Eco Logical Australia Pty Ltd, 2016. <i>Flora and Fauna Impact Review for UUG Extraction Plan</i> - South East Archaeology, 2016. <i>Ulan Coal Mines limited, Central tablelands of new south wales: Report on aboriginal heritage for Ulan underground mine Longwall panels 30 and west 6 – 8 Extraction plan</i> - Eco Logical Australia Pty Ltd (ELA), 2018. <i>Ulan Continued Operations Project - Modification 4 Longwall Optimisation Project</i> - SCT Operation Pty Ltd 2019. <i>Subsidence Assessment for Amendment to LW30 & LWW6 – LWW8 Extraction Plan</i> - SCT (March 2022) – <i>2021 Annual Review of Subsidence Monitoring at Ulan West and Ulan Underground Mines</i>

Reference	Title
	• SCT Operation Pty Ltd 2022. <i>Subsidence Assessment for LW31-32 Extraction Plan</i> • ELA (August 2022) - <i>Ulan Underground LW31 and LW32 biodiversity impact review</i> • OzArk Environment & Heritage (August 2022) <i>Longwalls 31 and 32 Extraction Plan – Aboriginal, European & Natural Heritage.</i> • Engeny Water Management (August 2022) – <i>Extraction Plan – Review of Historical Surface Water Impacts</i> • Australasian Groundwater & Environmental Consultants (December 2022) <i>Groundwater Impact Assessment for Ulan Underground LW31-LW32 Extraction Plan.</i>

7.3 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 30** below.

Table 30 Change Information

Version	Date	Review team (Consultation)	Change Summary
0.1	October 2016	Tara Stokes, Robyn Stoney, Ben Anderson	Document Development.
0.2	October 2017	Jessica Southgate	Document formatting updated in accordance with Dept. of Planning feedback. Included statement of commitments summary.
1.0	May 2019	Robyn Stoney, Lucy Stuart and Brad Tanswell	Review and update in response to feedback received from DPIE, DPI Water and OEH in October 2018.
2.0	August 2019	Tara Stokes	Updated correspondence for DPIE Approval of plan 19/08/2019.
3.0	April 2020	Robyn Stoney, Lucy Stuart, Stephen Bragg	This EP was amended to align with the approved MOD4 for the extension of longwall panels.
4.0	December 2020	Robyn Stoney, Lucy Stuart, Stephen Bragg	This EP was resubmitted on the 21/12/2020 to address the requirements from the DPIE Water feedback.
5.0	December 2022	Lucy Stuart, Tara Stokes, Stephen Bragg, SCT, AGE, ELA, OzArk & Engeny	Revised to include: new Guidelines for an Extraction Plan (May 2022), inclusion of LW31 and LW32, amendment to LW32 and LW33 First Workings and incorporate comments from agencies as recieved on the 13 April 2023 after submission of draft EP on the 3 March 2023 and as received on the 23 June 2023.

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 **Table 30** of this Extraction Plan.

Attachment A – Guideline Requirements

Extraction Plan Guideline	Section Detail	Section Address in this Extraction Plan
1. Introduction	○ Title Page; ○ Executive Summary; ○ Table of Contents; ○ Background; ○ Plans of the approved development including the approved mining area, associated surface development and the underground mining area to which the Plan applies; ○ Scope; ○ Plan Structure; ○ Master Trigger Action Response Plan (summarising all sub-plans which been amended).	Section 1
2. Plan Development and Consultation	○ Plan Requirements; ○ Specialist Assessments; ○ Review of Previous Subsidence Predictions; ○ Risk Assessment; ○ Avoidance and Minimisation Strategies (if applicable); ○ Consultation.	Section 2
3. Subsidence Assessment	○ Overview only	Section 3
4. Monitoring Programs	○ Subsidence Monitoring Program; ○ Environmental Monitoring Program; ○ Baseline Data; ○ Surface Water Flows and Quality; ○ Swamps (if applicable); ○ Groundwater Flows and Quality; ○ Landforms; ○ Biodiversity; ○ Heritage Features; ○ Infrastructure and Other Built Features; ○ Ongoing Baseline Data Collection Program;	Section 4
5. Management, Mitigation, Remediation and Reporting Measures	○ Performance Measures and Indicators; ○ Management & Mitigation Measures; ○ Remediation and Rehabilitation Measures; ○ Trigger Action Response Plans (TARPs); ○ Adaptive Management and Contingency Planning; ○ Incidents, Complaints, Exceedances and Non-Compliances; ○ Reporting, Review and Auditing;	Section 5
6. Plan Administration and Responsibilities	○ Plan Administration and Responsibilities	Section 6
7. References	○ References	Section 7
8. Appendices	○ Key Sub-Plans: ○ Water Management Plan (WMP) (collective for SWMP, GWMP & SWGWRP) ○ Land Management Plan for LW30-LW32 & LWW6-LWW8 (LMP LW30-32 & LWW6-LWW8)*	Appendix A Appendix B

Extraction Plan Guideline	Section Detail	Section Address in this Extraction Plan
	○ Biodiversity Management Plan (BMP) ○ Built Features Management Plan for LW30-LW32 & LWW6-LWW8 (BFMP LW30-32 & LWW6-LWW8)* ○ Heritage Management Plan (HMP) ○ Public Safety Management Plan for LW30-LW32 & LWW6-LWW8 (PSMP LW30-32 & LWW6-LWW8)* ○ Subsidence Monitoring Program for LW30-LW32 & LWW6-LWW8 (SMP LW30-32 & LWW6-LWW8)* ○ Extraction Plans 1 to 7 Notes: * Key Sub-Plans as required by the Guidelines. **Management Plans as required by PA08_0184.	Appendix C Appendix D Appendix E Appendix F Appendix G Appendix H
9. Other Attachments	○ Draft Extraction Plan Guidelines and where they are addressed in the Extraction Plan. ○ Relevant Consultation Records ○ Correspondence from Agencies ○ Key Contacts ○ Environmental sensitive surface and sub-surface features checklist ○ Technical Reports (Subsidence) ○ Technical Report (Groundwater) ○ Technical Report (Biodiversity) ○ Technical Report (Heritage) ○ Technical Report (Surface water) ○ Predicted Groundwater Allocation	Attachment A Attachment B Attachment C Attachment D Attachment E Attachment F Attachment G Attachment H Attachment I Attachment J Attachment K

Attachment B - Relevant Consultation Records

Government Department	Summary of Consultation	Matters Raised by Department During Consultation
Department of Planning, Industry and Environment (DPIE)	20 June 2016 letter from UCMPL requesting specialist team endorsement. 21 June 2016 meeting of DPIE and UCMPL representatives (DPIE Sydney) - outline the proposed Application Area and discuss the requirements of the Extraction Plan. 27 June 2016 letter from DPIE endorsing specialist team. 13 September 2016 follow up meeting of DPIE, DRE and UCMPL representatives (DPIE Sydney Office) - management and monitoring of key features of the Application Area and timeline for submission of the Extraction Plan. 10 October 2016 draft Extraction Plan provided for agency review 21 March 2017 – Forwarded feedback from EPA, DRG, DoI-Water and OEH 3 October 2017 – DPIE provided feedback on their review of the EP - Extensive consultation undertaken during the preparation of MOD4 (refer to <i>Section 3.2 Community and Other Stakeholder Engagement in Ulan Continued Operations Project - Modification 4 Longwall Optimisation Project Environmental Assessment</i>). 12 September 2018 DP&E request agencies provide further feedback. 12 October 2018 further feedback from agencies provided to UCMPL. 30 May 2019 Extraction Plan re-submitted to DPIE. 2 July 2019 DoI Water endorses the approval of the Extraction Plan. 9 August 2019 meeting with DPIE to discuss Extraction Plan, MOD 4 and revising all management plans including the Extraction Plan to align the recently approved MOD 4 on the 17 July 2019. - DPIE approved the Extraction Plan 19 August 2019. - The amended EP to align with MOD4 was submitted for reapproval on the 7 August 2020.	- DPIE sought clarification that no offset or conservation areas are within the Application Area (21/06/2016). Email response (22/06/2016) there are no Ulan offset or conservation areas within the Application Area. A small section of the Durridgere State Conservation Area is within the Application Area. - DPIE to be kept informed of any issues or concerns raised by regulators during consultation for preparation of the extraction plan. - Corrections to numbering, cross referencing, include detailed consultation (provided in Attachment 2) and timing and frequency of inspections for the PSMP. The updated plans were provided on 30/10/2017. - DPIE requested further assessments in relation to potential rock falls, Aboriginal Heritage and shallow aquifers on private property from subsidence in relation to MOD 4. UCMPL provided this information in January 2019. - The DPIE requested on the 2 September 2020 further consultation with the DPIE-Resource Regulator (DPIE-RR) and DPIE-Natural Resources Access Regulator (DPIE-NRAR) was required for the Extraction Plan amendment.

Government Department	Summary of Consultation	Matters Raised by Department During Consultation
Department of Planning, Industry and Environment (DPIE) – Resource Regulator (DPIE-RR)	29 June 2016-meeting of DRG and UCMPL representatives (DRG Maitland)- Outline of proposed Application Area and discuss the preparation requirements of the EP. 13 September 2016 follow up meeting of DPIE, DRG and UCMPL representatives (DPIE Sydney Office) - management and monitoring of key features of the Application Area and proposed timeline for submission of the EP. 10 October 2016 Provision of draft Extraction Plan for review. 24 February 2017 – Letter DRG to DPIE responding to the draft Extraction Plan - On the 17 September 2020, UCMPL sought further consultation with DPIE-RR as requested by DPIE, specifically to the amended Subsidence Monitoring Program, Built Features Management Plan, Public Safety Management Plan and the Rehabilitation Management Plan.	- Ensure rehabilitation strategies to address subsidence induced impacts are included in the EP. Request a joint meeting with DPIE once draft plans are ready (29/06/16), this was held on 13 September 2016 - The plans are requested to be in final form so that they can be approved (24/02/2017) - On the 6 November 2020, the Resources Regulator provided its reviewed of the amended Extraction Plan and is of the view that the modified mine plan does not materially change the health & safety risk due to subsidence at the site to that subject to the already approved Extraction Plan (refer to Attachment 2)
Mid-Western Regional Council (MWRC)	8 July 2016 letter sent to MWRC informing that preparation of the EP has commenced. 10 October 2016 Provision of draft Extraction Plan for review.	No matters raised at the time of submission, or since.
NSW Environment Protection Authority (EPA)	8 July 2016 letter sent to EPA informing that preparation of the EP has commenced. 10 October 2016 Provision of draft EP for review. 24 February 2017 EPA feedback supplied to DPE.	- No matters raised at the time of submission - On 24/02/2017: Noted no changes to TSS in Creeks and impacts not greater than predicted. The 2016 Creek stability assessment should have been used if it was available (the 2016 survey had not been completed at the time of submission of the extraction plan). - Recommends stream health monitoring is conducted annually and be conducted at a similar time of the year.
Natural Resources Access Regulator (NRAR), Department of Planning, Industry and Environment (DPIE) – Water (DPIE-Water)	8 July 2016 letter to DoI – Water informing that preparation of the EP has commenced. 10 October 2016 Provision of draft EP for review. 6 March 2017 Letter DoI-Water to DPIE, feedback on draft EP 18 May 2017 Comments and UCMPL responses returned to DoI—Water and DPIE ~12 September 2018 DPIE sent responses provided by UCMPL to request their further feedback 12 October 2018 – DoI provided feedback on UCMPL response	UCMPL should consult with DoI—Water to ensure the adequate Water Allocation. Greater detail on private bore and dam monitoring and management requested. Ponding and erosion monitoring to occur annually as well as pre and post mining. Reporting of flow events in the Mona Creek. Reporting of water take against WAL in the Annual Review, including losses from surface streams where applicable. Detail when notification of an incident to DPI Water will occur. Reporting of stream health, monitored annually, and water consumption records in the Annual Review. Flow gauges should be installed on the Goulburn River both up and downstream of ‘the Drip’.

Government Department	Summary of Consultation	Matters Raised by Department During Consultation
	- On the 17 September 2020, UCMPL sought further consultation with DPIE-NRAR as requested by DPIE. - On the 17 December 2020, NRAR provide its review of the amended Extraction Plan. - On the 21 December 2020, UCMPL provided a letter response with an update and further information addressing NRAR's recommendations.	Consider the installation of a Class A Evaporation Pan gauge. - Updated water licencing strategy requested and re-iterated the request for upstream and downstream flow gauges at the Drip and the Class A Evaporation Pan (12/10/2018). - On the 17 December 2020, NRAR provide its review of the amended Extraction Plan and recommended the following (refer to Attachment 2): Prior to Approval 1. <u>Licencing</u> Provide a breakdown of the peak annual groundwater flow being incidentally taken / dewatered; for each of the groundwater sources to be intersected by the project including breakdown by management zone where applicable (Refer to letter response from UCMPL dated 21 December 2020). 2. <u>Site Water Balance</u> The Applicant should present an amended site water balance which demonstrates predicted and actual inflows and take of groundwater from each water source - including management zones if applicable – considered essential to demonstrate compliance with the AIP and WMA. (Refer to letter response from UCMPL dated 21 December 2020). 3. <u>The Drip</u> In addition to current pore pressure and water quality monitoring, the Applicant should commit to undertaking and reporting of regular visual inspection and qualitative assessments of the 'The Drip' flows for the purpose of determining any or no impacts due to mining activities Refer to Appendix A Section 4.2.3.1 of the Water Management Plan and Table 27 of this EP). Not Required Prior to Approval 4. <u>Mona Creek Alluvium Monitoring</u> The Applicant should install the proposed monitoring bores and VWP, as per Enclosure 1, as soon as practical in order to meet the requirement of a minimum two years of temporal and spatial baseline data. (Refer to letter response from UCMPL dated 21 December 2020). 5. <u>Evaporation Monitoring</u> Install a class A Evaporation Pan on site (Refer to letter response from UCMPL dated 21 December 2020).

Government Department	Summary of Consultation	Matters Raised by Department During Consultation
		6. EMP Documents Assessment Criteria and TARPs should be updated to include additional monitoring points. The Applicant should update the relevant UCML environmental management plan documents (Water Management Plan, Groundwater Monitoring Program, Surface Water Monitoring Program etc.) to align with amendments to the Extraction Plan for LW30 and LWW6-8 and related sub-plans, and the recommendations provided in this assessment (e.g. adjusted drawdown contours, additional monitoring points, assessment criteria, and TARPs). (Refer to letter response from UCML dated 21 December 2020).
Mine Subsidence Advisory (MSA)	8 July 2016 letter sent to the MSAMSA providing information regarding the commencement of preparation of the Extraction Plan LW30 & W6-W8. MSA to receive copy of the draft Built Features and Public Safety Management Plans and Subsidence Monitoring Program once prepared. - Email request on the 19 July 2016 from the MSA requesting opportunity to review a copy of the extraction plan in relation to; - Any surface improvements likely to be impacted by subsidence. - Detailed performance indicators as per Table 14, s.24 (Project Approval 08_0184), ensuring surface improvements remain safe, serviceable and repairable. - Current predictions of the potential subsidence effects and impacts (in respect of surface improvements). - Measures to ensure compliance with the performance measures. - Extent of subsidence monitoring in respect of surface development. 21 October 2016 Provision of draft Extraction Plan for review including response to information requested in email 19 July 2016.	No matters raised at the time of submission or since.
Department of Planning, Industry and Environment (DPIE) – Biodiversity and Conservation Division (DPIE-BCD) Formally NSW Office of Environment & Heritage (OEH)	8 July 2016 letter sent to OEH providing information regarding the commencement of preparation of the Extraction Plan LW30 & W6-W8. 28 September 2016 Phone conversation with Senior Team Leader Planning – North West Region	- OEH request the opportunity to review the draft Extraction Plan and Technical Heritage report prior to the proposed meeting (21 Oct 2016). - Identify how an appropriate amount of data will be collected for statistical analysis and identify statistical tests. Clarify the number

Government Department	Summary of Consultation	Matters Raised by Department During Consultation
	regarding the status of heritage survey on Private Property within the Application Area. 10 October 2016 Provision of draft Extraction Plan for review. 24 February 2017 Letter OEH to DPIE. 25 September 2018 Email OEH to DPIE.	of observations and time period for a 'declining trend'. Amend the monitoring program (Table 5) to be consistent with Section 8.3 of BMP. Review performance indicators prior to finalisation of the extraction plan.
NSW National Parks & Wildlife Service (NPWS)	28 June 2016 meeting outlined Extraction Plan Application Area and predicted impacts. 8 July 2016 letter sent to NPWS providing information regarding the commencement of preparation of the Extraction Plan LW30 & W6-W8. NPWS to receive copy of the draft Water, Land, Biodiversity and Public Safety Management Plans once prepared. 26 September 2016 Consultation regarding proposed management and monitoring of potential subsidence within the Durridgere State Conservation Area. 10 October 2016 Provision of draft Extraction Plan for review. - Draft DSCA Access Licence issued from UCMPL to NPWS 4 March 2019 in relation to MOD4 infrastructure. - NPWS replied on 26 July 2019 with updates regarding the DSCA Access Licence process. - DSCA Access Licence issued by NPWS for Execution on the 5 June 2020.	No matters raised at the time of submission or since.

Agency/ Date	Document and Section	Comments	UCMPL Response
DRG 24 February 2017	All	Summarised: As the EP is potentially not in final form it is not proposed to make any formal expression of satisfaction with respect to the Subsidence related plans until such time as it is confirmed that the plans are final, and are marked thus. However, from an initial perusal of the submitted drafts the subsidence engineer has not identified any major issues of concern which cannot be addressed after final submission of the EP and formal request for expression of satisfaction. Rehabilitation: DRG will provide an expression of satisfaction recommendation for the rehabilitation plan. Please advise if DPE seek DRGs comment in relation to a Resource Recovery Plan as the conditions of the consent do not appear to call for DRE input into any recovery plan.	Revised plans are forwarded as 'final' and will be sent to DRG as well as DPE UCMPL is not required to prepare a Resource Recovery Plan
OEH 24 February 2017	Appendix C: Biodiversity Management Plan Longwall 30 & LWW6-W8	The extraction plan should identify how an appropriate amount of data will be collected for statistical analysis. The statistical tests to be undertaken should also be identified.	The performance indicators were reviewed applying the SMART principle (specific, measurable, achievable, realistic and timely). The indicators no longer rely on a statistical analysis, rather they are measured by a >10 per cent negative movement over two or more monitoring periods.
	BMP LW30 & W6-W8 Section 3.3	The term 'declining trend' should be clarified as to how many observations over a defined period of time would be accepted as a trend.	The BMP LW30 & W6-W8 has been updated to reflect the following definition of a declining trend: A declining trend is a negative movement in species richness score or abundance observations over two or more monitoring periods outside of normal seasonal fluctuations.
	BMP LW30 & W6-W8 Table 5	That the monitoring program listed as Table 5 is amended to reflect the approved monitoring program as identified in Section 8.3 of the Biodiversity Management Plan (dated 11 November 2015).	The monitoring program identified in Table 5 reflects the draft Biodiversity Management Plan (BMP) submitted to DPIE for approval in June 2016. It is anticipated that approval for this management plan would be received prior to the commencement of mining within the Extraction Plan area (due to commence in March 2020). The Aquatic/Stream Health Monitoring Program will occur annually. Targeted Subsidence impact monitoring for cave dwelling micro-bat species as well as monitoring of some control sites will continue to occur annually as proposed in the BMP LW30 & W6-W8. Floristic Based Subsidence Monitoring sites will continue to be monitored twice per year as proposed in the BMP LW30 & W6-W8. Feral Pest Monitoring will be undertaken annually. Monitoring which is proposed to remain biennial in accordance with the draft BMP LW30 & W6-W8 and the draft BMP submitted to DPIE; • Woodland Bird Surveys; • Acoustic Bird Detection for Swift Parrot, regent Honeyeater and Masked Owl; • Microbat Monitoring at sites outside the area of undermining, and • Floristic Monitoring at sites outside of the area of undermining. Annual monitoring of these programs has occurred in the past as per the current approved BMP (dated 11 November 2015), this was revised to biennial in line with recommendations from Eco Logical Australia on the basis that annual monitoring was providing consistent results. If changes are detected between monitoring campaigns in the future the Performance Indicators will be triggered and the TARP activated which will require a review of monitoring frequency.

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response
EPA 24 February 2017	Review of subsidence impacts on Surface Water UUG Longwall 30 & LWW6-W8	In relation to the Review of Subsidence Impacts, the EPA notes there have been no changes to surface water quality in Ulan, Mona, Curra and Bobadeen Creeks with respect of TSS and there is no greater impact beyond that previously predicted. The creek stability assessment for Ulan and Bobadeen Creeks undertaken in 2015 identified 3 active erosion sites within the subsidence impact zone of Bobadeen Creek and 21 were identified in Ulan Creek. The assessment indicates there was no visible signs of subsidence impact within the creek lines and erosion was most likely attributed to natural processes such as high flow events. These results are generally consistent with the 2014 assessment. The assessment does not indicate when the 2015 was conducted and why the results of a 2016 survey were not utilised for the assessment. The EPA recommends that the Department of Planning and Environment (DPE) request the proponent provides justification for not utilising 2016 data in its assessment, should it have been available.	Creek Stability Assessments are conducted annually for the Ulan Complex; the 2016 Creek Stability Assessments were conducted in December 2016 after the submission of the draft Extraction Plan LW30 & W6-W8. The 2016 Creek Stability Assessment concluded there was no visible signs of subsidence impact within the creek lines. This report is Attachment G of the 2016 Annual Review available on the UCMPL website at http://www.ulancoal.com.au/EN/ReportsandPublications/Pages/AnnualEnvironmentalManagementReport.aspx
	Appendix A: Water Management Plan Longwall 30 & LWW6-W8 Section 4.2.2	Section 4.2.2 of the Water Management Plan provides that stream health monitoring is to be conducted every 2 years with the results to be utilised to determine if a response is required in accordance with the Trigger Action Response Plan (TARP). The EPA considers that a frequency of 2 years between sampling events is insufficient to adequately determine trends and if a response is required, in a timely manner. The EPA recommends that the stream health assessment be conducted at least yearly and be conducted at a similar time of the year.	Stream health assessments will be conducted annually and will take place at a similar time each year. The Extraction Plan LW30 & W6-W8 and WMP LW30 & W6-W8 have been updated as such.
DPI Water 6 March 2017	WMP LW30 & W6-W8	It is noted that reference is made throughout the Extraction Plan and the Water Management Plan (WMP) regarding licensing of the consolidated and sedimentary aquifers to the east of the Great Dividing Range as occurring under the Water Act 1912. It should be considered that on 1 July 2016 the Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016 was gazetted. As such 20BL173821 was converted to 20AL214787 with 7060 shares within the Oxley Basin Coast Groundwater Source.	Section 2.3 of the WMP LW30 & W6-W8 updated to reflect current water licences held by UCMPL and allocations held.
	WMP LW30 & W6-W8 Section 2.3.2.1	Section 3.2.21 of the WMP should be updated to reflect current advice in the letter from Department of Planning & Environment, dated 6 February 2017. This letter states that discharge into the Goulburn River does not remove the obligation of acquiring the appropriate Water Access Licence (WAL) under the Water Management Act 2000 to account for baseflow loss. It is important to note that the proponent currently has a meeting scheduled with DPI Water on 17 March 2017 to discuss this matter.	Section 2.3.2.1 of the WMP LW30 & W6-W8 updated to reflect consultation undertaken with NSW DPI-Water. At the 17 March 2017 meeting with DPI-Water, UCMPL raised the question of using existing Water Licence WAL19047 for the Upper Goulburn River Water source with a current allocation of 600 Shares to offset baseflow losses to the Goulburn River. Further information on current usage of the licence shares including evaporation of Moolarben Dam and riparian flows as required by the licence conditions was requested by DPI-Water. This information was included in the 2016 Annual Review (page 69) and is provided below.

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response														
			A total of 207.6 ML of entitlement under water access licence WAL19047 was used during the <table><tr><th>Water Licence</th><th>Water sharing plan, source and management zone (as applicable)</th><th>Entitlement (Shares)</th><th>Shares in ML for 2016 Water Year</th><th>Passive take / outflows</th><th>Active pumping</th><th>TOTAL</th></tr><tr><td>WAL19047 (20WA 209953)69</td><td>Moolarben Creek Dam / Pump / Water Supply Upper Goulburn River Water source</td><td>600</td><td>600</td><td>205.19*</td><td>2.442</td><td>207.6</td></tr></table> reporting period (extraction limit of 600ML). Usages included 2.442 ML being extracted from Moolarben Creek Dam/Pump, 144.92ML of water was released as flow through the dam wall as per the conditions of the license and 42.02ML being evaporated from the Moolarben Dam during the reporting period. UCMPL proposed that it would be reasonable that 18.25ML of the remaining 410.62ML is allocated to offset baseflow losses to the Upper Goulburn River Water Source.	Water Licence	Water sharing plan, source and management zone (as applicable)	Entitlement (Shares)	Shares in ML for 2016 Water Year	Passive take / outflows	Active pumping	TOTAL	WAL19047 (20WA 209953)69	Moolarben Creek Dam / Pump / Water Supply Upper Goulburn River Water source	600	600	205.19*	2.442	207.6
Water Licence	Water sharing plan, source and management zone (as applicable)	Entitlement (Shares)	Shares in ML for 2016 Water Year	Passive take / outflows	Active pumping	TOTAL											
WAL19047 (20WA 209953)69	Moolarben Creek Dam / Pump / Water Supply Upper Goulburn River Water source	600	600	205.19*	2.442	207.6											
	WMP LW30 & W6-W8 Section 2.1	It is also noted that the proponent may have a shortfall in required WAL and actual WAL for this underground mining program. It is recognised that this will also be discussed at the meeting on 17 March 2017, thus the Extraction Plan should be updated to reflect ongoing consultation with DPI Water to ensure the site is appropriately licensed. To assist in this transparency, the WMP should be updated to include the relevant WAL held in relation to extraction of LW30 and LWW6-W8.	Consultation with DPI-Water updated in Section 2.1 of the Extraction Plan. The WMP LW30 & W6-W8 be updated to include reference to the relevant WAL/s held in relation to the extraction of LW30 and LWW6-W8: 20AL214787 for dewatering in the Oxley Basin Coast Groundwater Source, 7060 shares: - WAL27887** for dewatering in the Sydney Basin of the Murray Darling Basin Groundwater Source, 750 shares; - WAL37192 for dewatering in the Sydney Basin of the Murray Darling Basin Groundwater Source, 704 shares; - WAL36667 for dewatering in the Sydney Basin of the Murray Darling Basin Groundwater Source, 0 shares; Additional allocations (4031 shares) for the Sydney Basin Murray Darling Basin water sources relating to <i>Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011</i> have been secured as part of the controlled Allocation Order. **Extraction of water allocated to Wallerawang Collieries Limited by WAL27887 will be undertaken by UCMPL, facilitated under the NSW Office of Water ‘Application to change water access licence’ process														
	Appendix J: Private Property Subsidence Management Plan	Appendix J ‘Woodbury’ Private Property Subsidence Management Plan should include detail of proposed monitoring of water storages, particularly Dam 4. It is understood that there may also be a bore on this property; this should be shown on a figure within Appendix J. To assist with review of this plan the cadastre reference should also be provided.	Appendix J ‘Woodbury’ Private Property Subsidence Management Plan has been updated for the Extraction of LWW5 and UWO LW6 in consultation with the property owner. These updates will be incorporated into the LWW6 PPSMP and developed in consultation with the property owner. WMP LW30 & W6-W8 reference to Figure 15 has been corrected to Figure 3 and Private Bore labels added.														

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response																											
		The WMP refers to private bores shown in Figure 15, however the WMP does not include this figure. It is recommended this figure be added and further detail incorporated regarding compensatory water supply arrangements and make good provisions for these users. Detail should also be included for any make good provisions negotiated for the “Woodbury” property. It is recommended that where access is permitted, private bores be surveyed for both ground levels and headworks. Also, further detail should be provided regarding impacts on PB9, PB11, PB14, PB21, PB30 and PB32. This should include detail of current bore depth, water level and predicted level of drawdown.	The WMP LW30 & W6-W8 has been updated to include a section on compensatory water supply arrangements and make good provisions for private bore owners potentially impacted by groundwater drawdown. Appendix J ‘Woodbury’ Private Property Subsidence Management Plan Section 4.3.3 Compensatory Water Supply Agreement states that UCMPL will have in place a legally binding Alternative Water Supply Agreement with the landholder (which was drafted and provided to the landholder for review prior to submission of the draft extraction plan). The Alternative Water Supply Agreement has also been formally agreed with the Woodbury property. UCMPL will survey the Private Bores monitored during the 2017 annual private bore survey in order to obtain RLs and calculate standing water levels. It is noted that UCMPL do not control the use of these bores and therefore it is possible that bores are surveyed following use prior to recharge to standing water level. The following table of Private Bores predicted to be impacted with the predicted level of drawdown has been added to the WMP LW30 & W6-W8: <table><tr><th>Private Bore Number from Groundwater Monitoring Program</th><th>Predicted Level of drawdown 2009 Model (m)</th><th>To be undermined</th></tr><tr><td>PB2</td><td>40</td><td>Yes</td></tr><tr><td>PB8</td><td>80</td><td>Yes</td></tr><tr><td>PB9</td><td>2</td><td>No</td></tr><tr><td>PB11</td><td>5</td><td>No</td></tr><tr><td>PB14</td><td>2</td><td>No</td></tr><tr><td>PB21</td><td>5</td><td>No</td></tr><tr><td>PB30</td><td>2</td><td>No</td></tr><tr><td>PB32</td><td>2</td><td>No</td></tr></table>	Private Bore Number from Groundwater Monitoring Program	Predicted Level of drawdown 2009 Model (m)	To be undermined	PB2	40	Yes	PB8	80	Yes	PB9	2	No	PB11	5	No	PB14	2	No	PB21	5	No	PB30	2	No	PB32	2	No
Private Bore Number from Groundwater Monitoring Program	Predicted Level of drawdown 2009 Model (m)	To be undermined																												
PB2	40	Yes																												
PB8	80	Yes																												
PB9	2	No																												
PB11	5	No																												
PB14	2	No																												
PB21	5	No																												
PB30	2	No																												
PB32	2	No																												
	Ulan Underground Extraction Plan LW30 W6-W8 and WMP LW30 & W6-W8	It is recommended that the Ponding and Erosion monitoring as noted in Table 27 of the Extraction Plan occur both annually and pre and post mining	Ponding and Erosion monitoring in Table 28 of the Extraction Plan and Table 4 of the WMP LW30 & W6-W8 has been adjusted to occur ‘annually, pre and post mining’.																											
		Annual reporting on Mona Creek should include information on flow events following a significant rain event	Mona Creek surface water monitoring station SW10 has an automatic water sampler with flow detection. When flow in the creek line is detected a water, sample is automatically taken. The sample is then collected by UCMPL and sent to the laboratory for analysis for the following parameters: pH, EC, TSS, TDS and Turbidity. A summary of these results is provided in the Annual Review.																											

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response
			The Annual Review 2018 will include a summary of flow events recorded at flow gauging stations in creek lines, including Mona Creek.
	Ulan Underground Extraction Plan LW30 W6-W8 Section 4.3.3	Section 4.3.3 of the Extraction Plan should state that the AEMR must report on compliance with WAL conditions. This should also address whether any surface cracking has caused loss of surface water and if so identify under which WAL this loss was accounted by.	Section 4.3.3 of the Extraction Plan updated to reflect reporting on compliance with WAL conditions including any losses from surface cracking. Compliance with WAL conditions and shares was provided in the 2016 Annual Review. Where surface cracking is identified in creek lines or tributary flow lines an estimate of surface water loss to the underground, based on rainfall and previous flow monitoring data, will be provided in the Annual Review. The estimated surface water loss will be accounted in the relevant WAL and recorded in the Annual Review. No surface cracking was identified in creek lines or tributary flow lines in 2016.
	Appendix A Water Management Plan LW30 & W6-W8	Table 7 (Trigger Action Response Plan) should detail notification to DPI Water for level 1 and level 2 exceedances and proposed remediation and make good measures to be implemented following such exceedances.	Table 8 of WMP LW30 & W6-W8 updated to include notification to relevant government regulators (including DPI Water) under the Action component of the TARP for level 2 exceedances. Level 1 exceedances are exceedances of the performance indicators, which are a trigger for further investigation and assessment of cause/s to determine if the reason for the exceedance is due to mining within the application area. If this is confirmed to be the case the exceedance would now become a level 2 exceedance requiring notification to DPI-Water. All TARP triggers and investigations conducted will be reported in the Annual Report for the Extraction Plan LW30 & W6-W8 which will form part of the Annual review.
	Surface Water Monitoring Program (ULN SD PLN 0055)	It is recommended that stream health monitoring occur annually and be reported within the Annual Environmental Management Report (AEMR) this should include reporting on the condition of riparian vegetation and red gum forest and include recommendations for remediation when required in accordance with DPI Water Guidelines for Controlled Activities on Waterfront Land (2012). Such recommendations should also be included in the AEMR regarding stream stability and proposed erosion control measures.	Stream Health Monitoring has been adjusted to occur Annually in the Surface Water Monitoring Program (ULN SD PLN 0055), Biodiversity Management Plan (ULNCX-111515275-225), Extraction Plan LW30 & LWW6-W8 and Water Management Plan LW30 & LWW6-W8. Reporting on Stream Health Monitoring will be reported annually in the Annual Review, this will include an assessment of riparian vegetation at the monitoring locations. A floristic based monitoring site will be established within Blakelys Red Gum Open Forest within the Extraction Plan Application Area. The results of this monitoring will be available in the Annual Review. A summary of subsidence remediation activities completed and those outstanding at the end of the reporting year will be included in the Annual Review.
	Groundwater Monitoring Program (ULN SD PLN 0056)	The AEMR should include metered records of all water use on site and measure all inflows observed underground, noting the locations of significant underground seeps and their association with any identified geological structural features. This should be presented with detail on underground water take, gauging locations and information of underground groundwater storage. This should also be described in the Extraction Plan.	Section 4.2.3 of Extraction Plan WMP LW30 & W6-W8 updated with further details of water measurement process at Ulan. Section 4.2.6 of the Groundwater Monitoring Program specifies a summary of water management issues will be provided in the Annual Review (AR). This summary will include, but not be limited to, the following: • summary/analysis of groundwater monitoring results; • any variances from groundwater model predictions; • any notifications or complaints received from private landowners relating to groundwater issues; and

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response
			any actions required to be taken to mitigate groundwater impacts on privately owned bores. A summary of the site water balance is included in the Annual Review (AR) including groundwater inflows and groundwater extraction by metered records. The AR specifies groundwater extracted against current licences and allocations. Reporting for the Extraction Plan will be undertaken consistent with the above requirements from the Groundwater Monitoring Program and Water Management Plan.
		'The Drip' is a groundwater dependent feature. The following recommendations are made to assist in differentiating between climate and mine related impacts.	The EA (Umwelt 2009) Groundwater Assessment (MER, 2009) identified that no impacts are predicted to occur to 'The Drip' as a result of UCMPL mining operations which are moving northward and westward away from the feature. 'The Drip' feature is not anticipated to be impacted by mining within the Extraction Plan area and therefore is not included in the WMP LW30 & W6-W8. The Drip monitoring program is outlined in Section 4.1.9 of the Groundwater Monitoring Program (ULN SD PLN 0056).
		Flow gauges should be installed on the Goulburn River both up and downstream of 'the Drip'	Flow gauges are not proposed for install due to numerous vectors impacting on the Drip site. Data from flow gauges would be subject to noise and inefficiencies making it unfeasible for purpose.
		Further information is required regarding pools on ephemeral streams emanating from the mine site towards the general vicinity of 'the Drip' on the Goulburn River and monitor water levels in these pools.	- Flow monitoring gauging stations with automatic grab samplers are installed in Spring Gully (SW06), Bobadeen Creek (SW07) and Curra Creek. These are monitored for flow and sampled if flow is present following any >30mm rainfall events. These results will be reported in the UCMPL Annual Review 2018. - Semi-permanent water pools will be monitored via the ponding monitoring methodology with Extraction plan areas pre and post mining. No such pools exist within Curra Creek in the Extraction Plan LW30 & W6-W8 Application Area. Hydro geochemical monitoring was implemented at 'The Drip' in 2012 to provide information about the water source.
		A cluster of monitoring bores should be drilled into multiple aquifers at the closest practical location to 'the Drip'. This site should be between the mine site and this feature. Aquifer testing should be conducted and automatic water level loggers installed for each aquifer monitored. Commentary should be included justifying the proposed location and discussion regarding the limitations to this monitoring.	In late 2015, a Vibrating Wireline Piezometer (VWP) consisting of 8 transducers was installed approximately 400m north of the Drip. The purpose of this VWP is to gain a further understanding of the recharge source of the Drip. Pore pressure readings will be recorded daily using a data logger and will be analysed on a 3-monthly basis, as part of the Northern Monitoring Network. Commentary regarding selection of the location has been added to the GWMP during the Annual Review of Management Plans to be submitted to DPIE by the end of June 2017. Monitoring of 'The Drip' will be undertaken in accordance with the Groundwater Monitoring Program with these results reported in the Annual Review.

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response
		A hydrogeological discussion should be included regarding the anomalous drawdown results observed on the drawdown maps to the south of 'the Drip'.	The drawdown contours referred to were provided in the EA (Umwelt 2009) Groundwater Assessment (MER, 2009). For further detail on methodology and predictions please refer to this report available on the UCMPL Website at http://www.ulancoal.com.au/EN/OperatingApprovals/Pages/MajorApprovals
		Further definition of the catchment areas for both surface and groundwater sources following towards 'the Drip' and the Goulburn River should be provided to assist in informing required monitoring.	Surface Water Catchment Boundaries are provided in Figure 2.3 of the Water Management Plan (ULNCX-111515275-99). These will also be included in the Surface Water Monitoring Program (ULN SD PLN 0055) during the Annual Review of Management Plans to be submitted to DPIE by the end of June 2017. Catchment boundaries for groundwater sources has been included in the Water Management Plan (ULNCX-111515275-99) and Groundwater Monitoring Program (ULN SD PLN 0056) during the Annual Review of Management Plans that were submitted to DPIE at the end of June 2017.
		Geological cross-sections depicting hydrological features, including along the groundwater flow path from areas of maximum drawdown towards 'the Drip' and the Goulburn River should be provided. This should be sufficiently detailed to create an understanding of how each aquifer and surface water body interact with these features.	Relevant Geological Cross Sections have been included in the Groundwater Monitoring Program (ULN SD PLN 0056) during the Annual Review of Management Plans to be submitted to DPIE by the end of June 2019.
		It is recommended that key monitoring bores being monitored quarterly have automatic water level loggers installed.	Approximately half of the monitored bores across the breadth of the regional monitoring network are equipped with loggers. The piezometer wells contribute to the water chemistry section of the program. The wells were not constructed suitable to be retrofitted with logging technology and would require re-drilling and subsequently high financial costs to retrofit. Wells installed without loggers may be frequently dipped if needed to investigate water level changes.
	Water Management Plan (ULN SD PLN 0017)	All incident reports and submission of the AEMR to DPI Water must occur electronically to water.referrals@dpi.nsw.gov.au .	Acknowledged, UCMPL will make a footnote to this effect in the Water Management Plan (ULNCX-111515275-99).
	Groundwater Monitoring Program (ULN SD PLN 0056)	It is recommended that Glencore consider the installation of a Class A Evaporation Pan and rainfall gauge or provide justification for alternative physics-based methods for calculating groundwater recharge.	UCMPL plan to use daily pan evaporation from the SILO Data Drill for the water balance model. The Data Drill is a system which provides synthetic data sets for a specified point by interpolation between surrounding point records held by the Bureau of Meteorology https://www.longpaddock.qld.gov.au/silo/datadrill/). The Data Drill interpolates between actual stations. The nearest stations to Ulan are at Scone SCS (112 km NE) and Wellington (83km SW). The daily maintenance and installation of an evaporation pan is not considered to be warranted.
DPE 3 October 2017	Entire Document	There are errors in most management plans, including incorrect cross references and automatic cross-referencing. For example, cross reference to "Section 0" occurs throughout the EP and the Rehabilitation Management Plan has "Error! Reference source not found". Some sections are also incorrectly numbered. Check the entire document for these errors and update	The plans are updated. Unfortunately, it is a fault in these types of documents, that are templates from a document control server that the 'error source reference not found' may occur when the document is saved to any new folder. When the document is finalised and uploaded onto the server the glitches are resolved, so the final document would not have any of these errors.
		Include all changes proposed in response to input from by OEH, EPA and DPI Water	Updated Appendix A: WMP LW30 W6-W8, Appendix C MBP LW30 W6-W8, Appendix F: PSM LW30 W6-W8, Appendix J: Woodbury PPSMP and UUGEP LW30 W6-W8 to reflect comments made by OEH, EPA, DPI—Water and DPE. Changes (UCMPL responses to comments) coloured by:

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response
			OEH Orange type EPA Purple type DPI Water Blue type DPE Red type All of the type will be converted to black text in the final version of the document
	UUEP LW30 W6-W8	Include a summary of the commitments in the EA and cross reference where they have been managed within the EP	Summary table of statement of commitments included in UUEP LW30 W6-W8.
	Ulan Underground Extraction Plan LW30 W6-W8 Section 2.1.1	Update consultation section to include the tables provided in correspondence to the Department [DPE] dated 22 May and 18 May	Table 7 Summary of Consultation with Government Agencies updated to include correspondence from DPE dated 18 May and 22 May 2017
	Public Safety Management Plan	Review Table 5 of the public safety management Plan and add details for the timing and frequency of all inspections	Inspections to occur monthly from commencement of longwall to six months post mining for Roads and Tracks and General Surface on UCMPL land and on Durridgere State Conservation Area, and inspection schedule proposed for private property, though this is dependent on agreement of the private property owner.
OEH 25 September 2018	BMP	The SMART targets for monitoring should be provided before the management plan is finalised	Targets revised in the BMP, these were updated previously but were lost in a versioning problem, they are now re-entered
DPI Water 12 October 2018	WMP and GWMP	Provide strategy for achievement of necessary water allocations for the life of mine proposed water extraction The proponent must install a Class A Evaporation Pan and rainfall gauge to appropriate standards as part of the broader water monitoring program The proponent must establish flow monitoring points upstream and downstream of 'The Drip' (and incorporate this into the ongoing monitoring program) unless it is either physically not possible to do so, or there is risk for an unacceptable environmental impact to occur. In such circumstances the proponent must provide documented justification and photographic evidence demonstrating why the additional monitoring cannot be achieved.	Water allocations were secured for the life of mine water extraction in Jan 2019. The water licences are updated in the water management plan. The letter on the 6 March 2017 'recommended that Glencore <i>consider</i> the installation of a Class A Evaporation Pan and rainfall gauge <i>or</i> provide justification for alternative physics-based methods for calculating groundwater recharge.' UCMPL has reviewed the alternative physics-based methods and has integrated the Penman-Monteith Evapotranspiration (FAO-56 Method)¹⁵, which uses measured solar radiation, in the weather station. The Class A Pan Evaporation system is being considered, in discussion with DPI Water. UCMPL commissioned an investigation by a qualified hydrogeologist which demonstrates why the additional monitoring cannot be achieved, including photographic evidence. The Drip is located in the Goulburn River National Park. The feature "drips" into a wide section of the Goulburn River which has many flow paths and multiple rocky outcrops making the installation of flow monitors impractical. The "drips" generally fall onto outcropping rocks and add to small pools of water which form from the surrounding catchment. The volume of water produced from the 'Drips' is orders of magnitude less than other variability in the system and changes in 'Drip' flows could not

¹⁵ United Nations Food and Agriculture Organization (FAO) Penman and Monteith (1990) Irrigation and Drainage Paper No. 56 cited in https://www.mdba.gov.au/sites/default/files/pubs/sa-crop-evapotranspiration-guidelines-1998_0.PDF and Lincoln Zotarelli, Michael D. Dukes, Consuelo C. Romero, Kati W. Migliaccio, and Kelly T. Morgan (2Step by Step Calculation of the Penman-Monteith Evapotranspiration (FAO-56 Method).

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

Status: Final
Version: Version 8

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

Agency/ Date	Document and Section	Comments	UCMPL Response
			be discerned from other noise in the data. Flow metres immediately at the Drip would detract from the aesthetics of the area and have a negative impact on the National Park without scientific gain.
DPIE 19 August 2019	Ulan Underground Extraction Plan LW30 W6-W8	Approval of Extraction Plan- Letter attached below	

CCC Meetings	Summary of Historical 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 Historical 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

Resources Regulator
Department of Regional NSW



15th December 2022

Lucy Stuart
Glencore

Via Email: Lucy.Stuart@glencore.com.au

Dear Lucy,

The Resources Regulator has noted the submission of the draft extraction plan for Ulan Coal Expansion Plan LW-LW32 & LWW6-LWW8, for Ulan Coal Mine (MP08_0184-PA-123).

The Resources Regulator will review and comment on the extraction plan when it is formally submitted as a final copy.

Should you require input from our team prior to submission please contact the Resources Regulator via email on nswresourcesregulator@service-now.com or Phone 1300 814 609 (Press Option 2, then Press Option 5) to organise an information session.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Matthew Newton".

Matthew Newton

Principal Inspector Environment and Rehabilitation Operations
Resources Regulator

Ref: COM0005711
516 High Street
Maitland NSW 2320

resourcesregulator.nsw.gov.au

1



Heritage NSW - ACH - Post Approval - Proponent Request for Advice - Ulan Coal Mine - Expansion - Extraction Plan LW30-LW32 and LWW6-LWW8 (MP08_0184-PA-123) (Mid-Western Regional)

Dear Lucy,

Heritage NSW has reviewed the revised Extraction Plan is titled: *The Ulan Underground Extraction Plan LW30 to LW32 and LWW6 to LWW8* (the Extraction Plan), with respect to Aboriginal cultural heritage. I note that the Extraction Plan has also been prepared in consideration of the DPE's most recent *Extraction Plan Guidelines – October 2022* (the Guidelines) and requirements specified in Project Approval (PA) 08-0184, Schedule 3, Condition 26.

Heritage NSW has reviewed - Attachment I – Technical Report (Heritage) - Ulan Coal Continued Operations Project - Longwalls 31 and 32 Extraction Plan - Aboriginal, European and Natural Heritage – review prepared by Ozark Environment & Heritage. I note that the primary aim of this assessment is to consider the specific management strategies as outlined in the UCCO Project Environmental Assessment (EA) and the recent Modification 4 (MOD4) assessment in relation to Longwalls 31 and 32, and the preliminary forecast of subsidence effects prepared by SCT Operations Pty Ltd (SCT 2022). This advice is presented with consideration of Condition 24 and 26 of Schedule 3 of the subsidence performance measures for PA08_0184.

Attachment I – Technical Report (Heritage) and the reviewed of the Ulan Coal Continued Operations Project - Longwalls 31 and 32 Extraction Plan - Aboriginal, European and Natural Heritage, OzArk Environment & Heritage, has been prepared in reference to the relevant Heritage NSW guidelines. Based on the assessment provided, Heritage Ulan Coal Mine - Expansion - Extraction Plan LW30-LW32 and LWW6-LWW8 (MP08_0184-PA-123), NSW agrees with the management recommendations outlined in the assessment, and as such, has no additional comments, and does not require any further agency consultation in relation to this this extraction plan. If you have any questions regarding this advice, please contact me directly on 02 4927 3156.

Kind Regards

Nicole Davis

Nicole Davis

Manager Assessments

Heritage NSW

Subsidence Advisory



Ref: EOTH22-00397
13 January 2023

Lucy Stuart
via email Lucy.Stuart@glencore.com.au

Re: Ulan Coal Mines Revised Extraction Plan LW30 to LW32 and LWW6 to LWW8. MP08_0184-PA-123 / PAE-52334959

Dear Lucy,

This letter provides Subsidence Advisory NSW's comments on a proposed modification to an existing extraction plan approval at Ulan Coal mine referred to above.

It is understood that the extraction plan proposal is located within undeveloped land and as such will not impact privately owned surface development or surface infrastructure.

Given the above, Subsidence Advisory NSW has no further advice or comment to make on the proposal.

If you would like more information, please contact Subsidence Advisory NSW on 4908 4300 or subsidedevelopment@customerservice.nsw.gov.au.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kieran Black".

Kieran Black
Technical Specialist

PO Box 488G, Newcastle NSW 2300

02 4908 4300 | 24 Hour Emergency Service 1800 248 083
www.nsw.gov.au/subsidence-advisory



DOC22/1105233-3

Mr Bradley Tanswell
Environment Officer
Glencore – Ulan Coal

Via e-mail: Bradley.Tanswell@glencore.com.au

21 December 2022

Dear Mr Tanswell

ULAN UNDERGROUND EXTRACTION PLAN
Ulan Coal Mine - Expansion

I refer to the Proponent Request for Advice regarding the “*Ulan Underground Extraction Plan*” (the Plan), received by the Environment Protection Authority (the EPA) on 13 December 2022.

The EPA encourages the development of Environmental Management Plans/Programs to ensure that the proponents have determined how they will meet their statutory obligations and environmental objectives as specified by any Project Development Approval and/or the conditions of an Environment Protection Licence (EPL).

Please note however that it is not the EPA’s role to endorse these plans given that the EPA sets conditions/criteria for environmental protection and management and therefore cannot be directly involved in the development of strategies to comply with such conditions/criteria.

The EPA has however reviewed the Plan on this occasion and advises it has no specific comments to make.

If you have any specific questions regarding this matter, please contact Mr Aron Quinn on 6333 3802 or via e-mail at EPA.Southopsregional@epa.nsw.gov.au. For general enquiries to the EPA please call 131 555 or e-mail info@epa.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Lucy Apps', written in a cursive style.

LUCY APPS
A/Unit Head
Regulatory Operations Regional South

Phone 131 555
Phone +61 2 9995 5555
(outside of NSW)

TTY 133 677 then
ask for 131 155

Locked Bag 5022
Parramatta NSW 2124
Australia

6 Parramatta Square,
12 Darcy Street,
Parramatta NSW 2150
Australia

info@epa.nsw.gov.au
www.epa.nsw.gov.au
ABN 43 692 285 758



Department of Planning and Environment

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

Our ref: DOC22/1017183
Your ref: SSD-9679

Dear Lucy

Ulan West Extraction Plan Longwalls LW30 to LW 32 & LW1 to LW8

Thank you for your referral through the Major Projects Portal dated 15 December 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment inviting comments on the *Ulan West Extraction Plan LW30 to 32 & LWW1 to LWW8*.

BCS has commented on previous extraction plans which have subsequently been approved. We note that the Extraction Plan has been revised to include two additional approved longwall panels under PA08-0184 i.e. LW31 and LW32.

BCD notes that the extraction plan incorporates a review of subsidence assessments and environmental consequences for the proposed LW31 and LW32 and in consideration of the remaining approved longwall panels LWW8 and LW30.

BCS further notes that:

- estimates of subsidence effects for Longwalls 31 and 32 are consistent with the range of values previously forecast at similar overburden depths for the original Environmental Assessment, subsequent updates for modifications to the Project Approval and regular Subsidence Management Plan/Extraction Plan assessments at the Ulan Complex; and
- subsidence effects and impacts from the remaining mining in Longwalls 30 and W8 and from the planned mining of Longwalls 31 and 32 are expected to be consistent with or less than the previously forecast maxima and compliant with the subsidence performance measures for PA08_0184.

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.

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

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

Ben Ellis
A/ Principal Project Manager
North West Planning
Biodiversity, Conservation and Science Directorate

5 January 2023



Planning,
Industry &
Environment

Lucy Stuart
Environment and Community Manager
Ulan Coal Mines Pty Limited

18/05/2022

Dear Ms Stuart

**Ulan Coal Expansion - UUG EP LW30 & LWW6-8 (MP08_0184)
First workings amendment and appointment of experts**

I refer to your requests (MP08_0184-PA-107) regarding the Ulan Coal Expansion Project (MP08_0184) for:

- the Planning Secretary's approval for a change to the approved first workings for LW32 and LW33 under Condition 25, Schedule 3 of MP08_0184;
- the Planning Secretary's approval of suitably qualified persons to prepare the revision to the approved Extraction Plan for LW30 & LWW6-8 to include two additional longwall panels (LW31 and LW32) under Condition 26(a), Schedule 3 of MP08_0184; and
- comments from the Department for Ulan Coal Mines Pty Limited to address during the revision of the Extraction Plan for the inclusion of LW31 and LW32

The Department has reviewed the information and notes that the amendments are due to mine safety and economic considerations and would not change the position of approved surface infrastructure. Consequently, I can advise that the Planning Secretary approves the amendment to the first workings for LW32 & LW33.

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 (subsidence);
- Bryce McKay of Australasian Groundwater and Environmental Consultants (groundwater);
- Dr Jodie Benton and Ms Stephanie Rusden of OzArk Environment & Heritage (Aboriginal heritage)
- Susan Shield and Michael Best of Engeny Water Management (surface water); and
- Rachel Murray and Rebecca Croake of Eco Logical Australia Pty Ltd (biodiversity assessment).

Regarding the revision of the Extraction Plan for the inclusion of LW31 and LW32, it is requested that you consider relevant comments from the Department and relevant government agencies made on the original Extraction Plan for LW30 & LWW6-8 during the preparation of the revised Extraction Plan.

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

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 Pty Limited

01/02/2021

Dear Ms Stoney

**Ulan Continued Operations Project (MP08_0184)
Extraction Plan LW30 & LWW6-LWW8**

I refer to the Extraction Plan LW30 & LWW6-LWW8 which was submitted in accordance with Condition 26, Schedule 3 approval for the Ulan Continued Operations Project (MP08_0184). The plan has been amended to be consistent with the mine plan approved as part of Modification 4 to MP08_0184.

The Department has carefully reviewed the document and is satisfied that the plan has been updated to be consistent with the changes to the mine plan approved as part of Modification 4 and to respond to relevant agency feedback received during consultation regarding the plan.

Accordingly, the Planning Secretary has approved the Extraction Plan LW30 & LWW6-LWW8 (Revision 4.0, dated December 2020). Please ensure that the approved plan is placed on the project website at the earliest convenience.

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 be 'S O'Donoghue'.

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



Contact: Jane Curran
Email: jane.curran@nrar.nsw.gov.au

Robyn Stoney
Private Mail Bag 3006
Mudgee NSW 2850

Our ref: OUT20/15949, V15/3875-
4887

email: lucy.stuart@glencore.com.au

cc'd: Jack.Turner@planning.nsw.gov.au

Dear Lucy,

17 December 2020

Re: Ulan Coal – Amended Expansion Extraction Plan and associated plans for long walls 30, LWW6-LWW8

Thank you for giving the Department of Planning, Industry and Environment – Water (DPIE-Water) the opportunity to review the amended expansion extraction plan and associated plans for long walls 30, LWW 6 – LWW 8.

The DPIE-Water recommends the following.

Prior to approval

1. Licencing
 - o Provide a breakdown of the peak annual groundwater flow being incidentally taken / dewatered; for each of the groundwater sources to be intersected by the project including breakdown by management zone where applicable

2. Site Water Balance

The proponent should present an amended site water balance which demonstrates predicted and actual inflows and take of groundwater from each water source - including management zones if applicable – considered essential to demonstrate compliance with the AIP and WMA.

3. The Drip

In addition to current pore pressure and water quality monitoring, the proponent should commit to undertaking and reporting of regular visual inspection and qualitative assessments of the 'The Drip' flows for the purpose of determining any or no impacts due to mining activities

Not required prior to approval

4. Mona Creek Alluvium Monitoring

Level 11 Macquarie Tower, 10 Valentine Ave, Parramatta NSW 2150 | Locked Bag 5123 Parramatta NSW 2124
e: nrar.servicedesk@dpie.nsw.gov.au | <https://www.industry.nsw.gov.au>

2

The proponent should install the proposed monitoring bores and VWP, as per Enclosure 1, as soon as practical in order to meet the requirement of a minimum two years of temporal and spatial baseline data.

5. Evaporation Monitoring

Install a class A Evaporation Pan on site.

6. UCMPL Environmental Management Plan Documents

- Assessment Criteria and TARPs should be updated to include additional monitoring points
- The proponent should update the relevant UCMPL environmental management plan documents (Water Management Plan, Groundwater Monitoring Program, Surface Water Monitoring Program etc.) to align with amendments to the Extraction Plan for LW30 and LWW6-8 and related sub-plans, and the recommendations provided in this assessment (eg. adjusted drawdown contours, additional monitoring points, assessment criteria, and TARPs).

Should you have any further queries in relation to this submission please do not hesitate to contact the Natural Resources Access Regulator's Service Support Team at nrar.servicedesk@dpie.nsw.gov.au.

Yours sincerely



Alison Collaros
Licensing and Approvals Manager (East)
Natural Resources Access Regulator
Department of Planning, Industry and Environment



Resources Regulator

FORM EAMS generic v1.3
Our ref: MAAG0008527
LETT0005221

Department of Planning, Industry and Environment
Locked Bag 5022
Parramatta NSW 2124
Attn: Gen Lucas

Dear Gen Lucas

I refer to the Department of Planning, Industry & Environment's (DPIE) request for advice received on 17 September 2020 in relation to the Ulan Coal Mine - Expansion - Extraction Plan LW30 & LWW6-LWW8 (MP08_0184-PA-51). The Extraction Plan has been amended to cover Mod 4 to MP08_0184-PA-51 which comprised minor lengthening of LW 30, LWW7 & LWW8.

The Resources Regulator has reviewed the Extraction Plan and is of the view that the modified mine plan does not materially change the health & safety risk due to subsidence at the site to that subject to the already approved Extraction Plan.

It should be noted that the amended secondary extraction mine layout is subject to a High Risk Activity Notification under Clause 33 of Work Health and Safety (Mines and Petroleum Sites) Regulation 2014. Work health and safety risks due to subsidence will be regulated under WHS laws generally, and in particular the aforementioned clause and Clause 67 of the same regulation.

Should the mine operator choose to use any aspect of the Extraction Plan for the purposes of a High Risk Activity Notification for longwall extraction they must ensure consistency with the abovementioned WHS laws.

If you require additional information, please contact the Resources Regulator on 1300 814 609 or via email at nswresourcesregulator@service-now.com.

Yours sincerely,

Matthew Newton
Principal Inspector Environment & Rehab
Resources Regulator

6 November 2020

Resources Regulator
516 High Street MAITLAND NSW 2320 Australia | PO Box 344 HRMC NSW 2310 Australia
Tel: 1300 814 609



**Planning,
Industry &
Environment**

Planning & Assessment
Energy & Resources
Contact: Paul Freeman
Tel: 9274 6587
Email: paul.freeman@planning.nsw.gov.au

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

Via email: robyn.stoney@glencore.com.au

Dear Mr Allan

Ulan Coal Project (08_0184) – Extraction Plan for Longwalls 30 and W6-W8

I refer to your email dated 29 May 2019 enclosing the Extraction Plan for Longwalls 30 and W6-W8 at the Ulan Coal Mine in accordance with condition 26 of Schedule 3 of project approval 08_0184.

The Department has carefully considered the Extraction Plan and its component plans, and notes that advice provided by the Department and relevant Government agencies has been considered in the final version of the documents.

The Department is satisfied that the Extraction Plan meets the relevant conditions of approval. I wish to inform you that the Secretary has approved the Extraction Plan for Longwalls 30 and W6-W8 accordance with condition 26 of Schedule 3 of project approval 08_0184.

I would appreciate it if you could place the Extraction Plan and related component plans on the project website as soon as possible.

If you wish to discuss the matter further, please contact Paul Freeman on 9274 6587.

Yours sincerely

A handwritten signature in black ink, appearing to be 'SO', followed by the date '19/8/19'.

Steve O'Donoghue
Director
Resource Assessments
as nominee of the Secretary



**Planning &
Environment**

Planning Services
Resource Assessments
Contact: Matthew Riley
Tel: 9228 6339
Email: matthew.riley@planning.nsw.gov.au

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

Dear Ms Stoney

**Ulan Coal Mine (08_0184)
Approval of Extraction Plan Team**

I refer to your letter dated 20 June 2016, requesting the endorsement of a team of suitably qualified and experienced persons to prepare an Extraction Plan required under condition 26 of the Project Approval for the Ulan Coal Mine (08_0184).

The Department has reviewed the information you provided, and is satisfied that the nominated team is suitably qualified and experienced.

Consequently, the Secretary approves the following persons to prepare the plan:

- Dr Ken Mills – Strata Control Technology;
- Dr Colin Mackie – Mackie Environmental Research;
- Peter Kuskie – South East Archaeology;
- Susan Shield – Umwelt (Australia);
- Daniel Magdi – Eco Logical Australia; and
- Stephen Bragg – Pacific Environment.

If you wish to discuss the matter further, please contact Matthew Riley on 9228 6339.

Yours sincerely

A handwritten signature in black ink, appearing to be 'S O'Donoghue', with the date '27/6/16' written next to it.

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



20 June 2016

The Secretary
NSW Department of Planning and Environment
23-33 Bridge Street
SYDNEY NSW 2000

Attention: Stephen O'Donoghue

Seq: 43/16

Dear Mr O'Donoghue,

**Ulan No.3 Underground Extraction Plan Longwall Panels 30 & West 6 to West 8
Endorsement of Qualified & Experienced Specialists**

Ulan Coal Mines Limited (UCML) is preparing an Extraction Plan for longwall panels 30 and W6 to W8 within the Ulan No.3 Underground Mine.

In accordance with Condition 26 (a) of Project Approval 08_0184, UCML seeks the endorsement of the Director-General for the following qualified and experienced specialists to assist UCML in the preparation of the Extraction Plan.

Strata Control Technology

Strata Control Technology (SCT) is a leading mining engineering and strata control company and has been integral in the monitoring and management of subsidence effects and impacts at the Ulan Complex since 1990. These activities have been under the supervision and direction of Dr Ken Mills (B.E Hons Ph.D), a Senior Geotechnical Engineer with SCT. A personal resume for Dr Ken Mills is available upon request.

Dr Mills will be responsible for developing and preparing:

- Revised predictions of potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, as required by Condition (e); and
- A Subsidence Monitoring Program required within part of Condition 26 (g), including a program for collecting baseline data for future extraction plans as required in Condition 2f (h).

SCT has developed an extensive subsidence monitoring database (including the introduction and continued operation of 400m wide longwalls) which has been used to predict subsidence behaviour across the Ulan Complex. Dr Mills' relevant experience in subsidence monitoring and management at the Ulan Complex includes:

- Subsidence Assessment for Proposed Ulan West Modification LW 3 to 12 (2015)
- Revised EP for Ulan West Longwalls 1-4 (2015)
- Longwalls 1 & 2 EP for Ulan West (2013)
- Ulan No 3 Underground SMP Application LW W2 - W3 (2007)
- Ulan No 3 Underground SMP Application LW23-26 & W1 (2005)
- Subsidence Monitoring Programs for Longwall 23 - 26 & W1 and W2 - W3
- Subsidence Assessment Report, UCCO Environmental Assessment (2009)
- End of Panel Reports (LW23, 24, 25, W1, W2)

Private Mail Bag 3006, Mudgee, NSW 2850
4505 Ulan Road, Ulan, NSW 2850
T + 61 2 6372 5300 F + 61 2 6372 5335 www.glencore.com

Ulan Coal Mines Ltd ABN 80 000 189 248
Manager of the Ulan Joint Venture

Attachment D - Key Contact Register

Government Departments

Government Department	Contact	Phone	Email
DPE	Stephen O'Donoghue	Ph: 0477 345 626	Stephen.ODonoghue@planning.nsw.gov.au
DPE-RR	Stephen Clipperton	Ph: 1300 814 609	nswresourcesregulator@service-now.com
NSW Subsidence Advisory	Keiran Black	Ph: (02) 4908 4300	subsidenceadvisory@customerservice.nsw.gov.au
DPE-Water	Nalia Tabassum	Ph: 1800 633 362	naila.tabassum@dpie.nsw.gov.au
BCS	David Geering	Ph: (02) 6883 5335	david.geering@environment.nsw.gov.au
Heritage NSW	Nicole Davis	Ph: (02) 49273156	nicole.davis@environment.nsw.gov.au
MWRC	Brad Cam	Ph: (02) 6378 2850	council@midwestern.nsw.gov.au
EPA	Mr Aron Quinn	Ph: (02) 6333 3802	EPA.Southopsregional@epa.nsw.gov.au
NPWS	NPWS Manager (Mudgee Area)	Ph: (02) 6370 9000	npws.mudgee@environment.nsw.gov.au

Ulan Coal Personnel

Name	Position	Contact Details
Peter Ostermann	General Manager – Ulan Coal Mines Pty Limited	Work: 02 6372 5300 Email: Peter.Ostermann@glencore.com.au
David Ribaux	Operations Manager – Ulan Underground Operations	Work: 02 6372 5300 Email: David.Ribaux@glencore.com.au
Lucy Stuart	Environment & Community Manager – Ulan Coal Mines Pty Limited	Work: 02 6372 5368 Mobile: 0400 661 749 Email: Lucy.Stuart@glencore.com.au

Attachment E – 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 Extraction Plan 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 4.2.1
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 4.2.3
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 4.2.6
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 Extraction Plan 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 4.2.1
3) Aquifers, known groundwater resources	Y	Section 4.2.2
4) Springs	N	
5) Sea/lake	N	
6) Shorelines	N	
7) Natural dams	N	
8) Cliffs / pagodas	Y	Section 4.2.3
9) Steep slopes	Y	Section 4.2.3
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 4.2.4
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 4.2.4
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 4.2.5
9) Telecommunication lines (overhead/underground) and associated Extraction Plants	N	
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	N	
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 4.2.5
9) Farm dams	Y	Section 4.2.5
10) Wells, bores	Y	Section 4.2.5
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 4.2.5
9) Any other feature considered significant	N	
Areas of Archaeological and/or Heritage Significance	Y	Section 4.2.6
Items of Architectural Significance	N	
Permanent Survey Control Marks	Y	Section 4.2.5
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 4.2.5
6) Any other feature considered significant.	N	

Attachment F – Technical Report (Subsidence)

Attachment G - Technical Report (Groundwater)

Attachment H - Technical Report (Biodiversity)

Attachment I - Technical Report (Heritage)

Attachment J - Technical Report (Surface Water)

Attachment K – 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 - LMP LW30 – LW32 & LWW6 – LWW8

Appendix C - Biodiversity Management Plan

Appendix D - BFMP LW30 – LW32 & LWW6 – LWW8

Appendix E - Heritage Management Plan

Appendix F - PSMP LW30 - LW32 & LWW6 - LWW8

Appendix G - SMP LW30 – LW32 & LWW6 – LWW8

Appendix H - Extraction Plans 1 to 7
