ULAN
UNDERGROUND

GLENCORE

Appendix D: Built Features Management Plan Longwalls 30 & LWW6-LWW8

Ulan Underground

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1 Introduction

1.1 Extraction Plan Applicable Area

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

1.2 Purpose and Scope

The purpose of this Built Features Management Plan for Longwalls 30 & LWW6-LWW8 (BFMP LW30 & LWW6-LWW8) is to outline the management strategies, controls and monitoring programs to be implemented for the management of built features (either owned or non-Ulan Coal owned) in relation to potential environmental impacts resulting from secondary extraction within the Application Area.

This BFMP LW30 & LWW6-LWW8 (this Plan) has been amended to incorporate the approved MOD4[1] mine plan which extend[2] the longwall panel lengths of LW30, LWW7 and LWW8. Amendments to this Plan are identified by red text. A summary of the predicted changes to potential subsidence effects, subsidence impacts and environmental consequences, as a result of the revised mine plan layout at UUG is provided in **Section 3.0**. There are no significant changes to the monitoring or management measures previously proposed, as a result of the revised layout of LW30, LWW7 and LWW8.

This scope of this Plan applies to infrastructure potentially impacted as a result of mining within the Application Area (**Figure 2**).

The appointed team of suitably qualified and experienced experts which included representatives from Strata Control Operations (SCT) relevant to this plan, was endorsed by the Secretary of NSW Department of Planning and Environment (DP&E) on 27 June 2016 (Attachment 2 of the Extraction Plan).

[1] *Ulan Continued Operations Project - Modification 4 Longwall Optimisation Project Environmental Assessment (ELA, 2018)*

[2] As a result of MOD4, length of approximate extensions for LW30, LWW7 and LWW8 are 195m, 220m, 155m respectively.

Figure 1 Extraction Plan LW30 & LWW6-LWW8 Application Area

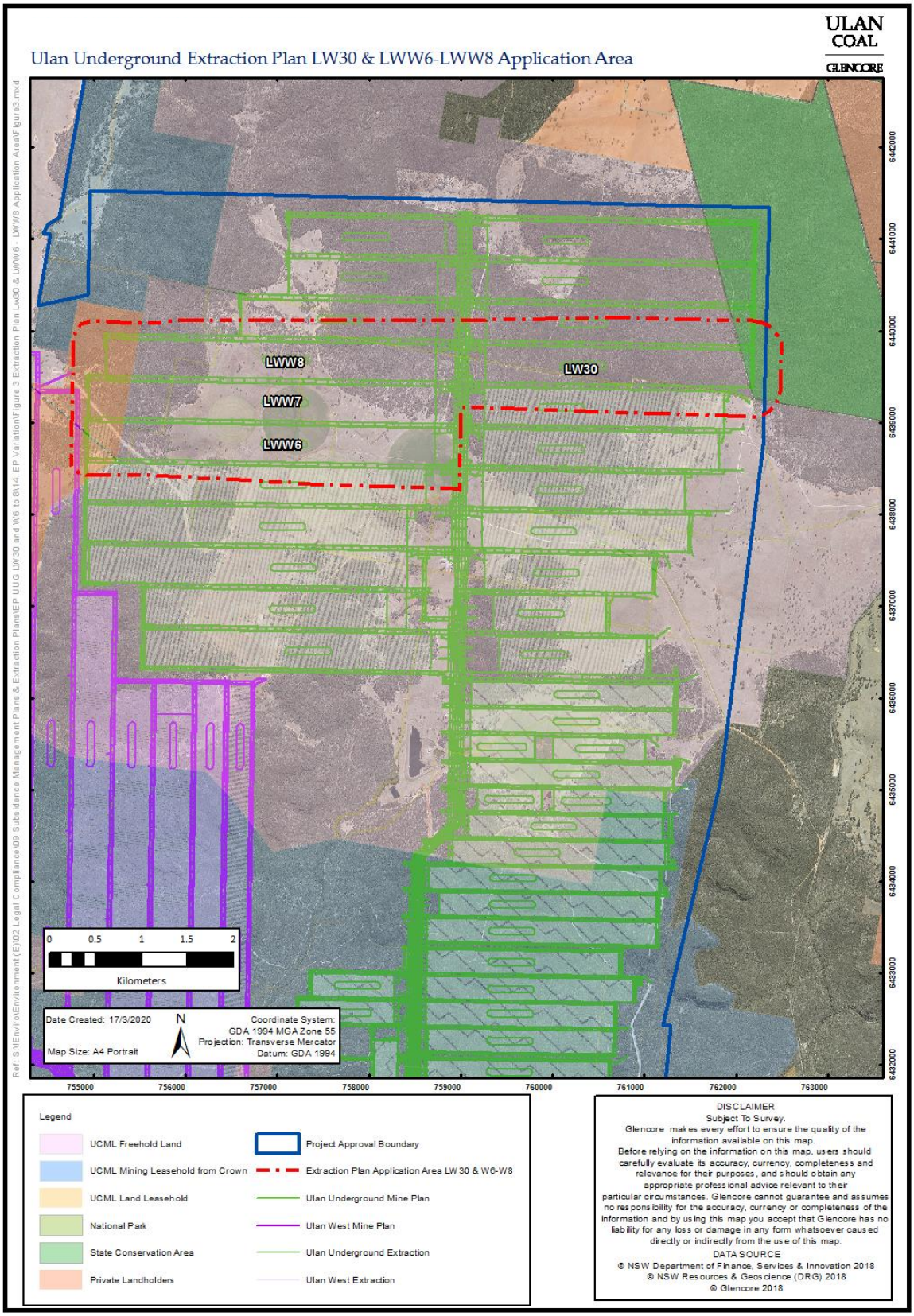


Figure 2 Built Features within the Application Area

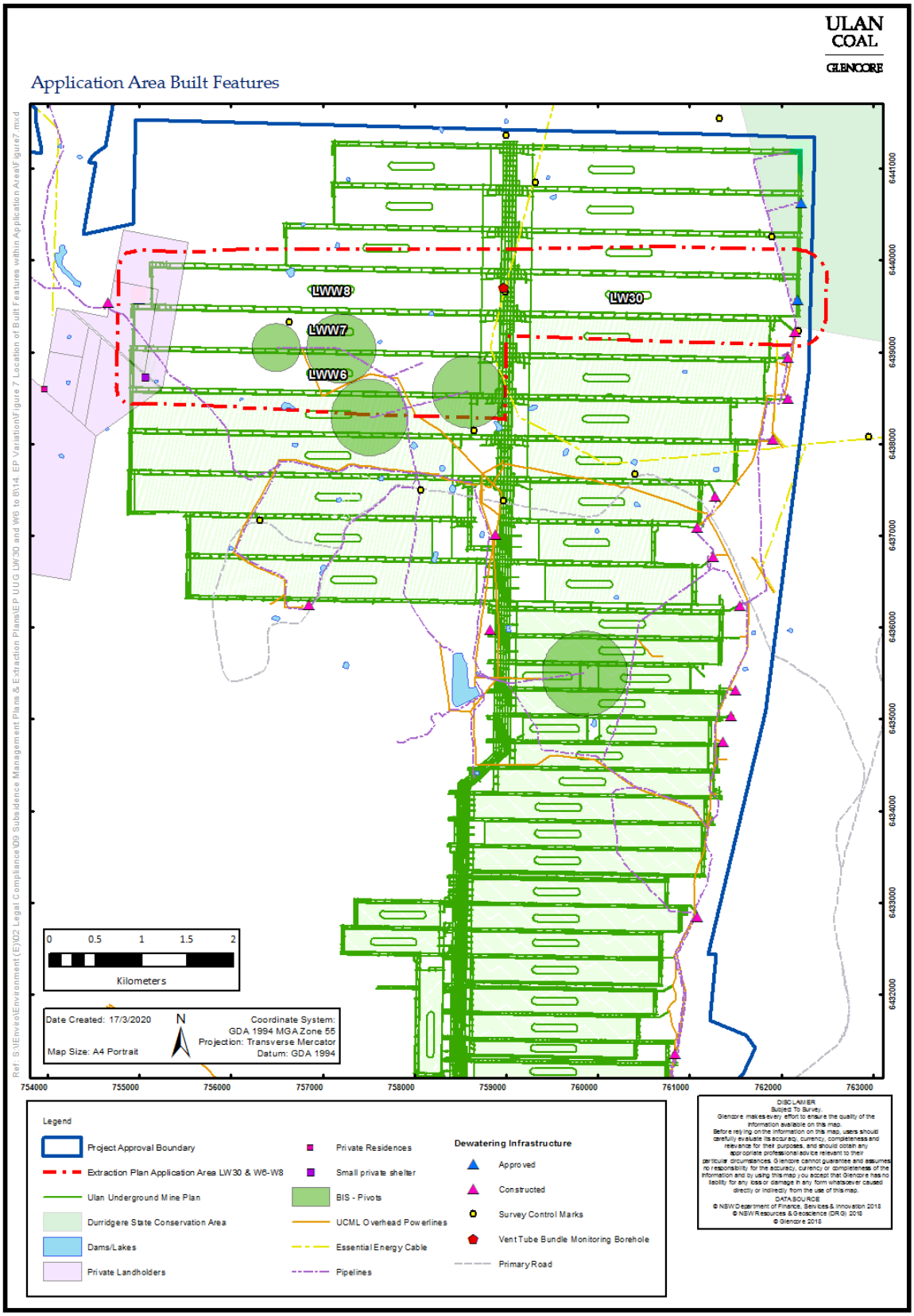
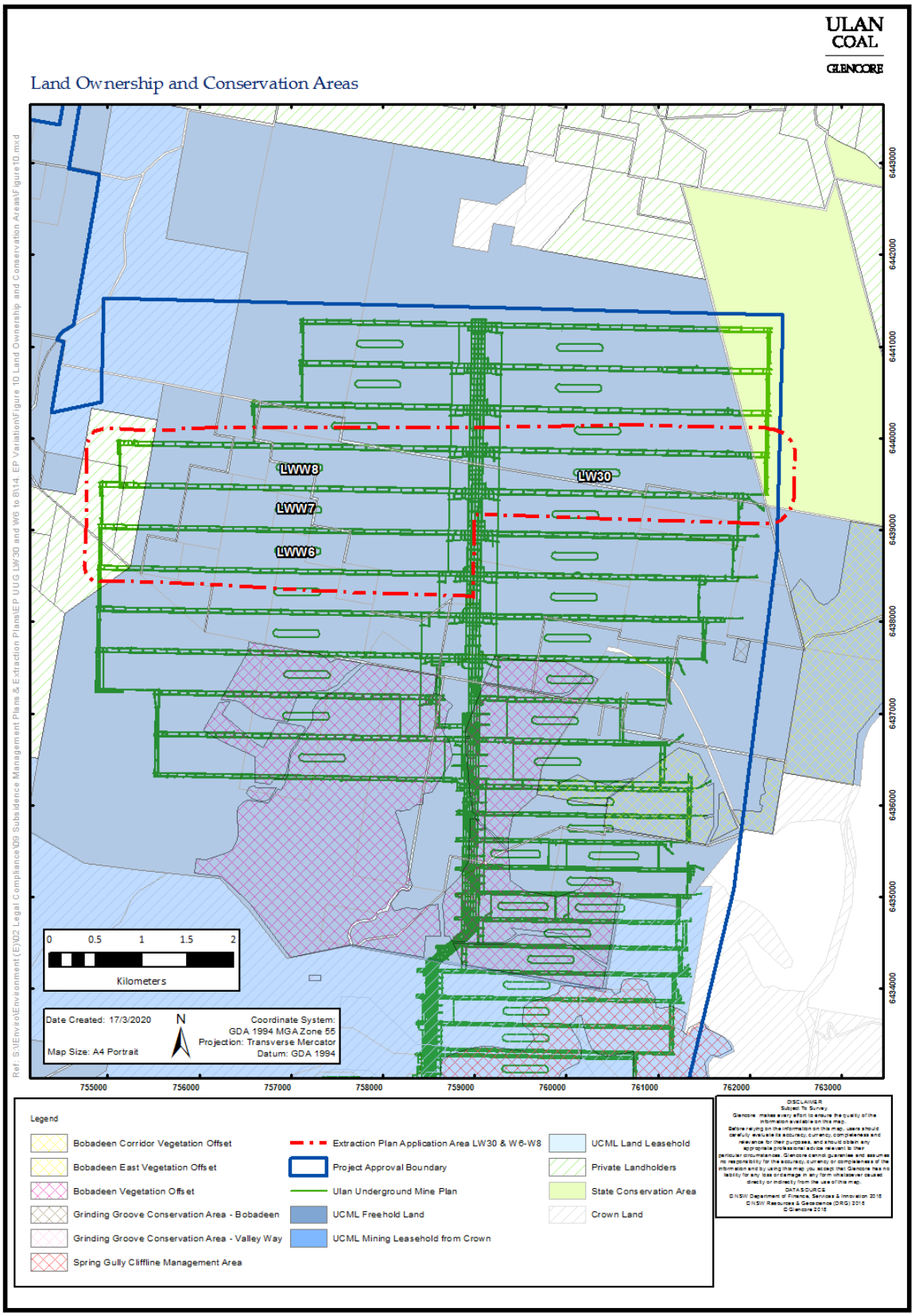


Figure 3 Land Ownership within the Application Area



1.3 General Description of the Application Area

The Application Area for the amended mine plan for LW30 & LWW6 - LWW8 only includes an additional section of the Durridgere State Conservation Area (DSCA). All other natural features and surface infrastructure, including farm or mining related infrastructure, remains the same except for newly built approved features constructed by UCMPL within the original Application Area (**Figure 2**).

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

Most of the land within the Application Area is owned by UCMPL, with the exception of one private property in the west of the Application Area and a small section of the Durridgere State Conservation Area (DSCA) in the east (**Figure 3**). There are no privately owned dwellings within the Application Area.

The mining authorisations applicable to UUG include ML1468, ML1341, ML1511, ML1554, ML1656, ML 1365, ML 1366, ML1467 and CCL741 (**Figure 4**).

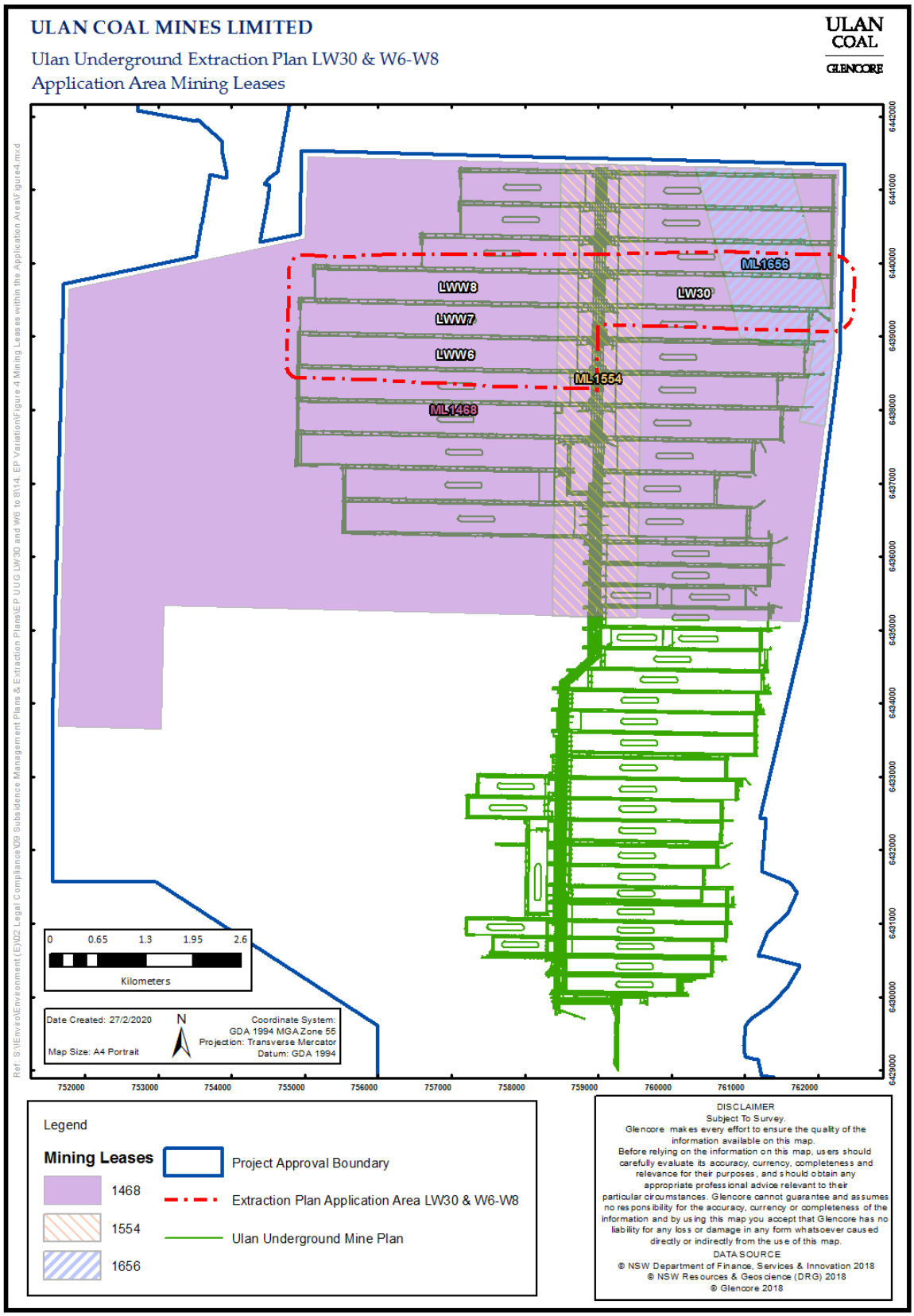
The depth of cover as measured from the top of seam varies from 165 meters to 335 meters. The depth of cover increases in northeast direction as the seam dips between 1 and 3 degrees along this orientation. Therefore the depth, in general terms, ranges from 165 meters to 270 meters for western panels (LWW6 to LWW8) and from 270 meters to 335 meters in the east (LW30).

Longwall mining at UUG targets the economic portion of the Ulan Coal Seam. The thickness of this section varies across the revised Application Area from approximately 2.5m to 3.3m with an average of 2.9m.

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

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

Figure 4 UCML Applicable Mining Applications



1.3.2 Description of Built Features within the Application Area

The majority of built features within the Application Area are owned by UCMPL. Non-UCMPL owned infrastructure includes one small shelter, farm dams and fences located on private property, a power line owned/managed by Essential Energy and state owned survey control marks (**Figure 2**).

1.3.2.1 UCMPL Owned Infrastructure

UCMPL owned infrastructure located within the Application Area includes permanent irrigation pivots, overhead power lines 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, power line and pipelines to service UWO's small bore ventilation shaft and dewatering installations to the west of the Application Area (**Figure 2**).

Changes to the location of UCMPL owned infrastructure as a result of MOD4 include the mine dewatering systems at the eastern end of LW30, which now will be positioned above the longwall extraction area (**Figure 3**).

The infrastructure within the service corridor and mine dewatering systems above LW30, LW32 and LW33[3] have been designed to accommodate the subsidence movements forecast in these areas.

1.3.2.2 Private Property Built Features

A small shelter made of timber and corrugated iron is located on Private Property within the Application Area (**Figure 2**). Agricultural built features of the property with the Application Area include boundary and internal farm fences and two farm dams.

1.3.2.3 Essential Energy Power Line

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 Application Area. The power line services one rural property to the north of the project area.

1.3.2.4 State Survey Control Marks

Three state survey control marks are located within the Application Area and a further ten marks within a two kilometre radius of the Application Area boundary. Some of these state survey controls marks are already reported as 'disturbed' by mining.

[3] Mine dewatering systems above LW30, LW32 and LW33 to be constructed prior to longwall extraction.

1.4 Structure of the BFMP LW30 & LWW6-LWW8

Table 1 identifies where the requirements of Condition 2, Schedule 5 of the PA 08_0184 are addressed in this Plan.

The main text sections and Attachments of this Plan are:

Section 1 Provides an introduction to this Plan, including the purpose and scope, relationship to the EMS and the document structure.

Section 2 Describes the regulatory requirements and provides a summary of relevant legislation and stakeholder consultation.

Section 3 Summarises the predicted subsidence impacts and environmental consequences resulting from the extraction of LW30 & LWW6-LWW8.

Section 4 Describes the management, monitoring and evaluation measures that will be implemented and how monitoring data will be used to assess the relevant performance indicators and performance measures.

Section 5 Provides a Contingency Plan to manage any unpredicted impacts and their consequences. Provides a Trigger Action Response Plan (TARP), which is a simple and transparent snapshot of the monitoring of environmental performance and where required the implementation of management and/or contingency measures.

Section 6 Provides a summary of the review and improvement process and reporting requirements.

Section 7 Outlines the roles and responsibilities for this Plan.

Section 8 Lists the documents referred to in **Sections 1 to 6** and provides an historical review reference of this Plan.

Attachment 1 Built Features Consultation

2 Regulatory Requirements

2.1 Project Approval

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

> *26. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Director-General. Each Extraction Plan must:*
>
> *…*
>
> *include:*
>
> *…*
>
> - *a Built Features Management Plan, which has been prepared in consultation with the owner/s of any relevant features, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings on these features; and*
> - *a program to collect sufficient baseline data for Future Extraction Plans[5].*

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

Table 1 Supporting Documents – Reference Summary

EP Guidelines for Extraction Plan Management Plans	PA 08_0184 Requirements for Management Plans - Condition 2, Schedule 5	This Plan **Reference**	**Section Description**
Overview of landscape features, heritage sites and environmental values to be managed under the component plan; and *Description of landscape features, heritage sites and environmental values to be managed under the component plan and their significance.*	Condition 2(a) *detailed baseline data*	**Section 1.3** of this Plan	Provides a summary description of built features within and outside the Application Area.
	Condition 2(b) *a description of:* • *the relevant statutory requirements (including any relevant approval, licence or lease conditions);*	**Section 2** of this Plan	Provides descriptions of project approval, subsidence performance measures and legislation applicable to this Plan.
Performance measures relevant to the landscape features, heritage sites and environmental values to be managed under the component plan	Condition 2(b) *a description of:* • *any relevant limits or performance measures/ criteria;*	**Section 2.2** of this Plan	Provides the subsidence performance measures for built features.
Performance indicators to establish compliance with these performance measures	• *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;*	**Section 4.3** of this Plan	Outlines performance indicators to assess the subsidence performance measures for built features.
	Condition 2(c) a description of the measures that would be implemented to comply with	**Section 4** this Plan	Describes the implementation of management measures.

[4] PA08_0184, Schedule 3, Condition 26(h).
[5] Ulan Coal's program to collect baseline data for Future Extraction Plans is provided in Attachment 3 of the Extraction Plan.

EP Guidelines for Extraction Plan Management Plans	PA 08_0184 Requirements for Management Plans - Condition 2, Schedule 5	This Plan Reference	Section Description
	the relevant statutory requirements, limits, or performance measures/criteria;		
Currently predicted subsidence impacts and environmental consequences relevant to the features, sites and values to be managed.		**Section 3** of this Plan	Provides a summary of the approved subsidence impacts and revised impacts.
Measures planned to remediate these impacts and/or consequences		**Section 4** of this Plan	Provides a summary of the subsidence management measures.
Proposed monitoring of the success of remediation measures following implementation		**Section 4** of this Plan	Provides a summary of the subsidence management measures and remediation measures for built features.
Existing baseline monitoring network and baseline monitoring results. *Proposed monitoring of subsidence impacts and environmental consequences.*	*(d) a program to monitor and report on the:* • *impacts and environmental performance of the project;* • *effectiveness of any management measures (see c above);*	**Section 4.2** of this Plan	Describes the existing and proposed monitoring and evaluation program.
Adaptive management proposed to avoid repetition of unpredicted subsidence impacts and/or environmental consequences *Contingency plans proposed to remediate unpredicted subsidence impacts and/or environmental consequences* *Trigger, Action, Response Plan*	*(e) a contingency plan to manage any unpredicted impacts and their consequences;*	**Section 5** of this Plan	Provides a Contingency Plan in the event performance measures are exceeded, higher than predicted subsidence or subsidence related incident has occurred. The Contingency Plan outlines the requirement to develop the appropriate course of actions, including corrective and preventative actions. This section also provides a TARP for to identify the appropriate response measures and responsibilities.
Responsibilities for implementation of the component plan		**Section 7** of this Plan	Responsibilities for implementation of this Plan is listed.
	(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	**Section 6.1** of this Plan	Describes the review mechanism for improvement.
	(g) a protocol for managing and reporting any: • *incidents;* • *complaints;* • *non-compliances with statutory requirements; and* • *exceedances of the impact assessment criteria and/or performance criteria; and*	**Section 6.2** of this Plan	Describes the reporting and community response process.
	(h) a protocol for periodic review of the plan.	**Section 6.1** of this Plan	Describes the review process of the plan.

2.2 Subsidence Performance Measures

This Plan outlines the management strategies, controls and monitoring programs to be implemented for the management of built features from the proposed secondary extraction workings within the Application Area[6] as described in the Extraction Plan. UCMPL must ensure that there is no exceedance of the subsidence impact performance measures[7] for built features as provided in **Table 2**.

Table 2 Built Features Performance Measures

Built Features	Subsidence Performance Measures ~~Criteria~~
All built features	Safe, serviceable and repairable unless the owner agrees otherwise in writing

2.3 Relevant Legislation

2.3.1 Mining Act 1992

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

The surface mining leases within the Application Area are ML1554 and ML1656, granted on 1 September 2004 and 3 March 2011 respectively.

Table 3 provides the conditions of mining leases within the Application Area relating to built features and the section where the condition is addressed in this Plan. Predictions and management of built features are discussed in **Section 3.2** and **Section 4.1.1**.

Table 3 Built Features Mining Lease Conditions

Mining Lease	Built Feature Condition	Section of this Plan
ML1468 **Condition 41**	The leaseholder shall as far as is practicable so conduct operations as not to interfere with or impair the stability or efficiency of any transmission line, communication line or pipeline traversing the surface or the excepted surface of the subject area and shall comply with any direction given or which may be given by the Minister in this regard.	**3.2 & 4.1.1**
ML1656 **Condition 13**	Operations must not interfere with or impair the stability or efficiency of any transmission line, communication line or pipeline or any other utility on the lease area without the prior written approval of the Director-General and subject to any conditions stipulated.	**3.2 & 4.1.1**
ML1554	No conditions in relation to built features	NA

[6] PA08_0184, Schedule 3, Condition 26(h).
[7] PA08_0184, Schedule 3, Condition 24, Table 14.

2.3.2 Environmental Planning and Assessment Act 1979

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

2.4 Consultation

Consultation was undertaken during the Project EA[8]. Consultation specific to the Extraction Plan was undertaken with government agencies, asset owners, Ulan Coal's Community Consultative Committee (CCC) and registered Aboriginal stakeholders.

There are several asset owners located within the Application Area, including:

- One private landholder to the west of the Application Area;
- NPWS as the landowner for the DSCA within the eastern portion of the Application Area;
- Three permanent state owned survey control marks; and
- Essential Energy as the owner of the 12.7KW power line that crosses through the Application Area.

These parties have been previously consulted either during the preparation of the Environmental Assessment for the Project EA, preparation and revisions of the SMP/Extraction Plan for LW27-29 and W4-W5, preparation of this Extraction Plan and MOD4.

Consultation with asset owners with regard to this Extraction Plan commenced in May 2016. A summary of the consultation undertaken for this Extraction Plan is outlined in Table 9, Section 2.1 of the Extraction Plan.

The Private Property Subsidence Management Plan (PPSMP) for LWW6 as agreed with the private landholder is located in Appendix J. The PPSMP for LWW7 and LWW8 will be prepared in consultation with the private landholder prior to the commencement of mining in each of the respective longwall panels. The agreed management of the Essential Energy asset is in accordance with the revised Essential Energy Management Plan as provided in Appendix K.

[8] Ulan Coal - Continued Operations Environmental Assessment (Umwelt 2009).

3 Predicted Subsidence Impacts and Environmental Consequences

The approved subsidence impacts and environmental consequences relating to built features are described in the Project EA and subsequent modifications.

The revised subsidence impact assessment[9] was completed by SCT Operations Pty Ltd (SCT) specifically for the Application Area (**Technical Report 1**). The SCT assessment concluded that no significant changes in subsidence impacts are expected from those described in the Project EA.

Section 3.1 provides a summary of approved subsidence impacts from the Project EA and subsequent modifications within the Project Area, relevant to this Plan.

Section 3.2 provides a summary from the revised subsidence impact assessment by SCT in 2016 relevant to this Plan.

Section 3.3 provides a summary of the relevant issues from the Extraction Plan Risk Assessment (**Technical Report 2**).

Section 3.4 provides a summary of the revised subsidence impacts as they relate *Subsidence Assessment for Amendment to LW30 and LWW6 - LWW8 Extraction Plan (SCT, 2019).*

3.1 Approved Subsidence Impacts and Environmental Consequences

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

> *Subsidence movements from the project mining geometry are expected to change the vertical and horizontal location of Ulan Trig and other permanent survey marks in the general vicinity out to a distance of up to 2km from the mining area. Subsidence movements are expected to be effectively complete once the two adjacent longwall panels have finished but may start up to 2km ahead of mining.*
>
> *Mining subsidence movements from the project mining geometry are expected to cause perceptible damage to the residential and farm buildings on privately owned properties identified as Property ID 57 "Billir", Property ID 254 "Woodbury", and Property ID 80 "The Broken Back". Buried services such as water and sewerage pipes are likely to be damaged. Telephone and powerlines may require mitigatory work depending on their specific location relative to mining, but in most cases, subsidence impacts on these services is easily manageable.*
>
> *There are several power lines crossing the project area. These are all of single pole construction and it is not anticipated (these structures will be impacted by subsidence), based on previous experience of mining under similar structures.*
>
> *Farm dams, fences and access tracks are not expected to be significantly impacted by mining subsidence movements. However, some minor remedial work may be necessary to fill in cracks and remove compression humps. Any impacts are expected to be consistent with impacts that have been experienced over previous longwall areas at the Ulan No 3 Mine.*

[9] PA08_0184, Schedule 3, Condition 26(e).

The following summary of revised subsidence impacts to flora and fauna were described in the Environmental Assessment Modification (MOD1) of Ulan Coal - Continued Operations (Umwelt 2011), which stated:

> *The proposed amendments to Ulan No. 3 and Ulan West have been assessed by Strata Control Technology. The proposed amendment do no significantly change the subsidence impacts as previously made as part of the Ulan Coal - Continued Operations Environmental Assessment (Umwelt, 2009), with minimal changes to previously assessed impacts. Predicted mine plan modification will meet the existing performance requirements of Project Approval 08_0184 Condition 24.*

The following summary of revised subsidence related impacts as a result of modifying the Ulan West Mine Plan were described in the Environmental Assessment Modification (MOD2) of Ulan Coal - Continued Operations (Umwelt 2012), which stated:

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

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

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

3.2 Revised Subsidence Impacts and Environmental Consequences

A summary of the revised subsidence assessment relevant to this LMP LW30 & W6-W8 and the Application Area by SCT (**Technical Report 1**) is provided below. The revised subsidence assessment by SCT concluded:

> *A single wire, single pole power line that supplies local private customers traverses the surface above main heading roadways from south to north in the central part of the EP area. This asset is owned by Essential Energy. Seven poles supporting this power line have been previously mined by the corner of Longwall 27 (one pole) and along the centreline of Longwall 26. No interruptions to supply were experienced during this previous mining even when the line experienced full subsidence of up to 1.5m. Five poles are located within the EP area. None of the poles are directly mined under by the proposed mining. Four are expected to experience maximum subsidence of less than 50mm and one of up to 100mm. Single pole power line structures are generally tolerant to subsidence movements. No perceptible impacts to this power lines are expected.*
>
> *Based on the subsidence monitoring and measurements of far-field movements at Ulan No 3 Mine, it is likely that PM170453 and PM170460 have already undergone significant horizontal movement as a result of previous mining up to Longwall W2 and Longwall 29 with the potential for PM170453 to also have*

experienced some horizontal movement. The proposed mining of Longwall 30 and Longwalls W6, W7 and W8 is expected to add to any previous horizontal, and in the case of PM170450 vertical, movements at these marks. A further 10 permanent marks have been identified within a 2 km radius of the EP area. Of these, six are to the south over or in proximity to previously mined longwall panels, whereas the four to the north of EP area are over solid coal. All of these survey stations should be considered temporarily decommissioned and it is understood that this process has already been completed.

The main residential building (Property ID 254 "Woodbury") and associated outbuildings are positioned approximately 700m to the west of the EP area. The power and telecommunications services to the dwelling run along the western boundary of this property. In these locations neither the structures nor the services are likely to be perceptibly impacted by the proposed mining.

Several ponds or farm dams are located on the Woodbury property. Two of these dams are located within the EP area at an overburden depth to the Ulan Seam of approximately 170m. These two dams are expected to experience the full range of subsidence movements from Longwall W5 and Longwall W6. Minor impacts including cracking and water loss is possible during the period of active mining below and in the general vicinity of each dam.

The dam located over Longwall W6 is fed from a spring located directly below it. The wall of this dam is currently in a state of disrepair where it has been breached but there was standing water in the base of the dam and fish at the time of a site visit in September 2016. Fracturing of the overburden strata during the start of mining Longwall W6 is expected to disrupt the spring that feeds the dam. It is considered unlikely that this spring fed system could be repaired or re-established.

A small open sided weather shelter constructed from rough sawn timber poles is located over Longwall W6. The shelter is about 5m long by 4m wide. It is expected to experience the full range of subsidence movements. The shelter is not expected to be significantly impacted although it is possible that some repairs may be necessary.

A number of fences and minor access tracks are present in the EP area and will undergo the full range of subsidence movements. Minor impacts are expected to the tension of fences with minor cracking and potential for steps along some of the access tracks. In areas of higher strain, fences may become affected to the extent that they become ineffective for stock control. Other infrastructure such as gates, cattle grids, and stockyards may also be affected depending on their specific location.

There are seven small farm dams within EP area located on UCML land. These are all located on drainage lines that are tributaries to Mona Creek. All of these dams are located above proposed longwall panels. Minor impacts are expected consistent with previous experience. Some cracking that may cause minor water loss is expected. Experience of mining below these type of dams indicates that the water losses are not likely to pose an operational risk to mining underground and with a small amount remediation work, the dams can typically be restored to their original condition.

The ground water level in any bores within the general mining area is expected to be affected by mining. These bores are likely to be physically impacted by shear movements in the rock strata below the ground surface when mining is

still several hundreds of metres away. Bores located above the longwall panels are considered unlikely to remain productive following mining.

The power lines and pipelines located over Longwalls W6 and W7 to service the pivot irrigation scheme have potential for impacts if they are subject to unconventional subsidence movements such as horizontal shears and steps. Single pole power line structures have been found to be generally tolerant of subsidence movements especially if the poles are closely enough spaced that ground clearances are not compromised.

The ground water monitoring installations are expected to be impacted. They are likely to be physically impacted by shear movements in the rock strata several hundred metres ahead of mining. The ground water monitoring installations are not expected to remain serviceable.

3.3 Risk Assessment

A risk assessment for the Extraction Plan Application Area was completed on 7 July 2016. The risk assessment was facilitated by AXIS Consulting (**Technical Report 2**) and attended by relevant UCMPL personnel and subsidence specialists. The primary objectives of the risk assessment were:

- To identify items to be addressed in the Extraction Plan (and related studies);
- Use the risk assessment as input into the preparation of the Extraction Plan;
- Develop parameters for inclusion in component management plans;
- Involve a cross section of Ulan Coal personnel, subject matter experts, decision makers and key stakeholders in the issue (hazard) identification process;
- Provide a risk rating for identified issues;
- Identify requirement for additional controls;
- Create implementation plan for additional investigations and/or controls; and
- Document the process and the results.

A summary of the key issues raised during the risk assessment area provided in Table 11 of the Extraction Plan. Potential environmental or public safety hazards were raised in relation to subsidence of the following built features within the Application Area, which included;

- Essential Energy power line;
- Farm buildings or sheds;
- Centre pivot structures;
- Farm fences;
- Farm dams;
- Ulan Coal power line to irrigation pivots;
- Ulan Coal irrigation pipeline;
- Ulan Coal dewatering pipeline; and
- State survey control marks.

All hazards were ranked as low with the implementation of the existing and proposed controls. As part of the preparation for extraction of each longwall panel (before extraction has commenced), the Technical Services Manager for Ulan Underground will conduct a risk assessment dedicated to reviewing the potential impact on surface subsidence on UCML owned infrastructure and related operational aspects. This risk assessment should involve a broad cross section of the workforce, include staff responsible for the management of impacted infrastructure.

3.4 Revised Subsidence Impacts (MOD4)

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

> *Although the proposed extensions to LWW7 and LWW8 would result in a greater mining and subsidence footprint on Woodbury, the impacts are not expected to be significantly different to those presented in SCT (2016) and consistent with those described in SCT (2018a) for MOD4.*
>
> *In general, the impacts to UCMPL owned property and farm or mining related infrastructure within the revised Extraction Plan Application Area are expected to be the same as those presented in SCT (2016).*
>
> *Estimates of impacts to the 12.7kV power line and survey control stations are expected to remain the same as those described in SCT (2016) and manageable using the same strategies or measures suggested in that assessment.*

4 Management, Monitoring and Evaluation

4.1 Subsidence Management Measures

4.1.1 Essential Energy Power Line

A single wire earth return (SWER) overhead power line, which services one rural landholder to the north of Ulan Coal Operations, traverses the surface of UCMPL owned land above the UUG main heading roadways in the central part of the Application Area (**Figure 2**). This asset is owned by Essential Energy.

Seven poles supporting this power line have been previously undermined by the corner of Longwall 27 (one pole) and along the centreline of Longwall 26. During the mining of these panels the power line experienced vertical subsidence up to 1.5 m. No interruptions to supply or impairment of the line were experienced.

Five poles are located within the Application Area (**Figure 2**). Four are expected to experience maximum subsidence of less than 50 mm and one of up to 100 mm. No poles are directly undermined. Single pole power line structures are generally tolerant to subsidence movements. No perceptible impacts to this power line is expected. Where minor remediation work is required this would occur in consultation with Essential Energy.

Management and monitoring of this asset will be conducted in accordance with the agreed Essential Energy Management Plan (**Appendix K** of the Extraction Plan).

4.1.2 State Survey Marks

A total of three permanent state survey marks (permanent marks) have been identified within the Application Area. These permanent marks are PM170450, PM170453, and PM170460. They are all positioned over currently unmined areas as shown on **Figure 2**. Based on the subsidence monitoring and measurements of far-field movements at UUG, it is likely that PM170453 and PM170460 have already undergone significant horizontal movement as a result of previous mining up to Longwall W2 and Longwall 29 with the potential for PM170453 to also have experienced some horizontal movement. The proposed mining of Longwall 30 and Longwalls LWW6, LWW7 and LWW8 is expected to add to any previous horizontal, and in the case of PM170450 vertical, movements at these marks.

A further 10 permanent marks have been identified within a 2 km radius of the Application Area (**Figure 2**). Of these, six are to the south over or in proximity to previously mined longwall panels, whereas the four to the north of Application Area are over solid coal.

In accordance with Section 40 of the *Surveying Regulation 2006*, UCMPL will notify the Surveyor General of the likely subsidence induced movement to each state survey mark with 2 km of active longwall mining. UCMPL will request that the mark is temporarily 'decommissioned' by removing its coordinates from the database during the period of active mining and subsidence effects. UCMPL will resurvey the permanent survey marks after cessation of subsidence movements is identified by the Subsidence Monitoring Program (**Appendix G** of the Extraction Plan) and verified by a suitably qualified subsidence engineer.

4.1.3 UCMPL Owned Infrastructure

UCMPL owned power lines, access roads, irrigation pivots and water pipelines are routinely inspected and maintained in accordance with the Maintenance Management System. Specific subsidence management strategies for UCMPL owned infrastructure are developed as required by the Ulan Underground Maintenance & Engineering Manager, following pre-mining risk assessment of potential

subsidence impacts. These management strategies are then incorporated into the maintenance management system for the relevant timeframe of potential subsidence impact.

Inspections of the power lines, including any necessary repairs to the power lines as result of subsidence, are coordinated and managed by the Ulan Surface Operations Electrical Superintendent. Inspections of the pipelines, including any necessary repairs to the pipelines as a result of subsidence, are coordinated and managed by the Ulan Surface Operations Water Manager/Superintendent.

There are several UCMPL owned farm dams within the Application Area which are likely to experience surface cracking during undermining; these dams will be monitored during and post mining and repaired as required.

Wire fences can be affected by tilting of the fence posts and changes of the tension in the fence wires, as mine-induced subsidence occurs. Regular inspections of fences within the Application Area, will be undertaken for safety management purposes and to ensure the integrity of the fencing. Internal fences will be repaired as required. Boundary fences will be repaired as soon as practical, in consultation with the adjoining landowner.

4.1.4 Private Property Built Features

Built features on the private property within the Application Area include farm dams, fences and a small shelter of timber and corrugated iron (**Figure 2**). A condition assessment of private property features will be undertaken pre and post mining to assess the actual subsidence impact to these features. Remediation of built features on private property will be conducted to restore the feature to its pre-mining condition unless otherwise agreed with the landholder or outlined in the management strategies within the PPSMP (Appendix J of the Extraction Plan).

4.2 Subsidence Monitoring Built Features

UCMPL completes regular visual inspections over the surface being longwall mined to monitor for signs of cracking and other subsidence induced impacts. These inspections will be documented within the monthly environmental checklist form and photos taken where appropriate, with all actions entered into CMO[10] in accordance with the EMS. UCMPL will undertake built feature inspections pre-mining, during and post mining within the Application Area in accordance with the requirements in **Table 4**.

Table 4 Summary of Built Feature Monitoring

Monitoring Component	Parameters	Location/Network	Monitoring Frequency	Monitoring Type[11]
UCMPL owned Built Features	Visual inspections to record the general condition of UCMPL's assets including serviceability and safety.	• UCMPL owned built features within the Application Area • Refer to **Figure 2**	• Farm dams, roads, pivots and fences will be inspected monthly during undermining to identify any subsidence impacts. • UCMPL owned power lines and pipelines are inspected and maintained in accordance with the UCMPL Maintenance Management System.	EP
Built Features on Private Property*	Visual condition assessment of Built Features including serviceability and safety.	• Non-UCMPL owned built features located on private property within the Application Area. • Refer to **Figure 2**	• Pre-mining: visual inspection. • During mining: visual inspections to be completed monthly during the extraction of the longwall under the property. • Landholder to contact UCMPL immediately if damage to a built feature is observed. UCMPL will conduct visual verification inspections[12];	EP

[10] CMO is an action tracking software solution automates the tracking of actions generated from incidents, audits, training, obligations or risk assessments etc.
[11] (EMS) – Ulan Coal Mine Complex Monitoring Program undertaken in accordance with Environmental Management Strategy including DP&E Approved Environmental Management Plans, (EP) - Monitoring Program specific to the Application Area and requirements of this Extraction Plan.
[12] No Inspection of cliff line during mining, no persons (including landholder) to enter the vicinity of this area during active undermining.

Monitoring Component	Parameters	Location/Network	Monitoring Frequency	Monitoring Type[11]
			• Post-mining: visual inspections to be completed within one month of the longwall leaving the boundary of the property. • Private Property Condition Assessment Report to be completed at least 3 months after cessation of mining and no later than within 12 months of cessation of mining.	
Essential Energy Power Line	Visual inspection by suitably qualified person to ensure integrity of the asset	• 5 poles located within the Application Area • Refer to **Figure 2**	• Prior to the commencement of each longwall extraction; • At a frequency of monthly during the extraction of each longwall; and • Inspected six monthly for at least 2 years (or until no further movement is recorded) after the extraction of each longwall.	EP
State Survey Control Marks	Ensure State Survey Control Marks within 2km radius of the goaf edge of active longwall are registered as 'Disturbed' through appropriate processes. Reinstate and resurvey the Survey Control Mark after cessation of subsidence movements is evidenced by the Subsidence Monitoring Program.	• All State Survey Control Marks within 2km radius of longwall mining. • Refer to **Figure 2**	• Prior to the commencement of each longwall; and • Post mining to determine if there are any state survey marks which meet the criteria for recommissioning.	EP

* All inspections on private property are subject to approval by the landowner

4.3 Assessment of Subsidence Performance Measures

Subsidence impact performance measures listed in Table 14 of the Project Approval[13] relevant to built features are provided in **Table 5**. UCMPL have developed a range of performance indicators (**Table 5**) to inform UCMPL if the performance measures are likely to be exceeded during the secondary extraction within the Application Area. **Table 6** provides a summary of the analysis of the monitoring data that will be undertaken to evaluate the potential impacts using the performance indicators against the performance measures.

Table 5 Built Features Performance Measures and Performance Indicators

Built Features	Subsidence Performance Measures	Performance Indicators
All built features	Safe, serviceable and repairable unless the owner agrees otherwise in writing	This performance indicator will be triggered if: • An assessment or notification of non-UCMPL owned built features integrity and functionality has determine to have been comprised without a written agreement in place with the built feature owner; or • Built features monitoring indicates subsidence impacts have or likely to have exceeded subsidence impact predictions.

[13] PA08_0184, Schedule 3, Condition 24.

Table 6 Monitoring of Environmental Consequences against Performance Indicators and Measures

Performance Measure	Monitoring of Environmental Consequence			Data Analysis to Assess against Performance Indicator(s)	Performance Indicator(s)	Assessment of Performance Indicator(s)	Assessment of Performance Measure	Relevant Management and Contingency Measure
	Site	Parameter	Frequency					
Safe, serviceable and repairable unless the owner agrees otherwise in writing	Built features within Application Area.	Unsafe, unserviceable and unrepairable.	**Table 4** of this Plan	Analysis of the built feature integrity and functionality; and Analysis of subsidence effects monitoring data.	UCMPL do not expect additional impacts to occur in regards to non-UCMPL built features within the Application Area, other than those features already identified in this Plan, as a result of longwall mining within the Application Area.	This performance indicator will be triggered if: • An assessment or notification of non-UCMPL owned built features integrity and functionality has determined to have been comprised without a written agreement in place with the built feature owner; or • Built features monitoring indicates subsidence impacts have or likely to have exceeded subsidence impact predictions. If data analysis indicates the performance indicators have been triggered, an assessment will be made against the performance measure.	The performance measure will have considered to be exceeded if monitoring for built features indicates a non-UCMPL owned built feature has become unsafe, unserviceable and unrepairable without the owner's consent in writing.	If the assessment of performance indicators determine an exceedance of the performance measures is due to subsidence related impacts as a result of mining within the Application Area, the Contingency Plan would include: • Notify asset owner immediately; • Notify relevant government agencies; • Conduct investigations; • In consultation with asset owner, develop a plan to undertake the necessary repairs; and • Reassess subsidence impacts.

5 Contingency Plan

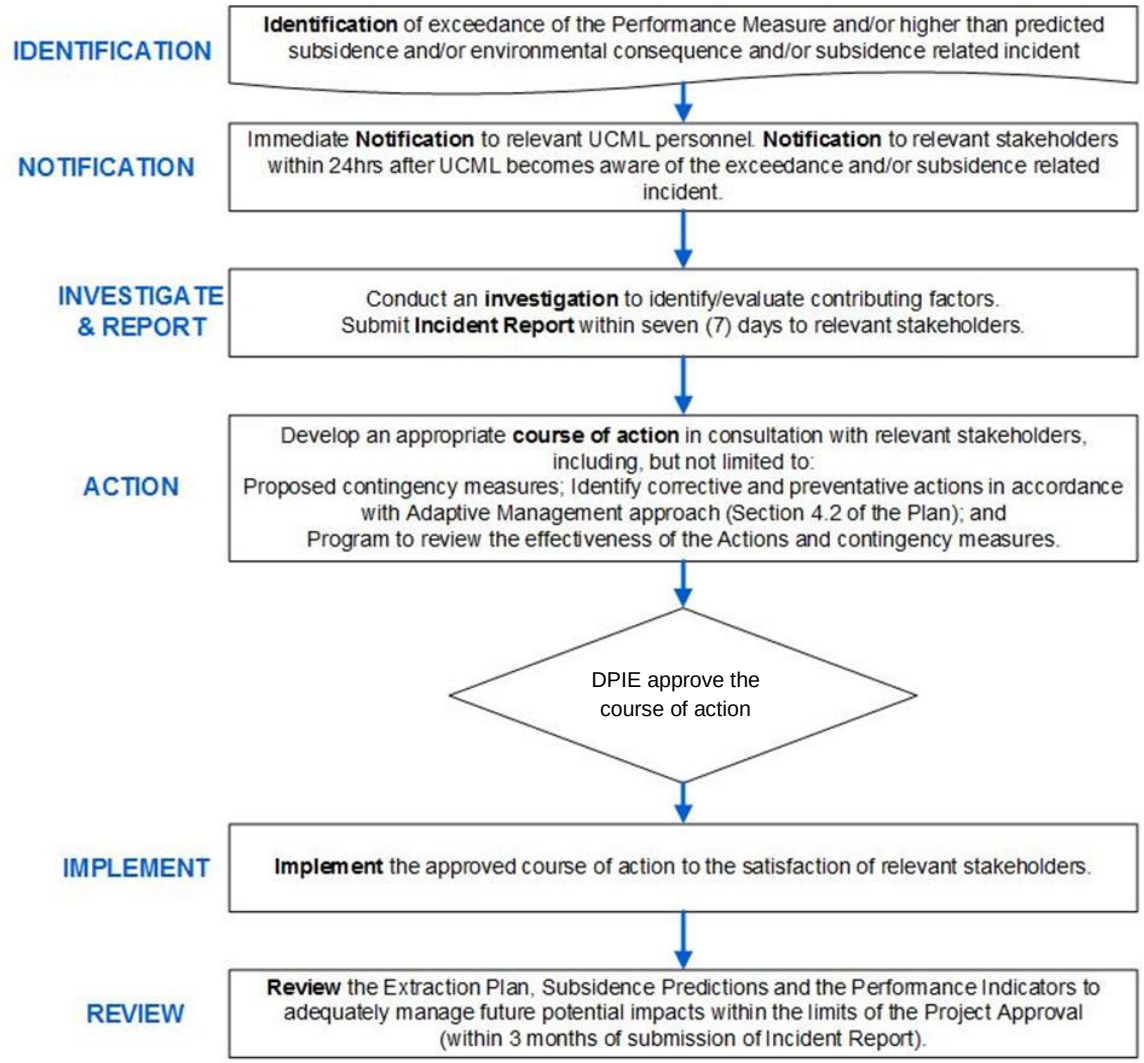
5.1 Adaptive Management

In the event the subsidence performance measures for built features as summarised in **Table 6** are considered to have been exceeded or are likely to be exceeded, response and management will be undertaken in accordance with protocols for incident reporting as identified in Section 4.3 of the Extraction Plan (**Section 6.2**).

Section 4.3 of the Extraction Plan describes the process for handling and investigating non-conformances, including allocation of responsibility, external and internal reporting requirements, and initiating and completing corrective and preventative actions.

Figure 5 displays the Contingency Plan to be implemented in the event the water performance measures are exceeded, higher than predicted subsidence or environmental consequence has occurred or in the event of a subsidence related incident.

Figure 5 Contingency Plan



5.2 Trigger Action Response Plan

Table 7 displays how the various predicted subsidence impacts, monitoring components, performance measures and responsibilities are structured to achieve compliance with the relevant statutory requirements and the framework for management and contingency actions.

Table 7 Built Features Management Plan Trigger Action Response Plan

	Normal State ***Predicted Impacts***	**Level 1 Response** ***Management Response***	**Level 2 Response** ***Contingency Phase***
Trigger	• As predicted, subsidence impacts on built features are consistent with **Section 3** of this Plan • Written agreements in place with non-UCMPL built feature owners.	• An assessment or notification of non-UCMPL owned built features integrity and functionality has determine to have been comprised without a written agreement in place with the built feature owner; or • Built features monitoring indicates subsidence impacts have or likely to have exceeded subsidence impact predictions.	• The performance measure has been exceeded, or is likely to be exceeded (i.e. loss of safety or serviceability) has been confirmed
Action	• Continue to monitor built features in accordance with **Section 4.2** of this Plan	• Implementation of management actions to assess if exceedances are due to mining related activities within the Application Area as described in Section 4.1 of this this Plan	• Implementation of management and contingency measures responses as identified in the Contingency Plan and reporting requirements as described in **Section 6.2.** • Review this Plan
Frequency	• Frequency of monitoring in accordance with **Section 4.2** of this Plan	Frequency of monitoring in accordance with **Section 4.2** of this Plan	• Review monitoring methodology and frequency of this Plan accordance with Contingency Plan.
Responsibility	• Environment and Community Manager.	• Environment and Community Manager • UUG Technical Services Manager	• Environment and Community Manager • UUG Technical Services Manager • UUG Operations Manager

6 Review and Improvement

6.1 Review

Ongoing monitoring and review on the performance and implementation of this Plan will be undertaken in accordance with Section 4.5 of the Extraction Plan. Any changes made to this Plan will be made in consultation with DPIE. A copy of the revised management plan will be supplied to the Secretary of the DPIE for approval.

6.2 Reporting Requirements

External reporting requirements, including incident and annual reporting, for this Plan will be in accordance with Section 4.3 of the Extraction Plan and Section 10.4 of the BMP.

In the event of an incident, UCMPL will notify the government agencies as identified in Section 4.3 of the Extraction Plan within 24 hours after becoming aware of the incident (**Figure 5**). Within seven days of the date of the incident, a detailed report of the incident will be provided and include, but not limited to, the following details:

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

6.3 Community Complaints

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

7 Roles and Responsibilities

The key responsibilities of personnel in relation to this Plan are summarised in **Table 8**. Responsibilities may be delegated as required.

Table 8 Key Responsibilities

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

Responsibility	Accountabilities
Electrical Superintendent **(Ulan Surface Operations)**	• Implement work orders from the maintenance management system in relation to power line inspections and subsidence management of UCMPL owned power lines. • Ensure appropriate repairs to Ulan Coal owned power lines as result of subsidence are undertaken in a timely manner.
Water Manager/Superintendent **(Ulan Surface Operations)**	• Implement work orders from the maintenance management system in relation to pipeline inspections and subsidence management of UCMPL owned pipelines. • Ensure appropriate repairs to UCMPL owned pipelines as result of subsidence are undertaken in a timely manner.

8 Document Information

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

8.1 Definitions

Definitions as provided in Section 5.1 of the Extraction Plan.

8.2 Accountabilities

Accountabilities are described in Section 7 of this Plan.

8.3 References

References as provided in Section 5.2 of the Extraction Plan.

8.4 Attachments

Attachment 1 Built Features Consultation

8.5 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 9** below.

Table 9 Change Information

Version	Date	Review Team (consultation)	Change Summary
0.1	October 2016	Tara Stokes	Original Submission EP LW30 & W6-W8
1.0	October 2017	Jessica Southgate	Document formatting updated in accordance with Dept. of Planning feedback.
2.0	April 2020	Stephen Bragg, Lucy Stuart	This EP was amended regarding extension of longwall panels to align with the approved MOD 4
3.0	December 2020	Robyn Stoney, Lucy Stuart, Stephen Bragg	This EP was resubmitted on the 21/12/2020 to address the requirements from the DPIE Water feeback

Attachment 1 - Built Features Consultation

Table 10 Summary of Historical Consultation with Continued Operations Built Feature Owners

Built Feature Owner	SMP/Extraction Plan Application	Summary of Consultation
Telstra Network **Note:** There are no active Telstra lines within Application Area	• (2005) SMP Application Area for LW 23-26 & W1 • (2007) SMP Application Area for LW W2 – W3 • (2011) Integrated SMP and Extraction Plan Longwall Panels LW27-29, W4-W5 and LWC,E, F, G (North 1)	• Telstra Network Integrity Services (NIS) and Telstra Country Wide (CW) have been consulted during the preparation of all SMP Applications to date, including the 2005 SMP Area (LW 23-26 & W1), 2007 SMP Area (LW W2-W3) and most recently the 2011 SMP/Extraction Plan Area (LW C, E, F, G). • Full details of all consultation for each SMP are provided within the relevant SMP Applications. • The status and condition of the buried telephone line was confirmed by the Telstra Network Integrity Services on the 25 August 2011.
Essential Energy	• (2011) Integrated SMP and Extraction Plan Longwall Panels LW27-29, W4-W5 and LWC,E, F, G (North 1)	• Consultation with Essential Energy (formerly Country Energy) was undertaken during the review of the Essential Energy Management Plan (ULN SD PLN 0071) for the 2011 SMP/Extraction Plan regarding the SWER line. • Further consultation with Essential Energy was undertaken during the August and September 2012 regarding the Essential Energy Management Plan (ULN SD PLN 0071). • The Essential Energy Management Plan was approved by the Manager Planning North Western Region on 18 September 2012. • Full details of this consultation are provided within the Essential Energy Management Plan (ULN SD PLN 0071).
Mid-Western Regional Council (MWRC) **Note:** There are no Public Roads within Application Area	• (2011) Integrated SMP and Extraction Plan Longwall Panels LW27-29, W4-W5 and LWC,E, F, G (North 1) • Ulan West Extraction Plan for LW1 – LW4	• Consultation with MWRC was undertaken through a project update meeting on the 27 June 2011 and a CCC meeting on the 2 August 2011, where a councillor represents MWRC as a committee member. • Additionally Ulan Coal has been working with MWRC since 2008 to close Bobadeen Road to restrict public access into the mining area. An Application to Close a Public Road was submitted by Ulan Coal to MWRC in 2008. • This application was subsequently approved by MWRC on 2 February 2009 allowing for Ulan Coal to make an application to purchase the road with the NSW LPMA. • Councillors from the MWRC attended the 04 June 2013 and 3 September 2013 CCC Meeting. Information was presented regarding the Application Area and preparation of an SMP/Extraction Plan. • 27 August 2015 letter sent to MWRC providing information of the revision to the approved Ulan West Extraction Plan for LW1 and LW2 to include the next two longwalls LW3 and LW4.
Crown Lands **Note:** There are no Crown Roads within Application Area	• (2005) SMP Application Area for LW 23-26 & W1 • (2007) SMP Application Area for LW W2 – W3 • (2011) Integrated SMP and Extraction Plan Longwall Panels LW27-29, W4-W5 and LWC,E, F, G (North 1) • Ulan West Extraction Plan for LW1 – LW4	• Ulan Coal have been negotiating with Crown Lands (formally LPMA) since 2003 regarding Crown Road closures throughout portions of freehold land owned by Ulan Coal. • Additionally, Ulan Coal consults regularly with Crown Lands (formally LMPA) in regards to the various access licenses that are maintained over the areas of Crown Land that Ulan Coal occupy. • A consultation meeting was held on the 10 August 2011 to provide an update on Ulan Coal current operations including the development of the 2011 SMP/Extraction Plan.

Built Feature Owner	SMP/Extraction Plan Application	Summary of Consultation
		• On the 17 September 2013, Ulan Coal prepared a briefing email regarding the Application Area and preparation of an SMP/Extraction Plan. • 27 August 2015 letter sent to Department of Lands providing information of the revision to the approved SMP/EP for LW1 and LW2 to include the next two longwalls LW3 and LW4.