Tallawang Magnetite Mine

Rehabilitation Management Plan

Mine Name		Tallawang Magnetite Mine			
Holder		Sibelco Australia Limited PO Box 47 Dunwich, QLD, 4183			
Authority		Authority	Expiry		
		PLL 3610 (1906) PLL1093 (1906) ML6023 (1906) ML1241 (1991) MPL265 (1991) ML1652 (2011)	3 April 2024 3 April 2024 3 April 2024 3 April 2024 3 April 2024 20 January 2032		
Commencement Date		1 August 2022			
Document control					
No.	Description	Author	Review	Approved	Date
1	RMP (Version 1)	P. Shine R. Firmer	A. Butler R. Murray	P. Dunn	07/10/2022

Table of Contents

Acronym	Description
AMD	Acid Mine Drainage
DA	Development Approvals
DPI	Department of Primary Industry
EIS	Environmental Impact Statement
ELA	Eco Logical Australia
EPA	Environment Protection Agency
LoM	Life of Mine
MOP	Mining Operations Plan
MOCP	Mining Operations and Closure Plan
ML	Mining Lease
MPL	Mining Purpose Lease
NEPM	National Environment Protection
NSW RR	New South Wales Resources Regulator
PLL	Private Lands Lease
RMP	Rehabilitation Management Plan
TARP	Trigger Action Response Plan
TSF	Tailings Storage Facility

1. Introduction to mining project

1.1. History of operations

Discovery of the magnetite deposit at Tallawang was made during the Gulgong gold rush in 1886, but the absence of precious metal mineralisation meant that the deposit was largely ignored until 1901.

Magnetite was first mined at Tallawang in 1901 in the Northern Pit by Australian Iron and Steel for use in iron production at Lithgow. From 1901 to 1928, ore was transported to Lithgow by rail where it was used for blast furnace feed. A total of 510,000 tonnes of ore was mined for this purpose. Mining at Tallawang then ceased with closure of the Lithgow smelter.

The pit was then selectively mined during World War II. Minimal quantities of the magnetite produced and used in manufacture of radio equipment.

From 1951 to 1955 Australian Magnetite Pty Ltd mined 5,926 tonnes of ore before mining operations again lapsed. Mining leases subsequently taken out by Elcom Collieries in 1962 passed through several hands until 1985 when Garmark Pty Ltd obtained the leases and completed an Environmental Impact Statement (EIS) to support a development consent for the Tallawang Project in May 1985. Garmark Pty Ltd proposed to conduct open cut and underground mining operations starting in the existing quarry and progressing southwards to the southern limit of the orebody. Under this proposal, diversion of the Tallawang Creek was required to exploit the resource and the open cut pit was intended to be progressively backfilled with mullock and tailings and the creek line re-instated following mining.

A water storage dam would have been created in the southern end of the open cut pit. Development Approval (DA) was subsequently approved (DA 105-85) by the Mudgee Shire Council (now Mid-Western Regional Council). Magnetite mining was then undertaken by the Eagle Corporation in 1986. The leases were later transferred to Australian Magnetite Pty Ltd and then to Doral Magnetite Pty Ltd. On 28 February 1990, Commercial Minerals Limited purchased the Tallawang Magnetite Mine from Doral Resources and mined the deposit (ML 1241) by open pit mining methods from 23 January 1991. Normandy Industrial Minerals Ltd (Commercial Mineral's parent company) assumed the management of the Tallawang Mine from 17 June 1998.

In 2000, Commercial Minerals Ltd was purchased by Unimin who, in May 2002, continued studies into the underground mine development and southern pit extension. Unimin was renamed in 2010 to Sibelco Australia Limited (Sibelco), to align to its parent company name. Following further evaluation of the resource and market, Sibelco proceeded with underground mining, but did not pursue the southern pit extension or Tallawang Creek diversion. Accordingly, backfilling of the open cut pit, as originally envisage by Garmark Pty Ltd in the 1985 EIS, was no longer required, and the water storage dam is now within the existing pit north of the 1985 proposed location. Mining ceased in March 2016, with processing continuing through to May 2016.

Progressive rehabilitation at the site has occurred since the 1990s. It is known that the overburden emplacements located on the Eastern site of the open pit were rehabilitated around 1990. Embankments on the tailings dam were stabilised and vegetated through to approximately 1998. In 2001 sections of the tops of the tailings dam were planted with pasture grasses. The northern edge of the open pit was shaped and vegetated in 1996 with further vegetation of Eucalypts and Acacias in 2003. Tree screens were put in place between the Castlereagh Highway and mine workings from the early 1990s to approximately 2006 (Sibelco, 2017a).

More recently under Sibelco's ownership, all buildings and infrastructure not intended to be retained at site have been removed. Landform establishment on the remaining sections of the tailings dam was undertaken using the dry stacked tailings stockpiles as a growth medium subsoil.

Two water processing dams have been backfilled and rehabilitated to pasture. The underground portal was sealed and the residual open pit void has been allowed to refill with forming a pit lake which covers the underground portal.

All disturbed areas of the operation have been rehabilitated to the intended final land use and are now in the ecosystem and land use development phase. Ongoing monitoring and maintenance of rehabilitated areas is undertaken as required.

1.2. Current development consents, leases and licences

The development approvals (DAs) granted under the *Environmental Planning and Assessment Act 1979*, Mining Leases (ML) granted under the *Mining Act 1992,* and other licences issued by Government agencies are outlined below in Table 1.

Table 1 Tallawang Magnetite Mine Consents, Authorisations and Licences

Documentation, Condition or Licence	Approval Authority	Description	Status
Development Approval			
DA105-85	Mudgee Shire Council (now Mid-Western Regional)	Establishment of a magnetite mine and processing plant	Current Endorsement date 18 July 1985
DA192/90	Mudgee Shire Council (now Mid-Western Regional)	Alteration of concrete storage area, office, amenities and weighbridge	Current Endorsement date 25 October 1990
DA238/90	Mudgee Shire Council (now Mid-Western Regional Council)	Extension of an existing magnetite mine and management of residue materials	Current Endorsement date 20 December 1990
DA169/92	Mudgee Shire Council (now Mid-Western Regional)	Erection of an office/ amenities building	Current Endorsement date 20 August 1992
DA115/98	Mudgee Shire Council (now Mid-Western Regional Council)	Construction of a rock screen wall	Current Endorsement date 3 September 1998
DA105-85 (modification)	Mid-Western Regional Council	Modification to approved production quantities, hours of operation and waste disposal method	Current Determination date 11 December 2007
Authorisations under the *Mining Act 1992*			
PLL3610 (1906)	Department of Resources & Energy (now Mining, Exploration and Geoscience)	Private Lands Lease	Granted 3 April 1962 Expiry 3 April 2024
PLL1093 (1906)	Department of Resources & Energy (now Mining, Exploration and Geoscience)	Private Lands Lease	Granted 3 April 1962 Expiry 3 April 2024

Documentation, Condition or Licence	Approval Authority	Description	Status
ML6023 (1906)	Department of Resources & Energy (now Mining, Exploration and Geoscience)	Mining Lease	Granted 26 October 1967 Expiry 3 April 2024
ML1241 (1991)	Department of Resources & Energy (now Mining, Exploration and Geoscience)	Mining Lease	Granted 23 January 2011 Expiry 3 April 2024
MPL265 (1991)	Department of Resources & Energy (now Mining, Exploration and Geoscience)	Mining Purposes Lease	Granted 23 January 2011 Expiry 3 April 2024
ML1652 (2011)	Department of Resources & Energy (now Mining, Exploration and Geoscience)	Mining Lease	Granted 21 January 2011 (Expiry 20 January 2032)
Other Licences			
EPL3160	NSW Environment Protection Authority	Environmental Protection Licence	Current
07-100121-003	NSW Work Cover	Licence for the Keeping of Dangerous Goods (Explosives & Detonators)	Licence surrendered. Magazines inspected by DTI on 14 July 2016 to confirm surrender
80WA720300	Department of Primary Industries	Water Supply Works Approval	Purpose: Mining Work: Excavation – groundwater 100ML Allocation Old licence reference WAL35981[1]
80WA723753	Department of Primary Industries	Water Supply Works Approval	Current 2ML Extraction limit per annum Work: Bore
Mine Operations and Closure Plan (MOCP)			
2020-2024 MOCP	New South Wales Resources Regulator (NSW RR)	Tallawang Magnetite Mine - MOCP	Superseded by this RMP.

1.3. Land ownership and land use

The six mining tenements comprising of the Tallawang Magnetite Mine (the Site) occupy parts of Lots 1 and 2 in DP732404 held in freehold by Sibelco (Table 2). Further, Sibelco purchased a section of Crown Land previously allocated for road purposes removing public access onto the mining tenements.

The total area of the combined six mining tenements is 185.90 hectares (ha). All land not used for mining purposes is leased to a neighbouring landholder who manages the land for agricultural use. Agricultural use currently includes both cropping and grazing on native and improved

[1] *WAL35981 will remain with the Tallawang Site and become an asset for the sale of the property*

pastures. The properties also include areas of remnant native vegetation. There are no stewardship or conservation agreements associated with the mining tenements.

Table 2 Land ownership

Land Tenure	Lease	Area (ha)	Land tenure	Landowner	Status	Expiry date
Lot 1 DPD732404	PLL3610 (1906)	0.8	Freehold	Sibelco Australia Limited	Current	3 April 2024
Lot 2 DP732404	PLL1093 (1906)	2.8	Freehold	Sibelco Australia Limited	Current	3 April 2024
Lot 1 DPD732404	ML6023 (1906)	0.7	Freehold	Sibelco Australia Limited	Current	3 April 2024
Lot 2 DP732404	ML1241 (1991)	78.5	Freehold	Sibelco Australia Limited	Current	3 April 2024
Lot 2 DP732404	MPL265 (1991)	27.0	Freehold	Sibelco Australia Limited	Current	3 April 2024
Lot 2 DP732404	ML1652 (2011)	76.1	Freehold	Sibelco Australia Limited	Current	20 January 2032

The details of lots adjacent to the Site are summarised in Table 3. As required by the *Form and way: Rehabilitation Management Plan (large mines)* (form and way) (NSW RR, 2021), landowners have not been identified for confidentiality. Land adjacent to the Site is used for agricultural cropping, grazing on native and improved pasture and rural residential use. A section of the western boundary is adjacent to the Castlereagh Highway (B55).

Table 3 Land tenure details of adjacent land (MinView, 2022)

Lot	Plan	Boundary	Lot	Plan	Boundary
60	DP750767	Eastern	71	DP75071	Western
10	DP750767	Eastern	2	DP248183	Western
11	DP750767	Eastern	3	DP248138	Western
12	DP750767	Eastern	109	DP750762	Western
81	DP750767	Northern	4	DP248183	Western
82	DP750767	Northern	52	DP750762	Southern
173	DP750767	Northern	55	DP750762	Southern
182	DP750751	Northern	69	DP750762	Southern
191	DP750751	Northern			

1.3.1 Land ownership and land use figure

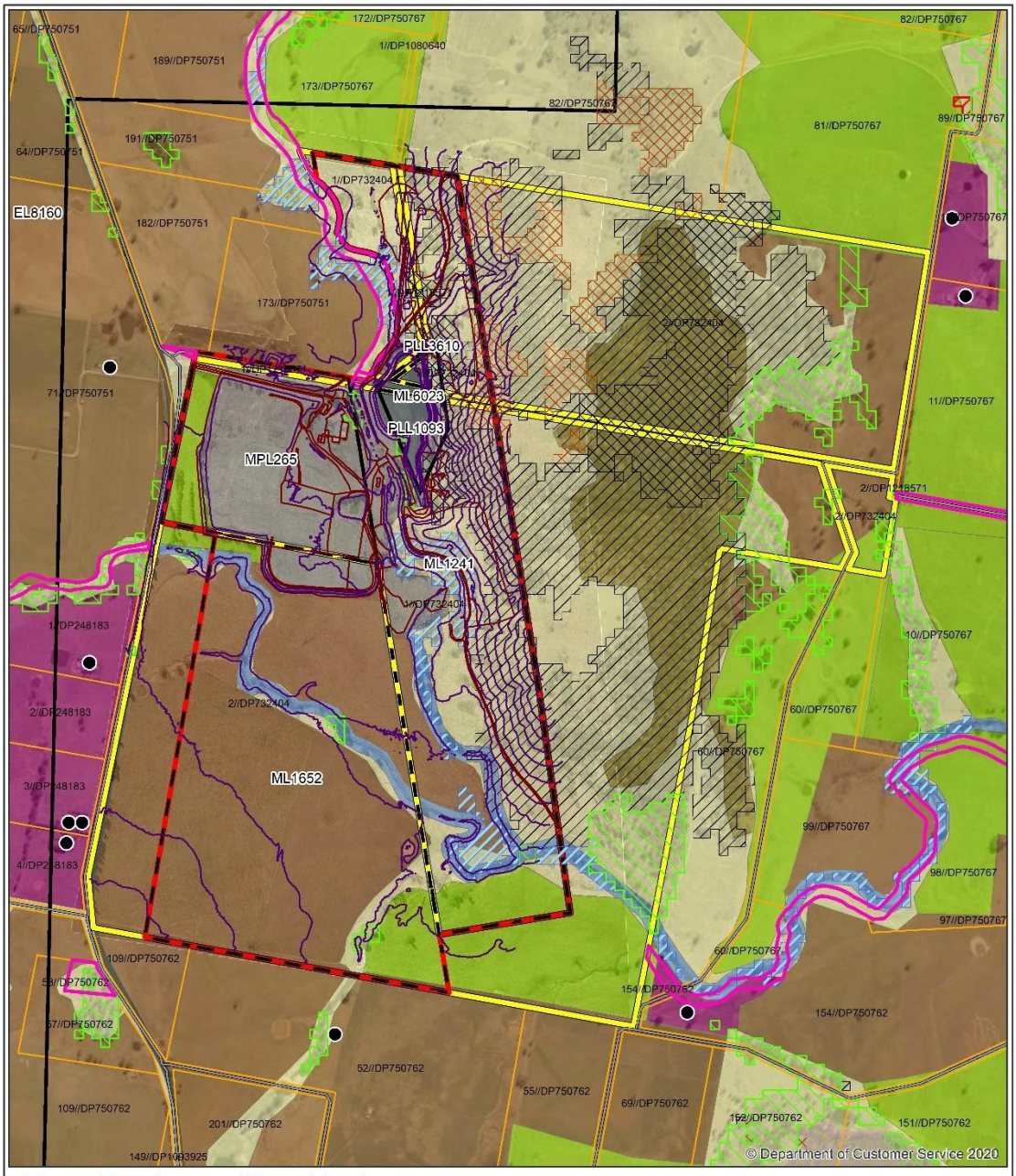

Figure 1 Land ownership and land use
Tallawang Magnetite Mine Rehabilitation Management Plan 2022

Figure 1 presents the land ownership and land use for areas surrounding the Site. The available land use mapping presents the older rehabilitated areas on the overburden emplacements to the

east of Tallawang Creek with the surrounding areas of "grazing on native vegetation" land use, as the areas are indistinguishable on aerial photography.

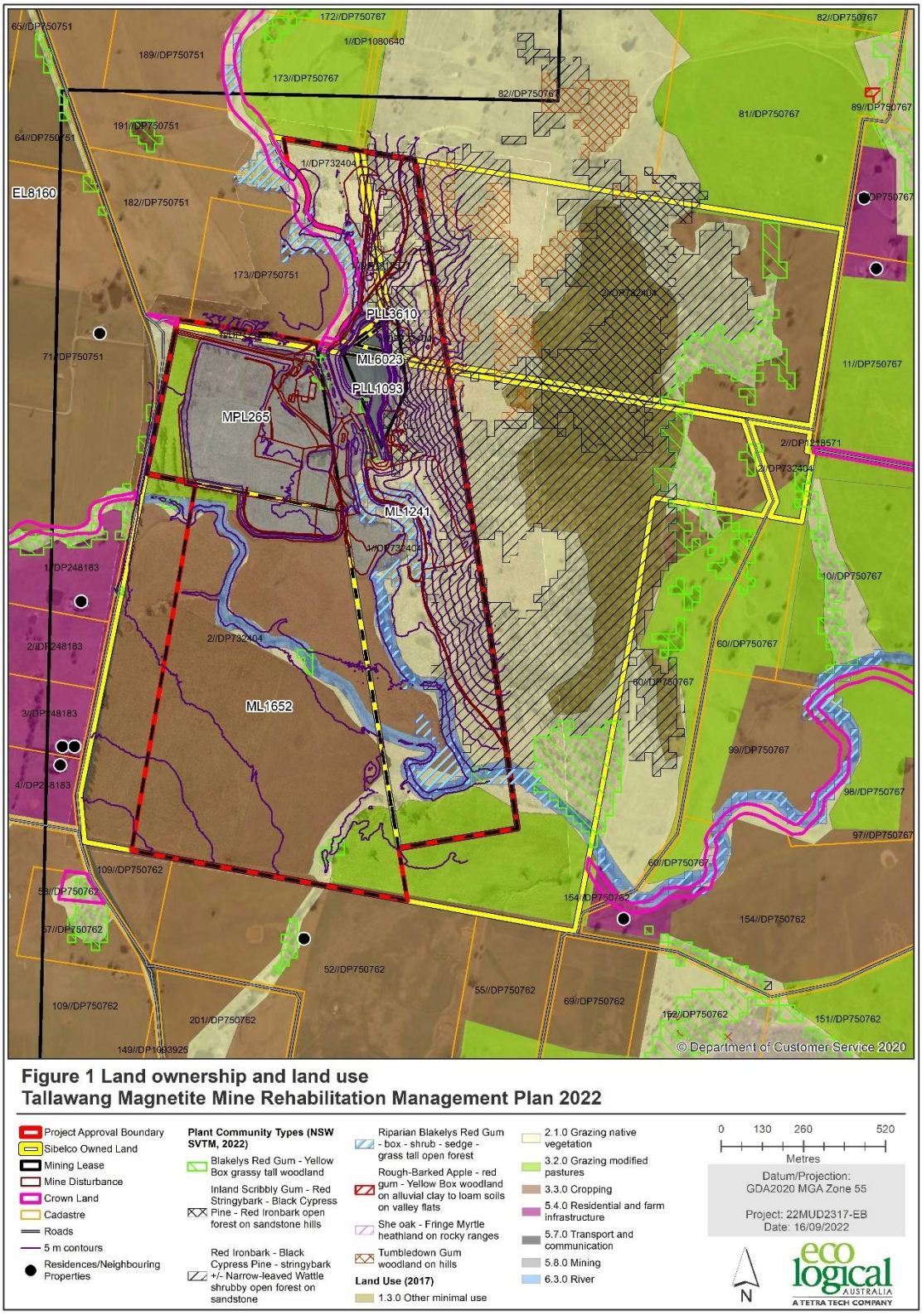

Figure 1 Land ownership and land use
Tallawang Magnetite Mine Rehabilitation Management Plan 2022

Figure 1 Land ownership and land use

2. Final land use

2.1. Regulatory requirements for rehabilitation

The regulatory and approval requirements relating to post-mining land use and rehabilitation are summarised in Table 4. It contains conditions in the DAs and the commitments identified in the *Environmental Impact Statement for the Mining and Beneficiation of Magnetite at Tallawang NSW* (R.W. Corkery & Co Pty. Ltd. 1985), noting that Condition 2 of DA 105/85 requires the "Development being generally in accordance with the Environmental Impact Statement dated May, 1985, prepared by R.W. Corkery & Co and submitted to [Mid-Western Regional] Council".

The mining lease (ML) conditions referred to in the DAs have also been included but it is noted that as of 2 July 2022, they have been replaced by the new standard conditions on mining leases under Schedule 8A to the *Mining Regulation 2016*.

It is noted that the rehabilitation condition in the development consent requires the site to be rehabilitated as outlined in the EIS, however, some details of the EIS are no longer applicable as some of the mining methods and mine developments did not proceed.

Table 4 Regulatory Requirements for Rehabilitation

Condition	Requirement	Relevant domain under the RMP	Relevant former domain as per MOCP (Sibelco, 2021)	Status	RMP Section
DA 105/85					
12	Overburden is to be grassed and mounded around the site in areas adjoining mining and processing operations so that the development is substantially screened from view of Trunk Road 55.	2, B	2 and G	Completed	6.2.1.d Figure 3
15	The site is to be progressively rehabilitated as outlined in the Environmental Impact Statement and in accordance with the requirements of the Soil Conservation Services, Department of Agriculture and Department of Mineral Resources.	B	7 and G	Completed [1]	Section 6 (all)
17	Provision of landscaping consisting of well advanced trees and shrubs to the Trunk Road 55 frontage and in the area around the beneficiation plant.	1, B	1 and G	Completed	6.2.5 Figure 3
DA 238/90					
5	Compliance with all environmental conditions detailed by Mining Lease Applications 75, 76 and 77 from the Department of Minerals and Energy.	All	All	Near completion. All that is remaining is monitoring until relinquishment.	Section 6 (all)
DA 115/98					
1	The rock wall is to be progressively rehabilitated with topsoil and planted with suitable trees shrubs and groundcovers.	Not applicable as this was associated with the southern pit extension that did not occur.		Not Applicable	Not applicable
EIS Commitments – Open Cut Area					
p3	1. Site rehabilitation will involve the backfilling of the open cut mine areas to pre-mining levels with a dam (similar in size to the existing quarry) at the southern end of the mine area.	5, F	6 and B (located north of proposed location due to no southern pit extension)	The southern pit extension did not occur. A water storage dam has been created in the final void and rehabilitation to meet the intent of the commitment is complete	6.2.3.a Figure 3
	2. The mullock stockpile and dams in the vicinity of the plant will remain.	2, 3, B, F	2, 3, B and G	Completed. The overburden emplacements	6.2.3.a, b, c,

Condition	Requirement	Relevant domain under the RMP	Relevant former domain as per MOCP (Sibelco, 2021)	Status	RMP Section
				have been retained and rehabilitated and dams have been retained for water management	Figure 2 and Figure 3
	3. All areas left will be grassed and trees and shrubs established.	B	7 and G	Completed	6.2.5 Figure 3
p56	4. Most of the open cut will be backfilled with mullock and tailings to create a landform similar to the pre-mining landform. The backfilling programme will be undertaken on a regular basis as the open cut advances in a southerly direction.	Not Applicable as southern pit extension did not occur.		Not Applicable	Not applicable
	5. The company proposes to undertake regular programmes to contour the land surface after the backfilling of the open cut is complete. The backfilled areas will be contoured once and additional 50 m length 100 m width of area is filled to ground level.	Not Applicable as southern pit extension did not occur.		Not Applicable	Not applicable
	6. Once the area is contoured, previously stripped topsoil will be spread over the area. The area will be sown with pasture grasses appropriate to the season and fertilised if necessary. The procedures, species planted, sowing density and application rates for fertiliser will be discussed with the Soil Conservation Service prior to commencement of rehabilitation. The initial rehabilitation area will be supervised by the Soil Conservation Service to ensure that the procedures adopted by the company will be suited to the overall project.	B	7 and G	Complete	6.2.4 Figure 3
	7. The company will satisfy all the requirements relating to rehabilitation that are imposed as conditions on the Company's Mining Leases granted by the Department of Mineral Resources.	B, F, I	Total site	Near completion. All that is remaining is monitoring until relinquishment.	Section 6 (all)
	8. Trees similar to those on the site prior to mining will be planted on the rehabilitated areas. Emphasis will be placed on creating shade areas for stock. Shade trees will be placed around the edge of the final water storage.	B	7 and G	Complete	6.2.5
p57	9. The fences constructed around the open cut area will be retained after rehabilitation commences to ensure new growth is not destroyed by stock or other animals. Limited grazing of the rehabilitated areas would be undertaken as required to reduce any fire risks.	5, F	6 and B	Complete	6.2.1.I
	10. The creation of a water storage dam at the southern end of the open cut. This dam will cover approximately one ha (170 m x 60 m) and have sides with slopes of not	5, F	6 and B (located north of proposed location	The southern pit extension did not occur. A	6.2.3.a Figure 3

Condition	Requirement	Relevant domain under the RMP	Relevant former domain as per MOCP (Sibelco, 2021)	Status	RMP Section
	greater than 1:3 (vert:hor). The company expects the water storage to remain relatively full (approximate water level) of 86 m A.H.D. This assumption is based on observations of the existing open cut on the site and the recent drilling.		due to no southern pit extension)	water storage dam has been created in the final void and rehabilitation to meet the intent of the commitment is complete	
	11. All underground portals within the open cut will be sealed to the satisfaction of the Department of Mineral Resources.	5, F	6	Complete	6.2.1.l, 6.2.2.f
	12. The levee bank on the eastern side of Tallawang Creek will be removed and the material incorporated as fill in the final landscaping of the open cut. Care will be taken to ensure as much soil as possible on the levees is retained for rehabilitation.	Not Applicable as southern pit extension did not occur.		Not Applicable	Not applicable
	13. The diversion banks on the eastern side of the open cut will be progressively removed as the open cut advances south wards. The banks will however not be removed until such time as rehabilitation is well advanced.	Not Applicable as southern pit extension did not occur.		Not Applicable	Not applicable
	14. The diversion channels will be retained to provide long term channel for Tallawang Creek.	Not Applicable as southern pit extension did not occur.		Not Applicable	Not applicable
	15. All fencing will be retained on the site unless it will interfere with the subsequent land use. Gates will be provided in the appropriate location for the landowner.	B, F, I	Total site	Acknowledged	6.2.2.a, b, c
	16. All creek crossings will be retained.	I, I	I and A	Acknowledged	2.4.1
EIS Commitments – Beneficiation Plant Site					
p58	17. All crushing plant and foundations will be removed.	I, I	I and A	Complete for areas where retained infrastructure will not be kept.	6.2.2.b
	18. All equipment will be removed from within the main building. The decision of whether to remove the building and its floor will be made at the completion of the project. The building may have an alternate use at the conclusion of the project.	I, I	I and A	Not applicable as building has been retained.	Not applicable
	19. The ore stockpile site will be cleaned up and any residual rock buried in the open cut. The area will be topsoiled, ripped and sown with pasture grasses.	I, I	I and A	Complete	6.2.3.b Figure 3
	20. All roads except the access road to the main building will be topsoiled, ripped and sown with pasture grasses.	I, I	I and A	Complete	6.2.3.b1 Figure 3

Condition	Requirement	Relevant domain under the RMP	Relevant former domain as per MOCP (Sibelco, 2021)	Status	RMP Section
	21. The mullock dump to the north and west of the plant site will be retained onsite. Each dump will be left in a grassed state with tree growth on their outer edge. It is likely that the dumps will provide a long-term source of hard material that could be of use to the Department of Main Roads, the State Rail Authority or Mudgee Shire Council. Material would be won from the inside of each dump or from the opposite side of the tree screen.	2, 4, B	2, 4 and G	Acknowledged	6.2.3.c Figure 3
	22. The tailings dam will be covered, contoured and vegetated at the completion of the project. The process and freshwater dams will be retained to provide long term water storage to support the final land use.	B, F	2, 3, B and G	Complete	6.2.3.a, 6.2.3.c Figure 3
ML1652					
7	Rehabilitation Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General.	B, F, I	A, B and G	Complete	Section 6 (all)
ML1241, ML6023, MPL265, PLL1093, PLL3610					
13a	Rehabilitation Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General and in accordance with the Mining Operations Plan so that: • There is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion. • The state of the land is compatible with the surrounding land and land use requirements. • The landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land. • In cases where revegetation is required and native vegetation has been removed or damaged, the original species must be re-established with close reference to the flora survey included in the Mining Operations Plan. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density.	B, F, I	A, B and G	Complete	Section 6 (all)

Condition	Requirement	Relevant domain under the RMP	Relevant former domain as per MOCP (Sibelco, 2021)	Status	RMP Section
	• The land does not pose a threat to public safety.				

1. Progressive rehabilitation has been undertaken (as described in Section 6). Sibelco and former operators have collaborated with relevant stakeholders and sought and acted on technical advice from qualified persons and technical services providers on soil and land quality, agronomy, water management, geotechnical stability, landform design, hydrogeology and water quality to achieve successfully achieve the nominated final land use outcomes. The intent of this condition (and similar conditions in DA 236/90) has therefore been met.

2.2. Final land use options assessment

This Rehabilitation Management Plan (RMP) references the final land use as approved by the Resources Regulator in the 2020-2024 Tallawang Magnetite Mine MOCP (Sibelco, 2021). Therefore, a final land use options assessment is not required for this RMP.

2.3. Final land use statement

The overall final land use goal for the Site is to create a final landform and range of assets that are compatible with the surrounding land use of agriculture and rural industries.

The majority of disturbed areas will have a final land use of agriculture – grazing on land rehabilitated to at least Rural Land Capability Classification Class VI (very light grazing). This is consistent with the land evaluation scheme referred to in the Mining Operations Plan (MOP) Guidelines referenced in the 2016 and 2020 Tallawang Magnetite Mine MOCP (Sibelco, 2017a; Sibelco, 2021). This final land us is also consistent with the land use prior to mining which was mainly farming (cattle and sheep grazing with some cropped land) and existing land uses adjacent to the mine disturbance (grazing, cropping and rural uses).

To complement and support this final land use goal, selected infrastructure and water storages will be retained under infrastructure, water management area and void final land use domains. The infrastructure items to be retained have been determined in consultation with a neighbouring landowner (the prospective purchaser of the underlying freehold). Upon surrender of the mining tenements, Sibelco plans to include these valuable assets as part of the sale of the freehold land on which the mining leases sit.

2.4. Final land use and mining domains

2.4.1 Final land use domains

The final land use domains for the Site, as depicted in the Final Landform and Rehabilitation Plan (see Section 5), are:

- Infrastructure
- Water management area
- Final void
- Agricultural - Grazing.

Table 5 provides a description of each final land use domain including all assets within the domain. The table also indicates the former domain names used in the 2020 MOCP (Sibelco, 2021) which have now been aligned with the spatial data requirements of the mine rehabilitation portal.

Table 5 Final land use domain descriptions

Final land use domain	Former domain name as per MOCP	Domain description
Agricultural – Grazing (B)	Rehabilitated Area – Rural Land Classification Class VI (G)	All rehabilitated grazing land, including vegetated drainage features.
Water management area (F)	Water management (B)	One retained water storage dam Sediment trap near retained administrative building and storage shed
Final Void (J)	Water management (B)	Open cut void and pit lake (water storage) which have been appropriately decommissioned.

Final land use domain	Former domain name as per MOCP	Domain description
Infrastructure (I)	Infrastructure area (A)	Selected infrastructure items retained from mining operations. Included assets are: • Main Access Road - Sealed Heavy Vehicle Access • Vacuum Pumps x 2 • Thickener Tanks x 2 • Laboratory • Mill Workshop • Steel Rack • Stores Area • Mill Supervisor Office Area • Plant Workshop • Vehicle Washdown Bay • Weighbridge • Weighbridge Control Room • Relocatable Administration Building • Relocatable Crib Room • Training Room • First Aid Room • Security Gate – Site Access • Site Perimeter Fence • Bridge over Tallawang Creek • Mill Storage Shed • Small Shed at Weighbridge • Product Storage Bays x 5

2.4.2 Mining domains

The mining domains are no longer active at the Site but included those outlined in Table 6. The table also indicates the former domain names used in the 2020-2024 MOCP (Sibelco, 2021) which have now been aligned with the spatial data requirements of the mine rehabilitation portal. Figure 2 provides the locations of the former mining domains prior to decommissioning.

Table 6 Mining domain descriptions

Mining domain name	Former domain name as per MOCP	Domain description
Infrastructure Area (1)	Infrastructure (1)	All built infrastructure assets on the site. Those retained in the final land use are provided in Table 5. As indicated in Figure 2, there is a small area within this domain that has also been managed as being potentially affected by subsidence.
Tailings Storage Facility (2)	Tailings Storage Facilities (2)	The tailings dams and stockpiled dried black sand.
Water Management Area (3)	Water management area (3)	Water storage dams and sediment traps
Overburden Emplacement Area (4)	Overburden emplacement area (4)	The overburden (mullock) material stockpiles. As indicated in Figure 2, there is a small area within this domain that has also been managed as being potentially affected by subsidence.
Other (8)	Stockpiled material (5)	Stockpiles including Run of Mine stockpiles area topsoil stockpiles
Active Mining Area (Open cut void) (5)	Void (Open cut void (6)	The open cut mining void.

Mining domain name	Former domain name as per MOCP	Domain description
N/A	Rehabilitated Area – Pasture (7)	This referred to the areas in the rehabilitation phase while the mine was still operational. Under the RMP these areas are considered under the Final Land Use Domain of Agricultural – Grazing (B) (see Table 5).

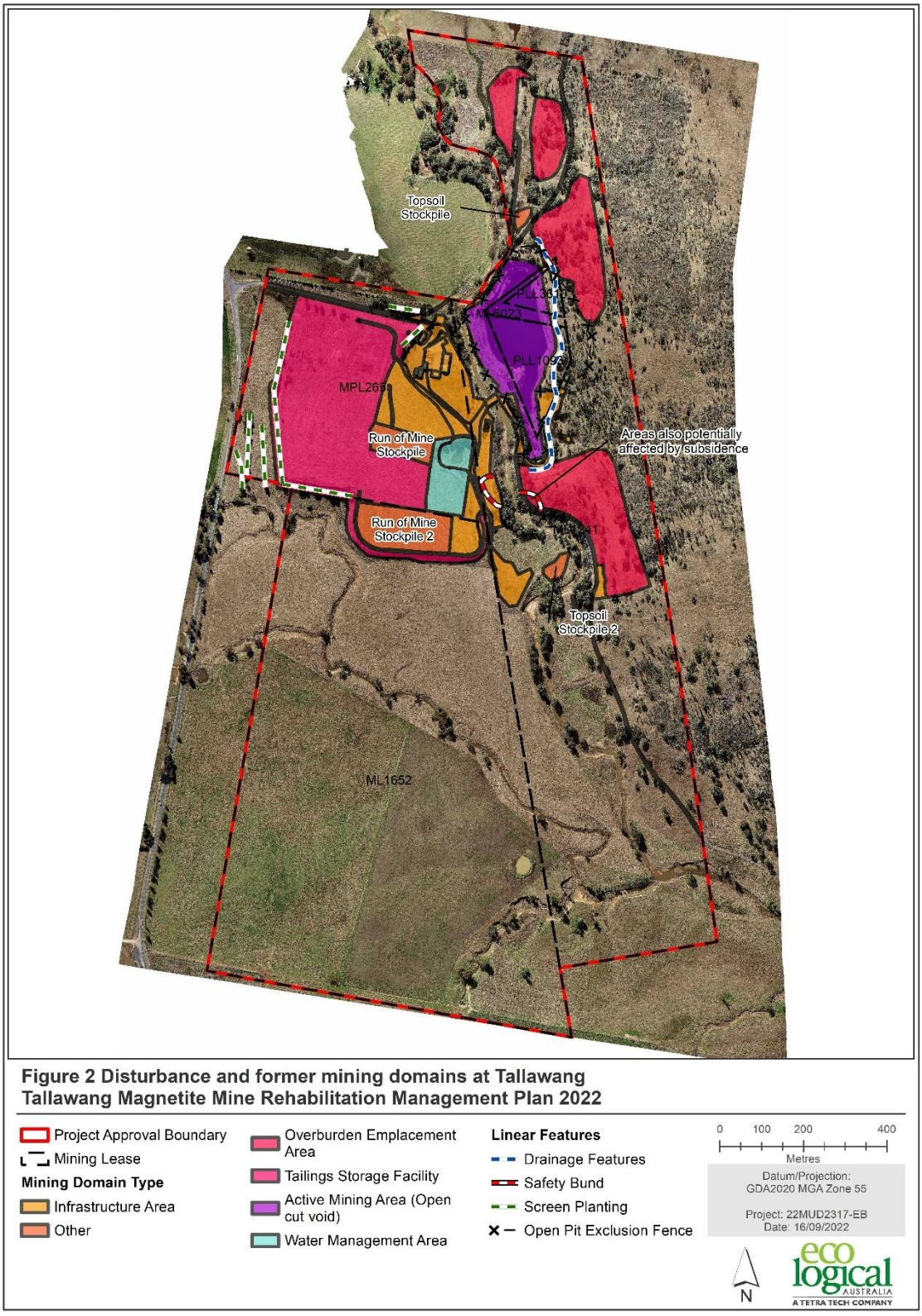

Figure 2 Disturbance and former mining domains at Tallawang

3. Rehabilitation Risk Assessment

Potential environmental risks have been considered for the Site and a risk assessment has been developed with consideration of:

- Clause 7 of Schedule 8A of the Mining Regulation 2016
- The bowtie risk assessment conducted by the NSW Resources Regulator
- The *Rehabilitation Risk Assessment Guideline* (NSW Resources Regulator, 2021)

To assess the risk rating for each potential risk, the likelihood, consequence and matrix measures outlined in Table 7 to

Table 9 respectively have been used. The potential risk event, control measures and risk rating are presented in Table 10.

To align with the guidelines, this risk assessment has been developed considering the following phases:

- Risks associated with the operational phase
    - Land clearing – risk and opportunities associated with land clearing.
    - Active mining operations – risk and opportunities for rehabilitation associated with the active mining phase across the domains.
    - Decommissioning – activities associated with decommissioning and demolishing the built infrastructure to achieve the final land use.
    - Construction of final landform – details the construction of the final landform.
- Risks associated with the rehabilitation phase
    - Growth medium development – Looks at how rehabilitated areas will be prepared with growth media.
    - Ecosystem and land use establishment – target vegetation associated with the final land use will be established and subsequently managed to progress the ecosystem.
    - Ecosystem and land use development – details how rehabilitated land will be actively managed to achieve the approved final land use.

It is noted that the Site has been in care and maintenance since 2016 as Sibelco concluded the site was no longer commercially viable. Therefore, risks associated with all stated in the operational phase, growth medium, and ecosystem and land use establishment have been managed according to the controls in the associated MOCP (Sibelco, 2021). There is now only minimal monitoring activity occurring at site, and as such the site is in the ecosystem and land use development phase. Still, to ensure all risk for the site has been adequately addressed, this risk assessment has been developed with consideration, but not limited to all phases.

Table 7 Likelihood measures

Level	Rating	Description	Frequency
5	Almost certain	The event is expected to occur in most circumstances	More than once a year
4	Likely	The event will probably occur in most circumstances	At least once per year
3	Possible	The event should occur at some time	At least once in 3 years
2	Unlikely	The event could occur at some time	At least once in 10 years

Level	Rating	Description	Frequency
1	Rare	The event may only occur in exceptional circumstances	Less than once in 15 years

Table 8 Consequence measures

Rating (level)	Health	Financial Impact	Environment
Insignificant (1)	Minor injuries not requiring first aid or near miss. No psychological stress.	Less than $10,000	Contained, reversible impact managed by on site response.
Minor (2)	First Aid treatment and/or one off counselling.	$10,000 to $100,000	Contained, reversible impact managed by internal response.
Moderate (3)	Medical treatment required and/or psychological intervention/treatment required.	$100,000 to $1,000,000	Contained, reversible impact managed by external agencies.
Major (4)	Serious or extensive injuries and/or significant and long term psychological stress.	$1,000,000 to $10,000,000	Uncontained, reversible impact managed by a coordinated response from external agencies.
Catastrophic (5)	Death or severe permanent physical and/or psychological disablements.	Greater than $10,000,000	Uncontained, irreversible impact.

Table 9 Risk assessment matrix

Consequence / Likelihood	Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
Almost certain (5)	Moderate (5)	High (10)	High (15)	Extreme (20)	Extreme (25)
Likely (4)	Low (4)	Moderate (8)	High (12)	High (16)	Extreme (20)
Possible (3)	Low (3)	Moderate (6)	Moderate (9)	High (12)	High (15)
Unlikely (2)	Low (2)	Low (4)	Moderate (6)	Moderate (8)	High (10)
Rare (1)	Low (1)	Low (2)	Low (3)	Low (4)	Moderate (5)

Table 10 Risk Assessment

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
General				
Insufficient skills and experience of rehabilitation personnel	Incorrect advice provided or rehabilitation measures taken throughout the operation phase which do not go towards achieving the overall rehabilitation goal.	• Contract a suitably qualified individual/ company to assist with development of rehabilitation documentation and advice • Provide adequate rehabilitation instruction in form of verbal and written directions • Hire competent individuals who are capable of taking direction	Low 4 (Unlikely, Minor)	Tailings – undertaken by senior mine engineers to manage design and construction Environmental – engaged suitably qualified consultant
Insufficient prioritisation of rehabilitation activities	Delays to rehabilitation schedule. Nominated final land use and rehabilitation completion criteria are not achieved.	• Follow the Form and Way requirements, MOCP completion criteria and validation methods to assist in guiding development of rehabilitation needs • Follow the Rehabilitation Management Plan to ensure rehabilitation actives are prioritised accordingly • Follow internal company timelines which link back to the overarching Rehabilitation Management Plan • Clearly assign responsibilities to internal and external teams	Low 4 (Unlikely, Minor)	Validation methods include but not limited to: • Inspection by suitably qualified person • Surveys and records • Photographs • Reports Contracts for engaged subcontractor works Schedule in the RMP
Public Safety	Unauthorised access to site	• All site access gates are locked at all times – specific keys or access card required for entry • Security cameras installed to monitor unauthorised access to site • Fences maintained to prevent unauthorised site access • Warning signs installed on boundary fences	Low 4 (Likely, Insignificant)	Security checks undertaken by personnel when site monitoring activities required Any un-authorised entry noted
Weed Infestation	Disturbed ground allows for the establishment of weeds	• Monitoring inspections determines no introduction of new weed species	Low 3	Results of monitoring inspections

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
		• Priority weeds are controlled in compliance with weed classification requirements • Vehicles to remain on pre-existing tracks at all times • Quarterly monitoring undertaken with any weed species noted	(Possible, Insignificant)	
Impacts on heritage items	Adverse impact on sites of cultural or European heritage	• There are no known Aboriginal heritage sites or artefacts located within the Site • There are no known natural heritage sites located within the Site • No ground-breaking activities scheduled moving forward	Low 4 (Rare, Major)	Approval required to conduct ground-breaking work onsite
Contamination	Hydrocarbon spill from storage or maintenance activities causes contamination of water and/or soil	• Mobile plant and equipment maintained regularly according to service schedule and maintenance undertaken in designated area • Daily pre-start checks undertaken on all mobile plant • Spill kit stations • No bulk storage of hydrocarbons or chemicals are kept at the Site • The minimal volumes of hydrocarbons are stores in self-bunded locations compliant with the Australian Standards (AS) 1940-2004 the storage and handling of flammable and combustible liquids.	Low 3 (Possible, Insignificant)	Management requirement for subcontractors to specify compliance with bunding if bringing hydrocarbons/ chemicals to site Contractors maintain pre-start checks and supply to Sibelco upon request
Noise from maintenance activities	Community complaint as a result of noise impacts generated from maintenance activities onsite	• Most maintenance procedures (mowing, slashing and weed control) do not generate unusual noise levels Inform neighbours of changes to normal operating times or significant maintenance activities involving heavy machinery which may result in periods of elevated noise • Provide contact details to neighbours to use to communicate concerns over noise	Low 3 (Possible, Insignificant)	Approval by Sibelco required to undertake works onsite
Occurrence of erosion	Soil erosion from disturbed or partially rehabilitated areas may increase sediment loads in downstream or off-site areas.	• Final landform has been established in accordance with KMH (2016a) • Rehabilitated land has been revegetated which will assist in minimising potential for erosion • Landform has been designed to be free draining • Surface water control infrastructure installed and maintained to slow water velocity to prevent erosion formation	Low 3 (Possible, Insignificant)	Quarterly rehabilitation monitoring Periodic inspections by site personnel

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
		• Key sediment dams will be retained until end of LoM whereby they will be desilted as required • Presence of erosion noted during monitoring or maintenance site visits and addressed as required		
Infrastructure				
Hazards associated with retained infrastructure	Adverse impacts on humans and/or native fauna as a result of hazards posed by retained infrastructure	• All buildings and infrastructure that are not included in the retained assets register identified in the MOCP have been removed • Retained assets discussed with neighbouring landholder and prospective purchaser. • Remaining buildings list will not require approval by Mid-Western Regional Council • Complying development certificate not required by Mid-Western Regional Council • Sibelco to commission a suitably qualified person to assess retained buildings for hazardous materials	Low 4 (Unlikely, Minor)	Retained building assessment report Sale agreement
Waste	Site contamination resulting from waste associated with infrastructure decommissioning	• All infrastructure which will not be retained has already been removed • All waste associated with the removed infrastructure has already been removed offsite	Low 3 (Possible, Insignificant)	Contamination assessment report
Habitation of structures and/or underground workings by native fauna	Adverse impact on native fauna residing in retained structures underground workings	• All retained infrastructures have been locked where applicable • All access to the underground mine has been permanently sealed in preparation for final land use (evidence provided in 2016 AEMR (Sibelco, 2017b)). • All underground workings are now flooded	Low 1 (Rare, Insignificant)	Water level observed is above access to underground

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
Landform Establishment and Growth Medium Development				
Insufficient volume or quality of growth medium to achieve target depth or placement methods	Inability for vegetation to establish on growth medium and inability to achieve the nominated final land use and rehabilitation completion criteria.	• Black sand onsite has been assessed for its suitability as a subsoil growth medium. The substrate to be used for rehabilitation has been assessed by a Certified Professional Soil Scientist and from field data collected to review soil function and development, metal and metalloid content, vegetation and ground cover, results confirm the soil material has suitable properties for supporting the proposed final land use and minimise environmental impacts. • Tailings Storage Facility (TSF) has been rehabilitated using subsoil growth medium • Organics have been applied to build up nutrient levels of growth medium • Growth medium required for rehabilitation areas has been spread	Low 2 (Unlikely, Insignificant)	Soil assessment report Quarterly rehabilitation monitoring and reporting
Unstable landform establishment	Unstable landform resulting in an adverse impact on the safety of the final land users	• Geotechnical report provides assessment of potential mine subsidence areas • Recommended controls from Geotechnical report are included in the RMP and have been implemented • Underground and open pit void have been allowed to fill with groundwater to stabilise • Erosion formation assessed and action taken to remediate if required • The rising water in the open cut void has minimised access to much of the high walls • Water diversion bund remains in place to prevent water inflow over the pit walls • Open cut void is fenced	Moderate 6 (Unlikely, Moderate)	Beck Engineering Geotechnical Report. Recommendations include: • Fencing the open cut void based on WA guidelines • Fence/bund areas of potential subsidence zones • Perform annual visual inspections of the pit, fence and potential subsidence areas Annual monitoring inspections undertaken to review the integrity of the fence line.

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
Exposure or release of geochemical adverse material associated with containment design and construction	Adverse impact to humans, and/or surrounding ecosystem as a result of geochemical material	• Detailed landform design have been completed by a suitably qualified engineer • All tailings storage facilities have been decommissioned, backfilled and rehabilitated • All previously mined overburden waste has been stockpiled, shaped and rehabilitated • Revegetation on tailings storage facility and overburden dump has occurred to increase stability and minimise erosion • Testing undertaken at site demonstrate low potential for AMD • Drainage controls and sediment dams are maintained in rehabilitation areas until stability is achieved • Final landforms are designed to be free draining	Low 3 (Rare, Moderate)	Results of testing demonstrated low potential of acid mine drainage (AMD)
Ecosystem Land Use Establishment and Development				
Poor seed quality and viability	Establishment of vegetation unsuitable for environment and does not lead to successful achievement of the post mining land use	• Seed species selection is well suited to the available soil resources and site conditions • Rehabilitation monitoring conducted quarterly to assess success and implement adaptive management if required	Low 4 (Unlikely, Minor)	Quarterly rehabilitation monitoring and reporting
Inappropriate revegetation species mix for target final land use	Rural Land Capability Classification Class VI not achieved due to inappropriate revegetation species mix	• Site will be rehabilitated to an agreed final land use compatible with the final landform and surrounding land use i.e., agricultural use consistent with Rural Land Capability Classification Class VI (low intensity grazing) (according to Emery K.A., 1986 Rural land capability mapping) • Monitoring species present via quarterly surveys	Low 4 (Unlikely, Minor)	Quarterly monitoring results and reporting
Feral animal, fauna and livestock impacting ecosystem establishment	Overgraze vegetation causing dieback of new growth	• Existing fence line and gate used to restrict access • Livestock grazing will be prohibited in rehabilitation areas until such time as mining lease relinquishment • Scheduled pest control program may be undertaken in consultation with NSW Local Land Services and coordinated with neighbouring	Low 3 (Possible, Insignificant)	Quarterly monitoring and reporting Opportunistic site observations from personnel

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
		properties if vegetation predation of vegetation is considered to pose a risk to rehabilitation success • Observations recorded during quarterly monitoring		
Insufficient establishment of target species and limited species diversity	Target not met for established species and diversity resulting in delay to achieving post mining land use	• Quarterly monitoring undertaken to review vegetation establishment and implement adaptive measures if required • Site water storages (open pit) can be used as a water source for irrigation during periods of drought. • Fencing remaining onsite to reduce potential for disturbance by site personnel, fauna and livestock • Vegetation cover, litter and rock measures as ground cover shall be no less than 50%, however if maintained or if prevailing climatic conditions prevent 50% ground cover, then ground cover is no less than on unmined land of equivalent Rural Land Capability Class Classification	Low 3 (Possible, Insignificant)	Quarterly monitoring and reporting
Adverse climatic conditions or weather events (drought, bushfire, flooding).	Disturbance or damage to rehabilitation areas, threat to stability of final landforms, poor vegetation establishment or growth, inability to achieve or sustain final land use.	• Site water storages (open pit) can be used as a water source for irrigation during periods of drought. • Rehabilitation monitoring has shown that vegetation has been resilient to severe drought (2017-2019). • Surface water control infrastructure installed, maintained and manage rainfall runoff directing to sedimentation dams • Sedimentation dams remain in place to allow water to settle prior to natural flow into Tallawang Creek diverting water away from the site • Contour drains installed to segregate clean and on-site water across the site	Moderate 6 (Possible, Minor)	KMH Environmental Surface Water Management Plan (KMH, 2016a)
Long term water quality and quantity issues	Water contamination - Surface water flow over disturbed ground causes sedimentation impacts in Tallawang Creek	• Adequate ground cover maintained • Surface water infrastructure is installed as described in the surface water management plan • Sedimentation dams remain in place to allow water to settle prior to natural flow into Tallawang Creek	Low 4 (Unlikely, Minor)	KMH Environmental Surface Water Management Plan (KMH, 2016a)

Risk Aspect	Summary of Potential Risk	Overview of current controls	Residual risk rating	Method of control assessment
		• Surface water flow is diverted around infrastructure area as described in the surface water management plan		
	Impact to aquifers as a result of rehabilitation measures	• Allow the underground mine and open pit to fill with groundwater to form a supply of accessible groundwater through WAL 35981. This will be sourced from the alluvial aquifer associated with the Tallawang Creek which the open cut pit truncated through. • A groundwater licence is not required to maintain the pit water levels and ongoing groundwater demands will be at the discretion of the landowners. However, the open pit will become a water storage to complement final land use.	Low 4 (Unlikely, Minor)	Water level observed is above access to underground
Final landform	Final landform is unsuitable to achieve the post mining land use	• Final landform established to comply with site rehabilitation management plan and designs • Final landform will comply with Rural Land Capability Classification system towards final land use of Class VI • Surrounding land is used for agricultural use	Low 4 (Unlikely, Minor)	Quarterly monitoring reporting

4. Rehabilitation objectives and rehabilitation completion criteria

4.1. Rehabilitation objectives and rehabilitation completion criteria

The following rehabilitation objectives and completion criteria have been adopted for the Site. These are in accordance with those of the approved 2020-2024 MOCP (Sibelco, 2021). The criteria only apply to the Final Land Use Domain as all preceding phases within the Mining Domain have been completed. Table 11 demonstrates how each final land use domain will be returned to a condition capable of achieving the final land use.

Table 11 Proposed Rehabilitation Objectives and Completion Criteria for Tallawang Magnetite Mine

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator(s)	Rehabilitation Completion Criteria	Validation Method
Infrastructure (I)	Infrastructure Area (I)	Retained assets and infrastructure compatible with overall post-mine land use	Retained assets / infrastructure	Infrastructure to be retained has been agreed with stakeholders. All other infrastructure has been removed.	Retained asset register developed and agreed with stakeholders as verified by • Stakeholder consultation records • Site inspection records and photographs • Presence of established landscaping along B55 frontage and access
			Presence of hazardous materials	A suitably qualified person has assessed retained buildings and identified that no hazardous materials are present.	Building assessment report by Suitably qualified person confirming no hazardous materials are present.
		The rehabilitated site will not present an unacceptable hazard to persons, stock or native fauna	Areas of potential contamination have been assessed by a contaminated lands specialist	Independent Contaminated Lands Assessment in accordance with National Environment Protection Measure (NEPM) guidelines has been completed. Remediation has been conducted (if identified through the Contaminated Lands Assessment) to make it safe for the proposed end land use. No areas requiring contaminated land remediation remain on site post closure.	Contaminated Lands Assessment undertaken by a Suitably qualified person.
			Access track suitability	Track surfaces have been graded to deflect water during rainfall events.	Site inspection records and photographs.
			Waste removal	All waste items have been removed and recycled or disposed of off-site.	Waste removal records and/or transport records. Site inspection records and photographs.
			Power supply	High voltage power supply has been removed from the site and replaced with low voltage supply to the remaining administration building.	Site inspection records and photographs.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator(s)	Rehabilitation Completion Criteria	Validation Method
Final Void (J)	Active Mining Area (Open cut void) (5)	Retained assets and infrastructure compatible with overall post-mine land use	Water supply	Groundwater in the final void is available for use under the existing Water Access Licence.	Water Access Licence WAL35981 remains valid and associated water supply bores remain intact.
		The rehabilitated site will not present an unacceptable hazard to persons, stock or native fauna	Unauthorised access to underground workings	Access points to the underground mine have been closed and are not accessible.	Site inspection records and photographs.
			Access to the void	Accidental access to the final void has been prevented through installation of bunding and/or fencing.	Site inspection records and photographs.
			Void slope is geotechnically stable	Void stability has been assessed by a suitably qualified person.	Geotechnical assessment undertaken by a Suitably qualified person.
Water Management Area (F)	Water Management Area (3)	Retained assets and infrastructure compatible with overall post-mine land use	Surface water management infrastructure	Sediment dams have been desilted if the depth of sediment is within 600 mm of the outlet prior to relinquishment.	Site inspection records and photographs.
Agriculture Grazing (B)			Water erosion hazard / Slope (%)	Slope (average slope at a readily mappable scale) is equal to or better than that required to achieve Rural Land Capability Classification Class VI (≤ 33 % or 18°).	Site assessment undertaken by a Suitably qualified person.
			Wind Erosion Hazard (soil surface	The combination of soil surface texture, wind erosive power and exposure to wind means that wind erosion hazard is equal to or better than that	Site assessment undertaken by a Suitably qualified person.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator(s)	Rehabilitation Completion Criteria	Validation Method
	Infrastructure Area (1), Tailings Storage Facilities (2), Water Management Areas (3), Overburden Emplacement Area (4), Other (8)	Rehabilitated land will be consistent with Rural Land Capability Classification Class VI (suitable for low intensity grazing)	texture/wind erodibility, exposure and wind erosive power)	required to achieve the equivalent of Rural Land Capability Classification Class VI.	
			Slope stability (mass movement)	No visual evidence of slumping or mass movement.	Site assessment undertaken by a Suitably qualified person.
			Shallow soils (soil depth cm)	Effective rooting depth of growing medium available is equal to or better than that required to achieve Rural Land Capability Classification Class VI (≥ 25 cm).	Site assessment undertaken by a Suitably qualified person.
			Soil acidification hazard	Soil surface pH and buffering capacity (based on soil texture) is equal to or better than that required to achieve Rural Land Capability Classification Class VI.	Site assessment undertaken by a Suitably qualified person.
			Rockiness – percentage of surface course fragments (%)	Rockiness is equal to or better than that required to achieve Rural Land Capability Classification Class VI (≤ 70 %).	Site assessment undertaken by a Suitably qualified person.
			Waterlogging	Land is not excessively waterlogged (showing evidence of waterlogging > 3 months in a year).	Site assessment undertaken by a Suitably qualified person.
		The rehabilitated site will be	Erosion features	The rehabilitated area has no active gully erosion (>300 mm deep) that could compromise post-mine land use.	Site monitoring by a Suitably qualified person. Monitoring records and photographs.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator(s)	Rehabilitation Completion Criteria	Validation Method
		stable with permanent landforms, soils, hydrology and vegetation cover having maintenance needs no greater than those of the surrounding land of similar quality under the proposed land use	Ground cover (%)	Not less than 50% ground cover (vegetation, litter, rock etc.) has been maintained or if prevailing climatic conditions prevent maintenance of 50% ground cover then groundcover is not less than that on unmined land of equivalent Rural Land Capability Classification Class.	Site monitoring by a Suitably qualified person. Monitoring records and photographs.
			Priority weeds	Priority weeds have been managed according to relevant local guidelines to minimise the presence of priority weeds.	Site monitoring by a Suitably qualified person. Weed control records and photographs.
			Pasture species	Pasture species are, on average, dominated by native and introduced grass, legume and herbage species recognised as pasture species or known to be palatable and provide forage for livestock.	Site monitoring by a Suitably qualified person. Monitoring records and photographs.
			Soil development and function	The processes of soil formation and soil function are evident.	Site monitoring by a Suitably qualified person. Monitoring records and photographs.
		The rehabilitated site will not present an unacceptable hazard to	Infrastructure removal	All infrastructure has been removed.	Site inspection records and photographs.
			Ground instability	Areas of potential mine subsidence or ground instability associated with the final void have been bunded or fenced as recommended by the final Geotechnical Report.	Site inspection records and photographs.

Final Land Use Domain	Mining Domain	Rehabilitation Objectives	Indicator(s)	Rehabilitation Completion Criteria	Validation Method
		persons, stock or native fauna	Areas of potential land contamination have been assessed by a contaminated lands specialist	Independent Contaminated Lands Assessment in accordance with relevant guidelines has been completed. Remediation has been conducted (if identified through the Contaminated Lands Assessment) to make it safe for the proposed end land use. No areas requiring contaminated land remediation remain on site post closure.	Contaminated Lands Assessment undertaken by a Suitably qualified person.
			Piezometer decommissioning	Groundwater monitoring piezometers have been decommissioned.	Site inspection records and photographs.

4.2. Rehabilitation objectives and rehabilitation completion criteria – stakeholder consultation

Stakeholder engagement was undertaken prior to the development of the objectives and completion criteria for the 2020 MOCP (Sibelco, 2021). This ensured that the appropriate rehabilitation practices were agreed upon to certify the site is safe, stable, and non-polluting on the completion of rehabilitation activities.

A summary of consultation efforts is represented in Table 12.

Table 12 Register of stakeholder consultation

Stakeholder	Date	Consultation activities and forms of consultation	Matters subject to consultation	Actions taken in response to the matters raised
Department of Resources and Energy (Environment), Department of Primary Industry (Water), Environmental Protection Authority	22 March 2016	On site meeting and email	Closure plan, future ownership of the Site	• Communication of pending closure plan submission • Discussion regarding each stakeholder requirement for content of closure plan • Agreement on infrastructure removal from underground mine and assessment of infrastructure to remain • Discussion on future land ownership of the Site • Discussion on groundwater licensing
Neighbour (identification concealed)	13 July 2016	Verbal communciation	Growth medium, water access licences, pasture species, finding from geotechnical report	• Discussed the growth medium that will be used in rehabilitation and provided the soil assessment results to the neighbour • Confirmed the pasture species list that will be used to achieve final land use • Communicated the findings and recommendations of the Geotechnical Report (Beck Engineering 31 May 2016) • Discussed the noise emissions likely to be generated through primary rehabilitation • Other information discussed not related to the closure plan included the water access licence which will be retained at the site, the supply of organic matter for use in rehabilitation and removal of the HV electricity supply
Department of Resources and Energy (Safety)	14 July 2016	Meeting and email	Sealing the underground mine	Discussion was held on: • The sealing of the underground portal, including the appropriate access point to seal and the appropriate for sealing off the access • The removal of the underground workshop • Communicated the findings and recommendations of the Geotechnical Report (Beck Engineering 31st May 2016) • The proposed design of the fence required to prevent access into the potential mine subsidence area

Stakeholder	Date	Consultation activities and forms of consultation	Matters subject to consultation	Actions taken in response to the matters raised
				• Retaining the "1020 service hole" and associated tanks to complement final land use
Mid-Western Regional Council	19 July 2016	Email	Closure plan	• Email sent to obtain advice on Mid-Western Regional Council's interest into input in the closure plan • Initial response advised that the planning department have no comment on the proposed Closure and Rehabilitation of the mine. • Mid-Western Regional Council advised that they would like a copy of the Closure and Rehabilitation Plan which will be provided
Department of Resources and Energy (Environment), Department of Primary Industry (Water), Environmental Protection Authority, Mid-Western Regional Council	29 August 2016	Email	Closure plan	• Draft Mining Operations and Closure Plan provided to stakeholders for review and comment prior to submission to Department of Resources and Energy • Feedback was received from the EPA and DPI which was addressed in the final MOCP submission
Mid-Western Regional Council	23 November 2016	Email	Development Consent	Complying Development Certificate Application submitted to Mid-West Regional Council to change building use from mining to farm buildings
Mid-Western Regional Council	3 October 2019	Email	Development Consent	After submitting a Development Consent Change to change the remaining infrastructure use from Open Cut Mining to Farm Buildings under the Environmental Planning and Assessment Act 1979, Sibelco was advised by the Mid-West Regional Council that no approval was required as the planned future land use complies with current land permissions.
NSW Resources Regulator	21 April 2019	LETT0005881	Notice of Approval	Approval of MOCP and assessment of security deposit
NSW Resources Regulator	28 June 2022	Zoom meeting	Transition to reform	Development of the RMP and access to the online portal discussed.

5. Final landform and rehabilitation plan

5.1. Final landform and rehabilitation plan – electronic copy

An electronic copy (PDF) of the final landform and rehabilitation plan is provided in:

- Figure 3 - Final Landform Features
- Figure 4 - Final Landform Contours

The plans have been prepared using theme data submitted to the mine rehabilitation portal. The electronic copy references the mine rehabilitation portal data theme submission ID numbers.

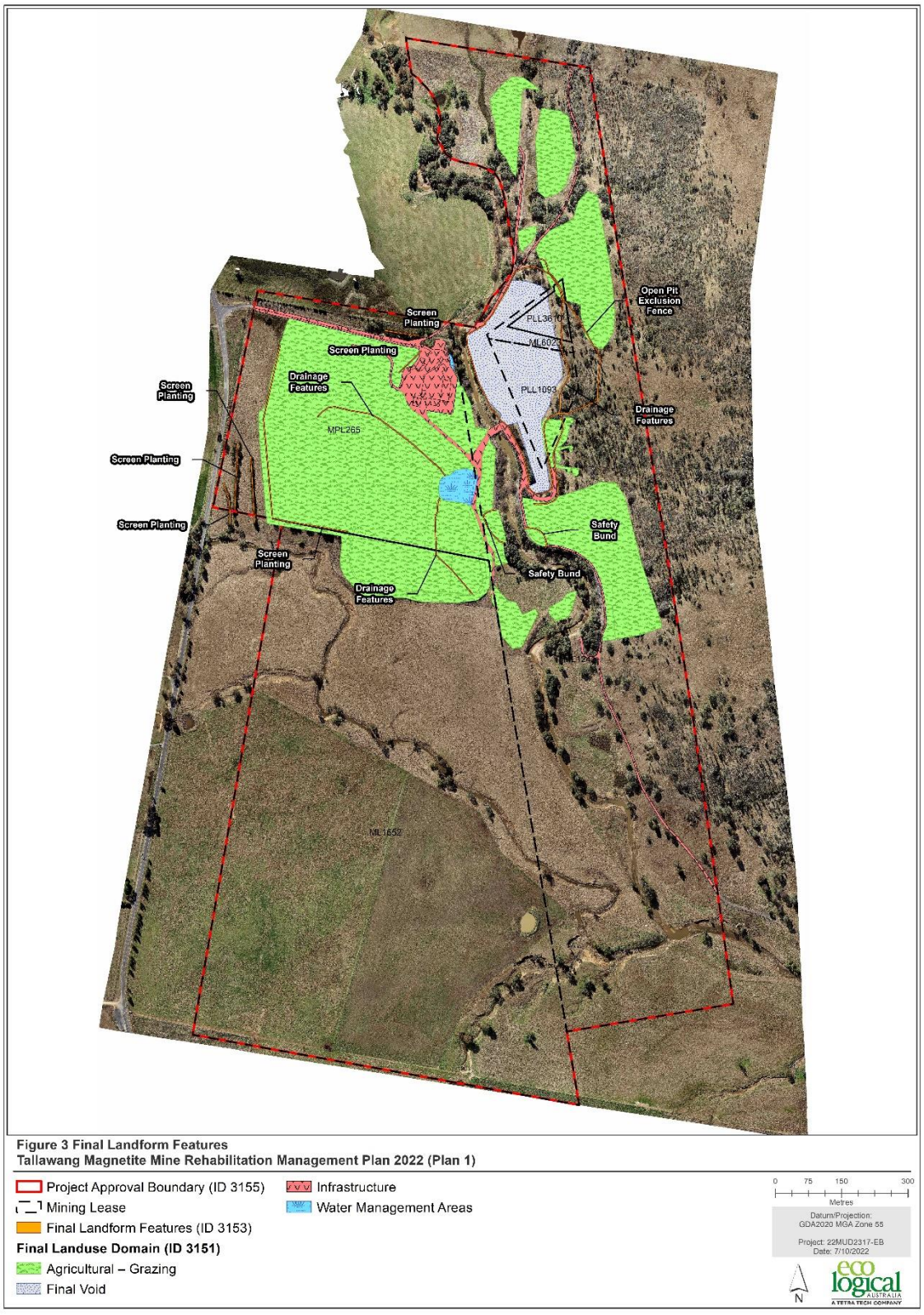

Figure 3 Final Landform Features

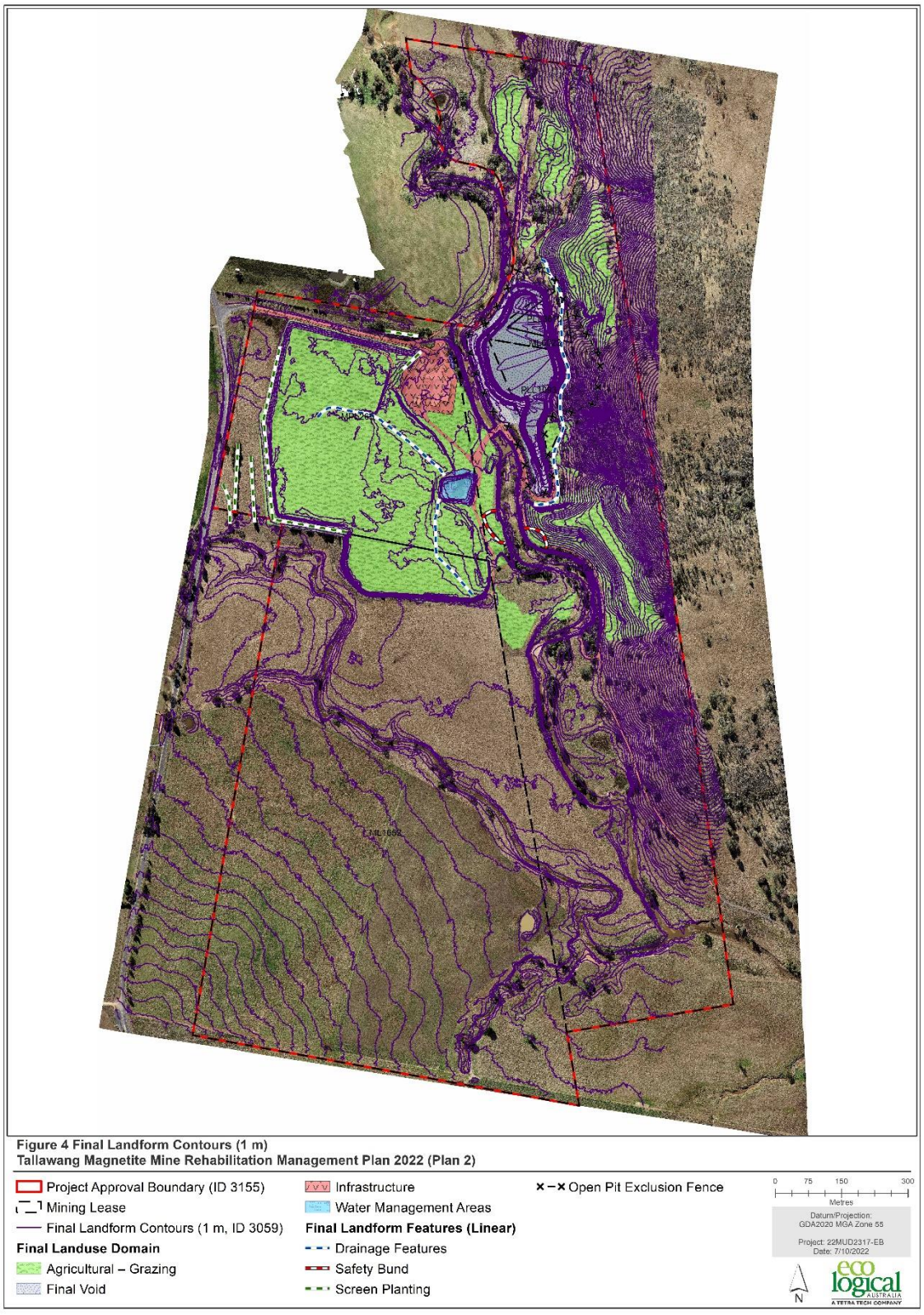

Figure 4 Final Landform Contours

6. Rehabilitation implementation

6.1. Life of mine rehabilitation schedule

All disturbed areas are in the ecosystem and land use development phase.

The schedule for the remaining life of the mine until rehabilitation completion is provided in Figure 5. The remaining activities required to achieve rehabilitation completion are:

- Implementation of the ongoing rehabilitation monitoring program.
- Implementation of minor rehabilitation repair works.
- Commissioning of an asbestos assessment for retained infrastructure.
- Decommissioning of any remaining groundwater monitoring piezometers.

These activities are outlined further in Section 6.2.6.

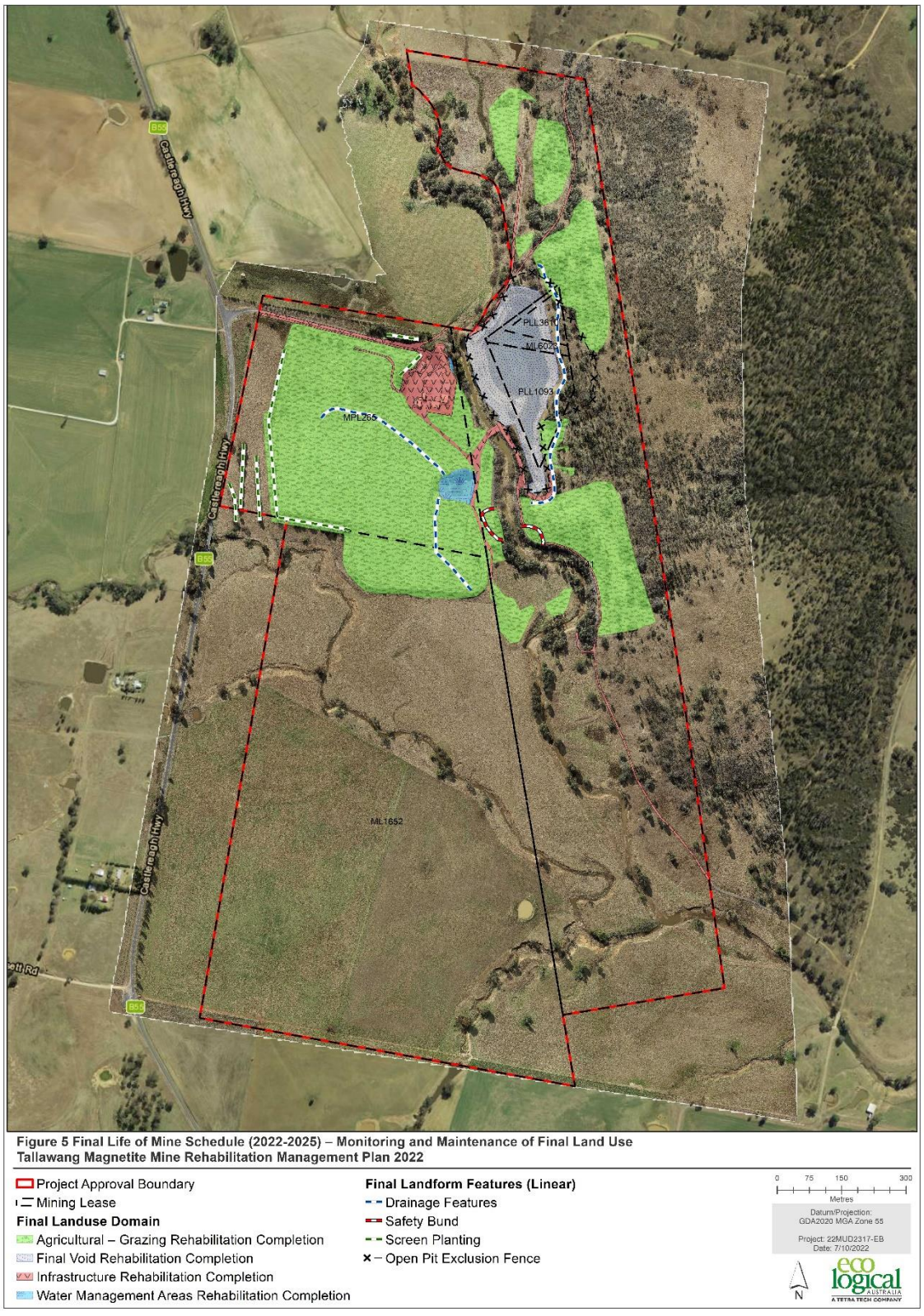

Figure 5 Final Life of Mine Schedule (2022-2025) – Monitoring and Maintenance of Final Land Use

6.2. Phases of rehabilitation and general methodologies

The Site is currently within the ecosystem and land use development phase, with the majority of the rehabilitation work already completed. Rehabilitation risks and opportunities have been previously considered in the general methodologies utilised in the active mining, decommissioning, landform establishment, growth medium development and ecosystem and land use establishment phases, which are now complete. Therefore, the majority of Section 6.2.1 to 6.2.5 is no longer relevant, however information has been summarised where proposed completion criteria associated with these phases have already been managed in accordance with the 2020-2024 MOCP (Sibelco, 2021).

6.2.1 Active mining phase

Mining ceased in March 2016, with processing continuing through to May 2016. No active mining is occurring, and no active mining is planned in the forward program. The site has been rehabilitated to the proposed final landform and final land use.

a. Soils and materials

Soil Landscapes of the Dubbo 1:250,000 Sheet indicates the alluvial low-lying areas comprise the Tucklan soil landscape euchrozems. These soils are gradational medium to heavy textured soils overlying alluvium at a depth of approximately 0.8 m. The soils occurring on the hillside comprise Surface Hill soil landscape non-calcic brown soils. These are shallow gradational medium to heavy textured soils overlying weathered bedrock at 0.5 m.

During operations, topsoils were stripped from disturbance areas and stored in designated topsoil stockpiles on site (constructed to no greater that 1.5 metres in height) for use in rehabilitation (Unimin, 2010). If not used immediately, stockpiles were seeded to provide vegetation cover. Further discussion of research on soil and soil forming materials used for rehabilitation is provided in Section 6.2.4.

As rehabilitation has been completed there is no deficit of material. The risk of soils being unsuited to the final land use has been considered and is low, as evidenced by the successful establishment of vegetation on all rehabilitated landforms to date.

b. Flora

The proposed final land use for rehabilitated areas is Agricultural – Grazing. There was no requirement to establish specific flora species in rehabilitation nor to translocate plants of threatened species. Consultation with a local agronomist was undertaken prior to revegetation. Native and improved pasture species have been used and persist in rehabilitation areas.

Weed management requirements are identified through the routine monitoring described in Section 6.2.6 and Section 8.

c. Fauna

The proposed final land use for rehabilitated areas is Agricultural – Grazing. There is no specific requirement to provide habitat for threatened or general native fauna habitat augmentation in the management of rehabilitation.

Pest management requirements are identified through the routine monitoring described in Section 6.2.6 and Section 8.

d. Rock/overburden emplacement

Overburden emplacement areas have constructed, shaped and rehabilitated. The waste material was benign (see Section 6.2.1.h) and did not require specific capping. As mining is complete, no further overburden emplacements will be created and there is no requirement for any additional material for overburden rehabilitation.

e. Waste management

The majority of waste has been removed from Site by licenced waste contractors. Historically, general waste was stored in designated areas on site prior to disposal off site by a licenced contractor. Where possible, materials were recycled, including cardboard generated on site and old batteries. Waste oil was collected in a designated container in the workshop and collected by Australia Waste Oil Refineries. The Site sewage was treated in a biocycle system (Sibelco, 2017a) which will remain in the final land use. A detailed Contaminated Site Assessment was undertaken by Kleinfelder Australia in May 2019 which concluded that potential contamination risk associated with the Site was low and acceptable and no further remediation was required.

Now that the Site is in the ecosystem and land use development phase, the only waste generated is during ad-hoc rehabilitation works by a site caretaker (subcontractor). There is potential for small amounts of non-production waste to be generated on an ad-hoc basis during the remainder of the rehabilitation and monitoring period.

f. Geology and geochemistry

The Tallawang Magnetite orebodies lie within the Lachlan Fold Belt, which covers a broad area of NSW. The Tallawang orebody is a contact metasomic deposit emplaced at the margin of the Gulgong Granite and folded rocks of the Capertee Rise.

Two significant mineralised zones are present, with the northern area exposed by mining. The skarns have formed within a sequence of felsic and mafic metavolcanics and politic and calcareous metasediments, which are part of the Silurian Dungaree Volcanics. The mineralisation is adjacent to the western boundary of the deformed Tallawang Granite, a sill-like microgranite intrusion of probable early Devonian age. To the east of these units is the post-orogenic, late Early Carboniferous Gulgong Granite. The skarns themselves have been structurally deformed, with pod-like bodies of semi-massive to massive magnetite and calc-silicates, with cordierite schist, biotite schist, metabasite and metadacite. The mineralisation bodies dip steeply west at the contact of the deformed granodiorite.

The Tallawang Magnetite Mine lease areas are located within the Dungaree Volcanics, close to the eastern boundary with the Gulgong Granite. The beds are found on the western margin of the magnetite orebodies and comprise a range of metamorphosed andesites, tuffs, arkoses and shales. The sediments petrologically are 40-60 percent quartz, 20-40 percent biotite, 10-30 percent feldspar and up to 10 percent iron rich hornblende. The rocks in which the north and south orebodies formed therefore represent a metamorphosed sequence of intermediate tuffs, siltstone, chert and impure dolomitic rocks of varying carbonate component laid down in a volcanic arc-marginal marine setting.

Semi-massive to massive magnetite occurs as a structurally hosted contact metasomatic deposit, which have formed within a volcano-sedimentary sequence (Dungaree Volcanics) of Silurian – Devonian age due to the intrusion of the nearby Gulgong Granite of Late Carboniferous age.

For further detail on geotechnical and geochemical risks, refer to Section 6.2.1.h and 6.2.1.i.

g. Material prone to spontaneous combustion

This is not considered a risk as magnetite is not prone to spontaneous combustion.

h. Material prone to generating acid mine drainage

No selective handling of mine waste was required. The 2010 MOP (Unimin, 2010) indicated that negligible quantities of sulphides occur within the mining waste. The assessments of tailings material and tailings leachate to date (Unimin, 2006; GHD, 2012; East-West, 2015; Kleinfelder, 2019; ELA, 2021) have not identified any acid generation from mine wastes.

KHM (2016b), in a review of toxicity characteristic leaching procedure (TCLP) test results on tailings conducted for a hydrological assessment in 2014, noted the tailings could be classified as "Inert Waste".

i. Ore beneficiation waste management

Historically, waste from the milling process comprised primarily of tailings. The waste was directed to a dedicated TSF where tailings were allowed to separate, and the water recovered. The embankments were constructed of compacted mine waste and lined with site-won clay and bentonite.

Based on the groundwater and surface water monitoring undertaken to that date, GHD (2012) concluded that there were no impacts to groundwater resulting from the tailings dam.

In 2012 a structural integrity investigation and report was prepared which summarised the risk of wall failure for the TSF was low. The tailings dams were regularly inspected for dam wall integrity (Sibelco, 2017a).

Cell 3 was the last section of the TSF to be used for operations. After the cessation of operations it was dewatered and dried out prior to landform establishment (Sibelco, 2021).

j. Erosion and sediment control

During operations, erosion and sediment control was managed through the construction of clean water diversions and a series of temporary and long-term sediment dams and pits designed to capture and treat mine impacted runoff prior to discharge to vegetated areas around the operation or via drainage structures to Tallawang Creek. These were described in detail in 2010 MOP (Unimin, 2010). Progressive rehabilitation of completed landforms was undertaken to minimise areas of exposed material that could generate sediment run-off.

Following cessation of mining, Sibelco engaged KMH Environmental to prepare a surface water management plan for the site in preparation for mine rehabilitation and closure activities (KMH, 2016a). Installation of erosion and sediment control infrastructure recommended by KMH (2016a) were completed during the term of the 2016 MOCP (Sibelco 2017a). The permanent structures include constructed rock lined drains, clean water diversion channels, sediment retention structures and drainage swales. Key features were installed to KMH's specifications and include a clean water diversion up-slope of the void, swales on the rehabilitated TSF and the retained water management structures adjacent to the TSF and the retained infrastructure.

All permanent structures have been designed and installed to blend in with the surrounding topography and will provide long term control for this risk. Sediment dams are retained for the final land use and desilted if required. For more information, refer to Section 6.2.3a.

k. Ongoing management of biological resources for use in rehabilitation

Ongoing management of biological resources is not required as all rehabilitation works have been satisfactorily completed.

l. Mine subsidence

The underground mine has been permanently sealed in preparation for final land use (water management) as shown in Figure 6. This complied with MA0003/2006 DA 105/85 Condition 2 – Commitments in the EIS that all underground portals will be sealed to the satisfaction of the Department of Mineral Resources. The vent fan has been removed and replaced with a steel grid designed to restrict access. All other access points to the underground are back filled with earthen materials to restrict access (Sibelco, 2017b).

The underground workings were inspected for potential subsidence by Beck Engineering (2016). They provided recommendations for fencing (compliant with Western Australian guidelines) around the open cut void and two areas of potential subsidence zones.

Figure 6 Photographs of the sealing of the underground portal

Further, the underground mine has been allowed to fill with groundwater. As the access to the underground mine is through the open cut void, this has also filled with groundwater resulting in a stabilised mine.

m. Management of potential cultural and heritage issues

Aboriginal heritage sites were identified within the development disturbance footprint as described in the EIS (R.W. Corkery & Co, 1985). In consultation with the Wellington Local Aboriginal Land Council (LALC) and the Dubbo Regional Aboriginal Land Council, it was determined that the sites could be destroyed if all artefacts were collected prior to destruction and lodged with Wellington LALC. During operations, any identified/known items of Aboriginal heritage were removed from the site and procedures were established to stop works and notify the appropriate agencies should potential artefacts or skeletal remains be uncovered.

n. Exploration actives

No further exploration activities will be undertaken at the Site.

6.2.2 Decommissioning

a. Site security

The site entrance gate is locked at all times and requires a security coded key for access. The Site is fenced with a stock proof fence to prevent accidental entry with warning signs placed along the boundary fence line.

b. Infrastructure to be removed or demolished

All infrastructure not being retained to support final land use has been demolished and removed, which comprises the following assets:

- Jaw Crusher x 2
- VSI and Associated Conveyers
- Crushed Ore Hopper
- Feed Bin with Associated Conveyers
- Ball Mill
- Magnetic Separators x 5
- Cyclones
- Drum Filter System
- Mill Control Room
- Electrical Control Room
- Explosives Magazines x 3
- Shed at Laydown Area
- Underground Workshop
- Product Storage
- Magnetite Storage Bays

The high voltage power to the site has been disconnected and replaced with a low voltage power supply to the administration building. All existing fences and gates have been retained. Concrete footings have been excavated to a depth of 150 mm and covered with black sand as part of rehabilitation efforts.

c. Buildings, structures and fixed plant to be retained

Remaining assets to be retained to support the final land use are outlined in Table 5. This is in line with MA0003/2006 DA105/85 – Commitments in the EIS (retention of fencing, gates, access road, retention of buildings for alternative use). Sibelco have been advised by the Mid-Western Regional Council that no approval is required to change the buildings used from Open Cut Mining to Farm Buildings under the *Environmental Planning and Assessment Act 1979*.

Water management structures no longer required have been decommissioned and filled. The sediment trap located behind the former product shed has been retained to manage sediment run-off from the hardstand area retained around the administrative buildings and storage sheds that are also being retained. The largest process water dam has been retained to provide on-going sediment control and water storage.

d. Management of carbonaceous/contaminated material

Sibelco engaged the services of KMH Environmental (KMH) to undertake a Phase 1 Contaminated Land Assessment (KHM, 2016b) and follow-up targeted sampling (KHM, 2017). Based on the recommendations from KMH (2017), a detailed Contaminated Site Assessment was undertaken by Kleinfelder Australia (Kleinfelder) in May 2019. Kleinfelder (2019) concluded that:

- The potential contamination risk associated with the Site was considered to be low and acceptable
- Asbestos containing materials were not detected in soil / fill / mine waste materials
- Generally, groundwater and surface water samples were found to be below the adopted water assessment criteria
- A remediation action plan was not warranted for the Site.

e. Hazardous material management

In accordance with the 2016 MOCP (Sibelco, 2017a), all hydrocarbons and potentially hazardous chemicals were removed to another Sibelco operation (prior to any divestment) or disposed of through a licenced contractor. As the site is no longer operational, hydrocarbons and chemicals are not permanently stored on site.

f. Underground infrastructure

The underground portal has been permanently sealed as part of the establishment of the final land use (water management) as shown in Figure 6. This complied with MA0003/2006 DA 105/85 Condition 2 – Commitments in the EIS that all underground portals will be sealed to the satisfaction of the Department of Mineral Resources. The vent fan has been removed and replaced with a steel grid designed to restrict access. All other access points to the underground are back filled with earther materials to restrict access (Sibelco, 2017b).

The portal has since been inundated as groundwater levels have recovered within the void outlined in the 2020 MOCP (Sibelco, 2021). The underground workings were inspected for potential subsidence by Beck Engineering (2016). They provided recommendations for bunding of areas of potential subsidence (refer to Section 6.3).

6.2.3 Landform establishment

a. Water management infrastructure

The two southern sediment dams have been decommissioned and backfilled and the final landform established as part of works on the adjacent TSF cells. The sediment trap located behind the former product shed has been retained to manage sediment run-off from the hardstand area retained around the administrative buildings and storage sheds that are also being retained. The largest process water dam has been retained to provide on-going sediment control and water storage.

b. Final landform construction: general requirements

The final landform has been constructed to align with characteristics of the surrounding land.

Roads, tracks and hardstand areas that were not retained to support the use of the retained assets did not require any additional earthworks to establish the final landform grade. These areas were deep ripped in preparation for growth medium application. Topsoil stockpiles were removed during rehabilitation works and minor areas reshaped to conform with the natural ground. The majority of landform establishment works occurred in the emplacement and tailings dam areas and is detailed in Section 6.2.3.c.

c. Final landform construction: reject emplacement areas and tailings dam

The final landform has been constructed to align with characteristics of the surrounding land.

The overburden emplacements on the eastern side of Tallawang Creek have final landforms that conform with the existing adjacent hillslopes and vary according to the surrounding topography

(see Figure 4). The final slopes are also consistent with the nominated final land use and land quality (Agriculture-Grazing on land which is equivalent to Rural Land Classification Class VI).

The landform design specifications for the TSF are provided in KMH (2016a) design. The final landform falls from the west at a height of approximately 10m above natural ground to approximately 4m above natural to the east adjacent to Tallawang Creek. The final form slope grades range between 1% and 10%, with the overall grade averaging approximately 2%. The final surface has been shaped to achieve very broad and sweeping slopes, with only small batters between remnant cells separating the older rehabilitated areas and most recently active sections of the TSF. The final landform aimed to generate sheet flow, as far as practical with an area of approximately 8 hectares of surface area that slopes at a maximum of 1% to the east and away from the western and southern tailings batters. The final surface has similar slopes to the slopes of the surrounding alluvial landform (see Figure 4). The TSF generally drains to the retained sediment basin on the water management final land use domain. Shallow swales were constructed to direct water to the dam, and these have since been well vegetated and stabilised.

d. Final landform construction: final voids, highwalls and low walls

The southern pit extension and Tallawang creek diversion did not occur (as originally envisaged in the 1985 Development Consent proposal). Therefore, the final void terminated near to the pre-existing quarry pit, north of the 1985 proposed void location. The final void is of similar size to that originally proposed and will be similarly used as a water storage area. The rehabilitation outcome is generally consistent with the EIS as required by DA105/85.

Open cut mining has truncated the eastern contact of the alluvial aquifer associated with Tallawang Creek which has led to ongoing seepage into the pit, which only slowed during the extended drought in 2019. This seepage occurs at 458 - 459 m AHD. Hydrological analysis and historical evidence indicate the final water level will be approximately 5m below the base of the Tallawang Creek. The equilibrium level of pit water following closure is predicted to be 458 - 459 m AHD based on observed spring water in the pit and in the creek. The current water level is approximately 449 m AHD.

A final Geotechnical Assessment (Beck Engineering, 2016) has been undertaken to ensure there are no unmanaged residual geotechnical hazards remaining at Site.

A security fence has been installed around the open pit void, as recommended by Beck Engineering (2016), to prevent accidental public and stock access. Although no surface instability has been observed to date during groundwater recovery and rising water levels in the mine void, during flooding of the mine void any instability has the potential to be accelerated.

The final location of fence installation varied from the recommended location to achieve straight fence lines; however, it includes all land recommended in the geotechnical report to be enclosed. The fence is a hinged joint stock fence with two barbs on top and has danger signs installed at 50-metre intervals that will remain when Mining Leases are relinquished.

The geotechnical report (Beck Engineering, 2016) and fencing recommendations were discussed with the DRE (now Resources Regulator) Safety Inspector who indicated that this fence design would meet the intent of ensuring site safety associated with the final void.

Beck Engineering concluded that remedial actions would not be required in the event of any predicted pit instability as all instabilities should be contained within the fence perimeter. The fenced off void therefore poses low risk to the public and future landowners.

e. Construction of creek/river diversion works

This sub-section is not relevant to the Site as no creek diversions have been constructed. They were envisaged as part of the original proposed development in 1985 to accommodate the southerly extension of the open cut, but this was never developed to the extent that diversions were required.

6.2.4 Growth medium development

The two large dry stacked tailing stockpiles (black sand) previously existing on the site were used as part of the rehabilitation for landform establishment and as a growth medium subsoil for the TSF, former ROM stockpile, infilled sediment dams and prepared roads, tracks and laydown areas. Material testing (East West, 2015) and rehabilitation trials were carried out by Sibelco to assess the suitability of the stockpiled black sand as a growth medium. The results of the analysis and trials were positive and indicated that the black sand could be ameliorated (with nutrients and gypsum or lime) to provide a suitable growing medium.

In response to a Notice issued by the Resources Regulator under the Mining Act 1992 section 240 (reference NTCE0007002) on 27 November 2020 (section 240 notice), Sibelco commissioned ELA to conduct a study to characterise and determine the quality of soils and materials across the site and to recommend amelioration measures required to ensure the achievement of the rehabilitation objectives for Tallawang.

The study confirmed that the soil and soil forming material present on the final landforms are near neutral or alkaline in nature and there is no indication of acid mine drainage generation. Further, the growing medium is not considered to pose a risk to the environment, grazing animals or humans. The study concluded that no management or amelioration measures were required, and that the quality of the growth medium was sufficient to achieve final land use outcomes across all relevant final landforms and domains (ELA, 2021).

6.2.5 Ecosystem and land use establishment

Progressive rehabilitation at the site has occurred since the 1990s. The overburden emplacements located on the Eastern site of the open pit were rehabilitated in the 1990s. Embankments on the tailings dam were stabilised and vegetated through to approximately 1998. In 2001 sections of the tops of the tailings dam were planted with pasture grasses. The northern edge of the open pit was shaped and vegetated in 1996 with further vegetation of Eucalypts and Acacias in 2003. Tree screens were put in place between the Castlereagh Highway and mine workings from the early 1990s to approximately 2006 (Sibelco, 2017a).

Vegetation establishment using pasture species and some tree establishment has already occurred in all areas requiring revegetation. Some recruitment of shade trees and shrubs has occurred on older part of the site, particularly on the overburden emplacements that were rehabilitated in the 1990s.

The suitability of the growing medium across the final landforms has been confirmed with successful establishment and vigorous growth of mixed pasture species and the return of soil function (ELA, 2021) (see Figure 7 and Figure 8).

All vegetation has now progressed to the ecosystem and land use development phase.

Figure 7 Pasture and shade tree establishment on overburden emplacement area (left) and former soil stockpile (right) (October 2020)

Figure 8 Pasture establishment on the former stockpiled black sand area on the TSF (left) and TSF Cell 2 (right) (October 2020)

6.2.6 Ecosystem and land use development

As part of the land and growth medium assessment conducted in response to the section 240 notice issued in November 2020, ELA (2021) confirmed that all the soil and land attributes (as documented in the completion criteria in Section 4) met the requirements of Rural Land Capability Classification Class VI in areas rehabilitated to the agriculture- grazing final land use. As this classification is based on inherent (and largely unchanging) land and soil characteristics, no on-going monitoring and assessment of Rural Land Capability Classification Class is required.

The rehabilitated areas are subject to routine monitoring and maintenance activities. The monitoring includes the identification and maintenance and on-going land management practices, such as weed and feral animal control, erosion control, repair/reseeding of areas of poor vegetation cover, low productivity. In the areas designated as agriculture- grazing final land use, are subject to on-going monitoring of species composition and pasture condition.

The monitoring and control practices implemented for this phase are outlined in Table 13 to ensure risks as outlined in Section 3 are appropriately managed until relinquishment. Details of the monitoring program are provided in Section 8.

Table 13 Monitoring and maintenance measures for the ecosystem and land use development phase

Activity	Time period	Management practices
Weed and feral animal control	Until confirmation of rehabilitation completion	Monitoring inspections (quarterly until June 2022 then 6 monthly until confirmation of rehabilitation completion) Weeds and pests classified and controlled in accordance with regional management plans (LLS, 2017; LLS, 2018) and records maintained
Erosion and drainage control	Until confirmation of rehabilitation completion	Monitoring inspections (quarterly until June 2022 then 6 monthly until confirmation of rehabilitation completion) Erosion repairs and topsoil replacement will be conducted as required and records maintained
Pasture monitoring	Until confirmation of rehabilitation completion	Monitoring inspections (quarterly until June 2022 then 6 monthly until confirmation of rehabilitation completion) Re-seeding/planting of rehabilitated areas or fertiliser application will be conducted as required and records maintained
Maintenance repairs (fence line/ tracks etc)	Until confirmation of rehabilitation completion	As required if identified from field observations recorded during monitoring or ad hoc site inspections

All rehabilitation areas have been successfully established, so re-seeding/planting and maintenance fertilising is not required.

Prior to relinquishment, Sibelco will commission an assessment of the retained administrative buildings to confirm that they do not have any materials containing asbestos. This was a corrective action required following the identification of a knowledge gap through the rehabilitation risk assessment outlined in Section 3. Remaining groundwater monitoring piezometers will also be decommissioned.

6.3. Rehabilitation of areas affected by subsidence

Sibelco engaged the services of Beck Engineering in 2016 to undertake a geotechnical assessment of the Site to assess the risk of mine instability and subsidence and recommend controls for management. The conclusions drawn from this assessment indicated that the mine is currently stable, and this condition would be unlikely to change now that mining operations have ceased.

The spatial extent of potential mine subsidence areas associated with stope instability and collapse were identified as part of the geotechnical assessment, and included:

- A northern stope with a portal from the pit
- Two 'blind' stopes located to the south of the pit ramp

The risk of subsidence for the two 'blind' stopes (AN2 and AN3) was also assessed by Beck Engineering as low. Both stopes are small in size and approximately 40 m below the surface. Beck Engineering identified that the potential subsidence zones are difficult to fence off and recommended restricting access through bunding and installation of warning signs at a 50 m spacing. The section of road above the subsidence zones has been bunded off at each end and warning signs have been erected. Beck Engineering (2016) concluded that remedial actions would not be required in the event of subsidence, as all instabilities should be contained within the perimeter of the areas to be bunded and therefore pose a low risk to the public and landowners.

7. Rehabilitation quality assurance process

All rehabilitation works have been completed with a view to achieving the rehabilitation objectives for the site. As all disturbed areas of the site are in the ecosystem and land use development phase, achievement of completion criteria for this phase will validate that rehabilitation has been completed and is ready for sign-off prior to relinquishment.

The quality assurance process for the remaining monitoring and maintenance activities, including the responsibility for implementation, validation of completion and documentation are outlined in Table 14.

Table 14 Quality assurance for the remaining rehabilitation activities

Rehabilitation action	Responsibility for implementation	Validation of completion	Documentation /Record
Implementation of the ongoing rehabilitation monitoring program.	Suitably qualified person under the direction of Sibelco's Sustainability Manager.	Monitoring report issued by ecologist.	Reports
Implementation of minor rehabilitation maintenance and repair works.	Suitably competent contractor under the direction of Sibelco's Sustainability Manager.	Photographs and site inspection.	Inspection records
Completion of an asbestos assessment for retained buildings.	Suitably qualified person under the direction of Sibelco's Sustainability Manager.	Inspection report issued by assessor.	Report
Sealing and grouting of any remaining groundwater monitoring piezometers.	Suitably competent contractor under the direction of Sibelco's Sustainability Manager	Photographs and site inspection.	Inspection records

The frequency of monitoring will be reviewed by Sibelco's Sustainability Manager subject to the outcomes documented in monitoring reports.

8. Rehabilitation monitoring program

8.1. Analogue site baseline monitoring

The rehabilitation monitoring program has been developed and implemented to evaluate the progress of rehabilitation towards fulfilling rehabilitation objectives and rehabilitation completion criteria nominated in Section 4 that have been carried over from the 2020-2024 MOCP (Sibelco, 2021).

The main objective is to rehabilitate land in the Agricultural – Grazing final land use domain to Rural Land Capability Classification Class VI. This benchmark does not rely on baseline or analogue site data. The land attributes required to achieve Rural Land Capability Classification Class VI that have been adopted for the rehabilitation completion criteria have been taken from:

- *Rural Land Capability Mapping* (Emery, 1986).
- *The land and soil capability assessment scheme – second approximation* (Office of Environment and Heritage, 2012).

Pasture productivity and condition is assessed with reference to the maintenance of an appropriate ground cover to provide erosion protection and feed quantity and pasture species composition and cover to provide feed quality.

Groundcover requirements are based on research on erosion rates from rehabilitated landforms presented in:

- *Effects of vegetation cover on runoff and erosion under simulated rain and overland flow on a rehabilitated site on the Meandu Mine, Tarong, Queensland* (Loch, 2000).
- *Soil Erosion Rates and Fertility Studies, Burton Coal Project*. (NRA, 2000)
- *MINErosion 3: Using measurements on a tilting flume-rainfall simulator facility to predict erosion rates from post-mining landscapes in Central Queensland, Australia* (So *et al.*, 2018).

The identification of native and introduced grass, legume and herbage species recognised as pasture species or known to be palatable and provide forage for livestock is based on:

- *The Grazier's Guide to Pastures: Sowing and managing profitable pastures in the Central and Southern Tablelands, Monaro and Upper South West Slopes of New South Wales. Second edition* (NSW Agriculture, 2003)
- *Common Native Grasses of Central West NSW* (LLS, 2015)
- *Pasture varieties used in New South Wales 2012-13* (DPI, 2012)
- *Pastures Australia* (web resource - AWI et al. 2022) see Factsheet Index at: https://keys.lucidcentral.org/keys/v3/pastures/Html/index.htm
- *Beef Stocking Rates and Farm Size - Hunter Region NSW* (DPI, 2006)
- *Central West CMA Native Vegetation Management - Native Fodder Shrubs for Pasture Enhancement* (www.cavrep.com)

Other appropriate published literature sources.

Rehabilitation objectives and completion criteria for the remaining final land use domains (Final Void, Water Management Area and Infrastructure) has been adopted from relevant reports and assessments prepared by suitably qualified persons and consultation with relevant stakeholders.

8.2. Rehabilitation establishment monitoring

Ecosystem establishment has already successfully occurred at the Site. All areas the ecosystem and land use development phase. Monitoring for this phase is outlined in Section 8.3.

8.3. Measuring performance against rehabilitation objectives and rehabilitation completion criteria

As discussed in Section 6.2.6, an assessment of achievement of Rural Land Capability Classification Class VI in areas rehabilitated to the Agricultural - Grazing final land use has been conducted (ELA, 2021) and no on-going monitoring and assessment of Rural Land Capability Classification Class is required.

Monitoring of pasture condition in the Agricultural - Grazing final land use domain (ecosystem and land use development phase) is conducted by a suitably qualified ecologist. Monitoring was initiated through the 2020 MOCP (Sibelco, 2021) and was conducted quarterly (covering different seasons) up to June 2022. As planned, monitoring will now occur at 6-monthly intervals until the relevant completion criteria have been consistently achieved.

The assessment is conducted along 50 m transects at a minimum of eight locations covering overburden dumps, former tailings cells and areas which have been disturbed by mining and revegetated. Data is collected for the presence of erosion features, ground cover (%), priority weeds and pasture species composition and cover. Observations of mass stability, erosion features are also recorded and opportunistic observations of track and fence condition, priority weeds and pests are also made and Sibelco's Caretaker and or Sustainability Manager informed so that controls or repairs can be initiated.

The collected data is assessed against the rehabilitation completion criteria to determine if it is on a trajectory to achieve or has achieved the required benchmark levels. The Annual Rehabilitation Report formally reviews the progress of rehabilitation against all completion criteria and provide recommendations for remedial action as required.

The achievement of completion criteria for the infrastructure and water management area final land uses will be validated using site records, reports and photographs.

9. Rehabilitation research, modelling, and trials

9.1. Current rehabilitation research, modelling, and trials

All proposed rehabilitation works have been completed. This was informed by previous trials. As no further works are required, there are no current or ongoing rehabilitation research, modelling or trials occurring at the Site.

9.2. Future rehabilitation research, modelling, and trials

All proposed rehabilitation works have been completed. This was informed by previous trials. As no further works are required, there are no rehabilitation research, modelling or trials are planned.

10. Intervention and adaptive management

A Trigger Action Response Plan (TARP) for rehabilitation of the Site is maintained by Sibelco. The current version of the TARP, which has been reviewed during development of the RMP, is provided in Table 15. The TARP provides intervention triggers for the rehabilitation monitoring occurring at the Site to address the remaining risks to successful rehabilitation if they emerge. The TARP will be reviewed and updated as required under the triggers outlined in Section 1.

There are no current or ongoing rehabilitation research or trials at the Site, and the outcomes of previous trials have been incorporated into rehabilitation methods that have now been completed. Remaining rehabilitation involves monitoring and as-required maintenance activities under the ecosystem and land use development phase. Therefore, adaptive management and research integration and are not applicable to the rehabilitation activities occurring at the Site.

Table 15 TARP for the current Site rehabilitation activities

Trigger Action Response Plan (TARP)				
Response to Undesired Changes to Rehabilitation affecting Outcome Criteria, or Operational Activities that may affect Rehabilitation Outcomes				
Rehabilitation Activity	**Green**	**Amber**	**Red**	**Recommended monitoring/measuring method**
Vegetation Failure	>50% vegetation coverage of the soil surface	>25% but <50% vegetation coverage of the soil surface	<25% vegetation coverage of the soil surface	
	Trigger Action Response to above Triggers			
	Vegetation assessment confirms adequate ground cover to minimise erosion and dust issues	Visual investigation for potential causes of low establishment rate. Undertake spot growth medium samples to determine if parameters fall within required ranges. Undertake soil amelioration as determined by soil samples. Follow up reseeding to improve groundcover density is to be considered following the application of soil amelioration	Detailed investigation into cause of vegetation failure. Investigations may include: detailed soil sampling program including soil moisture levels, analysis of meteorological conditions, analysis of land use following landform establishment. Use investigation findings to undertake soil amelioration and reseeding. Undertake biannual inspections to assess success of remediation work	On-going assessment of ground cover during rehabilitation monitoring inspections (6 monthly until completion sign off).
Geotechnical instability	No identified signs of instability or mass movement outside of fenced or bunded areas	Signs of minor settlement (drop in elevation), appearance of hairline ground cracks outside of fenced or bunded areas	Signs of significant movement: Appearance of enlarged ground cracks (+2mm wide), visible vertical or horizontal movement outside of fenced or bunded areas	
	Trigger Action Response to above Triggers			
	No action to be taken.	Depth and extent of cracking to be recorded during routine site inspections Minor settlement can be infilled with topsoil and reseeded if required.	Geotechnical investigation of the ground movement is to be undertaken together with an assessment of damage to rehabilitation landform or drainage structures.	Ground movement will be identified as part of formal and informal rehabilitation monitoring inspections.
	No active gully erosion (>0.3 m deep) present	Active erosion gullies >0.3 m – 1.0 m deep present	Active gullies and tunnels >1.0 m present	

Trigger Action Response Plan (TARP)				
Response to Undesired Changes to Rehabilitation affecting Outcome Criteria, or Operational Activities that may affect Rehabilitation Outcomes				
Rehabilitation Activity	**Green**	**Amber**	**Red**	**Recommended monitoring/measuring method**
Erosion and loss of topsoil/growth medium	**Trigger Action Response to above Triggers**			
	No action is to be taken other than continued monitoring following rainfall.	Erosion to be treated. Surface hydrology and landform is to be reviewed, in conjunction with surface vegetation and historic weather. Application of surface erosion control treatment may be considered.	Full investigation is to be undertaken with a review of all design parameters with particularly emphasis on overland flow from surface water sources. A consultant will be engaged by Sibelco to update the surface water management plan to remediate erosion onsite and prevent further erosion establishment. All recommendations of the updated surface water management plan will be implemented.	Visual assessment for active erosion features during rehabilitation monitoring inspections (6 monthly until completion sign off).
Site access track	Track surface shows no signs of erosion and water freely drains off the surface	Track surface remains undamaged with minor erosion or minor water ponding.	Track surface fractures with substantial erosion (undercutting, tunnel erosion, riling along bank), or significant water ponding	
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring.	Monitoring frequency is to be increased, and observations undertaken during rainfall events that cause runoff. Localised repair work is to be undertaken as needed. Diversion drains to be re-established if filled with sediment	Investigation into the cause of the erosion is to be initiated, and the design parameters reviewed. Surface grade to be re-established if poor drainage control is an issue.	Monitoring during informal and formal rehabilitation inspections (walk arounds) and monitoring.
Destructive environmental event (Fire, drought, flood, insect plague)	Minimal damage to pasture vegetation and landform including drainage structures, vegetation able to fully recover without intervention.	Minor damage to pasture and or landform and stability structures. Minimal remediation required e.g., reseeding or fertiliser application.	Significant damage to pasture and or landform and stability structures requiring remediation and redesign.	
	Trigger Action Response to above Triggers			

Trigger Action Response Plan (TARP)				
Response to Undesired Changes to Rehabilitation affecting Outcome Criteria, or Operational Activities that may affect Rehabilitation Outcomes				
Rehabilitation Activity	**Green**	**Amber**	**Red**	**Recommended monitoring/measuring method**
	No action to be taken other than continued monitoring.	Remediation action plan to be implemented by site personnel.	Detailed assessment to be undertaken and remedial action plan developed. Preventative measure to be investigated and any recommendations are to be implemented and the rehabilitation manual updated as required.	Identified as part of post event inspection and monitoring by rehabilitation specialist as required.
Weed Establishment	No priority weeds recorded	Individual or isolated priority weeds are managed according to relevant local guidelines to minimise the presence of priority weeds	Extensive outbreaks of declared weeds are identified (>5 patches or >0.5ha of impacted land)	
	Trigger Action Response to above Triggers			
	No action to be taken other than continued monitoring and continued land management practices	Weed control will focus on hand pulling or mechanical control to limit chemical use onsite	Weed management plan developed in consultation with landowners and Mid-Western Regional Council. Weed control will be undertaken by hand pulling or mechanical control for small patches. Large patches of declared weeds will be controlled with close reference to the specific weed guidelines provided by Mid-Western Regional Council. Where possible, chemical control will use biodegradable and environmentally friendly chemicals	On-going assessment of weed presence during rehabilitation monitoring inspections (6 monthly until completion sign off). Landowner will be consulted regarding any additional work undertaken to remove weeds.

11. Review, revision and implementation

The triggers for review and revision of the RMP are presented in Table 16. There are no triggers for revision of the RMP under the development consent or mining lease conditions for the Site other than those already covered by the statutory requirements under Clause 11 of Schedule 8A of the *Mining Regulation 2016*. As the Site is in the ecosystem and land use development phase with all domains on a trajectory towards achieving the proposed rehabilitation objectives, a revision of the RMP is not expected to be required unless:

- The rehabilitation activities for the site change,
- Rehabilitation monitoring indicates that a rehabilitation objective has not been or will not be achieved,
- Additional stakeholder consultation occurs.

Table 16 Triggers for the review and revision of the RMP

Trigger	Circumstances triggering an amendment	Period to complete amendment
Statutory, under Clause 11 of Schedule 8A of the Mining Regulation 2016	To substitute the proposed version of a rehabilitation outcome document[1] with the version approved by the Secretary.	Within 30 days after the document is approved.
	As a consequence of an amendment made under clause 14 of Schedule 8A of the Mining Regulation 2016 to an approved rehabilitation outcome document[1].	Within 30 days after the amendment is made.
	To reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment.	As soon as practicable after a risk assessment is conducted.
	Whenever given a written direction to do so by the Secretary.	In accordance with the direction.
Internal	The rehabilitation activities for the site change.	As soon as practicable after implementation of activity.
	Rehabilitation monitoring indicates that a rehabilitation objective has not been or will not be achieved.	As soon as practicable after corrective actions have been implemented.
	Additional stakeholder consultation occurs resulting in a review of activities.	As soon as practicable after stakeholder consultation is addressed.

[1]Rehabilitation outcome document refers to one of the following: the rehabilitation objectives statement, the rehabilitation completion criteria statement or the final landform and rehabilitation plan.

The preparation of the ARR will ensure an ongoing review of rehabilitation activities against the RMP and the rehabilitation objectives and completion criteria. The RMP will be managed by Sibelco and published on the Sibelco website.

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