sojitz
New way, New value

Level 27 Central Plaza One
345 Queen Street, Brisbane, Qld 4000
GPO Box 126, Brisbane, Qld 4001
Tel: (07) 3054 6901 Fax: (07) 3229 4803
ABN: 15 075 056 058

Minerva Mine

Progressive Rehabilitation and Closure Plan

ML70145 and ML70376

EA Holder - Minerva Coal Pty Ltd

ID/Version Number	Version 1	28 June 2022

Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Transitional Arrangements

The Department of Environment and Science provided a Progressive Rehabilitation and Closure Plan (PRCP) transition notice for the Minerva Mine on 9th March 2021. The transition notice required Minerva Coal Pty Ltd to submit a proposed PRCP for Minerva Mine to the Department of Environment and Science by 1st July 2022.

The proposed Minerva Mine *Progressive Rehabilitation and Closure Plan* fulfills the requirements of the PRCP transition notice.

1.2 Land Outcome Documents

The following land outcome documents (LODs) are in place for the Minerva Mine:

- Environmental Authority EPML00668613
- Minerva Mine *Residual Void Investigation Report* (Sojitz Minerva Mining 2021a) (refer to **Appendix A**)
- Minerva Mine *Rehabilitation Management Plan* (Sojitz Minerva Mining 2021b) (refer to **Appendix B**)

2 Project Planning

2.1 Mining Operations

Minerva Mine is managed by Sojitz Plus Pty Ltd on behalf of joint venture partners Sojitz Blue Pty Ltd and Kores Australia Minerva Coal Pty Ltd. Minerva Mine is located approximately 45 km south of Emerald and 25 km north of Springsure in Central Queensland (**Figure 1**). Open-cut mining operations commenced in 2004 and economic coal reserves were depleted by August 2021, with the site now being rehabilitated as part of mine closure activities.

Thermal coal was produced during active mining at an average rate of approximately 2.6 Mt per annum from multiple seams at a maximum depth of nearly 200 m below the surface. The coal had an average ash content of 15%. The coal did not need to be processed by a coal handling and preparation plant and no coarse rejects or fine tailings were produced. The coal was railed to the RG Tanna export terminal at Gladstone.

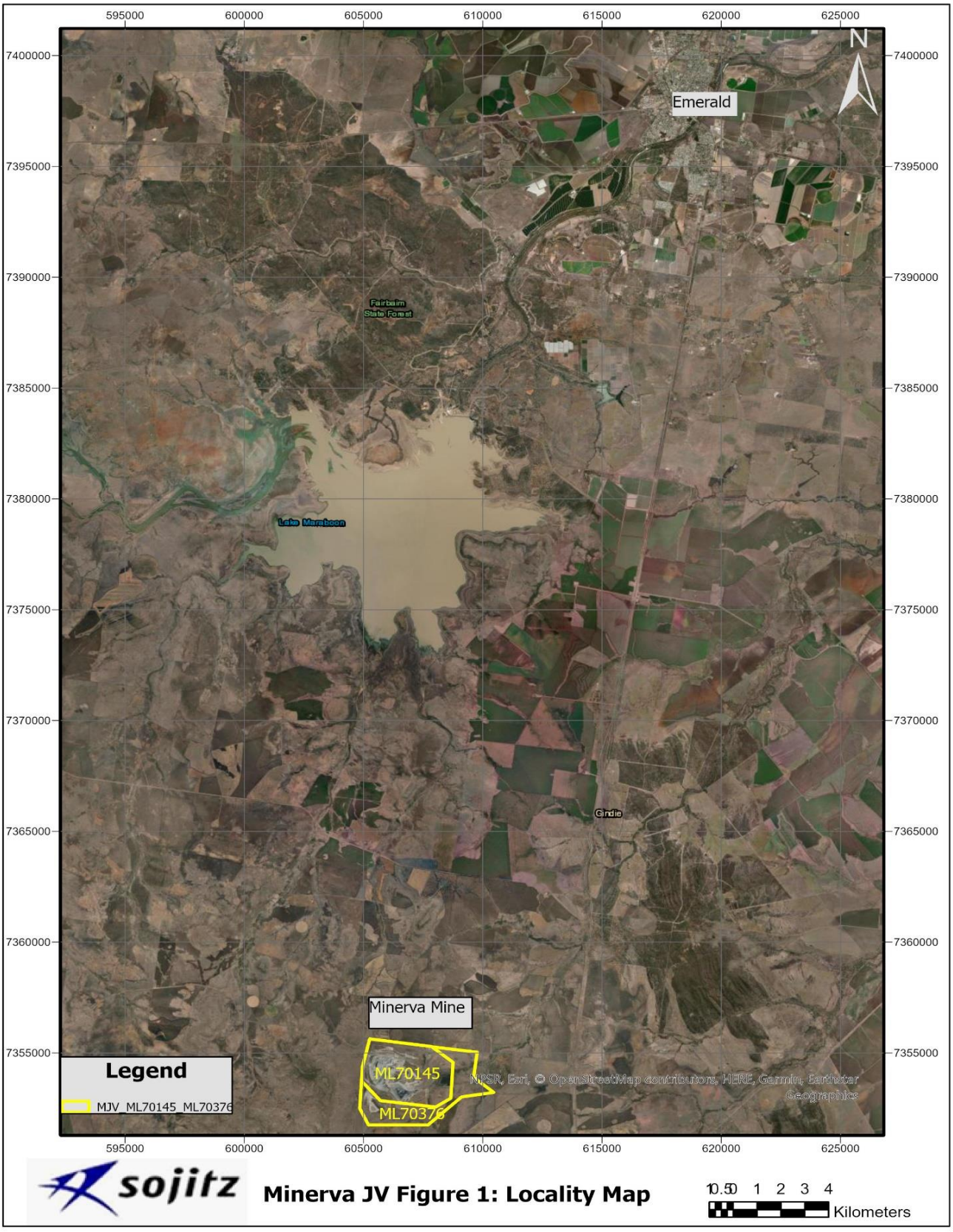

Figure 1 – Locality Map

2.2 Site Activities

The following mining related activities were undertaken at Minerva Mine during the 2004 to 2021 operational phase:

- Conventional open-cut mining using truck and shovel;
- Drill and blast activities;
- Coal haulage to the Run of Mine (ROM) pad and rail load-out;
- Stockpiling and crushing of ROM coal;
- Rail load-out of product coal (rail load-out is located outside the mining leases);
- Workshop maintenance activities for light and heavy vehicles;
- Bulk storage of diesel fuel;
- Storage of regulated waste generated by the mine activities;
- Borefields and water supply pipeline;
- Pit dewatering and storage of excess water;
- Topsoil stripping and haulage ahead of mining;
- Rehabilitation of disturbed areas.

Minerva Mine's Environmental Authority (EA) EPML00668613 authorises the following environmentally relevant activities:

- ERA 13 – Mining Black Coal
- ERA 8 – Chemical Storage
- ERA 56 – Regulated Waste Storage

2.3 Mining Tenements and Land Tenure

The mining leases comprising Minerva Mine, ML70145 and ML70376, are located entirely within the property boundaries of "Lexington", which is freehold land owned by Minerva Coal Pty Ltd. Details of the mining leases and the underlying land tenure are provided in **Table 1** and shown in **Figure 2**. The Lexington property boundary is shown in **Figure 3**, along with a second freehold property owned by Minerva Coal Pty Ltd (Mt Minerva).

Table 1 – Mining Leases

Mining Lease	Area (ha)	Expiry Date	Real Property Description	Tenure	Owner of Title
ML70145	930.10	30 Nov 2030	Lot 10 and Lot 11 on Plan DN40126	Freehold	Minerva Coal Pty Ltd
ML70376	626.33	30 Nov 2030	Lot 10 and Lot 11 on Plan DN40126, Lot 14 on Plan DN40170	Freehold	Minerva Coal Pty Ltd

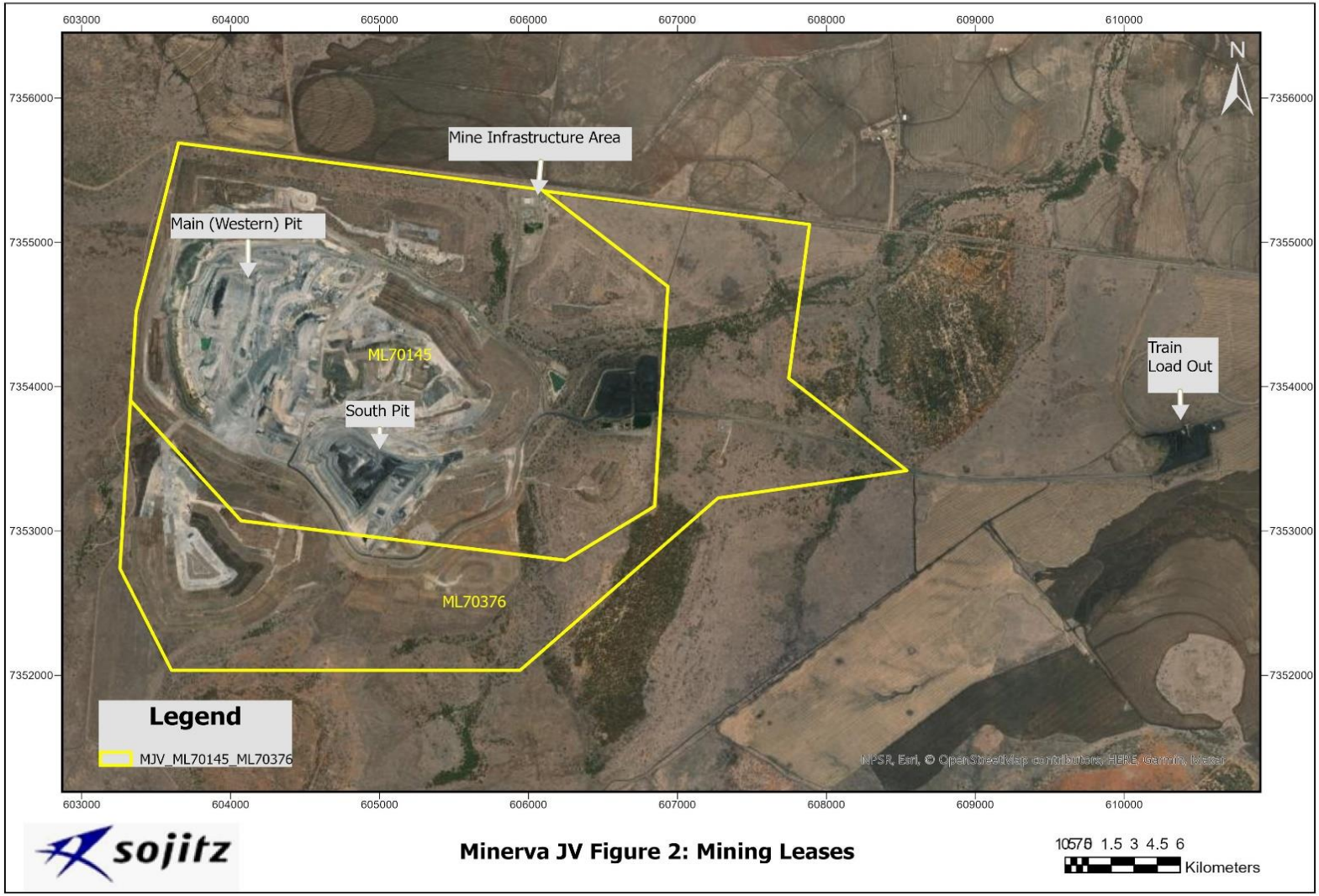

Figure 2 – Mining Leases

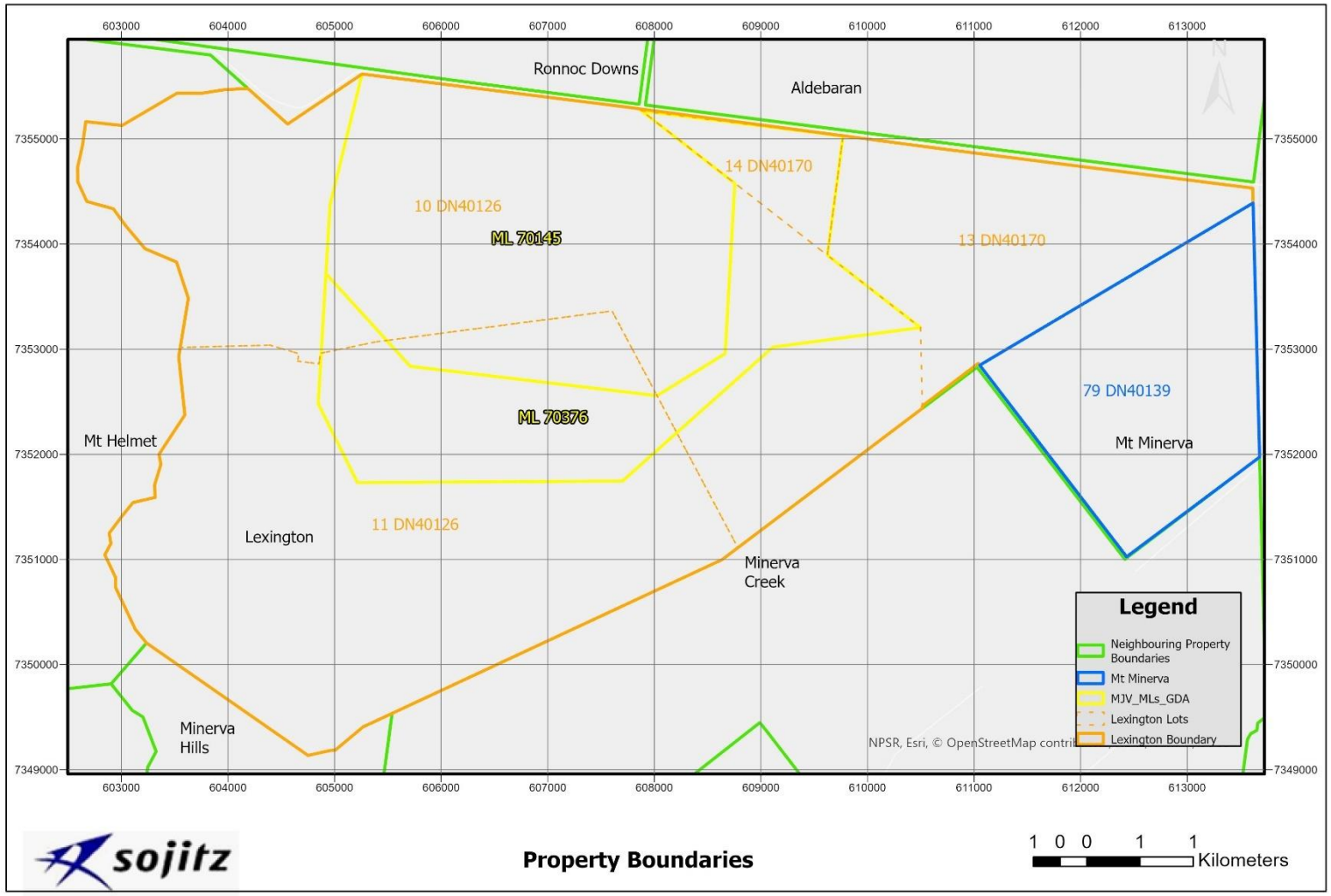

Figure 3 - Property Boundaries

2.4 Mine Plan

Open-cut mining at Minerva Mine occurred within two pits, the Western Pit and the Southern Pit. Coal was mined in a multi-seam operation, utilising hydraulic excavators and a truck fleet. The Western Pit was mined in an east to west progression, with a final void remaining adjacent to the western boundary of ML 70145. The Southern Pit was mined in a north-east to south-west progression, with a final void remaining in the south at the end of recovery of economical coal reserves.

The locations of the Western Pit and the Southern Pit final voids are provided in **Figure 4.**

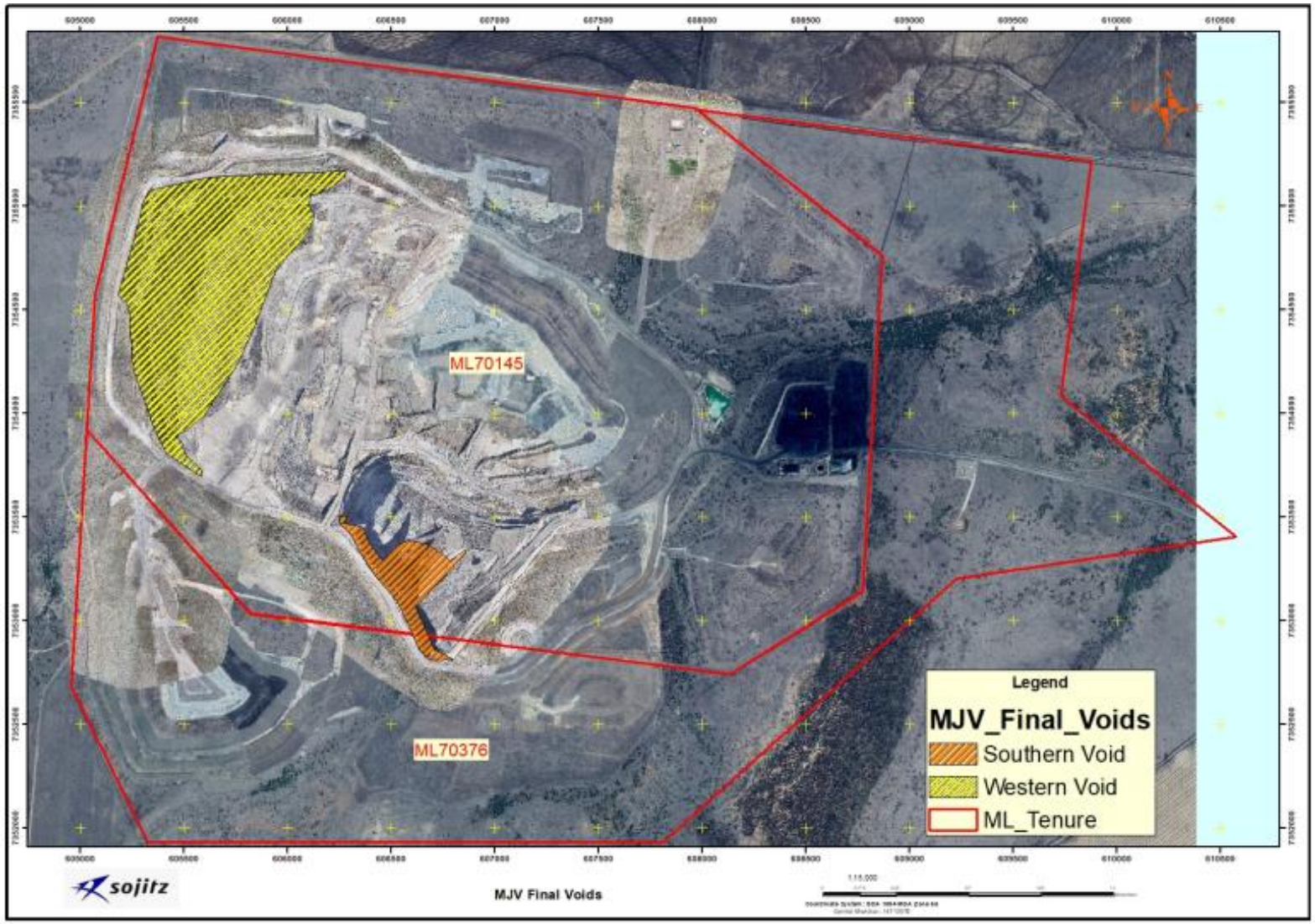

Figure 4 – Location of Final Void

2.5 Existing Rehabilitation

Progressive rehabilitation was undertaken at Minerva Mine during the life of the operations as areas became available. Depending on the rehabilitation treatment applied, post-mining land uses (PMLUs) for rehabilitated mining areas are either grassy open woodlands or low intensity grazing. PMLUs are discussed further in **Section 4**.

Areas disturbed by mining have been rehabilitated using either the (i) rock mulch and topsoil method (see **Section 6.8.3**), or the (ii) topsoil only method (see **Section 6.8.4**). Rehabilitation has been undertaken at the following locations:

- North-West Dump;
- South-West Dump;
- Main Dump;
- Creek Diversion North Dump;
- Creek Diversion South Dump; and
- Sandhurst Creek Diversion

The locations of (i) rock mulch and topsoil and (ii) topsoil only rehabilitation area as at April 2022 is shown in

Figure 5 and the timing of the progressive rehabilitation conducted since the commencement of mining is provided in **Figure 6**. The year of rehabilitation shown in ***Figure 6*** indicates when the rehabilitation was completed (i.e. when the area was sown). Rehabilitation works commence with reshaping, followed by hauling in rock mulch and/or topsoil, spreading same and deep ripping, and finally seeding (see **Section 6.8** for further details). Depending on the mine plan and location, the rehabilitation works may have commenced several years before final seeding. An application for certification of progressive rehabilitation has not been made for any of the rehabilitation areas.

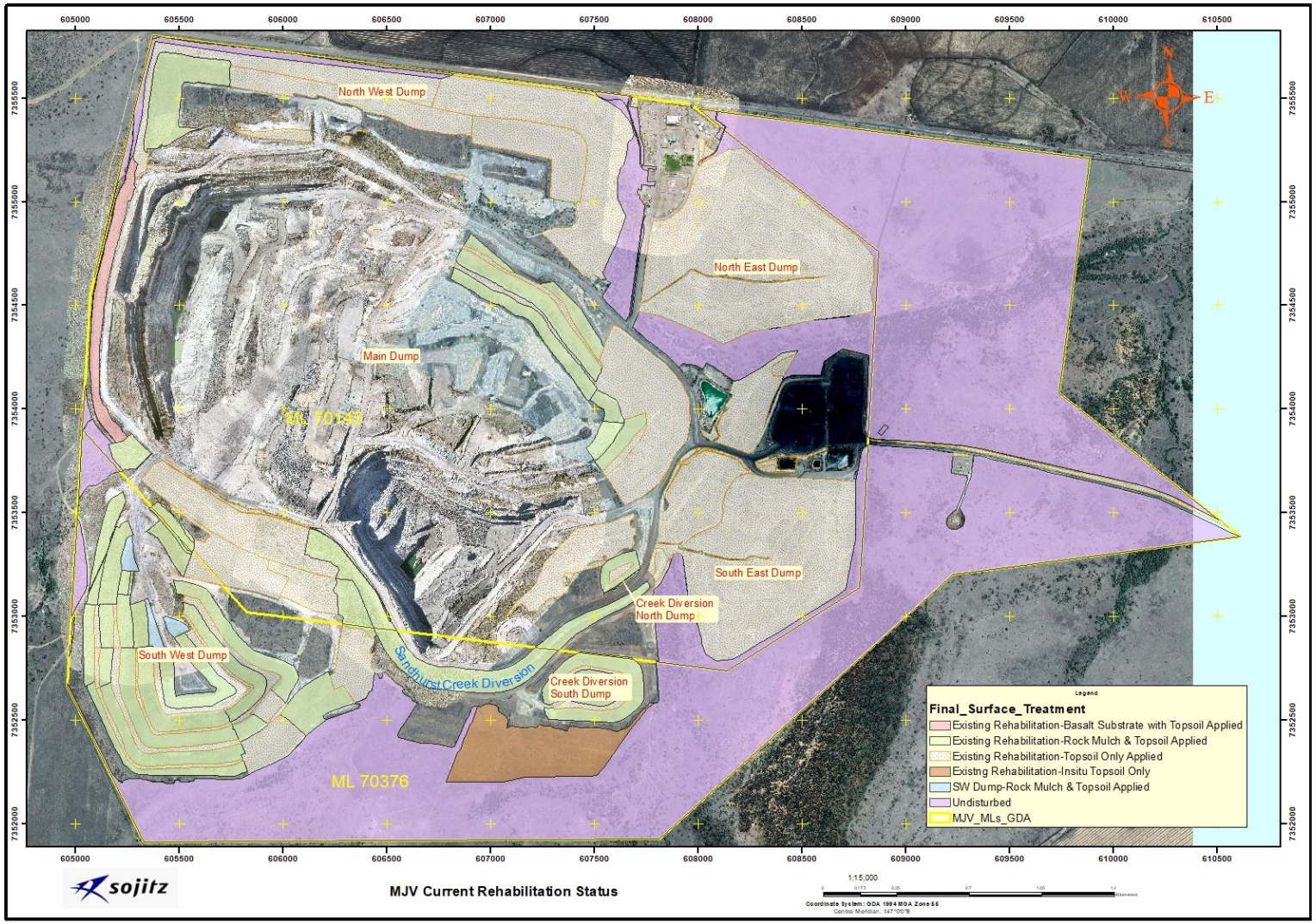

Figure 5 – Current Rehabilitation Status

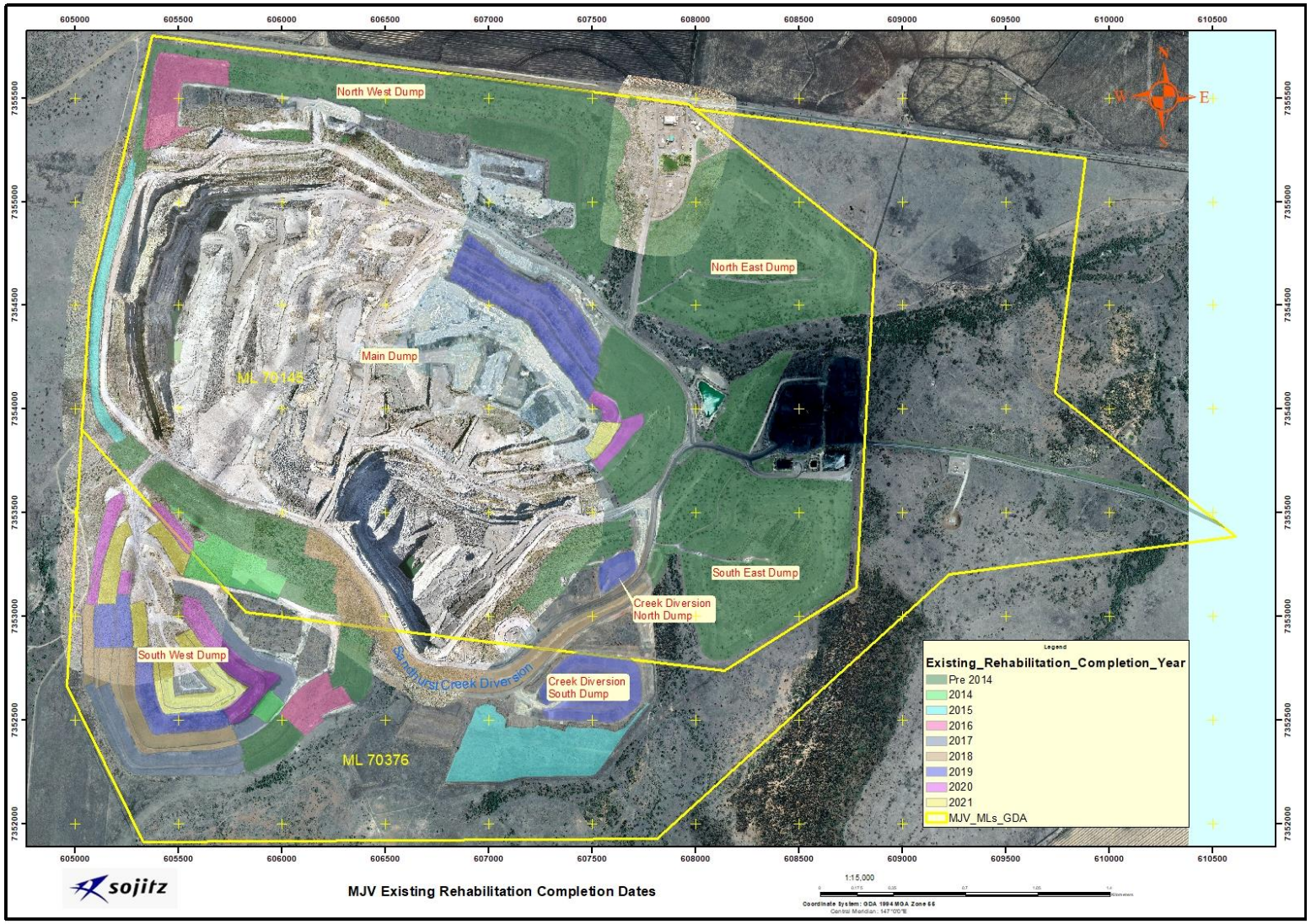

Figure 6 – Rehabilitation Completion Dates

2.6 Baseline Information

2.6.1 Climate

A summary of meteorological data from the Bureau of Meteorology's closest long-term weather monitoring station (Springsure) is provided in **Table** *2* and Figure 7**.** The rainfall data is for 1865 – 2022 and temperature data 1938 – 2022. The humidity data is for 1965 – 2010.

Table 2 – Meteorological Data for Springsure, Comet Street

Month	Average Temperature (°C) (1938 – 2022)		Humidity (%) (1965 – 2010)		Pan Evap (mm) (1956 – 2022)	Rainfall (mm) (1865 – 2022)		
	Min	Max	9am	3pm	Mean	Mean	Median	Highest
January	20.9	34	61	38		110	91	768
February	20.5	32.6	66	44		107	86	552
March	18.9	31.6	62	38		71	51	326
April	14.9	29	59	38		39	21	241
May	10.9	25.3	60	39		34	24	263
June	7.3	22.3	62	40		38	22	296
July	6.4	22.2	60	36		28	14	245
August	7.6	24.1	54	30		24	14	201
September	11.3	27.6	52	29		30	15	324
October	15.3	30.6	52	30		49	39	237
November	17.9	32.8	55	33		64	51	356
December	19.8	34.1	57	37		91	77	522
Annual					2040	687	635	1721

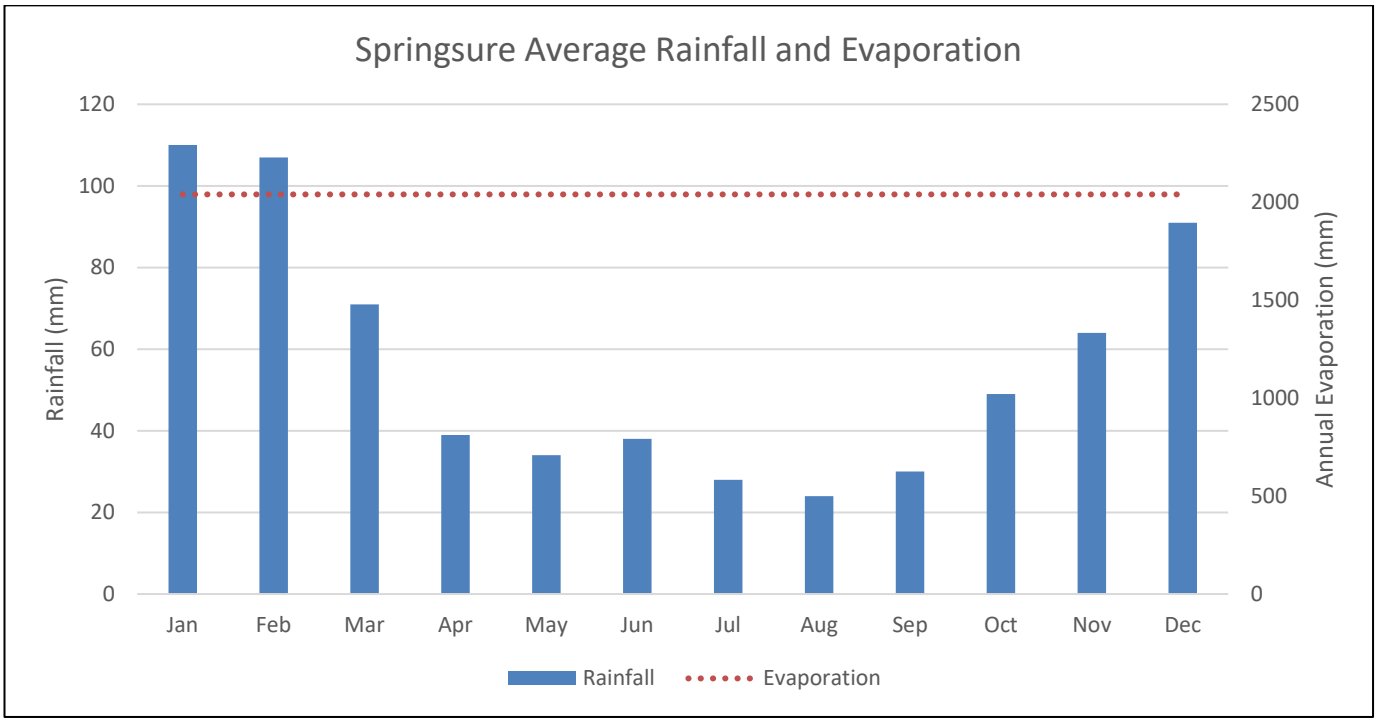

Figure 7 – Annual Average Rainfall and Evaporation

The majority of the annual rainfall occurs during the wet season (November to April), with an annual average rainfall of 687 mm at Springsure. The average pan evaporation rate for the region (2040 mm) greatly exceeds the average rainfall, with a moisture deficit of 1353 mm per annum. The water deficit conditions are a limiting factor with regard to vegetation establishment on disturbed land.

2.6.2 Geology

The general stratigraphy of the area from the surface to basement materials is shown in **Table 3**. Weathered and unweather Tertiary basalt generally overlays the Permian sediments, which contain the Permian coal measures

Table 3 – Stratigraphy within ML 70376 and ML 70145

Age	Formation
	Soil
Tertiary (Cenozoic)	Basalt
Tertiary (Cenozoic)	Fluvio-lacustrine Sediments
Permian	Cattle Creek Formation
Permian	Reids Dome Bed
Pre-Permian	Faulted Basement

Uplift in the Tertiary materials created the Lexington Dome, a structural feature within Permian aged consolidated sediments. The uplift event was followed by erosion and a series of basalt flows which formed a regional basalt cap.

The thickness of the basalt increases in all directions away from the Lexington Dome, though the central area of the Lexington Dome was not covered by basalt. Coal mining within ML 70145 started in an area with no basalt cover and progressed to the western boundary of ML 70145 where the basalt in 135m thick.

2.6.3 Topography

The pre-mining topography of Minerva Mine consisted of gently undulating open downs of basalt-derived black soil rising towards basaltic lava plateaus to the west and south of the site (mining leases). The relic basalt flows and intrusive volcanic plugs form steep mesa and ridges up to 250 m above the surrounding plains. Elevations range from 260 m AHD on the open downs within the mining leases and rise towards 500 m AHD to the west at the top of Mount Promenade. The surface topography fall across the open downs is from west to east at slopes of generally less than 1%.

Mine spoil dumps have formed rehabilitated landforms rising approximately 50 m above the pre-mining topography on the open downs. The rehabilitated spoil dumps are much lower than the adjacent escarpment and blend into the surrounding mesa landscape.

2.6.4 Soils

A total of 13 soil types have been recognised and mapped at the mine (Ison 1996a). The soils are grouped into five categories based on the geology of the underlying soils. ESys (2005 and 2007) undertook sampling to provide laboratory analysis for fertility and erodibility as part of land capability assessments. A summary of the soil types, land capability and the limiting factors are presented in **Table 4**.

Table 4 – Soil Types Mapped at Minerva Mine

Great Soil Group	Northcote	Australian Soil Classification	Description	Land Capability	Limiting factors
Tertiary Basalt					
Black earth Prairie	Ug5.12; Uf6.22	Black vertisol; Leptic tenosol	Very shallow, stony black cracking clays or dark brown non-cracking clays	VII	Plant available moisture, structure, rockiness
Black earth	Ug5.12	Black vertisol	Shallow cobbly black cracking clay	IV	Plant available moisture, rockiness
Black earth	Ug5.12	Black vertisol	Shallow to moderate deep black cracking clay	III	Plant available moisture
Black earth	Ug5.12	Black vertisol	Deep black cracking clay	III	Plant available moisture, soil workability, erosion
Acid and Intermediate Volcanic Rocks					
Prairie	Uf6.31 Uf6.32	Black or brown dermosol	Shallow cobbly reddish brown clays	VII	Plant available moisture, rockiness
Earthy sand	Um5.42	Tenosol	Shallow cobbly brown massive loam	VII	Plant available moisture, rockiness
Permian Sedimentary Rocks					
-	Uf6.31	Brown dermosol	Shallow cobbly brown or dark non-cracking clay	VI	Plant available moisture
Black earth	Ug5.1	Black vertisol	Deep dark grey or black cracking soils	III	Plant available moisture

Great Soil Group	Northcote	Australian Soil Classification	Description	Land Capability	Limiting factors
Grey clay	Ug5.1	Black vertisol	Deep dark grey cracking clay with gilgai	IV	Plant available moisture, salinity, soil workability
-	Uf6.31	Brown dermosol	Moderately deep brown or reddish brown non-cracking clays	III	Plant available moisture, rockiness, erosion
-	Dr2.13 Db1.14 Dd1.13	Red, brown or black chromosol	Moderately deep, loamy surface, red or brown duplex soils	IV	Plant available moisture
Secondary Calcareous Material					
Black earth	Ug5.11	Black vertisol	Moderately deep to deep black cracking clay	III	Plant available moisture
Alluvium					
Black earth	Ug5.1	Black vertisol	Deep black cracking clay	III	Plant available moisture. Salinity

2.6.5 Land Stability

The land within the mining leases on Lexington was used for grazing and dryland cropping prior to mining activities. Parts of ML70376 not required for mining activities are currently grazed under an agistment agreement. The balance of land owned by Minerva Coal Pty Ltd is used for grazing and dryland cropping. Surrounding properties support grazing, dryland cropping and irrigated cropping. The cracking clay black soils within the mining leases are stable soils that are not prone to dispersion or erosion. Land degradation from previous agricultural activities was not a distinguishing feature of the pre-existing landscape.

The agricultural capability of some soils is limited by rockiness, however the rock component of the soil makes it highly desirable for use on rehabilitated slopes. The use of a rock mulch cladding for mine rehabilitated areas provides a surface a high level of surface roughness and high infiltration rates. Rock mulch cladding provides a very stable rehabilitated post-mining land surface and is discussed further in **Section 6.3.2**.

2.6.6 Surface Water Hydrology

Minerva Mine is located in the headwaters of Sandhurst Creek, which flows from west to east into the Comet River and ultimately the Fitzroy River. Sandhurst Creek is an ephemeral stream and is the main surface water drainage feature within the mining leases. Sandhurst Creek is a Stream Order 2 and 3 within the vicinity of Minerva Mine and has a catchment area of approximately 43 km^2.

Sandhurst Creek generally does not contain permanent groundwater-derived baseflow within the mining leases, though a spring fed section of the creek is known to occur a few kilometres downstream at the Gregory Highway crossing.

Minerva Mine holds water licence number 406741 issued under the *Water Act 2000*, which authorises interfering with the flow of water in Sandhurst Creek by creating a stream diversion. Sandhurst Creek was permanently diverted to the south of the mine in 2008 to enable access to the coal reserves. Further permanent realignments to the diversion were constructed in 2014 and 2017 to extend the Western and Southern pits.

The Sandhurst Creek diversion is now approximately 5.8 km long and has been fully rehabilitated along the entire length. The diversion has a total width of between 30 – 212 m, a channel depth of between 1 – 22 m and a channel

grade of between 0.24 – 0.29%. The diversion has been designed to provide flood protection to the Western and Southern voids during a 0.1% annual exceedance probability (AEP) event.

2.6.7 Groundwater

The two main groundwater bearing units within the Minerva mining leases are:

- Upper Tertiary Basalts – vesicular and fractured zones within the basalt flows are water bearing and form productive aquifers, separated by weathered clays zones between basalt flow layers. Water from the basalt aquifer is suitable for stock watering and for irrigation of crops with low salt tolerances.
- Underlying Permian Consolidated Sediments – the coal seam and the Rieds Dome Beds form low yielding aquifers. Water from the Permian sediments is suitable for stock watering but not suitable for irrigation of crops.

Tertiary Basalts

The basalt has a distinct near-surface weathered profile and multiple horizons of fractured and unweathered basalt that may represent separate basalt flows. The uppermost weathered profile extends from the surface to ~ 30m below ground level. The underlying fractured basalt formation is the main aquifer located in the area immediately surrounding ML70145 and the proportion of fractured basalt determines the potential to store and transmit groundwater. Recharge to the basalt aquifer occurs via direct rainfall within the interception zone to the west of Minerva Mine.

Groundwater from the basalt aquifer is used for stock and domestic supplies along with irrigation for some small areas of broad acre cropping. Minerva Mine has historically used two bores located in the tertiary basalt aquifer for mine water requirements (Western bore and Lexington bore). The Western bore was mined out in 2016. The Lexington bore is located on Lot 11 on Plan DN40126, west of the ML70376 western boundary. Minerva Coal Pty Ltd holds Water Licence No.405647 for the Lexington bore. The licence is for 400 ML per annum for industrial purposes. There are two other licensed production bores is the area, both located in the tertiary basalt aquifer outside the Lexington property boundary. The Ronnoc Downs bore is approximately 3 km north of the Western void and the Gidd bore is approximately 7 km north-west of the Western void.

Groundwater flow direction is from the thicker basalt units (west of ML70145) towards the thinner basalt formation within ML70145. The Western residual void is expected to remain a groundwater sink in perpetuity due to the hydraulic gradients of the basalt aquifer towards the open void. Tertiary basalt groundwater inflow to the Southern residual void will not occur because the basalt formation is not intersected by the highwall of the Southern void. (AGE, 2017)

Annual seepage rates from the basalt aquifer to the Western final void were calculated by AGE (2017) using a GoldSim void water balance model. The long term water balance and mass balance modelling results are presented in the *MJV Residual Void Investigation Report* for the Western and Southern Voids (Sojitz Minerva Mining 2021a). Inflows from the basalt to the Western void is initially predicted to be around 1.1 ML/day until the water level of the void reaches the lower elevation of exposed basalt in the highwall and then decline thereafter as the water level rises. The Western void water level is predicted to reach equilibrium over a period of about 164 years and remain about 60m below the elevation of the regional basalt water table. The groundwater hydraulic gradient is expected to be maintained in perpetuity towards the Western residual void and therefore the likelihood of void water interacting with the basalt aquifer is low (AGE 2017).

Permian Consolidated Sediments

Groundwater storage and flow in the Permian sediments is predominately associated with natural interconnecting coal seam cleat and joint patterns. The coal seam aquifer is confined above and below by very low permeability interburden that form aquitards. Recharge of the Permian sediments predominantly occurs via vertical seepage from the overlying basalt aquifer where the coal seam sub-crops beneath the basalt or where the coal seam sub-crops near the ground surface.

Annual seepage rates from the Permian sediments to the Western and Southern residual voids were calculated by AGE (2017) using a GoldSim void water balance model and presented in the *MJV Residual Void Investigation Report* (Sojitz Minerva Mining 2021a). Inflows from the Permian sediments to the Western and Southern residual voids were calculated to be approximately 0.02 ML/day for each void. As the void water level increases, the rate of seepage from the Permian sediments are expected to reduce. Equilibrium of the Southern void water level is predicted to be reached over a period of about 110 years and have a maximum elevation of 200 mAHD, which is approximately 70

m below the elevation of the regional water table. The groundwater hydraulic gradient is expected to be maintained in perpetuity towards the Southern residual void and therefore the likelihood of void water leaving the voids via the coal seams is low (AGE 2017).

The Western and Southern voids will remain as residual voids post-mine closure and have been identified as non-use management areas (NUMAs) (Sojitz Minerva Mining 2021a). The management of the Western and Southern residual void NUMAs is discussed further in **Section 5**.

2.6.8 Vegetation

A vegetation survey was undertaken within ML70145 and ML70376 to ground-truth the Queensland Herbarium regional ecosystem (RE) mapping and search for threatened flora species (ESS 2004). The survey found no evidence of protected plants, though ESS (2004) mentioned the late dry season timing of the assessment made it difficult to identify all species.

RE mapping reconciliation has been undertaken for this PRC Plan and a description of the ground-truthed REs and the areas occupied within the mining leases are presented in **Table 5** and shown in **Figure 8**.

Table 5 – Regional Ecosystems Present within the Mining Leases

Regional Ecosystem	*Vegetation Management Act 1999* Status	*Environmental Protection and Biodiversity Conservation Act 1999* Status	Short Description	Area (ha)
Non-Remnant	NA	NA	Cleared or disturbed areas	1160.6
11.8.5	Not of Concern	Not Listed	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks.	145.2
11.8.11	Of concern	Endangered	*Dichanthium sericeum* grassland on Cainozoic igneous rocks.	186.4
11.8.11a/11.4.9/ 11.3.25 (50/40/10)	Of Concern / Endangered / Not of Concern	Endangered / Endangered / Not Listed	*Dichanthium sericeum* grassland on Cainozoic igneous rocks that includes *Melaleuca bracteata* woodland drainage depressions **/** *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains / *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.	61.4
11.9.1	Endangered	Endangered	*Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks.	3.8
			TOTAL	1557.4

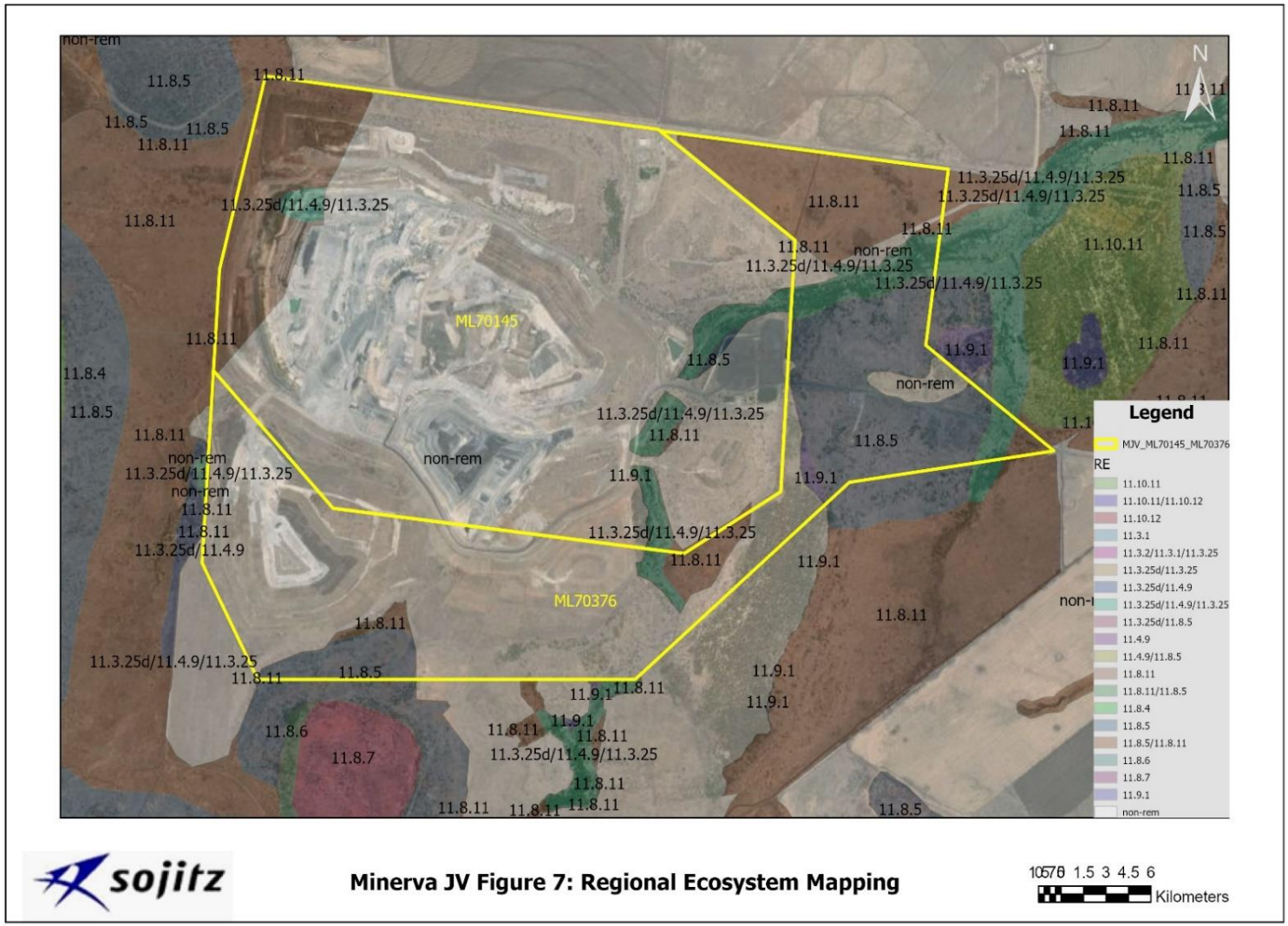

Figure 8 – Regional Ecosystem Mapping

Part of the mining operations for Minerva Mine involved clearing 133 ha of threatened ecological community RE 11.8.11 Natural Grasslands of the Queensland Central Highlands and Northern Fitzroy Basin. This RE is dominated by *Dicanthium sericeum* (Queensland Bluegrass) and is listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) as endangered.

The EPBC Act approval (EPBC 2005/2039) for clearing the 133 ha of RE 11.8.11 required the establishment of an equivalent 133 ha offset area of RE 11.8.11. The offset area was established to the east of Minerva Mine on a portion of the Lexington property owned by Minerva Coal Pty Ltd. The natural grasslands offset area is managed by Minerva Mining Pty Ltd in accordance with a Native Grassland Management Plan (Minerva Coal 2015). The area is secured via a Voluntary Declaration under the *Vegetation Management Act 1999*.

2.6.9 Fauna

Earthworks Environmental Services (EES) compiled a list of threatened species following a desktop review of species that could potentially occur in the area and a site visit (EES 2004, EES 2005). The fauna species list included 12 threatened species listed under the *Nature Conservation Act 1992* (NC Act) and the EPBC Act that could potentially occur in the general locality (see **Table 6**).

Table 6 – Threatened Species Potentially Occurring in the Area

Class	Scientific Name	Common Name	NC Act Status	EPBC Act Status	Species Observed within Mining Leases*
Bird	*Neochmia ruficaudus*	Star Finch	Endangered	Endangered	No
Bird	*Geophaps scripta*	Squatter Pigeon (Southern sub-species)	Vulnerable	Vulnerable	No
Bird	*Hirundapus caudacutus*	White-throated Needletail	Vulnerable	Migratory / Vulnerable	No
Bird	*Falco hypoleucos*	Grey Falcon	Vulnerable	Vulnerable	No
Reptile	*Hemisapsis damelii*	Grey Snake	Endangered	Not Listed	No
Reptile	*Denisonia maculata*	Ornamental Snake	Vulnerable	Vulnerable	Yes
Reptile	*Egernia rugosa*	Yakka Skink	Vulnerable	Vulnerable	No
Reptile	*Furina dunmall*	Dunmall's Snake	Vulnerable	Vulnerable	No
Reptile	*Rheodytes leukops*	Fitzroy River Turtle	Vulnerable	Vulnerable	No
Reptile	*Acanthophis antarcticus*	Common death Adder	Vulnerable	Not Listed	No
Reptile	*Strophurus taenicauda*	Golden-tailed Gecko	Near Threatened	Not Listed	No
Mammal	*Chalinolobus dwyeri*	Large-eared Pied Bat	Vulnerable	Vulnerable	No

*ESS (2004)

The ornamental snake has been recorded in the eastern margins of ML70376 within the open downs regional ecosystem 11.8.11 *Dichanthium sericeum* grasslands on Cainozoic igneous rocks. Essential habitat for the ornamental snake has been identified in this grassland area and along Sandhurst Creek (downstream of the diversion) within ML70376. No other essential habitat for threatened flora or fauna species has been identified within the boundaries of ML70376 and ML70145.

2.6.10 Land Use

Land uses within ML70376 and ML70145 prior to mining were cattle grazing and dryland cropping (mainly sorghum and mung beans). Clearing of native grasslands and woody vegetation on Lexington was required to establish the grazing and cropping activities. Some small areas of irrigated cropping were also undertaken on Lexington to the west of ML70376. Water supplies for irrigation and stock watering were sourced from the basalt aquifer.

Prior to the establishment of Minerva Mine, there was no coal mining in the locality surrounding Lexington or within the broader catchment area of Sandhurst Creek. The land capabilities of some areas on Lexington have been modified by mining activities and the PMLUs for the disturbed areas are discussed in **Section 4**.

3 Community Consultation

3.1 Community Consultation Register

A range of community consultation activities involving closure-related activities, or matters that closure affects, have been undertaken for Minerva Mine since 2015 and these are presented in the Community Consultation Register in **Table 7.** The proposed PMLUs and NUMAs identified in this plan remain consistent with the information presented to, and discussed with, the local community, and described in the relevant LOD (*Rehabilitation Management Plan* (Sojitz Minerva Mining 2021b)) required under EA Condition F3. Objections to the Minerva Mine rehabilitation and closure plans have not been received during these community engagement activities.

Table 7 – Community Consultation Register

Date	Community Member(s)	Consultation Activity	Closure and PMLU-Related Engagement
5 April 2015	Hugo Spooner (neighbouring landholder-Avocet). University of Queensland Geography Department Students	On-site presentation and discussions	Overview of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
15 October 2015	Cameron Higgins (neighbouring landholder-Ronnoc Downs)	Mine site tour and discussions	Discussion of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
27 April 2016	Western Kangoulu Ltd	Joint meeting with Minerva Mine General Manager	Progress of cultural heritage authorisation process. Overview of operations, residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
13 May 2016	Fred Conway – Garringbal	Telecon about cultural heritage	Cultural heritage investigation and management agreement and Garringbal Compensation Agreement
8 July 2016	University of Queensland Geography Department Students	Presentation and mine site tour	Overview of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
13 July 2016	Mark and Joy Comiskey (neighbouring landholder-Ronnoc Downs)	Discussion and mine site tour	Overview of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.

Date	Community Member(s)	Consultation Activity	Closure and PMLU-Related Engagement
29 September 2016	Department of Environment and Heritage	Presentation and Inspection of Rehabilitation Areas.	Overview of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
27 July 2017	Central Highlands Regional Council	Presentation and Inspection of Rehabilitation Areas.	Overview of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
11 October 2017	Mark Comiskey, Sean Schimke, Ann Foot, Tim Crocker,D Rolfe (district landholders and interested parties)	Lexington Agistment Agreement – Expression of Interest inspection	Grazing management and infrastructure maintenance requirements related to agisting cattle on mine leases and surrounding areas owned by Minerva Coal Pty. Ltd.
8 November 2017	Department of Environment and Heritage	On-site compliance audit	Review of EA Conditions including rehabilitation approach, residual voids and post-mine land uses discussed. Inspection of rehabilitation areas.
14 December 2017	BHP	On-site inspection and discussions	Overview of mining and rehabilitation methods. Residual voids and proposed bushland habitat and grazing post-mine land uses discussed.
1 February 2020	Garingbal Kara People	Meeting	Overview of mine closure timeframes and process
21 January 2021	Garingbal Kara People	Meeting	Overview of mine closure timeframes and process
1 August 2021	Community open day	On-site tour of mining operations. Presentation on post-mining landform.	Post-mining landform (residual voids and spoil). Overview of mine closure timeframes and process
15 March 2022	Garingbal Kara People	Meeting	Overview of mine closure timeframes and process

3.2 Community Consultation Plan

Minerva Mine is in the closure execution phase. On-going community consultation shall be carried out in relation to the rehabilitation being conducted under this PRC Plan.

The objectives of the community consultation are to:

- provide information about the timing and extent of planned rehabilitation and closure-related activities;
- provide information about the progress in implementing rehabilitation;
- receive community feedback on matters concerning rehabilitation; and
- provide timely responses to community feedback and enquiries relating to matters concerning rehabilitation.

The type of planned consultation with various community members, the frequency of engagement and the information to be conveyed are summarised in Table 8**.**

Table 8 - Community Consultation Plan

Community Member(s)	Consultation Type (Frequency)	Information Conveyed
Entities agisting stock and share farming on Lexington	Meeting (as-needs basis) (on-going)	Stock access restrictions (if applicable)
Adjoining landholders (Ronnoc Downs, Avocet properties)	Site tour (Annual or upon request) Meeting (Upon request)	Site tour of rehabilitation, overview of progress
Other nearby landholders	Meeting (Upon request) Site tour (Upon request)	Overview of progress of rehabilitation
Garingbal Kara People	Meeting (Upon request) Site tour (Upon request)	Overview of progress of rehabilitation
District residents	Community open day (2024, then every 5 years)	Site tour of rehabilitation, overview of progress
Central Highlands Regional Council	Meeting (Upon request)	Overview of progress of rehabilitation

Feedback received during consultation activities shall be considered and an assessment made as to whether it is appropriate to modify the timing or manner in which rehabilitation works are being carried out at the time. The outcome of the assessment will be conveyed to the relevant community members and any other relevant third parties in a timely manner.

Should any changes to the PRCP Schedule be proposed that may affect a community member, consultation shall be undertaken regarding the proposal and the details and outcome recorded in the Community Consultation Register.

4 Post-Mining Land Uses

PMLUs for Minerva mining leases were approved in the *Rehabilitation Management Plan* (Sojitz Minerva Mining 2021b), a LOD required to be submitted under the EA. The designated PMLUs are the options that are best suited to the area based on final landforms and surrounding agricultural activities. Land uses such as cropping were not suitable due to limitations of the post mining landforms.

The following PMLUs apply:

- grassy open woodlands; and
- low intensity grazing

The nominated PMLUs can be transitioned into the proposed PRCP Schedule as they are consistent with a LOD required under the EA, and a further detailed selection process is not required for this document (DES 2020). The PMLUs are described in the following sections and their locations shown in **Figure 9.** The associated completion criteria are presented in Section 4.6.

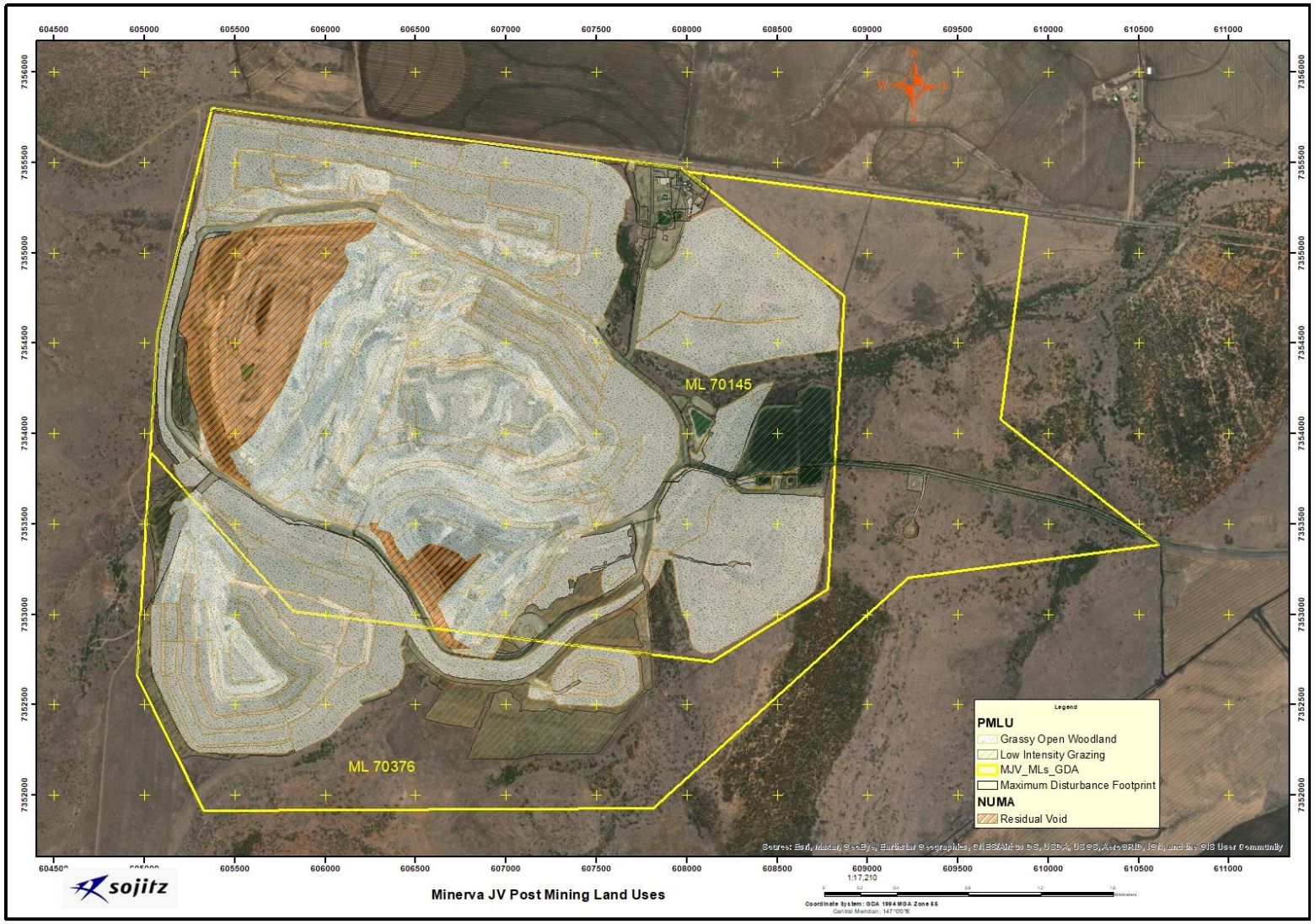

Figure 9 – Post-Mining Land Uses

4.1 Grassy Open Woodlands

The mine spoil domain shall be become a grassy open woodland habitat where the overriding objective is long-term stability of the spoil dumps to ensure that potential impacts on the receiving environment are minimised. Where possible, the plants seeded will be naturally occurring local species, however other species may also be included where they have a functional role that local species cannot fulfil (see **Section 6.8.5**). The established grassy open woodlands PMLU provides long-term habitat and foraging opportunities for fauna. The habitat will also provide corridors for fauna movement.

The rock mulched spoil batters and the top of dumps that have been rehabilitated with topsoil only shall have a grassy open woodland PMLU. The mine spoil domain is most suited to the grassy open woodlands PMLU due to the steeper slopes and rock cladding that exist with this landform, which are not desirable for agricultural activities. The grassy open woodlands PMLU will result in the following enhanced environmental values:

- Increased landform stability, reflecting slope and rock scree attributes of adjoining landforms and regional ecosystems;
- Reduced potential for sediment-laden runoff entering the downstream receiving environment; and
- Increased flora biodiversity, providing a wider array of fauna habitat types over the longer term.

Grass swards that develop in non-grazed grassy open woodlands PMLUs can become rank over time and loose effectiveness in controlling erosion. Low intensity infrequent fires at the commencement of the dry season can be used as a management tool to re-stimulate plant growth and remove rank grass overgrowth if required. Rehabilitation using rock mulch reduces the reliance of vegetative cover and root structures for erosion protection. The rock mulched spoil batters used for grassy open woodlands PMLUs (> 5% slope) provide enduring erosion protection of the spoil dump, irrespective of the plant growth stages (see **Section 6.3.2**).

The rehabilitation shall be non-polluting, stable, safe to humans and wildlife and able to sustain a grassy open woodland PMLU.

4.2 Low Intensity Grazing

The infrastructure domain is assigned to low intensity grazing PMLU, as the rehabilitated infrastructure areas are most suited to grazing due limited past surface earthworks disturbance and the favourable shallow slopes of the stable landform. This rehabilitation will become at least land suitability class 3 (suitable grazing land with moderate limitations) according to the *Guidelines for Agricultural Land Evaluation in Queensland* (Queensland Government 2015).

Grazing land units need to be a sufficient size or part of a larger paddock so that overgrazing or degradation of the rehabilitated area does not occur. Grazing shall be managed such that sufficient grass cover is maintained to provide ongoing protection from surface erosion. Pasture species selected for rehabilitation to low intensity grazing are included based on their palatability to stock and their occurrence within adjacent pastoral lands. Plants selected include a mixture of native and improved pastures, with the list of species provide in **Section 6.8.5**. Under low intensity grazing conditions, the post-mining land use would be sustainable, non-polluting, stable and safe to humans, stock and wildlife.

Some mine site infrastructure will be retained after mine closure where the infrastructure provides benefits to the background landholder and surrounding neighbours. A list of the infrastructure to be retained by the landholder to support the low intensity grazing PMLU is provided in **Section 6.10.1** and shown in Figure 10 and Figure 11. A signed landholder statement is included in **Appendix C**. All retained infrastructure provided to the landholder will be in a condition that is safe to humans and wildlife, non-polluting, stable and able to be sustained by the background landholder.

Figure 10 – Site Retained Infrastructure

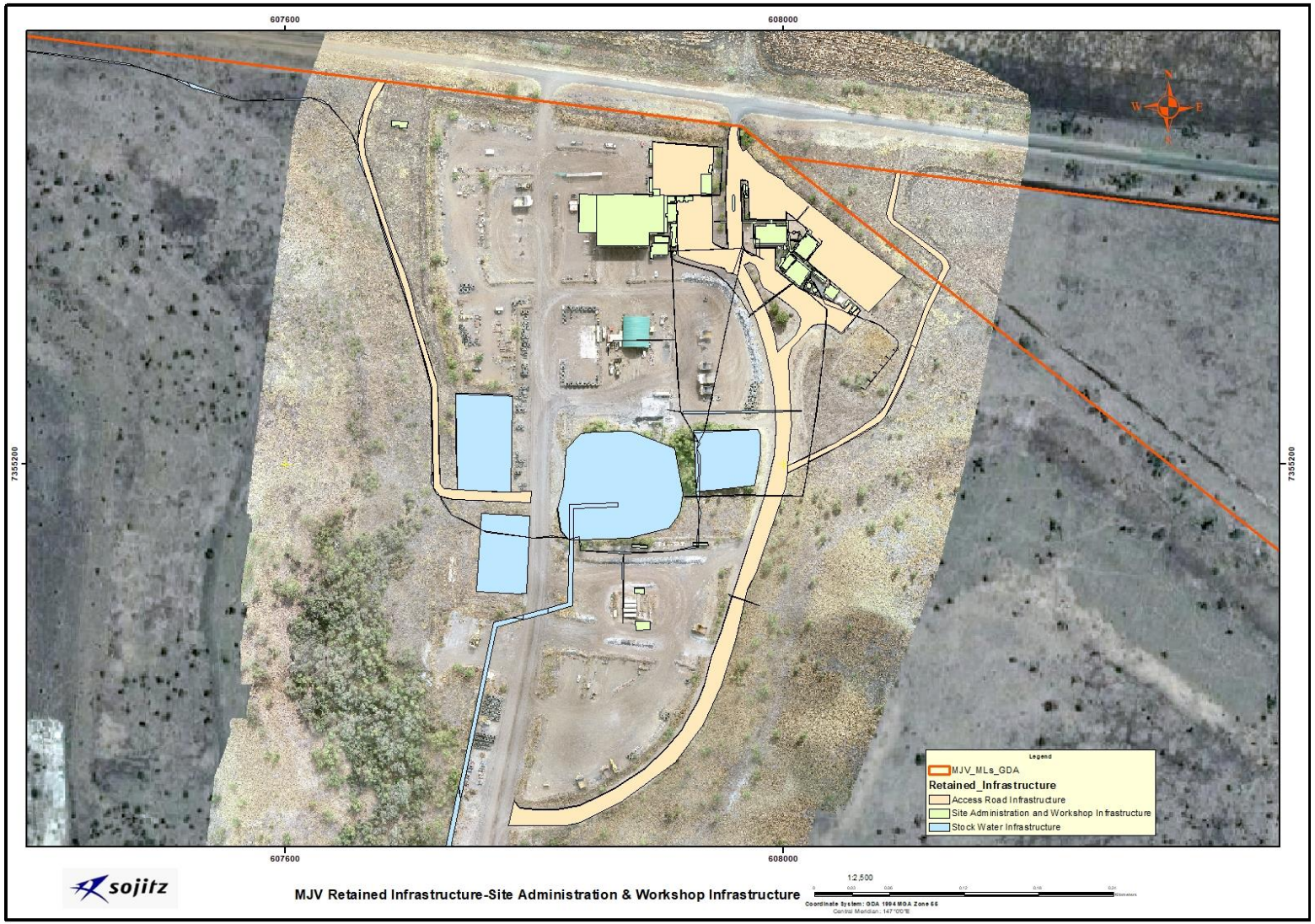

Figure 11 - Retained Infrastructure - Administration and Workshop Area

The current water storages domain remain as water storages and form part of the low intensity grazing PMLU, providing a water source for stock and fauna. Water quality in the storages was maintained below ANZECC (2000) irrigation and stock water salinity limits when used during active operations. The only ongoing water input to these dams is from rainfall run-off, which provides a clean long-term water source. The water storages listed in **Table 9** will remain following mine closure as part of a land use that is safe to humans and wildlife, non-polluting, stable and a sustainable water supply to stock and fauna. The water storages forming part of the low intensity grazing PMLU are shown in **Figure 9**.

Table 9 - Water Storages

Water Storage	Volume (ML)	Source and Use During Operations	Future Use
Industrial Raw Water Dam	7.8	Groundwater pumping for Industrial area use	Stock water and fauna use
Industrial Area Dam 1	6.2	Collects run-off for Industrial area use	Stock water and fauna use
Industrial Area Dam 2	9.3	Collects run-off for Industrial area use	Stock water and fauna use
Industrial Area Dam 3	3.0	Collects run-off for Industrial area use	Stock water and fauna use
ROM Dam 1	11.5	Collects run-off for mining purposes	Stock water and fauna use
ROM Dam 2	7.4	Collects run-off for mining purposes	Stock water and fauna use
ROM Dam 3	38.2	Pit dewatering point and collects run-off for mining purposes	Stock water and fauna use
Dam 4	66.6	Pit dewatering point for mining related purposes	Stock water and fauna use
Dam 7	25.8	Sediment Dam for spoil dump areas	Stock water and fauna use

4.3 Relevant Government Strategies and Plans

Minerva Mine is located in the “rural zone” under the Central Highlands Regional Council Planning Scheme (CHRC 2016). The rural zone is intended to:

- provide for and encourage a broad range of rural uses such as cropping, intensive horticulture, intensive animal industries, animal husbandry, animal keeping and other primary production;
- provide opportunities for non-rural uses that are compatible with agriculture, the environmental features and the landscape character of the area; and
- protect or manage significant natural resources and processes to maintain capacity for primary production.

The PMLUs nominated for Minerva Mine are consistent with the zoning and other designations of the land under the planning scheme, as well as compatible with the existing adjoining land uses of improved pasture grazing, cropping and natural bushlands. Development approval is not required to establish the PMLUs under the planning scheme.

The PMLUs also aligns with the regional outcomes under the Central Queensland Regional Plan 2013, which include allowing for agriculture within Central Queensland to continue to grow while supporting resource industries co-existence in the area

4.4 Completion Criteria

The completion criteria for the PMLUs are presented in **Table 10**.

Table 10 – Completion Criteria for PMLU

PMLU	Rehabilitation Goal	Completion Criteria
Grassy Open Woodlands	Safe to humans and cattle	• Rehabilitation dump is geotechnically stable with FOS ≥ 1.5 • No active gully erosion present
	Stable	• External batters ≤ 25% slopes covered with minimum 0.5 m thick competent rock mulch • Top of dump ≤ 5% slopes covered with minimum 0.2 m thick topsoil
	Non-polluting	• No acid or saline seepage areas • Median receiving water quality run-off EC < 1,000 µS/cm and pH 6.0 – 9.0
	Able to sustain agreed post mining land use	• ≥ 2 native tree / shrub species present • ≥ 3 perennial grass species present • Effective rooting depth > 0.5 m • Invasive weed species comprise < 10% of groundcover • Livestock excluded from area
Low Intensity Grazing	Safe to humans and cattle	• No active gully erosion present • Dam walls are geotechnically stable with FOS ≥ 1.5 • Retained infrastructure in accordance with the written Landholder statement • Infrastructure condition assessment report to be completed prior to handover of infrastructure to Landholder
	Stable	• All areas have slopes ≤ 5% covered with minimum 0.2 m thick topsoil • Dams have a functioning bywash with no active erosion • All infrastructure and materials have been removed from site that are not subject to Landholder statement
	Non-polluting	• No acid or saline seepage areas • Median receiving water quality < 1,000 µS/cm and pH 6.0 – 9.0 • Dam water quality meets ANZECC 2000 livestock drinking water standards for beef cattle.

PMLU	Rehabilitation Goal	Completion Criteria
		• Contaminated materials identified by a site investigation report have been removed
	Able to sustain agreed post mining land use	• Vegetative ground cover ≥ 50% • ≥ 3 perennial pastures / shrub species present • Effective rooting depth > 0.5 m • Invasive weed species comprise < 10% of groundcover

5 Non-Use Management Areas

The Western and the Southern voids have been identified as NUMAs in the following LODs:

- *Minerva Mine Residual Void Investigation Report* (Sojitz Minerva Mining 2021a)
- *Minerva Mine Rehabilitation Management Plan* (Sojitz Minerva Mining 2021b)

Table F1 of the EA stipulates a maximum void surface area of 91 ha, with a maximum void wall slope of 70 degrees in competent rock. The total area of the Western and Southern final voids equals 89 ha (Sojitz Minerva Mining 2021a). This is subject to minor change as design is refined and physical works progress.

The rehabilitation treatments for the Western and Southern voids are described in Sojitz Minerva Mining (2021a, 2021b) and summarised below in Sections 5.1 and 5.2. The final void hydrology study and stability analysis is provided in the residual void investigation report (Sojitz Minerva Mining, 2021a).

Under the relevant transitional provision, as the Western and Southern voids are pre-approved NUMAs described within land outcome documents, Minerva Mine is not required to:

- justify the proposed NUMAs;
- provide evidence to support the justification of the NUMA;
- be the subject of a Public Interests Evaluation; or
- provide for the rehabilitation of voids located within a floodplain to a stable condition.

Notwithstanding the above, significant evidence to support the justification of the NUMAs is presented in the *Minerva Mine Residual Void Investigation Report* (Sojitz Minerva Mining 2021a).

This PRC Plan also outlines how the residual voids will be managed in a best practice manner that minimises risks to the environment.

5.1 Western Void

The Western residual void is expected to remain a groundwater sink in perpetuity, forming a maximum pit water level of RL 210 m. The maximum surface area of the Western final void at RL 210 m is 76.84 ha (Sojitz Minerva Mining, 2021).

As part of mine closure activities, a permanent bund shall be installed 50 m from the crest of Western void as a safety measure to restrict access to the highwall. The closure bund will be placed outside the Sandhurst Creek diversion 0.1% AEP flood extent so not to impede flow. If required, fencing and open-hole warning signs will be erected in association with the closure bund installation for additional safety measures.

Rehabilitation of the Western void will include (Sojitz Minerva Mining 2021a):

- reshaping the current low walls to 25% with 30 m wide benches every 30 m of vertical lift;
- reshaping low wall down to RL 210 m (max water equilibrium level), with fill below this at angle of repose; and

- capping reshaped 25% slopes with 0.5 m thick of basalt rock mulch, plus topsoil.

Shaped surfaces will internally drain to void area.

5.2 Southern Void

The Southern residual void will remain a groundwater sink in perpetuity, with inflows from the Permian sediments and the Western residual void forming a maximum pit water level of RL 200 m. The maximum surface area of the southern void at RL 200 m is 12.18 ha (Sojitz Minerva Mining, 2021).

As part of mine closure activities, a permanent bund shall be installed 50 m from the crest of the Southern void as a safety measure to restrict access to the highwall. The closure bund will be placed outside the Sandhurst Creek diversion 0.1% AEP flood extent so not to impede flow. Fencing and open void warning signs will be erected in association with the closure bund if required as additional safety measures.

Rehabilitation of the Southern void will include (Sojitz Minerva Mining 2021a):

- reshaping the current low walls to 25% with 30 m wide benches every 30 m of vertical lift;
- reshaping low wall down to RL 200 m (max water equilibrium level), with fill below this at angle of repose;
- Partial reshape of high wall south-east section to 25% to reduce void area;
- Reshaped 25% slopes shall be capped with 0.5 m thick of basalt rock mulch, plus topsoil;
- Shaped surfaces will internally drain to void area.

5.3 Completion Criteria

The completion criteria for the residual voids are presented in **Table 11.**

Table 11 – Completion Criteria for NUMAs

NUMA	Completion Criteria
Western Void	• High wall and end wall maximum slope ≤70 degrees projected to surface. • Assessment report by Registered Professional Engineer of Queensland (RPEQ) on the Geotech stability of final voids. • High wall and end wall bund constructed of competent materials and set back minimum 50 m from crest (≥ FOS of 1.5). No public access with fencing and signage erected if required. • Low wall ≤25% slope above RL 210 m, with 0.5 m thick rock mulch cover. • Angle of repose slopes below RL 210 m (≤ 65%). • Sandhurst Creek 0.1% AEP flood event does not enter final void. • Surface and groundwater quality of receiving waters meets the requirements of Schedule W of the EA. • Void has no adverse environmental impact on basalt aquifer.
Southern Void	• High wall and end wall maximum slope ≤70 degrees projected to surface. • Assessment report by Registered Professional Engineer of Queensland (RPEQ) on the Geotech stability of final voids. • High wall and end wall bund constructed of competent materials and set back minimum 50 m from crest (≥ FOS of 1.5). No public access with fencing and signage erected if required.

NUMA	Completion Criteria
	• Low wall ≤25% slopes above RL 200 m, with 0.5 m thick rock mulch cover. • Angle of repose slopes below RL 200 m (≤ 65%). • Sandhurst Creek 0.1% AEP flood event does not enter void. • Surface and groundwater quality of receiving waters meets the requirements of Schedule W of the EA. • Void has no adverse environmental impact on basalt aquifer.

5.4 Voids in Floodplains

Section 126D(3) of the *Environmental Protection Act 1994* states that if the land subject to a proposed PRCP schedule will contain a void situated wholly or partly in a floodplain, the PRCP schedule must provide for rehabilitation of the land to a stable condition. A floodplain is defined under Section 41C(3) of the *Environmental Protection Regulation 2019* as the modelled peak water level at 0.1% AEP for a relevant watercourse.

Section 126D(3) of the *Environmental Protection Act 1994* does not apply where a NUMA has already been identified in a LOD and is transitioned into the PRCP schedule consistent with the LOD (DES 2021). The Western and Southern residual voids have been previously identified and detailed in the LODs for Minerva Mine.

Notwithstanding that section 126D(3) does not apply for Minerva Mina, surface flooding does not represent a threat to the stability of the residual voids, as they are located outside the 0.1% AEP modelled flood extent.

6 Rehabilitation Methodology

6.1 Hydrogeology

A residual void hydrological study was undertaken by AGE (2017) based on the outcomes from a water balance model prepared by KBR (2017) to:

- calculate future groundwater inflow rates to the Western and Southern residual voids;
- determine the long-term water balance in the residual voids, including the long-term equilibrium water level and any potential interactions with surrounding aquifers; and
- estimate the long-term void water quality in the residual voids.

The study outcomes are presented in the *Residual Void Investigation Report* (Sojitz Minerva Mining 2021a) and summarised below.

Western Void

The water balance model for the Western residual void indicates the water level will rise towards an equilibrium over a period of about 164 years. The long-term median equilibrium water level is predicted to be about 195 mAHD, with a range of 185 to 210 mAHD. The maximum water level remains 60m below where the residual void would spill to the surrounding environment.

The long-term equilibrium water level is predicted to be 6m below the base of the basalt exposed in the highwall (201 mAHD) and the maximum void water level is predicted to be above the base of the basalt. This is shown in cross-section in **Figure 12**. The maximum void water level is predicted to remain about 60m below the elevation of the regional groundwater table. A groundwater hydraulic gradient is expected to be maintained in perpetuity towards the Western residual void and therefore the likelihood of void water interacting with the basalt aquifer is low.

Southern Void

The water balance model for the Southern residual void indicates the water level will rise towards an equilibrium over a period of about 110 years. The long-term median equilibrium water level is predicted to be about 175 mAHD, with a range of 150 to 200 mAHD. The maximum water level remains 60m below where the residual void would spill to the surrounding environment

The long-term equilibrium water level is predicted to be within the lower coal seam group and the maximum void water level is predicted to be within the upper coal seam group. This is shown in cross-section in **Figure 13**. The maximum void water level is predicted to remain about 70m below the elevation of the regional groundwater table. A groundwater hydraulic gradient is expected to be maintained in perpetuity towards the Southern residual void and therefor the likelihood of void water leaving the void via coal seams is low.

The predicted void water equilibrium level for the Southern void is lower than predicted levels for the Western void and a hydraulic gradient is expected to form towards the Southern void. The Southern void will remain a groundwater "sink" where evaporation permanently depresses the water level.

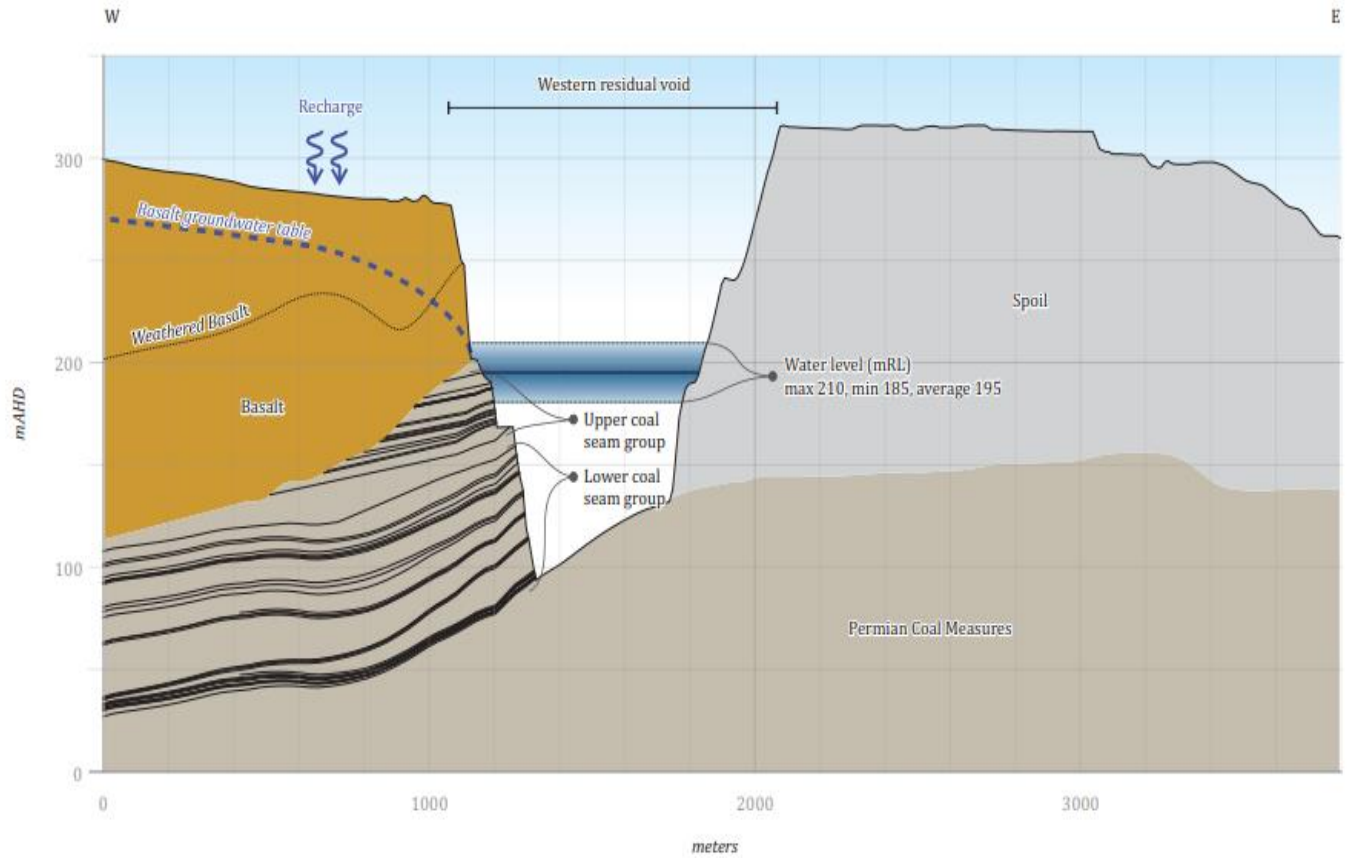

Figure 12 – Western Residual Void Equilibrium Water Levels

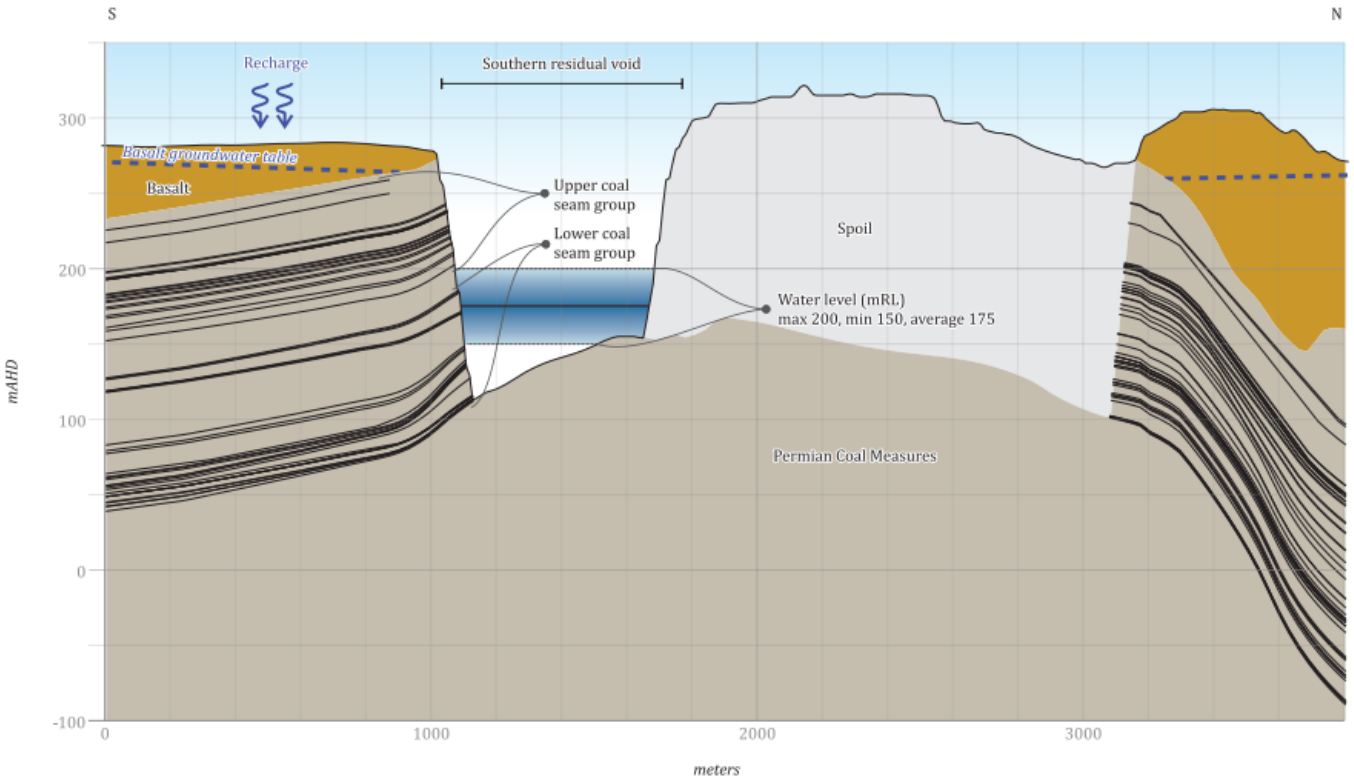

Figure 13 – Southern Residual Void Equilibrium Water Levels

Water Quality

The ANZECC (2000) water quality guidelines classifies irrigation water with a "high salinity rating" as having an electrical conductivity of between 2.9 dS/m and 5.2 dS/m (equivalent to 1,945 – 3,485 mg/L TDS). Adverse effects in beef cattle can be expected to begin when stock drinking water exceeds 4,000 mg/L TDS (ANZECC 2000). In the long-term, the salinity of water in both residual voids is predicted to become unsuitable for irrigation initially and subsequently become unsuitable for stock water for beef cattle as TDS exceeds the ANZECC irrigation and stock water guidelines. The predicted long-term water levels and time to exceed irrigation and stock water quality in the residual voids is summarised in **Table 12.**

Table 12 – Residual Void Water Level and Water Quality

Characteristic	Western Residual Void	Southern Residual Void
Pit crest (spill) level	272mRL	262mRL
Maximum long-term equilibrium water level	210mRL	200mRL
Average long-term equilibrium water level	195mRL	175mRL
Time to reach equilibrium water level	~164 years	~110 years
Time to reach ANZECC high salinity irrigation water quality	~190 years	~90 years
Time to exceed ANZECC beef cattle stock water quality	~465 years	~164 years
Median annual increment in Total Dissolved Solids	7 mg/L	25 mg/L
Total Dissolved Solids at 500 years	4,300 mg/L	16,000 mg/L

In light of the long-term water quality, the authorised residual voids are unable to support a PMLU and are identified NUMAs. The void water would not, however, result in adverse environmental impacts on surrounding aquifers as groundwater hydraulic gradients are expected to be maintained in perpetuity towards both voids. The maximum water level in the voids is 60m below the spill point and void water would not be released to surface waters or surrounding lands. The study confirms the residual voids would not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual voids themselves.

6.2 Flooding

Sojitz Minerva Mining Pty Ltd holds water licence number 406741 issued under the *Water Act 2000* to divert Sandhurst Creek around the western and southern mine pits to enable access to coal reserves. The diversion was constructed in stages (Western and Southern diversions) and totals 5,819m in length. The design criteria and design parameters for the diversion are described in the *Residual Void Investigation Report* (Sojitz Minerva Mining 2021a).

The diversion was designed to convey flow during a 0.1% AEP flood event such that associated flood waters do not enter the Western or Southern residual voids. Throughout active mining (2004 – 2021), all upstream Sandhurst Creek floodwaters were successfully conveyed via the diversion and there were no instances of floodwaters entering the mining pits. The predicted extent of the 0.1% AEP flood event was modelled in 2021 with the HEC-RAS hydraulic modelling program using the most recent LiDAR survey of the diversion and surrounds (Cardno 2021). The modelling took into account tributary inflows and any changes to topography since the original design (e.g. road works). The modelling confirmed the surface flows from a 0.1% AEP flood event did not interact with the authorised residual voids (see **Figure 14**).

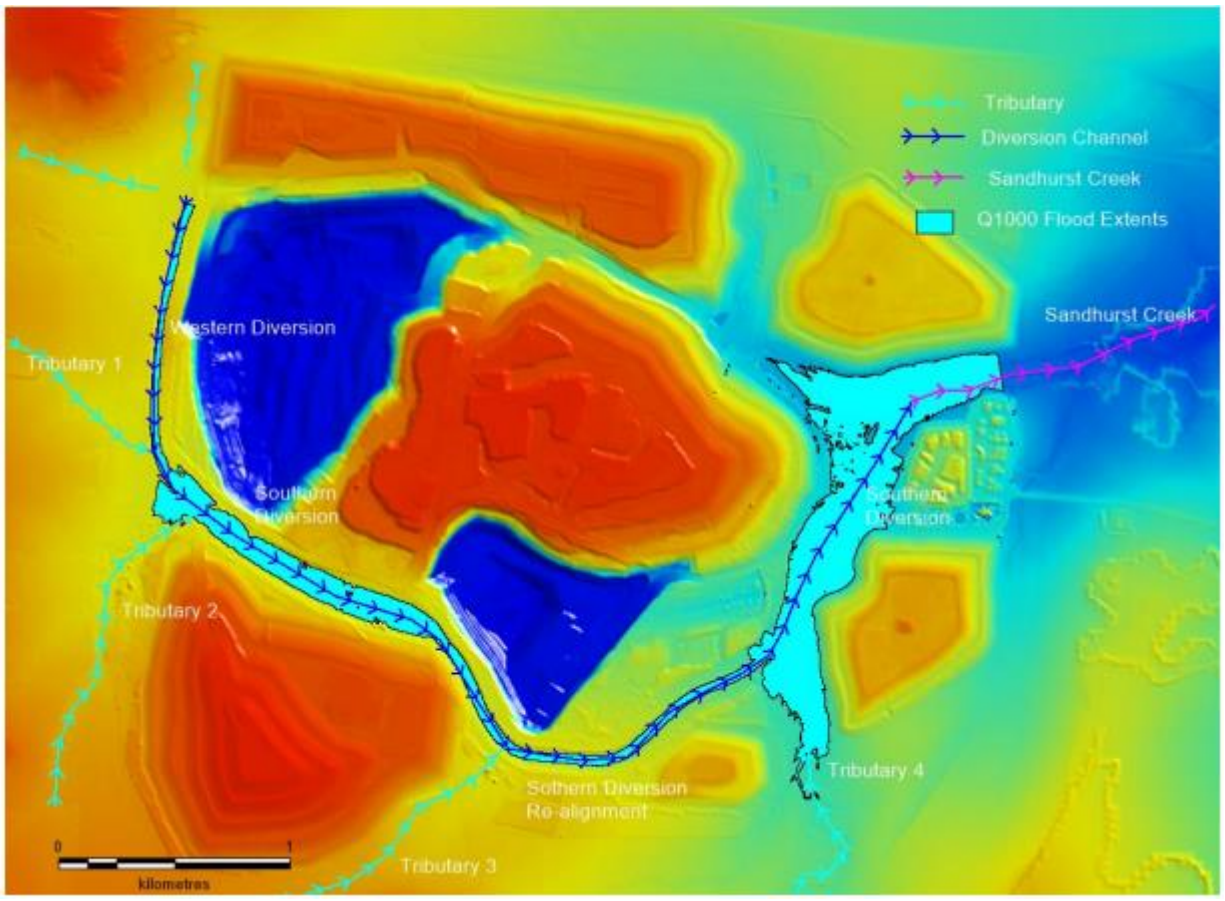

Figure 14 – Sandhurst Creek 0.1% AEP Flood Extent

As part of mine closure activities, a permanent bund shall be installed 50 m from the crest of the residual voids as a safety measure to restrict access to the highwalls. The closure bund is not required to contain a 0.1% AEP flood within the diversion and is deliberately placed outside the flood extent so as not to impede flow.

Surface flooding does not represent a threat to the Western and Southern residual voids, as they are located outside the 0.1% AEP modelled flood extent. The location of the residual voids adjacent to a floodplain and their NUMA status has been described in the *Residual Void Investigation Report* (Sojitz Minerva Mining 2021a) LOD.

6.3 Soil and Capping Materials

6.3.1 Material Volumes

Topsoil

Minerva Mine currently has approximately 1,032,000 m^3 of topsoil in stockpiles based on the site's most recent survey reconciliation. The topsoil stockpiles are positioned around the site and were sourced from topsoil stripping activities ahead of mining. The locations and volumes of the topsoil stockpiles are shown in **Figure 15.**

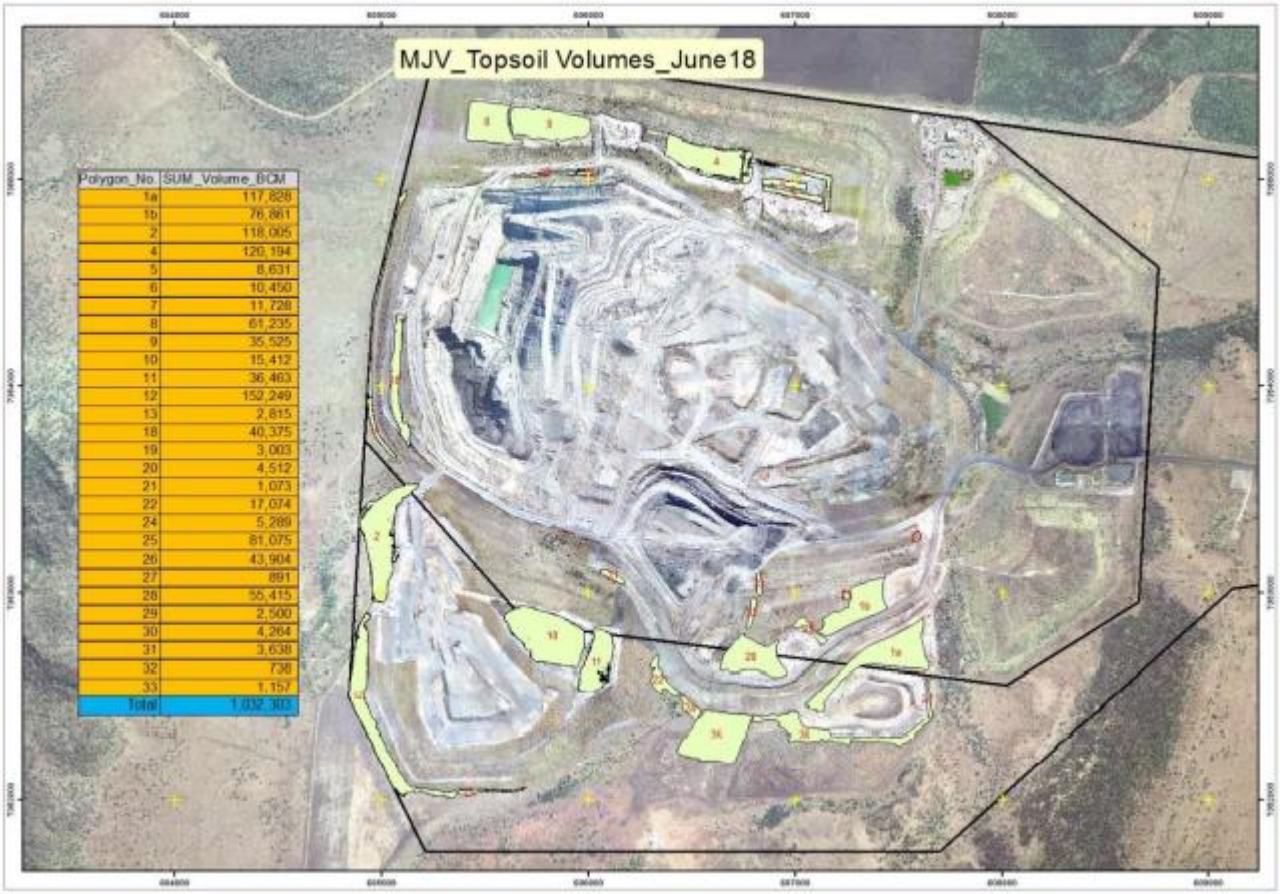

Figure 15 – Topsoil Stockpiles and Volumes

Following cessation of mining in August 2021, no further topsoil will be stripped and stockpiled. The total disturbed area currently requiring topsoil for rehabilitation at the end of mine life is 435.7 ha.

The rehabilitation treatments allow for 100 – 200 mm thick topsoil application for rock mulch areas and greater than 200 mm for topsoil only areas without rock mulch (Sojitz Minerva Mining 2021b). The stockpiled topsoil volume of

1,032,000 m^3 provides more than sufficient topsoil to cover the 435.7 ha of disturbance with the required topsoil thickness.

Basalt

The Western pit high wall contained large volumes of competent basalt, with the thickness of the basalt strata reaching ~130 m in the western portion of ML 70145. Basalt from pre-strip activities has been stockpiled for use in rock mulch rehabilitation on dumps that have a re-profiled surface greater than 5% slope. Placement of 0.5 m thick basalt rock mulch over shaped spoil dumps mimics stable rock scree landforms in the area and promotes the development of a bushland habitat for the rehabilitated areas.

Minerva Mine has stockpiled approximately 2,382,000 m^3 of competent basalt on the in Main pit dump and the Southern dump, based on the site's most recent survey reconciliation. The locations and volumes of the basalt stockpiles are provided in **Figure 16**.

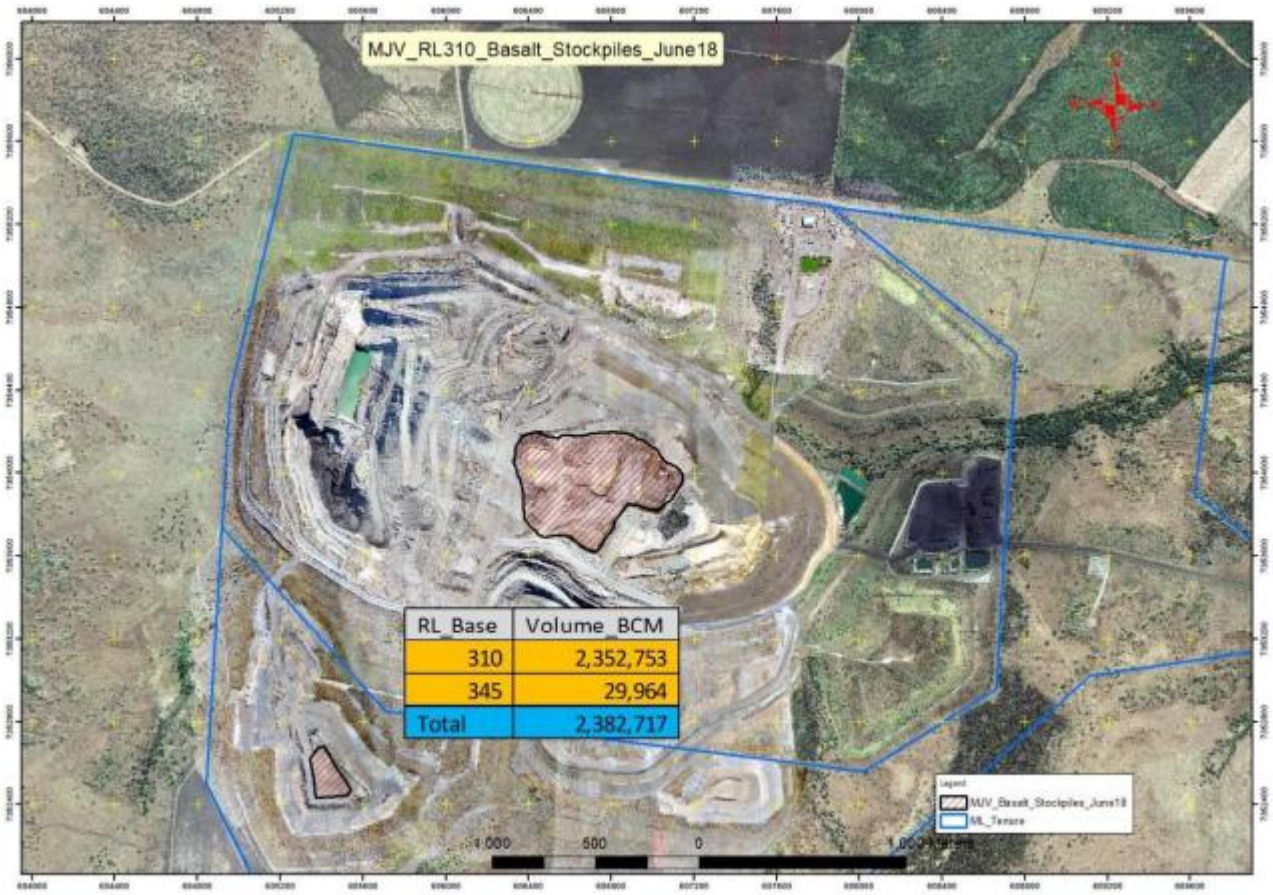

Figure 16 – Basalt Stockpiles and Volumes

The total disturbed area requiring rehabilitation with rock mulch at the end of mine life is 202.5 ha. The rock mulch rehabilitation treatments allow for 0.5 m thick of basalt over the surface of reprofiled areas. The total volume of 2,382,000 m3 of basalt rock provides more than sufficient material to cover the entire 202.5 ha with a minimum rock mulch thickness of 0.5m.

6.3.2 Material Quality

Competent basalt used for rock mulching at Minerva Mine has the following attributes:

- a resilient coarse fragment content that controls surface erosion by mechanical means;
- desirable characteristics for plant growth; and

- desirable infiltration and moisture retention characteristics.

Rock mulching provides a surface with high infiltration rates and a high level of surface roughness. In addition to providing erosion resistance, rock mulching effectively acts as a sponge that minimises surface runoff, increases infiltration and limits concentration of surface flow. Secondly, where a minor pipe structure has formed in underlying spoil, the rock mulch cover is largely resistant to erosive forces.

Moisture captured during rainfall events, slowly drains from the rock mulch into the clayey spoil below and the moistened spoil is weakened and deforms and settles under the weight of the rocky overburden. This process assists in stabilising/repairing erosional features that develop (Emmerton 2019). Basalt is highly resistant to erosion which makes it suitable as rock mulch on slopes up to 25%. The surface treatments are designed to provide a substrate with physical properties that minimise erosion and optimise infiltration, rather than relying on vegetation cover to stabilise the slopes. A total of 13 soil types have been recognised and mapped at the mine (Ison 1996a) (see **Table 4**). Topsoils range from shallow to deep black vertisols on Tertiary basalt interspersed by red brown non-cracking dermosol clays on Permian sediments. The black vertisols are the dominant soil type within the mining leases and are known to have very high soil fertility and a large water holding capacity (Queensland Government 2016).

During operations topsoil was stripped in accordance with depths formulated by Esys (2005) and stockpiled. The topsoil stockpiled is fertile and well suited to form the rehabilitated PMLUs of grassy open woodlands and low intensity grazing.

6.3.3 Ameliorants

The stockpiled black vertisols provide highly fertile growth media for rehabilitation areas. The topsoil used for rehabilitation does not require chemical alterations, fertilizer or organic matter inputs to achieve the grassy open woodlands and low intensity grazing PMLUs.

Introduced pasture species such as buffel grass, Rhodes grass and green panic are common in the area and are known to germinate from stockpiled topsoil. Applying fertilizer would provide introduced pasture species with an unwanted competitive advantage, enabling them to outcompete native species desired for the PLMUs of grassy open woodlands and low intensity grazing.

6.4 Waste Characterisation

The following characterisation of spoil material based on analysis of 22 drilling core samples taken within the footprint of the mine pit was provided by ESys (2005):

Salinity: 89% of the spoil classes were non-saline with the remaining spoil classes having medium to high salinity. The saline spoil classes were lithologies over the Sandhurst 1 coal seam, the weathered material above the Funnel seams and all coal seams. Based on the spoil material quality, saline drainage is not expected and has not been observed at Minerva Mine during operations.

Chemical induced dispersion: Sodicity was present in all spoil classes but not at excessive levels, ranging from 7-14% ESP. The calcium-magnesium ratio is low in most of the unweathered spoil classes, which is common for Central Queensland spoils.

Mechanical dispersion: The dispersion indices of all tested spoil classes other than Wurba sandstone were moderate again suggesting some mechanical dispersion.

Erodibility: Soil erodibility of the spoil classes were generally on par or lower than that of the soils tested. Spoil with a K factor exceeding 0.045 is considered erodible. The USLE K factor for the tested spoil classes are ranked below and show that the Funnel spoil materials contained the highest K factor:

i) Funnel = 0.052 > Wurba = 0.43 – 0.46 > Lexington = 0.04 > Wills = 0.038 > Minerva = 0.028.

Acid Mine Drainage: overburden and interburden materials were inert, while some fine-grained materials that occur immediately above the Funnel and Sandhurst 1 coal seams were potentially acid forming. The potentially acid forming material associated with the Funnel and Sandhurst 1 coal seams represented less than 5% of the sampled overburden. Laboratory testing indicated that most of the overburden is non-acid forming and has neutralising capacity, so net acid generating spoil materials is not expected. Results from the testing are provided in **Table 13**.

Table 13 – Acid Producing Potential of Spoil

Acid Producing Potential	Net acid Production (kg H2SO4 / t)	Spoil Classes
None (neutralising)	< -15	Lexington, Minerva 4 and 5 lithologies
None (neutralising)	-15 to -10	Wills, Minerva 1 to 3 lithologies
Very low (low neutralising)	-10 to 0	Lexington siltstone, Minerva 5, Sandhurst 2 and Minerva mudstone lithologies
Low (low acid)	0 to 5	Funnel lithologies
Moderate (5% of samples)	>5 (max 7.8)	Sandhurst 1 lithologies

The unweathered Sandhurst 1 seam lithologies represented the only net acid material with moderate acid producing potential. The Sandhurst 1 lithology could be neutralised by mixing Sandhurst 1 with other spoil at a ratio of 1:1 (except spoil surrounding Funnel lithologies). The acid potential was not sufficiently high to warrant encapsulation. Management of Sandhurst 1 material during mining operations involved burying the waste at the base of in-pit dumps.

Major Elements: All seam lithologies were tested for trace elements such as arsenic, chromium, copper, lead, nickel, zinc, cadmium and mercury. Cadmium and mercury levels were below detection levels throughout. The metal levels of the Permian coal measures were less than the QDME (1995) soil investigation threshold levels in all materials. All spoil types were very low in nitrogen and phosphorus, being characteristic of spoils in Central Queensland. Potassium was acceptable or marginally low in most spoil classes with the notable exception of weathered spoil above the Funnel seams and lithologies above the Wurba seam. Calcium, magnesium and sulphur levels were at acceptable levels in all spoil classes tested.

Given the low levels of trace elements, neutral mine drainage is not expected to occur at Minerva Mine due to the absence of enriched elements.

There is no evidence of spontaneous combustion of carbonaceous materials leading to surface heating in rehabilitated areas.

6.5 Landform Design

A final landform has been prepared for Minerva Mine based on the final pit and dump profile that remained at the end of mining in August 2021. The final landform is described in the *Residual Void Investigation Report* (Sojitz Minerva Mining 2021a) LOD and *Rehabilitation Management Plan* (Sojitz Minerva Mining 2021b) LOD.

The following criteria were applied in preparing the final landform design:

Final Voids and Low Walls

- Reshape the current low walls to 25% with 30 m wide benches every 30 m of vertical lift;
- Western pit reshape low wall down to RL 210 m (max water equilibrium level), with fill below this at angle of repose;
- Southern pit reshape low wall down to RL 200 m (max water equilibrium level), with fill below this at angle of repose;
- Southern pit highwall reshaped south-east section to 25% to reduce void area, no reshape of Western pit highwall;
- Reshaped 25% slopes shall be capped with 0.5 m thick of basalt rock mulch, plus topsoil; and
- Shaped surfaces will internally drain to void area.

Out of Pit Spoil Dumps and External Draining Batters

- Batter surfaces with a grade of 25% slope or less with 0.5m basalt rock mulch plus topsoil;
- Benches installed at 15 m or less vertical lifts, wide enough to enable topsoil haulage along the benches;
- With slopes less than 5%, topsoil only application to shaped surfaces; and
- Rehabilitated surfaces designed to shed water to the receiving environment.

A three-dimensional model of the final landform has been prepared and is shown in **Figure 17**, with the green shading indicating the area requiring reshaping. The final heights of the rehabilitated landforms are provided in **Figure 18**, with the South-West dump forming the highest elevation at RL 345 m.

Figure 17 – 3D Model of Final Landform

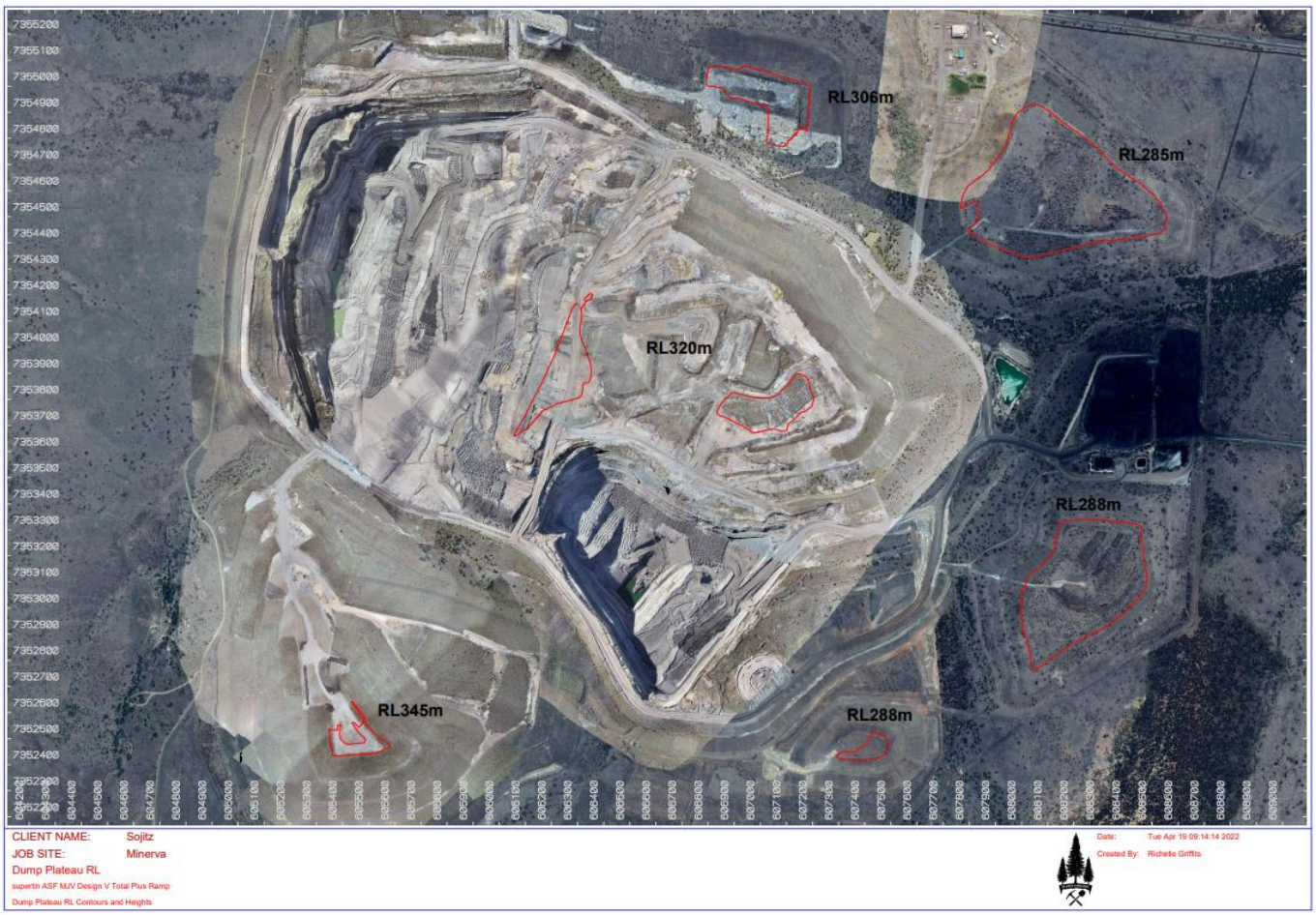

Figure 18 – Final Heights of Rehabilitated Landforms

6.6 Waste Material Cover Design

The coal produced at Minerva Mine did not need to be processed by a coal handling and preparation plant, so coarse rejects or fine tailings were not generated. All of the ROM coal was crushed on stockpile areas and then loaded onto trains as product coal, with no waste produced. The coal stockpiles will be scalped of all carbonaceous materials prior to being rehabilitated. There are no areas that need to be capped to manage potentially reactive materials.

6.7 Water Management

Water used onsite was obtained from the following sources: (i) basalt aquifer bore, (ii) groundwater seepage to the mining voids, and (iii) rainfall run-off collected in mining voids. The water quality of the water soured from the basalt aquifer was suitable for unrestricted use across the mining operations for activities such as dust suppression, workshop use, and vehicle washdown (typical electrical conductivity <1,000 µS/cm). Water sourced from pit dewatering (groundwater seepage and rainfall run-off) generally had higher electrical conductivity than the basalt aquifer and was predominately used for watering haul roads (typical electrical conductivity ~ 3,000 µS/cm) (Sojitz Minerva Mining 2017).

The industrial area dams receives run-off from the heavy vehicle workshop, hardstands and the wash-down pad, after being treated via an oily water separator. These dams capture storm water run-off that may potentially contain residual contaminants from the industrial area. This water captured by the industrial dams is recycled for use onsite.

The ROM dams and the sediment dams are positioned around site to collect run-off from coal stockpiles or spoil dump areas. These dams are designed to capture sediment run-off during heavy storm events and allows by-wash of supernatant water to the environment in accordance with Condition W38 of the EA. Spillway releases of non-mine

affected water from ROM dams and sediment dams are suitable for entering the receiving environment due to the high flows and low solute concentrations during the storm events. Site dams will remain after closure as a water supply and forming part of the low intensity grazing PMLU. A list of these dams is provided in **Section 4.3**.

Rainfall run-off and groundwater seepage shall accumulate in the Western and Southern voids, which will eventually reach long-term equilibrium levels approximately 60m below pit crest (see **Section 6.1**). Groundwater hydraulic gradients are expected to be maintained in perpetuity towards each residual void (AGE 2017). The void water will not interact with the basalt aquifer or the receiving environment and will not overflow (Sojitz Minerva Mining 2021a). The final voids will act in perpetuity as internally draining sediment traps for the catchment of the voids.

The Sandhurst Creek Diversion is a permanent diversion that will remain post mine closure. The diversion water licence requires an on-going monitoring and evaluation program be carried out consistent with ACARP Project C9068 *Monitoring and Evaluation Program for Bowen Basin River Diversions* (ACARP 2001). The water licence cannot be relinquished until the diversion is meeting or progressing towards:

- developing features (including geomorphic and vegetation) present in the landscape and in local watercourses;
- maintenance of a sediment transport regime that allows the diversion to be self-sustaining and not directly impact upstream or downstream reaches; and
- the diversion and associated structures maintain equilibrium and functionality and do not require ongoing maintenance.

6.8 Revegetation

6.8.1 Revegetation Objectives

Minerva Mine reviewed the rehabilitated landform design criteria in 2015 and developed the following rehabilitation objectives to achieve the PMLUs of grassy open woodlands and low intensity grazing (Sojitz Minerva Mining, 2021b):

- Landform stability is paramount;
- Appropriate final surface treatment and sustainable vegetation cover is key to prevention of erosion;
- Optimise in-pit dumping practices in the Main (Western) void to the most cost effective and practicable extent during operations;
- All infrastructure will be removed from site unless otherwise agreed in writing by the post mining land holder.
- Provide landforms that are sufficiently stable such that vegetation is self-sustaining;
- Return land to an agreed land use and capability;
- Ensure downstream surface water quality is of agreed standard during and after mining;
- Ensure surface water on the leases is of agreed standard after mining;
- Ensure that decommissioned landscapes are safe for humans and wildlife.

The rehabilitation objectives will be met by undertaking the rehabilitation practices described in **Section 6.8.2** to **Section 6.8.6** below.

6.8.2 Shaping Landforms

Spoil dumps formed by the removal of overburden have been placed either out of pit creating new landforms or within the mining footprint to partially backfill the void. Once the spoil has been dumped to the designed levels, reshaping of the surfaces can commence to provide the final landform profile.

Reshaping is undertaken with bulldozers to achieve a maximum slope angle of 25% for externally draining batters, ramps and internally draining low walls. The top of dumps are generally reshaped with slopes less than 5% that may drain towards the residual void low walls or to the external batters.

Benches are incorporated into the spoil reprofiling on the external batters and the internally draining low walls as part of the final landform design. Benches are designed to be relatively flat and free draining, which acts to dissipate concentrated flow of water that may develop from storm water run-off.

Once the landform shaping meets the designed profiles, it is ready for topsoil or rock mulch application to create the final surface.

6.8.3 Topsoil Application Areas

Stockpiled topsoil is spread over the reshaped spoil dumps to provide the physical structure and chemical properties required for vegetation growth. Topsoil is applied to areas with slopes of < 5 % (e.g. top of dumps, infrastructure areas), as rock mulching is not required to stabilise such slopes. Topsoil is applied in accordance with the following methodology:

- The topsoil is delivered to the shaped surface and spread out at depths of at least 200 mm;
- The profile is deep ripped on the contour with bulldozers to slow the surface flow of water (in the absence of established vegetation), de-compact the profile, and promote rainfall infiltration;
- The ripped topsoil surface is then seeded to achieve the PMLU of low intensity grazing. A blend of native and introduced grass and legume species are included in the seed mix;
- Fertiliser or other ameliorants are not applied to topsoiled areas (see **Section 6.3.3**).

6.8.4 Rock Mulch Application Areas

The use of rock mulch on spoil slopes up to 25% provides an enduring surface armour and offers a growth media to support grass and trees. The competent basalt has been stockpiled from pre-strip operations and will be applied in accordance with the following methodology:

- Basalt is dumped by trucks onto the shaped surface and then pushed out by bulldozers to achieve a 500 mm thick layer;
- Topsoil is then delivered to the rehabilitation area and pushed out over the top of the basalt using bulldozers to achieve 100 – 200 mm thickness;
- The surface is then deep ripped on the contour with bulldozers, which will mix the basalt and topsoil together forming a rock mulch;
- The rock mulch surface is then ripped and seeded to achieve the PMLU of grassy open woodlands. A blend of native species including trees, shrubs and grasses represented in nearby regional ecosystem are included in the seed mix (see **Section 6.8.5**);
- Fertiliser or other ameliorants are not applied to rock mulched areas (see **Section 6.3.3**).

6.8.5 Seed Mixes

The application of seed is the final step for completing the rehabilitation work. Areas are seeded in the cooler months (i.e. April to August) when tree and shrub germination and establishment is not inhibited by competition from introduced grass species. Stock are excluded from newly rehabilitated areas using fencing to prevent damage to young vegetation.

For topsoil only areas, native perennial grass species are included in the mix, supplemented with introduced grass/legume species (if required) at an aggregate rate of 15 kg/ha. For rock mulch areas, where possible a blend of native species including trees and shrubs represented in nearby regional ecosystem are included in the seed mix and applied at an aggregate rate of 15 kg/ha. Seed species that are commonly applied to rehabilitation at Minerva for rock mulch and topsoil only areas are provided in **Table** 14.

Table 14 – Seed Species Commonly Used for Rehabilitation

Species Used for Rock Mulch Areas		Species Used for Topsoil Only Areas
Eucalyptus exserta	*Lysiphylum hookeri*	*Dichanthium* spp.
Eucalyptus populnea	*Cassia brewsterii*	*Aristida* spp.
Eucalyptus crebra	*Casuarina cristata*	*Panicum* spp.
Eucalyptus tereticornis	*Atalaya hemiglauca*	*Astrebla* spp.
Eucalyptus cambageana	*Acacia bancroftii*	*Stylosanthes scabra*
Eucalyptus coolibah	*Acacia victoriae*	*Cynodon dactylon*
Eucalyptus moluccana	*Acacia coriacea*	*Heteropogan contortus*
Eucalyptus melanophloia	*Acacia salicina*	
Eucalyptus tesselaris	*Acacia harpophylla*	
Corymbia citriodora	*Acacia anuera*	
Corymbia erythrophloia	*Dodonaea viscosa*	

Seeds are sourced from only reputable seed suppliers. The preference is for seed harvested from Central Queensland, where possible. Seed germination tests are generally undertaken by the seed suppliers as part of quality assurance to ensure the seeds are viable before packaging and delivery to site.

6.9 Final Void Treatments

The Western and Southern pits will remain as residual void NUMAs and a safety bund will be constructed around the perimeter of the high wall / end walls (see **Section 5**). PSM (2021) completed a stability analysis of the Western and Southern residual voids and noted that a buttress of the Southern Residual Void was recommended to provide a minimum factor of safety of 1.5 to the safety bund. The *Residual Void Investigation Report* (Sojitz Minerva Mining 2021a) included the stability analysis as an appendix, with the report also indicating a review of the PSM (2021) stability analysis would be undertaken before submission of this PRC Plan.

WK Geotechnical were engaged by Minerva Mine to complete a review of the PSM (2021) stability analysis and also other technical information pertaining to the long-term stability of the residual voids (WK Geotechnical 2022) (**Appendix D**). The review assessed the stability of the residual voids under both maximum pit water level and no pit water scenarios. The stability analysis modelling indicated that a 1.5 factor of safety would be maintained to the residual void safety bunds in all scenarios. WK Geotechnical (2022) confirmed that no reshaping or remedial changes (e.g. buttressing) to the residual voids (as described in the LODs) are required in order to meet the 1.5 factor of safety. **Figure 19** provides the crest lines for the Western and South residual voids (dark blue line), the proposed closure bund location (red line) and the 0.1% AEP flood extent (light blue line). The bund remains outside the 0.1% AEP flood extent.

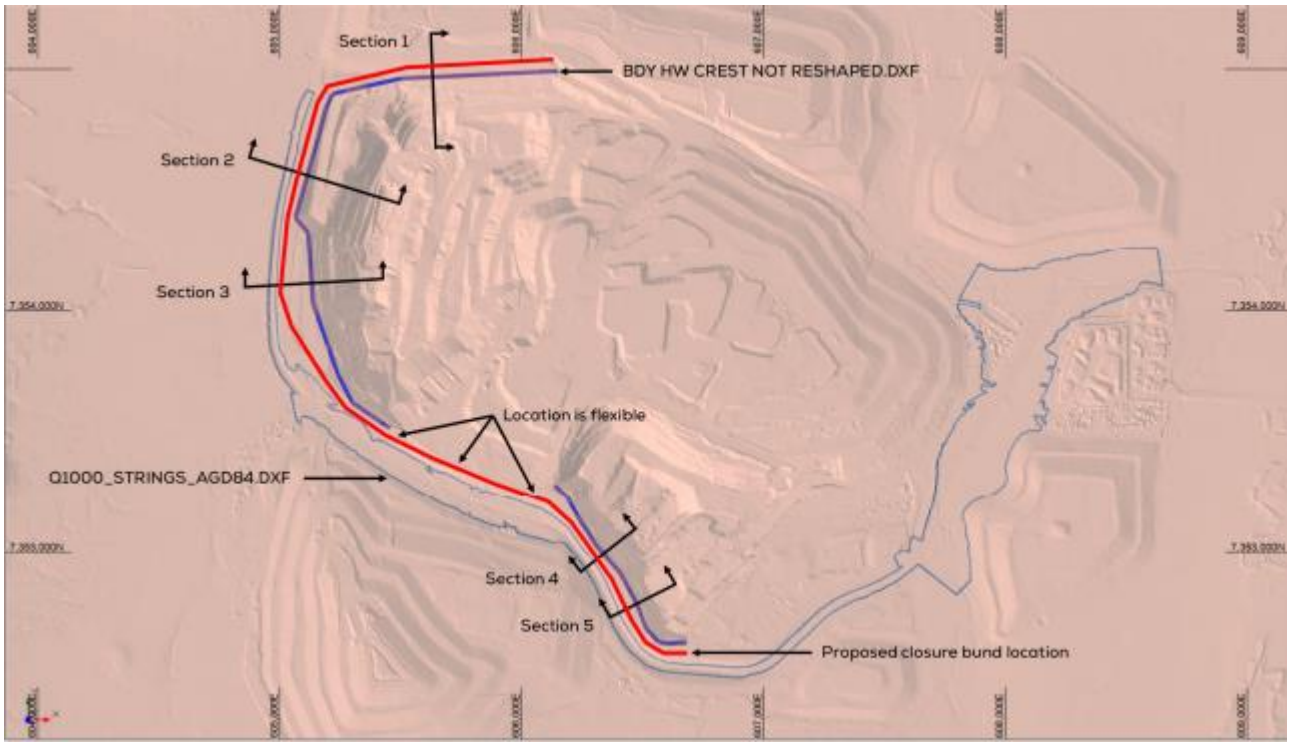

Figure 19 – Residual Void Closure Bund

The residual void investigation report LOD (Sojitz Minerva Mining 2021a) provided final landforms and the rehabilitation treatments for the residual voids (see **Section 6.5**). A conceptual hydrogeological model has been provided in **Section 6.1** and indicates the final voids will remain a groundwater sink in perpetuity.

6.10 Built Infrastructure

6.10.1 Infrastructure to be Retained

Minerva Coal Pty Ltd holds ML70145, ML70376, EA EPML00668613 and underlying freehold land on the Lexington property. Certain infrastructure that is beneficial to the running of the Lexington property, and an adjacent property also owned by Minerva Coal Pty Ltd (Mt Minerva), is to be retained. The location of these two properties is shown in **Figure 3.** Lexington covers an area of 3,442ha, which is predominantly grazed with some dryland cropping conducted in the eastern extent. Mt Minerva covers an area of 494ha, which is largely dryland cropping. The retained infrastructure will beneficially support both the PMLUs and the overall productive use of the two properties. Benefits include the provision of water storage and buildings for farm equipment and personnel, and storage of fodder. The infrastructure will also help support the management of Minerva Coal Pty Ltd's natural grasslands offset area established under EPBC Act approval (EPBC 2005/2039) (see **Section 2.6.8**). In addition, the adjoining properties will also have the opportunity to reach appropriate agreements to utilise these facilities for farming purposes.

A statement from Minerva Coal Pty Ltd accepting ownership, responsibility and liability for retained infrastructure is presented in **Appendix C**.

The following infrastructure will remain following mine closure and be owned by the landholder:

- access roads, vehicle parking and associated hardstands;
- dams, with associated groundwater production bore and pipeline to Industrial Raw Water Dam;
- site administration facility, including muster shed;
- workshop and associated sheds;

- electrical transformers and connections; and
- potable water tanks and on-site septic system.

A site investigation report will be undertaken as part of the closure activities to identify any areas of contamination that require removal or remediation. The investigation will be guided by the locations of former environmentally relevant activities and notifiable activities. If the investigation identifies residual contamination associated with the retained infrastructure that is impractical to remove or remediate due to its location, the infrastructure transfer agreement stipulates the landholder shall have responsibility for the ongoing maintenance and ownership liability for the location in question (see **Appendix C**).

6.10.2 Infrastructure to be Decommissioned

Infrastructure that is not beneficial to the landholder and the PMLUs will be decommissioned as part of mine closure. Demolition activities will remove the physical infrastructure and then rehabilitate the ground that was supporting the infrastructure. The areas will be rehabilitated by covering the exposed ground with at least 200mm mm of topsoil, deep ripping and seeding the surface.

If the site investigation report identifies areas of contamination, then the material would be managed as part of the rehabilitation works prior to the application of topsoil.

The following infrastructure will be removed as part of mine closure:

- truck fill points;
- wash down bay and associated hardstands;
- fuel farm;
- haul roads;
- explosives magazine and compound;
- used tyre stockpiles / used tyre bunds;
- ROM infrastructure;
- fixed lighting towers;
- security / boom gates and security fences
- remote crib huts;

Used plant, equipment and salvageable materials (e.g. steel) shall be sold or disposed off-site. Waste tyres may be disposed in pit in accordance with the EA conditions E4 and E5. General waste may be disposed of on site in accordance with EA condition E11.

7 Risk Assessment

7.1 Rehabilitation Risk Assessment

The risks of the PMLUs and NUMAs causing environmental harm and not being safe and structurally stable have been identified. These are non-trivial hazards that may arise during Minerva Mine's closure phase and which may affect the attainment of rehabilitation objectives and completion criteria.

The possible causes of each identified risk were then assessed, along with potential impacts. The next step undertaken was to analyse the risks in terms of likelihood (**Table 15)** and consequence **(Table 16**), taking into consideration the controls and actions either currently undertaken, or to be undertaken, to minimise adverse outcomes or promote beneficial outcomes. The analysis took into account the experience gained from over a decade of mine rehabilitation undertaken Minerva Mine. A 5 x 5 risk matrix format tailored to PRC Plan requirements was used (**Table 17**).

Table 15 - Risk Likelihood

Rare	Unlikely	Possible	Likely	Almost Certain
Very unlikely to occur	May occur over a period of about twenty years	May occur over period of about five years	May occur once a year	May occur more than once a year

Table 16 - Risk Consequence

Very Low	Low	Moderate	High	Very High
Environment				
Localized minor environmental harm, no structural instability, no remediation required, quick recovery.	Localized environmental harm or minor instability, minor remediation takes <2 months.	Localized environmental harm or structural instability, remediation takes <2 years.	Environmental harm or structural instability that is widespread on site. Remediation takes >2 and <10years.	Environmental harm or structural instability that is widespread, or extends off site. Remediation takes > 10years.
Safety				
First aid case with no medical treatment.	Medical treatment case injury	Injury requiring in-patient care	Single fatality or single permanent disability	Multiple fatalities or multiple severe permanent disabilities

Table 17 - Risk Matrix

Likelihood	Consequence				
	Very Low	Low	Moderate	High	Very High
Almost Certain	Medium	Significant	High	High	High
Likely	Medium	Significant	Significant	High	High
Possible	Low	Medium	Significant	High	High
Unlikely	Low	Low	Medium	Significant	High
Rare	Low	Low	Medium	Significant	Significant

The evaluation of risks was an iterative process whereby the need, or otherwise, for additional controls (risk treatments) in order to manage risk to an acceptable level was considered. The steps followed were consistent with *AS ISO 13000:2018 Risk management – Guidelines* (Australian Standards 2018).

The final outcome of the risk assessment is presented in **Table 18**

Table 18 - Rehabilitation Risk Assessment

Ref.	Hazard (Risk Description)	Cause	Impact	Controls/Actions	Likelihood	Conse-quence	Risk Rating	Risk Treatment – Contextual Information
1	Insufficient material available for rehabilitation	Insufficient stripping and stockpiling of topsoil and basalt rock mulch.	Inadequate depth of topsoil and basalt rock mulch respreads on rehabilitated areas.	Sufficient topsoil volumes already stockpiled for rehabilitation of PMLUs. Large surplus of basalt material already available for rock mulching.	Rare	Moderate	Medium	Section 6.3.2 Material Quality Rehabilitation material volumes in Section 6.3.1
2	Saline and/or acidic spoil	Saline and/or potentially acid generating spoil exposed on surface.	Poor vegetation establishment. Surface water contamination.	At risk materials buried during operations. Rehabilitation monitoring and maintenance.	Unlikely	Moderate	Medium	Very low proportions of saline and potentially acid materials were excavated (Section 6.4 Waste Characterisation).
3	Poor vegetation establishment of grassy open woodland PMLU	Inadequate depth of topsoil and/or rock mulch. Poor ground preparation. Inappropriate species mix for local environment. Inadequate seeding rate. Competition from weeds and introduced pasture grasses. Uncontrolled fire.	Non-compliance with PRCP milestone criteria. Erosion.	Stockpile adequate topsoil and rock mulch volumes. Species and seeding rates selected based on past local rehabilitation experience. Source seeds from reputable suppliers. Fertilizer not applied. Exclude stock. Rehabilitation monitoring and maintenance.	Possible	Moderate	Significant	Section 6.3.2 Material Quality Section 6.8 Revegetation Section 6.8.5 Seed Mixes Section 8 Monitoring and Maintenance
4	Pastures degrade in low intensity grazing PMLU.	Grazing commences before grasses fully established. Overgrazing.	Weeds and non-beneficial species predominate. Reduced carrying capacity. Erosion. Non-compliance with PRCP milestone criteria.	Only begin grazing once grasses well established. Monitor groundcover and rotate stock to spell paddocks.	Unlikely	Moderate	Medium	Section 6.3.2 Material Quality Section 6.8 Revegetation Section 6.8.5 Seed Mixes Section 8 Monitoring and Maintenance
5	Weeds proliferate in revegetated areas	Topsoil contains seed bank of invasive weeds. Mobile equipment introduce weeds.	Invasive weeds species retard establishment of beneficial flora species. Non-compliance with PRCP milestone criteria.	Topsoil sourced from stockpiles (with declining weed seedbank). Fertilizer not applied (to avoid promoting weed growth). Wash down of earthmoving equipment. Weed spraying program.	Unlikely	Moderate	Medium	Section 6.8 Revegetation Section 8 Monitoring and Maintenance

Ref.	Hazard (Risk Description)	Cause	Impact	Controls/Actions	Likelihood	Conse-quence	Risk Rating	Risk Treatment – Contextual Information
6	Gully and rill erosion	Concentration of rainfall runoff. Landform slopes too steep for infiltration characteristics of rehabilitated substrate. Inadequate ground cover.	Sedimentation and elevated turbidity in downstream waters. Loss of topsoil and vegetative cover. Non-compliance with PRCP milestone criteria.	Gully formation minimized by (a) low intensity grazing PMLU restricted to slopes ≤5%, (b) rock mulching of slopes > 5%. Contour ripping. Vegetation cover. Rehabilitation monitoring and maintenance.	Possible	Moderate	Significant	Section 6.3.2 Material Quality Section 6.5 Landform Design Section 6.8 Revegetation Section 8 Monitoring and Maintenance
7	Safety hazard from erosion gullies	Concentration of rainfall runoff. Landform slopes too steep for infiltration characteristics of rehabilitated substrate. Inadequate ground cover.	Injury to people, stock. Non-compliance with PRCP milestone criteria.	Public access to site restricted. Gully formation minimized by (a) low intensity grazing PMLU restricted to slopes ≤5%, (b) rock mulching of slopes > 5%. Contour ripping. Vegetation cover. Rehabilitation monitoring and maintenance.	Unlikely	Moderate	Medium	Section 6.3.2 Material Quality Section 6.5 Landform Design Section 6.8 Revegetation Section 8 Monitoring and Maintenance
8	Hydrocarbon contaminated land	Hydrocarbon spills in infrastructure area	Soil contamination retarding revegetation. Surface water contamination.	Removal or treatment of contaminated materials identified by a site investigation report.	Unlikely	Low	Low	Section 6.10 Built Infrastructure
9	Extreme flood flows enter residual voids.	Sandhurst Creek flood event spills into residual voids.	Erosion of pit crest at point of entry. Void water level rises above modelled long-term maximum level for a period.	The licenced Sandhurst Creek diversion has been designed and constructed such that a flood event with 0.1% AEP does not enter the Western or Southern residual voids. Design allowance for 50m of pit crest erosion retreat (closure bund constructed minimum 50m from crest)	Rare	Moderate	Medium	Post-event remediation: Construct flood levee between creek and void Section 6.2 Flooding Section 6.7 Water Management Section 6.9 Final Void Treatments
10	Migration of saline water from residual voids to licenced groundwater production bore in basalt.	Salinity in residual voids increases over time. Hydraulic gradient forms from voids toward adjacent aquifer.	Increased salinity in licenced Lexington groundwater bore.	Hydrogeological conditions are such that hydraulic gradient is maintained in perpetuity from basalt aquifer towards the voids. Monitoring of water quality and level in bores specified in Environmental Authority.	Rare	Moderate	Medium	Section 6.1 Hydrogeology Section 6.9 Final Void Treatments

Ref.	Hazard (Risk Description)	Cause	Impact	Controls/Actions	Likelihood	Conse-quence	Risk Rating	Risk Treatment – Contextual Information
11	Residual void wall slope failure.	Geotechnical instability	Pit crest extends into Sandhurst Creek 0.1% AEP flood zone.	Maximum void wall slopes < 70 degrees for competent material, angle of repose for incompetent material (as per Environmental Authority). FOS ≥ 1.5 Assessment report by a Registered Professional Engineer of Queensland (RPEQ) on the geotechnical stability of final voids. Design allowance for 50m of pit crest erosion retreat (closure bund constructed minimum 50m from crest).	Rare	Moderate	Medium	Post-event remediation: Construct flood levee between creek and void. Section 6.9 Final Void Treatments
12	Fall into residual void	People, stock have access to pit crest.	Injury or fatality to people, stock.	Public access to site restricted. Public and stock excluded from NUMAs. Fencing, warning signs, as required. Closure bund constructed 50m from crest. Assessment report by a Registered Professional Engineer of Queensland (RPEQ) on the geotechnical stability of final voids.	Rare	High	Significant	Section 6.9 Final Void Treatments

7.2 Rehabilitation Trials

Minerva have undertaken rehabilitation works since 2011 and extensive experience has been gained with techniques that result in stable landforms. Improvements in rehabilitation practices were trialled, including the use of rock mulch cover for spoil dump batters in preference to topsoil-only methods. The rock mulch method proved successful and this rehabilitation approach has now been adopted for all dump batters with > 5% slope. This experience has been drawn on at all relevant stages, including when previously determining and designing final landforms, and in preparing this document.

8 Monitoring and Maintenance

8.1 Milestone Criteria Monitoring

The rehabilitation monitoring program has been developed to meet the rehabilitation milestone criteria listed in the PRCP Schedule (**Section 9**). The specific monitoring activities and the frequencies of monitoring for each rehabilitation milestone are presented in **Table 19**.

Table 19 – Rehabilitation Monitoring Activities

Rehabilitation Milestone (RM)	Monitoring Activity	Monitoring Frequency
RM1 – Infrastructure Decommissioning and Removal	• Visual inspection that all infrastructure has been removed that is not listed in written agreement with landholder.	At mine closure
RM2 – Remediation of Contaminated Land	• If remediated areas show signs of ongoing contamination, undertake re-sampling to verify all contaminated materials were removed.	As required
RM3a – Landform Shaping	• Survey control on earthmoving equipment or in-field survey scans to track conformance to landform designs.	During rehabilitation works
RM3b – Final Trim	• Survey control on earthmoving equipment or in-field survey scans to track conformance to landform designs.	During rehabilitation works
RM4a – Rock Mulch Haulage	• Haulage operations – no specific monitoring required.	NA
RM4b – Rock Mulch Application	• Survey control on earthmoving equipment or in-field survey scans to track conformance to design of rock mulch thickness; • Visual inspections to verify rock is competent basalt or sandstone materials that will provide long-term durability; • Visual inspections to verify rock consists of variable sizes with ranges suitable for 0.5 m thick application.	Survey and assessments of rock quality to occur during rehabilitation works
RM5a – Topsoil Haulage	• Haulage operations – no specific monitoring required.	NA
RM5b – Topsoil Spreading	• Survey control on earthmoving equipment or in-field survey scans to track conformance with thickness specification.	During rehabilitation works
RM6a – Deep Ripping	• Survey control to mark locations for rip lines on the contour and visual inspections to ensure ripping completed at required depths.	During rehabilitation works
RM6b – Deep Ripping and Seeding	• Seed species and application rate to be consistent with Section 6.8.5.	Prior to ordering seed for rehabilitation

Rehabilitation Milestone (RM)	Monitoring Activity	Monitoring Frequency
RM7 – Revegetation (grassy open woodlands) RM9 – Achievement of a stable PMLU (grassy open woodlands)	The grassy open woodlands rehabilitation areas shall be assessed using the following approach at all monitoring sites: • Monitoring transects to be 50 m long; • Soil sampling of topsoil for physical and chemical laboratory analysis to determine if soil limitations; • Visual assessment of soil type, soil structure and soil surface condition; • Visual assessment of surface rock cover condition for rock mulched sites; • Evaluation of gross erosion features and measurements of rill or gully depths, if present. Determine if the erosion is active or if stabilised as part of the landform; • Visual inspection for any acid / saline seepage areas or areas of contamination; • Identification of grass, shrub or tree species present; • Assessment of groundcover % (dead or alive material); • Assessment of rooting depth in soil profile; • Visual estimate of % invasive weed prevalence. • Downstream receiving environment water quality (pH, EC, sulphate, suspended solids)	Every three years
RM8 – Revegetation (low intensity grazing) RM10 – Achievement of a stable PMLU (low intensity grazing)	The low intensity grazing rehabilitation areas shall be assessed using the following approach at all monitoring sites: • Monitoring transects to be 50 m long; • Soil sampling of topsoil for physical and chemical laboratory analysis to determine if soil limitations; • Visual assessment of soil type, soil structure and soil surface condition; • Evaluation of gross erosion features and measurements of rill or gully depths if present. Determine if the erosion is active or if stabilised as part of the landform; • Visual inspection for any acid / saline seepage areas or areas of contamination; • Identification of grass species present; • Assessment of groundcover % (dead or alive material); • Inspection of rooting depth in soil profile; • Determine % invasive weed prevalence. • Downstream receiving environment water quality (pH, EC, sulphate, suspended solids)	Every three years

8.2 Maintenance Activities

Areas of rehabilitation completed to date have been stable and have required negligible interventions to maintain stability. The results from the monitoring programs in **Table 19** shall inform future maintenance requirements. The monitoring program is important for the early identification of rehabilitated areas that are not on a trajectory to meeting the relevant completion criteria. If the rehabilitation monitoring indicates that areas are not trending towards the interim revegetation milestone criteria (RM7 and RM8), then the following corrective actions would be considered where relevant:

- removal of residual contaminated materials;
- application of soil ameliorants;
- ripping and re-seeding the area;
- enrichment planting;
- additional application of rock mulch;

- additional application of topsoil;
- repairing areas of erosion;
- controlling overland flow pathways;
- spraying of invasive weeds.

9 References

ACARP (2002). Maintenance of Geomorphic Processes in Bowen Basin River Diversions. Project Number C8030 – C9068, July 2002.

AGE (2017). Minerva Residual Void Investigation – Groundwater Inflow Calculation. Memorandum to Sojitz Minerva Mining Pty Ltd, July 2017.

ANZECC (2000). Australia and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy. Volume 1, October 2000.

Australian Standards (2018). AS ISO 13000:2018 Risk management – Guidelines.

Cardno (2021). Definition of Q1000 Flood Extends for Minerva Final Void Assessment. Internal Technical Memorandum for Sojitz Green Pty Ltd by Cardno (Qld) Pty Ltd. 5 October 2021.

CHRC (2016). Central Highlands Regional Council Planning Scheme 2016. Amendment No. 6. Effective 16 May 2022.

DES (2021). Guideline – Progressive Rehabilitation and Closure Plans (PRC Plans). Department of Environment and Science. Version 2, 17 March 2021.

EES (2004). Assessment of flora impacts associated with proposed mining operations at Minerva deposit (Mining Lease 70145), central Queensland. Earthworks Environmental Services Report 04c31.

EES (2005). Desktop assessment of fauna impacts associated with proposed mining operations at Minerva deposit (Mining Lease 70145), central Queensland. Earthworks Environmental Services Report 04c31b to Minerva Mining.

Emmerton, B.R (2019). Bowen Basin Spoil Classification for Improved Mine Rehabilitation Outcomes. PhD Thesis. The University of Queensland. Supported by ACARP Project C24063.

ESys (2005). Assessment of soils and overburden/interburden materials available for rehabilitation after mining, Minerva Mine. A report by ESys Consulting Pty Ltd to Sandhurst Mining Company Limited February 2005.

ESys (2007). Assessment of soils of Minerva South. A report by ESys Consulting Pty Ltd to Minerva Mining Company Ltd July 2007.

Ison (1996a). Minerva Project Soil and Land Capability Assessment. Ison Environmental Planners, May 1996.

Jacobs (2017). Sandhurst Creek Southern Diversion Design. Sojitz Minerva Joint Venture. R1 V5 Southern, Final 24 April 2017.

KBR (2017). Minerva Mine – Final Void Modelling Assessment – 2017. Model for Sojitz Minerva Mining Pty Ltd, Project No. BEW754-0001, July 2017.

Minerva Coal (2015). Native Grassland Management Plan. Minerva Coal Pty Ltd, January 2015.

PSM (2021). Highwall Stability – Geotechnical Closure Study. Short Report to Sojitz Minerva Mining Pty Ltd Operations Manager. 18 October 2021.

QDME (1995). Assessment and Management of Acid Mine Drainage. Queensland Department of Mines and Energy Technical Guideline. January 1995.

Queensland Government (2015). Guidelines for Agricultural Land Evaluation in Queensland. Department of Science, Information, Technology and Innovation and the Department of Natural Resources and Mines. December 2015.

Queensland Government (2016). Accessed 12 May 2022. Common Soil Types Common soil types | Environment, land and water | Queensland Government (www.qld.gov.au)

Sojitz Minerva Mining (2017). Water Management Plan and Erosion and Sediment Control Plan – Version 14. December 2017.

Sojitz Minerva Mining (2021a). Residual Void Investigation Report. Minerva Joint Venture. Version 1.0, 5 November 2021.

Sojitz Minerva Mining (2021b). Minerva Mine Rehabilitation Management Plan. Version 1.1, November 2021.

WK Geotechnical (2022). Minerva Final Void Stability Assessment. Internal Technical Memorandum to Sojitz Green Pty Ltd by WK Geotechnical. 7 February 2022.

10 PRCP Schedule

10.1 Final Site Design

All areas of disturbed and undisturbed land within ML 70145 and ML 70376 have been assigned a PMLU or identified as a NUMA consistent with LODs. The assigned PLMUs and NUMAs are presented in the final site design (see **Figure 20**), along with the Sandhurst Creek 0.1% AEP floodplain and the maximum disturbance footprint for Minerva Mine.

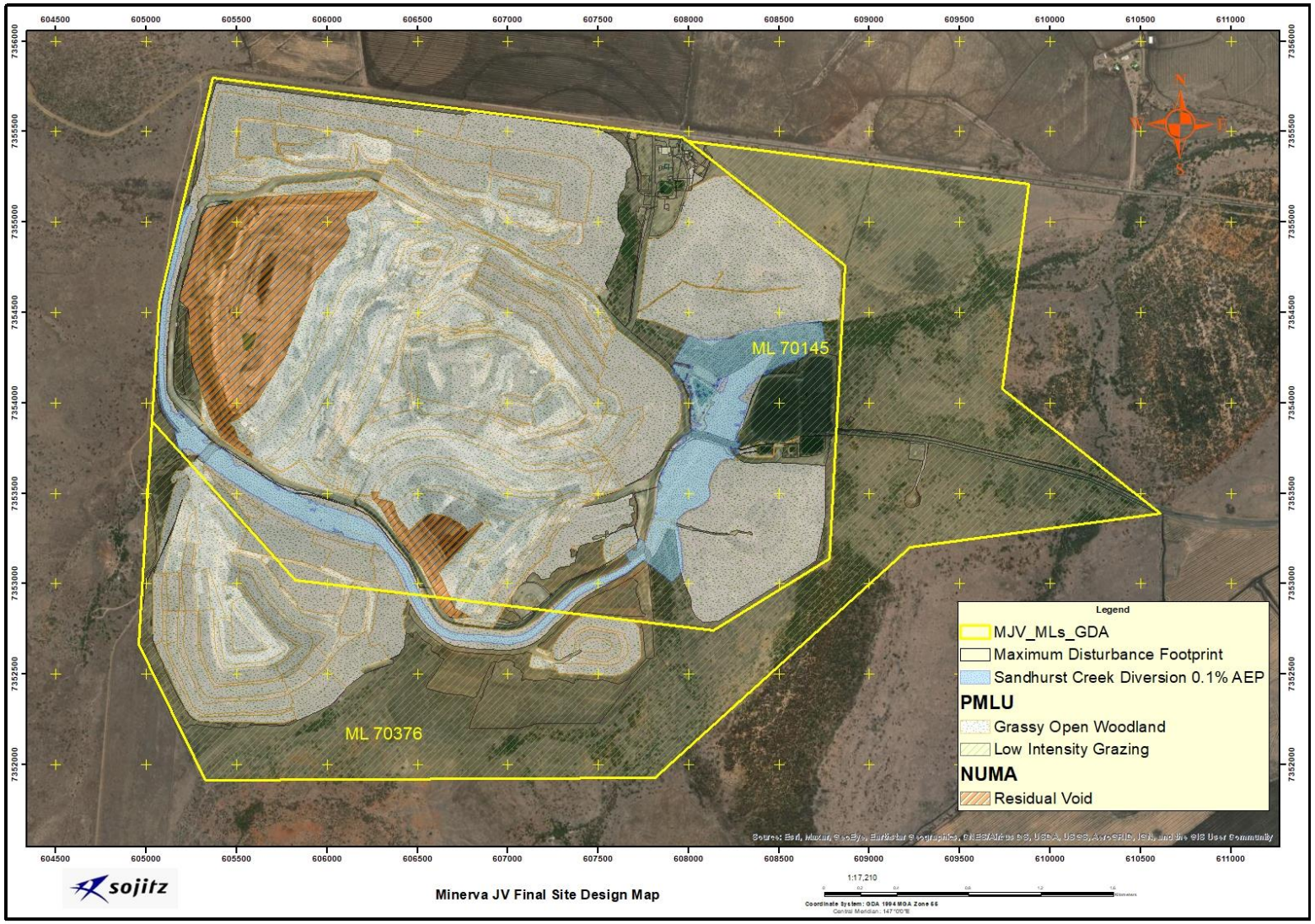

Figure 20 – Final Site Design

10.2 Reference Map

A total of 22 rehabilitation areas (RAs) have been identified within ML 70145 and ML 70376. RA 11 – RA 22 are existing areas of rehabilitation, with RA 1 – RA 10 nominated for future rehabilitation. The Western and the Southern residual voids are shown as improvement area (IA) IA 1 and IA 2.

The RAs and the IAs are shown in **Figure 21**.

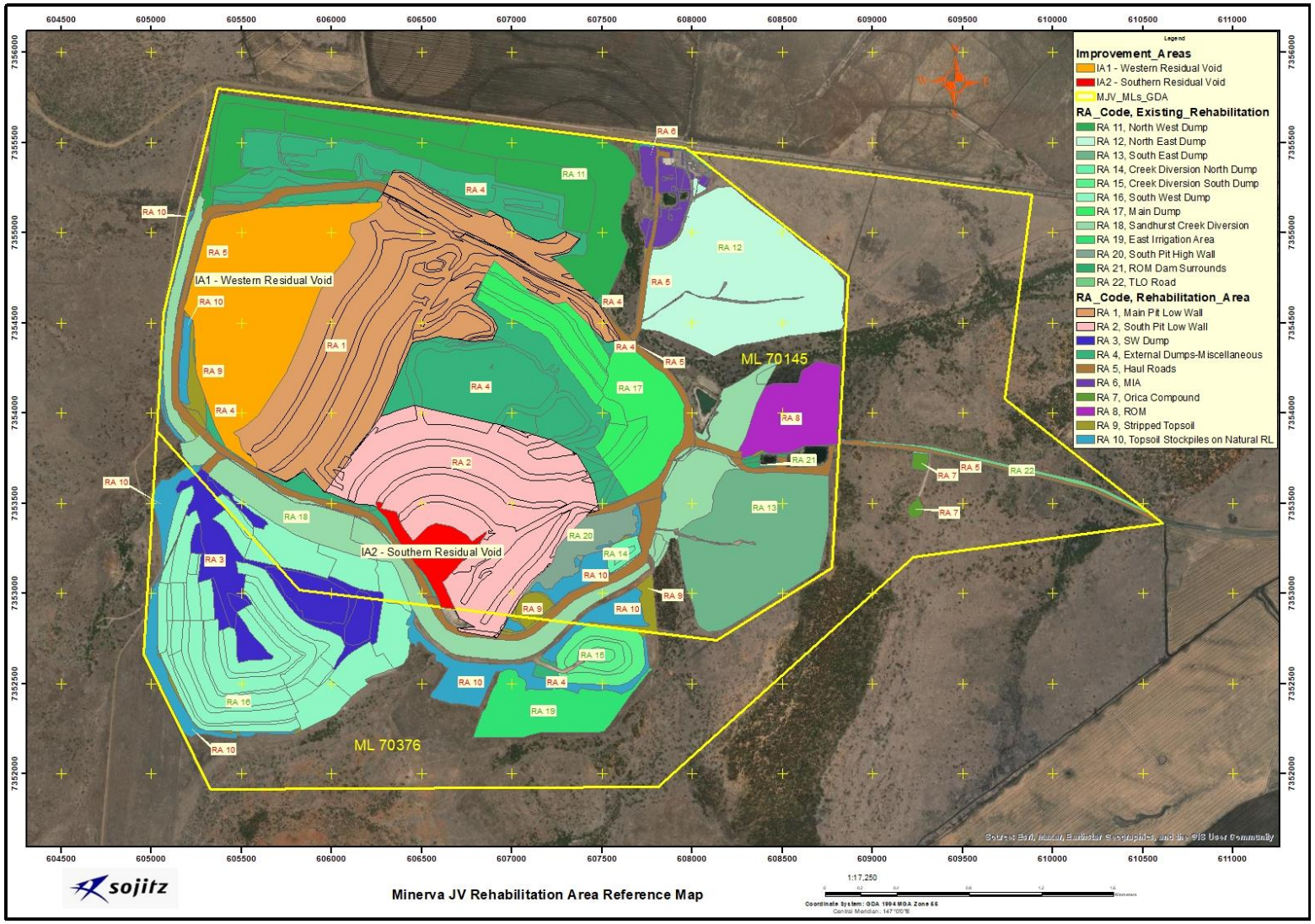

Figure 21 – Rehabilitation Areas

10.3 Rehabilitation Milestones

Rehabilitation milestones (RMs) and associated criteria have been developed for rehabilitation areas. The milestone criteria will determine if the rehabilitation has fulfilled the requirements for the specified stage of work. The RMs and milestone criteria are presented in **Table 20**.

Table 20 – Rehabilitation Milestones

Milestone Reference	Rehabilitation Milestone	Milestone Criteria
RM1	Infrastructure Decommissioning and Removal	a) All services disconnected, except those to be retained by landholder by agreement. b) All buildings demolished and removed, except those to be retained by landholder by agreement.
RM2	Remediation of Contaminated Land	a) Contaminated land assessment by suitably qualified person b) Removal of contaminated materials c) Assessment by suitable qualified person that contaminated land has been removed
RM3a	Landform Shaping	External Batters a) Landform profiled to ≤ 25% b) Benches to be installed at 15m vertical lift intervals, width of benches determined by size of equipment delivering topsoil. Low Wall Spoil a) Landform profiled to ≤ 25% b) Benches to be installed at 30m vertical lift intervals, width of benches to be 30m. c) Shaping above 210 RL near Western final void, with any fill below this level at angle of repose d) Shaping above RL 200 near Southern final void, with any fill below this at angle of repose
RM3b	Final Trim	a) Final trim of some areas that have been shaped and require an even surface prior to topsoil application
RM4a	Rock Mulch Haulage	a) Haulage and placement of competent rock mulch onto shaped rehabilitated areas
RM4b	Rock Mulch Application	a) Rock mulched areas reshaped to surface ≤ 25% b) Rock mulch applied at a minimum of 0.5m thick to reshaped surfaces c) Rock mulch not required for shaped areas that are < 5% slope
RM5a	Topsoil Haulage	a) Haulage and placement of topsoil on rock mulch rehabilitated areas b) Haulage and placement of topsoil on topsoil only rehabilitated areas
RM5b	Topsoil Spreading	a) Spreading topsoil ≥ 0.1m thick on rock mulch areas b) Spreading topsoil ≥ 0.2m thick on topsoil only areas
RM6a	Deep Ripping	a) Areas deep ripped to mix topsoil into rock mulch substrate
RM6b	Deep Ripping and Seeding	a) Areas deep ripped on the contour to provide seed bed and surface erosion control b) Seed applied at set rates for grassy open woodlands and low intensity grazing PMLUs

Milestone Reference	Rehabilitation Milestone	Milestone Criteria
RM7	Revegetation (grassy open woodlands)	a) Vegetation has been established and meets interim grassy open woodlands performance requirements as follows: i) Effective rooting depth > 0.5 m ii) No acid or saline seepage areas iii) Absence of active rills and gullies iv) Ground cover stable or improving (may include dead and alive material or rocky debris) v) Developing vegetation consisting of native trees, shrubs and grasses vi) Areas of contamination have been remediated and monitored
RM8	Revegetation (low intensity grazing)	a) Vegetation has been established and meets interim low intensity grazing performance requirements as follows: i) Effective rooting depth > 0.5 m ii) No acid or saline seepage areas iii) Absence of active rills and gullies iv) Ground cover stable or improving (may include dead and alive material or rocky debris) v) Developing vegetation consisting of native trees, shrubs and grasses vi) Areas of contamination have been remediated and monitored
RM9	Achievement of a stable PMLU (grassy open woodlands)	a) Rehabilitation dump is geotechnically stable with FOS ≥ 1.5 b) No active gully erosion present c) External batters ≤ 25% slopes covered with minimum 0.5 m thick competent rock mulch d) Top of dump ≤ 5% slopes covered with minimum 0.2 m thick topsoil e) No acid or saline seepage areas f) Water quality run-off EC < 1,000 µS/cm and pH 6.0 – 9.0 g) ≥ 2 native tree and shrub species present h) ≥ 3 perennial grass species present i) Effective rooting depth > 0.5 m j) Invasive weed species comprise < 10% of groundcover k) Livestock excluded from area
RM10	Achievement of a stable PMLU (low intensity grazing)	a) No active gully erosion present b) All areas have slopes ≤ 5% covered with minimum 0.2 m thick topsoil c) No acid or saline seepage areas d) Water quality run-off < 1,000 µS/cm and pH 6.0 – 9.0 e) Vegetative ground cover ≥ 50% f) ≥ 3 perennial pasture and shrub species present g) Effective rooting depth > 0.5 m h) Invasive weed species comprise < 10% of groundcover

10.4 Management Milestones

Management milestones (MMs) and associated criteria have been developed for the Western and Southern residual void NUMA improvement areas. The milestone criteria will determine if the improvement areas have met the outcomes of the NUMA completion criteria. The MMs and milestone criteria are presented in **Table 21**.

Table 21 - Improvement Area Management Milestones

Milestone Reference	Management Milestone	Milestone Criteria
MM1	Achievement of structural stability	a) Highwall and end wall maximum slope ≤ 70 degrees projected to surface b) Assessment report by Registered Professional Engineer of Queensland (RPEQ) on the geotech stability of final voids. c) Closure bund installed minimum 50 m from pit crest or distance equal to FOS of 1.5 d) 0.1 AEP flood event in Sandhurst Creek diversion does not enter final void
MM2	Achievement of safety and minimisation of environmental harm	a) High wall and end wall bund constructed of competent materials and set back minimum 50 m from crest (≥ FOS of 1.5). b) No public access to highwalls / endwalls (bunding / fencing / signage as required). c) Assessment report by Registered Professional Engineer of Queensland (RPEQ) on the geotechnical stability of final voids d) Surface water and groundwater quality of receiving waters meets the requirements of Schedule W of the Environmental Authority. e) Voids have no adverse environmental impacts on basalt aquifer

10.5 Rehabilitation Area Schedules

The following tables provide the schedules for completing the Rehabilitation Milestones for each Rehabilitation Area. The PMLUs and associated Rehabilitation Milestones with completion dates are provided in the tables.

Table 22 – RA1

Post-mining land uses (PMLU)										
Rehabilitation area	RA1 - Main Pit Low Wall									
Relevant activities	Rehabilitating pit low wall									
Total rehabilitation area size (ha)	137.0									
Commencement of first milestone: RM1	8/08/2029									
PMLU	Grassy Open Woodlands									
Date area is available	8/08/2029									
Cumulative area available (ha)	137.0	137.0	137.0	137.0	137.0	137.0	137.0	137.0	137.0	137.0
Milestone completed by	13/07/2031	24/07/2031	24/05/2032	1/06/2032	24/12/2032	24/01/2033	1/02/2033	10/02/2033	2/07/2038	31/03/2044
Milestone Reference	**Cumulative area achieved (ha)**									
RM3a	137.0									
RM3b		36.7								
RM4a			100.4							
RM4b				100.4						
RM5a					137.0					
RM5b						137.0				
RM6a							137.0			
RM6b								137.0		
RM7									137.0	
RM9										137.0

Table 23 - RA2

Post-mining land uses (PMLU)										
Rehabilitation area	RA2 - South Pit Low Wall									
Relevant activities	Rehabilitating pit low wall									
Total rehabilitation area size (ha)	98.0									
Commencement of first milestone: RM1	2/12/2027									
PMLU	Grassy Open Woodlands									
Date area is available	2/12/2027									
Cumulative area available (ha)	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Milestone completed by	8/08/2029	28/07/2031	13/11/2031	22/11/2031	5/02/2033	21/03/2033	28/03/2033	4/04/2033	2/07/2038	31/03/2044
Milestone Reference	**Cumulative area achieved (ha)**									
RM3a	98.0									
RM3b		29.2								
RM4a			68.8							
RM4b				68.8						
RM5a					98.0					
RM5b						98.0				
RM6a							98.0			
RM6b								98.0		
RM7									98.0	
RM9										98.0

Table 24 - RA 3

Post-mining land uses (PMLU)										
Rehabilitation area	RA3 - South West Dump									
Relevant activities	Rehabilitating out of pit dump									
Total rehabilitation area size (ha)	36.5									
Commencement of first milestone: RM1	22/12/2031									
PMLU	Grassy Open Woodlands									
Date area is available	22/12/2031									
Cumulative area available (ha)	21.3	21.3	21.3	21.3	21.3	36.5	36.5	36.5	36.5	
Milestone completed by	22/05/2033	4/12/2031	15/12/2031	15/02/2033	24/02/2033	29/05/2033	6/06/2033	2/07/2038	31/03/2044	
Milestone Reference	**Cumulative area achieved (ha)**									
RM3b	21.3									
RM4a		12.4								
RM4b			12.4							
RM5a				20.9						
RM5b					20.9					
RM6a						36.5				
RM6b							36.5			
RM7								36.5		
RM9									36.5	

Table 25 - RA4

Post-mining land uses (PMLU)										
Rehabilitation area	RA4 - External Dumps_Miscellaneous									
Relevant activities	Rehabilitating out of pit dumps									
Total rehabilitation area size (ha)	109.6									
Commencement of first milestone: RM1	13/07/2031									
PMLU	Grassy Open Woodlands									
Date area is available	13/07/2031									
Cumulative area available (ha)	3.0	88.7	88.7	88.7	91.7	91.7	109.6	109.6	109.6	109.6
Milestone completed by	19/07/2031	24/05/2033	29/06/2032	6/07/2032	10/04/2033	2/05/2033	31/05/2033	8/06/2033	2/07/2038	31/03/2044
Milestone Reference	**Cumulative area achieved (ha)**									
RM3a	3.0									
RM3b		88.7								
RM4a			20.9							
RM4b				20.9						
RM5a					91.7					
RM5b						91.7				
RM6a							109.6			
RM6b								109.6		
RM7									109.6	
RM9										109.6

Table 26 - RA5

Post-mining land uses (PMLU)										
Rehabilitation area	RA5 - Haul Roads									
Relevant activities	Rehabilitating haul roads									
Total rehabilitation area size (ha)	46.9									
Commencement of first milestone: RM1	6/07/2032									
PMLU	Low-Intensity Grazing									
Date area is available	6/07/2032									
Cumulative area available (ha)	46.9	46.9	46.9	46.9	46.9	46.9	46.9			
Milestone completed by	12/07/2032	21/05/2033	18/06/2033	25/06/2033	2/07/2033	2/07/2038	31/03/2044			
Milestone Reference	**Cumulative area achieved (ha)**									
RM3b	46.9									
RM5a		46.9								
RM5b			46.9							
RM6a				46.9						
RM6b					46.9					
RM8						46.9				
RM10							46.9			

Table 27- RA6

Post-mining land uses (PMLU)										
Rehabilitation area	RA6 - Mine Industrial Area									
Relevant activities	Infrastructure removal and rehabilitation of land									
Total rehabilitation area size (ha)	9.3									
Commencement of first milestone: RM1	22/06/2032									
PMLU	Low-Intensity Grazing									
Date area is available	22/06/2032									
Cumulative area available (ha)	0	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	
Milestone completed by	22/06/2032	31/07/2032	7/08/2032	14/08/2032	22/08/2032	29/08/2032	5/09/2032	2/07/2038	31/03/2044	
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	0									
RM2		9.3								
RM3b			9.3							
RM5a				9.3						
RM5b					9.3					
RM6a						9.3				
RM6b							9.3			
RM8								9.3		
RM10									9.3	

Table 28 – RA7

Post-mining land uses (PMLU)										
Rehabilitation area	RA7 - Orica Compound									
Relevant activities	Rehabilitating laydown area									
Total rehabilitation area size (ha)	1.4									
Commencement of first milestone: RM1	5/08/2031									
PMLU	Low-Intensity Grazing									
Date area is available	5/08/2031									
Cumulative area available (ha)	1.4	1.4	1.4	1.4	1.4	1.4	1.4			
Milestone completed by	6/08/2031	11/04/2033	2/05/2033	9/05/2033	16/05/2033	2/07/2038	31/03/2044			
Milestone Reference	**Cumulative area achieved (ha)**									
RM3b	1.4									
RM5a		1.4								
RM5b			1.4							
RM6a				1.4						
RM6b					1.4					
RM8						1.4				
RM10							1.4			

Table 29 - RA8

Post-mining land uses (PMLU)										
Rehabilitation area	RA8 - Run of Mine (ROM)									
Relevant activities	Infrastructure removal and rehabilitation of land									
Total rehabilitation area size (ha)	19.9									
Commencement of first milestone: RM1	24/07/2032									
PMLU	Low-Intensity Grazing									
Date area is available	24/07/2032									
Cumulative area available (ha)	0.0	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	
Milestone completed by	24/07/2032	12/10/2032	25/10/2032	14/11/2032	28/11/2032	3/05/2033	11/05/2033	2/07/2038	31/03/2044	
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	0.0									
RM2		19.9								
RM3b			19.9							
RM5a				19.9						
RM5b					19.9					
RM6a						19.9				
RM6b							19.9			
RM8								19.9		
RM10									19.9	

Table 30 – RA9

Post-mining land uses (PMLU)										
Rehabilitation area	RA9 - Stripped Topsoil									
Relevant activities	Rehabilitating areas that have been stripped of topsoil									
Total rehabilitation area size (ha)	10.6									
Commencement of first milestone: RM1	6/08/2031									
PMLU	Low-Intensity Grazing									
Date area is available	6/08/2031									
Cumulative area available (ha)	10.6	10.6	10.6	10.6	10.6	10.6	10.6			
Milestone completed by	7/08/2031	19/04/2033	9/05/2033	16/05/2033	18/06/2033	2/07/2038	31/03/2044			
Milestone Reference	**Cumulative area achieved (ha)**									
RM3b	10.6									
RM5a		10.6								
RM5b			10.6							
RM6a				10.6						
RM6b					10.6					
RM8						10.6				
RM10							10.6			

Table 31 – RA10

Post-mining land uses (PMLU)										
Rehabilitation area	RA10 - Topsoil Stockpiles on Natural RL									
Relevant activities	Rehabilitating areas following topsoil stockpile removal									
Total rehabilitation area size (ha)	40.4									
Commencement of first milestone: RM1	24/05/2033									
PMLU	Low-Intensity Grazing									
Date area is available	24/05/2033									
Cumulative area available (ha)	40.4	40.4	40.4	40.4	40.4					
Milestone completed by	30/05/2033	20/06/2033	28/06/2033	2/07/2038	31/03/2044					
Milestone Reference	**Cumulative area achieved (ha)**									
RM3b	40.4									
RM6a		40.4								
RM6b			40.4							
RM8				40.4						
RM10					40.4					

Table 32 – RA11

Post-mining land uses (PMLU)										
Rehabilitation area	RA11 - North West Dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	78.9									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	78.9	78.9								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	78.9									
RM9		78.9								

Table 33 – RA12

Post-mining land uses (PMLU)										
Rehabilitation area	RA 12 - North East Dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	69.3									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	69.3	69.3								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	69.3									
RM9		69.3								

Table 34 – RA13

Post-mining land uses (PMLU)										
Rehabilitation area	RA 13 - South East Dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	53.6									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	53.6	53.6								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	53.6									
RM9		53.6								

Table 35 – RA14

Post-mining land uses (PMLU)										
Rehabilitation area	RA 14 - Creek Diversion North Dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	2.5									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	2.5	2.5								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	2.5									
RM9		2.5								

Table 36 – RA15

Post-mining land uses (PMLU)										
Rehabilitation area	RA 15 - Creek Diversion South Dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	13.4									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	13.4	13.4								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	13.4									
RM9		13.4								

Table 37 – RA16

Post-mining land uses (PMLU)										
Rehabilitation area	RA 16 - South West dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	103.7									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	103.7	103.7								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	103.7									
RM9		103.7								

Table 38 – RA17

Post-mining land uses (PMLU)										
Rehabilitation area	RA 17 - Main Dump									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	46.5									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	46.5	46.5								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	46.5									
RM9		46.5								

Table 39 – RA18

Post-mining land uses (PMLU)										
Rehabilitation area	RA 18 - Sandhurst Creek Diversion									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	67.1									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Grassy Open Woodlands									
Date area is available	2/07/2033									
Cumulative area available (ha)	67.1	67.1								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM7	67.1									
RM9		67.1								

Table 40 – RA19

Post-mining land uses (PMLU)										
Rehabilitation area	RA 19 - East Irrigation Area									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	20.4									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Low-Intensity Grazing									
Date area is available	2/07/2033									
Cumulative area available (ha)	20.4	20.4								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM8	20.4									
RM10		20.4								

Table 41 – RA20

Post-mining land uses (PMLU)										
Rehabilitation area	RA 20 - South Pit High Wall									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	9.8									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Low-Intensity Grazing									
Date area is available	2/07/2033									
Cumulative area available (ha)	9.8	9.8								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM8	9.8									
RM10		9.8								

Table 42 – RA21

Post-mining land uses (PMLU)										
Rehabilitation area	RA 21 - ROM Dam Surrounds									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	0.9									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Low-Intensity Grazing									
Date area is available	2/07/2033									
Cumulative area available (ha)	0.9	0.9								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM8	0.9									
RM10		0.9								

Table 43 – RA22

Post-mining land uses (PMLU)										
Rehabilitation area	RA 22 - TLO Road									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	2.7									
Commencement of first milestone: RM1	2/07/2033									
PMLU	Low-Intensity Grazing									
Date area is available	2/07/2033									
Cumulative area available (ha)	2.7	2.7								
Milestone completed by	2/07/2033	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
RM8	2.7									
RM10		2.7								

10.6 Improvement Area Schedules

The following tables provide the schedule for completing the Management Milestones for each Improvement Area.

Table 44 – IA1

Post-mining land uses (PMLU)										
Rehabilitation area	IA 1 - Western Residual Void									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	78									
Commencement of first milestone: RM1	31/03/2042									
PMLU	NUMA									
Date area is available	31/03/2042									
Cumulative area available (ha)	78.0	78.0								
Milestone completed by	31/03/2043	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
MM1	78.0									
MM2		78.0								

Table 45 – IA2

Post-mining land uses (PMLU)										
Rehabilitation area	IA 2 - Southern Residual Void									
Relevant activities	Landform meeting completion criteria									
Total rehabilitation area size (ha)	11.58									
Commencement of first milestone: RM1	31/03/2042									
PMLU	NUMA									
Date area is available	31/03/2042									
Cumulative area available (ha)	11.6	11.6								
Milestone completed by	31/03/2043	31/03/2044								
Milestone Reference	**Cumulative area achieved (ha)**									
MM1	11.6									
MM2		11.6								

Appendices

Appendix A – Residual Void Investigation Report

Residual Void Investigation Report. Minerva Joint Venture. Version 1.0. Sojitz Minerva Mining 5 November 2021.

(Report provided in a separate file)

Appendix B – Rehabilitation Management Plan

Minerva Mine Rehabilitation Management Plan. Version 1.1. Sojitz Minerva Mining. November 2021.

(Report provided in a separate file)

Appendix C – Landholder Statement to Retain Infrastructure

Landholder Statement to Retain Infrastructure. Minerva Coal Pty Ltd. June 2022.

(Report provided in a separate file)

Appendix D – Minerva Final Void Stability Assessment

Minerva Final Void Stability Assessment. Internal Technical Memorandum. WK Geotechnical. 7 February 2022.

(Report provided in a separate file)