

Mining Operations Plan Integra Underground

1 November 2018- December 2023

MOP Amendment AB

Revision	Issue Date	Originator	Reviewed	Approved
Submission to DRG	3 November 2016	Chris Jones (SLR)	Mark Robinson (Glencore) and Kelly Smith (Glencore)	Mark Robinson (Glencore)
Revised Submission to DRG	17 November 2016	Chris Jones (SLR)	Mark Robinson (Glencore)	Mark Robinson (Glencore)
MOP Amendment	27 March 2017	Chris Jones (SLR)	Chloe Piggford (Glencore)	Chloe Piggford (Glencore)
New MOP	26 September 2018	Chris Jones (SLR)	Chloe Piggford (Glencore)	Chloe Piggford (Glencore)
MOP Amendment A	10 December 2018	Megan Crowhurst (SLR) & Chris Jones (SLR)	Chloe Piggford (Glencore)	Chloe Piggford (Glencore)
MOP Amendment A (Version 2)	31 May 2019	Chris Jones (SLR)	Keith Simkin (Glencore)	Keith Simkin (Glencore)
MOP Amendment B	30 June 2020	Megan Crowhurst (SLR) & Chris Jones (SLR)	Chloe Piggford (Glencore)	Chloe Piggford (Glencore)

INTEGRA UNDERGROUND

Mining Operations Plan

Name of Mine	Integra Underground	
MOP Commencement Date	1 November 2018	
MOP Completion Date	31 December 2023	
Mining Authorisations (Lease/Licence No.)	CL 382, ML 1551, ML 1525, ML 1518, ML1437, ML1676, ML 1786, ML 1740, ML 1742	
Name of Authorisation/Authorisation holder(s)	HV Coking Coal Pty Limited Level 38, Gateway Building, 1 Macquarie Place, Sydney 2000	
	A.C.N. 605 492 804	
Name of Mine Operator (if different)	HV Coking Coal Pty Limited	
Name and Contact Details of the Mine Manager (or equivalent)	Peter Ostermann Operations Manager 640 Middle Falbrook Rd Glennies Creek NSW 2330 PO Box 320 534 Singleton NSW 2330 02 65774205 6577 4200	
Name and Contact Details of Environmental Representative	Chloe PiggfordKeith SimkinChloe Piggford Environment and Community Manager 640 Middle Falbrook Rd Glennies Creek NSW 2330 PO Box 320 534 Singleton NSW 2330 02 657742056577 4200	
Name of Representative(s) of the Authorisation Holder(s)	Peter Ostermann 640 Middle Falbrook Rd Glennies Creek NSW 2330 PO Box 320-534 Singleton NSW 2330 02 65774205 6577 4200	
Title of Representative(s) of the Authorisation Holder(s)	Operations Manager	
Signature of Representative(s) of the Authorisation Holder(s) Date:		

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Appendix 2 - Risk Assessment

Foreword

The contents of this Mining Operations Plan (MOP) follow the format identified in the NSW Department of Trade and Investment (now known as Resources Regulator) publication entitled "*ESG3 Mining Operations Plan (MOP) Guidelines*", September 2013. The Integra Underground is not a metalliferous or non-coal mine and is therefore, designated as a Level 1 mine.

To assist the reader, separate management plans referred to in this MOP are presented as separate documents and are to be viewed in conjunction with the written information provided within this MOP.

1 Introduction

1.1 History of Operations

1.1.1 Earlier Operations (Pre Glencore)

Major interest in the development of the coal resource in the area commenced in the mid-1970s, with the extensive exploration culminating in the lodgement of a Development Application (DA) for an underground mine in August 1990. The DA sought approval for a range of activities including:

- Establishment of 'initial surface facilities' and a box cut seam entry at a site approximately 2 km east of the existing highwall entry (the Barrett Seam Entry);
- Construction and subsequent expansion of a modular CHPP on a site approximately 1km west of the Surface Facilities Area;
- Construction of a rail loading facility and inclined drift centred adjacent to the CHPP;
- Coal extraction, initially using continuous miners and later, using longwall methods; and
- ROM coal extraction increasing from approximately 0.55 Mtpa using continuous miners to approximately 3 Mtpa following the introduction of longwall techniques.

Following a Commission of Inquiry in mid-1991, Development Consent (DA 105/90) was granted on 01 November 1991 subject to 26 conditions.

Although initial mining operations commenced in October 1996, economic circumstances dictated a postponement of major coal mining and processing infrastructure development activities until the latter part of the decade. In the interim, emphasis was placed on undertaking a range of activities required, and investigating alternative methods and arrangements, for a progression into full-scale operations.

In August 1998, as a consequence of these investigations, Maitland Main Collieries (MMC) (the then major shareholder in the Integra Underground) lodged a S.96(2) application and accompanying Statement of Environmental Effects (SEE) with the then Department of Urban Affairs and Planning seeking the Minister's approval for amendments to DA 105/90 to enable:

- Development of an underground entry to CL 382 from the highwall within the mined out North Pit of the adjoining Camberwell Open Cut Coal Project (formally known as the Integra Open Cut, now Rix's Creek North);
- Processing of 0.2 Mtpa coal extracted through Camberwell Open Cut's CHPP;
- Despatch of the washed coal via Camberwell Open Cut's train loading facility; and
- Development of site facilities on and adjacent to the former Oak Park School grounds.

Underground development commenced in May 1999 and, over the period to May 2000, involved the development of three underground roadways from the Portal Area to a distance approximately 1,700 m underground. Five roadways (the North-West Mains – Plan 3) with interconnecting cut-throughs were then driven in a north-westerly direction.

Longwall mining in the first, narrow (90 m wide) panel (LW1) commenced in August 2002 and, since that time, with increasing knowledge and understanding of local geological and mining conditions, has progressed through the developmental / viability assessment phase to what now constitutes a modern longwall mining operation.

On 25 June 2002, an amendment to DA 105/90 (DA 105-90-M3) was granted enabling the establishment of a ventilation shaft and associated facility off Forest Road (above the western extremity of the North-Western Mains), plus a private surface power line to that facility.

Construction of the ventilation shaft commenced in October 2002 and was completed in April 2003.

Following this there were a series of modifications to the consent, including:

In January 2005, a Section 96 (1A) modification was submitted to enable the upgrade of facilities at the mine portal which included relocation and/or replacement of the existing workshop, fuel storage, fire station and fuel/service/washdown bay located within the Portal Area. This modification was approved in February 2005.

In February 2005, a Section 96 (2) modification was submitted to enable an increase in Runof-Mine (ROM) coal production to 4.5 Mtpa through continued use of existing mining equipment and personnel. The application, which also covered the installation of limited additional facilities and infrastructure to support and enable more efficient operations, was approved by the Minister for Planning on 1 November 2005.

On 21 December 2005 the Section 96 (2) modification (essentially the same proposal) was re-submitted due to some concerns regarding notification and consultation process with the original application. This modification was approved on the 20 September 2006.

In February 2006 a Section 3(A) modification was submitted that incorporated a number of changes to the surface facilities infrastructure at Integra Underground. This modification was approved by the Minister for Planning on the 31 January 2007. Subsequent modifications to this approval allowed for installation of a new ventilation shaft and gas flare plant.

In August 2006, a Part 3(A) application to cover mining in the Middle Liddell Seam for the proposed Longwalls 10 - 17 was submitted to the then Department of Planning. This application covered perceived inadequacies in the original Environmental Impact Statement (EIS) which were identified in the Subsidence Management Plan approval process. This application also allowed for the initiation of the approval process for both Hebden and Barrett Seam workings.

In March 2006, the process of consolidating consents was investigated for Glennies Creek Underground and Camberwell Open Cut. A Part 3A application was subsequently submitted and in November 2010, Integra Underground and Open Cut were granted a consolidated Integra Mine Complex Project Approval PA 08_0101 and 08_0102.

Over the life of the Colliery to date, Integra Coal Operations (ICO) or its predecessors had submitted a series of MOPs, with the most recent (pre-Glencore) being a Care and Maintenance MOP for Integra Underground, approved on 23 December 2014 until 31 August 2017.

1.1.2 Glencore Care and Maintenance Operations

In late 2015, HV Coking Coal Pty Ltd (HVCC) (a 100% Glencore-owned company) acquired all assets associated with the Integra Underground, which had been placed in care and maintenance in May 2014. During this time environmental management of the site was maintained under a care and maintenance environmental management system.

Prior to HVCC's purchase of Integra Underground, the mine formed part of the larger Integra Mine Complex. This complex comprised both underground and open cut operations and operated under a single project approval instrument which combined the project approvals for the Integra Underground (PA 08_0101) and Integra Open Cut (PA 08_0102). Following the separate sale of the underground and open cut, the combined project approval was modified to separate the open cut and underground approvals. The underground mine now operates under PA 08_0101.

1.1.3 Recommencement of Operations - Glencore

Underground operations recommenced in 2017, with development resuming in February 2017 and longwall extraction resuming in May 2017 (in accordance with the Extraction Plan as required under Condition 20 of Schedule 3 of PA 08_0101). An application for a further modification to PA 08_0101 (MOD 7) and accompanying Environmental Assessment (EA) was lodged with the Department of Planning and Environment (DPE) in June 2017. Subsequently, approval was granted by DPE on 15 September 2017. The modification application was made to facilitate the construction of a water pipeline from Integra Underground to the adjacent Mt Owen Complex and the subsequent use of the pipeline to transfer mine water. The modification enables surplus mine water collected at Integra Underground to be managed at Mt Owen Complex and within Glencore's Greater Ravensworth Area Water Sharing Scheme (GRAWSS).

An application for Modification 8 (MOD 8) to PA 08_0101 and accompanying EA was lodged with the DPE in November 2017. Approval was granted by DPE on 16 April 2018. MOD 8 allows continuation of longwall mining of the Middle Liddell Seam further to the north of the currently approved longwall panels, along with the construction and operation of ancillary surface infrastructure required to support the mining activities.

Details of activities proposed during this MOP term are included in **Section 2**.

1.1.4 History of Previous MOP's

The recent MOP history for Integra Underground is outlined in below:

- Glennies Creek Colliery June 2006 December 2008;
- Glennies Creek Colliery MOP February 2009 March 2015;
- Integra Mine Underground Operations Care and Maintenance 2014 2017; and
- Integra Mine Underground Operations MOP (January 2017 to December 2018) this document; and
- MOP Amendment 1 (March 2017) The MOP was updated based on the extension of LW 14. The extension of LW 14 by approximately 270 metres from the PA 08_0101 (Mod 6) layout is in accordance with PA 08_0101.
- MOP Amendment A (December 2018) The MOP was updated based on ancillary mining activities (AMA) and other aspects listed in **Section 1.1.5.** MOP Amendment A was again updated in May 2019, and approved 22 July 2019, following comments from the Resources Regulator.

Integra Underground also provided a letter to the Resources Regulator outlining a change to the approved MOP on 19 January 2018. It was proposed to include an additional location for a drill hole for geotechnical investigation for a ventilation shaft. The Resources Regulator confirmed that a MOP Amendment/Addendum was not required for this addition drill hole.

On 20 March 2018 Integra Underground provided a further letter to the Resources Regulator with a minor location change of the proposed drill hole. The Resources Regulator acknowledged this location changes on 29 March 2018. Details of the location of the drill hole will be reported in the next Integra Underground Annual Review (**Section 10.1**).

1.1.5 MOP Amendment A

MOP Amendment A was completed in order to capture the following changes proposed at Integra Underground:

- Addition of an AMA boundary to MOP plans;
- The dewatering of the Hebden seam (disturbance 50m x 50m) added to the MOP (this document), MOP plans and RCE;

- Inclusion of an existing treated effluent pond (1357m²) to the MOP (this document), MOP plans and RCE;
- Addition of a run off pond (2570m²) to the MOP (this document), MOP plans and RCE;
- Additional exploration holes to the MOP (this document), MOP plans and RCE,
- Placement of a demountable building, where a 'small building' was originally located; and
- Replacement of an existing demountable building with a larger demountable building.

MOP Amendment A was updated following the Notice of Refusal Letter from the Resources Regulator dated 8 April 2019. The changes from the December 2018 submission include:

- Addition of information that was removed in the December 2018 submission for MOP Amendment A including performance indicators/criteria and information relating to general environmental management. The information which has been brought back into MOP Amendment A has not been shown as a tracked change as it was within the currently approved MOP;
- Additional detail regarding seed mix (Section 7.2.4);
- Small changes to areas within the text relating to Domain 2 Ventilation and Gas Management at the start of MOP. This is based on updated GIS from early 2019;
- Update to Plan 2 relating to current gas drainage. Updates to MOP Plan 3 Series based on 2019 GIS data for gas drainage. This change related to the gas well sequencing in Plans 3A – 3E;
- Small changes to the rehabilitation monitoring section (Section 8); and
- No change to the RCE was required for the May 2019 update, with the RCE based on Plan 3E (End of MOP) for Integra Underground. There have been minor changes in the May 2019 MOP update relating to the start of MOP (Plan 2) areas for gas wells and gas well sequencing throughout the MOP period (3 Series Plans). However at this point there is no proposed change to the status of gas wells at the end of the MOP from the RCE submitted in December 2018.

1.1.6 MOP Amendment B

MOP Amendment B was completed in order to capture the following administrative changes:

- Amendment to the project approval boundary and boundary of CL 382 in MOP plans;
- Addition of ML 1786, ML 1740, ML 1742 to the MOP document and plans;
- Small change to Plan 3B to include five additional gas wells in place in 2020 (LW17)
- No change to the RCE is required, with the RCE based on Plan 3E (End of MOP) for Integra Underground. There have been minor changes in the June 2020 MOP update relating to gas well sequencing throughout the MOP period (Plan 3B). However, at this point there is no proposed change to the status of gas wells at the end of the MOP from the RCE submitted in December 2018; and
- Additional detail regarding subsidence monitoring, remediation and reporting.

1.2 Current Consents, Authorisations and Licences

1.2.1 Approvals and Licences

Integra Underground current consents, authorisations and licences are represented in **Table 1-1**.

Table 1-1 Approvals Leases and Licences

Type of Lease / Licence/Approval	Expiry	Comments
PA 08_0101 Mod 8	31.12.2035	Integra Underground Project Approval Modification 8 approved in April 2018 for longwall extension and additional surface infrastructure.
Environment Protection Licence (EPL) 3390	In force - anniversary date 31.08	Variation application approved in 11.2017 to revise an overlapping boundary with the Mt Owen Complex.
Coal Lease (CL) 382	11.11.2033	Varying surface exemptions. Part transfer between HVCC and Mt Owen completed in 2016. Part transfer between HVCC and Bloomfield completed in 2016 to transfer the area of CL382 covering the Open Cut North Pit and the Glennies Creek Pit Water Dam (also known as Possum Skin Dam).
Mining Lease (ML) 1437	27.03.2032	Part transfer from CL357
ML 1525 (Shaft)	17.11.2023	Forest Road Ventilation Shaft Area (from 20m to 5m from surface)
ML 1676	04.01.2026	Sub-Lease MPL 343 was under agreement with Glendell Tenements Pty Ltd. Overlies ML 1525 (-5m to surface)
ML 1518	27.03.2032	Part transfer from CL 357
Mining Lease (ML) 1551	27.03.2032	Part transfer from CL 357
ML 1786	31.12.2031	Varying surface exceptions Mining Lease Application No. 567
ML 1740	30.12.2023	Surface exception Partial transfer of CCL 708
ML 1742	22.10.2034	Surface exception Partial transfer of ML 1694
WAL 961	In Perpetuity	150 Units (High Security)
WAL 960	In Perpetuity	50 Units (High Security)
WAL 484	In Perpetuity	3 Units (High Security)
WAL 485	In Perpetuity	99 Units (General Security)
WAL 1172	In Perpetuity	3 Units (High Security)
WAL 1173	In Perpetuity	303 Units (High Security)
WAL 1242	In Perpetuity	13 Units (Supplementary)
20BL167917	In Perpetuity	Monitoring Bore
20BL169571	In Perpetuity	Monitoring Bore

Type of Lease / Licence/Approval	Expiry	Comments
20BL169573	In Perpetuity	Monitoring Bore
20BL169574	In Perpetuity	Monitoring Bore
20BL169862	25.09.2020	Groundwater extraction (up to 450 ML/annum) for
20BL169864	25.09.2020	dewatering purposes
20BL172505	19.05.2021	Groundwater extraction (up to 500 ML/annum) for
20BL172506	19.05.2021	dewatering purposes
20BL171707	In Perpetuity	Monitoring Bore
20BL171708	In Perpetuity	Monitoring Bore
20BL171710	In Perpetuity	Monitoring Bore
20BL171813	In Perpetuity	Monitoring Bore
20BL171870	In Perpetuity	Monitoring Bore
20BL172277	In Perpetuity	Monitoring Bore
20BL172278	In Perpetuity	Monitoring Bore
20BL172279	In Perpetuity	Monitoring Bore
OSSM 3969/2008	30.06.2019	Extension of Approval to operate on-site sewage management system

1.2.2 Project Approval Rehabilitation Management Plan Requirement

Schedule 3 Condition 40 of PA 08-0101 outlines the requirement to prepare a Rehabilitation Management Plan for Integra Underground (**Table 1-2**). The MOP has been prepared to cover this requirement.

Condition	Comment	Section in MOP/Comment
Schedule 3 Condition 40 a)	be prepared in consultation with the Department, OEH, Dol Water, Council and the CCC;	Section 1.4
b)	be submitted to the DRG for approval;	This document
c)	be prepared in accordance with any relevant DRG guideline, and be consistent with the rehabilitation\ objectives in Table 12 and in the documents referred to in conditions 2 and 3 of Schedule 2;	Prepared in accordance with ESG3 Mining Operations Plan (MOP) Guidelines, September 2013
d)	build, to the maximum extent practicable, on the Biodiversity Management Plan and the other management plans required under this approval;	Other management plans – See Section 3.2
e)	address all aspects of rehabilitation and mine closure, including final land use assessment, rehabilitation objectives, domain objectives, completion criteria and rehabilitation monitoring. The Proponent must implement the approved management plan as approved from time to time by the Secretary.	Section 4 Section 6 Section 8

Table 1-2 PA 08_0101 Rehabilitation Management Plan Requirement

1.3 Land Ownership and Land Use

An overview of the tenure of the general area is shown in **Plan 1C.**

The Integra Underground operation lies immediately to the south-east of Glencore's Mt Owen Complex whilst other surrounding mines include the Ashton Mine to the west and south-west.

A schedule of land ownership, occupancy, and title over the authorisation area is contained in **Table 1-3.**

Table 1-3 Land ownership/tenure for Integra Underground mining lease areas

Lot Number	Plan Number	Owner Type	Comment
1	1009231	Full Lot	
1	1083482	Full Lot	
1	1180252	Part Lot	
1	1206886	Full Lot	
1	626854	Part Lot	
1	655758	Full Lot	
1	701939	Full Lot	
1	725524	Full Lot	
1	770733	Full Lot	
1	772332	Full Lot	
1	781057	Full Lot	
1	799154	Full Lot	
1	851867	Part Lot	
1	865784	Part Lot	
1	940619	Part Lot	
1	996213	Full Lot	
1	998045	Full Lot	
10	6830	Full Lot	
104	804053	Part Lot	
11	6830	Full Lot	
111	850054	Full Lot	
112	850054	Full Lot	
12	6830	Full Lot	
12	835203	Full Lot	
1221	709371	Part Lot	
13	6830	Full Lot	
17	6830	Part Lot	
2	1072124	Part Lot	
2	1180252	Part Lot	
2	1206886	Full Lot	
2	701939	Full Lot	

Lot Number	Plan Number	Owner Type	Comment
2	770733	Full Lot	
2	780607	Full Lot	
2	851867	Full Lot	
2	859544	Part Lot	
21	6830	Part Lot	
3	1072124	Full Lot	
3	1206886	Full Lot	
3	606344	Full Lot	
3	701939	Full Lot	
3	851867	Full Lot	
3	859544	Part Lot	
332	832646	Part Lot	
4	1072124	Part Lot	
4	1180252	Part Lot	
4	851867	Full Lot	
5	133183	Full Lot	
5	851867	Full Lot	
5	859544	Part Lot	
532	788015	Part Lot	
6	851867	Full Lot	
6	859544	Full Lot	
622	1097524	Part Lot	
64	752499	Part Lot	
65	752499	Full Lot	
66	752499	Part Lot	
7	851867	Full Lot	
7	859544	Full Lot	
71	625171	Part Lot	
710	624852	Part Lot	Lot to be subdivided
791	580967	Part Lot	Lot to be subdivided
8	6830	Part Lot	
8	851867	Part Lot	
8	859544	Full Lot	
921	844642	Full Lot	
922	844642	Part Lot	
923	844642	Part Lot	
924	862883	Part Lot	
925	862883	Part Lot	

Lot Number	Plan Number	Owner Type	Comment
926	862883	Part Lot	

Lease Holdings and Cadastral information are shown in Plan 1C.

1.4 Stakeholder Consultation

Consultation with landowners, residents, stakeholders and regulatory bodies surrounding and associated with the Integra Underground has been undertaken to inform stakeholders of the changes in ownership of the Integra Underground and Open Cut operations, changes in land ownership and mining tenements, and the recommencement of operations at the Integra Underground.

The existing consultation includes but is not limited to the following key components:

- A 24-hour community hotline this service aims to promptly and effectively address community concerns;
- Amalgamation of the Integra Underground Community Consultative Committee (CCC) with the Mt Owen Complex CCC – currently meets three times twice per year to discuss environmental management and any matter raised by members on behalf of the community;
- Integra Underground website includes updates on current and future operations, including past and present environmental monitoring results;
- Glencore Greater Ravensworth Area Newsletters these are prepared bi-annually and circulated to disseminate information on Glencore's operations in the area, including Integra Underground; and
- Management of a complaints register to record complaints and steps to follow up complaints.

Consultation with the following key government stakeholders has been undertaken, with Schedule 3 Condition 40 requiring consultation with the DPE, Office of Environment and Heritage (OEH), Department of Industries (Dol) Water, Council and the CCC for the preparation of the Rehabilitation Plan (covered by this MOP). As consultation is required for the all management plans under PA 08_0101, Glencore has completed consultation with departments for the Integra Underground Project, not specific consultation for individual management plans.

The details of consultation for the reopening of Integra Underground are provided in **Table 1-4.**

Stakeholder	Date	Aspects Discussed
DPE (Sydney)	October 2016	Discussion regarding the update of the EMS and Management Plans.
Resources Regulator	27 October 2016	A meeting was held at the Resources Regulator offices to discuss the submission of the MOP and Plans for Integra Underground on 27 October 2016. The MOP was approved by the Resources Regulator on 30 November 2016.
OEH	November 2016	Consultation completed for preparation of management plans and recommencement of operations.
Dol Water	1 November 2016	Consultation completed for preparation of management plans and recommencement of operations.
Singleton Council	3 November 2016	Consultation completed for preparation of management plans and recommencement of operations.
ССС	July 2016	Consultation included an update on rehabilitation and the EMS.

Table 1-4 Consultation Log for the Reopening of Integra Underground

Integra Underground consulted with the Resources Regulator for the 2017 MOPMOP Amendment 1 in 2017. In 2018 there were also discussions relating to exploration areas and addition drill hole locations, with this discussed further within **Section 2.3.1** of this MOP. MOP Amendment A was updated in May 2019 following the Notice of Refusal Letter from the Resources Regulator dated 8 April 2019. The updated MOP Amendment A was approved on 22 July 2019. See **Section 1.1.5** for changes.

Extensive consultation was also undertaken during preparation of the MOD 7 and MOD 8 EAs in 2017, along with re-submission of updated management plans (see **Section 3.2**) in June 2018 to various government agencies.

2 Proposed Mining Activities

2.1 Project Description

Previous operational activities have consisted of coal extraction from the Middle Liddell seam (up to completion of LW12) and development work in the Hebden seam within the lease areas shown in **Plan 1C**.

Key operational activities during the MOP term will include:

- Longwall development within the Middle Liddell seam using continuous miners;
- Longwall mining within the Middle Liddell seam. The approval of MOD 8 allows mining within LW15 to 20;
- Extraction of coal to a maximum of 4.5 Mtpa of ROM coal;
- Subsidence monitoring and remediation as per the approved Integra Underground Extraction Plan;
- Storage of ROM Coal at the pit top. Haulage of ROM coal to the Rix's Creek North Coal Handling and Preparation Plant (CHPP) for processing is undertaken by Bloomfield Colleries;
- Operation of workshop and administration areas; and
- Construction of mine infrastructure, including service and ventilation facilities.

The approval of MOD 8 and this MOP also allows for the construction and use of additional surface infrastructure, including:

- The addition of a Goaf Dewatering Site consisting of additional dewatering boreholes and associated infrastructure;
- Surface auxiliary fans and associated infrastructure;
- Additional electricity transmission lines and distribution lines;
- Additional gas drainage boreholes to facilitate the safety of underground operations;
- Increased usage of the currently approved gas flares; and
- Relocation and upgrade of the existing store facility;
- An additional access road off Middle Falbrook Road; and
- Use of the C4 Dam (at Rix's Creek North Mine) to store raw water from Glennies Creek.
- MOP Amendment A updates outlined in **Section 1.1.5**, including:
 - Addition of an AMA boundary to MOP plans;
 - The inclusion of an existing treated effluent pond (1357m²);
 - Addition of a run off pond (2570m²);
 - Dewatering of the Hebden seam (50m x 50m);
 - Additional exploration holes;
 - Review of gas drainage locations;
 - Placement of a demountable building, where a 'small building' was originally located; and
 - Replacement of an existing demountable building with a larger demountable building.

There is no change to the project description for MOP Amendment B.

2.2 Asset Register

The Primary Domains within the MOP area include:

- Domain 1 Pit Top Area;
- Domain 2 Ventilation Infrastructure and Gas wells;
- Domain 3 Water Management;
- Domain 4 Current Rehabilitation; and
- Domain 5 Underground Mining Area.

The majority of infrastructure outlined within the Asset Register are within Domains 1 and 2 and are outlined within **Table 2-1** and **Figure 2-1**. Areas of domains at MOP commencement and the end of the MOP are outlined in **Section 7.3**.

Infrastructure Features	Decommissioning and Rehabilitation Activities	Approvals Required	Area/Length								
Primary Domain 1 - Pit	Primary Domain 1 - Pit Top										
 Key buildings (i.e.): Main office buildings Training room Bathhouses Workshops 	Disconnect services, demolish and remove infrastructure, remove concrete pads, remove carbonaceous material and dispose of in box cut void.	None	End of MOP =Approximately 3030m²3311m²								
Underground portal	Capping of entries in accordance with Resources Regulator requirements	Approval from Resources Regulator	3 entry points								
Roads, pathways, ramps and carparks	Remove bitumen and dispose of in box cut void. Rehabilitation of exposed area	None	4,820m ²								
Electrical infrastructure (i.e.): • Substations • Swtichyard	Disconnect services. Remove offsite	As per Radiation licence	690m ² substation 2753m ² switchyard								
Hardstand areas	Ripping and rehabilitation.	None	2,291.5m ²								
Contaminant storage areas	Remediation of any contamination. Ripping and rehabilitation.	None	3 areas								
Coal stockpile areas	Ripping and rehabilitation.	None	560,000m³ 13.3Ha								
Pipelines	Remove infrastructure	None	Total of 16.3kms								
Primary Domain 2 - Ver	ntilation Infrastructure and Gas wells										
Overall Ventilation Area	Remove bitumen and dispose of in box cut void. Rehabilitation of exposed area	None	9.2Ha start of MOP 32.2 Ha end of MOP (new ventilation facility proposed in 2019).								
Goaf Dewatering Site	Goaf dewatering site, 11 KV switch room, electrical transformer	None	Footprint of approximately 4.1 Ha. Planned for 2020								
Hardstand areas	Ripping and rehabilitation	None	2,194m ²								

Table 2-1 Infrastructure Features - Underground Pit-Top Facilities Area

Infrastructure Features	Decommissioning and Rehabilitation Activities	Approvals Required	Area/Length
Ventilation fans	Disconnect services. Remove offsite	Removal and capping as per the Resource Regulator requirements	Currently3facilitiesNewventilationfacilityatsiteproposedin2019(total of 4 at site).
Gas wells	Disconnect services. Remove offsite Capping of boreholes	Removal and capping as per the Resources Regulator requirements	See MOP Plan 2 for total gas wells at MOP Commencement. Estimated 9.1 Ha at MOP End (MOP Plan 3E) will still be active. Proposed gaswell rehabilitation will be reviewed annually.
Roads associated with gas wells	Roads associated with gas wells and powerlines. Additional roads installed by Integra Underground covering LW's 14-20.	None	5.8 ha estimated at Plan 3E.
Powerlines	66kV and 11kV	None	10.6km
Domain 3 - Water Mana	igement		
Dams: • Sewage effluent ponds • Process water • Sedimentation • Clean water • Dewatering of the Hebden seam gas	Remove sediment from dams, minor earthworks as required to infill some dams. Completed minor revegetation for stability.	None	2@ 36,563.25m ³ Run off Pond @ 2570m ² Sewage Pond @ 1357 m ² Hebden Seam Gas Dewatering Dam @ 2500m ²
Water infrastructure	Disconnect services. Remove offsite	None	556m ²
Domain 4 - Current Ref	nabilitation		
No infrastructure	Rehabilitation maintenance Possible further rehabilitation works	None	7.2 ha
Domain 5 - Undergrour	nd Mining Area	-	
No infrastructure.	Subsidence remediation	Extraction Plan approval for LW 13-14 and LW 15- 16. and 14. Further Extraction Plans required.	Existing workings = 564.9 ha Additional longwalls (total end of MOP) = 836 ha
Exploration holes	Disconnect services. Capping of boreholes. Rehabilitation.	Removal and capping as per Resources Regulator requirements	See MOP Plans

2.3 Activities over the MOP Term

This section outlines proposed activities during the MOP term. This MOP covers the mining of LW 14 to 20 and activities associated with the underground operations.

2.3.1 Exploration

HVCC is proposing to drill exploration holes, vertical production wells and SIS holes within the Project Area during the MOP term. Details of gas management are outlined further in **Section 2.3.2.1**.

The indicative timing of this disturbance is 2019 and 2020. The exploration will be used to:

- Obtain detailed coal quality and seam gas information;
- Obtain more detailed information on strata, geological anomalies and geotechnical data; and
- Assist with refining the mine design.

During the MOP term exploration drilling for the Integra Underground will be conducted over multiple leases. Mt Owen Complex is generally the lease holder for the ground surface and exploration drilling may incorporate both Mt Owen Complex and Integra Underground subsurface/ stratified leases. The exact locations of the proposed exploration holes will be determined as mining progresses based on operational needs at the time and further technical studies. However, exploration holes, where practicable, will be positioned to:

- Avoid threatened species, populations, or their habitats and EECs;
- Avoid identified heritage items;
- Minimise clearance and disturbance of native vegetation; and
- Minimise erosion and sedimentation.

Surface disturbance and rehabilitation of exploration works will be managed via the Glencore Work Authorisation process such that works are conducted in an environmentally responsible manner and with due consideration to the community. Exploration activities will minimise the installation of access tracks to drill sites by utilising existing tracks where possible, therefore disturbance is kept to a minimum to safely drill.

Upon completion of exploration activities, boreholes are sealed and rehabilitated in accordance with the DTIRIS guideline EDG01 Environmental Management Guideline for Industry Borehole Sealing Requirements on Land: Coal Exploration (NSW Department of Trade and Investment 2012). Exploration drilling sites will be rehabilitated within the MOP period in accordance with Glencore *11.09 Exploration Drilling Protocol* and the *Integra Underground Exploration Activities and Minor Surface Infrastructure Management Plan.* Rehabilitation of boreholes is proposed for 2020.

All exploration will be carried out in accordance with the requirements of the *Work Health and Safety (Mines) Act 2013* and relevant mining authorisations.

On occasion an exploration hole may remain open to be used as a groundwater monitoring site in which case application will be made to the Dol - Water for a water licence.

Any exploration outside a mining lease will be managed under a Surface Disturbance Notice and reported in the relevant Exploration Lease Environmental Management Report. All exploration within a mining lease will be reported in the Integra Underground Annual Review.

As part of MOP Amendment A, additional exploration holes are required. The establishment of exploration sites will involve clearing and land disturbances.

In line with practice conducted at existing exploration sites, Integra Underground will utilise existing access tracks wherever possible. The cost to rehabilitate exploration holes is included

in the RCE. The December 2018 MOP Amendment A reviewed the proposed locations of exploration during the MOP amendment, with 13 additional holes included in the RCE.

Refer to MOP Plans for further details on the proposed AMA area.

2.3.2 Construction

In addition to exploration bores, the construction activities detailed in the following subsections will be undertaken within the MOP term. The construction equipment required may consist of earthmoving equipment (excavators, loaders, dozers, graders etc), trucks (for movement and supply of materials), mobile cranes, and drilling and boring machines.

2.3.2.1 Gas Drainage

The gas extraction and flaring plant which was commissioned in 2014 will be operational during the MOP period. The installation of gas drainage boreholes that connect the mine workings to the surface will continue to be undertaken during the MOP period to reduce:

- The coal seam's in-situ gas content to a level below the outburst threshold; and
- Gas emissions into the mine ventilation system to a level which satisfies statutory concentrations for people and equipment.

HVCC propose to drill for pre-drainage of gas from the Hebden seam via methods such as vertical production wells and SIS holes.

Borehole patterns/spacings vary according to the gas content, composition, permeability, and available drainage time.

Goaf gas drainage boreholes are installed ahead of the advancing longwall panels. Typically, site preparation takes one week, and borehole drilling takes approximately two weeks. The drill sump contents are removed at the completion of the drilling and the sump filled. Installation of the fencing is generally completed in the subsequent week.

All borehole sites will be located in either areas of grassland within the Integra Underground Project Area or within the approved disturbance footprint for the Mt Owen Complex. Clearing and land disturbance associated with the installation of gas drainage infrastructure will generally involve:

- Establishment of an approximately 40 m by 40 m pad for each gas drainage borehole site;
- Clearing and disturbance for access tracks to borehole; and
- Clearing and disturbance for trenches to bury the gas pipelines.

Integra Underground will utilise existing access tracks wherever possible.

The methane gas produced from goaf areas will be supplied to the Glennies Creek Power Station as far as practicable. Surplus gas will be released via the existing gas flares. Free venting of gas will only be undertaken as a contingency measure, when other gas management options are not practicable. Methane gas management will be an ongoing process during this MOP period. Greenhouse gases are also addressed by the Integra Underground Air Quality and Greenhouse Gas Management Plan.

An indicative plan of gas drainage is outlined within Plans 3A -3E. HVCC will provide details about completed gas drainage rehabilitation and proposed gas drainage construction and rehabilitation as part of the Annual Review. HVCC are committed to reviewing the status of all gas drainage boreholes across site every quarter.

No changes to the RCE were required for the May 2019 update, with the RCE based on Plan 3E (End of MOP) for Integra Underground. There have been minor changes to the text in the May 2019 MOP update relating to the start of MOP (Plan 2) areas for gas wells and gas well

sequencing throughout the MOP period (3 Series Plans). However at this point there is no proposed change to the status of gaswells at the end of the MOP from the RCE submitted in December 2018.

No change to the RCE is required for MOP Amendment B, with the RCE based on Plan 3E (End of MOP) for Integra Underground. There have been minor changes in the June 2020 MOP update relating to gas well sequencing throughout the MOP period (Plan 3B). However, at this point there is no proposed change to the status of gas wells at the end of the MOP from the RCE submitted in December 2018.

2.3.2.2 Water Management

As part of MOP Amendment A, the dewatering of the Hebden seam is required. The MOP Amendment allows for a new dam to be built to store water from the dewatering activities, with this dam known as the Hebden Seam Pre Drainage Dewatering Dam (approximately 2500m²).

MOP Amendment A also allows for the addition of a run off pond (2570m²) and the inclusion of the existing treated effluent pond (1357m²).

2.3.2.3 Ventilation Works

A new ventilation and services facility (Ventilation Shaft 34) is required to provide adequate ventilation and services to the underground mining operation. This new facility will be located above the main headings and near LW16 and construction is expected to commence in 2018.

Surface auxiliary fans and associated bleeder shafts may be constructed within the underground extraction area for LW15 to 20 approved by MOD 8. The exact locations are to be confirmed once the dimensions of the longwall panels are finalised. All the surface auxiliary fan sites will be located within areas of grassland and will not result in any disturbance of native woodland.

2.3.2.4 Ancillary Infrastructure

To facilitate the dewatering of future mine workings, a Goaf Dewatering Site may be constructed near the north eastern end of LW 14 (if required). The final position of the Goaf Dewatering Site will be dependent on the contours within the coal seam and the location of sensitive environmental features. A minor access road may be constructed to provide access to the Goaf Dewatering Site. A network of water pipelines will transfer the dewatered mine inflows to the Mt Owen Complex Water Management System for use at the Mt Owen Complex or transferred to other mines within the GRAWSS. Disturbance associated with this site is not expected until 2020.

A 66 kV powerline will be constructed from the Forest Road Ventilation Site to the new ventilation shaft overlying the North Mains in 2018-2019. The site overlying the North Mains may contain a substation (66 kV to 11 kV). An additional 11 kV powerline may be constructed in 2019 from this substation to the Goaf Dewatering Site and surface auxiliary fans if required.

The disturbance associated with the construction of a new store (approximately 40m x 20m) at the Main Surface Facilities, along with the additional access road off Middle Falbrook Road is expected to commence in 2018, with construction expected to be complete in 2019.

2.3.3 Mining Operations (Including Mining Purposes)

During the MOP period, mining activities will include:

- Development associated with LW 15 to 20; and
- Longwall extraction of LW 14 to 20.

Development works will be undertaken using continuous miners with shuttle cars loading onto a conveyor belt system.

A longwall face (maximum continuous capacity 3000 tonnes per hour) will extract each longwall block. LW14 has a maximum void width of 256.5m. LWs 15 to 20 have an indicative width of 256m, up to a maximum width of 320m. Gas drainage boreholes will be required for each block for the extraction of excess gas (mostly methane) from the goaf.

Additional details regarding the mining methodology will be outlined in the Extraction Plan for LW 15 to 20.

2.3.4 Rock/Overburden Emplacement

There are no rock/overburden emplacement activities to be carried out during the term of this MOP period, with the site being an underground operation. All ROM coal is transported to the Rix's Creek North CHPP, with this coal handling managed by Bloomfield Collieries in accordance with PA 08_0102.

2.3.5 **Processing Residues and Tailings**

There are no processing activities which will produce residues and tailings to be carried out during the term of this MOP period. All ROM coal is transported to the Rix's Creek North CHPP, with this coal handling and processing managed under a separate MOP and PA 08_0102 by Bloomfield Collieries.

2.3.6 Waste Management

Waste management activities and services will continue during the term of this MOP. Waste management practices at Integra Underground are based on the waste management hierarchy whereby waste is minimised in the first instance, reused/recycled in the second instance and disposed of as a last resort.

Tasks associated with waste management will include specific waste receptacles for waste segregation and management of general waste, building waste, batteries, cardboard and paper, comingled recycling, scrap steel, waste oil, oily rag and oil filter and oily water.

Rubbish Disposal

A specific waste management contractor will assist with waste collection and disposal during the MOP period.

The contractor consolidates several waste streams into a single contract to account for all waste streams and to assist/encourage greater recycling of all materials on site. Additional communication is provided for all employees via tool box talks, to ensure a greater understanding of the importance of segregating waste streams to achieve effective and responsible waste management.

Sewage Treatment/Disposal

On-site sewage treatment systems include a primary aeration tank with a secondary maturation pond and a package sewage treatment plant. Wastewater from the systems are dispersed by irrigation sprays on dedicated irrigation areas.

Hazardous Waste Management

Hazardous wastes such as batteries, waste oils, greases, oil filters, oily rags and oily water are collected by the waste contractor and removed from site.

2.3.7 Decommissioning and Demolition Activities

During the MOP term progressive removal of gas wells and surface gas drainage infrastructure will be undertaken when deemed redundant to future operations. In addition, two buildings near the administration area will be demolished unless deemed by the proponent to be required for post-mining purposes. If retained, they will be subject to commercial arrangements with future landowners.

2.3.8 Temporary Stabilisation

Stabilisation works may be undertaken as required to maintain a safe working environment. These stabilisation works may include; highwall stabilisation in the boxcut, erosion repairs and associated earthworks.

2.3.9 Progressive Rehabilitation and Completion

During the term of this MOP, it is planned that eight gas wells at Integra Underground will be rehabilitated. Each gas well site is approximately 40m x 40m and will be rehabilitated in accordance with the *Integra Underground Gas Drainage Borehole Sealing and Rehabilitation Procedure* (INTUG-793190758-943) which outlines gas well capping and rehabilitation methods.

HVCC will review the gas wells each quarter to determine the operational need for each gas well. When a gas well is deemed to be no longer required for future operations, it will be rehabilitated.

2.3.10 Material Production Schedule During MOP Term

Proposed material production is outlined within Table 2-2.

Material	Unit	November – December 2018	2019	2020	2021	2022	2023
Stripped Topsoil	m ³	0	0	0	0	0	0
Overburden	m ³	0	0	0	0	0	0
ROM Coal	Mt	484,891	2,960,403	2,785,413	3,169,328	2,444,053	898,393
Reject Material	Mt	0	0	0	0	0	0
Product	Mt	330,071	1,987,775	1,889,379	2,238,594	1,787,488	673,916

Table 2-2 Material Production Schedule During the MOP Term

It is noted that the topsoil on site is generally of poor quality. Much of the future disturbance proposed for construction of gas drainage in LW's 15 -20 is located within the following areas:

- Areas disturbed and not rehabilitated yet by Mt Owen. These areas do not contain topsoil;
- Areas rehabilitated by Mt Owen (overburden dumps). In these areas the topsoil has been ripped into the shaped overburden as part of Mt Owen rehabilitation process. HVCC would be unable to strip this topsoil; and
- Areas approved for disturbance by Mt Owen. These areas contain topsoil and the topsoil resource will be retained for use in rehabilitation.

In the event that topsoil resources are retained and topsoil stripping occurs, the following activities are proposed:

- Topsoil will be stripped where possible with a target depth of 0.1m;
- Prior to clearing, topsoil and subsoil materials will be characterised to assess potential constraints/opportunities for use in rehabilitation;
- Preference will be given to placing topsoil directly onto disturbed areas;
- Topsoil stockpiles are to be located away from traffic areas and watercourses;
- Appropriate sediment controls will be installed to prevent soil loss;
- Topsoil stockpiles to be kept longer than six months will be sown with a cover crop to minimise soil erosion and invasion of weed species;
- Prior to re-spreading, weed growth will be scalped from the top of the topsoil stockpiles, if required, to minimise the transport of weeds into rehabilitated areas; and
- Any topsoil stockpiles that have evidence of noxious weed growth will be treated prior to the use in rehabilitation.

3 Environmental Issues Management

3.1 Environmental Risk Assessment

The key risks associated with the proposed activities at Integra Underground during the term of this MOP have been identified and assessed in accordance with Glencore's Risk and Change Management Standard which establishes a qualitative risk assessment methodology in accordance with the requirements of the Joint Australian and New Zealand Standard *AS/NZS 31000:2009 Risk Management – Principles and Guidelines.* A 'Risk to Rehabilitation' Risk Assessment was completed in August 2018 and is attached as **Appendix 2**.

The method used for the risk assessment encompassed the following key steps:

- Identifying the related risks, including what could happen, when and where;
- Analysing the risks using a qualitative risk approach (i.e. identifying existing controls, determining specific consequences/likelihoods and then determining the residual level of risk);
- Evaluating the risks to determine the significant issues. The purpose of risk evaluation is to make decisions based on the outcomes of the risk assessment about which of the risks need controls or the implementation of a mitigation strategy; and
- Establishing controls to mitigate/treat the risks identified as part of the process.

The risk assessment identified 19 potential risks/hazards; none were considered a high risk to rehabilitation. Three of the risks/hazards were considered medium risk and 15 risks/hazards were considered low risks to rehabilitation. Additional controls were recommended were required to manage the risk.

3.2 Environmental Risk Management

Environmental aspects connected to Integra Underground are identified and managed within the Environmental Management System (EMS). The EMS aligns with Glencore policies and protocols and is structured with Environmental Management Plans specific to environmental aspects. Management Plans have been prepared for the following conditions:

- Noise Management Plan (S3 C9);
- Air Quality and Greenhouse Gas Management Plan (S3 C15);
- Extraction Plan (S3 C20);
- Water Management Plan (S3 C31);
- Biodiversity Management Plan (S3 C32);
- Heritage Management Plan (Aboriginal and Historic Heritage) (S3 C33);
- Rehabilitation Management Plan this MOP (S3 C40);
- Exploration Activities and Minor Surface Infrastructure Management Plan (S3 C41); and
- Construction Traffic Management Plan (S3 C42).

These management plans were revised following approval of PA08_0101 MOD 8 and approved by the DPE in September 2018.

The current management plans for Integra underground are included in the link below:

www.glencore.com.au/IntegraUnderground

3.2.1 Specific Risks Relating to Rehabilitation and Disturbance Areas

Specific risks to disturbed and rehabilitated areas are outlined within the following sub sections.

3.2.1.1 Geology and Geochemistry

The Integra Underground Project Area is predominantly covered by shallow hillslope-based colluvium, with alluvial based sedimentary deposits in the valley floors. These are in turn sequentially underlain by coal measures of the Vane Subgroup, Archerfield Sandstone and Jerrys Plains Subgroup of the Whittingham Coal Measures. The sequence contains interlayered sandstone, conglomerate, mudstone, siltstone and coal (Beckett 1988).

The risk assessment did not identify any issues with the site's geology and geochemistry that could impact upon rehabilitation.

3.2.1.2 Material Prone to Spontaneous Combustion

Integra Underground recognises that spontaneous combustion presents a potential threat to rehabilitation and long term public safety unless appropriate controls are maintained.

Integra Underground will continue the following management measures to minimise the risk of spontaneous combustion, in accordance with the *Spontaneous Combustion Principal Mining Hazard Plan*:

- Regular inspections;
- Minimising the length of time coal is held in stockpiles;
- Monitoring coal stockpiles for signs of spontaneous combustion;
- Immediately reporting incidents;
- Ventilation assessments; and
- Extinguishment by excavation, spreading and saturation with water.

Based on these management measures, the risk of spontaneous combustion impacting on rehabilitation was considered low.

3.2.1.3 Material Prone to Generating Acid Mine Drainage

The surface disturbance footprint associated with Integra Underground is minimal and disturbed areas within the dirty water footprint are not prone to sulphide materials. There have been no recorded incidents of outflows of acidic water from this site.

Material prone to generating acid mine drainage was considered a low risk to rehabilitation in the risk assessment. In the unlikely event of acid mine drainage, Integra Underground would engage a specialist to assist with managing the issue, as well consult with the Resources Regulator.

3.2.1.4 Mine Subsidence

Mine subsidence has the potential to prevent the achievement of the rehabilitation outcome prescribed in this MOP. Mine subsidence could cause the settlement of active and rehabilitated landforms to such an extent that drainage is impacted on. Although considered a low risk to rehabilitation at Integra Underground, the following controls are in place to mitigate this risk.

Existing Longwalls

The Glennies Creek Colliery Longwalls 10 to 17 Subsidence Management Plan (SMP) was approved on 17 October 2008. In April 2014, extraction of second workings up to and including LW 12 has been undertaken and in accordance with the *LW10-12 Subsidence Monitoring Program*, surveys have been completed up to the end of this panel.

On 25 August 2014, DRE granted approval to vary reporting frequency for subsidence to sixmonthly, while the mine remained in care and maintenance. This six monthly report includes a visual inspection of surface areas potentially affected by subsidence. To date, no unpredicted subsidence impacts have been recorded.

Longwalls 13 and 14

The Extraction Plan for LW 13 and 14 has been prepared and submitted to the DPE as per the requirements of Schedule 3 Condition 20 of PA 08_0101 and the Extraction Plan Guidelines from DPE. The Extraction Plan has been approved by the DPE includes the following:

- Review of existing subsidence results;
- Predicted subsidence impacts and mitigation measures for LW 13 and 14;
- Proposed subsidence and environmental monitoring program; and
- Reporting requirements.

If subsidence monitoring or inspections indicate there are impacts related to subsidence; mitigation measures will be enacted as per the Extraction Plan and specific Asset Management Plans. Key mitigation measures include:

- Investigation of the cause of subsidence impacts;
- Liaison with relevant stakeholders;
- Assessment of monitoring data;
- Continuation of monitoring data and inspections;
- Reporting as per the Extraction Plan;
- Implement specific mitigation measure to rectify the issue as per specific management plans; and
- Final liaison with relevant stakeholders and the Resource Regulator.

Longwalls 15 to 20

Extraction Plans will be completed prior to undertaking mining within LW 15 to 20. It is planned that an Extraction Plan will be submitted to the DPE in latein mid 20198 to cover LW 15 and 16.

Extraction Plans will be completed in accordance with Schedule 3 Condition 20 of PA 08_0101 and the Extraction Plan Guidelines from the DPE. Extraction Plans will contain measures to monitor, mitigate and remediate subsidence impacts and include various environmental management plans and asset management plans to manage impacts to built and natural features. Extraction Plans will be developed in consultation with the relevant regulatory authorities, land owners and asset owners.

3.2.1.5 Surface and Ground Water

Surface and ground water management at Integra Underground is conducted in accordance with the Water Management Plan (WMP). The WMP includes a site water balance, an erosion and sediment control plan, surface water management, groundwater management and surface and groundwater response plans. Water control structures such as diversions, drains, sumps and pipework will be monitored and maintained during the MOP period to reduce and

where possible limit any adverse effects on surface and groundwater. Pipelines associated with water management are reviewed as part of the monthly work inspections.

3.2.1.6 Erosion and Sediment Control

Integra Underground has a policy to prevent soil erosion and sediment transport at the source as per the Erosion and Sediment Control Plan, which is included in the WMP. The current mine site footprint provides minimal opportunity for erosion in both clean and dirty water areas. If erosion cannot be significantly reduced in situ, sedimentation control structures are used to capture and reduce loads in periods of high rainfall. Activities that have the highest risk of affecting erosion and sediment transport on site and within gas drainage infrastructure are topsoil stripping, ground preparation and rehabilitation. The risk assessment did not identify any high risks relating to erosion and sediment control at Integra Underground.

Erosion and sediment controls relating to disturbed and rehabilitated areas at site include:

- Regular inspections, including during and after high rainfall events;
- Conducting best practice land clearing procedures for all proposed disturbance areas;
- Coordinating disturbance activities to minimise exposure of bare soils to the elements;
- Minimising run-off into the disturbance area from upslope catchment areas to reduce the amount of sediment laden water requiring management;
- Directing sediment laden runoff into designated water management structures for treatment, or pumping to the mine water management system;
- Restricting vehicle access (as much as possible) to designated access and haul roads;
- Appropriate storage of material stockpiles in areas away from roadways and other drainage lines;
- Erecting temporary erosion and sediment control structures such as silt fences;
- Maintaining water management structures to designated capacities;
- Revegetation of disturbed areas (beyond the mine footprint) as soon as possible following the completion of disturbance activities; and
- Implementing an ongoing maintenance program for the site erosion and sediment control structures.

3.2.1.7 Soil Type(s) and Suitability

Soil in undisturbed areas in the vicinity of the surface facilities comprise duplex soils with clay to sandy loam A horizon over a clay loam to light clay to a clay B horizon and alluvial soils in drainage lines. Soils in the vicinity of the shaft site are comprised of Solodic soils on slopes and alluvial soils in drainage lines. The potential for erosion in these areas is limited to areas of disturbance or minimal vegetation that may expose dispersive loams and clays

There are no plans for major surface disturbance during the term of this MOP, with minimal surface disturbance required for maintenance of rehabilitation and sediment controls and the construction activities detailed in **Section 2.3.2**. All topsoil disturbed for minor surface activities such as the installation of gas drainage boreholes will be salvaged and used for future rehabilitation of these areas.

The risk assessment identified soil type and suitability as a medium risk to rehabilitation. It is acknowledged for final rehabilitation a topsoil substitute such as biosolids would be used in the area around the pit top and ventilation facility due to a lack of available topsoil.

3.2.1.8 Flora and Fauna

Procedures for management of threatened flora and fauna species, non-threatened flora and fauna, biodiversity, weed and pests are outlined in the Integra Underground Biodiversity Management Plan (BMP).

In accordance with the BMP and PA 08_0101 Statement of Commitments, pre-clearing surveys are carried out and groundcover clearance protocols established prior to any vegetation clearing being undertaken during the MOP period.

Subsidence impacts and management relating to flora and fauna have been assessed as part of the Extraction Plan for LW 13 and 14 and will also be assessed in the preparation of future Extraction Plans. There are no offset areas associated with the Integra Underground Project. Flora and fauna monitoring is outlined within the BMP, with short term, medium and long-term mitigation measures outlined within Section 4 of the BMP.

3.2.1.9 Overburden Characterisation

There are no activities planned for generating or relocating overburden material during the term of this MOP.

3.2.1.10 Slopes and Slope Management

Periodic inspections by geotechnical personnel may be carried out on highwall areas above the portal entrance. Remedial works for highwall stability may be undertaken as required to ensure a safe operating environment. Prior to closure a qualified engineer will review the stability of the highwall for long-term stability post closure. If required, controls will be implemented to achieve a long-term safe and stable landform.

3.2.1.11 Air Quality

Procedures for monitoring and management of dust and greenhouse gas emissions are outlined in the Integra Underground Air Quality and Greenhouse Gas Management Plan (AQGHGMP).

The principal sources of atmospheric dust emissions from activities at Integra Underground during the MOP term are associated with:

- Disturbance for exploration and drilling works;
- Wind-blown dust from exposed surfaces; and
- Vehicle movements on the internal unsealed hardstand areas or access roads around the site.

The results of air quality monitoring will be assessed against the relevant criteria from PA 08_0101 and EPL3390. Results will be provided in the Annual Review and EPL Annual Return.

Disturbed areas are kept to a minimum and rehabilitated with vegetation as soon as practicable to minimise the potential for dust generation. Unsealed trafficable areas are maintained in such a manner as to reduce dust emission. Water carts can be used around the pit top area for dust suppression as required.

3.2.1.12 Contaminated Land and Hazardous Substances

Hazardous materials including bulk diesel fuels and chemicals are contained in bunded storage areas to minimise the potential for accidental spills. All chemicals are accompanied by the relevant Safety Data Sheets as required by work, health and safety regulations. Spill kits are located adjacent to the diesel and oil tanks, stores, hydrocarbon storage shed and workshop and storage bay. Spill kits will be monitored and stocked as required.

Hydrocarbons are managed in accordance with the Glencore Protocols.

3.2.1.13 Blasting

There will be no surface blasting activities associated with the site during the MOP.

3.2.1.14 Noise

Procedures for monitoring and management of noise impacts are outlined in the Integra Underground Noise Management Plan (NMP).

The key noise sources for the operation will be the pit top area and infrastructure associated with ventilation and gas flaring.

Key noise controls include:

- Due diligence assessments prior to disturbance; and
- Maintenance of machinery associated with the pit top and ventilation/gas management.

3.2.1.15 Visual and Lighting

Visual amenity management is a low risk for the Underground Operation. Management of lighting and visual amenity impacts are addressed in the MOD 8 EA.

3.2.1.16 Heritage (Aboriginal and European)

Management of impacts to heritage are addressed in the Integra Underground Aboriginal Heritage Management Plan and the Integra Underground Historical Heritage Management Plan.

There will be some land disturbance associated with gas drainage boreholes and construction activities detailed in **Section 2.3.2**. Land disturbance activities follow the Glencore Ground Disturbance Permit process, which identifies the potential for heritage sites via GIS.

3.2.1.17 Bushfire

Regular grounds maintenance provides cleared areas and fire breaks around surface facilities via lawn mowing, brush cutting and weed spraying. The mine has fire control services on site and two branches of the Rural Fire Service are located nearby.

4 Post Mining Land Use

4.1 Regulatory Requirements

The regulatory requirements specific to post mining land-use and rehabilitation outcomes at Integra Underground are summarised in **Table 4-1** below.

Table 4-1 Reg	ulatory Requir	rements for Inf	egra Underground
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				Domain (Is the criteria applicable?)					
Source Document	Subject	Rehabilitation/Post Mining Objective	D1 Pit Top Area	D2 Ventilation Infrastructure and Gas wells	D3 Water Management	D4 Current Rehab	D5 Underground Mining Area		
PA 08_0101 Schedule 3, Condition 38	Site (as a whole)	Safe, stable and non-polluting.	Yes	Yes	Yes	Yes	Yes		
PA 08_0101 Schedule 3, Condition 38	Surface Infrastructure	To be decommissioned and removed unless Resource Regulator agrees otherwise.	Yes	Yes	Yes				
PA 08_0101 Schedule 3, Condition 38	Other land affected by the project	Restore ecosystem function, including maintaining or establishing self-sustaining eco- systems comprised of: - local native plant species (unless the Director-General agrees otherwise); and - a landform consistent with the surrounding environment.	Yes	Yes	Yes	Yes	Yes		
PA 08_0101 Schedule 3 Condition 38	Glencore Mt Owen Bettys Creek Diversion	Rehabilitate to the same or better geotechnical geomorphic and ecological condition as prior to mining, unless the owner agrees otherwise.			Yes		Yes		
PA 08_0101 Schedule 3, Condition 38	Sections of Bettys Creek and Main Creek to be undermined	Hydraulically and geomorphologically stable, with diverse habitats and ecology.			Yes		Yes		
PA 08_0101 Schedule 3, Condition 38	Creek Diversions	Hydraulically and geomorphologically stable, with diverse habitats and ecology.			Yes		Yes		
PA 08_0101 Schedule 3, Condition 38	Built Features	Repair to pre-mining condition or equivalent unless the owner agrees otherwise.					Yes		

			Domain (Is the criteria applicable?)				
Source Document	Subject	Rehabilitation/Post Mining Objective	D1 Pit Top Area	D2 Ventilation Infrastructure and Gas wells	D3 Water Management	D4 Current Rehab	D5 Underground Mining Area
PA 08_0101 Schedule 3, Condition 38	Community	Minimise the adverse socio- economic effects associated with mine closure.	Yes	Yes	Yes	Yes	Yes
PA 08_0101 Schedule 3, Condition 39	Rehabilitation	The Proponent must carry out rehabilitation of the site progressively, that is, as soon as reasonably practicable following the disturbance.	Yes	Yes	Yes	Yes	Yes
PA 08_0101 Appendix 7 - Statement of Commitments	Rehabilitation	Rehabilitation associated with proposed mining will be undertaken in accordance with the relevant MOP, REMP, Extraction Plans and SMPs.	Yes	Yes	Yes	Yes	Yes
Mining Lease 1437 Deed, Condition 7	Rehabilitation	Any disturbance as a result of activities under this lease must be rehabilitated to the satisfaction of the Director- General.	Yes	Yes	Yes	Yes	Yes
Mining Lease 1437 Deed, Condition 14(d)	Roads and Tracks	Temporary access tracks must be rehabilitated and revegetated to the satisfaction of the Director- General as soon as reasonably practicable after they are no longer required under this Lease.	¥ os	Yes			Yes
Mining Lease 1515 Deed, Condition 23	Rehabilitation	If so directed by the Minister, the lease holder shall rehabilitate to the satisfaction of the Minister any lands within the subject area which may have been disturbed by the lease holder.	Yes	Yes	Yes	Yes	Yes

			Domain (Is the criteria applicable?)						
Source Document	Subject	Rehabilitation/Post Mining Objective	D1 Pit Top Area	D2 Ventilation Infrastructure and Gas wells	D3 Water Management	D4 Current Rehab	D5 Underground Mining Area		
CL 382 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.		Yes			Yes		
ML 1437 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Yes		Yes				
ML 1518 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Yes		Yes				
ML 1525 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.		Yes	Yes	Yes	Yes		
ML 1551 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Yes			Yes			
ML 1676 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.		Yes	Yes	Yes	Yes		
			Domain (Is the criteria applicable?)						
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Source Document	Subject	Rehabilitation/Post Mining Objective	D1 Pit Top Area	D2 Ventilation Infrastructure and Gas wells	D3 Water Management	D4 Current Rehab	D5 Underground Mining Area		
ML 1786 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.		Yes			Yes		
ML 1740 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.		Yes			Yes		
ML 1742 Condition 2	Rehabilitation	Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.		Yes			Yes		

4.2 Post Mining Land Use Goal

Integra Underground is committed to achieving a post mining land use outcome which is safe, stable and sustainable and meets the requirements of key stakeholders. In general, and where practicable the final landscape will be returned to as close as possible to the pre-mining land use configuration. A conceptual final landform design and rehabilitation plan which details land use is shown on **Plan 4**.

4.3 Rehabilitation Objectives

The rehabilitation objectives for the site seek to achieve an agreed post mining land use that is safe, stable, non-polluting and sustainable. Individual domains may have more site-specific objectives, as contained in the following extract from Schedule 3, Condition 38 of PA 08-0101. The objectives in **Table 4-2** are also included as completion criteria within **Section 6**.

Rehabilitation Objectives

38. The Proponent must rehabilitate the site in a manner generally consistent with the rehabilitation strategy described in the documents referred to in conditions 2 or 3 of Schedule 2 and the objectives in the table below

Area/Domain	Rehabilitation Objectives			
Site (as a whole)	Safe, stable and non-polluting.			
Surface Infrastructure	To be decommissioned and removed unless DRE agrees otherwise.			
Other land affected by the project	 Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: local native plant species (unless the Director-General agrees otherwise); and a landform consistent with the surrounding environment. 			
Glencore Mt Owen Bettys Creek Diversion	s Rehabilitate to the same or better geotechnical geomorphic and ecological condition as prior to mining, unless the owner agrees otherwise.			
Sections of Bettys Creek and Main Creek to be undermined	Hydraulically and geomorphologically stable, with diverse habitats and ecology.			
Creek Diversions	Hydraulically and geomorphologically stable, with diverse habitats and ecology.			
Built Features	Repair to pre-mining condition or equivalent unless the owner agrees otherwise.			
Community	Minimise the adverse socio-economic effects associated with mine closure.			

Table 4-2 Rehabilitation Objectives

The Statement of Commitments which appends PA 08_0101 states that 'Effective rehabilitation is undertaken at the completion of mining. Rehabilitation associated with proposed mining will be undertaken in accordance with the relevant MOP, REMP, Extraction Plans and SMP's'.

5 Rehabilitation Planning and Management

5.1 Domain Selection

5.1.1 Domains

The Primary Domains are defined on the basis of land management units within the mine site. These Operational domain types generally have unique operational and functional purposes and so are likely to have similar geophysical characteristics. **Table 5-1** lists the Domain types and Codes.

Table 5-1 Domain Coding

Code	Primary Domain	Code	Secondary Domain
1	Pit Top Area	А	Subsidence Management Area
2	Ventilation Infrastructure and Gas wells	В	Water Management Area
3	Water Management	С	Rehabilitation Area - Pasture
4	Current Rehabilitation	D	Rehabilitation Woodland/Pasture
5	Underground Mining Area		

5.1.2 Domain 1 – Pit Top Area

This domain includes infrastructure and key features associated with the pit top area, with a full list of features outlined in **Section 2.2**. Key features include:

- Buildings;
- Roads and tracks;
- Powerlines (used for mine supply only);
- Wash-down areas, carparks and associated equipment;
- Sewage Effluent Ponds;
- Tanks;
- Transformers;
- Longwall Laydown Area;
- ROM stockpile area and associated infrastructure;
- Hardstand / Storage Areas;
- Stacker Belt Conveyor CV001;
- Diesel Storage Tank; and
- Portal.

5.1.3 Domain 2 – Ventilation Infrastructure and Gas wells

This includes the ventilation facility off Forest Road, gas flares, gas drainage pumps and pipes. These key features are shown in **Plan 2 and 3**.

The Fan Site has been developed in accordance with the PA 08_0101 and includes:

- 3 surface to seam shafts approximately 320m deep and associated fan motors, buildings and infrastructure,
- Gas Plant,
- Compressor and electrical buildings and infrastructure,
- Clean water diversions,

- Surface water catchment dams, settling ponds and associated drainage structures,
- Bunding along Forest Rd,
- Turkeys nest dam initially used during shaft construction and targeted for use as a staging dam for connection to the Glencore Greater Ravensworth Water Management System,
- Stockpile of shaft cuttings material,
- Associated access roads,
- Ballast and concrete boreholes and hoppers,
- Tube bundle monitoring system,
- Other boreholes including one used electrical power, the Ashton Water borehole

An additional ventilation and services facility and goaf dewatering site will be added during this MOP period, with this outlined in MOP Plan 3A. There will also be a series of auxiliary fan shafts established during the MOP period.

5.1.4 Domain 3 - Water Management

Water management areas include dirty water sumps and process water dams. The majority of these dams are located at the Pit-Top Facilities area and the Ventilation Fan sites. As part of MOP Amendment A, water management areas also include a run off pond and sewage pond located which are shown on MOP Plans. Moreover the dewatering of the Hebden seam (50m x 50m area for a new dam) is proposed. See **Section 1.1.5** for further details.

5.1.5 Domain 4 – Current Rehabilitation

Gas well sites above the mining area are used to extract gas during and post mining. Some of these gas wells are no longer required for operational use and have been rehabilitated. The rehabilitation of gas well areas is categorised as "Pasture".

This domain includes 7.2 hectares of rehabilitation which falls within the Project Approval Area for Integra Underground. The current rehabilitation area consists of a section of rehabilitated overburden and is a woodland/pasture area.

5.1.6 Domain 5 - Underground Mining Area

The underground mining area overlies the active mining area and is subject to subsidence. In general, subsidence impacts at Integra Underground are low or minimal (**Plan 3**). Remedial subsidence work may include Rail Line maintenance conducted by the Rail Line Owner.

Previously LW12 extraction ceased on 22 April 2014. It is highly likely that more than 90% of the mining subsidence has occurred within 2 months of completion of mining. It is highly unlikely that the estimated residual subsidence (<10%) will result in significant impacts.

An Extraction Plan has been prepared to cover LW 13 and 14 within the Middle Liddell seam. This Extraction Plan has been prepared to cover the PA 08_0101 requirements (Schedule 3 Condition 20) and the Extraction Plan Guidelines from the DPE. The Extraction Plan was approved by the DPE on 11 August 2017 and outlines predicted subsidence impacts and monitoring and mitigation measures. Extraction Plans for mining within LW 15-20 will be submitted for approval prior to commence of secondary extraction in these longwalls. An Extraction Plan relating to LW 15 and 16 is planned for submission in late 2018.

The Bettys creek diversion falls within this domain, with specific completion criteria relating to the Bettys Creek diversion within **Section 6** of this MOP. There are several farms dams located within the overall approved mining footprint, with these not being classified as Water Management as most dams were located prior to mining operations in the area.

For MOP Amendment A, additional exploration holes are proposed. See **Section 1.1.5** for further details.

5.2 Secondary Domains

The Secondary domains (Post Mining Land Use Domains) are defined as land management units characterised by a similar post mining land use objective (i.e. following mining). These post Mining Land Use Domains for Integra Underground are limited to only a few categories owing to the nature of the surface within the lease boundaries. These Secondary Domains include the following;

5.2.1 Subsidence Management Area

Surface cracks due to subsidence will be identified and remediated (if required) in accordance approved Extraction Plans.

An Extraction Plan includes a Subsidence Monitoring Program to describe the monitoring against performance measures and the remediation approach for any predicted subsidence impacts. Subsidence monitoring includes visual inspections during active subsidence and survey monitoring. Subsidence features will be remediated to seal cracks and re-grade depressions (where required) to minimise localised ponding and long term impacts to catchment areas. All subsidence remediation will be completed in accordance with the Extraction Plan. Water management features remaining post mining include dams at the former Pit-Top Facilities site. The largest of these will include the remnants of the final void at the portal, which currently forms part of the Domain 1 – Pit Top Area. The smaller dams, including the Process Water Dam and Sedimentation Dam, will be rehabilitated to a clean water status. The final landform in this area will be shaped to allow drainage to the portal void (**Plan 4**).

5.2.2 Water Management Area

Water management features remaining post mining include dams at the former Pit-Top Facilities site. The largest of these will include the remnants of the final void at the portal, which currently forms part of the Domain 1 – Pit Top Area. The smaller dams, including the Process Water Dam and Sedimentation Dam, will be rehabilitated to a clean water status. The final landform in this area will be shaped to allow drainage to the portal void (**Plan 4**). Some dams around the pit top are proposed to remain post closure. Section 3.3.11 of the original Environmental Assessment states that *All Sedimentation dams which assist in the management/control of water flows from the final rehabilitated surface, would provide fauna habitat or represent an asset to the future land use will be retained following mine closure. All dams to be retained will be assessed for structural integrity and any requiring upgrading or maintenance works will be completed.*

5.2.3 Rehabilitation Area – Pasture

The majority of the rehabilitated areas at mine closure will fall under the categories of Rehabilitation Pasture, with this including the Domain 1 - Pit Top Area and Domain 2 Ventilation Infrastructure and Gas wells.

5.2.4 Rehabilitation Area – Woodland/Pasture

This domain includes 7.2 hectares of rehabilitation which falls within the Project Approval Area for Integra Underground. This rehabilitation has been completed over a former overburden area, prior to the site being managed by Glencore.

At closure it is proposed that there will be approximately 1.4ha of woodland rehabilitation associated with gas wells and 0.3ha of woodland rehabilitation required for the area of disturbed trees along the proposed powerline road.

5.3 Domain Rehabilitation Objectives (Level 1 Mines only)

The following are the common rehabilitation objectives of all domains:

- Safety risks are eliminated as far as reasonably practicable;
- The final landform will be stable and fit for purpose;
- A stable free draining landform, capable of supporting pasture and/or sustainable ecosystems of native trees and shrubs;
- Ecological diversity will be maintained or enhanced;
- Rehabilitation works do not impact on sites/areas of Aboriginal cultural heritage;
- Promote biodiversity through weed and feral animal control programmes; and
- The agriculture value of the lands will be sustained or enhanced in a manner consistent with the mining plans.

Specific rehabilitation objectives and completion criteria for different MOP domains is outlined within **Section 6.** These objectives and completion criteria have been separated into Phase and domain.

5.4 Rehabilitation Phases

The final rehabilitation objective (i.e. post-mining) is the development across the site of sustainable ecosystems that are representative of the adjacent landscape. This rehabilitation can be conceptually described by a series of phases such as:

- Phase 1 Decommissioning Infrastructure removed, contamination remediated, electricity decommissioned, heritage buildings retained (removal of hard stand areas, buildings, contaminated materials, hazardous materials);
- Phase 2 Landform Establishment incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology;
- Phase 3 Growth Medium Development incorporates physical, chemical and biological components of the growing media and ameliorants that are used to optimise the potential of the media in terms of the preferred vegetative cover;
- Phase 4 Ecosystem and Land Use Establishment incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control/management and establishment of flora; Subsurface Development;
- Phase 5 Ecosystem and Land Use Sustainability incorporates components of floristic structure, nutrient cycling recruitment and recovery, community structure and function; fauna presence, growth, ecosystem resilience; Infrastructure Development; and
- Phase 6 Land Relinquishment land use and landscape is deemed as suitable to be relinquished from the Mining Lease; Demonstrated ultimate success of the rehabilitation process. This may be biophysical or physical.

Table 5-2 shows the relevant rehabilitation phases for each domain, based on the post mining land use and landscape. The aim of this table is to provide a summary of completed phases for each domain at the end of the MOP period.

Rehabilitation Phase	D1 – Pit Top Area	D 2 - Ventilation Infrastructure and Gas wells	D3 – Water Management	D4 – Current Rehabilitation	D 5 – Underground Mining Area
Phase 1 – Decommissioning					
Phase 2 – Landform Establishment		x		x	x
Phase 3 – Growth Medium Development		х		х	x
Phase 4 – Ecosystem and Land use Establishment		х		х	х
Phase 5 – Ecosystem and Land use Sustainability					
Phase 6 – Land Relinquishment					

Table 5-2 Rehabilitation Phases during MOP Term - Primary Domain based on Post Mining Land Use

Note: x - Active phases during the term of this MOP. Only a small part of Domain 2 is in a phase of rehabilitation, with the rest of Domain 2 active.

6 Performance Indicators and Completion / Relinquishment Criteria

Performance indicators and associated completion/relinquishment criteria are appropriate to the location and relevant to the stated rehabilitation goal and rehabilitation objectives for each mine domain. Each indicator relates to guidelines, project approvals, industry standards, scientific literature or other sources such as rehabilitation trials and analogue sites, as appropriate. Rehabilitation indicators and performance criteria go hand in hand insofar as:

Performance indicator is an attribute of the biophysical environment (e.g. pH, slope, topsoil depth, biomass) that can be used to approximate the progression of a biophysical process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion/relinquishment criterion (i.e. defined end point). The indicator may be aligned to an established protocol and used to evaluate changes in a system.

Completion/Relinquishment criteria are objective target levels or values that can be measured to quantitatively demonstrate the progress and ultimate success of a biophysical process. These are the standards that are to be met by successful rehabilitation. They will generally be in the form of a numerical value that can be verified by measurement of the indicators selected for the rehabilitation objectives. They may include an element based on time.

The performance indicators in this MOP are designed to provide the ability to track the development of sustainable ecosystems through a series of conceptual stages to ensure that the completion/relinquishment criteria are met.

The use of this approach allows for early intervention where desired rehabilitation trends are not being achieved. In this case, an adaptive management or contingency management approach can be used to respond in the event of poor rehabilitation performance or unexpected results.

Performance indicators and completion criteria have been nominated as reasonably achievable target levels or values. In some instances, subjective criteria or ranges of values have been more appropriate for certain indicators where uncertainty has existed. Completion criteria have been nominated for each phase of rehabilitation so that rehabilitation success can be quantitatively tracked throughout the life of the mine. It should be noted that the development of suitable completion criteria is an iterative process and acceptable values or levels may change over time with advances in research and technology.

Completion criteria will be achieved at each successive phase of rehabilitation to proceed to the next phase. Demonstration of completion criteria to permit the release of security will be achieved using recording techniques including photography, statistical analysis, qualitative reporting, chronological comparative analysis and adjacent land capability analysis.

sioning

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP	
All Domains	·						
Develop a detailed Mine Closure Plan including rehabilitation and decommissioning	Consistent with Resources Regulator expectations	Establishing clear and agreed criteria which can be used to provide the standard against which the final mine rehabilitation and post mining land use can be assessed.	Previous MOP	No		Detailed Mine Closure Plan not yet commenced	
Remove all infrastructure upon closure.	Removal of infrastructure	All buildings and other infrastructure will be demolished and removed from the site unless deemed by the proponent to be required for post- mining purposes. If retained, they will be subject to commercial arrangements with future landowners.	EA - Section 8.13.3	No		Not commenced	
Domain 1 - Pit Top Area							
Infrastructure Removal	Removal of exploration infrastructure	All drill holes (and excavations that remain abandoned from previous mining or exploration), have been backfilled and sealed in accordance with <i>EDG01 – Borehole Sealing Requirements on Land.</i>	PA 08_0101 Schedule 3, Condition 38	No		Not commenced	
All hazardous and contaminated materials area appropriately removed or remediated.	Carbonaceous material, concrete and bitumen	It is currently planned that all carbonaceous material, concrete and bitumen that has been removed from the footprint of the ROM stockpile area and the pit top area will be disposed of in the void. Prior to closure Integra Underground will investigate the viability of capping, including the potential to bring some capping material in, or remove carbonaceous material from site to a licenced waste disposal. All carbonaceous material has been removed from the footprint of the ROM stockpile area and disposed of in the void.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced	
	Removal of hazardous materials	The surface is free of any hazardous materials (e.g. petroleum, chemicals and explosive products).	Previous MOP (Consistent with other Glencore operations)	No		Not commenced	

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
		A contamination assessment has been undertaken and any contaminated areas that have been identified have been remediated.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Removal of roads and tracks	Minor roads and tracks removed.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
The portal entry is sealed	Seal portal entry	The portal entry has been sealed in accordance with Resources Regulator guidelines and the Mine Sealing Plan. The sump will remain at closure and this area will be a water source.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Remove all site servicing in a safe manner	All site servicing infrastructure is removed	All services including power, water, data and telephone lines on the site will be isolated, disconnected and terminated to make them safe and inspection pits and junction boxes for underground services will be sealed.	Previous MOP	No		Not commenced
All roads and hardstand areas will be removed and remediated	All removal and remediated undertaken to the satisfaction of Resources Regulator	Bitumen roadways, car parks and hardstand areas around the CHPP, workshop and administration areas will be ripped up and the inert waste material placed in available voids and buried or recycled where feasible. All areas will then be reshaped, deep ripped, topsoiled and seeded. There will likely that there will be a shortage of	Previous MOP	No		Not commenced
		topsoil. Where this is the case ameliorants such as biosolids will be used to act as a growing medium.				
Domain 2 - Ventilation Inf	rastructure and Gas we	lls				
	Removal of gas drainage pipelines and flares	All gas drainage and flare infrastructure has been removed as per Resources Regulator requirements.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Removal of all surface infrastructure	Remove all gas drainage boreholes	All boreholes have been removed in accordance with Resources Regulator requirements and are ready for sealing.	Previous MOP (Consistent with other Glencore operations)	No		Not commencedSo me have been removed and sealed
	Complete removal of gas well items	Gas well headwork and concrete slabs removed.	Previous MOP (Consistent with other Glencore operations)	Completed as gas wells		Some have been removed

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
				become redundant		and sealed Not commenced
Domain 3 - Water Manage	ement					
Mine water dams and sediment dams are decontaminated prior to removal or re-use as clean water dams in the final landform	Removal of hazardous materials	Sediments accumulated in mine water and sediment dams is removed from the dam floor and emplaced in the final void.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Removal of water management structures not required in final landform	All water management structures that are not required as part of the post-closure land use have been demolished and removed from the site.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Removal of Integra Underground to Mt Owen Pipeline at closure	Removal of pipeline	If not required as part of the post-closure land use, the Integra Underground to Mt Owen Pipeline has been decommissioned and rehabilitated.	This MOP (Consistent with other Glencore Operations	No		Not commenced

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
Domain 1 - Pit Top Area	I					
	Slopes	All rehabilitated slopes are less than 10 degrees (or are between 10 and 14 degrees with Resources Regulator approval). Steep slopes are to be limited to around the highwall area.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 2.0	Not commenced
	Longterm stability of highwall	Prior to closure a qualified engineer will review the stability of the highwall for long-term stability post closure. If required, controls will be implemented to achieve a long-term safe and stable landform.	New criteria for this MOP	No		
	Stability	Earth works have been undertaken and the site is assessed to be geotechnically stable and free draining to local watercourses.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Landform compatible	All excavations have been filled in or sealed.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Landforms to be safe, stable and non-polluting	with final land use	Exploration areas have been shaped to a stable and permanent form suitable for post mining land use.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Consistent with surrounding landform, where practical and aligned with relevant approvals	Final landform shape adequate as assessed by surveyor and/or environmental representative.	Criteria from previous Care and Maintenance MOP	Completed as gas wells become redundant	Table 9.2 Threat - 1.0	On-going
	Erosion	Active erosion is assessed to be minimal.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Erosion	Monitoring verifies there are no gully or tunnel erosion features, or rills >200mm deep.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 3.0	Not commenced
	Spontaneous Combustion	There is no evidence of spontaneous combustion.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
	AMD	There is no evidence of AMD generation.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	No unplanned pooling of water	Landform surface drainage contours are adequately water shedding. Quarterly Rehabilitation Inspections.	Criteria from previous Care and Maintenance MOP	On-going		On-going
Domain 2 – Ventilation	Infrastructure and Gas	wells and Domain 4 – Current Rehabilitation				
	Consistent with surrounding landform, where practical and aligned with relevant approvals	Final landform shape adequate as assessed by surveyor and/or environmental representative.	Criteria from previous Care and Maintenance MOP	Completed as gas wells become redundant	Table 9.2 Threat - 1.0	On-going
Landforms to be safe, stable and non-polluting	No unplanned pooling of water	Landform surface drainage contours are adequately water shedding	Criteria from previous Care and Maintenance MOP	Completed as gas wells become redundant		On-going
	Erosion	Monitoring verifies there are no gully or tunnel erosion features, or rills >200mm deep.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 3.0	Not commenced
Domain 3 – Water Mana	igement					
Final landform drainage will integrate with surrounding catchments and will achieve long term geomorphic stability and minimise erosion.	Final landform drainage design	Final landform drainage structures including drains, banks and dams have been designed and constructed in accordance with an approved detailed drainage design and the Blue Book Vol 2E.	DECC 2008 (Blue Book) ACARP C13048	No	n/a	Commenced
Domain 5 - Undergroun	d Mining Area					
All subsidence impacts	Subsidence cracks	Any surface cracking due to subsidence has been rehabilitated by re-grading to seal cracks.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat 1.0	Not commenced
rehabilitated	Free draining landforms	Drainage lines are restored and there is no evidence of ponding.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced

Management of subsidence impacts as per the approved Extraction Plans No subsidence impacts as a result of the mining of LW 13 to 20 Biodi Built Publi	sidence impacts will be managed as per the oved Extraction Plan. sidence Performance Measures as per edule 3, Condition 17 of PA 08_0101 are as ws: er <u>Glennies Creek alluvial aquifer</u> - Negligible impact; <u>Natural watercourses on site</u> - No greater environmental consequences than predicted in the Underground Project EA; <u>Mt Owen Bettys Creek Diversions</u> - No greater than the environmental consequences predicted in the Underground Project EA, unless the owner agrees otherwise in writing; <u>Underground Project Creek Diversions</u> - Remain hydraulically and geomorphologically stable; and <u>Other water storages and drainage lines</u> - No greater than the environmental consequences predicted in the Underground Project EA. <u>diversity</u> <u>Threatened species, populations, habitat or ecological communities</u> - Negligible impact. It Features <u>All built features (except those fully covered by an operative contractual arrangement with another mine owner or other owner of the relevant built feature) - Safe, serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing, including: serviceable and repairable, unless the owner agrees otherwise in writing including: serviceable and repairabl</u>	Approved Extraction Plan	Νο		Not commenced
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Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP		
All Domains								
Use of topsoil effectively to assist in improved rehabilitation	Topsoil depth	Topsoil or a suitable alternative has been spread uniformly at a depth of 100mm. There will likely that there will be a shortage of topsoil. Where this is the case ameliorants such as biosolids will be used to act as a growing medium.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 4.0	Not commenced		
Testing of topsoil	Topsoil Testing	Topsoil testing is completed for rehabilitation areas prior to spreading. Soil characteristics such as pH, EC and erosion and sediment control potential are within 20% of analogue sites.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 4.0	Required for future rehabilitation		
Topsoils are characterised and ameliorated for use in woodland and grazing land uses.	Topsoil characterisation	Topsoils and topsoil substitutes have been tested to assess suitability for post mining land use.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		
	Amelioration	Appropriate soil ameliorants (e.g. gypsum, fertilisers, mulch) have been applied in accordance with specifications.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		
Erosion is minimised	Temporary ESC	Temporary ESCs are installed prior to topsoil re-spreading.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		
Soil at final rehabilitation is fertile.	Soil fertility	Soil fertility comparable to adjacent landscape.	Criteria from previous Care and Maintenance MOP	Completed as gas wells become redundant		On-going		

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
All Domains						
Weeds are controlled on Integra lands.	Weed presence	There are no significant weed infestations and weeds do not comprise a significant proportion of the species in any stratum.	Previous MOP (Consistent with other Glencore operations)	No		Minimal rehabilitation. Not commenced
Weeds are controlled on Integra lands	Weed presence	Less than 10% of the rehabilitation area classified as weeds. Weeds within rehabilitation are comparable to analogue sites.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat – 15.0	Not commenced
Feral animal pests are controlled on Integra lands.	Feral animal density	Feral animal pests are controlled in accordance with legislation and the Biodiversity Management Plan.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Erosion does not present a safety hazard or compromise the post mining land capability.	Erosion and Sediment – Control	No evidence of significant erosion.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Land capability of grazing areas will be comparable to pre-mining land capability.		No significant erosion is present that constitutes a safety hazard or compromises the capability of the supporting the end land use.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Stable landform	Gully erosion	Monitoring verifies there are no gully or tunnel erosion features, or rills >200mm deep.	Previous MOP (Consistent with other Glencore operations)	No	Table9.2Threat-3.0	Not commenced
Soil fertility and soil structure is comparable between rehabilitation areas and reference sites	рН	Testing verifies that pH is within 0.5 of analogue sites or between 6 and 8 at Year 5.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 5.0	Not commenced
	EC	Testing verifies that EC of surface soils is below 1000 mS/cm at Year 5.	Tongway and Hindley 1996	No	Table 9.2 Threat - 5.0	Not commenced
	Nutrients	Nitrogen, potassium and phosphorus are within 20% of analogue sites at Year 5.	Tongway and Hindley 1996	No	Table 9.2 Threat - 5.0	Not commenced

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP			
	Soil carbon	Testing indicates that organic carbon levels are broadly trending toward 20% of levels at reference sites at Year 5.	Tongway and Hindley 1996	No	Table 9.2 Threat - 5.0	Not commenced			
	Surface cover	Rehabilitation monitoring verifies that ground cover (vegetation, leaf litter, mulch) is greater than 70% at Year 5.	Tongway and Hindley 1996	No	Table 9.2 Threat - 7.0	Not commenced			
Domain B – Water Managen	Domain B – Water Management Area								
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Discharge water quality	Discharge water quality meets the EPL requirements. Integra Underground to comply with section 120 of the Protection of the Environment Operations Act 1997.	EPL 3390	No		Not commenced			
Domain C Rehabilitation Area - Pasture									
Establishment of a representative number of species and at similar density to adjacent ecological grassland	Species richness, presence of recalcitrant species, weed %	High number of different species, density similar to adjacent grassland, low weed percentage.	Criteria from previous Care and Maintenance MOP	No		Not commenced			
Stable groundcover	Surface cover	Ground cover (vegetation) greater than 70% at Year 5.	New criteria	No	Table 9.2 Threat – 7.0	Not commenced			
Stable groundcover	Surface cover	Pasture species to consist of grasses and legumes appropriate to the district and recognised as suitable for beef cattle grazing.	Criteria from previous Care and Maintenance MOP	No		Not commenced			
Domain D – Rehabilitation V	Voodland/Pasture	-				_			
Stable groundcover	Surface cover	Rehabilitation monitoring indicates ground cover (vegetation, leaf litter, mulch) greater than 70% when in this rehabilitation phase.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat – 7.0	Not met - in progress			
Stable groundcover	Stems per hectare	At the end of this rehabilitation phase, rehabilitation monitoring indicates 500 stems per hectare.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat – 8.0	Not met - in progress			
Diverse woodland/grassland rehabilitation	Vegetation Health	Rehabilitation monitoring confirms the presence of at least two overstorey and two understorey species at all ages.	Previous MOP (Consistent with other Glencore operations)	No		Not met - in progress			

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
Diverse woodland/grassland rehabilitation	Vegetation Health	More than 75 per cent of trees are healthy and growing as indicated by long term rehabilitation monitoring.	Previous MOP (Consistent with other Glencore operations)	No		Not met - in progress
Diverse woodland/grassland rehabilitation	Vegetation Health	Rehabilitation monitoring confirms canopy cover is in the range of 10 per cent to 30 per cent.	Previous MOP (Consistent with other Glencore operations)	No		Not met - in progress
Diverse woodland/grassland rehabilitation	Species Composition	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is within 25% of analogue sites at Year 5.	New criteria	No		Not met - in progress

Table 6-5 Rehabilitation Table – Ecosystem an	nd Land Use Sustainability
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Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP		
All Domains								
Weeds are controlled on Integra lands	Weed presence	There are no significant weed infestations and weeds do not comprise a significant proportion of the species in any stratum.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		
Weeds are controlled on Integra lands	Weed presence	Less than 10% of the rehabilitation area classified as weeds.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		
Feral animal pests are controlled on Integra lands.	Feral animal density	Feral animal pests are controlled in accordance with legislation and the MOP.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		
Monitoring demonstrates soil profile development in rehabilitated areas (e.g. development of organic layer, litter layer).	Soil Quality	Soil characteristics (pH, EC and erosion and sediment control potential) are in the range within 20% of the levels of analogue sites at Year 10 of rehabilitation.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 6.0	Not commenced		
	Surface cover	Ground cover (vegetation, leaf litter, mulch) is in the range of analogue sites at Year 10.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat - 12.0	Not commenced		
Safe, stable and non-polluting site	Criteria	Landform meets final land use criteria	PA 08_0101 Schedule 3, Condition 38	On-going		On-going		
Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Rehabilitation completed and signed off by the Minister.	All rehabilitation within the mining lease is completed on time and in accordance with the closure criteria to the satisfaction of the Minister.	CL382, ML1437, ML1518, ML1525, ML1551, ML1786, ML1740, ML1742 and ML1676 - Section 2	No		Not commenced		
Domain A – Subsidence Management Area								
Land capability of grazing areas will be comparable to pre-mining land capability	Erosion and sediment control	No significant erosion is present that constitutes a safety hazard or compromises the capability of the supporting the end land use.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced		

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
Glencore Mt Owen Bettys Creek Diversions - Rehabilitate to the same or better geotechnical, geomorphic and ecological condition as prior to mining, unless the owner agrees otherwise	Erosion and sediment control	Betty's Creek diversion is rehabilitated to the condition of adjacent creek bed along Betty's Creek which has not been impacted by the diversion.	PA 08_0101 Schedule 3, Condition 38	No		Commenced
Sections of Bettys Creek and Main Creek are to be undermined but must remain hydraulically and geomorphologically stable, with diverse habitats and ecology	Hydraulic and geomorphic stability Diverse habitats and ecology	Betty's Creek diversion is rehabilitated to the condition of adjacent creek bed along Betty's Creek which has not been impacted by the diversion.	PA 08_0101 Schedule 3, Condition 38	No		Commenced
Surface and groundwater that leave the mining leases will not be degraded to a significant extent	Preservation of downstream water quality	Both current and future water quality will be maintained at levels that are acceptable for users downstream of the site.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Post mining land use will be achieved through the planting of suitable trees.	Post mining land use is achieved.	Suitable species are planted and established to achieve the nominated post- mine land uses.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Reduce potential erosion caused by dust	Erosion and sediment control	Water and wind induced erosion is minimised, including the likelihood of environmental impacts being caused by the release of dust.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Operating at optimum efficiency to minimise potential dust impacts from wind erosion.	Rehabilitation practices are on target to meet specified completion criteria	Meet or exceed annual rehabilitation targets shown in areas nominated within respective Mining Operations Plans (MOPs).	AQGHG Management Plan	No		Not commenced
Fauna	Maintained or increased populations of threatened species. No impact on fauna habitat outside of defined disturbance areas.	Prevent and/or minimise impact of mining operations on fauna. Ongoing for life of project. Preclearance surveys as required.	Biodiversity Management Plan	No		Not commenced

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP		
Flora	No impact on vegetation outside of defined disturbance areas. Weeds are being controlled.	Vegetation outside of the designated disturbance area is to be protected. Ongoing for life of project.	Biodiversity Management Plan	No		Not commenced		
Domain B - Water Management								
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion	Water Quality	Discharge water quality meets the EPL requirements.	Previous MOP	No		Not commenced		
		Quality of surface water and seepage released from the site (if any) is such that releases of contaminants are not likely to cause environmental harm.	Previous MOP (Consistent with other Glencore operations)	On-going		On-going		
No environmental harm will be caused by surface water quality	Surface water quality	Water quality of any residual water bodies is suitable for the nominated use and does not have the potential to cause environmental harm. The nominated final land use around the pit top area is an area that has been rehabilitated predominately with pasture. The dams will assist with erosion and sediment control on newly rehabilitated areas at mine closure.	Previous MOP (Consistent with other Glencore operations)	On-going		On-going		
Undertake rehabilitation of waterways	Waterways have been rehabilitated to satisfy the objectives set out in the Biodiversity Management Plan.	Monitor and rehabilitate Betty's, Main and Glennies Creek for impacts from Integra Underground.	Biodiversity Management Plan	No		Not commenced		
Domain C – Pasture								
Vegetation developing in structure and complexity to that of the adjacent remnant vegetation	Groundcover %, species type, weed %	High level of vegetation structure, complexity and species. Low level of weed percentage	Criteria from previous Care and Maintenance MOP	No. To be completed as gas wells become redundant		On-going		

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
	Pasture Composition	Pasture composition comprises palatable grasses and legumes appropriate to the district and suitable for cattle grazing	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Grazing productivity	Grazing areas are assessed to have a Rural Land Capability Class VI or better	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Grazing productivity	Grazing areas have comparable productivity to district averages (i.e. carrying capacity).	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
Grazing pasture areas is sustainable for cattle	Grazing productivity and water supply	Suitable water is available to support cattle grazing.	Previous MOP (Consistent with other Glencore operations)	No		Not commenced
	Pasture Species Composition	At least 75% of species surveyed consist of grasses and legumes appropriate to the district and recognised as species suitable for grazing at Year 10 for pasture rehabilitation.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat – 10	Not commenced
	Carrying Capacity	Demonstrated carrying capacity for a specified head of stock per hectare is within 20% of analogue sites at Year 10 for pasture rehabilitation.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat – 11	Not commenced
Domain D – Rehabilitation V	Voodland/Pasture					
	Vegetation Health	More than 75 per cent of trees are healthy and growing as indicated by long term rehabilitation monitoring.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat 9.0	Currently not in this phase
Diverse woodland/pasture rehabilitation	Stems per hectare	Rehabilitation monitoring indicates at least 500 stems per hectare.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat 8.0	Not met - in progress
	Species Composition	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is within 20% of analogue sites at Year 10.	Previous MOP (Consistent with other Glencore operations)	No	Table 9.2 Threat 13.0	Currently not in this phase
	Recruitment and Succession	Evidence of recruitment and succession of both short and long-lived species. Evidence of levels within 20% of analogue sites at Year 10.	Previous MOP (Consistent with other Glencore operations)	No		Currently not in this phase

Objective	Performance Indicator	Completion Criteria	Justification / Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
	Habitat Structures	Rehabilitation monitoring confirms habitat features are incorporated into woodland rehabilitation areas (including rock piles, and coarse woody debris). Features generally consistent with analogue sites.	Previous MOP (Consistent with other Glencore operations)	No		Habitat features are present.

7 Rehabilitation Implementation

7.1 Status at MOP Commencement

Information pertaining to the status of the domains at MOP commencement is shown in **Table 7-1** and presented graphically in **Plan 2**.

Domain	Status at MOP Commencement			
Primary Domain				
Domain 1 – Pit Top Area	This domain is currently active.			
Domain 2 – Ventilation and Gas wells	This domain is currently active.			
Domain 3 – Water Management	This domain is currently active.			
Domain 4 – Current Rehabilitation	Approximately 7.2 hectares of rehabilitation which falls within the Project Approval Area for Integra Underground. This is rehabilitation of an overburden area.			
Domain 5 – Underground Mining Area	This domain is currently active. Minimal subsidence repair is required at Integra Underground due to the depth of cover.			
Secondary Domains				
Secondary Domain A – Subsidence Management Area	At MOP commencement this includes areas of previous subsided land associated with the Integra Underground.			
Secondary Domain B – Water Management Area	No final water management at site at MOP commencement			
Secondary Domain C – Rehabilitation Area (Pasture)	Rehabilitation of gas wells associated with the Integra Underground. Existing rehabilitated gas wells is shown in Plan 2 .			
Secondary Domain D – Rehabilitation Woodland/Pasture	This covers the existing rehabilitation area.			

Table 7-1 Status of Domains at MOP Commencement

7.2 Proposed Rehabilitation Activities during the MOP Term

Rehabilitation activities to be completed during this MOP will be confined to decommissioned gas drainage sites. Information regarding rehabilitation and phases is outlined within **Section 7.2.1 to 7.2.6**.

7.2.1 Phase 1 - Decommissioning

For this MOP period, decommissioning will include the removal of some gas well infrastructure and removal of two buildings near the admin area. No other decommissioning is planned during the MOP period. Current decommissioned gas wells are shown in Plan 2.

An indicative plan of gas drainage is outlined within Plans 3A -3E. HVCC will provide information about completed gas drainage rehabilitation and proposed gas drainage construction and rehabilitation as part of the Annual Review. This updated plan will also outline the proposed locations of anxilliary fans associated with Integra Underground. HVCC are committed to reviewing the status of all gas drainage boreholes across site every quarter.

One building at the pit top will be decommissioned and removed at part of MOP Amendment A.

7.2.2 Phase 2 - Landform Establishment

For this MOP, Landform Establishment involves some subsidence repair, with minor filling and shaping of cracking to being completed within landform establishment phase. All subsidence remediation will be completed in accordance with the approved Extraction Plan-for LW 13 and 14, and future Extraction Plans that cover the mining of LWs 15 to 20. Integra Underground do not believe there will be a requirement for subsidence remediation within LWs 1-12.

Minor shaping will be required of gas well sites which will be decommissioned and rehabilitated during the MOP period.

At final closure extensive shaping would be required within Domain 1 – Pit Top Area.

The criteria, performance measures and indicators for the landform establishment stage is provided for relevant domains in **Section 6**.

7.2.3 Phase 3 - Growth Medium Development

There is a possibility of some minor growth medium development work during the MOP period (use of soil or ameliorants) following the remediation of subsidence. There is a shortage of topsoil at the site, with a requirement to import material such as biosolids at closure to assist with rehabilitation of disturbed areas within Domain 1 (Pit Top Area) and Domain 2 (Ventilation Infrastructure and Gas wells).

Due to a lack of quality topsoil material, a compost will be used to assist with temporary stabilisation of the shaped spoil area which forms part of the Ventilation Infrastructure area.

The criteria, performance measures and indicators for the growing medium development stage are provided for relevant domains in **Section 6**.

7.2.4 Phase 4 - Ecosystem and Land Use Establishment

For this MOP, the Ecosystem and Land use Establishment phase incorporates the rehabilitation of gas well infrastructure not required for future operations.

The general approach for this phase will also include the following considerations though the limited size and nature of the rehabilitation areas may impact on the effective application of available techniques:

- Use of pasture species in rehabilitation;
- Management and control of weed and vertebrate pest species;
- Establishment assessment of land capability and agricultural suitability;
- Optimising carrying capacity and/or stocking rates;
- Appropriate flora species selection in terms of the revegetation programme (seed selection);
- Enhancing opportunities for nutrient cycling;
- Optimising use of onsite resources e.g. woody debris, rock, mulch in terms of habitat creation and/or final land use; and
- Developing and implementing techniques that focus on habitat enhancement including tree hollow salvaging.

The criteria, performance measures and indicators for ecosystem and land use establishment are provided for relevant domains in **Section 6.**

Once the spoil area at the Ventilation Infrastructure area has been shaped and compost material has been added, the area will be stabilised with a seed mix consistent for temporary rehabilitation.

The Ravensworth pasture seed mix is outlined below and includes the proposed species and rates per ha.

- Cooch 5 kg per ha;
- Winter rye 4 kg/ha;
- Sephi medic 4 kg/ha;
- Aurora loosa 3kg/ha;
- Seaton park clover 6kg/ha;
- Panic 6kg/ha;
- Kikuyu 5kg/ha;
- Phalaris grass -10kg/ha; and
- Setaria grass 10kg/ha.

Fertiliser is also added to the seed mix. The majority of future rehabilitation at site will consist of pasture.

A small number of gaswells are proposed to be woodland rehabilitation at closure based on the post mining land use. A common seed mix for woodland species in the Ravensworth area is outlined below.

- Blue Flax Lily 0.1kg/ha;
- Winter Apple 0.1kg/ha;
- False Sarsaparilla 0.1kg/ha;
- Hickory Wattle 0.2kg/ha;
- Sally Wattle 0.3kg/ha;
- Bull Oak 0.1kg/ha;
- Weeping Grass 0.1kg/ha;
- Kangaroo Grass 0.1kg/ha;
- Many flowered mat rush 0.1kg/ha;
- Green Wattle 0.5kg/ha;
- Sickle Wattle 0.5kg/ha;
- Silver Stemmed Wattle 0.3kg/ha;
- Blackthorn 0.1kg/ha;
- Gorse Bitter Pea 0.1kg/ha;
- Grey Bush Pea 0.1kg/ha;
- Spotted Gum 1.3kg/ha;
- Blakely's Red Gum 0.4kg/ha;
- Narrow Leave Ironbark 0.1kg/ha;
- Broadleaf Ironbark 0.5kg/ha;
- Grey Box 0.8kg/ha;
- Forest Red Gum 0.3kg/ha.

The seed mix will depend upon the availability of seed at the time and the advice of a seeding contractor. Integra Underground will continue to liaise with the other nearby Glencore sites regarding the preferred seed mix.

7.2.5 Phase 5 - Ecosystem and Land use Sustainability

For this MOP, Integra Underground does not consider any existing or proposed rehabilitation will be in a stage of Ecosystem and Land use Sustainability as the rehabilitation will likely be within the Phase 4 – Ecosystem and Land Use Establishment.

Ecosystem and Land use Sustainability incorporates the general principles of:

- Development of land use and land capability which is consistent with the surrounding areas;
- Nutrient Cycling;
- Development of land use options that provide optimal and sustainable social and economic benefit to the local community;
- Species diversity and abundance for both flora and fauna;
- · Development of profiles in the growing media; and
- Vegetation communities capable of withstanding catastrophic events e.g. bushfire and extensive drought.

The criteria, performance measures and indicators for ecosystem and land use sustainability are provided for relevant domains in **Section 6**.

7.2.6 Land Relinquishment

There will be no land relinquishment during the period of this MOP.

7.2.7 Summary of Proposed Rehabilitation

A description of proposed disturbance and rehabilitation during the MOP period is outlined below.

Year	Total Disturbance Area (ha) (per MOP year)	Cumulative Disturbance Area (ha)	Total Rehabilitation Area (ha) (per MOP Year)	Cumulative Rehabilitation Area (ha)	Comments
Start of MOP	91.0 100.3	91.0 100.3	12.6 13.1	12.6 13.1	Rehabilitation at MOP Commencement includes Domain 4 (Current Rehabilitation Area) and approximately 5.4ha 9ha of the gas wells.
					May 2019 review included additional gaswell disturbance. Disturbance includes Domain 1-3 in Table 7.3 which has been reviewed for the May 2019 document review.

Table 7-2 Indicative Rehabilitation and Disturbance Rates during the Life of the MOP

Year	Total Disturbance Area (ha) (per MOP year)	Cumulative Disturbance Area (ha)	Total Rehabilitation Area (ha) (per MOP Year)	Cumulative Rehabilitation Area (ha)	Comments
End of	28.3 2 8.9 6.8	119.3 127.1	To be confirmed in	To be confirmed	Includes:
2019			Annual Review plans	n Annual Review plans	Ventilation facility (additional 22.7ha);
					Additional water management (0.1ha 7427m ² (0.74ha); inclusive of the dewatering associated with Hebden seam 2,500m ² (0.25ha).
					Additional gas wells (proposed 20 5 gas wells – approximately 3.20 .8ha); and
					Disturbance for powerline road (2.3 ha).
End of 2020	To be confirmed	l in Annual Review	Includes additional gas wells and goaf drainage area (additional 4.0ha) .		
End of 2021	To be confirmed	in Annual Review	Includes additional gas wells and tracks.		
End of 2022	To be confirmed	in Annual Review		Includes additional gas wells and tracks.	
End of 2023	To be confirmed in Annual Review plans	121.6 122.3	To be confirmed in Annual Review plans	25.7	Indicative only at this point. Rehabilitation based on approximately 18.5 ha of rehabilitated gas wells and 7.2ha of Domain 4 (Current Rehabilitation Area).
					Estimated disturbance summary includes:
					 66.7ha of pit top; 51.1ha of ventilation area and gas drainage as active; and 3.8 4.5ha of water management.

An indicative plan of gas drainage is outlined within Plans 3A -3E. HVCC will provide details about completed gas drainage rehabilitation and proposed gas drainage construction and rehabilitation as part of the Annual Review. HVCC are committed to reviewing the status of all gas drainage boreholes across site every quarter.

Subsidence areas have not been shown as 'disturbance' within the table above as the site has had minimal requirements for subsidence remediation due to the depth of cover from mining.

7.3 Summary of Rehabilitation Areas during the MOP Term

Limited rehabilitation works will be undertaken during the term of the MOP. Work will primarily be carried out at decommissioned gas well sites. **Table 7-3** below summarises the rehabilitation domains at the start and end of the MOP term.

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at the start of the MOP (ha)	Area at the end of the MOP (ha)	Comment
		1C	Active	65.9	66.7	Small increase to pit top area.
			Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
Pit Top Area (1) Rehabilitation Area – Pasture (C)	Rehabilitation Area – Pasture (C)		Ecosystem and Land Use Establishment	0	0	
			Ecosystem and Land Use Sustainability	0	0	
			Land Relinquishment	0	0	
		Total	65.9	66.7		
Pit Top Area	Total:	1	r	65.9	66.7	
Ventilation Infrastructur e and Gas wells 2)	Rehabilitation – Pasture (C)	2C	Active	2 1.4 4.7	51.1	Currently (Plan 2) this domain
			Decommissioning	0	0	Includes ventilation area
			Landform Establishment	0	0	active and 5.4ha 9ha rehabilitated gaswells) and approximately 2ha of tracks tracks.
			Growth Medium Development	0	0	
			Ecosystem and Land Use Establishment	5. <mark>9</mark>	17.1	The proposed disturbance and rehabilitation in this domain for
			Ecosystem and Land Use Sustainability	0	0	Plan 3E (End of MOP).

Table 7-3 Indicative Rehabilitation and Disturbance Rates during the MOP Term

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at the start of the MOP (ha)	Area at the end of the MOP (ha)	Comment
			Land Relinquishment	0	0	 2 x ventilation areas (total of 32.2 ha); Goaf drainage area = 4ha; Active gas wells (approximately 57 wells = 9.1ha). Tracks for gas drainage = 3.5ha (assuming others remain from earlier panels); and Powerline track – 2.3ha. Estimated rehabilitated gaswells Plan 3E = 18.5ha (estimate of 17.1 ha pasture and 1.4 ha woodland) The total area for rehabilitated gaswells is an estimate and updates will be provided annually to the Resources Pagulater
			Total	30.6 26.8	68.2	
			Active	0	0	
	Rehabilitation – Woodland/Past ure (D)	2D	Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
Ventilation Infrastructur e and Gas wells 2)			Ecosystem and Land Use Establishment	0	1.4	Estimated rehabilitated gaswells = 18.5ha (estimate of 16.8 ha pasture and 1.7 ha woodland)
			Ecosystem and Land Use Sustainability	0	0	
			Land Relinquishment	0	0	
Ventilation In	frastructure and G	Sas wells	Total:	26.8 30.6	69.6	
Water Management Area (3)			Active	3.7 3.8	3.8 4.3	Additional for the new
			Decommissioning			Ventilation Facility. This has
	Water Management Area (A)	ЗА	Landform Establishment	0	0	size of the water management
			Growth Medium Development			Hebden Seam Gas Drainage
			Ecosystem and Land Use Establishment			= $2,500m^2$ and run off pond $2570m^2$

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at the start of the MOP (ha)	Area at the end of the MOP (ha)	Comment
			Ecosystem and Land Use Sustainability Land Relinquishment	37 38	2843	
Water Manage	ement Area Total:		. olui	3.7 3.8	3.8 4.3	
			Active	0	0	
			Decommissioning	0	0	
			Landform Establishment	0	0	
			Growth Medium Development	0	0	
Current Rehabilitatio n Area (4)	Rehabilitation Area - Woodland/ Pasture	4D	Ecosystem and Land Use Establishment	7.2	7.2	There is an area of existing rehabilitation near the pit top. No proposed change during the MOP period.
			Ecosystem and Land Use Sustainability	0	0	
			Land Relinquishment	0	0	
			Total	7.2	7.2	
Current Reha	bilitation Area To	tal:	1	7.2	7.2	
	Subsidence Management Area	5A	Active	564.9	836.0	LW 1-14 (current location) area is 564.9 ha. Remaining area until end of MOP = 271.1 ha
			Decommissioning Landform		N/A	
Underground Mining Area (5)			Establishment Growth Medium Development			
			Ecosystem and Land Use Establishment	N/A		
			Ecosystem and Land Use Sustainability			
			Land Relinquishment			
		Total	564.9	836.0		
Underground Mining Area Total:			564.9	836.0		
TOTAL of all Domains (ha)				672.4 668.5	983.8 983.8	

7.4 Relinquishment Phase achieved during MOP Period

There will be no land relinquishment during the period of this MOP.

8 Rehabilitation Monitoring and Research

8.1 Rehabilitation Monitoring

Ongoing monitoring and maintenance of rehabilitation areas at Integra Underground will be conducted in accordance with the **Table 8-1**. The overarching objectives of the rehabilitation monitoring program are to:

- Assess the long term stability and functioning of re-established ecosystems on mine affected land;
- Assess rehabilitation performance against the performance indicators and closure criteria; and
- Facilitate continuous improvement in rehabilitation practices.

The rehabilitation monitoring programme for this MOP has been developed specifically in relation to threats to rural pasture establishment and comprises assessment of:

- Evidence of erosion, potholing or slumping;
- Evidence of contamination or other limitations to vegetative establishment;
- Pasture species diversity;
- Evidence of soil profile development; and
- Threats to rehabilitation success, such as the presence of weeds or pests.

8.1.1 Rehabilitation Monitoring Locations

Rehabilitation monitoring at Integra Underground was completed in 2017 by AECOM. This was the first year of data collection and as such established baseline conditions of existing rehabilitated lands across the site.

Rehabilitated Gas wells

Given the small size of the disturbance footprint within the gas well sites (and subsequently the limited amount of land rehabilitation), the monitoring methodologies defined in both the BMP and in GCAA's '11.16 – Completion Criteria and Rehabilitation Monitoring' for pasture rehabilitation monitoring (i.e. using nested quadrats along a linear transect line) were deemed inadequate in view of the actual ground conditions. Instead, it was decided to adopt a 10m x 10m plot size, which was considered more suitable (AECOM 2018). The data collected, sampling area and sampling effort within the established 10m x 10m plots all met or exceeded the monitoring requirements in the aforementioned documents.

At each of the rehabilitated Gas well sites and as far as possible, the 10m x 10m plot was established to fit fully within the disturbance / rehabilitated area. The rehabilitation monitoring results, along with any remedial works required, will be summarised in the Annual Review. Annual reviews will be conducted of rehabilitation monitoring data to assess trends and monitoring programme effectiveness.

Table 8-1 outlines the monitoring elements to be assessed to determine the level of achievement against the performance indicators.

Aspect of Rehabilitation	Elements to be Monitored	Monitoring Frequency
Review of quality of rehabilitation	Describe the pasture species diversity (e.g. evidence of target species present, note dominant species).	Annually
	Photographic record	Annually
	Signoff of rehabilitation as part of the Glencore Surface Disturbance Permit.	Following successful rehabilitation
Weeds and pests	Species identity. Approximate numbers/density of infestation. Observations of impact on rehabilitation (if any).	Quarterly during the first two years and biennially after that.
Erosion	General observations relating to soil stability, existing erosion/riling, groundcover, water drainage in the vicinity and unauthorised access to the rehabilitated areas (e.g. unauthorised access track through area).	Quarterly for first year and then yearly. Inspections should also be opportunistic after significant rainfall events.

Analogue Monitoring Locations

Three analogue pasture sites were established and monitored as part of the 2017 monitoring program (AECOM 2018).

These were established in areas of undisturbed native pastures located within the Integra Underground project boundaries and selected to be representative of the local type and condition of grazing lands in the area. Consideration was also given to evidence of subsidence impacts when selecting the areas for analogue pasture sites establishment.

Monitoring sites located in areas of undisturbed native woodland vegetation community had been recently established and monitored as a requirement of the BMP. The data collected at these sites has been also been used for the purpose of this rehabilitation monitoring program, including the two monitoring sites located in areas of Spotted Gum – Ironbark Forest.

Monitoring sites located in areas of undisturbed native woodland vegetation community had been recently established and monitored by SLR Consulting as a requirement of the BMP. The data collected at these sites has been used for the purpose of this rehabilitation monitoring program, including the two monitoring sites located in areas of Spotted Gum – Ironbark Forest (coded SG01 and SG02 in the SLR report).

Rehabilitation Monitoring Locations

In late 2015, HVCC (a 100% Glencore-owned company) acquired all assets associated with the Integra Underground, which had been placed in care and maintenance in May 2014. As part of the new ownership existing environmental records have been reviewed, with there was no evidence of rehabilitation monitoring being completed on the area of 'Current Rehabilitation' - Domain 4. Two monitoring sites were established within this domain during the 2017 monitoring (AECOM 2018). The location of the two monitoring sites were randomised prior to field deployment in order to remove potential operator's bias associated with monitoring site placement in the field. The following considerations were adhered to during the monitoring sites placement:

- Sites were located no closer than 50 metres from a track/road or other disturbance areas, and no closer than 20 metres from the rehabilitation patch perimeter boundary; and
- Sites were located at least 100 metres apart.

A standard monitoring plot design for native vegetation will be used in Domain 4, with this being consistent with the BioBanking Assessment Methodology 2014 (NSW Office of Environment and Heritage, 2014).

Each established monitoring site consisted of a 50 metre linear transect with an associated 20m x 20m plot, as represented graphically in Figure 8-1. The 50m transect was located along the contour (i.e. across the slope as opposed to up-down the slope) and delineated with wooden pickets established at the start and end points.

Based on the results of the rehabilitation monitoring, some criteria within Section 6 may need reviewing, with this to be completed in consultation with the DRE.



Figure 8-1 Rehabilitation Monitoring Plot for Native Vegetation

Results of rehabilitation monitoring are outlined in the Annual Review. The rehabilitation monitoring classifies monitoring locations as satisfactory, areas requiring additional maintenance and areas classified as poor. HVCC commits to improving rehabilitation areas through continued maintenance and adaptive management. Integra Underground continues to liaise with neighbouring Glencore operations regarding methodologies for undertaking rehabilitation as well as rehabilitation monitoring. Glencore aims to use a consistent seed mix across the Ravensworth operations.

9 Intervention and Adaptive Management

9.1 Threats to Rehabilitation

Events that cannot be predicted may present risks to Integra Underground rehabilitation, these may include:

- Climate change;
- Bushfire;
- Drought;
- Flood;
- Dam failure;
- Major landform deformation due to geotechnical instability;
- Changes to regulatory requirements;
- Infestations of destructive species; or
- Malicious damage.

An event such as those listed above could have substantial consequences for rehabilitation value and are likely to require effective recovery practices to limit the harm, control the risks and to rebuild the rehabilitation to achieve satisfactory performance criteria within a reasonable timeframe to achieve relinquishment. A summary of threats to rehabilitation is outlined in **Table 9-1**.

Table 9-1 Threats to Rehabilitation

Threat	Measurable Contributing Factors
Climate change	Severe stormsDeparture from average predicted weather
Severe bushfire	 Prolonged low rainfall, high temperatures and prevailing winds High fuel loads
Drought	Prolonged periods of little to no rainfallWind
Flood	 Severe storm and/or prolonged rainfall Glennies Creek Dam at or near capacity Blocked or modified drainage systems
Dam failure	Glennies Creek Dam is upstream of Integra Underground
Landform deformation	 Mine subsidence Geotechnical failure of slopes and highwalls Spontaneous combustion Significant erosion Dispersive material
Regulatory changes	 Change of government Changes to community perceptions
Infestations	 Introduced exotic and invasive species Poorly managed pest and feral animal control
Malicious damage	 Act of wilful destruction Inadvertent destruction via an accident
9.2 Trigger Action Response Plan

In preparation to counter the threats to rehabilitation, Integra Underground have documented a high-level Trigger Action Response Plan (TARP). The aim of the TARP is to provide a basis from which to foresee potential harm to the environment and rehabilitation, to take reasonable measures to address the risk and to escalate control actions as required to safeguard the desired outcomes.

The TARP:

- Summarises the key risks;
- Identifies the measurable data that is to be monitored;
- Outline the trends that require additional awareness; and
- Outlines appropriate tiered controls that may be implemented.

Some performance indicator data intrinsically has a high degree of variability either due to the nature of what is being measured or because of the limitations of effectively capturing representative quantitative and qualitative data to describe the performance of a complex interrelated system. The Integra Underground TARP identifies trends in data rather than actual trigger points because the former implies a change over time and the latter may lead to unnecessary responses due to sporadic data.

Trending data is used to give an early or preliminary indication that environmental harm may be possible because the performance measure has diverged from the desired completion criteria.

The purpose of the TARP is to initially identify the requirement for closer monitoring or early intervention that may mitigate potential impacts before damage occurs or increases to an unacceptable level. TARPS will be reviewed and may be revised as conditions change or if any new risks to rehabilitation are identified. Key quantitative criteria from **Section 6** have been included as 'Normal Triggers' in **Table 9-2**.

Table 9-2 TARP for Rehat	oilitation
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	Threat	Data or Observational Level Trigger	Trigger	Action				
1. Landform Deformation		Normal	Landform stable with adequate water/erosion and sediment controls in place. Final landform shape adequate as assessed by surveyor and/or environmental representative. Any surface cracking due to subsidence has been rehabilitated by re-grading to seal cracks.	Continue landform shaping in accordance with site Plans and Procedures.				
		Level 1 Trigger	Observations of minor: erosion and sediment transport, topsoil loss, poor groundcover, cracking/slumping, ponding and diminished water drainage, vegetation disturbance, soil loss and disturbance.	Implement measures as required: Establish survey observation pattern or alternative monitoring system such as wireline extensimeter Modify drainage lines to ensure the system performs as required. Install ESC devices to reduce flow velocities and scour. If practical, re-grade to reduce flow velocities and introduce rock- lined drop structures to eliminate scour. If practical, reapply topsoil to reshaped areas. If practical, implement soil regeneration methods such as mulching and re-spreading. Revegetate if required.				
		Level 2 Trigger	Sudden change in landform. Observations of major: erosion and sediment transport, topsoil loss, diminished groundcover, cracking/slumping, ponding and diminished water drainage, vegetation disturbance, soil loss and disturbance.	Implement additional measures as required: Assess risk to safety and environment. Barricade and demarcate exclusion areas. Develop a recovery plan.				
2. Slope Gradient		Normal	All rehabilitated slopes are less than 10 degrees (or are between 10 and 14 degrees with Resources Regulator approval).	No response required. Continue monitoring program				
		Level 1 Trigger	Rehabilitated overburden areas have slopes >10° but <14°. Slope angles not approved by the Resources Regulator.	Undertake regrading and revegetation of the area if it is not designed to be $>10^{\circ}$.				

Threat	Data or Observational Level Trigger	Trigger	Action
	Level 2 Trigger	Slopes above 14 degrees.	Undertake a review of the landform design, including survey if required. Undertake regrading and revegetation of the area, if required.
3. Gully Erosion	Normal	Monitoring verifies there are no gully or tunnel erosion features, or rill greater than 200mm deep.	No response required. Continue monitoring program.
	Level 1 Trigger	Erosion greater than 200mm deep but less than 300mm deep.	A suitably trained person to inspect the site. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.
	Level 2 Trigger	Erosion greater than 300mm deep.	Undertake a review of the drainage of the area and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable.
4. Topsoil Depth	Normal	Topsoil or suitable alternative has been spread uniformly at a depth of 100mm. Topsoil testing is completed for rehabilitation areas prior to spreading. Soil characteristics such as pH, EC and erosion and sediment control potential are within 20% of analogue sites.	No response required.
Level 1 Trigger Topsoil ouniformly character sediment analogue Level 2 Trigger Topsoil ouniformly character sediment outside th		Topsoil or suitable alternative has been spread uniformly at a depth between 50 to 100mm. Soil characteristics such as pH, EC and erosion and sediment control potential are within 30% of analogue sites.	Investigate options and alternatives (e.g. OGM) to be able to meet additional topsoil requirements.
		Topsoil or suitable alternative has been spread uniformly at a depth less than 50mm. Soil characteristics such as pH, EC and erosion and sediment control potential is greater than 30% outside the range of analogue sites.	Source and budget for purchasing topsoil for use in rehabilitation. Investigate use of alternatives such as OGM. No seeding of area until additional ameliorates have been spread across the proposed rehabilitation area.

	Threat	Data or Observational Level Trigger	Trigger	Action				
5.	Soil Quality – Year 5 (following rehabilitation)		Soil characteristics are within the range of analogue sites, including: Testing verifies that pH is within 0.5 of analogue sites or between 6 and 8 at Year 5.					
		Normal	Nitrogen, potassium and phosphorus are within 20% of analogue sites at Year 5. Testing verifies that EC of surface soils is below	No response required. Continue monitoring program.				
			1000 mS/cm at Year 5. Testing indicates that organic carbon levels are broadly trending toward 20% of levels at reference sites at Year 5.					
		Level 1 Trigger	Soil monitoring indicates that results for one or more of these parameters are less than 15% from analogue sites.	Continue monitoring. Investigation into improving soil quality using ameliorants.				
		Level 2 Trigger	Soil monitoring indicates that results for one or more of these parameters are greater than 15% from analogue sites.	Continue monitoring. Investigation into improving soil quality us ameliorants. Engage soil specialist to provide advice.				
6.	Soil Quality – Year 10	Normal	Soil characteristics (pH, EC and erosion and sediment control potential) are in the range within 20% of the levels of analogue sites at Year 10 of rehabilitation.	No response required. Continue monitoring program.				
		Level 1 Trigger	Soil characteristics (pH, EC and erosion and sediment control potential) are in the range between 20% and 30% of the levels of analogue sites at Year 10 of rehabilitation.	Continue monitoring. Investigation into improving soil quality using ameliorants.				
		Level 2 Trigger	Soil characteristics (pH, EC and erosion and sediment control potential) are greater than 30% off the levels of analogue sites at Year 10 of rehabilitation.	Continue monitoring. Investigation into improving soil quality using ameliorants. Engage soil specialist to provide advice.				
7.	Poor Groundcover - Year 5	Normal	Rehabilitation monitoring indicates that ground cover (vegetation, leaf litter, mulch) greater than 70% when in the Ecosystem and Landuse Establishment Phase.					

Threat	Data or Observational Level Trigger	Trigger	Action				
			Undertake a field survey to identify likely causes of unsatisfactory germination rates.				
	Level 1 Trigger	Rehabilitation monitoring indicates less than 70%,	Determine if additional work is required, or if rehabilitation will improve with general maintenance.				
		but greater than 50% ground cover.	Re-seed areas with unsatisfactory cover.				
			Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.				
	Lovel 2 Trigger	Rehabilitation monitoring indicates less than 50%	Undertake analytical soil testing and evaluation, Where appropriate implement recommendations for amelioration				
		groundcover.	Implement appropriate management actions including revising rehabilitation procedures if required.				
8. Poor Survival - Year 5	Normal	At the end of the ecosystem and landuse establishment phase, monitoring of woodland rehabilitation (current rehabilitation) indicates at least 500 stems per hectare.	No response required. Continue monitoring program.				
		At the end of the ecosystem and landuse	Undertake a field survey to identify likely causes of unsatisfactory germination and survival rates.				
	Level 1 Trigger	establishment phase, monitoring of woodland rehabilitation (current rehabilitation) indicates less	Determine if additional work is required, or if rehabilitation will improve with general maintenance.				
		than 500 stems per hectare, but greater than 350 stems per bestare	Possibly consider additional tube stock planting.				
			Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.				
		At the end of the ecosystem and landuse establishment phase, monitoring of woodland	Undertake analytical soil testing and evaluation, Where appropriate implement recommendations for amelioration.				
	Level 2 mggel	rehabilitation (current rehabilitation) indicates less than 350 stems per hectare.	Implement appropriate management actions including revising rehabilitation procedures if required.				
9. Poor Survival – Year 10	Normal	More than 75% of trees are healthy and growing as indicated by long term rehabilitation monitoring.	No response required. Continue monitoring program.				

Threat	Data or Observational Level Trigger	Trigger	Action			
	Level 1 Trigger	Less than 75% but greater than 60% of trees are healthy and growing as indicated by long term rehabilitation monitoring.	Undertake a field survey to identify likely causes of unsatisfactory germination and survival rates. Determine if additional work is required, or if rehabilitation will improve with general maintenance. Possibly consider additional tube stock planting of eucalypt species. Review seeding procedures including seasonal mixes, timing and seed rate per hectare.			
	Level 2 Trigger Less than 50% of trees are healthy and g indicated by long term rehabilitation monit	Less than 50% of trees are healthy and growing as indicated by long term rehabilitation monitoring.	Undertake a field survey to identify likely causes of unsatisfactory germination and survival rates. Undertake analytical soil testing and evaluation, Where appropriate implement recommendations for amelioration. Implement appropriate management actions including revising rehabilitation procedures if required. Engage a rehabilitation specialist. Review all rehabilitation and analogue monitoring results to determine reasons for rehabilitation failure.			
10. Pasture Species Composition - Year 10	Normal At least 75% of species surveyed consist of grasses and legumes appropriate to the district and recognised as species suitable for grazing at Year 10 for pasture rehabilitation.		No response required. Continue monitoring program.			
	Level 1 Trigger	Between 50% and 75% of species surveyed consist of grasses and legumes appropriate to the district and recognised as species suitable for grazing at Year 10 for pasture rehabilitation.	Continue monitoring program. Comparison of rehabilitation with analogue sites and other nea Glencore operations. Seed mix review.			
	Level 2 Trigger Less than 50% of species surveyed consist of grasses and legumes appropriate to the district and recognised as species suitable for grazing at Year 10 for pasture rehabilitation.	Continue monitoring program. Comparison of rehabilitation with analogue sites and other nearby Glencore operations. Seed mix review. Engage a rehabilitation specialist. Potential to complete additional rehabilitation or seeding to improve diversity.				

Threat	Data or Observational Level Trigger	Trigger	Action				
11. Pasture Species Composition - Year 10	Normal	Demonstrated carrying capacity for a specified head of stock per hectare is within 20% of analogue sites at Year 10 for pasture rehabilitation.	No response required. Continue monitoring program. Consider grazing trials.				
	Level 1 Trigger	Demonstrated carrying capacity for a specified head of stock per hectare is within between 20% to 30% of analogue sites at Year 10 for pasture rehabilitation.	Continue monitoring program. Comparison of rehabilitation with analogue sites and other nearby Glencore operations. Review of grazing program e.g. Areas, number of cattle.				
	Level 2 Trigger	Demonstrated carrying capacity for a specified head of stock per hectare is greater than 30% of analogue sites at Year 10 for pasture rehabilitation.	Continue monitoring program. Comparison of rehabilitation with analogue sites and other nearb Glencore operations. Review of grazing program e.g. Areas, number of cattle. Soil testing program and potential use of ameliorants to improv carrying capacity.				
12. Failure of rehabilitation – Groundcover - Year 10	Failure of rehabilitation – Ground cover (vegetation, leaf litter, mulch) Groundcover - Year 10 Ground cover (vegetation, leaf litter, mulch)		No response required. Continue monitoring program.				
	Level 1 Trigger	Groundcover meets some criteria of analogue sites but fails to meet all criteria.	Undertake a field survey to identify likely causes of unsatisfactory germination and/or growth rates. Re-seed areas with unsatisfactory cover. Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare.				
	Level 2 Trigger	Groundcover fails to meet all the criteria of analogue sites.	Undertake analytical soil testing and evaluation. Where appropriate implement recommendations for amelioration. Implement appropriate management actions including revising rehabilitation procedures if required.				
13. Rehabilitation Diversity – Woodland/grassland - Year 10	Normal	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is within 20% of analogue sites at Year 10.	No response required. Continue monitoring program.				

Threat	Data or Observational Level Trigger	Trigger	Action				
	Level 1 Trigger	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is between 20% to 30% of analogue sites at Year 10.	Undertake a field survey to identify likely causes of unsatisfactory diversity. Re-seed areas or plant tube stock to improve diversity. Review seeding procedures including seasonal mixes, timing and seed rate per hectare.				
	Level 2 Trigger	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is greater than 30% outside the desired analogue sites at Year 10.	Undertake a field survey to identify likely causes of unsatisfactory diversity. Re-seed areas or plant tube stock to improve diversity. Review seeding procedures including seasonal mixes, timing and seed rate per hectare. Engage a rehabilitation specialist to advice on ways to improve diversity. Soil assessment may be required.				
14. Rehabilitation Succession	Normal	Evidence of recruitment and succession of both short and long lived species. Evidence of levels within 20% of analogue sites at Year 10.	No response required. Continue monitoring program.				
	Level 1 Trigger	Some evidence of recruitment and succession of both short and long lived species. Evidence of levels greater than 20% from analogue site levels at Year 10.	Undertake a field survey/monitoring to identify likely causes of the lack of recruitment and succession. Engage a rehabilitation specialist to advice on ways to improve diversity. Soil assessment may be required.				
	Level 2 Trigger	No evidence of recruitment and succession for both short and long lived species.	Undertake a field survey/monitoring to identify likely causes of unsatisfactory diversity. Engage a rehabilitation specialist to advice on ways to improve diversity. Soil assessment may be required. Consider rehabilitation trials and use of ameliorants for future rehabilitation.				
15. Infestations (Weed/Pests) NormalLess than 10% of the reh as weeds. Weeds within r analogue sites.		Less than 10% of the rehabilitation area classified as weeds. Weeds within rehabilitation compared to analogue sites.	Continue with normal weed and pest management procedures.				
	Level 1 Trigger	Increase of colonies, clusters, nests, wildlife deaths, vegetation degradation. Trapping quantities slightly increase (flora/fauna surveys).	Photographs and mapping of recordings. Review topsoil management techniques. If practical decrease the time between landform establishment and seeding.				

Threat	Data or Observational Level Trigger	Trigger	Action
	Level 2 Trigger	Increase of colonies, clusters, nests, wildlife deaths, vegetation degradation. Trapping quantities significantly increase (flora/fauna surveys).	Cooperation/reporting to regulatory bodies. Increased frequency and intensity of weed/pest control programmes. If practical, undertake re-seeding with robust native species and support with fertilisation. Implement, where practical, quarantine practices such as light vehicle wash-downs, boot cleaning and access prohibition. Implement suggested preventative actions to reduce transmission.

10 Reporting

10.1 Annual Review

An Annual Review report is required to be prepared for Integra Underground as per Schedule 5, Condition 11 of PA 08_0101 and relevant mining lease conditions.

The Annual Review includes a summary of rehabilitation monitoring and reporting (including subsidence remediation) and is sent to the Resources Regulator, DPE, OEH and other relevant stakeholders. The Annual Review is also publicly available on the Integra Underground website.

The Annual Review will contain additional details regarding the mine layout, exploration and gas drainage during each calendar year, as well as planning for the next calendar year's activities.

10.2 Incident Reporting

Non-compliances and incidents will be reported within the Annual Review and EPL Annual Return. If an incident causes or threatens serious environmental harm, then incident management and reporting will be completed as per the Pollution Incident Response Management Plan.

Further details of incident reporting can be found in the Integra Underground EMS.

10.3 Extraction Plan

Reporting required by the approved Extraction Plan for LW 13 and 14 will be undertaken. This is described in the Subsidence Monitoring Program within the Extraction Plan. This includes Annual Review reporting and incident reporting consistent with **Section 10.1** and **Section 10.2** above. Further, reporting required by the approved Extraction Plan may include bi-monthly subsidence reporting (if new impacts are identified), and six-monthly subsidence reporting, to the Resources Regulator and DPIE. Future Extraction Plans will be completed covering the mining of LWs 15-20.

11 Plans

The following MOP Plans have been prepared for this MOP and have been included as **Appendix 1**:

- Plan 1A Pre-Mining Environment Project Locality
- Plan 1B Pre-Mining Environment Natural Environment
- Plan 1C Pre-Mining Environment Built Environment
- Plan 2 Mine Domains at Commencement of MOP (Updated based on April 2019 GIS)
- Plan 2-1 Mine Domains at Commencement of MOP Pit Top Area
- Plan 2-2 Mine Domains at Commencement of MOP Ventilation Area Infrastructure
- Plan 3A Mining and Rehabilitation End of 2019
- Plan 3A-1 Mining and Rehabilitation Pit Top Area Year 1 End of 2019
- Plan 3A-2 Mining and Rehabilitation Ventilation Area Infrastructure Year 1 End of 2019
- Plan 3B Mining and Rehabilitation End of 2020
- Plan 3C Mining and Rehabilitation End of 2021
- Plan 3D Mining and Rehabilitation End of 2022
- Plan 3E Mining and Rehabilitation End of 2023
- Plan 3E -1– Mining and Rehabilitation End of 2023
- Plan 3E -2 Mining and Rehabilitation End of 2023
- Plan 4 Final Rehabilitation and Post Mining Land Use
- Plan 4-1 Final Rehabilitation and Post Mining Land Use Pit Top Area
- Plan 4-2 Final Rehabilitation and Post Mining Land Use Ventilation Area Infrastructure
- Plan 5 Final Rehabilitation and Post Mining Land Use Cross Sections

All MOP plans were updated for MOP Amendment B to reflect an amendment to the project approval boundary and CL 382 boundary, a small change to Plan 3B to include five additional gas wells in place in 2020 (LW17), as well as the addition of ML 1786, ML 1740 and ML 1742.

12 Review and Implementation of the MOP

12.1 Review of the MOP

This MOP has a term of five years and two months, with the site not intending to undertake a review of the MOP unless there is a change in circumstances for the mine.

This MOP will be reviewed and revised in accordance with Schedule 5, Condition 6 of PA 08_0101.

12.2 Implementation

Key roles for the Operations Manager and the Environment and Community Manager are outlined in **Table 12-1** below.

Title	Responsibility
Operations Manager	Provide resources required and support to implement this MOP Implement the processes referenced in this MOP
Environment and Community Manager or delegate	Implement, monitor and review the processes referenced in this MOP Consult with regulatory authorities as required Undertake monitoring as required Undertake maintenance as required Report the progress of any rehabilitation and monitoring of biodiversity in the Annual Review

Table 12-1 Responsibilities for the Implementation of the MOP

13 Appendices

Appendix 1 – MOP Plans

Appendix 2 – Risk Assessment

Copies of key statutory information can be found on the following link:

www.glencore.com.au/IntegraUnderground

APPENDIX 1 – MOP Plans (Included separately due to file size)

APPENDIX 2 – Risk Assessment

Integra Underground Ris	sk Assessment D <mark>GLENCORE</mark>
Project Name:	Integra Underground MOP
Date of BBRA:	24-08-2018
Risk Assessment Name	Integra Underground MOP MOP Risk Assessment
Scope of Risk Assessment	
This risk assessment is to review the Broad Bush Risk Assessment that was existing broad brush risk assessment for the site.	conducted in 2018. The risk assessment involved reviewing the
Objectives	
Identify relevant environment and community risks associated with the Inte	gra Underground during the MOP period.

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify th	ne risks, causes and poten	ntial consequences	Identify the existing controls to manage the identified risks		Treat the Risks			
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Consequence Category	Expected Risk Conseque nce	Risk Likelihood	Current Risk Rating	Treatment plans/tasks (Description)
Clearance of land/vegetation Construction Drilling UG Coal Mining Rehabilitation	Air Quality - Dust	Air Emission - Dust	Health Impacts	Excessive Dust Uncontrolled Dust Ineffective dust controls High dust levels at private receptors	Water cart part of contract Minimise land disturbance Consider weather condition (hot days AQGHG Management Plan GCAA Generic Induction and Site Familisation Wet drilling operation Geological conditions Location of works/ proximity to neighbours	Environment	1	С	4	
UG Coal Mining	Air Quality - Odour	Air Emission / Other Odour from Spontaneous Combustion	Community complaints / mistrust	Spontaneous combustion Long stockpile duration Flaring / combustion	AQGHG MP Air Quality TARP Spontaneous Combustion Management Plan	Environment	2	E	3	
Clearance of land/vegetation UG Coal Mining Rehabilitation	Biodiversity - Flora and Fauna	Damage / Impact to protected or unprotected species or vegetation communities	Fauna killed / impacted Habitat destroyed	Unauthorised clearing of vegetation Inappropriate tree felling process Subsidence	E&C team member present during tree felling Minimise land disturbance Demarcation/ pegging of GDP areas Fencing of the HMA Biodiversity MP Ecological assessments/ due diligence GIS spatial database GDP Procedure Tree Felling Procedure GDP Permit GCAA Generic Induction and Site Familiarisation Annual monitoring	Environment	2	D	5	
Clearance of land/vegetation	Biodiversity - Flora and Fauna	Unapproved land clearance - on lease or off lease	Impact / Inhibit Business Process / Operations - delays / stoppages / costs	Misunderstanding of approvals Poor contractor management	Fencing approval boundaries when in proximity to GDP area GDP Procedure GDP Permit GIS Spatial Data Management Plan GIS Spatial data system	Legal & Compliance	2	D	5	

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Consequence Category	Expected Risk Conseque nce	Risk Likelihood	Current Risk Rating	Treatment plans/tasks (Description)
Clearance of land/vegetation UG Coal Mining Rehabilitation	Cultural / European Heritage	Cultural / Eurpean Heritage area impacted or destroyed	Community Complaints / Fines	Unauthorised clearing of land Subsidence	Fencing of heritage sites in proximity to GDP areas Salvage of sites Aboriginal Heritage Management Plan Historic Heritage Management Plan Ecological assessments/ due diligence GDP Procedure GDP Permit GIS Spatial Data Management Plan GIS Spatial data system GCAA Generic Induction and Site Familiarisation	Community/Rep utation	2	D	5	
Clearance of land/vegetation UG Coal Mining Rehabilitation	Surface Water	Contamination or poor quality surface water	Water quality impact or deterioration	Unauthorised clearing of land No, or ineffective, E&SC Subsidence	E&SC (e.g. sed fence) in place prior to clearing of land (requirement of GDP) Minimise land disturbance Consider waterway proximately in planning Water Management Plan, including E&SC GDP Procedure GDP Permit GDP inspections (E&C presence during clearing) Rainfall inspections	Environment	2	D	5	
UG Coal Mining	Surface Water	Uncontrolled release (failure / overflow) - outside contained catchment, going offsite	Water quality impact or deterioration	Insufficient pumping infrastructure	Pumps and pipelines Water Management Plan Operational Water Management Plan Water monitoring Quarterly dam inspection Rainfall inspections	Environment	2	С	8	
UG Coal Mining	Surface Water	Shortage of surface water supply to business - lower than low-level storage target	Insufficent water for operations	Lack of water licencing Lack of water storage	High security water licences Ability to share MOC water licence under approval Water MPs	Legal & Compliance	2	D	5	

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Consequence Category	Expected Risk Conseque nce	Risk Likelihood	Current Risk Rating	Treatment plans/tasks (Description)
Clearance of land/vegetation Rehabilitation	Soil type and suitability	Shortfall / Deficit in required cap / cover or growth medium / topsoil for closure	Impact / Inhibit Business Process / Operations - delays / stoppages / costs	Poor topsoil stripping, handling and stockpiling	E&SC around topsoil stockpiles Minimise land disturbance (geofab/gravel over topsoil) GDP Procedure GDP Permit GDP inspection Topsoil Management Strategy	Financial	1	В	7	
Clearance of land/vegetation Construction Drilling UG Coal Mining Rehabilitation	Noise / Vibration	General mine noise	Health Impacts	Earthmoving equipment Surface Infrastructure Ineffective noise controls High noise levels at private receptors	Noise Management Plan Noise monitoring Adherence to Industrial Noise Guidelines Equipment engineering checks prior to use onsite. Location of works/ proximity to neighbours SPL testing	Environment	2	D	5	
Clearance of land/vegetation Construction Demolition Maintanence	Waste	Inappropriate waste disposal	Environmental damage	Insufficient waste disposal facilities Low level of awareness	Bunded Areas Waste Management Plan Waste Management Contract Hydrocarbon Management Plan Monthly E&C Inspections GCAA Generic Induction and Site Familiarisation	Environment	1	С	4	
Drilling	Lighting	Unacceptable visual impact	Community Complaints / Fines	No, or ineffective, lighting controls Lighting plant facing offsite	Audit	Environment	1	E	1	

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Consequence Category	Expected Risk Conseque nce	Risk Likelihood	Current Risk Rating	Treatment plans/tasks (Description)
Maintenance Activities	Contamination	Closure Liability - Creation of Contaminated Site	Environmental damage	Spills Poor clean up of spills	Bunded areas Hydrocarbon Management Plan Phase 1 contamination assessment completed Spill kits Emergency response/ PIRMP Inspections	Environment	1	В	7	
UG Coal Mining	Groundwater	Localised impacts to groundwater - no sensitive receptors within ML boundaries	Water quality impact or deterioration	Seepage Subsidence	Water Management Plan Water monitoring	Environment	2	D	5	
UG Coal Mining Rehabilitation	Subsidence	Subsidence - Impacts greater than predicted	Environmental damage Unsuccessful rehabilitation	Subsidence	Approved Extraction Plan Subsidence monitoring Weekly subsidence inspections	Environment	2	D	5	
Rehabilitation	Mine closure	Acid generating material discovered onsite	Environmental harm Impact on rehabilitation	Acid sulphate soils	No recorded incidents of outflows of acidic water Site not prone to sulphide materials	Environment	2	E	3	

Assess Type; Key Elements-These change depending on TYPE of Risk Assessment		Identify the risks, causes and potential consequences			Identify the existing controls to manage the identified risks	Determine the Expected Consequence / Likelihood applicable to the Expected Consequence / Current level of risk				Treat the Risks
Process/Area	Sub Key Element (If applicable)	Risk Description - Something happens	Consequence - resulting in:	Causes - Caused by	Existing Control Description	Consequence Category	Expected Risk Conseque nce	Risk Likelihood	Current Risk Rating	Treatment plans/tasks (Description)
Rehabilitation	Geology and geochemisty	Poor quality material	Environmental harm	Poor quality material onsite	No identified geology or geochemistry issues that could impact upon rehabilitation success	Environment	1	Ш	1	
Rehabilitation	Mine closure	Rehabilitation planning not adequate - does not cover full LOM and full lease	Impact / Inhibit Business Process / Operations - delays / stoppages / costs	No rehabilitation plan	Mining Operations Plan Rehabilitation Management Plan LOM and budget process	Financial	2	D	5	
Rehabilitation	Mine closure	Rehabilitation - Execution - Legacy is growing over last 3 years (Ratio of Disturbed vs Seeded)	Impact / Inhibit Business Process / Operations - delays / stoppages / costs	No rehabilitation/ disturbance plan	Mining Operations Plan Rehabilitation Management Plan LOM and budget process	Financial	2	D	5	