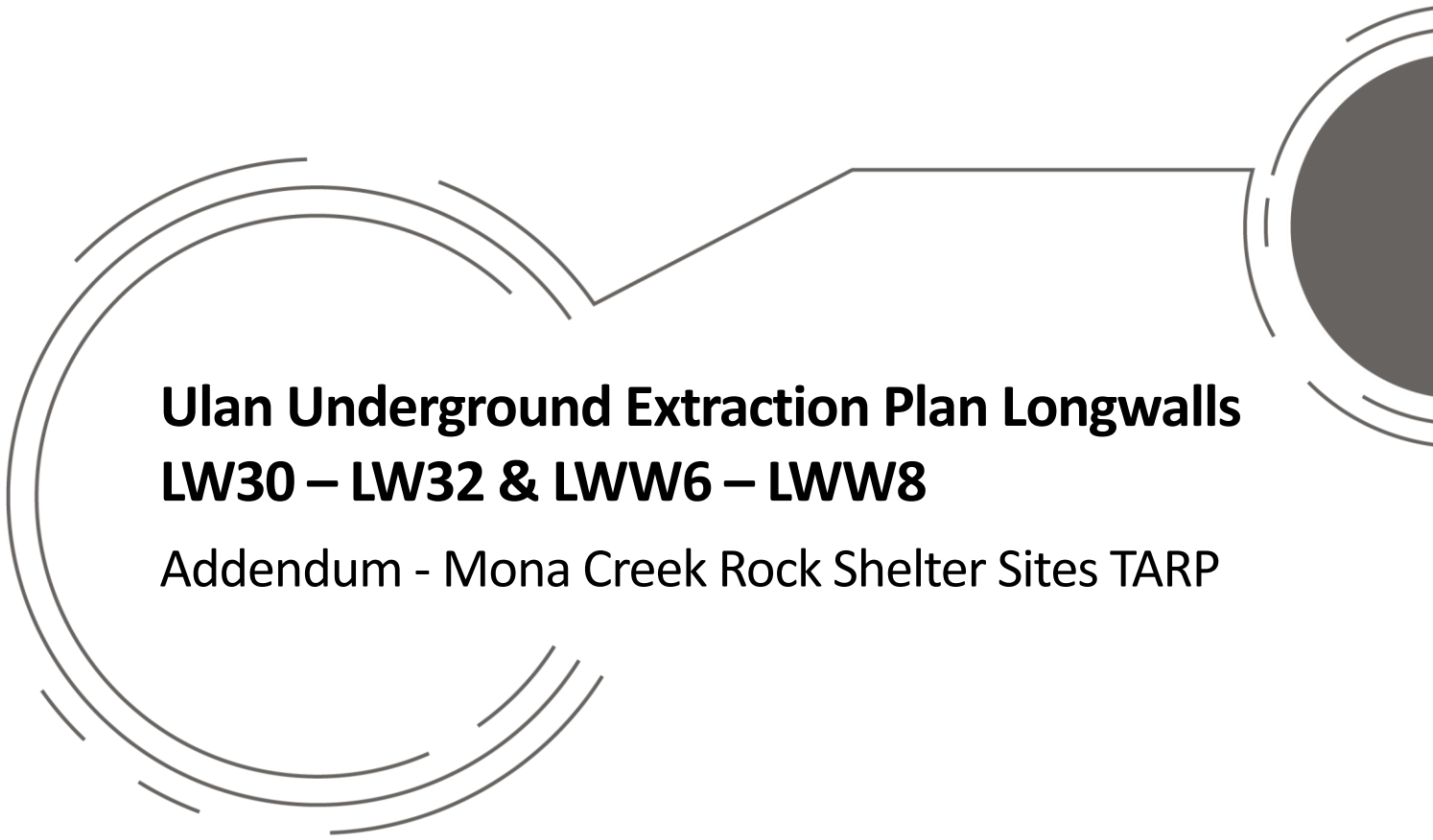


ULAN
COAL

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**Ulan Underground Extraction Plan Longwalls
LW30 – LW32 & LWW6 – LWW8**

Addendum - Mona Creek Rock Shelter Sites TARP

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1. Introduction

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 was 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.

The Extraction Plan was approved by the DPE on the 29 September 2023.

During consultation with the DPE in April 2023, the DPE requested a specific trigger action response plan (TARP) for the Mona Creek Rock Shelter Sites (MCRSS) be submitted by UCMPL and approved by the DPE prior to the commencement of extraction in LWW8, as stated:

Subsequent to the approval of this EP, the Department will request that a specific trigger action response plan be submitted and approved prior to the commencement of extraction in LWW8. A TARP will also be requested for any other highly significant Aboriginal heritage sites with nil/negligible performance measures. The Department will likely request targeted advice from the Independent Advisory Panel for Underground Mining (IAPUM) on the appropriateness of these TARPs.

This was further confirmed upon the approval of the Extraction Plan by DPE with Condition 5 stating:

The Proponent must prepare a subsidence monitoring and mitigation program for the Mona Creek Rock Shelter Sites (Ulan ID # 180-187) to the satisfaction of the Secretary, prior to the commencement of secondary extraction in Longwall LWW8. This program must include a comprehensive:

- a) baseline data set to enable meaningful comparison of subsidence impacts;*
- b) Trigger Action Response Plan for the sites; and*
- c) mitigation plan for the sites, to cover all actions to ensure the performance measure of nil impact upon these sites is achieved.*

2. Purpose & Scope

UCMPL have prepared this Extraction Plan Addendum (the Addendum) to address the DPE's request to develop a specific TARP for the MCRSS (**Figure 1**). The Addendum must be read in conjunction with the Extraction Plan.

If there is any inconsistency between the Extraction Plan and this Addendum specific to the monitoring and trigger action response for the MCRSS, this Addendum shall prevail.

3. Planning

Strata Control Technology (SCT) were engaged by UCMPL to design a specific ground movement monitoring system and develop a TARP with appropriate management measures for the MCRSS. A meeting with the DPE, UCMPL and SCT was held on the 9 August 2023. A copy of the SCT presentation is provided in **Attachment A**. Where applicable this Addendum references SCT's recommendation as provided to the DPE on the 9 August 2023 and SCT Technical Memo as provided in **Attachment B**.

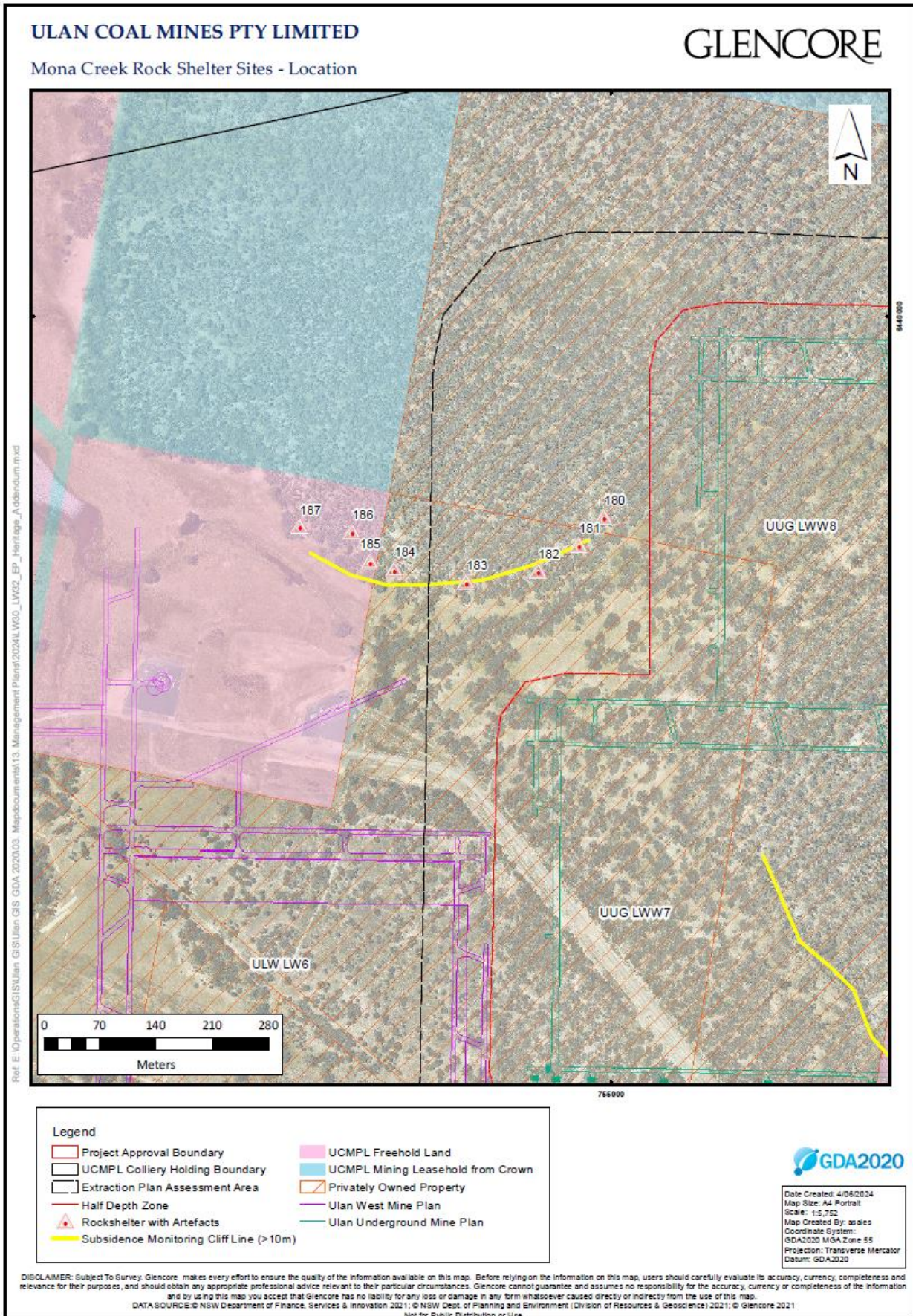


Figure 1 Location of MCRSS and LWW8

4. Monitoring Program

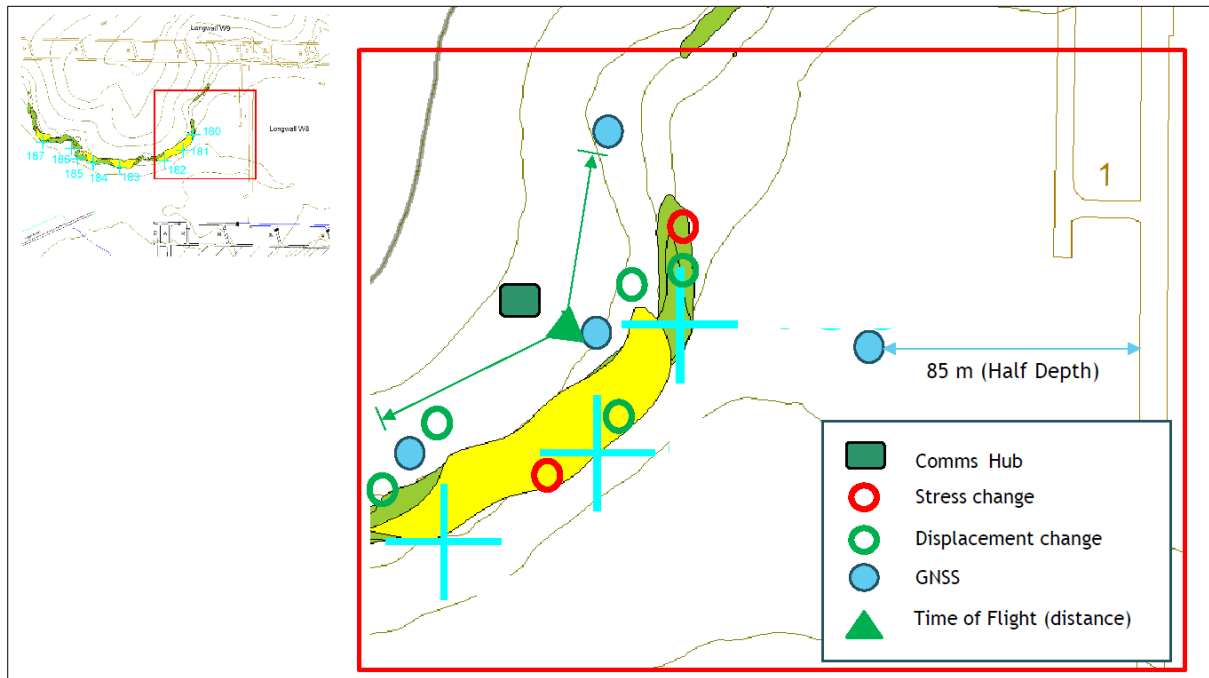
Section 4 of the Extraction Plan provides details of both the subsidence effects and the various environmental and heritage monitoring programs. To evaluate the impacts from subsidence on the MCRSS within the Extraction Plan Area, **Table 4-1** provides a detailed description of the monitoring locations, frequency and parameters measured for the MCRSS proposed by SCT (**Attachment B**).

As recommended by UCMPL’s subsidence engineer SCT, the TARP for the MCRSS (**Table 5-2**) is based on strain triggers to monitor displacement change (**Attachment B**).

Table 4-1 MRCSS Monitoring Program

Parameter/Methodology	Site	Frequency
<p>Mona Creek Rock Shelter Sites (MCRSS)</p> <ul style="list-style-type: none"> 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 alarms³. GNSS units to be installed before mining of LWW8 (locations to be confirmed by survey and subsidence specialist). Variety of real time strain sensors² to monitor crack width and convergence monitoring with triggering alarms. 	<p>MCRS Sites Ulan ID # 180-187^ to the west of the Extraction Plan Area on both private property and UCMPL land.</p> <p>(refer to Figure 1 and Figure 2)</p>	<ul style="list-style-type: none"> Pre-mining¹ Post mining (within one month¹) Continuous strain sensors³ and 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 features within the property; monthly during active mining longwall; 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 Potentiometer units to monitor displacement change. ³ The GNSS for the MCRSS. Refer to **Table 4-2** and **Figure 4** and **Attachment B**.



Note: “+” denotes location of Mona Creek Rock Shelter Sites

Figure 2 Proposed Instrument Layout for Mona Creek Heritage Sites

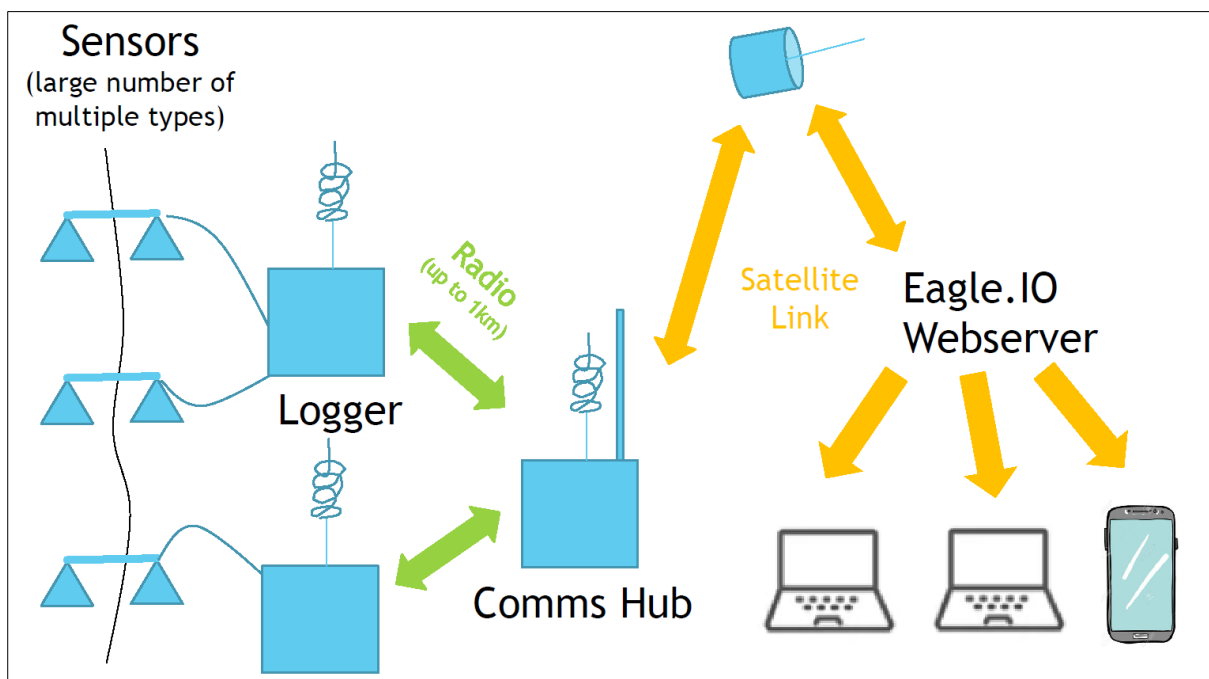


Figure 3 Overview of Proposed MCRSS Subsidence Monitoring System

Mona Creek Rock Shelter Sites (MCRSS)

Pre-mining and post mining photographic monitoring (Table 18 of the Extraction Plan) of the MCRSS will be completed to monitor for any far field subsidence movements effects (Figure 13 of the Extraction Plan). The MCRSS and associated cliff line by design are protected from impacts by mining setback, a barrier greater than half depth from the nearest GOAF edge (UUG LWW8). Previous experience at Ulan and in the Western Coalfields indicates that a barrier equal to half depth (75-90m at this site) is sufficient to provide full protection to sandstone formations from any perceptible impacts (**Attachment B**). The minimum distance between the associated MCRSS and the nearest goaf edge is 140m. This minimum barrier is close to double the barrier that would normally be used to fully protect sandstone formations from mining related subsidence impacts.

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 of the Extraction and **Section 5.1** of the Addendum.

The monitoring methodology will use photographic recordings of the MCRSS, as identified within the HMP. In addition, UCMPL will establish a variety of real time sensors and continuous global navigation satellite system (GNSS) units (**Figure 3** and **Figure 4**) at the MCRSS prior to commencing LWW8, to provide continuous three-dimensional (3D) ground movement data with trigger alarms (**Attachment B**).

As recommended by UCMPL's subsidence engineer SCT, the TARP for the MCRSS (**Table 5-2**) is based on strain triggers (**Table 4-2** and **Figure 4**) to monitor displacement change (**Attachment B**).

In the event the performance indicators for the MCRSS has been triggered (Section 5.1 of the Extraction and **Section 5.1** of the Addendum, UCMPL will carry out an investigation to determine if the exceedance is subsidence related as described in the Master TARP (MTARP) Table 24 in the Extraction Plan and the **TARP (Table 5-2)** of the Addendum.

4.1 Baseline Monitoring

Baseline monitoring at the MCRSS commenced in January 2024 with the initial monitoring system finalised in April 2024. This does not include the stress cell monitoring unit that will be installed on the rockface to determine the baseline stress levels of the landform. This monitoring component is anticipated to be installed in Q3 2024, providing sufficient baseline data prior to the commencement of LWW8 scheduled for secondary extraction in Q4 2025.

SCT Principle Subsidence Engineer attended site on 4th and 5th January 2024 to ground truth the area and identify suitable locations for monitoring units. At the time of submission of this Addendum, seven (7) potentiometer units (monitoring displacement change), four (4) GNSS units and one (1) temperature probe have been installed and are collecting baseline data (**Figure 4**). One stress change monitor is still to be installed. **Table 4-2** outlines the coordinates of the currently installed units, **Table 4-3** depicts the in-situ field position of the monitors.

This baseline data is to determine the natural variation within the cliff line features prior to the secondary extraction of LWW8 which is due to commence, based on current operations planning, in December 2025, therefore allowing sufficient data capture under a range of natural conditions.

Table 4-2 MCRSS Monitor Locations

Monitor ID	Easting	Northing	Elevation
Pot 1	754989	6439768	471
Pot 2	754989	6439759	471
Pot 3	754984	6439758	473
Pot 4	754969	6439762	477
Pot 5	754968	6439754	477
Pot 6	754970	6439728	472
Pot 7	754946	6439713	474
Temperature Probe	754972	6439755	476
Swarm Cell Logger	754970	6439753	476
GNSS MCRS01	755053	6439736	456
GNSS MCRS02	754974	6439801	473
GNSS MCRS03	754976	6439747	502
GNSS MCRS04	754918	6439703	505

Notes: Pot = potentiometer units

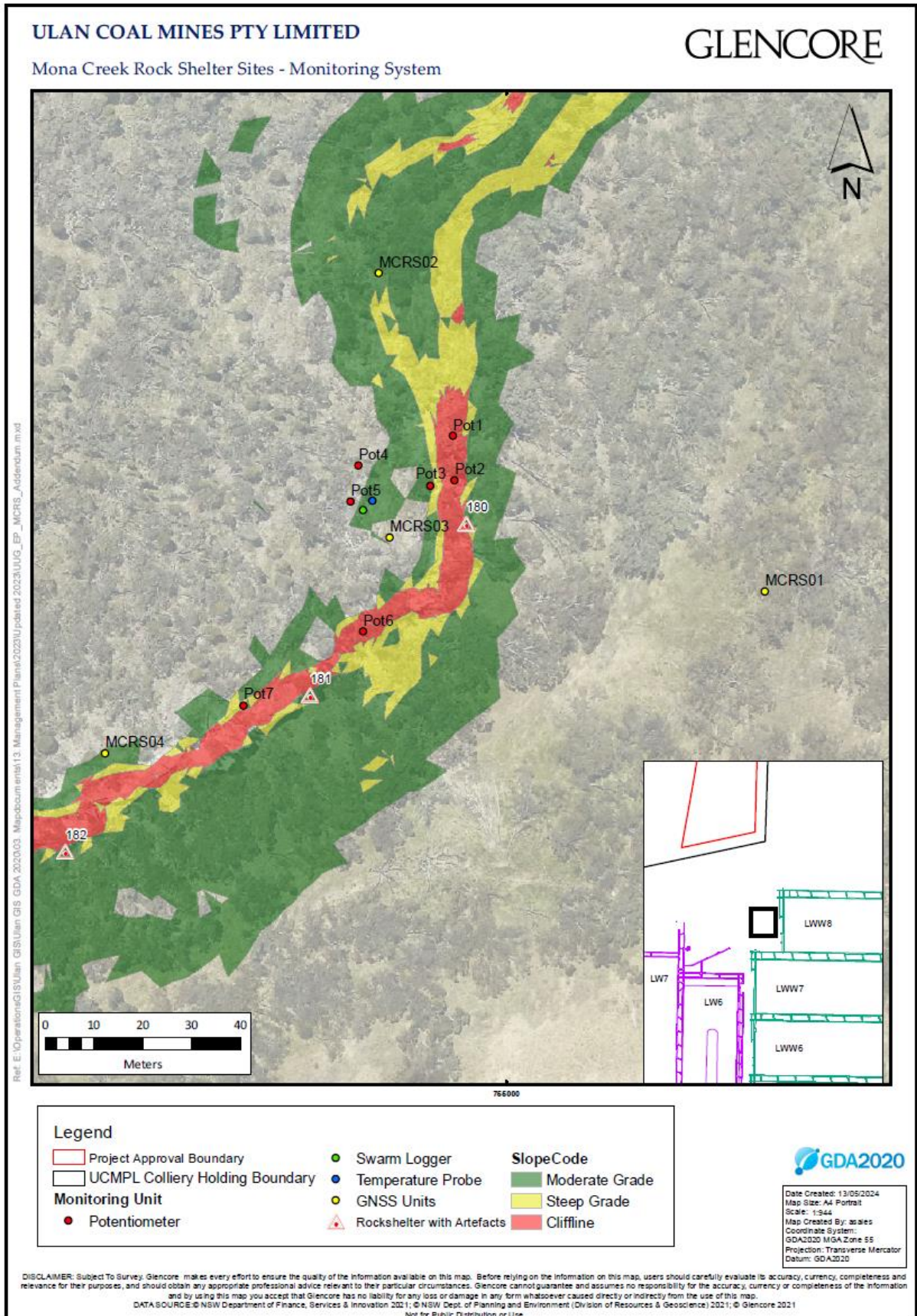


Figure 4: Mona Creek Rock Shelter Sites - Monitoring Units

Table 4-3 MCRSS Monitors - Field Installation

Pot 1	Pot 2
 <p>210°SW (T) ● 55 S 754988 6439760 ±29ft ▲ 1559ft</p> <p>Mona Creek Monitoring System 05 Jan 2024, 13:53:44</p>	 <p>225°SW (T) ● 55 S 754991 6439758 ±42ft ▲ 1557ft</p> <p>Mona Creek Monitoring System 05 Jan 2024, 13:56:04</p>
Pot 3	Pot 4
 <p>291°W (T) ● 55 S 754981 6439758 ±29ft ▲ 1564ft</p> <p>Mona Creek Monitoring System 05 Jan 2024, 13:56:29</p>	 <p>238°SW (T) ● 55 S 754966 6439756 ±32ft ▲ 1575ft</p> <p>Mona Creek Monitoring System 05 Jan 2024, 13:59:54</p>

Pot 5	Pot 6
 <p>Compass overlay: S 80, SW 210, 240, W 270, NW 300. Bearing: 250°W (T). Coordinates: 55 S 754967 6439749 ±13ft. Elevation: 1572ft.</p> <p>Mona Creek Monitoring System 05 Jan 2024, 14:01:34</p>	 <p>Compass overlay: E 60, SE 90, 120, S 150, 180. Bearing: 129°SE (T). Coordinates: 55 S 754970 6439725 ±22ft. Elevation: 1557ft.</p> <p>Mona Creek Monitoring System 05 Jan 2024, 14:03:33</p>
Pot 7	Temperature Probe
 <p>Compass overlay: W 40, 270, NW 300, 330, N 0. Bearing: 310°NW (T). Coordinates: 55 S 754945 6439708 ±13ft. Elevation: 1553ft.</p> <p>Mona Creek Monitoring System 05 Jan 2024, 14:04:32</p>	 <p>Compass overlay: SE 150, S 180, SW 210, 240, W 270. Bearing: 201°S (T). Coordinates: 55 S 754972 6439745 ±19ft. Elevation: 1567ft.</p> <p>MCRS SUBSIDENCE MONITORS Temperature Probe 01 May 2024, 14:42:40</p>

Swarm Cell Data Logger

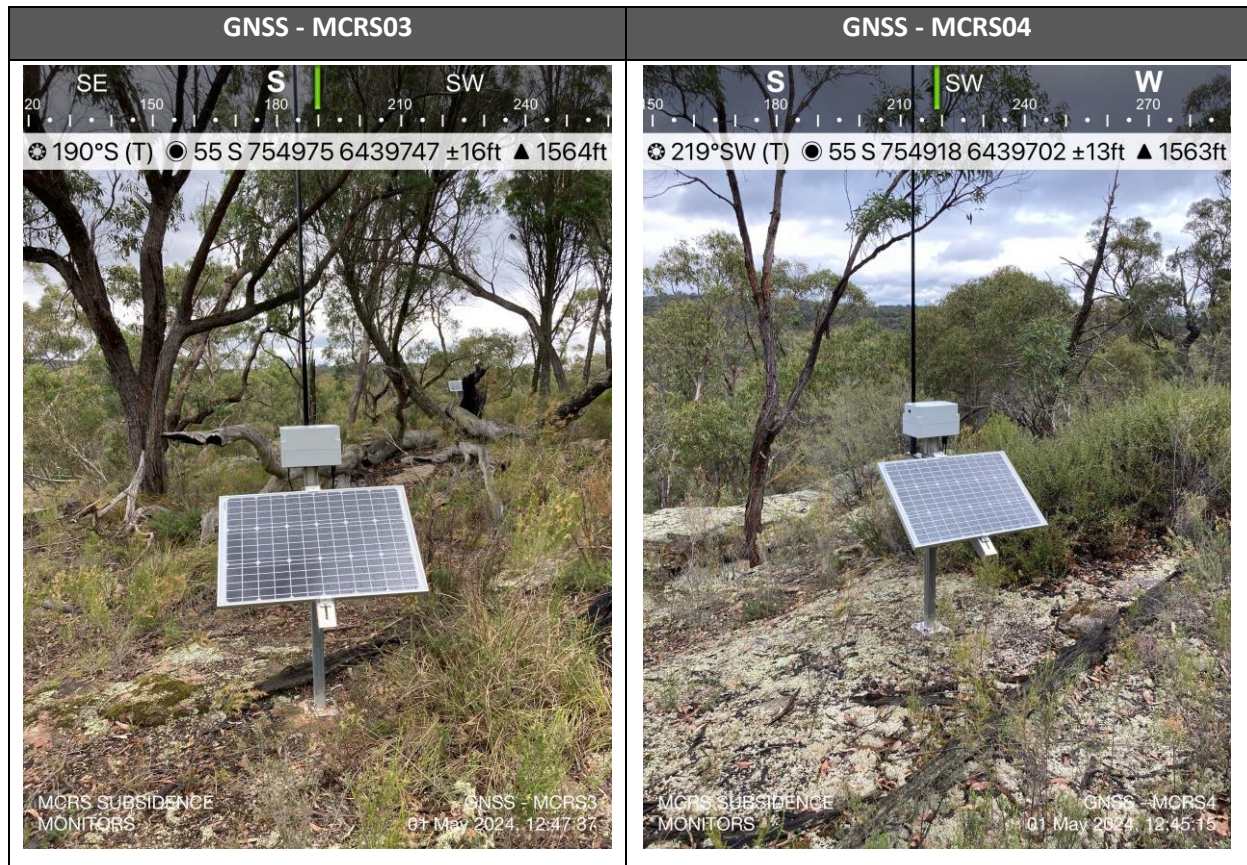


GNSS - MCRS01



GNSS - MCRS02





Of the seven potentiometers, six are positioned across existing cracks within the landform features to monitor changes within the rock structures. One potentiometer (Pot 6) is located across a rock structure that is undergoing obvious tree root jacking to better understand the rate of change related to vegetation impacts in rock features. **Figure 5** depicts an example of the potentiometer devices installed at MCRSS, using epoxy resin to adhere to the substrate.



Figure 5: Example of Potentiometer Device

5. Measurement and Evaluation

5.1 Performance Measures and Performance Indicators

In accordance with Condition 24, Schedule 3 of the PA08_0184, UCMPL must ensure that there is no exceedance of the subsidence impact performance measures (Table 3 of the Extraction Plan). Table 22 of the Extaction Plan and **Table 5-1** 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, at the MCRSS during the secondary extraction within the Extraction Plan Area.

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 for the MCRSS has been triggered, UCMPL will carry out investigations as described in the MTARP (Section 5.5 of the Extraction Plan) and the TARP (**Table 5-2**) to determine if the exceedance is subsidence related.

Table 5-1 MCRSS Subsidence Performance Measures and Performance Indicators

	Subsidence Performance Measure	Subsidence Performance Indicator	Assessment of Performance Measure
Aboriginal sites	Nil impact on Mona Creek Rock Shelter Sites	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 of the Extraction Plan and Section 4 of the Addendum) indicates: <ul style="list-style-type: none"> – A trigger alarm from the LWW8 sensors^{1,2} monitoring crack width and convergence has been received; and/or – A trigger alarm from the LWW8 GNSS² 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 TARP (Table 5-2) and the MTARP (Section 5.5 of the Extraction Plan).

Notes: ¹ Potentiometer units. ² The GNSS for the MCRSS. Refer to **Table 4-2** and **Figure 4** and **Attachment B**.

5.2 MCRSS Trigger Action Response Plan (TARP)

UCMPL have developed a Master Trigger Action Response Plan (MTARP) (Table 24 of the Extraction Plan) and **Table 5-2** specific for the MCRSS, 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, UCMPL have developed a specific trigger action response plan for the MCRSS (**Table 5-2**).

In the event the subsidence performance measures as summarised in Table 3 of the Extraction Plan are considered to have been exceeded or are likely to be exceeded at the MCRSS, response and management measures in the MTARP (Table 24) and the TARP (**Table 5-2**) will be undertaken in accordance with the relevant protocols for:

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

Table 5-2 MCRSS TARP

Monitoring Sites	Monitoring Parameters	TARP Levels	Subsidence Performance Indicator Triggers	Action/Response
Subsidence				
Mona Creek Rock Shelters #180-#187 (refer to Figure 1 and Figure 2).	Subsidence parameters to be measured utilising: - Stress Cell Monitors; - Displacement monitors; - GNSS Units	Level 1:	Realtime strain monitoring data indicates changes within the feature within + / - 0.3mm/m. Review by UCMPL’s subsidence engineer, confirms predicted subsidence values and impacts have not been exceeded.	Continue subsidence monitoring during all TARP Levels as required by Section 4.2.6 of the Extraction Plan and the SMP LW30-32 & LWW6-LWW8. Provide a summary of subsidence monitoring results, and if triggered any investigations, within the Annual Review as outlined in Section 5.8.1 of the Extraction Plan.
		Level 2:	Realtime strain monitoring data indicates changes within the ranges of: - -0.3 to -0.6 mm/m or, - +0.3 to +0.9 mm/m	Investigations and verification completed by the Technical Committee ¹ to determine if changes indicated by monitoring are mining induced or influenced by other causes. If Level 2 investigations confirm changes are non-mining related proceed to Level 1. If investigations conclude that the changes seen are mining related, notification of the findings will be made to the Steering Committee ² . Extraction will continue as planned as long as monitoring indicates changes are remaining within the Level 2 range.
		Level 3:	Realtime strain monitoring data indicates changes within the ranges of: - -0.6 to -0.9mm/m - +0.9 to +1.3mm/m	If monitoring indicates changes within Level 3 ranges, extraction progression will halt until investigations are undertaken to verify changes identified are mining induced or are caused by external factors, i.e. weather events or natural processes. The Technical Committee ² will then take findings to the Steering Committee ³ who will make a determination on the findings and if extraction will proceed. All Level 3 ranges will be reported) to the DPE upon confirmation by the Technical Committee ² as required by Section 5.7.1 of the Extraction Plan. If investigations confirm exceedances are mining related but operations remain within approved subsidence impacts performance measures, UCMPL will initiate the Adaptive Management Measures (Section 5.6.1 in the Extraction Plan) to remain within subsidence performance measures. In the event of the subsidence performance measures has been exceeded and confirmed by the Technical Committee ² , Government agency notification and correspondence as outlined in the Contingency Response (Section 5.6.2 and Section 5.7.1 of the Extraction Plan). UCMPL will 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. 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 of the Extraction Plan.

Notes: ¹ **Technical Committee:** Ken Mills (SCT), Technical Services Manager (UUG), Lucy Stuart (UCMPL), Amanda Sales (UCMPL), Michael Nicholson (GNSS). ² **Steering Committee:** General Manager (UCMPL), Operations Manager (UUG), Technical Services Manager (UGG), Lucy Stuart (UCMPL) and Amanda Sales (UCMPL).

6. Plan Administration and Responsibilities

Key responsibilities for this Addendum are summarised in **Table 6-1**.

Table 6-1 UCMPL Responsibility for this Addendum

Responsibility	Accountabilities
Ulan Underground Operations Manager	<ul style="list-style-type: none"> • Understand the Extraction Plan and this Addendum and ensure appropriate technical services resources for the implementation of this Extraction Plan are available • Authorise internal and external reporting requirements of this Extraction Plan and this Addendum.
Ulan Underground Technical Services Manager	<ul style="list-style-type: none"> • Ensure the Subsidence Effect Monitoring pertaining to the H and F Line and this Addendum are implemented, carried out within specified timeframes, are adequately checked, processed and are prepared to the required standard.
Environment and Community Manager (ECM)	<ul style="list-style-type: none"> • Implement this Extraction Plan and this Addendum 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 and this Addendum; • 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)	<ul style="list-style-type: none"> • Implement monitoring programs as required by this Extraction Plan and this Addendum and conduct analysis of results against performance indicators as described in this Extraction Plan and this Addendum; • Prepare this Extraction Plan and this Addendum 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.

7. Document Information

7.1 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 7-1** below.

Table 7-1 Change Information

Version	Date	Review team (Consultation)	Change Summary
1.0	June 2024	Lucy Stuart, Amanda Sales, and SCT	UCMPL have prepared this Extraction Plan Addendum (the Addendum) to address the DPE's request to develop a specific TARP for the MCRSS provided in June 2023.

Notes: Any 'version' discrepancies displayed in the Footer of this Document are a function of the UCMPL document control register.

Attachment A – Proposed Monitoring System for Mona Creek Rock Shelters (SCT) – Presentation

Attachment B – Explanation of Strain Based TARP Levels for Mona Creek Monitoring (SCT)
