UG1 LONGWALLS 101 TO 105 BUILT FEATURES MANAGEMENT PLAN TELSTRA

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1	September 2017	September 2017	Approved	MCO and MSEC	Environmental Department
2	June 2020		Inclusion of LW 104-105	MCO	UG Technical Services Department

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MCO_BFMP_TELSTRA	2	Jun 20		Jun 23	MCO	S. Archinal

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1.0 INTRODUCTION

The Moolarben Coal Complex is an open cut and underground coal mining operation located approximately 40 kilometres north of Mudgee in the Western Coalfield of New South Wales (NSW) (Figure 1).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Sojitz Moolarben Resources Pty Ltd and a consortium of Korean power companies). MCO and MCM are wholly owned subsidiaries of Yancoal Australia Limited.

The UG1 Underground Mine is a component of the approved Moolarben Coal Complex (Figure 2). The UG1 Underground Mine commenced first workings in April 2016 and commenced secondary workings (longwall extraction) in October 2017 by longwall mining methods from the Ulan Seam within Mining Lease (ML) 1605, ML 1606, ML 1628, ML 1691 and ML 1715 (Figure 3).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 and would continue to be carried out in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) (as modified) and Project Approval (08_0135) (Moolarben Coal Project Stage 2) (as modified).

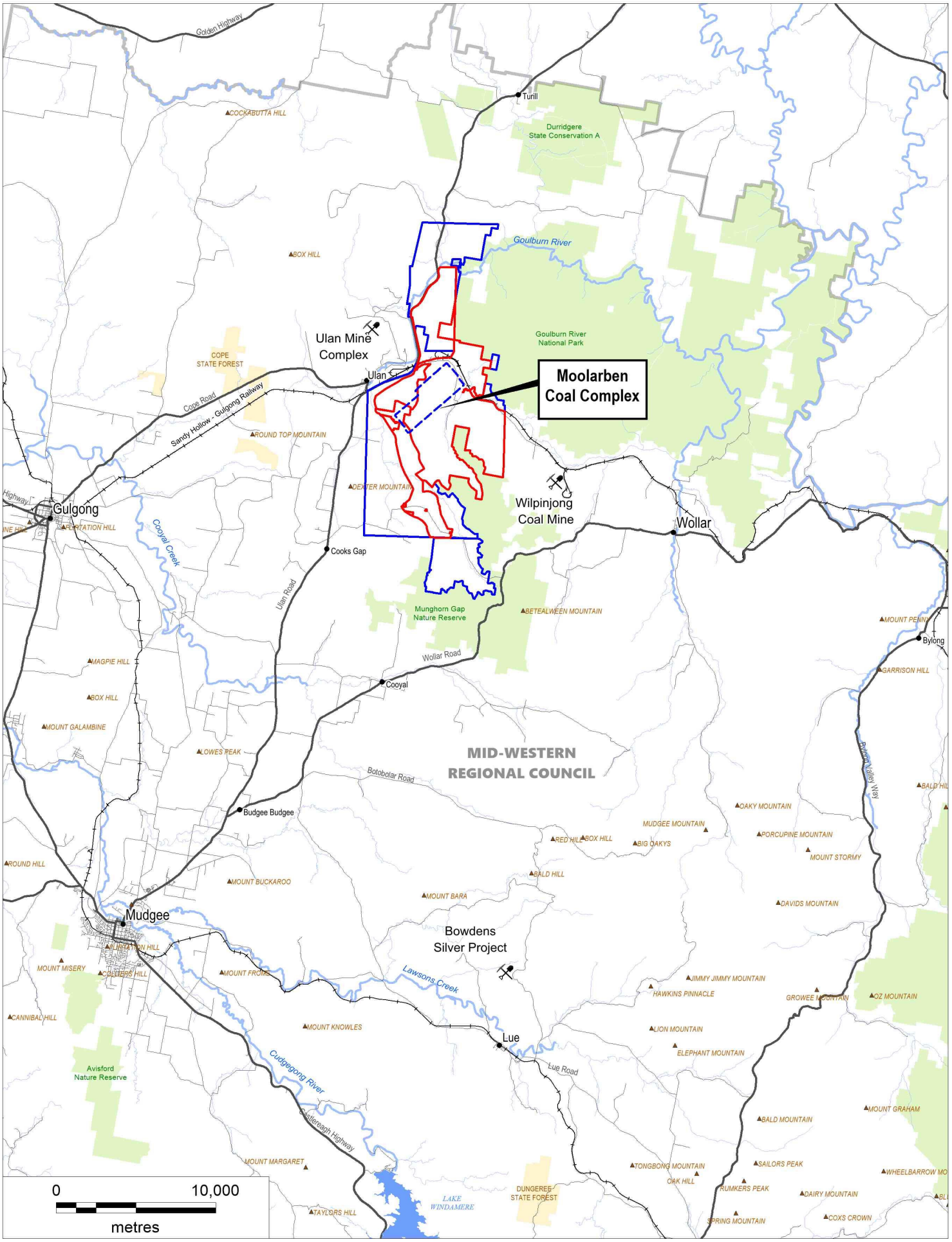
This UG1 Longwalls 101 to 105 Built Features Management Plan – Telstra (LW101-105 BFMP-TELSTRA) forms a part of the Extraction Plan for Longwalls 101 to 105 (herein referred to as Longwalls 101-105) of the approved UG1 Underground Mine.

1.1 PURPOSE AND SCOPE

Purpose: This LW101-105 BFMP-TELSTRA outlines the management of potential subsidence impacts of the proposed secondary workings described in the Extraction Plan on the Telstra telecommunication cables.

Scope: This LW101-105 BFMP-TELSTRA covers the optical fibre and copper telecommunication cables in the vicinity of the Study Area[1], which relates to the extent of subsidence effects resulting from the secondary extraction of Longwalls 101-105 (Figure 4). This LW101-105 BFMP-TELSTRA has been reviewed and updated, prior to the secondary extraction of Longwalls 104 and 105.

[1] Longwalls 101-105 and the area of land within the furthest extent of the 26.5 degree (°) angle of draw and 20 millimetres (mm) predicted subsidence contour. The Telstra assets are not located with the Study Area.



Legend

- Exploration Licence Boundary
- Mining Lease Boundary
- Local Government Area
- National Park / Nature Reserve
- State Forest
- Mining Project

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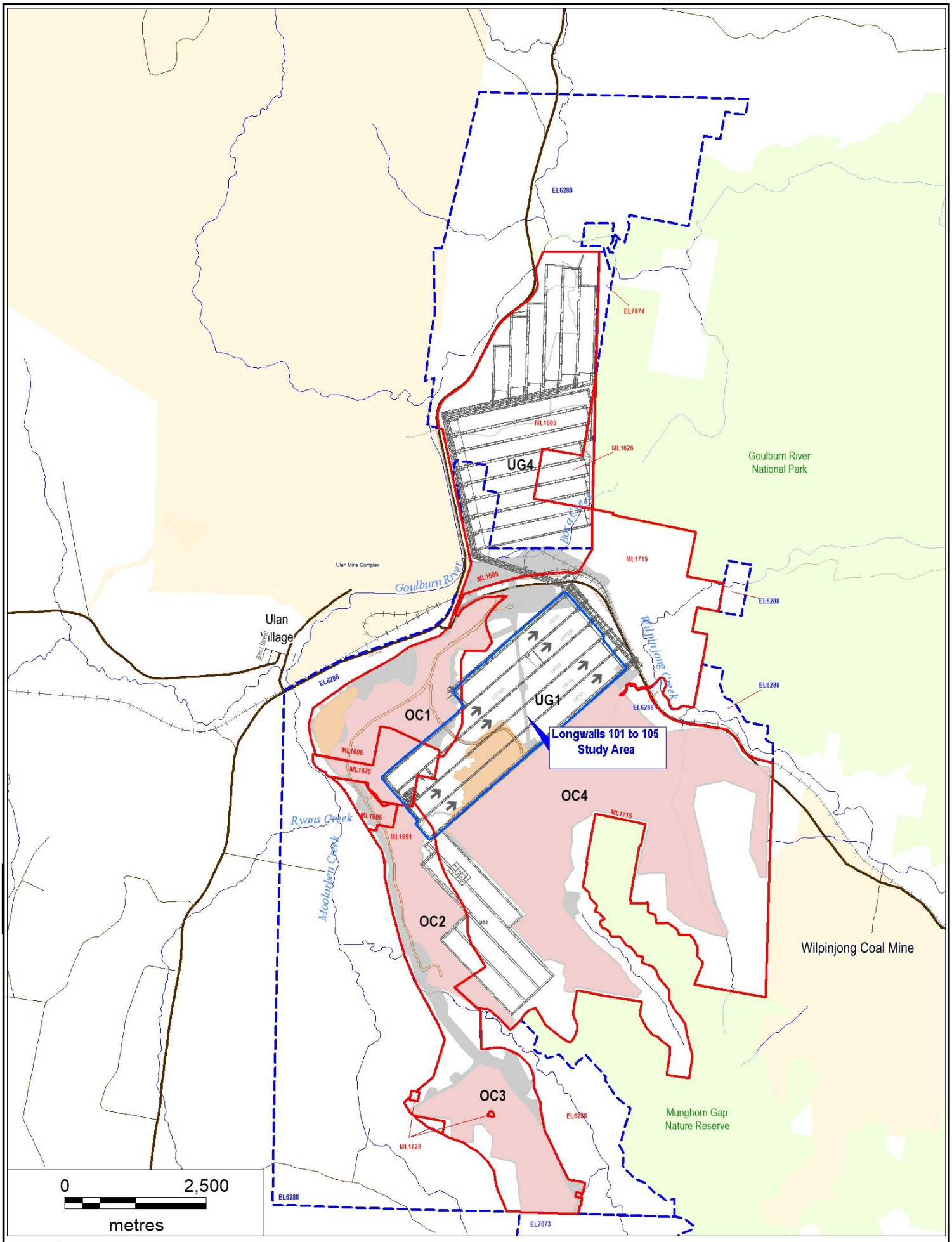
YANCOAL 兖煤澳大利亚有限公司 MOOLARBEN COAL

Figure 1
Regional Location



Legend

- Exploration Licence Boundary
- Mining Lease Boundary
- Haul Road
- Rail Line
- Watercourse

Existing / Approved Development

- Open Cut Mining Area
- Underground Workings
- Out-of-Pit Emplacement
- Surface Infrastructure

- Longwalls 101 to 105 Study Area
- Direction of Longwall Mining

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MOOLARBEN COAL

Figure 2
Moolarben Coal Complex Layout

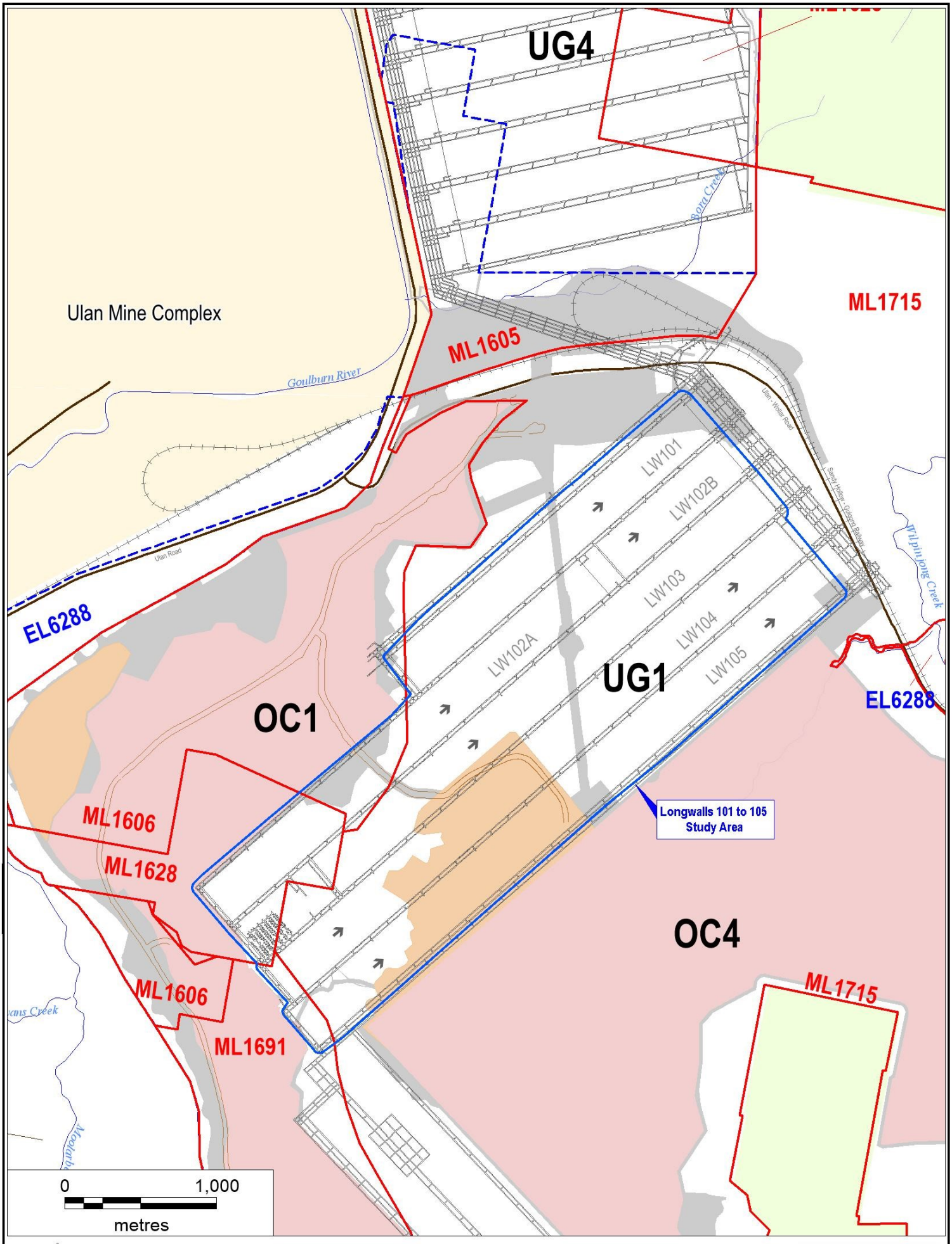
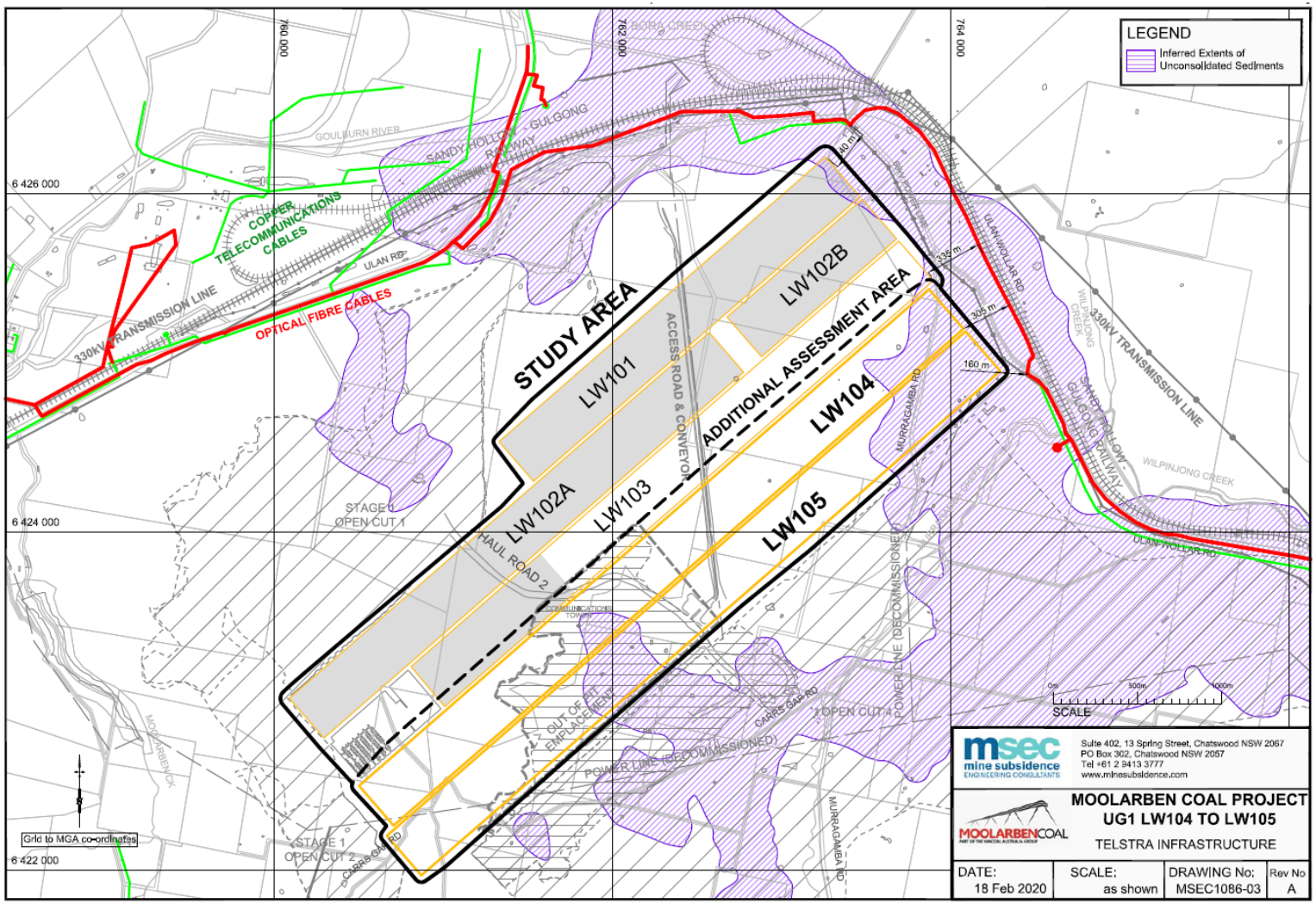


Figure 3
UG1 Longwalls 101-105 Layout



Source; MSEC (2020)

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MOOLARBEN COAL

Telstra Assets

Figure 4

1.2 SUITABLY QUALIFIED AND EXPERIENCED PERSONS

In accordance with Condition 5(a), Schedule 4 of Project Approval (08_0135), the suitably qualified and experienced persons that have prepared this LW101-105 BFMP-TELSTRA, namely representatives from Mine Subsidence Engineering Consultants (MSEC) and MCO, were endorsed by the Secretary of the Department of Planning and Environment (DPIE).

This LW101-105 BFMP-TELSTRA has been prepared in consultation with Telstra (Section 4.4).

A list of the key responsibilities of MCO personnel in relation to this LW101-105 BFMP-TELSTRA, and a list of key contacts, is provided in Section 11.

1.3 STRUCTURE OF THE LONGWALLS 101-105 BFMP-TELSTRA

The remainder of the LW101-105 BFMP-TELSTRA is structured as follows:

Section 2: Describes the review and update of the LW101-105 BFMP-TELSTRA.
Section 3: Outlines the statutory requirements applicable to the LW101-105 BFMP-TELSTRA.
Section 4: Provides baseline data, extraction schedule, revised assessment of the potential subsidence impacts and environmental consequences for Longwalls 101-105, as well as the outcomes of the risk assessment.
Section 5: Details the performance measures relevant to Telstra assets.
Section 6: Describes the monitoring program.
Section 7: Describes the management measures that will be implemented.
Section 8: Details the performance indicators that will be used to assess against the performance measures.
Section 9: Provides a contingency plan to manage any unpredicted impacts and their consequences.
Section 10: Describes the Trigger Action Response Plan (TARP) management tool.
Section 11: Describes the roles and responsibilities for MCO personnel and key contacts.
Section 12: Describes the program to collect sufficient baseline data for future Extraction Plans.
Section 13: Describes the Annual Review, audits, regular reporting and improvement of environmental performance.
Section 14: Outlines the management and reporting of incidents.
Section 15: Outlines the management and reporting of complaints.
Section 16: Outlines the management and reporting of non-compliances with statutory requirements.
Section 17: Lists the references cited in this LW101-105 BFMP-TELSTRA.

2.0 LONGWALLS 101 TO 105 BFMP-TELSTRA REVIEW AND UPDATE

In accordance with Condition 5, Schedule 6 of Project Approval (08_0135), this LW101-105 BFMP-TELSTRA will be reviewed as follows:

> *5. Within 3 months of the submission of:*
> *(a) the submission of annual review under condition 4 above;*
> *(b) the submission of an incident report under condition 7 below;*
> *(c) the submission of an audit under condition 9 below; or*
> *(d) any modification to the conditions of this approval or MP 05_0117 (unless the conditions require otherwise),*
>
> *the Proponent shall review and, if necessary, revise the strategies, plans, and programs required under this approval to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval*

2.1 ACCESS TO INFORMATION

In accordance with Condition 11, Schedule 6 of Project Approval (08_0135) MCO will make the approved LW101-105 BFMP-TELSTRA publicly available on the MCO website.

3.0 STATUTORY REQUIREMENTS

MCO's statutory obligations are contained in:

- the conditions of the NSW Project Approval (05_0117) (as modified) and NSW Project Approval (08_0135) (as modified);
- the conditions of Commonwealth Approvals (EPBC 2007/3297, EPBC 2013/6926 and EPBC 2008/4444) and 2007/7974;
- relevant licences and permits, including conditions attached to the Environment Protection Licence (EPL) No. 12932 and MLs (i.e. ML 1605, ML 1606, ML 1628, ML 1691 and ML 1715); and
- other relevant legislation.

Obligations relevant to this LW101-105 BFMP-TELSTRA are described below.

3.1 EP&A ACT PROJECT APPROVAL

Condition 5(g), Schedule 4 of Project Approval (08_0135) requires the preparation of a Built Features Management Plan as a component of Extraction Plan(s) for second workings. In addition, Conditions 3, 5(n), 5(p) and 6, Schedule 4 and Condition 3, Schedule 6 of Project Approval (08_0135) outline general management plan requirements that are applicable to the preparation of this LW101-105 BFMP-TELSTRA.

Table 1 indicates where each component of the conditions is addressed within this LW101-105 BFMP-TELSTRA.

Table 1: Management Plan Requirements

Project Approval (08_0135) Condition	LW101-105 BFMP-TELSTRA Section
Condition 3, Schedule 4	
Notes: *...* • *The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 5 below).* • *Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.* *...* • *Requirements under this condition may be met by measures undertaken in accordance with the Mine Subsidence Compensation Act 1961.* *...*	Section 8 Sections 5, 6 & 8 Section 9
Condition 5(g), Schedule 4	
(g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which: • *addresses in appropriate detail all items of key public infrastructure and other public infrastructure and all classes of other built features;* • *has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;* • *recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and* • *in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact the infrastructure;*	Section 4.1 Section 4.4 Sections 7 & 9 Section 13.1
Condition 5(n), Schedule 4	
(n) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 18 and 19, or where any such exceedance appears likely;.	Section 9
Condition 5(p), Schedule 4	
(p) include a program to collect sufficient baseline data for future Extraction Plans.	Section 12
Condition 6, Schedule 4	
6. The Proponent shall ensure that the management plans required under conditions 5(g)-(l) above include: *(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and* *(b) a detailed description of the measures that would be implemented to remediate predicted impacts.*	Section 4 and 6.3 Section 7

Table 1 (Continued): Management Plan Requirements

Project Approval (08_0135) Condition	LW101-105 BFMP-TELSTRA Section
Condition 3, Schedule 6	
3. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	Sections 3 and 4.4
(a) detailed baseline data;	Section 4.1
(b) a description of:	
• *the relevant statutory requirements (including any relevant approval, licence or lease conditions);*	Section 3
• *the relevant limits or performance measures/criteria;*	Section 5
• *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 8
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Sections 7 & 9
(d) a program to monitor and report on the:	Sections 6, 8 & 13
• *impacts and environmental performance of the project;*	
• *effectiveness of any management measures (see c above);*	
(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9
(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Sections 6 & 13
(g) a protocol for managing and reporting any:	
• *incidents;*	Section 14
• *complaints;*	Section 15
• *non-compliances with statutory requirements; and*	Section 16
• *exceedances of the impact assessment criteria and/or performance criteria; and*	Section 9
(h) a protocol for periodic review of the plan.	Section 2

3.2 OTHER LEGISLATION

The Acts which may be applicable to the conduct of the Moolarben Coal Complex includes, but is not limited to:

- *Crown Lands Act, 1989;*
- *Fisheries Management Act, 1994;*
- *Heritage Act, 1977;*
- *Coal Mine Subsidence Compensation Act 2017;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974;*

- *Biodiversity Conservation Act, 2016;*
- *Protection of the Environment Operations Act, 1997;*
- *Roads Act, 1993;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Work Health and Safety Act, 2011;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Relevant licences or approvals required under these Acts will be obtained as required.

4.0 TELECOMMUNICATION CABLES

4.1 BASELINE DATA

Telstra infrastructure in the vicinity of the Study Area includes an optical fibre cable and a copper cable. The Telstra telecommunication cables are located along the northern side of Ulan-Wollar Road and adjacent to the Sandy Hollow Gulgong Railway, as shown on Figure 4.

The telecommunication cables are located to the north and east of the Study Area and are approximately 160 metres (m) from Longwall 105 at their nearest point. To the west, the telecommunication cables are approximately 335 m from Longwall 103 (Figure 4).

At distances of 160 m or more, the telecommunication cables will not be subjected to measurable conventional mine subsidence ground movements (i.e. less than the limits of survey accuracy), however, the cables may experience far field horizontal movements (MSEC, 2020).

4.2 LONGWALLS 101-105 EXTRACTION SCHEDULE

The Telstra telecommunication cables are located to the north and east of the Study Area (Figure 4) and may experience far-field horizontal movements.

Longwalls 101-105 and the area of land within the furthest extent of the 26.5° angle of draw and 20 mm predicted subsidence contour (i.e. the Longwalls 101-105 Study Area) are shown on Figures 3 and 4. Longwall extraction will occur from the west to the east. The longwall layout includes approximately 311 m panel widths (void) with 20 m pillars (solid).

The provisional extraction schedule for Longwalls 101-105 is provided in Table 2.

Table 2: Provisional Extraction Schedule

Longwall	Estimated Start Date	Estimated Duration	Estimated Completion Date
101	-	-	Complete
102 (A+B)	-	-	Complete
103	-	9 months	June2020
103 Plunge	-	-	Complete
104	July 2020	12 months	June 2021
105	July 2021	11 months	May 2022

Following approval of the UG1 Optimisation Modification in April 2016, MCO has delineated geological features in Longwall 102 and 103 that prevented economic mining of these sections, and has subsequently revised the longwall layout to avoid these features. The subsequent barrier pillar separating Longwalls 102A and 102B is approximately 140 m in length and the LW103 commencing end was shorted by 660m and replaced by a first workings only production panel. LW104 was also shortened by 70m at the commencing end to allow for a rear of panel shaft. In addition, following further detailed design, Longwalls 101-105 have been shortened by approximately 70 m to provide safe operational conveyor distance between the end of the longwalls and main headings. A review of the impacts of the Palaeo Channel and saturated extent of the same finish ends area of LW104 and 105 resulted in no further mine plan changes to that outlined. With the exception of these changes, the longwall geometry is the same as that for the approved UG1 Optimisation Modification, and MSEC (2017a and 2020) concludes that the overall impact assessments for the natural and built features are unchanged or reduced

4.3 REVISED SUBSIDENCE AND IMPACT PREDICTIONS

Subsidence and impact predictions for Longwalls 101-105 in relation to the Telstra assets was conducted by MSEC (2015) as part of the Moolarben Coal Complex UG1 Optimisation Modification Environmental Assessment (EA), and concluded:

> *The effects of the predicted subsidence and the differential far field movements due to the proposed extraction of the UG1 longwalls on the optical fibre cable are unlikely to adversely impact on the cable.*

Revised subsidence and impact predictions specifically for the extraction of Longwalls 101-105 on Telstra telecommunication cables were conducted by MSEC and reported in MSEC (2020) . Subsequent to the preparation of MSEC (2017b), the longwall layout was revised to incorporate a reduced longwall length and shorter barrier pillar (Section 4.2). MSEC (2020) includes updated subsidence predictions for the revised layout. As the asset is located further from Longwalls 101-103, a reduced impact is predicted by MSEC (2020) compared to MSEC (2017b).

In relation to subsidence predictions, MSEC (2020) makes the following conclusions:

- The telecommunication cables are not expected to be subject to measurable conventional mine vertical subsidence, tilt, curvature or strain.
- The telecommunication cables may experience low level far field horizontal movements in the order of 80 mm.
- Copper telecommunication cables have been mined beneath extensively in NSW and are known to tolerate significant subsidence related movements without impact.

- The existing open cut (OC1) will significantly reduce the potential for far-field movements.
- The presence of unconsolidated Tertiary sediments (in the north-east) should result in further reducing the potential for far-field movements to develop at the telecommunication cables.
- Given the predicted levels of conventional subsidence, tilt, curvature and strain and the low level far field movements, the development of adverse impacts to the telecommunication cables due to the extraction of Longwalls 101-105 is considered to be unlikely.
- The potential transfer of ground strain into the Telstra optical fibre cables can be monitored using Optical Time Domain Reflectometry. Ground movements can also be monitored using traditional survey lines and visual inspections.
- If non-conventional movements or signal attenuation are detected during active subsidence, then the cable can be relieved by locally exposing and then reburying the affected section of cable.

It is expected that the cable can be maintained in serviceable condition with the implementation of the appropriate monitoring and management strategies (Sections 6 and 7).

4.4 RISK ASSESSMENT MEETING

In accordance with the draft *Guidelines for the Preparation of Extraction Plans* (DPIE and DRE, 2015), potential risks and potential risk control measures and procedures have been considered at a risk assessment for the Telstra infrastructure in the vicinity of Longwalls 101-103, held on 15 March 2017. Attendees at the risk assessment meeting included representatives from MCO, Telstra, MSEC and a risk assessment facilitator (AXYS Consulting Pty Ltd [AXYS]). This was subsequently reviewed by MCO and MSEC representatives for Longwall 104 and 105 in January 2020.

The investigation and analysis methods used during the risk assessment review included (AXYS, 2020):

- Confirmation of relevant Telstra assets.
- Review of the revised subsidence predictions and potential impacts on Telstra assets (including consideration of past experience in Longwall 101 and 102 and in the Western Coalfield).
- Consideration and discussion of the proposed monitoring program, management measures and contingency measures.

The following potential risks were identified during the risk assessment (AXYS, 2020):

- Copper cable becomes unserviceable due to mining of Longwalls 101-105 and Yancoal are required to compensate Telstra for the necessary repairs.
- Optical fibre cable (main cable between Ulan and Wollar) becomes unserviceable due to mining of Longwalls 101-105 and Yancoal are required to compensate Telstra for the necessary repairs.

A number of risk control measures and procedures were identified prior to and during the risk assessment and are summarised as follows:

Baseline Data / Validation

1. Obtain from Telstra confirmation that all services that may be affected by mining of Longwalls 101-105 have been identified and documented in the BFMP.
2. Carry out an inspection of the telecommunication cables within 400 m of Longwalls 101-105 prior to mining to confirm that physical access is available.
3. Installation of the subsidence monitoring program.
4. Establish the pre-mining condition of the telecommunication cables by testing signal integrity (i.e. baseline resistance measurement for the copper cable and baseline Remote Fibre Monitoring System [RFMS] for the optical fibre cable).
5. Carry out an investigation to determine the Telstra customers that would be affected if the copper cabling became unserviceable and what service would need to be provided while copper cabling repairs were carried out.

Management / Monitoring / Response Measures

6. Establish a key contacts list between MCO and Telstra to provide a regular update of status of mining activities, and for ongoing liaison.
7. Include in the LW101-105 BFMP-TELSTRA a schedule of times/frequency of communication with Telstra for the status of mining of Longwalls 101-105.
8. Develop a TARP and include triggers for conditions that may need to be actioned by MCO and/or Telstra, including a trigger to confirm when cable monitoring is to be being carried out when the mining of Longwalls 101-105.

MCO considers all risk control measures and procedures to be feasible to manage all identified risks.

The proposed risk control measures and procedures have been incorporated where relevant in this LW101-105 BFMP-TELSTRA and the program for implementation is summarised in Table 3.

Table 3: Program for Implementation of Proposed Risk Control Measures and Procedures

	Risk Control Measure / Procedure	LW101-105 BFMP-TELSRTA Section	Proposed Timing
Baseline Data / Validation			
1	Obtain from Telstra confirmation that all services have been identified and documented in the LW101-105 BFMP-TELSTRA.	Section 6.2	Prior to Longwall 104
2	Carry out an inspection of the physical location of the telecommunication cables within 400 m of Longwalls 101-105 to confirm that physical access is available.	Section 6.2	Prior to Longwall 104
3	Extend the subsidence monitoring program for Longwalls 104 and 105.	Section 6	Prior to Longwall 104
4	Establish the pre-mining condition of the telecommunication cables by testing signal integrity.	Section 6	Prior to Longwall 104
5	Determine the Telstra customers that would be affected if the copper cable became unserviceable and what service would need to be provided while copper cabling repairs were carried out.	Section 6	Prior to Longwall 104
Management / Monitoring / Response Measures			
6	Establish key contacts list in the LW101-105 BFMP-TELSTRA.	Section 11.1	Complete
7	Include a schedule of times/frequency of communication with Telstra for the status of mining of Longwalls 101-105 in the LW101-105 BFMP-TELSTRA.	Section 7 and Table 6	Complete
8	Include in the TARP triggers for conditions that may need to be actioned by MCO and/or Telstra.	Section 10 and Attachment 1	Complete

5.0 PERFORMANCE MEASURES

The performance measures specified in Table 19, Schedule 4 of Project Approval (08_0135) relevant to the Telstra telecommunication cables, as a built feature, are listed in Table 4.

Table 4: Built Features Subsidence Impact Performance Measures

Feature	Subsidence Impact Performance Measure
Other infrastructure:	
Fibre-optic cable	Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Other built features and improvements, including fences	Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.

Source: Table 19 in Schedule 4 of Project Approval (08_0135).

In accordance with Condition 3, Schedule 4 of Project Approval (08_0135), MCO must ensure that there is no exceedance of the performance measures listed in Table 19, Schedule 4 to the satisfaction of the Secretary of the DPIE.

Section 6 outlines the monitoring that will be undertaken to assess the impact of Longwalls 101-105 against the performance measures in relation to the telecommunication cables. Management measures for the telecommunication cables are outlined in Section 7 and performance indicators for the performance measures are summarised in Section 8.

6.0 MONITORING

A monitoring program will be developed in order to monitor the impacts of the extraction of Longwalls 101-105 on the telecommunication cables to identify loss of serviceability during or after mining. Key components of the monitoring program are summarised in Table 5.

Table 5: Telecommunication Cables Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility
Pre-mining			
Physical access inspection within 400 m of Longwalls 101-105.	Location / alignment of telecommunication cables.	Prior to commencement of Longwall 104 extraction.	Underground Technical Manager / Telstra
UG1 subsidence monitoring lines as described in the UG1 Longwalls 101 to 105 Subsidence Monitoring Program (LW101-105 SMP).	Ground survey (including 'FF Line'). Monitoring parameters include: • subsidence; • tilt; • tensile strain; and • compressive strain.	Prior to commencement of Longwall 101 extraction and extend prior Longwall 104 extraction.	Underground Technical Manager / Registered Mine Surveyor
Potentially affected customers.	Investigate and determine the Telstra customers that would be affected if the copper cables became unserviceable.	Prior to commencement of Longwall 101 extraction and again prior Longwall 104 extraction.	Underground Technical Manager / Telstra
Copper cable – signal integrity.	Establish pre-mining condition by taking a baseline resistance measurement and provide results to MCO.	Prior to secondary extraction within 400 m of the Longwall 104 take-off position.	Telstra / Underground Technical Manager
Optical fibre cable – signal integrity.	Establish pre-mining condition by taking baseline RFMS and provide results to MCO.	Prior to secondary extraction within 400 m of the Longwall 104 take-off position.	Telstra / Underground Technical Manager
During and After Mining			
UG1 subsidence monitoring lines as described in the LW101-105 SMP.	Ground survey (including 'FF Line'). Monitoring parameters include: • subsidence; • tilt; • tensile strain; and • compressive strain.	Prior to secondary extraction within 400 m of the longwall take-off position (i.e. the existing longwall mining limits). At 100 m intervals when mining within 400 m of the longwall take-off position. *[Inspection sheets to be provided to Telstra following inspection unless otherwise agreed]*	Underground Technical Manager / Registered Mine Surveyor

Table 5 (Continued): Telecommunication Cables Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility
During and After Mining (Continued)			
Copper cable – signal integrity.	Test resistance and compare against baseline measurement.	Following identification of ground movements >20mm along FF line.	Telstra
	Subsidence impact inspections will target the identification of: • movement of the cable; and • ground compression/tension.	In the event resistance testing indicates a significant variation from the baseline reading.	Telstra / Underground Technical Manager
Optical fibre cable – signal integrity.	Continuous RFMS readings.	Following identification of ground movements >20mm along FF line.	Telstra
	Subsidence impact inspections will target the identification of: • movement of the cable; and • ground compression/tension.	If RFMS records a change that exceeds ± 3.0 dB (compared to baseline).	Telstra / Underground Technical Manager

The frequency of monitoring will be reviewed either:

- in accordance with the Annual Review; or
- if triggered as a component of the Contingency Plan as outlined in Section 9 of this LW101-105 BFMP-TELSTRA.

6.1 SUBSIDENCE PARAMETERS

Subsidence parameters (i.e. subsidence, tilt, tensile strain, compressive strain and absolute horizontal translation) associated with mining will be measured in accordance with the LW101-105 SMP.

In summary, surveys will be conducted to measure subsidence movements in three dimensions using a total station survey instrument. Subsidence movements (i.e. subsidence, tilt, tensile strain and compressive strain) will be measured along subsidence lines that have been positioned across the general landscape.

Monitoring of subsidence parameters specific to the telecommunication cables will be measured by a survey line ('FF Line' along the alignment of Ulan-Wollar Road [i.e. roughly parallel to the telecommunication cables]). This survey line will monitor the general movement about the longwalls and the data will allow evaluation of the likely ground movements about the cable line (by comparison between measured and predicted movements). Unless otherwise agreed with Telstra, inspection sheets detailing the outcome of the subsidence impact inspections will be provided, following confirmation of any observed ground movements >20mm.

6.2 SUBSIDENCE IMPACTS

Telstra will provide confirmation that all services have been identified and documented in the LW101-105 BFMP-TELSTRA prior to secondary extraction of Longwall 104 commencing.

Prior to the commencement of Longwall 101 extraction and again prior Longwall 104 extraction, in conjunction with Telstra, MCO will conduct an investigation to determine the Telstra customers that would be affected if the copper cabling became unserviceable and what service would need to be provided while copper cabling repairs were carried out.

An inspection of the physical location of the telecommunication cables within 400 m of Longwalls 101-105 would also be conducted prior to commencement of Longwall 104 to confirm access.

A baseline resistance test (of the copper cable) and RFMS measurement (of the optical fibre cable) will be completed prior to secondary extraction occurring within 400 m of the Longwall 104 take-off position. Additional resistance tests of the copper cable will be undertaken in the event monitoring of the FF Line identifies ground movements in excess of survey accuracy (i.e. >20mm). RFMS monitoring will occur continuously in the event monitoring of the FF Line identifies ground movements in excess of survey accuracy (i.e. >20mm).

In the event that resistance tests detect a significant variation from the baseline reading, or, in the event RFMS detects a change from the baseline condition that exceeds ± 3.0 dB, Telstra will conduct a subsidence impact inspection targeting the identification of movement of the cable and ground compression/tension.

Visual inspections of the cables will be conducted by Telstra as required, in accordance with Telstra's routine inspection program or if triggered by a signal loss or transmission fault detected by the RFMS (Table 5).

Information will be recorded in the LW101-105 BFMP-TELSTRA Subsidence Impact Register (Attachment 2) and reported in accordance with Project Approval (08_0135) (Section 13).

6.3 ENVIRONMENTAL CONSEQUENCES

MCO and Telstra will compare the results of the subsidence impact monitoring against the built features performance measure and indicators (Sections 5 and 8). In the event the observed subsidence impacts from the Moolarben Coal Complex exceed the performance measure or indicators, MCO and Telstra will assess the consequences of the exceedance in accordance with the Contingency Plan described in Section 9.

7.0 MANAGEMENT MEASURES

A number of potential management measures in relation to telecommunication cables are considered to be applicable (including stabilisation methods if required) and potential contingency measures are summarised in Section 9.1.

Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures.

A summary of management measures will be reported in the Annual Review.

Key management actions and timing is summarised in Table 6.

Table 6: Telecommunication Cables Key Management Actions

Management Measure	Timing/Frequency	Responsibility
Pre-mining		
Notification to Telstra prior to commencement of secondary extraction.	Prior to secondary extraction of Longwall 101 and 104.	Underground Technical Manager
Physical access inspection of telecommunication cables.	Prior to secondary extraction of Longwall 101 and 104.	Telstra / Underground Technical Manager
Investigate and **determine potentially affected Telstra customers.**	Prior to secondary extraction of Longwall 101 and 104.	Telstra / Underground Technical Manager
Establish baseline signal integrity/condition of telecommunication cables.	Prior to secondary extraction within 400 m of the Longwall 104 take-off position.	Telstra / Underground Technical Manager
During Mining		
Notification to Telstra prior to subsidence effects on telecommunication cables.	Prior to secondary extraction within 400 m of the Longwall 101 and 104 take-off position.	Underground Technical Manager
Test signal integrity of the copper cable by testing resistance.	Following identification of ground movements >20mm along the FF Line.	Telstra / Underground Technical Manager
Test signal integrity of the optical fibre cable by RFMS.	Following identification of ground movements >20mm along the FF Line.	Telstra / Underground Technical Manager

Table 6 (Continued): Telecommunication Cables Key Management Actions

Management Measure	Timing/Frequency	Responsibility
During Mining		
Undertake subsidence impact inspection.	In the event resistance testing indicates a significant change or RFMS record a change that exceeds ± 3.0 dB (compared to baseline).	Telstra/ Underground Technical Manager
Provision of **inspection sheets** detailing the outcome of the subsidence impact monitoring program to Telstra.	Following subsidence impact inspections unless otherwise agreed by Telstra.	Underground Technical Manager
Notification to Telstra if management measures are considered to be required.	During Longwalls 101-105 extraction.	Underground Technical Manager
Implement TARP (Attachment 1).	During Longwalls 101-105 extraction.	Underground Technical Manager

8.0 ASSESSMENT OF PERFORMANCE INDICATORS AND MEASURES

In accordance with Condition 5(d), Schedule 4 of Project Approval (08_0135), performance indicators have been developed for the performance measures listed in Table 4 (Section 5).

The performance indicators proposed to ensure that the performance measures for the optical fibre cables are achieved include:

- negligible transmission loss from mine subsidence impacts; and
- negligible impacts on structural integrity of the cable lines from mine subsidence.

Monitoring conducted to inform the assessment of secondary extraction of Longwalls 101-105 against the performance indicators for the performance measures relevant to the optical fibre cable as a built feature is outlined in Section 6.

If a performance measure is considered to have been exceeded, the Contingency Plan outlined in Section 9 of this LW101-105 BFMP-TELSTRA will be implemented.

9.0 CONTINGENCY PLAN

In the event the performance measures relevant to the telecommunication cables as built features, summarised in Table 4, are considered to have been exceeded or are likely to be exceeded, MCO will implement the following Contingency Plan:

- The observation will be reported to the Underground Technical Manager and the Environmental and Community Manager within 24 hours.
- The observation will be recorded in the Subsidence Impact Register (Attachment 2).
- The likely exceedance will be reported in an Incident Report (refer to the Extraction Plan).
- MCO will provide the Incident Report to relevant stakeholders (i.e. DPIE, DRE and Telstra).
- MCO will conduct an investigation to identify and evaluate contributing factors to the exceedance, including re-survey of the relevant subsidence monitoring lines, analysis of predicted versus observed subsidence parameters and a review of the subsidence monitoring program with updates to the program where appropriate.
- An appropriate course of action will be developed in consultation with relevant stakeholders and government agencies including proposed contingency measures (Section 9.1), and a program to review the effectiveness of the contingency measures.
- The course of action will be approved by, and implemented to the satisfaction of, Telstra and DRE.
- This LW101-105 BFMP-TELSTRA and the performance indicators will be reviewed to adequately manage future potential impacts within the limits of Project Approval (08_0135).

MCO will comply with the *Coal Mine Subsidence Compensation Act, 2017* (formerly NSW *Mine Subsidence Compensation Act, 1961);* in the event that property damages occur as a result of mining Longwalls 101-105.

9.1 CONTINGENCY MEASURES

Contingency measures will be developed in consideration of the specific circumstances of the feature (e.g. the location, nature and extent of the impact, and the assessment of environmental consequences).

Potential contingency measures that could be considered in the event either of the performance measures for the telecommunication cables is exceeded are summarised in Table 7.

Table 7: Potential Contingency Measures

Environmental Consequence	Potential Contingency Measures	
	Measure	Description
Impact on:		
Optical Fibre Cable	Stabilisation	Automatic monitoring detects degradation in signal. Trench fill material is removed from the identified degradation zone, allows fibre to flex, and relieve compression forces.
	Emergency	Certain bandwidth is redeployed to other cores within this cable (where available) and/or to other Telstra interconnectors.
	Rebuilding	Fibre heat treatment to soften compression point and return affected cores to operation.
Copper Cable	Emergency	Failure in copper telecommunication cables to be rectified by repairs. If extended duration outage, then a temporary mobile phone connection could be provided by Telstra to commercial or residential users affected.

10.0 TRIGGER ACTION RESPONSE PLAN – MANAGEMENT TOOL

The framework for the various components of this LW101-105 BFMP-TELSTRA are summarised in the TARP shown in Attachment 1. The TARP illustrates 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.

The TARP comprises:

- baseline conditions;
- predicted subsidence impacts;
- trigger levels from monitoring to assess performance; and
- triggers that flag implementation of contingency measures.

The TARP system provides a simple and transparent snapshot of the monitoring of environmental performance and the implementation of management and/or contingency measures.

11.0 ROLES AND RESPONSIBILITIES

Key responsibilities of MCO personnel in relation to this LW101-105 BFMP-TELSTRA are summarised in Table 8. Responsibilities may be delegated as required.

Table 8: Longwalls 101 to 105 Built Features Management Plan – Telstra
Responsibility Summary

Responsibility	Task
General Manager	• Ensure resources are available to MCO personnel to facilitate the completion of responsibilities under this LW101-105 BFMP-TELSTRA.
Underground Technical Manager	• Ensure the LW101-105 SMP is implemented. • Ensure monitoring required under this LW101-105 BFMP-TELSTRA is carried out within specified timeframes, adequately checked and processed and prepared to the required standard. • Undertake relevant monitoring and implementation of management measures summarised in Tables 5 and 6 respectively.
Environmental and Community Manager	• Liaise with relevant stakeholders regarding subsidence impact management and related environmental consequences.
Registered Mine Surveyor	• Undertake all subsidence monitoring to the required standard within the specified timeframes and ensure data are adequately checked, processed and recorded.

11.1 KEY CONTACTS

The details of key contacts and phone numbers in relation to this LW101-105 BFMP-TELSTRA are summarised in Table 9.

Table 9: Longwalls 101 to 105 Built Features Management Plan – Telstra
Key Personnel Contact Details

Organisation	Position	Contact Name	Phone Number
MCO	Underground Technical Manager	Mr Liam Mildon	02 6376 1614
	Environmental and Community Manager	Mr Graham Chase	02 6376 1407
	Moolarben Coal Hotline		1800 556 484
Telstra	Network Integrity/Central Field Consultant	Mr Stephen Lynch	0418 618 737
	Underground Technical Manager	Mr Colin Dove	0428 970 826
	Damages	-	132 203

12.0 FUTURE EXTRACTION PLANS

In accordance with Condition 5(p), Schedule 4 of Project Approval (08_0135), MCO will collect baseline data for the future Extraction Plan (e.g. for the next Underground Mine). However, for the telecommunication cables, the baseline (and post-mining) data collected for Longwalls 101-103 will be used as baseline for Longwalls 104-105 as longwall mining progressively moves further south of the Telstra assets.

In addition to the baseline data collection, consideration of the environmental performance and management measures, in accordance with the review(s) conducted as part of this LW101-105 BFMP-TELSTRA, will inform the appropriate type and frequency of monitoring of the assets relevant to the next Extraction Plan.

13.0 ANNUAL REVIEW, REGULAR REPORTING AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

In accordance with Condition 4, Schedule 6 of Project Approval (08_0135), MCO will conduct an Annual Review of the environmental performance of the Project by the end of March each year, or as otherwise agreed by the Secretary of the DPIE.

The Annual Review will:

- describe the works carried out in the previous calendar year, and the development proposed to be carried out over the current calendar year;
- include a comprehensive review of the monitoring results and complaints records of the Project over the previous calendar year, including a comparison of these results against the:
  - relevant statutory requirements, limits or performance measures/criteria;
  - monitoring results of previous years; and
  - relevant predictions in the EA;
- identify any non-compliance over the last 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.

In accordance with Condition 11, Schedule 6 of Project Approval (08_0135), the Annual Review will be made available on the MCO website.

As described in Section 2, this LW101-105 BFMP-TELSTRA will be reviewed within three months of the submission of an Annual Review, and revised where appropriate.

In accordance with Condition 8, Schedule 6 of Project Approval (08_0135), MCO will also provide regular reporting on the environmental performance of the Project on the MCO website.

13.1 AUDITS

In accordance with Condition 9, Schedule 6 of Project Approval (08_0135), an independent environmental audit was conducted by the end of December 2015 and again in 2018, and will be undertaken every three years thereafter. A copy of the independent environmental audit will be provided to the Secretary of the DPIE and made available on the MCO website.

The independent environmental audit will be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of the DPIE.

The independent environmental audit will assess the environmental performance of the Project and assess whether it is complying with the requirements of Project Approval (08_0135), and any other relevant approvals, and recommend measures or actions to improve the environmental performance of the Project.

Further to the above, audits to ISO 31000 Risk Management standard are conducted on elements of the Moolarben UG Safety Management System annually, with internal and external audits being undertaken on alternate years. Additionally, an annual auditing of compliance and effectiveness on built features is captured as part of the Annual Review process.

14.0 INCIDENTS

An incident is defined in Project Approval (08_0135) 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 Project Approval (08_0135).

In the event that an incident which causes, or threatens to cause, material harm to the environment occurs, the incident will be managed in accordance with the Pollution Incident Response Management Plan.

The reporting of incidents will be conducted in accordance with Condition 7, Schedule 6 of Project Approval (08_0135).

MCO will notify the Secretary of DPIE and any other relevant agencies immediately after MCO becomes aware of the incident which causes or threatens to cause material harm to the environment. For any other incidence associated with the project, MCO will notify the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident. Within seven days of the date of the incident, MCO will provide the Secretary of DPIE and any relevant agencies with a detailed report on the incident. The report will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

15.0 COMPLAINTS

MCO maintains a Community Complaints Line (Phone Number: 1800 556 484) that is dedicated to the receipt of community complaints. The Community Complaints Line is publicly advertised and operates 24 hours per day, seven days a week, to receive any complaints from neighbouring residents or other stakeholders.

MCO has developed a Community Complaints Procedure which details the process to be followed when receiving, responding to and recording community complaints. The Community Complaints Procedure is supported by a Complaints Database.

The Community Complaints Procedure is a component of the MCO Environmental Management Strategy which requires the recording of relevant information including:

- the nature of complaint;
- method of the complaint;
- relevant monitoring results and meteorological data at the time of the complaint;
- site investigation outcomes;
- any necessary site activity and activity changes;
- any necessary actions assigned; and
- communication of the investigation outcome(s) to the complainant.

In accordance with Condition 11, Schedule 6 of Project Approval (08_0135), the complaints register will be updated monthly and made available on the MCO website.

16.0 NON-COMPLIANCES WITH STATUTORY REQUIREMENTS

A protocol for the managing and reporting of non-compliances with statutory requirements has been developed as a component of MCO's Environmental Management Strategy and is described below.

Compliance with all approvals, plans and procedures will be the responsibility of all personnel (staff and contractors) employed on or in association with the Moolarben Coal Complex.

The Environmental and Community Manager (or delegate) will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 14, MCO will notify the Secretary of the DPI&E, and any other relevant agencies, of any incident associated with MCO.

A review of MCO's compliance with all conditions of Project Approval (08_0135), mining leases and all other approvals and licenses will be undertaken prior to (and included within) each Annual Review. The Annual Review will be made publicly available on the MCO website.

As described in Section 13.1, an independent environmental audit was conducted by the end of December 2015 and again in 2018, and will be undertaken every three years thereafter. A copy of the audit report will be submitted to the Secretary of the DPIE and made publicly available on the MCO website.

17.0 REFERENCES

AXYS Consulting Pty Ltd (2017) *Potential Impact of Longwall 101 to 103 on Telstra Infrastructure – Risk Assessment Report*.

Department of Planning and Environment and NSW Trade & Investment – Division of Resources and Energy (2015) *Guidelines for the Preparation of Extraction Plans Required under Conditions of Development Consents, Project Approvals and Mining Lease Conditions for Underground Coal Mining*. Version 5. Draft.

Mine Subsidence Engineering Consultants (2015) *Moolarben Coal Complex: Revised Predictions of Subsidence Parameters and Revised Assessments of Subsidence Impacts Resulting from the Proposed UG1 Mine Layout Optimisation Modification*.

Mine Subsidence Engineering Consultants (2017a) *Moolarben Coal Complex: Moolarben Project Stage 2 – Longwalls 101 to 103 – Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Extraction Plan.* Report number MSEC867.

Mine Subsidence Engineering Consultants (2017b) *Moolarben Coal Operations: Longwalls 101 to 103 – Subsidence Predictions and Impact Assessments for the Telstra Infrastructure.*

Mine Subsidence Engineering Consultants (2020) Moolarben Project Stage 2- *Longwalls 104 to 105 Subsidence Predictions and Impacts Assessments for the Natural and Built Features In Support of the Extraction Plan*

ATTACHMENT 1

UG1 LONGWALLS 101 TO 105 BUILT FEATURES MANAGEMENT PLAN – TELSTRA
TRIGGER ACTION RESPONSE PLAN

Condition	Normal		Level 1	Level 2
	Baseline Conditions	**Predicted Impacts**	**Implement Management Measures**	**Restoration/Contingency Phase**
Trigger	Telecommunication cables are serviceable and repairable or as otherwise identified by pre-mining inspection.	Small far field subsidence effects on telecommunication cables.	Monitoring identifies impacts that are greater than predicted, but the performance measure has not been exceeded and is not likely to be exceeded.	If either of the Performance Measures relevant to the telecommunication cables are exceeded, or are likely to be exceeded (i.e. loss of serviceability).
Action	Establish baseline data, including: • Physical access audit. • Pre-extraction subsidence survey as per the UG1 Longwalls 101 to 105 Subsidence Monitoring Program. • Determine potentially affected Telstra customers. • Telstra to establish baseline signal integrity of copper cable and optical fibre cable.	Conduct monitoring as described in **Section 6**, including: • MCO to conduct ground survey and, following confirmation of any observed movements, provide Telstra with the inspection sheets (unless otherwise agreed with Telstra). Monitoring parameters include: – subsidence; – tilt; – tensile strain; and – compressive strain. • Telstra to test signal integrity of the telecommunication cables. • Telstra to undertake subsidence impact inspection, targeting the identification of: – movement of the cable; and – ground compression/tension.	Telstra will be notified in the event management measures are considered to be required. Management measures (e.g. stabilisation methods) implemented (with regard to the specific circumstances of the subsidence impact [e.g. the nature and extent of the impact]). Follow-up inspections will be conducted to assess the effectiveness of the management measures implemented and the requirement for any additional management measures.	Contingency Plan implemented (with regard to the specific circumstances of the subsidence impact). In summary: • The observation will be reported to the Underground Technical Manager and the Environmental and Community Manager within 24 hours. • The observation will be recorded in the Subsidence Impact Register. • The exceedance or likely exceedance will be reported in an incident report. • An investigation will be conducted to identify and evaluate contributing factors to the exceedance. • An appropriate course of action will be developed in consultation with Telstra, relevant stakeholders and government agencies. • The course of action will be approved by, and implemented to the satisfaction of, relevant stakeholders and government agencies. • The Built Features Management Plan – Telstra and the performance indicators will be reviewed to adequately manage future potential impacts. Potential contingency measures are described in Table 7.
Frequency	• Physical access inspection: – Prior to the commencement of Longwall 101 and 104extraction. • Ground survey: – Prior to the commencement of Longwall 101 and 104extraction. • Potentially affected customers: – Prior to the commencement of Longwall 101 and 104 extraction. • Baseline signal integrity: – Prior to secondary extraction within 400 m of the Longwall 104 take-off position.	• Ground survey: – Prior to secondary extraction within 400 m of the longwall take-off position. – At 100 m intervals when mining within 400 m of the longwall take-off position. – Following completion of extraction of each of Longwalls 101 to 105 • Signal integrity: – In the event ground survey identifies movements (in excess of survey accuracy ie >20mm) undertake resistance testing of copper cable. – Continuous RFMS in the event ground survey identifies movements (in excess of survey accuracy ie >20mm) undertake resistance testing of copper cable. – . • Subsidence impact inspection: – In the event resistance testing or RFMS identifies a significant change in signal integrity (compared to baseline).	To be implemented as required (i.e. if monitoring identifies impacts that are greater than predicted, but the performance measure has not been exceeded and is not likely to be exceeded).	To be implemented following identification of an exceedance of the performance measure, or if the performance measure is likely to be exceeded (i.e. unsafe or loss of serviceability).
Position of Decision Making	• Underground Technical Manager. • Telstra – Network Integrity/Central Field Consultant.	• Underground Technical Manager. • Telstra – Network Integrity/Central Field Consultant.	• Underground Technical Manager. • Telstra – Network Integrity/Central Field Consultant.	• Underground Technical Manager. • Telstra – Network Integrity/Central Field Consultant.

ATTACHMENT 2

UG1 LONGWALLS 101 TO 105 BUILT FEATURES MANAGEMENT PLAN – TELSTRA
SUBSIDENCE IMPACT REGISTER

UG1 Longwalls 101 to 105 Built Features Management Plan – Telstra
Subsidence Impact Register

Impact Register Number	Built Feature	Impact Description	Does Impact Exceed the Built Feature Performance Measure/Indicators? (Yes/No)	Management Measures Implemented	Were Management Measures Effective? (Yes/No)