Mining Licence MIN4644
Work Plan (Minerals) PLN-001702

Licence Ownership Details	
Licensee	Mandalay Resources Costerfield Operations Pty Ltd
Registered Address	McNichols Lane COSTERFIELD VICTORIA 3523

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed: _____

Delegate of the Department Head

Date: 28/09/2023

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Plan Summary Details	
Project Name	Brunswick West Tailings Storage Facility
Plan Description	This Work Plan has been submitted by Mandalay Resources (Mandalay) in relation to the construction of the Brunswick West Tailings Storage Facility located on mining licence MIN4644 and which is part of the Costerfield Operations. Attached document AE1046.9 WPV Brunswick West TSF_v4 and associated appendices provides greater detail about the general site infrastructure, environmental settings and the specifics of the variation.

Area Details	
Property Name	
Address	McNicols Lane
Suburb / Town	Costerfield
Postcode	3523
Land Tenure (ownership) details	
Land Tenure Type	
Depth Limitations	No
Depth Limits	

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Resource Type	
Commodity to which the plan pertains	Antimony; Gold
Primary Commodity	Antimony
Minerals Total Estimated Ore	39,300.00
Unit of Measure	Tonnes

Proposed Final Depth of Extraction	
Estimated Max Terminal Depth	N/A
Batter Slope Angle	N/A

Top soil, overburden and subsoil disturbance	
Est Volume of Top Soil	N/A
Unit of Measure Top Soil	N/A
Est Depth of Top Soil	N/A
Est Volume of Sub Soil	N/A
Unit of Measure Sub Soil	N/A
Est Depth of Sub Soil	N/A
Est Volume of Overburden	N/A
Unit of Measure Overburden	N/A
Est Depth of Overburden	N/A
Area of Disturbance	13.60 hectares

Operation Type	
Operation Type	Underground
Operation Type – Other	

Plant, Equipment and Method
85t Excavator 60t Excavator 45t Excavator 36t Excavator GPS x 2 20t Excavator GPS x 2 D6 Dozer D6 Dozer GPS x 3 D11 Dozer 12t smooth drum roller 17t Pad Foot roller x 6

815 Compactor 623 Scraper x 4 30kl Watercart x 3 40t Dump Truck x 10 14 Grader 14 Grader GPS 4t Shik Steer 13kl Fuel Truck

Mineral Recovery Method	
Mineral Recovery method	Flotation
Mineral Recovery method - Other	

Operating Hours (24 Hour)				
	Above Ground Operations	**Below Ground Operations**	**Sales**	**Processing**
Mon-Fri Start	7:00	0:00	8:00	0:00
Mon-Fri End	18:00	24:00	18:00	24:00
Sat Start	7:00	0:00	8:00	0:00
Sat End	18:00	24:00	18:00	24:00
Sun Start	7:00	0:00	8:00	0:00
Sun End	18:00	24:00	18:00	24:00
Public Holiday Activity	No	Yes	No	Yes
Operational hours Clarification				

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WORK PLAN SPECIFIC CONDITIONS

MINING LICENCE MIN4644

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

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EARTH RESOURCES REGULATOR

Stability

1. Within two years of approval of work plan variation, and then every five (5) years thereafter, complete a stability assessment of the proposed closure landforms for all the shafts, portals/boxcuts and Brunswick Pit to ensure that the final landforms will meet a design acceptance criteria of a Factor of Safety (FoS) of 1.6. The review must consider any gaps in geotechnical, hydrogeological and hydrological information to ensure that the final landforms and their proposed stability controls will address the risks to public safety and be safe and sustainable in the long term.

DEPARTMENT OF ENVIRONMENT, LAND, WATER AND PLANNING

Notification of works

1. Before works start, the licence holder must advise all persons undertaking the vegetation removal or works on site of all relevant conditions.

Protection of retained native vegetation

2. Before works start, a native vegetation protection fence must be erected to protect all native vegetation to be retained within 15 metres of the works area. This fence must be erected at:
   a) A radius of 12 times the diameter of any tree trunk, measured at a height of 1.4 metres above ground level, to a maximum of 15 metres but no less than 2 metres from the base of the trunk of the tree; and
   b) To protect patch(es) of native vegetation not containing trees at a minimum distance of 2 metres from any retained native vegetation.
   The fence must be constructed of star pickets and paraweb or similar to the satisfaction of the Department of Energy, Environment and Climate Action. The protection fence must remain in place until all works are completed to the satisfaction of the department.

3. Except with the written consent of the department, within the area of native vegetation to be retained and any tree protection zone associated with the permitted use and/or development, the following is prohibited:
   a) vehicular or pedestrian access;
   b) trenching or soil excavation;

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c) storage or dumping of any soils, materials, equipment, vehicles, machinery, or waste products;
d) construction of entry and exit pits for underground services, and
e) any other actions or activities that may result in adverse impacts to retained native vegetation.

Native vegetation removal

4. Native vegetation removal must be in accordance with the extent specified in the Native Vegetation Removal report CUF_2022_039 dated 20 December 2022. The total area of native vegetation permitted to be removed is 0.328 hectares, comprised of:
   a) 7 patches of native vegetation with a total area of 0.328 hectares (containing 1 large canopy tree);

Native vegetation offsets

5. To offset the removal of 0.328 hectares of native vegetation, the licence holder must secure native vegetation offsets, in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) as specified below:
   A general offset of 0.230 general habitat units:
   a) located within the Goulburn Broken Catchment Management Authority boundary or City of Greater Bendigo municipal district;
   b) with a minimum Strategic Biodiversity Value score of at least 0.439;
   A large tree offset:
   c) The offset(s) secured must provide protection for at least 1 large tree.
6. Before any native vegetation is removed, evidence that the required offset for the project has been secured must be provided to the satisfaction of the DEECA. This evidence is one or both of the following:
   a) credit extract(s) allocated to the Work Plan from the Native Vegetation Credit Register, and/or
   b) an established first party offset site including a security agreement to the required standard, signed by both parties, and a 10-year offset management plan to the satisfaction of, and approved by the Department of Energy, Environment and Climate Action (DEECA). The offset management plan must detail the 10-year management actions and ongoing management of the site. Every year, for ten years, after DEECA has approved the offset management plan, the applicant must provide notification of the management actions undertaken towards implementing the offset management plan to the DEECA. An offset site condition statement, including photographs must be included in this notification.

   A copy of the offset evidence will be endorsed by the Department of Energy, Environment and Climate Action and form part of this approval.

ENVIRONMENT PROTECTION AUTHORITY

1. Prior to commencing work under this work plan variation, the licensee must develop a Groundwater Management Plan in consultation with EPA. The plan must demonstrate that:
   a) the risks of harm to human health and groundwater from Brunswick West TSF will be eliminated or minimised so far as reasonably practicable; and
   b) the potential impacts on environmental values from the construction, operation and rehabilitation of Brunswick West TSF are understood.
2. Prior to commissioning of Brunswick West TSF, the licensee must implement any additional groundwater management measures required by the Groundwater Management Plan.

GOULBURN-MURRAY WATER

1. Should groundwater be intercepted the applicant must contact GMW to discuss whether a take and use licence is required.
2. Drilling or excavation in close proximity to waterways is to be avoided. Should the applicant need to drill or excavate on a waterway (non-registered or designated), or alter a waterway to enable drilling to occur, contact will need to be made with GMW to discuss the Waterway Determination process and the relevant Catchment Management Authority to discuss if a Works on a Waterway would be required.
3. Any water taken and disposed back underground can only occur subject to approval by GMW under section 76 of the Water Act 1989 inclusive of all other relevant agency approvals.
4. Should licencing of the proposed Tailings Storage facility be required in accordance with section 67(1A) of the Water Act 1989, the applicant should contact GMW to confirm the need for a Licence to Construct Works prior to the commencement of construction.

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Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 29/09/2023

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MANDALAY RESOURCES

Work Plan Variation
Brunswick West TSF

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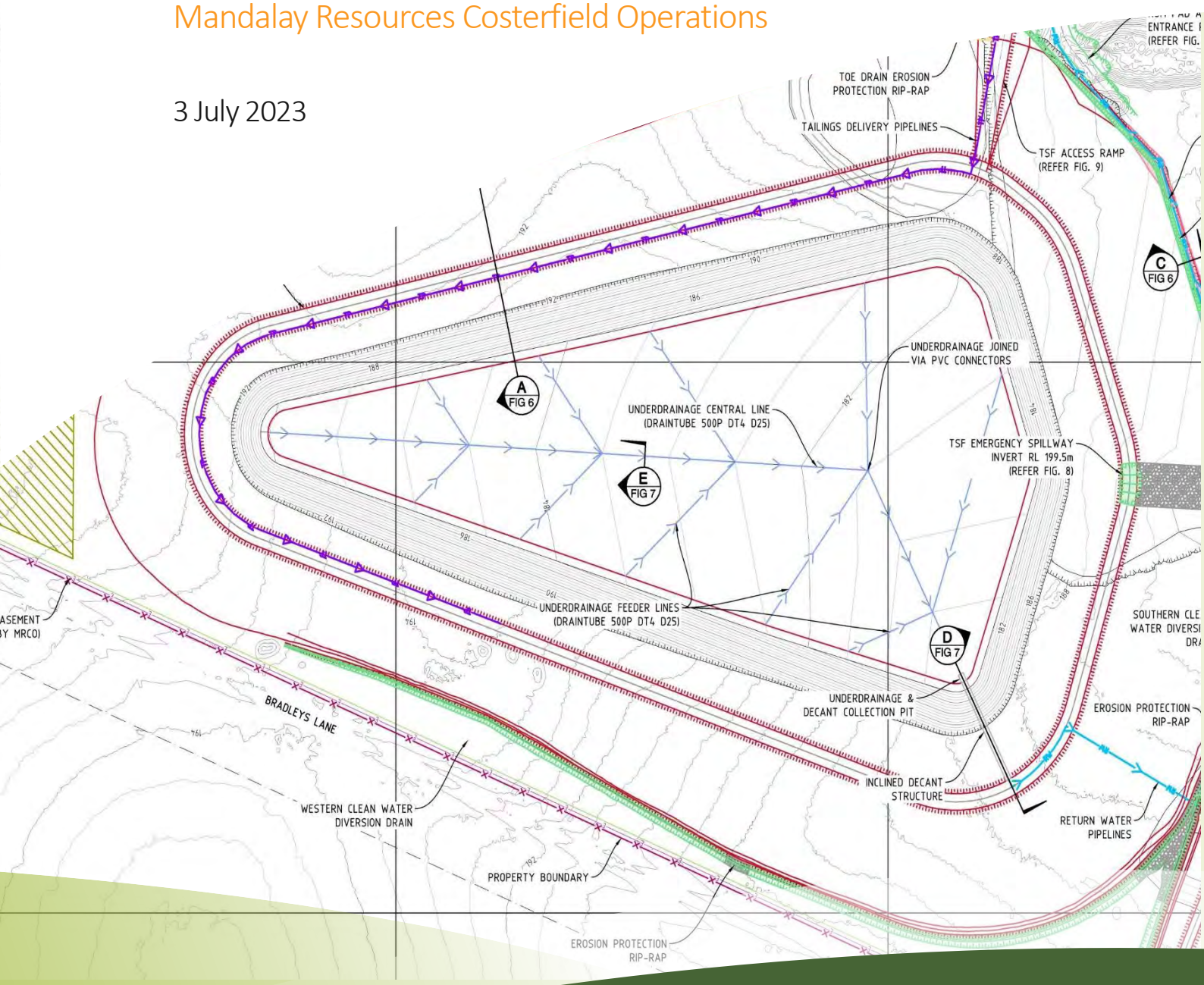
Mandalay Resources Costerfield Operations

3 July 2023



WPV Brunswick West TSF

Mandalay Resources Costerfield Operations

AE1046.9_WPV

July 2023

Version 4		
Issued to		
Ross Laity, Sustainability Manager, Mandalay Resources Costerfield Operations		
Prepared by	Reviewed by	Approved by
Neil Wines (Principal Environmental Consultant)	Michael Cramer (Director)	Michael Cramer (Director)

Previous versions			
Version:	1	14 October 2022	Draft
	2	30 October 2022	Final Draft
	3	20 April 2023	Updates to address ERR comments
	4	3 July 2023	Respond to ERR comments

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Abbreviations

ANCOLD	Australian National Committee on Large Dams
CRS	Community Reference Subcommittee
DEECA	Department of Environment, Energy and Climate Action
EPA	Environment Protection Authority (Victoria)
ERC	Environmental Review Committee
ERR	Earth Resources Regulation
GMW	Goulburn Murray Water
ha	hectares
HDPE	high-density polyethylene
H:V	horizontal:vertical
Mandalay	Mandalay Resources Australia Pty Ltd
MRCO	Mandalay Resources Costerfield Operations
km	kilometre
m	metres
m^2	square metres
m^3	cubic metres
MRSDA	*Mineral Resources (Sustainable Development) Act 1990*
MRSD(MI) Regulations	Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019
RL	reduced level
ROM	run-of-mine
RWP	return water pond
TSF	tailings storage facility
WP	work plan
WPV	work plan variation

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Guideline requirements: Design and Management of Tailings Storage Facilities (ERR 2017)

The Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (MRSDMIR) require a risk-based work plan or work plan variation to be lodged and approved before any work, including the construction or operation of a TSF, can commence under the licence. Proponents must ensure that the work plan for a TSF contains the details required by either the Mineral Resources (Sustainable Development) Act 1990 (MRSDA) or the appropriate regulations.

Licenses are required by the MRSDA to ensure they eliminate or minimise their risks as far as reasonably practicable. The actions that a licence or work authority holder undertakes to achieve this outcome must be detailed in a risk-based work plan under Section 39 (ab) of the MRSDA. Proponents should ensure that a work plan submitted for approval complies with these guidelines.

Where a TSF is proposed as supplementary work on an existing site or a significant change to an existing TSF is proposed (and these are outside the provisions of the current work plan), the operator must submit a work plan variation.

A key purpose of the work plan is to set out the planned operational phase of the TSF to reduce risk to the environment, the public and surrounding infrastructure. This should include planning for the systematic deposition of tailings, water and process chemicals in the facility.

For a site with a proposed TSF, the work plan documentation would typically include but is not limited to the information listed in Table E.1.

Table E.1 Work plan variation documentation

Work plan variation documentation	Reference
Site description including expected climatic conditions	Section 2 and 4 TSF Detailed Design Report (ATC Williams 2023)
Suitably scaled and referenced maps and plans, including a location map and a general arrangement in Australian Map Grid (AMG) coordinates	Section 3, 4 and 5 TSF Detailed Design Report (ATC Williams 2023)
A site investigation report detailing surface water and drainage, site geology, hydrogeology and expected TSF foundation conditions as well as long-term embankment stability, if applicable	Section 4 TSF Detailed Design Report (ATC Williams 2023)
A design report including plans showing physical dimensions and details of capacity (see Section 8)	Section 4 TSF Detailed Design Report (ATC Williams 2023)
Surface water diversion and drainage to minimise flows into the TSF	Section 4

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Work plan variation documentation	Reference
	TSF Detailed Design Report (ATC Williams 2023)
The expected composition of the tailings and decant water (chemical, physical, rheological, geotechnical and mineralogical)	Section 4 TSF Detailed Design Report (ATC Williams 2023)
Clear statement of the quantity of tailings to be stored and a quantitative water balance that accommodates all gains and losses	Section 4 TSF Detailed Design Report (ATC Williams 2023)
Risk assessment to evaluate potential impacts relating to the environment and public safety, and hydrogeological, geotechnical, and embankment-related hazards posed by the design, operation rehabilitation and closure of the TSF	Section 4.1.3 and 6 TSF Detailed Design Report (ATC Williams 2023) Intermediate NVR Report – Brunswick West TSF & Flood Mitigation (CHEC 2023)
Details about the proposed construction and operation of the TSF and associated infrastructure, including the proposed management of the tailings and water	Section 4 TSF Detailed Design Report (ATC Williams 2023)
An environmental management plan outlining how potential TSF-related impacts on the surrounding environment will be minimised	Section 4.5.1, 5 and 6
A community engagement plan that addresses the addition of a TSF	Section 7 Community Engagement Plan - MIN4644 (MRCO 2021)
A program for monitoring, auditing and reporting of safety, operational and environmental factors appropriate to the nature and scale of the operation and the criteria that will be used to assess performance	Section 4.1.5, 5 and 6
An emergency response plan including a failure scenario analysis of dam break and land inundation	Section 6 TSF Detailed Design Report (ATC Williams 2023) Brunswick West TSF Dam Safety Emergency Plan - MIN4644 (MRCO 2023a)
Plans for closure and rehabilitation including a description of the intended end use of the site	Section 8 TSF Detailed Design Report (ATC Williams 2023) Rehabilitation Plan - MIN4644 (Accent 2022)

Work plan variation documentation	Reference
An independent technical review supports the design of the TSF	Independent Technical Review (WSP-Golder 2023)

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1 Introduction

The Mandalay Resources Costerfield Operations (MRCO) produces a high grade gold ore using long-hole stoping with cemented rockfill. The Costerfield Gold Mine (situated on MIN4644) currently produces ore from two veins, the Shepherd and Youle lodes, at production rates of between 12,000 tonnes to 15,000 tonnes per month. Ore is trucked to the surface via the Brunswick Portal to the Brunswick Processing Plant, where it is stockpiled and blended into the crusher.

Tailings produced from processing have been stored in the Bombay Tailings Storage Facility (TSF) and the Brunswick TSF. The Bombay TSF was recently raised to its final elevation, and is currently active and receiving tailings, with capacity expected to be reached in approximately November 2023. The Brunswick TSF is at capacity, and MRCO have no intention of further raising the facility. Once the Bombay TSF is at capacity, both these facilities will be closed [ATC Williams 2023]. Accordingly, MRCO will develop a new TSF – the Brunswick West TSF – to receive tailings once existing permitted capacity has been reached.

This Work Plan Variation (WPV) relates specifically to the development of the Brunswick West TSF.

The Brunswick West TSF footprint will cover 12 hectares and is located on MIN4644 (total area of 1,219 hectares). The area is currently used for agriculture and grazing and is bounded by Crown Land to the east, MRCO infrastructure and farmland to the south, and Bradleys Lane to the west.

This WPV document describes the activity and how the variation interacts with the approved Consolidated Work Plan PLN-001247. The document has been prepared in accordance with the requirements *Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects* (ERR 2020a) (the Guidelines) and with reference to *Technical Guideline Design and Management of Tailings Storage Facilities* (ERR 2017). The document should be read in conjunction with the ATC Williams (2023) Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report 109014.15 R04 (Rev 3).

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2 Background

MRCO is located within the Costerfield mining district of Central Victoria, approximately 50 km east of the City of Greater Bendigo, on Mining Licences MIN4644 and MIN5567. The licences are held by MRCO, a wholly owned subsidiary of Mandalay Resources Australia Pty Ltd (Mandalay).

Figure 2.1 shows the regional plan and location of these tenements.

MRCO comprises the underground Augusta, Cuffley, Brunswick and Youle gold and antimony mines, and associated infrastructure including the Brunswick Processing Plant, the TSFs, and the Splitters Creek Evaporation Facility. The mining and processing activities are located within MIN4644, while the evaporation facility at Splitters Creek is within MIN5567. Exploration drilling activities occur within MIN4464 but also in the surrounding exploration licence areas.

2.1 Locality

The Costerfield Operations are located within the Costerfield mining district of Central Victoria, approximately 10 km northeast of the township of Heathcote (see Figure 2.1), 50 km east of the City of Greater Bendigo and 100 km north of Melbourne.

2.2 Historic context

Gold and antimony were first discovered at Costerfield in 1860 and underground mining has taken place on and off since this time. Historic mining of the Costerfield–Bombay–Minerva complex occurred between surface level and 300 m below ground level, initially via shaft, and later in some areas as open cut mining.

The current mining operations at the site commenced in 2006. MRCO purchased the operations on December 1, 2009, from AGD Operations Pty Ltd.

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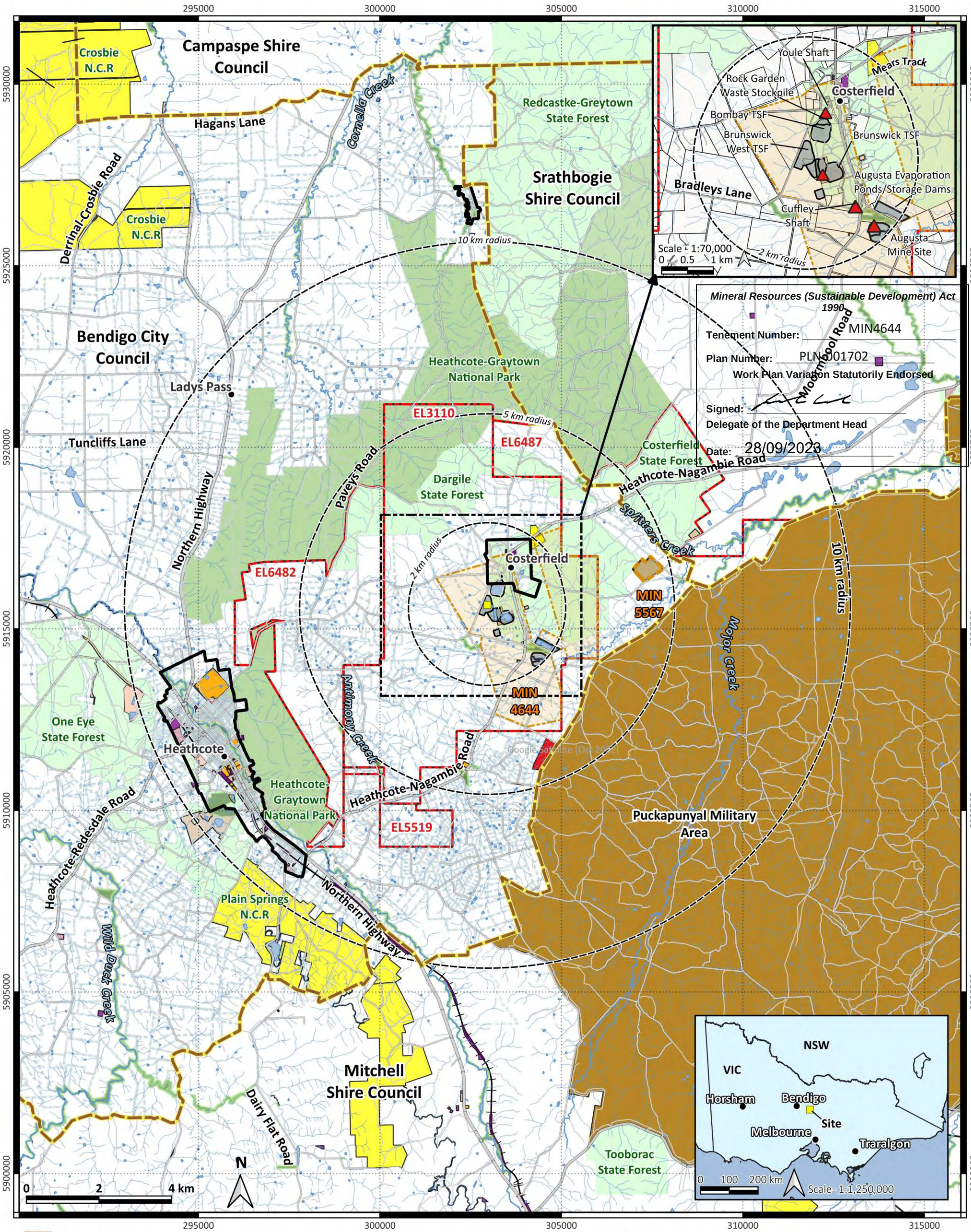

Exploration Licence
Mining Licence
Mine site domain
Offset area
LGA boundary
Lot boundary (inset map)
Vent shaft (inset map)
Town
Radius circle

Crown Land
Commonwealth Land
Community Use Area
Earth Resources
Historic and Cultural Features Reserve
National Park
Natural Features Reserve
Nature Conservation Reserve

Services and Utilities
State Forest
Uncategorised Crown Land
Other Crown Land
Road
Railway
Main watercourse
Watercourse - tributary
Water body

AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.1. Regional plan and tenements

Created 3/11/2022 and revised 17/03/2023
CRS: GDA 20 MGA 55
Scale: 1:100,000 @ A3 (main map)
Page size: A3

Additional data, main map: VIC_TR_TRANSPORT (Road, Rail), VIC_locality_point, VIC_PLM25, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATERAREA, VIC_LGA_POLYGON, VIC_TOWNSHIP_POLYGON
Inset map (lower): STE_2021_AUST_GDA2020

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3 Current Operations

3.1 Overview of operations

Costerfield operates a continuous mining operation 24 hours a day 365 days per year with a workforce of approximately 220 employees.

Mining at Costerfield targets several individual lodes (including the Youle and Shepherd lodes). Mining is currently not active at Augusta, Cuffley or Brunswick. Access to the lodes is either via the Augusta Portal or Brunswick Portal and associated declines. The total disturbance area of the current operation is 147 ha.

Ore extraction is achieved through three different mining methods: full face development, uphole stoping and predominantly longhole cemented rock fill (CRF) stoping.

Mining at Youle follows a bottom-up sequence mining from the northern and southern extents retreating towards the central access. The practice of placing CRF in stope voids has been undertaken at Youle to improve local ground stability using waste rock from development with the addition of a cement slurry mix. Mobile equipment includes underground haulage trucks, loaders, jumbos, integrated tool carriers, cement agitator trucks, fork lifts and light vehicles.

Underground ore from the Youle and Shepherd lodes is trucked to the surface via the Brunswick Portal and placed on the Run of Mine (ROM) ore pad located adjacent to the Brunswick Processing Plant.

The ore is transferred to the Brunswick ROM pad where it is stockpiled, screened and blended prior to being fed into the Brunswick Processing Plant. The Brunswick Processing Plant throughput is typically around 13,000 tonnes/month. Metallurgical testwork has been conducted on ore extracted at Costerfield and results are provided in Table 3.1. There is currently no evidence that changes in ore type will introduce additional risks or require different consideration to the tailings currently stored at site.

Table 3.1 Metallurgical Testwork

Variable	Brunswick Main	Brunswick Penguin to Kiwi	Cuffley LG 0358.1	Cuffley HG M2569	Youle Low Grade	Youle High Grade
Feed Au g/t	8.65	11.9	9.0	17.7	4.89	13
Feed Sb %	3.31	3.88	3.00	7.98	2.56	5.1
Feed As %	0.50	0.13	0.12	0.07	0.02	0.03
Concentrate As %	3.20	0.87	0.98	0.002	0.22	0.25
Gravity Au Rec. %	22.1-25.2	30	41	54	43	57
Recovery Au %	87.1	93.7	98	95	96	97
Recovery Sb %	98.3	99	99	95	99	99

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The surface crushing and screening system processes underground ore down to a particle size suitable for milling through a two-stage closed circuit ball milling circuit. Centrifugal style gravity concentrators are used on the combined primary milling product and secondary mill discharge, to recover a gold rich gravity concentrate that is sold as a separate gold concentrate and sent to a local refinery.

Secondary milled products are classified by size and processed through a simple floatation circuit comprising a single stage of rougher, scavenger and cleaning. The concentrate is thickened through dewatering and filtration to produce a final antimony/gold concentrate product that is then bagged and transported to Melbourne Port for packing into shipping containers for shipment to overseas customers. The tailings is thickened before being sent to a TSF.

Flotation chemicals used in the Brunswick Processing Plant include lead nitrate, potassium amyl xanthate, CMS41, Copper sulphate, Interfroth 106 and Magnafloc 5250.

Tailings have been stored in the Bombay TSF and the Brunswick TSF. Once the currently active Bombay TSF is at capacity, both these facilities will be closed [ATC Williams 2023]. The Brunswick West TSF to be constructed so that it can receive tailings once existing TSF capacity has been reached.

Geotechnical and geochemical testing of tailings has been conducted to identify the makeup of tailings produced by the Brunswick Plant see Appendix A Section 10.2.

Mine ventilation comprises fresh air being sourced from surface intakes including the Brunswick Portal, Augusta Portal, Augusta ladderway, Brunswick Fresh Air Rise and Augusta Fresh Air Rise.

Exhaust ventilation flows exit the active mine workings via two airways comprising the Youle Return Air Rise and Cuffley Return Air Rise.

Groundwater is pumped to the surface via the Cuffley rising main. Water is pumped to the Augusta Mine Dam before being distributed for re-use in mining operations as well as feed to the Reverse Osmosis (RO) Plant located at Brunswick. Permeate from the RO plant meets applicable water quality criteria and is discharged under licence to a local waterway (Wappentake Creek).

Excess water and RO brine is sent to the Splitters Creek Evaporation Facility.

3.2 Costerfield Operations components

The surface components of the Costerfield Operations are located at the following three main sites:

- Augusta site
- Brunswick site
- Splitters Creek.

The TSF development will be located at the Brunswick site.

3.3 Brunswick site

The Brunswick site currently comprises the following surface components (see Figure 3.1):

- processing plant
- mill workshop and administration buildings
- ROM pad and crushing plant
- Brunswick Pit
- Brunswick Portal
- Brunswick Return Air Raise
- Youle Return Air Raise
- Brunswick TSF
- Brunswick West TSF
- Bombay TSF
- reverse osmosis water treatment plant and pipelines
- laydown area
- exploration core shed and storage yard
- Mill Stormwater Dam
- Rock Garden waste stockpile.

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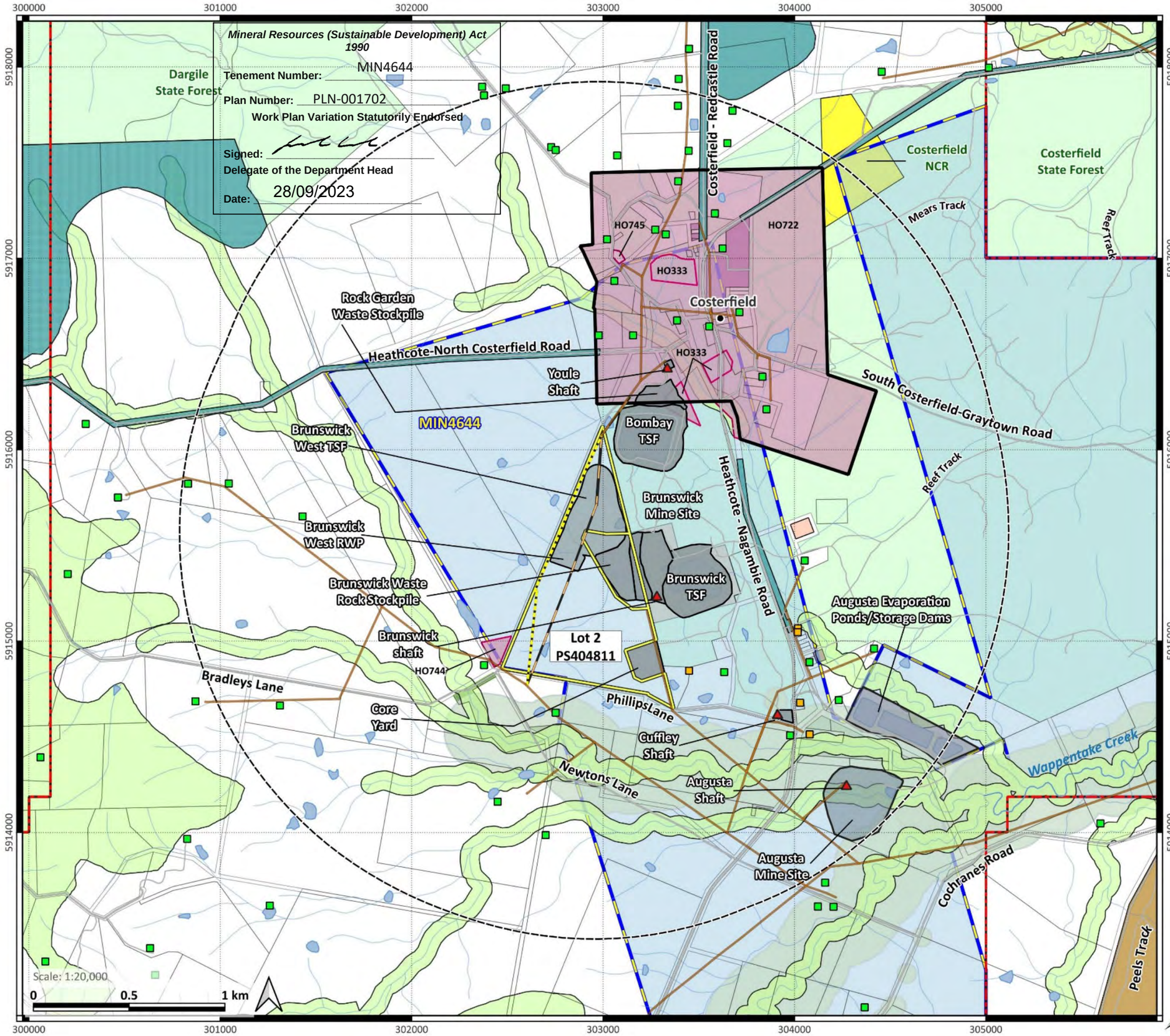
AE1046.9 Mandalay Resources - Costerfield Operations

Figure 3.1. Brunswick West TSF layout

Created 2/11/2022 and revised 30/03/2023
CRS: GDA 20 MGA 55
Scale: 1:20,000 @ A3
Page size: A3



- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Road
- Watercourse - tributary
- Existing transmission line
- Relocated transmission line
- Mineral Licence boundary
- Lot 2 PS404811
- Private land lot boundary
- Township boundary
- Transmission line to be relocated
- Radius from Brunswick West TSF - 2 km

Planning Overlay

- Environmental Significance Overlay (ESO) - Schedules 1 and 2
- Heritage Overlay (HO)
- Vegetation Protection Overlay (VPO) - Schedules 2 and 3
- Aboriginal Cultural Heritage

Crown Land

- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Additional data: VIC_TR_Road, VIC_locality_point, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA, VIC_TOWNSHIP POLYGON, VIC_POWERLINE and PLAN_ZONE wms (http://services.land.vic.gov.au/catalogue/publicproxy/guest/dv_geoserver/wms?VERSION=1.1.1&WIDTH=512&HEIGHT=512&LAYERS=VMPLAN_PLAN_ZONE&STYLES=&SRS=EPSG%3A4283&BBOX=141%2C-39%2C150%2C-34)

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4 Work Plan Variation

4.1 Brunswick West Tailings Storage Facility

The WPV is for the construction, operation and rehabilitation of the Brunswick West TSF.

Along with the TSF construction additional tailings delivery and return water pipelines will be installed, groundwater monitoring bores, flood mitigation barriers, improved higher security fencing and relocation of the single wire earth return (SWER) powerline and poles to underground will be required to accommodate and operate the TSF.

The Brunswick and Bombay TSF's have been expanded several times as approved by work plan variation PLN-001247 and are nearing capacity. Therefore, to continue operations at Costerfield there is a need to manage approximately 9,000 m^3 of tailings per month.

The Brunswick West TSF requires ancillary infrastructure to be installed during operation. This infrastructure includes but is not limited to:

- HDPE piping to deliver tailings slurry to the TSF
- HDPE piping for return water from the Return Water Pond (RWP)
- Electrical cabling to provide power for a pump on the RWP
- Commissioning of several ground water monitoring bores
- Commissioning of addition dust monitoring gauge sites
- Installation of security/animal proof fencing and signage

4.1.1 Design Concept

The Brunswick West TSF has been the subject of a detailed design and assessment by consulting engineers, ATC Williams and their report is attached in Appendix A "Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report 109014.15 R04 (Rev 3)".

The design concept is for a single-stage TSF for the storage of tailings for approximately five years. The detailed design consists of:

- excavation of foundation material within the TSF impoundment to Moderately Weathered (MW) rock to provide borrow materials for construction and to maximise the storage capacity of the TSF;
- lining of the upstream batter slopes (either with compacted clay or geosynthetic liner) for tailings and decant water storage;
- construction of perimeter embankments to final height;
- construction of a decant structure within the TSF; and
- construction of an external Return Water Pond (RWP).

The Brunswick West TSF is located adjacent to the Brunswick site (to the west) Figure 4.1. Figure 4.2 (ATC Williams 2023 Figure 5) shows the surface layout and Figure 4.3 (ATC Williams 2023 Figure 6) shows the embankment sections and details of the facility.

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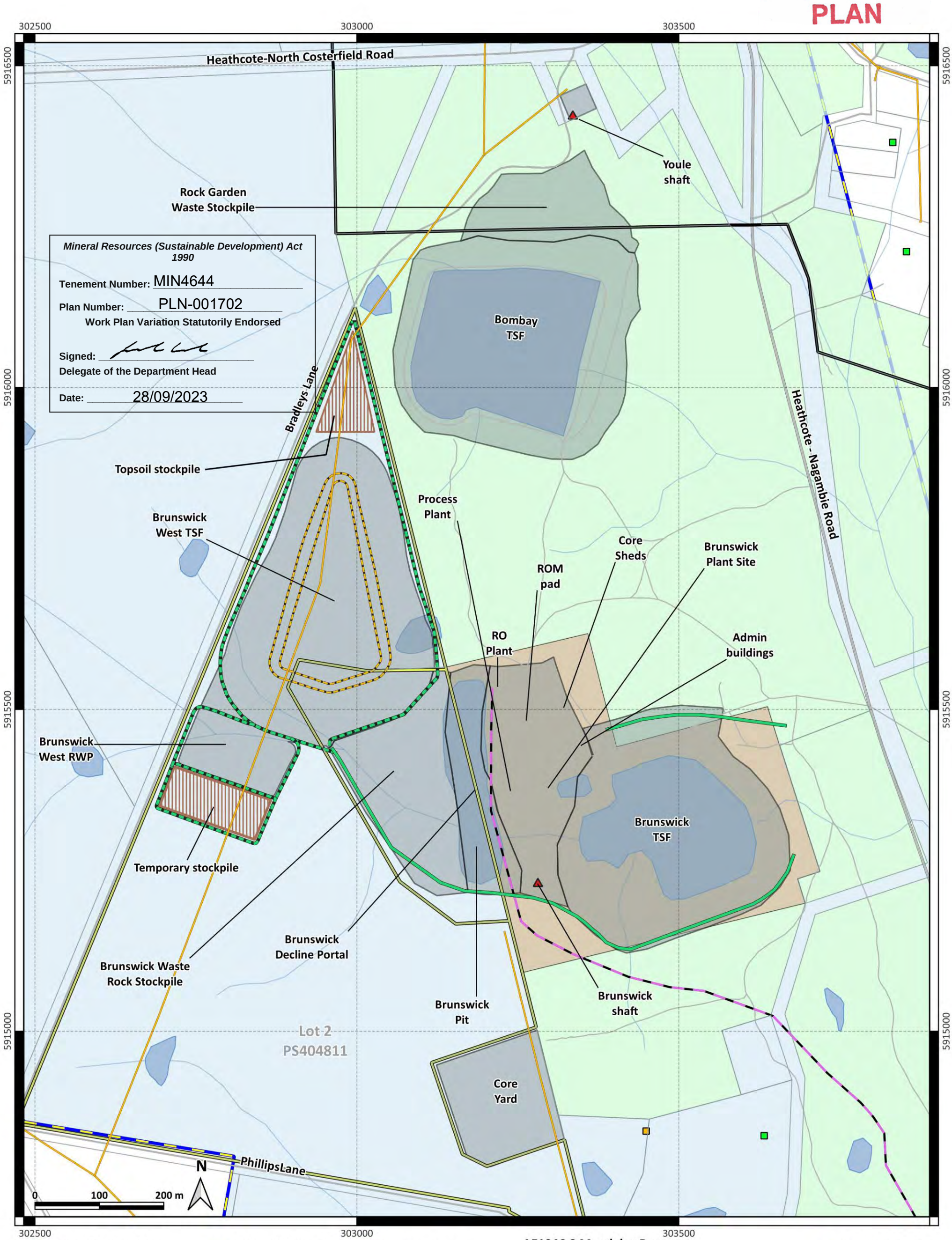


- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- RO discharge line
- Brunswick West TSF earthworks location
- Power transmission line
- Road
- Watercourse
- Mine site domain
- Mining licence (MINTEN 4644)
- Stockpile
- Lot boundary - site
- Lot boundary
- Costerfield Township
- Water body

Crown Land

- Earth Resources
- State Forest

AE1046.9 Mandalay Resources - Costerfield Operation

Figure 4.1. Site layout - Brunswick site

Created 3/11/2022, revised 28/03/2023, 20/06/2023 and 3/07/2023

CRS: GDA 20 MGA 55

Scale: 1:5,500 @ A3

Page size: A3

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_V_PARCEL_MP, VIC_PLM_25_CROWNLAND, VIC_POWERLINE, VIC_TOWNSHIP_POLYGON

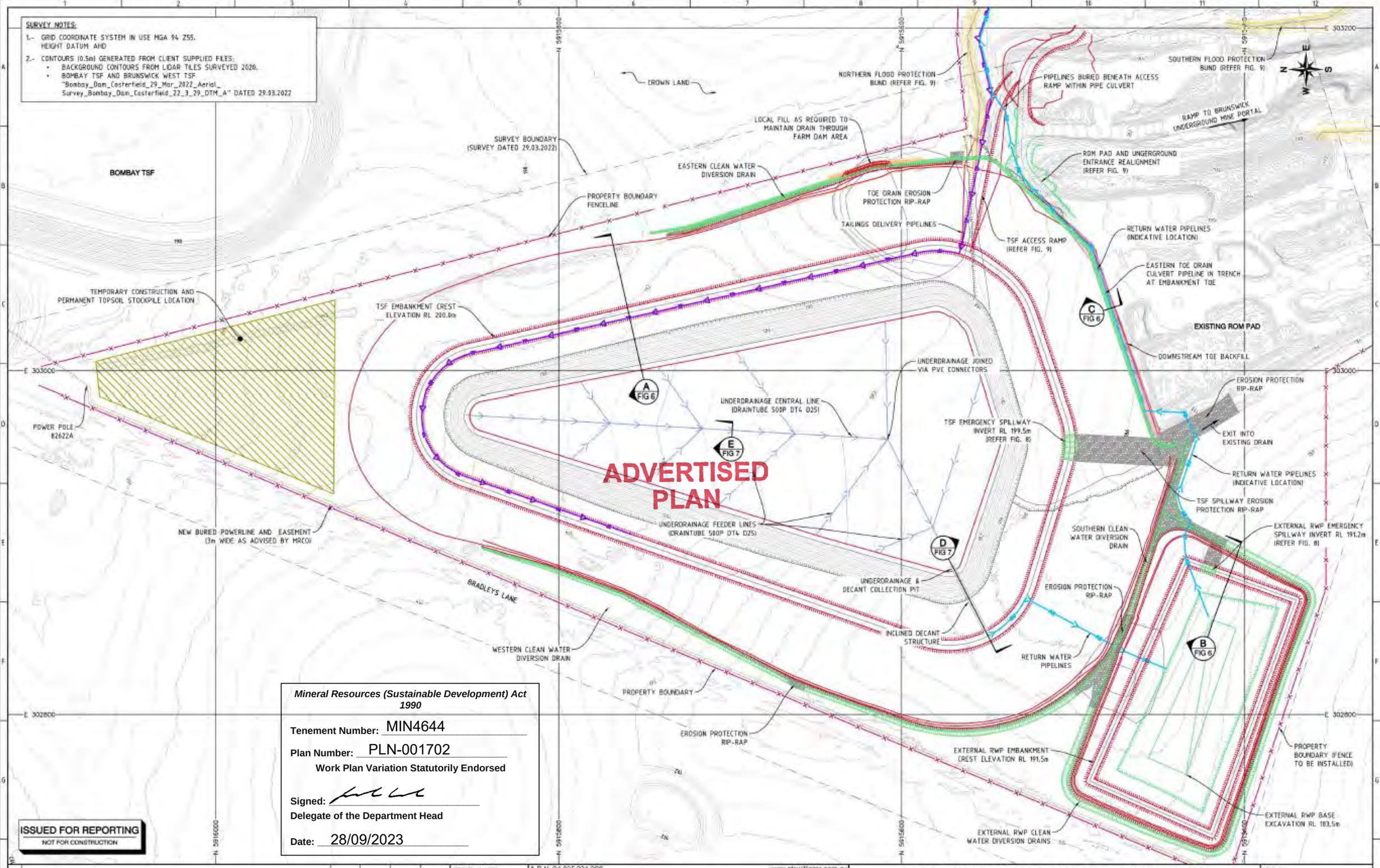
ACCENT ENVIRONMENTAL

MANDALAY RESOURCES

SURVEY NOTES:

1.- GRID COORDINATE SYSTEM IN USE MGA 94 Z55.
HEIGHT DATUM AHD

2.- CONTOURS (0.5m) GENERATED FROM CLIENT SUPPLIED FILES:
- BACKGROUND CONTOURS FROM LIDAR TILES SURVEYED 2020.
- BOMBAY TSF AND BRUNSWICK WEST TSF "Bombay_Dam_Costerfield_29_Mar_2022_Aerial_Survey_Bombay_Dam_Costerfield_22_3_29_DTM_A" DATED 29.03.2022



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Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 28/09/2023

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NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECKD	APPRD
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0	FOR EXTERNAL REVIEW	11.10.22	AC	CN	CN
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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BRUNSWICK WEST TAILINGS STORAGE FACILITY
EMBANKMENT LAYOUT PLAN

DWG. No.
FIGURE 5

SHEET SIZE A3 Rev. 1

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SHEET 1 OF 1

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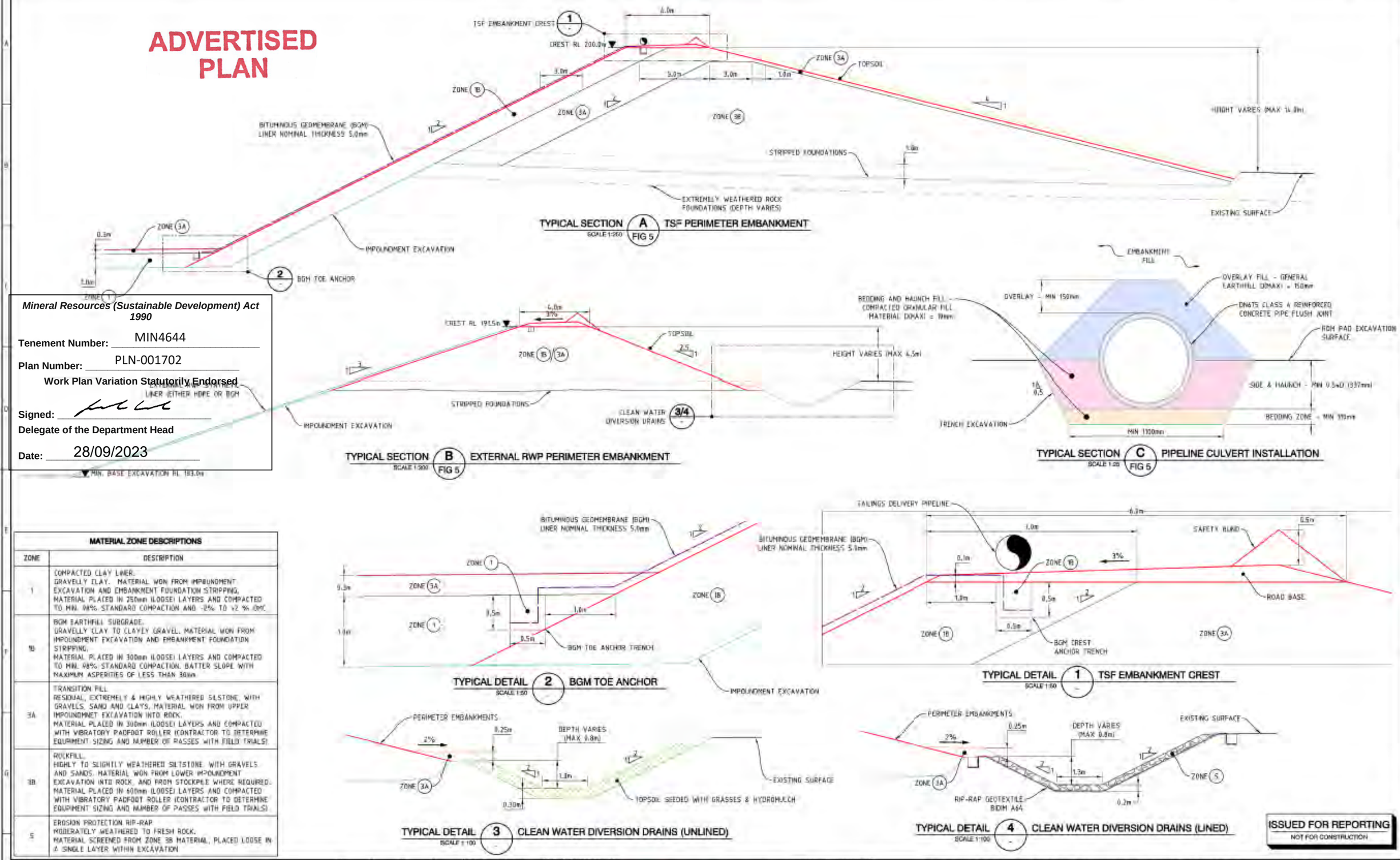

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed: _____

Delegate of the Department Head

Date: 28/09/2023

MATERIAL ZONE DESCRIPTIONS

ZONE	DESCRIPTION
1	COMPACTED CLAY LINER. GRAVELLY CLAY. MATERIAL WON FROM IMPOUNDMENT EXCAVATION AND EMBANKMENT FOUNDATION STRIPPING. MATERIAL PLACED IN 250mm (LOOSE) LAYERS AND COMPACTED TO MIN. 98% STANDARD COMPACTION AND -2% TO +2 % OMC
1B	BGM EARTHFILL SUBGRADE. GRAVELLY CLAY TO CLAYEY GRAVEL. MATERIAL WON FROM IMPOUNDMENT EXCAVATION AND EMBANKMENT FOUNDATION STRIPPING. MATERIAL PLACED IN 300mm (LOOSE) LAYERS AND COMPACTED TO MIN. 98% STANDARD COMPACTION. BATTER SLOPE WITH MAXIMUM ASPERITIES OF LESS THAN 30mm
3A	TRANSITION FILL. RESIDUAL, EXTREMELY & HIGHLY WEATHERED SILTSTONE, WITH GRAVELS, SAND AND CLAYS. MATERIAL WON FROM UPPER IMPOUNDMNET EXCAVATION INTO ROCK. MATERIAL PLACED IN 300mm (LOOSE) LAYERS AND COMPACTED WITH VIBRATORY PADFOOT ROLLER (CONTRACTOR TO DETERMINE EQUIPMENT SIZING AND NUMBER OF PASSES WITH FIELD TRIALS)
3B	ROCKFILL. HIGHLY TO SLIGHTLY WEATHERED SILTSTONE, WITH GRAVELS AND SANDS. MATERIAL WON FROM LOWER IMPOUNDMENT EXCAVATION INTO ROCK, AND FROM STOCKPILE WHERE REQUIRED. MATERIAL PLACED IN 600mm (LOOSE) LAYERS AND COMPACTED WITH VIBRATORY PADFOOT ROLLER (CONTRACTOR TO DETERMINE EQUIPMENT SIZING AND NUMBER OF PASSES WITH FIELD TRIALS)
5	EROSION PROTECTION RIP-RAP. MODERATELY WEATHERED TO FRESH ROCK. MATERIAL SCREENED FROM ZONE 3B MATERIAL, PLACED LOOSE IN A SINGLE LAYER WITHIN EXCAVATION

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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BRUNSWICK WEST TAILINGS STORAGE FACILITY
EMBANKMENT SECTIONS AND DETAILS

DWG. No.
FIGURE 6

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SHEET 1 OF 1

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Independent Review

An Independent Review of the fundamental design parameters associated with the ATC Williams (2023a) detailed design was conducted by consulting engineers WSP-Golders. This review confirmed that the TSF has been designed in accordance with best practice and relevant ANCOLD guidelines and Victorian Department of Jobs, Precincts and Regions Earth Resource Regulations (ERR) guidelines.

In response to the WSP-Golders review, ATC Williams has amended the design and issued Rev1 of the Detailed Design Report (ATC Williams 2023a). WSP-Golders ITR have reviewed the Detailed Design Report (Rev3) and confirmed that they are satisfied that the revision has addressed the comments they raised during their initial review (Rev0) and subsequent revisions. The Independent Technical Review letter (WSP-Golders ITR 2023) is included in Appendix B.

4.1.2 Site conditions

The site of the Brunswick West TSF is on Lot 2 PS404811 know as 200 Bradleys Lane and is approximately 500 m northwest of the Brunswick Processing Plant, within an adjacent farm paddock. The site is roughly triangular, and is bounded by Crown Land to the east, MRCO infrastructure and additional farmland to the south, and Bradleys Lane to the west. The disturbance area of the Brunswick West TSF will be 12 ha.

The site has a ridge in the centre of the paddock at approximately RL 194.0 m running in a south-easterly direction, from which the natural ground slopes to the north, east and south has a natural grade of up to 5%. The site currently contains two farm water dams (to be removed) at the east and south, the latter of which is located within a natural drainage channel.

The site currently contains farm infrastructure, trees and a high voltage single wire earth return (SWER) powerline. This powerline is to be relocated and Powercor have been engaged to undertake these works. The powerline is planned to be installed underground along the edge of the paddock adjacent to Bradleys Lane. Additionally, the boundary of the Brunswick West TSF extends partially into the MRCO Low Grade Run of Mine (ROM) pad. The trees and infrastructure are to be removed prior to commencement of construction and the overlapping area of the ROM pad will be removed to allow for the TSF embankment. The site is also located immediately upgradient from the Brunswick underground portal located within the Brunswick Pit.

The local climate of the Costerfield region is considered ‘semi-arid’. The climate is generally characterised by cool and wet winters, whilst the summer is often hot and dry.

The regional geology at the Costerfield Operations comprises recent to Holocene age fluvial and colluvial deposits, typically comprising gravel, sand and silt, overlying Silurian age Costerfield Siltstone, typically comprising thinly bedded siltstone, with minor sandstone and conglomerate.

The Costerfield Operations are located in an area of moderate seismicity within Victoria, located on the western side of the Melbourne Structural zone, which is bounded by the Mount Williams Fault to the west and the Governor Fault to the east.

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A detailed description of local geological and geotechnical site conditions is available in Appendix A Section 11.5. Table 32 of this report outlines topsoil and clay quantities. Table 33 of the same report also details the Earthworks Material balance and demonstrates sufficient materials are available to construct, operate and rehabilitate the facility. Section 4.3 of Appendix A describes the local geology and identified a fault that has been considered and address by design engineers.

The Brunswick West TSF has an embankment toe offset from the Western and Eastern property boundaries of 10 m. Powercor require a 6.0 m wide easement the new electrical cable to be buried. The cable is to be located in the easement 4.5m from the property boundary to avoid the Tree Protection Zone of vegetation on the Bradleys Lane road reserve. The Embankment toe offset from the power cable easement is 4.0 m and no civils works encroach into the easement.

4.1.3 Regulatory Design Criteria and Consequence Category

The design of the Brunswick West TSF has been prepared to comply with the relevant ANCOLD Guidelines and Victorian Department of Jobs, Precincts and Regions Earth Resource Regulations (ERR) guidelines. Specific design requirements for tailings storage facilities are given by ANCOLD and ERR, which relate to the risk classification of the facility. These classifications determine the level of detail applied to design (specifically storm water storage, spillway, and earthquake design criteria) and operation, maintenance, and surveillance requirements.

The ANCOLD guidelines assign Consequence Categories for Dam Failure and Environmental Spill of contained water. Due to the location of the site relative to the Brunswick underground portal, flood protection measures to prevent the inundation of tailings underground in the event of a dam break have been considered essential to the works. With these mitigation measures in place, a dam break assessment found the critical Population at Risk (PAR) to be 25, primarily associated with mine personnel located at the Brunswick Processing Plant. The severity of damage and loss was found to be Major due to the business and external reputation impacts. As such, a Dam Failure Consequence Category of High B has been assigned to the Brunswick West TSF.

The major findings of the ATC Williams (2022b) Brunswick West Tailings Storage Facility Dam Break Investigation 109014.15R02) are incorporated into the Detailed Design Report.

An Environmental Spill Consequence Category of Low was found, based on the potential release of saline mine water to the environment in the event of a spillway flow, but Significant has been adopted for the design.

A Dam Safety Emergency Plan (MRCO 2023a) has been prepared to:

- identify dam safety event triggers which could place the integrity of the Brunswick West TSF at risk and require immediate action;
- provide recommendations which should be taken by MRCO personnel to respond to these dam safety event triggers to mitigate any potential emergency incidents; and

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- provide timely warning to relevant emergency management agencies for their implementation of protection measures for downstream communities.

The Brunswick West TSF Dam Safety Emergency Plan is included in Appendix C.

4.1.4 Construction

The early works for the facility will consist of the removal of existing farm equipment and livestock, removal and re-location of an existing overhead powerline running through the centre of the site, draining water from the existing farm dams, removal and mulching of trees, and excavation of a portion of the existing low grade ROM pad to re-expose natural ground.

Foundation preparation will consist of initially stripping 0.5 m of topsoil across the entire footprint, followed by a further excavation of 0.5 m of clayey material for embankment construction, and compaction of the remaining foundation clay to 98% standard maximum dry density. At the farm dams and at the ROM pad, the foundations will be stripped to weathered rock.

The impoundment within the facility will be excavated through less weathered rock to a minimum elevation of RL 180.0 m providing the bulk of the embankment construction material. The base of the facility will be lined with 1.0 m of select compacted clay won from stripping and excavation. An underdrainage network at the base of the impoundment will be constructed to aid in consolidation of the tailings and will feed into a decant structure.

Hydraulic performance of the embankments will be provided by a Bituminous Geomembrane (BGM) liner installed on the embankment upstream face and connected to the base impoundment liner. The embankments will be formed by construction of an upstream clayey subgrade for the placement of the BGM, a transition weathered rockfill zone, and a downstream less weathered rockfill shoulder. The embankments will be constructed to their final downstream closure batter slopes of 4:1 (H:V) and covered with topsoil.

All construction material volumes required are stated in section 20 of the detailed design report Appendix A. Materials required to construct cap and rehabilitate are available from site stockpiles. Mandalay can increase the production of waste rock that can be used for rehabilitation and construction by increasing the dimensions of the excavated tunnels in the underground mine. Waste rock balances are produced by mine engineers annually to understand any deficits or surpluses in waste rock material as mine progresses.

Temporary stockpiles for material won from the TSF excavation will be formed on the parcel to the south of the RWP. Contractors have indicated that an area of 3ha will be required to manage construction materials. Of the 3ha, 1ha will comprise of a topsoil stockpile located to the immediately south of the RWP, while the remaining 2ha will be allocated from MRCO owned land immediately west of the Brunswick Pit, refer to Figure 4.1 ,4.2 and Figure 4.1.

Temporary stockpiles will be up to 3.0m high however long term stockpiles will be maximum of 2.0m in height. Upon completion of the TSF the remaining topsoil will be retained on the TSF property. Excess topsoil and weathered material can also be stockpiled on the freehold property owned by the company to the south of the facility. Long term topsoil stockpiles will be managed in line with best practise. The company will commit to future environmental studies to understands the erodibility of the topsoil to help inform site rehabilitation.

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An external return water pond (RWP) will be formed of general earthfill material and lined with a geosynthetic liner to provide a very low permeability seal for water storage.

Construction and rehabilitation phases will be limited to constructions hours of 7am – 6pm Monday to Friday and 7am – 1pm Saturdays. Delivery of tailings to the TSF will take place 24 hours a day, 7 days a week consistent with 24-hour operation of the mine.

Maximum noise levels at adjoining residences as per Planning Permit AM/2248/1997/C condition 7 are as follows;

Day: Monday – Friday (0700 – 1800 hours) 45 dB(A)
Saturday (0700 – 1300 hours) 45 dB(A)
Saturday (1300 – 1800 hours) 42 dB(A)
Sunday and Public Holidays (0700 – 1800 hours) 42 dB(A)
Evening: Monday – Sunday (1800 – 2200 hours) 42 dB(A)

Night: Monday – Sunday (2200 – 0700 hours) 36 dB(A)

The construction fleet required to complete the Brunswick West TSF consists of scrapers, bulldozer, compactors, excavators, and off-road trucks and water carts. It is estimated that the construction will take 250 days to complete.

A detailed construction schedule will be provided to the department following approval of this work plan variation. Surface blasting will not be undertaken on the Brunswick West TSF construction.

4.1.5 Operational Concept

The TSF operational concept will involve deposition from a single point at the northern-most point of the facility. Occasional deposition from an additional 4-6 spigot points strategically placed around the facility will help to shape the tailings beach. This arrangement allow the tailings beach to shape to a low point at the southwestern corner of the facility against the embankments where an inclined decant structure will be constructed.

Surface water within the TSF will enter into the inclined decant structure. The decant structure will comprise three large, heavy duty HDPE pipelines with slots cut into them, and wrapped in an ultraviolet (UV) resistant filter geotextile, and connected to a pre-cast concrete pit at the base of the embankment. The geotextile will allow water to freely migrate into the pipelines and filter down to the base pit, while preventing tailings from entering. As the tailings rise, the geotextile within the tailings mass will clog, primarily allowing surface water to enter in the pipelines. Water will be pumped out of the pit via a submersible pump and sent to the external RWP.

The intention of the external RWP is to help alleviate previous issues with the existing TSFs where water remained on the facilities for extended periods of time during periods while the Brunswick Processing Plant water needs were met and the Augusta storage dams were full. The external RWP will effectively act as detention basin for the TSF, allowing for water to be continually removed from the TSF even when the Augusta storage dams are at capacity. All water collected within the external RWP will be conveyed to either the Brunswick Processing Plant for re-use or the Augusta storage dams.

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Prior to commissioning the TSF a site-wide water balance will be updated to include the new facility and current operating status of the water infrastructure at site as per design report recommendation.

The Brunswick West TSF will receive the full particle size distribution (PSD) of the tails stream.

4.1.6 Operating Levels

The design of the Brunswick West TSF is driven by the embankment height and the operational intent and regulatory water storage requirements. The maximum operating levels have been assigned based on the ANCOLD regulatory requirements for a High B consequence category dam, which include

- Spillway Capacity = Probable Maximum Flood
- Wet Season Storage Allowance = Maximum Operating Pond from Water Balance
- Extreme Storage Allowance = 1 in 100 AEP, 72-hour event plus contingency freeboard.

A minimum beach freeboard from the embankment crest to the top of tailings of 0.5 m was also applied to prevent tailings overflow due to localised deposition mounding and aid in providing suitable storm storage beneath the emergency spillway

The results of the spillway assessment indicated that a minimum 0.3 m deep, 6 m wide spillway is sufficient to pass the Probable Maximum Flood without overtopping the embankment crest. The spillway has been designed at 0.5 m deep to further reduce and mitigate the risk of embankment overtopping failures.

The Maximum Operating Pond observed from 1,000 realisations of synthetic climate data over the life of the Brunswick West TSF was approximately 14,000 m^3, equating to a pond depth of 0.8 m at the end of filling.

The extreme storm storage allowance for the runoff from a 1:100, 72-hour storm within the Brunswick West TSF catchment (i.e., confined within the embankments) was approximately 11,000 m^3, equating to an additional 0.26 m of freeboard required.

The contingency freeboard is equal to wave runup from 1:10 AEP winds plus 0.3 m freeboard. Wave run-up from wind is generally only a concern for large dams with relatively deep bodies of water against the embankment and a long fetch distance from the embankments, which is not applicable for the Brunswick West TSF which is relatively small, and thus wave run-up from wind will be negligible. Contingency freeboard is therefore equal to 0.3m.

Based on this assessment, the following levels are specified for the Brunswick West TSF:

- Maximum Operating Pond = RL 198.9 m
- Extreme Storm Storage Allowances = RL 199.1 m
- Contingency Freeboard = RL 199.4
- Spillway Invert Level = RL 199.5 m
- *(Additional freeboard to spillway 0.1 m)*
- Embankment Crest Level = RL 200.0 m.

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4.1.7 Management/Operation

An Operations, Maintenance and Surveillance Manual will be developed specifically for the Brunswick West TSF. This will include hydraulic performance criteria and instructions to cover all necessary monitoring, daily and weekly routine inspections and surveillance activities. Tailings deposition, decant and return water management procedures will also be documented. In accordance with ANCOLD, this manual will be completed prior to the commencement of tailings deposition.

The Environment Management Plan and Environment Monitoring Plan will be updated to include the addition of the Brunswick West TSF and to cross-reference the Operations, Maintenance and Surveillance Manual. The plans will also include any ambient environmental monitoring not covered by the Operations, Maintenance and Surveillance Manual, such as dust during construction and downstream surface, water quality during operation. These plans will be revised prior to the commencement of construction works.

As the site has two existing TSFs, the construction and operation of the Brunswick West TSF does not constitute a new category of on-site activity. The Environment Management Plan, Environment Monitoring Plan and activities routinely undertaken onsite already address issues associated with the presence of TSFs at the Costerfield Operations.

4.1.8 Inspections

The Operations, Maintenance and Surveillance Manual will specify that MRCO are to engage consulting engineers to conduct the intermediate and comprehensive dam safety inspections in line with the requirements outlined by ANCOLD for a TSF of a High B consequence category.

4.1.9 Conceptual Closure

The closure design proposed for the effective management of the key post closure risks will aim to:

- Maintain the stability and integrity of the embankments, crests and surfaces into perpetuity.
- Provide erosion protection for any intermediate cover layer materials and the underlying tailings.
- Provide sufficient thickness of earthfill material so that burrowing animals cannot access the tailings.
- Minimise dust by preventing uncontrolled erosion and release of the fine tailings material.
- Minimise seepage.

The main risk of post-rehabilitation water contamination from the TSF is considered to be the potential for AMD to occur. As discussed below, the risk of impacts from AMD are considered to be low.

The results of the Geochemical testing showed that the maximum contamination concentration limits defined by EPA (EPA 2020) were only exceeded for the arsenic content from the Brunswick tailings (2/3 samples), which were believed to have been deposited in the mid 2000's.

The more recent samples collected from Bombay TSF, for tailings deposited around 2010-2011, had arsenic concentrations lower than the maximum concentration limits. In consideration

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that there has been very little change to the ore body and processing methods since 2011, the Bombay tailings are considered to be more representative of the future tailings that will be deposited into Brunswick West TSF.

Ongoing testing is required to confirm the chemical characteristics and non-acid forming nature of tailings materials.

A conceptual closure concept for the TSF has been developed as follows:

- A domed (convex), self-shedding cover with a nominal 5% grade.
- The cover layers will comprise a low permeability earthfill material, overlain by inert (i.e., non-acid generating) earthfill and weathered rockfill, and a final layer of topsoil to support revegetation.
- The low permeability earthfill material will be placed directly over the tailings surface and will be:
  - a minimum cover thickness of 0.5 m at the perimeter embankment, and an increase in thickness over the tailings surface to the centre of the TSF to form a minimum 5% grade from the centre of the TSF towards the embankment perimeter.
  - connected to the BGM clayey subgrade and BGM liner around the entire perimeter of the TSF to fully encapsulate the tailings.
  - designed to a thickness to support a revegetated surface without plant roots intercepting the tailings below.
- The earthfill and weathered rockfill will be placed over the earthfill material to a minimum thickness of 0.5 m, matching the minimum underlying 5% grade of the landform.
- The topsoil material will be placed over the weathered rockfill to a nominal thickness of 300 mm.

As the tailings will be at least 0.5 m below the embankment level at the cessation of deposition due to freeboard, the minimum thickness of the cover over the tailings will therefore be 1.8 m. Due to the 5% minimum gradient, a cover thickness of approximately 7.8 m will be achieved at the highest point of the domed TSF landform.

If early closure of the facility is expected, the final TSF landform can be achieved by partial deconstruction of the embankment to the tailings level, and reclamation of embankment materials for impoundment backfilling/cover construction.

Figure 4.4 (ATC Williams 2023 Figure 12) shows the closure layout plan for the Brunswick West TSF.

4.2 Planning consent

Planning Permits (Planning Permit No. 1834 and 2248) were issued by the City of Greater Bendigo on 8 May 1996 and 11 July 1997 allowing mining and mineral production on MIN4073 (subsequently amalgamated MIN4644). See Appendix XX for complete list of approvals.

The City of Greater Bendigo has advised that further planning consent will be required for the works (see Appendix D: Planning Information Request: 75/2022/PIR - 28 September 2022).

EPA Operating Licence OL000109992 activity plan will require amendment upon completion of the Brunswick West TSF.

GMW will require Mandalay to obtain a licence to construct before commencing the Brunswick West TSF. Upon completion a licence to operate from GMW will also be required.

Mandalay Resources has a compensation agreement for MIN4644 with the landowner of the Brunswick West TSF property as per Folio No. 90012063.

4.3 Brunswick Portal Administrative Update NOT-000329

On 1 June 2020 Mandalay received an approval for an administrative change to the approved Work Plan being the location of a Portal in the Brunswick Pit. The original Work Plan described a portal to be developed in the upper north-western bench of the pit. Following the completion of mining in the Brunswick Pit a favourable location for the Portal was defined in the south-eastern wall lower down in the excavation. The Portal development was subsequently completed in November 2020 and is known as the Brunswick Portal.

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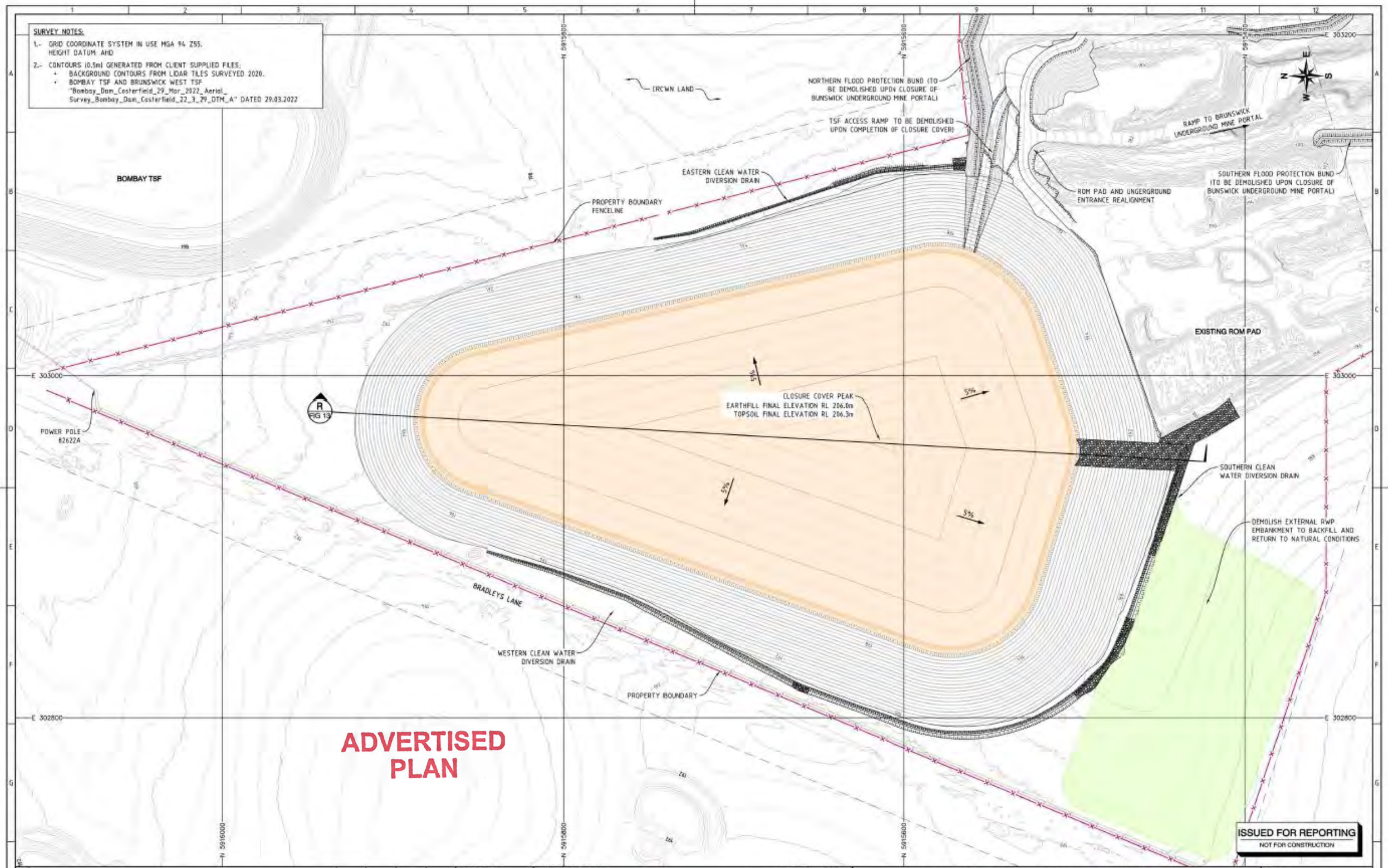
SURVEY NOTES:

1.- GRID COORDINATE SYSTEM IN USE MGA 94 Z55.
HEIGHT DATUM AHD

2.- CONTOURS (0.5m) GENERATED FROM CLIENT SUPPLIED FILES;
- BACKGROUND CONTOURS FROM LIDAR TILES SURVEYED 2020.
- BOMBAY TSF AND BRUNSWICK WEST TSF "Bombay_Dam_Costerfield_29_Mar_2022_Aerial_Survey_Bombay_Dam_Costerfield_22_3_29_DTM_A" DATED 29.03.2022



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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BRUNSWICK WEST TAILINGS STORAGE FACILITY
FACILITY CLOSURE LAYOUT PLAN

DWG. No.
FIGURE 12

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5 Environmental impacts

5.1 Land ownership and tenure

Land property descriptions for the MRCO sites are presented in Table 5.1.

Table 5.1 Operational sites and land tenure

Site	Lot/Plan	Tenure	Ownership/ Management
Augusta Mine Portal and Offices	(AB3, AB3G, AB3A) Lot 1 TP246611	Freehold	Tobin Family
Augusta Storage Dams/Evaporation Facility	Allot 8 Sec1 Parish of Costerfield	Freehold	MRCO
Cuffley Ventilation Shaft and facilities	Allot 34 Sec1 Parish of Costerfield	Freehold	MRCO
Mine Dewatering Rising Main and Pipeline	Allot 39 Sec1 Parish of Costerfield	Crown Land	DEECA
Brunswick Processing Plant, Brunswick TSF and Bombay TSF	Allot 37 Sec1 Parish of Costerfield	Crown Land	DEECA
Youle Ventilation Shaft and Rising Main	Allot 13 Sec6 Parish of Costerfield	Freehold	MRCO
Brunswick Open Pit and Core Storage Area	Lot 1 PS404811	Freehold	MRCO
Brunswick West TSF	Lot 2 PS404811	Freehold	Harris Family
Splitters Creek Evaporation Facility	Lot 2 LP206672R	Freehold	MRCO

NB: Grey shading highlights the inclusion of Brunswick West TSF

5.2 Landscape and landuse

The Costerfield Operations are located within a relatively flat, undulating plain, with several shallow waterways cut into it. The vegetation in the area consists of sparse woodland with little understory, typical of Box-Ironbark forest in this area.

Land use surrounding the site is mainly small-scale farming, State forest and some residential properties. Vegetation in the farmed areas comprises mainly grasses used for grazing, with small copses of trees in natural waterholes and along waterways. State forest is located adjacent to the site.

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Figure 5.1 shows the zoning overlay for the MRCO sites and surrounding lands.

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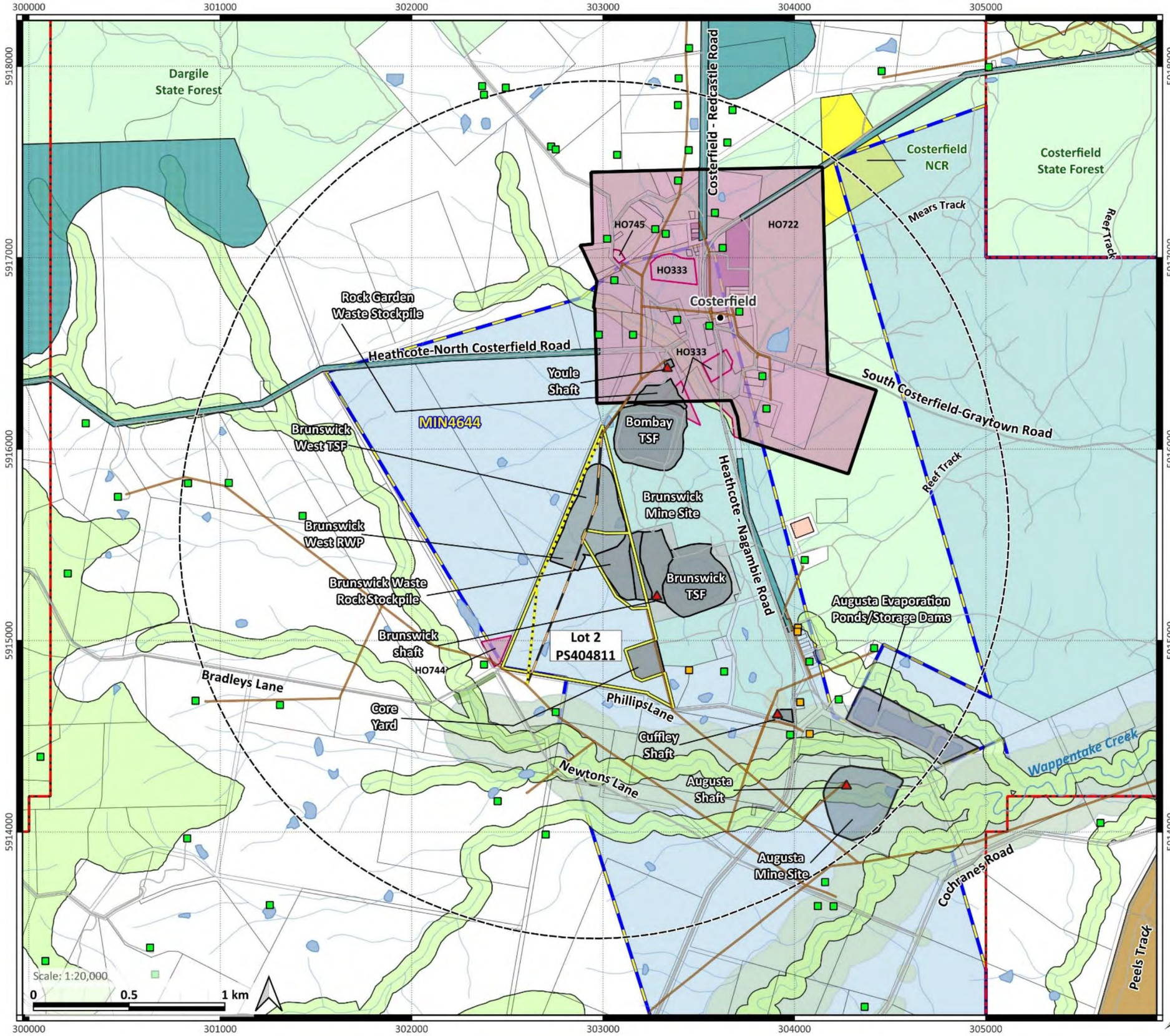
Figure 3.1. Brunswick West TSF layout

Created 2/11/2022 and revised 30/03/2023
CRS: GDA 20 MGA 55
Scale: 1:20,000 @ A3
Page size: A3



- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Road
- Watercourse - tributary
- Existing transmission line
- Relocated transmission line
- Mineral Licence boundary
- Lot 2 PS404811
- Private land lot boundary
- Township boundary
- Transmission line to be relocated
- Radius from Brunswick West TSF - 2 km

Planning Overlay

- Environmental Significance Overlay (ESO) - Schedules 1 and 2
- Heritage Overlay (HO)
- Vegetation Protection Overlay (VPO) - Schedules 2 and 3
- Aboriginal Cultural Heritage

Crown Land

- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Additional data: VIC_TR_Road, VIC_locality_point, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA, VIC_TOWNSHIP POLYGON, VIC_POWERLINE and PLAN_ZONE wms (http://services.land.vic.gov.au/catalogue/publicproxy/guest/dv_geoserver/wms?VERSION=1.1.1&WIDTH=512&HEIGHT=512&LAYERS=VMPLAN_PLAN_ZONE&STYLES=&SRS=EPSG%3A4283&BBOX=141%2C-39%2C150%2C-34)

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The Brunswick West TSF is located wholly within the existing disturbed footprint of grazing land adjacent to the Brunswick site. A small patch of native vegetation is required to be removed to permit construction for the TSF.

5.3 Sensitive receptors

Sensitive receptors are those aspects of the natural or human environment that may be impacted by mining operations. Under the MRSD Act, ERR has a duty when determining the consequence of a risk event to consider the potential impacts to (ERR 2020a):

- *Members of the public:*
  - *Public health, safety, amenity and Aboriginal heritage*
- *Land, property and infrastructure:*
  - *Neighbouring property, land use and nearby infrastructure such as highways, transmission lines, pipelines, schools and hospitals*
- *Environment:*
  - *Air, water, soil, vegetation, and flora and fauna species.*

The sensitive receptors closest to the Brunswick West TSF are shown in Figure 5.2 .

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Figure 5.2. Sensitive receivers - Brunswick West TSF

Created 2/11/2022 and revised 30/03/2023
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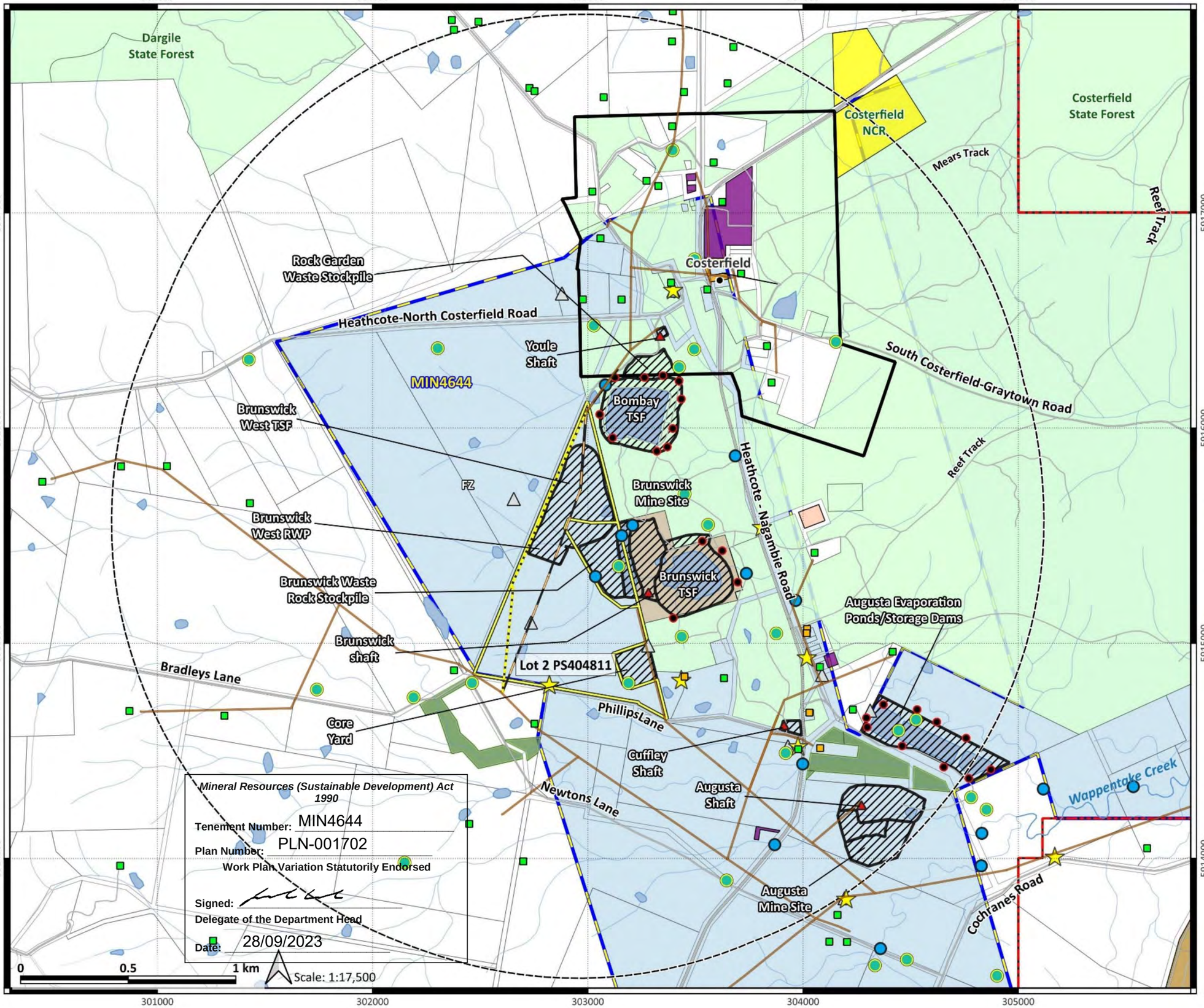
Scale: 1:17,500 @ A3
Page size: A3



- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Town
- Dust monitoring site
- Groundwater monitoring site
- Noise monitoring site
- Seepage detection bore
- Surfacewater monitoring site
- Road
- Watercourse - tributary
- Existing transmission line
- Mine site domain
- Mineral Licence boundary
- Lot 2 PS404811
- Private land lot boundary
- Township boundary

Crown Land

- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land

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Additional data: VIC_TR_Road, VIC_locality_point, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA, VIC_TOWNSHIP POLYGON, VIC_POWERLINE and PLAN_ZONE wms (http://services.land.vic.gov.au/catalogue/publicproxy/guest/dv_geoserver/wms?VERSION=1.1.1&WIDTH=512&HEIGHT=512&LAYERS=VMPLAN_PLAN_ZONE&STYLES=&SRS=EPSG%3A4283&BBOX=141%2C-39%2C150%2C-34)

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5.4 Surface water

There are a number of ephemeral creeks in the vicinity of the mining operations, including Wappentake Creek and its tributaries. The surrounding plains are considered to be alluvial, and the lower-lying areas occasionally flood during heavy rainfall events.

As shown in

Figure 5.3, the facility will remove an existing farm dam located on a minor waterway crossing the TSF site and a portion of the waterway catchment will be lost. Catchment management authorities are responsible for the control, management and authorisation of works and activities in, under, on or over designated waterways. Goulburn Broken Catchment Management Authority will be consulted in relation to works on a waterway and a permit will be obtained if required for this waterway prior to the commencement of works.

Approval to undertake works and/or activities ensures the protection and care of waterways, and the conservation and preservation of flora, fauna and habitat in waterways throughout the catchment.

The majority of the catchment area upstream of the Brunswick West TSF will be diverted around the western side of the Brunswick West TSF and be directed into the existing clean water diversion channel located around the perimeter of the Brunswick site. This channel re-joins the natural waterway to the east of the Brunswick TSF.

5.5 Groundwater

The regional groundwater aquifer is confined to semi-confined and consists of Silurian siltstones and mudstones. Groundwater flow within this regional aquifer is through fractures and fissures within the rock. The regional aquifer is overlain by a perched alluvial aquifer comprising recent gravels, sands and silt. A groundwater assessment has been carried out by WSP Golders Appendix I. The assessment found that the risks to groundwater are expected to be low due to the following key hydrogeological attributes:

- Disconnect between base of TSF excavation and pre and post mining groundwater levels.
- Investigations indicate the perched alluvial aquifer systems are absent at the site.
- The TSF site is underlain by a low permeability weathered siltstone bedrock, with a horizontal hydraulic conductivity of 10-8m Vertical hydraulic conductivity is assumed to be lower that the horizontal estimates.
- Geochemical modelling predicts the siltstone strata has a high capacity for attenuation of the elevated Antimony (Main contaminate constituent in decant water).
- Elevated heavy metals are naturally occurring in the background water quality of the regional basement aquifer, and already exceed guideline criteria for Environmental Values relevant to the adopted segments.

- Based on the review, the proposed TSF is considered to be a low risk to the present groundwater environments

An assessment of the baseline groundwater quality and the applicable Environmental Values has been completed see section 3.9 of Appendix I.

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297000 298000 299000 300000 301000 302000 303000 304000 305000 306000

5918000 5917000 5916000 5915000 5914000

Donellys Lane
Dargile State Forest
Costerfield - Redcastle Road
Costerfield NCR
EL3310
EL6487
Mears Track
Reef Track
Rock Garden Waste Stockpile
Youle shaft
Costerfield
Heathcote-North Costerfield Road
South Costerfield-Graytown Road
Costerfield State Forest
MIN4644
Heathcote - Nagambie Road
Reef Track
Lot 2 PS404811
Bradleys Lane
PhillipsLane
Augusta Evaporation Ponds
Cuffley shaft
Newtons Lane
Augusta shaft
Wappentake Creek
Augusta Mine Site
Cochranes Road
Peels Track
Hylands Lane
EL6842
EL3310
Antimony Creek

Bradleys Lane
Bombay TSF
Brunswick West TSF
Brunswick Plant Site
Brunswick TSF
Brunswick Pit
Brunswick West RWP
Brunswick Shaft
Core Yard
PhillipsLane
Scale - 1:11,000
0 100 200 m

N
0 0.5 1 km
Scale: 1:25,000

Vent shaft
Existing clean water diversion drain
Brunswick West TSF clean water diversion drain
Road
Watercourse
Mine site domain
Mining licence (MINTEN 4644)
Exploration licence boundary
Private land lot boundary
Lot PS404811
Western subcatchment
Costerfield Township
Water body
Crown Land
Commonwealth Land
Community Use Area
Earth Resources
Natural Features Reserve
Nature Conservation Reserve
Services and Utilities
State Forest
Uncategorised Public Land

AE1046.9 Mandalay Resources - Costerfield Operation

Figure 5.3. Brunswick West TSF - impacted waterway

Created 3/11/2022, revised 30/03/2023
CRS: GDA 20 MGA 55
Scale: 1:25,000 @ A3
Page size: A3
Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, HY_WATERAREA, VIC_PLM_25_CROWNLAND, V_PARCEL_MP and VIC_TOWNSHIP_POLYGON

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5.6 Flora

The Brunswick West TSF is located within the disturbed footprint of grazing land adjacent to the Brunswick site, however, a small patch of native vegetation located in the north section of the site is required to be removed for the activity. The powerline required to be relocated will be installed underground along the edge of the pasture paddock adjacent to the Bradleys Lane.

A Native Vegetation Removal Report (CHEC 2023) has been prepared by Central Highlands Environmental Consultancy (CHEC) (Vegetation Quality Assessment Accredited Practitioner) and is attached in Appendix E.

This report contains the following information:

- Ecological Vegetation Class and Bioregional Conservation Status
- presence of any Large Trees at benchmark size
- topography and land information
- impact on values and avoid and minimise statement
- how offset requirements can be met.

The findings of the report were:

- The Net Loss removal area was estimated to be 0.276 ha – for the clearance of the remnant patch native vegetation (this included 1 Large Old Tree). This net loss will need to be offset.
- No Victorian Rare or Threatened Species were detected during the survey.
- There was no native vegetation located within the improved pasture area (treeless areas) of the paddock that are to be disturbed. There was also no native vegetation located along the route for the underground powerline, and potential sites for pits and new power poles. Installation of the underground powerline may impact on tree roots along Bradleys Lane.
- The Peels Lane offset site (MRCO's existing offset area) has more than enough offset available to offset the vegetation disturbance. Approximately only 4.9% of the estimated remaining unallocated area within the offset site is required to meet the offset amount for the removal of native vegetation.

Figure 5.4 shows the vegetation to be removed and the location of the Peels Lane offset site (Lot 1 TP163903).

To minimise impacts on tree roots along Bradleys Lane due to the relocation of the powerline, MRCO has discussed options with Powercor regarding powerline relocation. An underground installation was selected to eliminate the need for any pruning/lopping required for an overhead installation. The underground installation is to be bored and not trenched, with boring to be positioned so any encroachment is less than 10% of any Tree Protection Zone (TPZ) (in accordance with AS4970-2009 Protection of trees on development sites) and with entry and exit pits outside any designated TPZ to avoid root damage. TPZ's for vegetation along Bradleys Lane road reserve has been confirmed by site investigations and is detailed in Appendix E.

Further, the construction of flood mitigation measures and will require the removal of planted vegetation. Amongst the planted vegetation is patches of Sifton bushes that will require offset.

The field visit also mapped Sifton bushes (Cassinia Sifton) in six locations for an estimated total area to be removed of approximately 0.051 ha (see Figure 5.4). CHEC have assessed the native vegetation removal for the location mapped and determining the offset requirement will be a general offset amount of 0.031 general habitat units. The Native Vegetation Removal Report – Mandalay flood works (CHEC 2023) is attached in Appendix E.

5.7 Fauna

An assessment of all potential impacts to species or communities listed under the Flora and Fauna Guarantee Act (FFG 1988) and the Environment Protection and Biodiversity Conservation Act 1999 has been considered as part of the development. This assessment is included the Native Vegetation Removal Report (CHEC 2023) in Appendix E.

There are two FFG Act listed species that may present a moderate impact or greater by the development. These include the Brush-tailed phascogale and Lace Monitor. There are some small hollows present which may contain phascogales. Lace Monitors may be present due to hollows being used as a food source, however most of the hollows are not big enough for the reptile to access fully and for that reason, there is only a low-moderate likelihood of the reptile being present.

There is one EPBC Act listed species being the Painted Honeyeater for which the proposed development may present a moderate impact or greater.

The Painted Honeyeater may be present however would be limited by the amount of food source available. Other birds including the Swift Parrot and Superb Parrot are found throughout this area but were considered to have a Low likelihood mainly due to the limited food resources offered by a small patch of trees.

- To ensure that loss of fauna is avoided or minimised Mandalay will adopt the following measures: Conduct a pre-clearance inspection check and relocated any native fauna into nearby bushland.

Install several phascogale nest boxes in nearby retained trees to address hollow loss.

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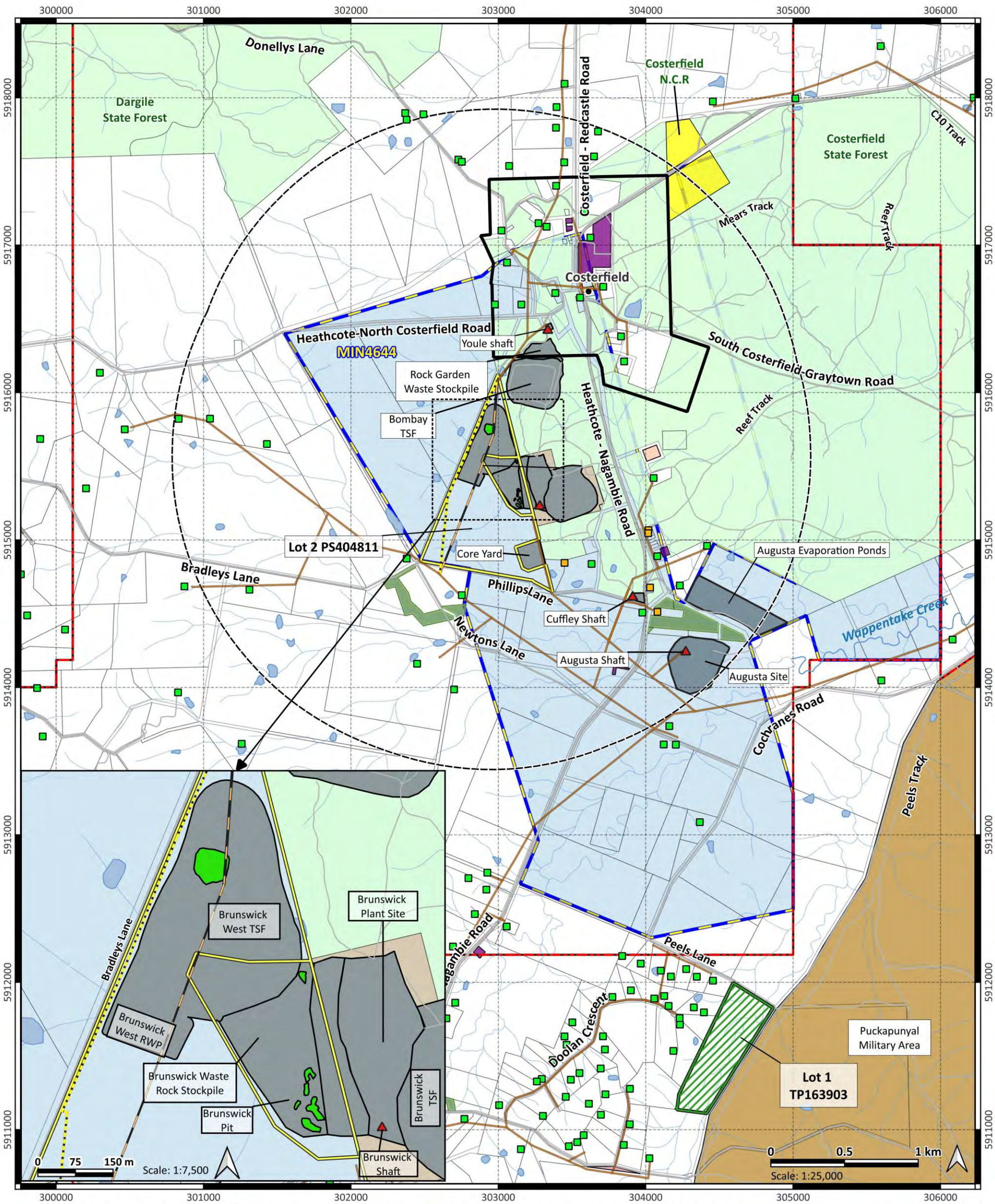

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Town
- Existing power transmission line
- Power transmission line to be relocated
- Relocated power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Mining Licence
- Mine site domain
- Vegetation pending removal (inset map)
- Lot boundary - offset related
- Costerfield township
- Water body
- Radius circle - 2 km

Crown Land

- Commonwealth Land
- Private land lot boundary
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land

AE1046.9 Mandalay Resources - Costerfield Operation

Figure 5.4. Brunswick West TSF - vegetation offset

Created 3/11/2022 and revised 30/03/2023

CRS: GDA 20 MGA 55

Scale: 1:25,000 @ A3

Page size: A3

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_TOWNSHIP-POLYGON, VIC_POWER_LINE, PLM25_Vic_crown_lands.

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5.8 Heritage

Aboriginal cultural heritage

The Taungurung Clan Aboriginal Corporation is the Registered Aboriginal Party designated as the traditional owners of the land on which mining licence MIN4644 is located (SRK 2017).

Certain areas within MIN4644 and close to current operational areas are designated as Areas of Cultural Heritage Sensitivity, including land 200 m either side of Wappentake Creek, Tin Pot Gully Creek and Mountain Creek South.

A Cultural Heritage Management Plan (CHMP) self-assessment has been conducted for the activity (see Appendix F CHMP self-assessment outcome) and has identified that there is no requirement for a CHMP to be developed.

Historic context

As the Brunswick West TSF is located wholly within the existing disturbed footprint of grazing land adjacent to the Brunswick site, no impacts to historically significant locations are expected.

5.9 Air Quality

Air Quality Assessment

Objective

> *Minimise* risks of harm to human health or the environment from pollution and waste arising from the design, manufacture, construction and operation of the TSF.

Identify hazard

Dust can cause health complications and impact surrounding views, vegetation and land uses.

There is also an insignificant impact from vehicle emissions.

MRCO have identified that as has been considered for mining operations, dust will be generated during construction from:

- vehicles travelling on unsealed roads
- vegetation clearing
- stockpiling of soil and rock
- equipment like crushers and conveyers.

Risk Assessment

As required under the Mineral Resources (Sustainable Development) Regulations 2019, the site has an approved risk based environmental management system that includes hazard and sensitive receptor identification, inherent risk assessment, control measures and residual risk assessment. The plan includes monitoring and actions required to manage the risk.

The dust controls in the site's environmental management plan include:

- dampening unsealed roads to prevent dust during dry conditions
- site roads also have enforced speed limits

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- plant and equipment are to be maintained to manufacturer's specifications
- limiting the disturbance area
- limiting dust generating activities in adverse weather conditions
- rehabilitating disturbed areas including soil stockpiles.

Implement controls

MRCO monitor weather and activities daily during construction work and is ready to adjust its activities when conditions are dry and windy.

Check controls

Sustainability Manager has responsibility and accountability for dust emission controls.

MRCO regularly checks and keeps a log of controls and equipment to make sure they're maintained and working well. MRCO have a dust gauge network that monitors dust levels in the mine surrounds and identifies other present or potential dust sources. Conduct regular visual inspections and audits during construction. Analysing records and data for reports on dust impacts.

Review and improvement

MRCO adjusts controls depending on their effectiveness, or if onsite conditions change. MRCO register dust complaints, which trigger a review and possible changes to controls and practices.

Green House Gas Assessment

Objective

Minimise risks of harm to human health or the environment from pollution and waste arising from the design, manufacture, construction and operation of the TSF.

Identify hazard

GHG emissions will be released directly and indirectly from the TSF construction and operation activities.

Scope 1 (or direct) GHG emissions are released directly into the atmosphere as a result of:

- emissions from combustion of fuel in Construction fleet, such as graders, dozers, trucks and excavators
- emissions from the mining and processing of ore to produce gold products and tailings
- emissions from combustion of fuel in operational vehicles, such as graders, trucks and cars.

Scope 2 GHG emissions are indirect emissions from the consumption of purchased energy products during TSF operation activities:

- electricity for operating processing plant pumps and equipment to manage tailings.

Scope 3 GHG emissions are all other indirect emissions that arise from the TSF construction and operation activities. Various goods and services required for the TSF construction and operation, including:

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- Materials to build TSF
- BGM liner of TSF
- Pumps and pipelines to operate TSF.

Risk Assessment

As required under the Mineral Resources (Sustainable Development) Regulations 2019, the site has an approved risk based environmental management system that includes hazard and sensitive receptor identification, inherent risk assessment, control measures and residual risk assessment. The plan includes GHG monitoring and actions required to manage the risk.

Implement controls

Specifically for this project:

TSF design and location to improve efficiency and minimise waste and energy use:

- TSF to be located close to tailings source reducing pumping impacts.
- TSF to be design to require minimal earthworks at closure of the facility.
- TSF to be cut/fill construction thus limiting requirement to haul material from internal stockpiles or from off-site sources.

TSF construction

- Low sulphur fuel supplied to contractor for earthworks constructions (scope 1 emission).
- Minimise re-handle as much as possible.
- Pipe water to on-site water storage dam rather than source from elsewhere.
- Reduce wastage of BGM liner through additional assessment work prior to ordering.
- Earthwork machinery and equipment are maintained in accordance with manufacturer's specifications to reduce GHG emissions.

TSF operation

- Consider GHG emissions in procurement of equipment for operation of TSF
- maintain machinery and equipment in accordance with manufacturer's specifications to reduce GHG emissions from the processing operations.
- all substances are handled, stored, used or transported in a way that minimises risks of harm from GHG emissions.

TSF decommissioning

- Salvage and sale of equipment and material for re-use at end of operating life to reduce waste.
- Rehabilitate the facility to be a free draining revegetated landform to promote carbon capture.

Check controls

Sustainability Manager has responsibility and accountability for emission controls.

MRCO regularly checks and keeps a log of controls and equipment to make sure they're maintained and working well. Conduct regular visual inspections and audits during construction.

MRCO review and update TSF design and monitor the implementation of controls during construction.

MRCO monitors energy use, analysing records and data. MRCO consider option of increasing Renewable source component of electricity supply. MRCO review the procurement process, look for knowledge of emerging technology solutions and adopt new technologies when it is reasonably practicable to do so.

Review and improvement

MRCO adjusts controls depending on their effectiveness, or if activities change. The results of studies of efficiencies of equipment and energy usage may trigger a review and changes to controls and practices.

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6 Risk identification, assessment and management

The MRSD (MI) Regulations require operators to identify and assess all risks that the new or changing works may pose to the environment, to the public, or to nearby land, property or infrastructure (known as mining hazards). The identified risks are to be eliminated or minimised as far as reasonably practicable with risk treatments that specify the measures to be used to eliminate or minimise those risks and monitor performance.

6.1 Regulatory requirements

In relation to risk assessment, under the MRSD (MI) Regulations (ERR 2020a):

> *Regulation 48 Information required in application for variation of work plan*
>
> *(1) For the purposes of section 41(2) of the Act, the prescribed information is the following—*
>
> *(a) if changes to the work or rehabilitation set out in the work plan are proposed, a description of any new or changed exploration hazard, mining hazard or rehabilitation hazard arising from the proposed changes that significantly increases the risks posed to—*
>
> > *(i) the environment; or*
> >
> > *(ii) any member of the public; or*
> >
> > *(iii) land, property or infrastructure in the vicinity of the work or rehabilitation relating to the new or changed hazard;*
>
> *(b) if any new or changed hazard is described under paragraph (a), the information specified in regulations 44 and 45 that relate to the new or changed hazard, including the resulting proposed changes to the work plan.*

6.2 Risk process

The risk assessment process adopted for this report follows the risk identification and assessment framework detailed in the Guidelines (ERR 2020a).

The aim of the process is to identify and assess the risk that the development may pose to the environment, to any member of the public, or to land, property or infrastructure in its vicinity. The assessment is to identify site-specific issues, constraints or characteristics requiring specific management to ensure that stated rehabilitation objectives can (continue to) be achieved after rehabilitation criteria have been met.

The risk assessment includes risks that may require action or incur a cost after rehabilitation is complete. The assessment of those risks is required to include:

- the type, likelihood and consequence of the risks
- the activities required to manage the risks
- the projected costs to manage the risks

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 28/09/2023

Type text here

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- any other matter that may be relevant to risks arising from the rehabilitated land.

6.3 Risks identified

The Brunswick West TSF development does not introduce any "new" mining hazards but duplicates existing risks associated with the current mining operations as described in detail in the MIN4644 Risk Management Plan associated with the Consolidated Work Plan PLN-001247.

High residual risks have been identified. This risks are the possible failure of TSF embankments, fire and security breaches may impact on public safety. Risk treatment plans have been developed to further address these and can be found in Appendix G. The mining hazards relevant to the elements of this Work Plan Variation are shown in Table 6.1.

Table 6.1. Potential mining hazards and applicability to the WPV

Potential mining hazard	***Construction***	***Operation***	***Closure***	***Post Closure***
Air blast	-	-	-	-
Altered visual amenity	*Yes*	*Yes*	*Yes*	*Yes*
Dust/air emissions	*Yes*	*Yes*	*Yes*	-
Erosion and sedimentation	*Yes*	*Yes*	*Yes*	*Yes*
Fire	*Yes*	-	*Yes*	-
Flood	-	*Yes*	-	-
Fly rock	-	-	-	-
Ground disturbance	*Yes*	*Yes*	*Yes*	*Yes*
Ground instability	-	*Yes*	*Yes*	*Yes*
Ground vibration	-	-	-	-
Hazardous waste	-	*Yes*	*Yes*	*Yes*
Light emissions	-	-	-	-
Noise pollution	*Yes*	*Yes*	*Yes*	-
Security breach	*Yes*	*Yes*	*Yes*	-

6.4 Risk assessment

Likelihood, consequence, and risk rating tables are provided in Table 6.2, Table 6.3 and Figure 6.1 following the criteria outlined in the Guidelines (ERR 2020a). In the Guidelines, the consequence categories are further defined in relation to the potential consequences of impacts on 'public health and safety', 'land, property and infrastructure', and 'the environment' (air, water, soil, vegetation, flora and fauna).

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Table 6.2 Consequence categories and definition (ERR 2020a)

Category	Definition
Critical	*Hazard has critical impact, in terms of severity and/or duration.* *Treatment or remediation effort is required, although some effects may be irreversible.* *Remediation of environmental contamination would require significant private and public resources.* *Hazard event would be the subject of widespread community outrage.*
Major	*Hazard has major impact, in terms of severity, duration and/or frequency of occurrence. Treatment or remediation effort is required. Some effects may be irreversible.* *Remediation of environmental contamination would require significant private and public resources.* *Hazard event would be the subject of widespread community concern.*
Moderate	*Hazard has moderate, noticeable impact, in terms of severity, duration and/or frequency of occurrence. Moderate treatment or remediation effort may be required.* *Hazard event would be the subject of limited community concern.*
Minor	*Hazard is perceived but has minor and typically temporary effects. Some remediation may be required.*
Insignificant	*Impacts are barely recognised and/or quickly recovered from. No specific remediation required.*

Table 6.3 Likelihood categories and description (ERR 2020a)

Category	Definition
Rare	*Highly unlikely, but the risk event may occur in exceptional circumstances. (likelihood <5%).*
Unlikely	*The risk event could occur at some time. (likelihood 5% to 30%).*
Possible	*The risk event might occur at some time. (likelihood >30% to 70%).*
Likely	*The risk event will probably occur in most circumstances. (likelihood >70% to 90%).*
Almost certain	*The risk event is expected to occur in most circumstances. (likelihood >90%).*

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Likelihood					
Almost Certain	Medium	High	Very High	Very High	Very High
Likely	Medium	Medium	High	Very High	Very High
Possible	Low	Medium	Medium	High	Very High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Medium	Medium	High
	Insignificant	Minor	Moderate	Major	Critical

Consequence

Figure 6.1 Risk matrix showing classification of risk ratings (ERR 2020a)

Once the risk rating has been established some risks will need to have controls in place to reduce them to an acceptable level. Higher risk levels should take priority. Table 6.4 provides guidance on what steps need to be taken depending on the risk rating.

Table 6.4 Risk Rating Acceptability (ERR 2020a)

Category	Definition
Very High	*Totally unacceptable level of risk. Controls must be put in place to reduce the risk to lower levels.*
High	*Generally unacceptable level of risk. Controls must be put in place to reduce the risk to lower levels or seek specific guidance from ERR.*
Medium	*May be acceptable provided the risk has been minimised as far as reasonably practicable.*
Low	*Acceptable level of risk provided the risk cannot be eliminated.*

The Brunswick West TSF mining hazard risk assessment template from the Guidelines (ERR 2020a) has been used to summarise mining risks, as shown in Table 6.1.

The likelihood and consequence ratings listed in Table 6.4 to Table 6.14 for the residual risks are post-treatment (i.e. they assume that the 'activities to manage risk' have been implemented).

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Table 6.5 Risk assessment: altered visual amenity

Objectives or outcomes to be met	
In terms of visual amenity, guidance is provided in *Guidelines for Landscape and Visual Impact Assessment* (The Landscape Institute with the Institute of Environmental Management and Assessment, 2013). The TSF will be visible from the adjacent Bradleys Lane although roadside vegetation will provide some screening. The downstream embankment will be visible from Phillips Lane 700m to the South. All residences within 2,000 m are either screened by vegetation or topography. The goal of the Costerfield Operations is to comply with applicable guidelines for particulate emissions from mining and processing, and to acceptably minimise community amenity impacts. To achieve this, using the applicable guidelines, the following objectives shall be met: • Visual impacts of the TSF on sensitive receptors are minimized • Offsite light emissions are minimized • Visual dust emissions are minimized / eliminated • Minimal complaints received regarding visual impacts, light and dust emission Additionally, during the closure and post closure phase of the mine, the following criteria shall be met (see Brunswick West TSF Closure Plan): • Long-term stable embankments with minimum 4H:1V outer slopes to limit erosion and allow revegetation • A tailings surface capping system of minimum 500mm thickness, consisting largely of excavated waste rock from the underground mine • Revegetation of the landform as pasture for livestock.	
Risk source	**Possible consequence**
Brunswick West TSF	Visual impact of height of TSF above natural ground level on neighbouring landowners or residences
Standard controls	
Minimise TSF heights as far as reasonably practical - height kept to a minimum to meet operational needs (e.g. 5 years)	
Limit height to existing approved Bombay TSF embankment height	
Topsoil stockpiles to be shaped and pasture established to blend them into the existing environment	
Revegetation of embankment and disturbed areas as soon as practicable – Embankment to be constructed to planned closure slope (4H:1V) to permit re-establishment of pasture.	

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Decommissioning and rehabilitation of TSF to agreed post-mining landuse and landforms							
Vehicles to use low beam when in operation at night							
No permanent lighting to be installed							
Post closure monitoring to ensure successful cover system and revegetation							
Relevant associated procedures							
Rehabilitation Plan							
Community Engagement Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Brunswick West TSF	Private Property	Moderate	Possible	Medium	Minor	Unlikely	Low
Outcome of risk assessment							
The maximum inherent risks are rated **Medium**. The preparation of risk treatment plans is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.							

Table 6.6 Risk assessment: dust

Objectives or outcomes to be met
In terms of dust emissions, the requirements to be met by the Costerfield Operations are set out in the *Environment Reference Standard*. A review of wind data from Redesdale (BOM Station number 0888051), approximately 30 km from Costerfield was conducted. The predominant wind direction is North and South and

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sustained winds rarely exceed 40 km/hr. There are 5 dust gauges positioned within 1,000 m of the TSF. Three gauges are to the North and two gauges are to the South. These dust gauges are positioned at or between the TSF and private property. The goal of the Costerfield Operations is to comply with applicable guidelines for particulate emissions from mining and processing, and to acceptably minimise community amenity impacts. To achieve this, using the applicable guidelines, the following objectives shall be met:

- For a 24 hr average: particles with mean aerodynamic diameter less than 10 microns (PM_{10}) must not exceed 50 µg /m³ or particles with mean aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) must not exceed 25 µg /m³.

Risk source	Possible consequence
Brunswick West TSF	Dust emissions created by winds blowing across dried out tailings surface creating dust that may impact on amenity, air quality and/or public health Dust emissions created by mobile equipment operation during construction and rehabilitation
Standard controls	
Moisture control of tailings surface through use of a single point spigot at the northern most point of the facility with occasional deposition from an additional 4-6 spigot points to maintain the tailings beach over the whole of the tailings area.	
Maintain decant pond in south-west corner of TSF.	
Overall shape of the TSF (narrow at the deposition point and widening out towards the tail end will result in tailings being continually deposited over the same general area, limiting the potential for evaporation to completely dry the tailings beach out.	
Speed limit of no more than 10km/hr on TSF embankment crest and site access roads.	
Decommissioning and rehabilitation of TSF with appropriately designed cover system and vegetation.	
Use water cart on roads / construction areas within the site.	
Add dust suppression agent to water tankers to aid in dust suppression.	
Relevant associated procedures	
Ambient Air Quality Management Plan	

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Rehabilitation Plan							
Community Engagement Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Tailings stored in TSF	Air quality / Public safety	Minor	Unlikely	Low	Minor	Rare	Low
Operation of Mobile Equipment	Air quality / Public safety	Moderate	Almost Certain	Very High	Moderate	Possible	Medium
Outcome of risk assessment							
The maximum inherent risks are rated **Very High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.							

Table 6.7 Risk assessment: erosion and sedimentation

Objectives or outcomes to be met
In terms of erosion and sedimentation, the requirements to be met by the Costerfield Operations are set out in *Environment Reference Standard* and supported by EPA Publication 1834: *Civil construction, building and demolition guide*. The goal of Costerfield Operations is to minimise impacts on downstream water quality as a result of mining-related erosion and sedimentation, and to comply with EPA licence conditions. To achieve this, using the applicable guidelines, the following objectives shall be met: • No significant deviation in water quality from background (non-mine affected) conditions

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- Surface water discharged from the premises is not contaminated with waste as per EPA licence conditions, where applicable, including turbidity with a 75th percentile limit of 10 Nephelometric Turbidity Units

An erosion risk event associated with the project is a high rainfall event which then leads to discharge from TSF emergency spillway or embankment failure. Dam break modelling is summarised as inundation maps in the Dam Safety Emergency Plan which defines the following objectives:

- To identify dam safety event triggers which could place the integrity of the Brunswick West Tailings Storage Facility (TSF) at risk and require immediate action;
- Provide recommendations which should be taken by Mandalay Resources Costerfield Operations (MRCO) personnel to respond to these dam safety event triggers to mitigate any potential emergency incidents

Additionally, during the closure and post closure phase of the mine, the following criteria shall be met (see Brunswick West TSF Closure Plan):

- Long-term stable embankments with minimum 4H:1V outer slopes to limit erosion and allow revegetation
- A tailings surface capping system of minimum 500mm thickness, consisting largely of excavated waste rock from the underground mine
- Revegetation of the landform as pasture for livestock.

Risk source	Possible consequence
Brunswick West TSF	Unplanned, sediment-bearing or erosive discharge from the TSF during construction, operation or closure resulting in impacts on private property, crown land, surface water and aquatic ecosystems
RWP	Unplanned, sediment-bearing or erosive discharge from the RWP during construction, operation or closure resulting in impacts on private property, crown land, surface water and aquatic ecosystems
Disturbed, unrehabilitated ground	Erosion and sedimentation caused by rainfall runoff from disturbed, unrehabilitated land or material stockpiles resulting in impacts on surface water and aquatic ecosystems
Standard controls	
Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity	
Drainage control works to divert surface water away from disturbance areas	
Culvert and channel capacity that can convey the relevant flood event design criteria (i.e. 1:100 AEP, Critical Duration)	
Minimise disturbance areas	

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Rehabilitation and establishment of pasture on areas of exposed soil							
Create and implement a sediment and erosion control plan for the construction and rehabilitation phases							
Control drainage in areas where activities are being undertaken to ensure captured rainfall is directed to a sediment retention basin							
Use of appropriately sized sediment retention basin							
For erosion control of TSF embankments, final slopes of 4H:1Vwill be adopted. Topsoil will be placed and vegetation established to further stabilize the embankment slope.							
Heavy vehicles to be cleaned and be free of soil prior to leaving construction/rehabilitation site							
Re-use of captured water for construction purposes							
Standard controls as documented in the Costerfield Surface Water Management Plan							
Post closure monitoring to include key aspects of current operational monitoring programs including surface water monitoring and groundwater monitoring							
Relevant associated procedures							
Surface Water Management Plan							
Brunswick West TSF Dam Safety Emergency Plan							
Rehabilitation Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Brunswick West TSF	Private property, surface water and aquatic ecosystems	Moderate	Likely	High	Moderate	Unlikely	Medium

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RWP	Private property, surface water and aquatic ecosystems	Moderate	Likely	High	Moderate	Unlikely	Medium
Disturbed, unrehabilitated ground	Private property, surface water and aquatic ecosystems	Minor	Likely	Medium	Minor	Unlikely	Low
Outcome of risk assessment							
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of a risk treatment plan is therefore not considered necessary.							

Table 6.8 Risk assessment: fire

Objectives or outcomes to be met	
In terms of fire, the responsible authorities are the Victoria Police and the Country Fire Authority. The objective of the Costerfield Operations is no impact to public safety, private property, community facilities or crown land as a result of mine-related fire ignition.	
Risk source	**Possible consequence**
Plant and Equipment – fire generation activity (ignition source)	Fire ignited as a result of mining activities may impact on air quality and/or public health, as well as causing damage to private property, community facilities, crown land, public land or the Heathcote-Graytown National Park.
Standard controls	
Maintenance of firebreaks	
Preventative maintenance program on mobile equipment and fixed plant to ensure the risk of spark generation is minimised	
Maintenance of adequate on-site water storages for fire-fighting purposes	

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Inclusion of bushfire authority in community engagement plan and emergency risk management plan							
Trained Emergency Response Team personnel across the mining workforce							
Relevant associated procedures							
Brunswick West TSF Dam Safety Emergency Plan							
Community Engagement Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Plant and Equipment – fire generation activity (ignition source)	Air quality / public safety / private property / community facility / crown land / National Park	Critical	Unlikely	High	Critical	Rare	High
Outcome of risk assessment							
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk is rated as **High**. The preparation of risk treatment plan is therefore considered necessary and can be found in RRAM.							

Table 6.9 Risk assessment: flood

Objectives or outcomes to be met

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In terms of mitigating the risk of mining-related flood impact, specifications are set out in Guidelines on Tailings Dams (ANCOLD 2019) and Guideline for the design and management of tailings storage facilities (ERR 2017). Guidance is also provided in EPA Publication 1834: Civil construction, building and demolition guide. A flood risk event associated with the project is a high rainfall event which then leads to embankment failure and flooding of nearby creeks and downstream receptors. Dam break modelling is summarised as inundation maps in the Dam Safety Emergency Plan which defines the following objectives:

- To identify dam safety event triggers which could place the integrity of the Brunswick West Tailings Storage Facility (TSF) at risk and require immediate action
- Provide recommendations which should be taken by Mandalay Resources Costerfield Operations (MRCO) personnel to respond to these dam safety event triggers to mitigate any potential emergency incidents
- Provide timely warning to relevant emergency management agencies for their implementation of protection measures for downstream communities.

The goal of the Costerfield Operations is to minimise any flood risks associated with TSF or associated activities including implementing planning and management

systems to prevent discharge. To achieve this, water holding structures be designed, constructed, operated and decommissioned in strict accordance with applicable engineering standards and practice.

Additionally, during the closure and post closure phase of the mine, the following criteria shall be met (see Brunswick West TSF Closure Plan):

- Long-term stable embankments with minimum 4H:1V outer slopes to limit erosion and allow revegetation
- A tailings surface capping system of minimum 500mm thickness, consisting largely of excavated waste rock from the underground mine
- Revegetation of the landform as pasture for livestock.

Risk source	Possible consequence
Brunswick West TSF	Impact on public safety, private property, crown land, water quality and aquatic ecosystems from unplanned discharge from the TSF. Flooding of local waterways reaching mine facilities and causing the erosion of mined materials or release of mining-related contaminants.
RWP	Impacts on public safety, private property, crown land, water quality and aquatic ecosystems from flooding due to unplanned discharge from the RWP. Flooding of local waterways reaching mine facilities and causing the erosion of mined materials or release of mining-related contaminants.
Standard controls	

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Construction of external RWP to aid the removal of water that may accumulate on the TSF post a rainfall event							
Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity							
Inclusion of relevant authority in the community engagement plan and emergency risk management plan (i.e. Dam Safety Emergency Plan)							
TSF and RWP to be constructed as turkeys nest facilities to minimize catchment area							
Location of at-risk project facilities away from floodplains							
Appropriately designed, constructed and maintained clean water diversion drains							
Standard controls as documented in the Costerfield Surface Water Management Plan							
Post closure monitoring to include key aspects of current operational monitoring programs including surface water monitoring and groundwater monitoring							
Relevant associated procedures							
Surface Water Management Plan							
Brunswick West TSF Dam Safety Emergency Plan							
Rehabilitation Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Brunswick West TSF	Public safety / private property / crown land	Major	Unlikely	High	Major	Rare	Medium
RWP	Public safety / private property / crown land water	Major	Unlikely	High	Major	Rare	Medium

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	and aquatic ecosystems						
Brunswick West TSF	Water quality / aquatic ecosystems	Major	Unlikely	High	Moderate	Rare	Medium
RWP	Water quality / aquatic ecosystems	Major	Unlikely	High	Moderate	Rare	Medium

Outcome of risk assessment
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.

Table 6.10 Risk assessment: ground disturbance (including water quality)

Objectives or outcomes to be met
In terms of surface water impact, the requirements to be met by the Costerfield Operations are set out in *Environment Reference Standard (ERS)* and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) (as referenced in the ERS). The goal of the Costerfield Operations is to minimise impacts on downstream water quality as a result of mining-related activities, and to comply with EPA licence conditions. To achieve this, using the applicable guidelines, the following objectives shall be met: • No significant deviation in water quality from background (non-mine affected) conditions • No significant elevated antimony levels in downstream surface waters (taking into account ANZG/ Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ 2000) trigger levels and background concentrations) • No impact on designated beneficial uses of water as measured by the appropriate environmental quality objectives and indicators specified in the *Environment Reference Standard*

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- Discharge of waste to surface water must comply with EPA licence conditions, where applicable, including:
  - stormwater diverted around the premises must not be contaminated with waste
  - discharge of waste to surface waters must be in accordance with the limits specified in the licence

In terms of land impact, the requirements are set out in *Environment Reference Standard*, the *National Environment Protection Measures (NEPM*) and the EPA licence. The following objective shall be met, as outlined in the EPA licence:

- No contamination of land

In terms of groundwater impact, the requirements are set out in the *Environment Reference Standard* and the EPA licence. The following objective shall be met, as outlined in the EPA licence:

- No contamination of groundwater

For historic heritage impacts, requirements for protection are set out at the local government level in Heritage Overlays and at a state level under the *Heritage Act 2017*. The objective of the Costerfield Operations is to avoid harm or disturbance to historic heritage places.

For aboriginal cultural heritage impacts, requirements for protection are set out under the Aboriginal Heritage Regulations 2018. The objective at the Costerfield mine is to avoid harm or disturbance to aboriginal cultural heritage places.

Additionally, during the closure phase of the mine, the following criteria shall be met (see Rehabilitation Plan):

- site is safe for final land use
- site is non-polluting
- vegetation is self-sustaining
- site rehabilitation supports future land use
- site does not require long-term monitoring and maintenance.

Risk source	Possible consequence
Construction/Rehabilitation Activity – plant and equipment	Potential for land clearance activities to affect terrestrial ecosystems, result in loss of vegetation and disrupt public infrastructure (overhead powerline relocation)
Construction/Rehabilitation Activity – plant and equipment	Potential for discharges to impact on designated Areas of Cultural Heritage Sensitivity (e.g. creek lines), requiring approvals for certain surface disturbing works

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Brunswick West TSF	Potential impact on groundwater and surface water quality associated with seepage or discharge from the TSF, affecting terrestrial or aquatic ecosystems, private land or crown land
Return Water Pond (RWP)	Discharge to surface drains (containing salinity and metals) potentially resulting in impacts on surface waters and soil (affecting terrestrial or aquatic ecosystems, private land or crown land)

Standard controls
Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity
Freeboard and water level management
Groundwater bores and associated monitoring
Pipelines inspected regularly to ensure structural integrity and no leakages
Ongoing sampling and monitoring of surface water and groundwater to ensure no contamination
TSF liner constructed with low permeability (as per ERR 2017))
Apply high standards in design, construction, operation, maintenance and decommissioning of TSF groundwater monitoring bores
Planning to ensure that sufficient material (rock, clay, sand and soil) is available for covering of tailings in final rehabilitation
Provision of adequate surface water drainage control along TSF and RWP embankments
For erosion control of TSF embankments, final slopes of 1V:4H will be adopted
Annual independent hydrogeological review and advice
Erosion and sedimentation management
Geochemical testing of tailings
Procedures describing contingency measures in the event of the discovery of new archaeological relics (s.24 of *Aboriginal Heritage Act 2006*)
Heritage Victoria will be contacted if any archaeological relics are discovered during excavation.

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Powerline relocation will be via an underground installation (bored and not trenched and positioned so any encroachment is less than 10% of any TPZ) to eliminate the need for any pruning/lopping and minimise tree root impacts							
Native vegetation removal will be offset at the MRCO Peels Lane Native vegetation offset site							
Relevant associated procedures							
Surface Water Management Plan							
Groundwater Management Plan							
EPA Victoria Operating Licence 109992							
Rehabilitation Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Construction/Rehabilitation Activity – plant and equipment	Surface water / ecosystems	Minor	Almost certain	High	Minor	Unlikely	Low
	Private land / crown land	Minor	Almost certain	High	Minor	Unlikely	Low
	Areas of cultural heritage sensitivity	Minor	Unlikely	Low	Minor	Unlikely	Low
	Ecosystems	Minor	Almost certain	High	Minor	Unlikely	Low
	Public infrastructure	Moderate	Almost certain	Very High	Minor	Rare	Low

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Brunswick West TSF	Groundwater / surface water / ecosystems	Moderate	Possible	Medium	Moderate	Rare	Medium
	Private land / crown land	Moderate	Possible	Medium	Minor	Rare	Low
RWP	Groundwater / surface water / ecosystems	Moderate	Possible	Medium	Moderate	Rare	Medium
	Private land / crown land	Moderate	Possible	Medium	Moderate	Rare	Medium
Disturbed and rehabilitated ground (weeds and pests)	Private land / crown land / ecosystems	Minor	Likely	Medium	Minor	Possible	Medium

Outcome of risk assessment
The maximum inherent risks are rated **Very High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of a risk treatment plan is therefore not considered necessary.

Table 6.11 Risk assessment: ground instability

Objectives or outcomes to be met
In terms of ground instability, the requirements applicable to the Costerfield Operations are set out by *Geotechnical guideline for terminal and rehabilitated slopes* (ERR 2020) and *Technical Guideline for Design and Management of Tailings Storage Facilities* (ERR 2017). Requirements are also set out in applicable ANCOLD guidelines for the planning, design, construction, operation and closure of TSFs. The goal of the Costerfield Operations is to have no impact on public safety, private

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property or crown land due to ground disturbance associated with TSFs. To achieve this, structures will be designed, constructed, operated and closed in strict accordance with the above geotechnical and engineering standards and practice.

Additionally, during the closure and post closure phase of the mine, the following criteria shall be met (see Brunswick West TSF Closure Plan):

- Long-term stable embankments with minimum 4H:1V outer slopes to limit erosion and allow revegetation
- A tailings surface capping system of minimum 500mm thickness, consisting largely of excavated waste rock from the underground mine
- Revegetation of the landform as pasture for livestock.

Risk source	Possible consequence
Brunswick West TSF	Possible failure of TSF embankments may impact on public safety, private property, crown land, groundwater, surface water and native vegetation
RWP	Possible failure of dam embankments may impact on public safety, private property, crown land, groundwater, surface water and native vegetation

Standard controls
Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity
Geotechnical assessments of the stability of the proposed TSF and RWP embankments taking into account the proximity of the Brunswick Pit and underground workings
Regular facility inspections by MRCO personnel to confirm no abnormal conditions or circumstances that could affect the stability of the TSF or RWP
Independent surveillance of TSF and RWP as specified by ANCOLD
Closure and rehabilitation of TSF with appropriately designed cover system and vegetation
Post closure monitoring to include key aspects of current operational monitoring programs including surface water monitoring and groundwater monitoring
Relevant associated procedures
Surface Water Management Plan
Rehabilitation Plan

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Risk source and receptor		Risk assessment					
		Inherent risk			Residual risk		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Brunswick West TSF	Public safety / private property / crown land / groundwater / surface water / native vegetation	Critical	Unlikely	High	Critical	Rare	High
RWP	Public safety / private property / crown land / groundwater / surface water / native vegetation	Moderate	Unlikely	Medium	Moderate	Rare	Medium
Outcome of risk assessment							
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk is rated as **High**. The preparation of risk treatment plan is therefore considered necessary and can be found in Appendix G.							

Table 6.12 Risk assessment: Hazardous materials and waste

Objectives or outcomes to be met

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In terms of hazardous materials and waste, the objectives are set out in *Environment Reference Standard*, EPA publication IWRG701, *Sampling and analysis of waters, wastewaters, soils and wastes*. The goals of the Costerfield Operations are to:

- Minimise impacts on land, surface water or groundwater as a result of the management and use of hazardous materials and the generation and management of waste
- Avoidance of contamination of land and groundwater, as required by the EPA licence
- Ensuring stormwater diverted around the premises is not contaminated with waste, as required by the EPA licence

Risk source	Possible consequence
Tailings	Leaching of metals from TSF into the environment (in particular, acid rock drainage) or spill from tailings delivery pipeline has the potential to impact on soil, groundwater and surface water
Standard controls	
Ongoing geochemical testing of tailings (confirm Arsenic levels are low and tailings are non-acid forming)	
Ongoing sampling and monitoring of surface water and groundwater to ensure no contamination	
TSF liner constructed with low permeability (as per ERR 2017)	
Appropriately designed, constructed and maintained tailings structures with adequate freeboard capacity and controlled discharge capacity	
TSFs located away from major surface waters, drainage lines and floodplains	
TSF decant contaminants of concern (antimony and arsenic) are known to naturally occur at elevation concentrations, with respect to environmental values, within the regional groundwater system	
The siltstone bedrock, which is host to the regional aquifer system is also understood to have a strong attenuation capacity for elevated metals (antimony and arsenic)	
At closure, the TSF will be capped and rehabilitated to reduce mounding recharge	
Post closure monitoring to include key aspects of current operational monitoring programs including surface water monitoring and groundwater monitoring	
Relevant associated procedures	

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Groundwater Management Plan							
Surface Water Management Plan							
Capture, Storage and Disposal of Waste Hydrocarbons Procedure							
Hazardous Chemical Management Procedure							
Rehabilitation Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Tailings	Private property – Soil / surface water / ecosystems	Minor	Possible	Medium	Minor	Rare	Low
	Private property – Groundwater / surface water / ecosystems	Minor	Possible	Medium	Minor	Rare	Low
Outcome of risk assessment							
The maximum inherent risks are rated **Medium**. The preparation of a risk treatment plan is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.							

Table 6.13 Risk assessment: noise pollution

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Objectives or outcomes to be met	
In terms of noise emissions, the aim of the Costerfield Operations is to not exceed the noise emission levels that are set out in Planning Permit (**AM/2248/1997/C**), the *Environment Reference Standard* and EPA Publication 1834: *Civil construction, building and demolition guide*. The goal of the Costerfield Operations is to comply with requirements for noise emissions from mining and processing activities, and to acceptably minimise community amenity impacts. To achieve this, using the applicable guidelines, the maximum noise levels at adjoining residences during operations shall be: • Monday-Friday (Day) – 0700 to 1800 hours 45 A-weighted decibels (dB(A)) • Saturday (Day) – 0700 to 1300 hours 45 dB(A) • Saturday (Day) – 1300 to 1800 hours 42 dB(A) • Sunday and Public holidays (Day) – 0700 to 1800 hours 42 dB(A) • Monday-Sunday (Evening) – 1800 to 2200 hours 42 dB(A) • Monday-Sunday (Night) – 2200 to 0700 hours 36 dB(A)	
Risk source	**Possible consequence**
Construction/Rehabilitation Activity – plant and equipment	Noise from mobile equipment involved in the construction and closure of the TSF may impact on amenity, neighbouring landowners or residences
Standard controls	
Fixed plant orientation and position	
Equipment maintenance regime in accordance with manufacturer specifications	
Engineering attenuation controls i.e. mufflers, acoustic screens and enclosures	
Restricted operation of noise generating equipment	
Noise / acoustic barriers or bunds to be considered (if required)	
Relevant associated procedures	

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Noise Management Plan							
Traffic Management Plan							
Community Engagement Plan							
Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Construction/Rehabilitation Activity – plant and equipment	Private property	Minor	Likely	Medium	Minor	Possible	Medium
Outcome of risk assessment							
The maximum inherent risks are rated **Medium**. The preparation of a risk treatment plan is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.							

Table 6.14 Risk assessment: security breach

Objectives or outcomes to be met	
In terms of site security, Costerfield Operations is targeting zero security breaches.	
Risk source	**Possible consequence**
Brunswick West TSF	Harm to unauthorised persons or animals entering TSF and becoming trapped in tailings that appears to be a solid surface

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RWP	Harm to unauthorised persons or animals entering RWP
Standard controls	
TSFs and water storages are enclosed by chain-link fence with lockable gates that are to be locked when site is unattended Site is kept secure during construction utilising temporary fencing	
No-unauthorized signage to be erected	
Regular inspections by operating personnel	
Control access to site	
Relevant associated procedures	
Site Access Procedure	
Rehabilitation Plan	

Risk source and receptor		**Risk assessment**					
		Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Brunswick West TSF	Public safety	Critical	Unlikely	High	Critical	Rare	High
RWP	Public safety	Critical	Unlikely	High	Critical	Rare	High

Outcome of risk assessment
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk is rated as **High**. The preparation of risk treatment plan is therefore considered necessary and can be found in RRAM.

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7 Stakeholder identification and community engagement

7.1 Community Engagement Plan

The Costerfield Community Engagement Plan sets the framework for engaging with all of the mine's stakeholders and is a tool for employees to utilise when making operational decisions. In doing so, the plan ensures that the impact of the mining operation on stakeholders is minimised and well managed, and that transparent and ongoing consultative relationships are developed and maintained.

There is a duty to consult with the community throughout the period of the mining licence under section 39A of the MRSDA. The objective of engagement with the community and stakeholders is to ensure that interested parties are informed of the new or changing mining activities and given the opportunity to express how they may be affected.

MRCO's Community Engagement Plan (MRCO 2022b) describes the Company's aims and strategies in relation to consultation associated with various forms of stakeholder engagement and information sharing are prescribed in the Plan. Refer to the Community Engagement Plan for further details.

The main forum for discussing issues related to mine operations and development is the Environmental Review Committee (ERC). The ERC has been established to review, discuss and provide feedback on environmental monitoring and community relations performance associated with mining, milling, and exploration operations, as well as future development of the Brunswick West TSF WPV.

The aim of the ERC Community Reference Subcommittee (CRS) is to resolve issues or concerns before complaints are generated and to assist MRCO in their planning and decision making. The role of the CRS is to promote a good working relationship between the mine and the community by providing a platform for information sharing, collaborative discussion, constructive input and meaningful feedback on project proposals and future mine operations. The CRS works under the auspices of the ERC but affords more time to relevant discussion regarding community affairs.

MRCO has engaged widely with key stakeholders over the past two years regarding the Brunswick West TSF WPV. The minutes of the CRS meetings are included in Table 7.1 and have been included in Appendix H highlighting the community engagement activities for the project.

Table 7.1. Engagement documentation

Engagement document	Date
CRS Meeting minutes	3/03/2021
CRS Agenda	7/04/2021
CRS Meeting minutes	7/04/2021
CRS Agenda	5/05/2021
CRS Meeting minutes	9/06/2021

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Engagement document	Date
CRS Agenda	14/07/2021
MRCO Letter to CRS August 2021	17/08/2021
CRS Agenda	8/09/2021
CRS Meeting minutes	8/09/2021
CRS Agenda	13/10/2021
CRS Meeting minutes	13/10/2021
CRS Agenda	3/11/2021
CRS Meeting minutes	3/11/2021
CRS Agenda	9/02/2022
CRS Meeting minutes	9/02/2022
CRS Agenda	9/03/2022
CRS Meeting minutes	9/03/2022
CRS Agenda	6/04/2022
CRS Meeting minutes	6/04/2022
CRS Agenda	11/05/2022
CRS Meeting minutes	11/05/2022
CRS Agenda	8/06/2022
CRS Meeting minutes	8/06/2022
CRS Agenda	6/07/2022
Community Engagement - Approval Pathway for CRS Discussion	8/08/2022

7.2 Update of Community Engagement Plan

The Community Engagement Plan has been updated to include the addition of the Brunswick West TSF in the project outline and sensitive receptor figures.

As the site has two existing TSFs, the construction and operation of the Brunswick West TSF does not constitute a new category of on-site activity. The Community Engagement Plan and the engagement activities already address issues associated with the presence of TSFs at the Costerfield Operations.

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8 Rehabilitation

The MRCO Rehabilitation Plan has been revised to include the Brunswick West TSF closure and rehabilitation concepts, objectives and activities are described in detail in the revised plan.

8.1 Post-mining land uses and post-mining landform

The general rehabilitation concepts described in the MRCO Rehabilitation Plan involve:

- decommissioning and removal of the mine facilities
- covering and stabilising tailings dams
- reshaping disturbed areas
- revegetating disturbed areas.

8.1.1 Post-mining land uses

The Costerfield Operations operate under agreements with the state and landowners that commit MRCO to return the disturbed land to the pre-mining land uses, where practical.

Brunswick

The planned final land use for the Brunswick West TSF site is grazing.

Alternative land uses

The current planned final land use represents the base-case and will be subject to review and stakeholder consultation as part of the closure planning process.

8.1.2 Post-mining landforms

The rehabilitated site of the Brunswick West TSF will be returned in the form of pastoral grassland. Rehabilitation of areas disturbed by Brunswick West TSF shall be implemented to achieve the following outcomes:

- long-term stable landform compatible with the surrounding landscape;
- turkey nest style TSF to become water shedding hill with non-eroding slopes; and
- suitable for grazing land use.

8.1.3 Closure concept

The TSF has been the subject of detailed design and assessment by consulting engineers, ATC Williams and their report “Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report 109014.15 R04 (Rev 3)” includes details of the Conceptual Closure Plan in accordance with ANCOLD (2019). An outline of this concept is presented in Section 4.1.9

A detailed closure design and plan will be prepared for the decommissioning and closure of the facility in accordance with ANCOLD (2019).

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8.1.4 TSF Closure Plan

The primary closure objective for the Brunswick West TSF is to design and construct an engineered cover system utilising available on-site materials to ensure long-term tailings containment. Once constructed, the covered tailings impoundment will require minimal and ideally no ongoing supervision.

The TSF Closure Plan will ultimately be developed prior to closure of mining operations in consultation with state regulators. The TSF Closure Plan will address key post-closure issues such as embankment stability, surface water erosion, flora and fauna impacts, dust, seepage and visual amenity.

Rehabilitation of the site shall include the following measures:

- All infrastructure, equipment, structures and pipelines are to be removed.
- A suitably qualified Engineer shall develop a detailed design for encapsulation of the tailings and rehabilitation of the external embankment on closure. The current conceptual closure design includes layers of inert material and topsoil capping the tailings.
- Topsoil, stripped and stockpiled during the construction stage shall be spread across the site.
- The site shall be revegetated as pasture.

The closure design for the effective management of the key post closure risks will aim to:

- Maintain the stability and integrity of the embankments, crests and surfaces into perpetuity.
- Provide erosion protection for any intermediate cover layer materials and the underlying tailings.
- Provide sufficient thickness of cover so that burrowing animals cannot access the tailings.
- Minimise dust by preventing uncontrolled erosion and release of the fine tailings material.
- Minimise seepage.

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9 References

Accent (2022). Rehabilitation Plan - MIN4644. Version 1. Accent Environmental. 3 November 2022.

ANCOLD (2019). *Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure – Revision 1*. Australian National Committee on Large Dams Incorporated (ANCOLD Inc). July 2019.

ANZG (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Access: *www.waterquality.gov.au/anz-guidelines*

ATC Williams (2023a). Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report 109014.15 R04 (Rev 3). March 2023.

ATC Williams (2022b). Brunswick West Tailings Storage Facility Dam Break Investigation 109014.15 (Rev 02). October 2022.

CHEC (2023). Native Vegetation Removal Report – Brunswick West Tailings Storage Facility and Flood Mitigation. Version 3. Central Highlands Environmental Consultancy. 1 March 2023.

City of Greater Bendigo (2022). Planning Information Request: 75/2022/PIR. City of Greater Bendigo. 28 September 2022.

ERR (2017). *Technical Guideline Design and Management of Tailings Storage Facilities.* Earth Resources Regulation. April 2017.

ERR (2020a). *Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects*. Version 1.3. December 2020. Earth Resources Regulation.

ERR (2020b). *Preparation of Rehabilitation Plans Guideline for Mining & Prospecting Projects*. Version 1.0. February 2020. Earth Resources Regulation.

Golder (2016). Costerfield-health-risk-assessment. Revision 0. Golder Associates. 7 April 2016.

MRCO (2021). Community Engagement Plan. Version 6.2. Mandalay Resources Costerfield Operation. 26 March 2021.

MRCO (2023a) Dam Safety Emergency Plan. April 2023.

MRCO (2022b) Community Engagement Plan. October 2022.

WSP Golders (2023). Independent Peer Review of the design of the proposed Brunswick West Tailings Storage Facility. 27 March 2023.

WSP Golders (2023) Brunswick West Tailings Storage Facility Groundwater Assessment 29 March 2023

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Appendix A:
Detailed Design Report

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Appendix B: Independent Technical Review

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Appendix C:
Dam Safety Emergency Plan

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Appendix D: Planning Information Request: 75/2022/PIR

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Appendix E: Native Vegetation Removal Report

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Appendix F:
CHMP Self Assessment

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Appendix G:
Risk Treatment Plan
Brunswick West TSF – Ground Instability
Fire
Security

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Appendix H: Community Engagement Documentation

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Appendix I: Groundwater Assessment

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Appendix J: Credible Failure Mode Assessment

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Appendix K: Brunswick West TSF Closure Plan

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Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 28/09/2023

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Risk Management Plan

Costerfield Operations

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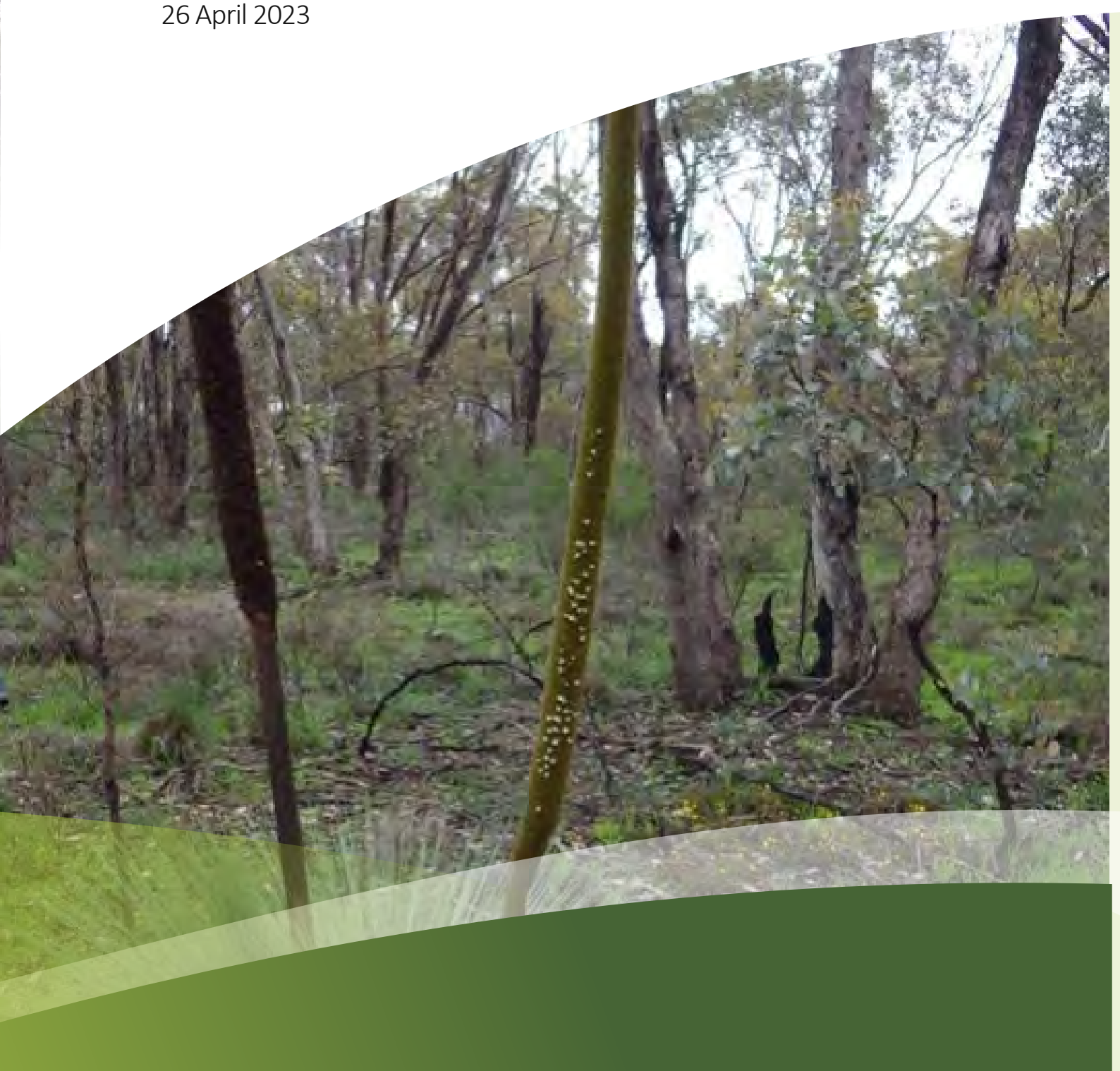
26 April 2023



Risk Management Plan

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Costerfield Operations

AE1046.9_RMP

April 2023

Version 7			
Issued to			
Ross Laity, Sustainability Manager, Mandalay Resources Costerfield Operations			
Prepared by	Reviewed by	Approved by	
Neil Wines (Principal Environmental Consultant)	Michael Cramer (Director - Accent)	Michael Cramer - Director -	
Previous versions			
Version:	1	12/7/2017	Draft
	2	21/7/2017	Draft
	3	8/9/2017	Draft
	4	21/12/2017	Finalised for Consolidated Work Plan
	5	6/11/2018	Updated for WPV
	6	17/04/2019	Updated for WPV

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Abbreviations

ANCOLD	Australian National Committee on Large Dams
ARD	acid rock drainage
dB(A)	A-weighted decibels
CEP	Community Engagement Plan
DEECA	Department of Energy, Environment and Climate Action
DELWP	former Department of Environment, Land, Water and Planning (now DEECA)
DJPR	former Department of Jobs, Precincts and Regions (now DEECA)
EPA	Environment Protection Authority (Victoria)
ERC	Environmental Review Committee
ERR	Earth Resources Regulation
G-MW	Goulburn-Murray Water
GBCMA	Goulburn-Broken Catchment Management Authority
ha	hectares
Mandalay	Mandalay Resources Australia Pty Ltd
km	kilometre
M	million
MCP	mine closure plan
m	metres
m^2	square metres
m^3	cubic metres
mm	millimetre
mm/s	millimeter per second
MRSD Act	*Mineral Resources (Sustainable Development) Act 1990*
MRSD (MI) Regulations	Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019
RRAM	Resource Rights Allocation and Management
RMP	Risk Management Plan
RO	reverse osmosis
ROM	run-of-mine
TSF	tailings storage facility
WPV	work plan variation

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Guidelines	Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects

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1 Introduction

1.1 Background

Mandalay Resources (Mandalay) owns and operates the Costerfield Operations in central Victoria. The project is located approximately 100 km north of Melbourne and 10 km from the regional town of Heathcote. The site is comprised of the Augusta and Cuffley underground gold and antimony mining operations (MIN4644), the Brunswick processing plant and tailings storage facilities (MIN4644), and the Splitters Creek evaporation facility (MIN5576). Figure 1.1 shows the location of these operations and facilities.

This Risk Management Plan (RMP) refers only to the operations on MIN4644.

1.2 Purpose

This Risk Management Plan (RMP) has been jointly prepared to meet the requirements of:

- The *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act)
- The Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (MRSD (MI) Regulations).

The Costerfield RMP was first prepared in 2017 to support the Consolidated Work Plan for the Costerfield Operations (PLN001247). The plan was created following a review of existing management plans and procedures at the Costerfield Operations, and integrates this information to fully describe the risk management process. The RMP was last updated in 2019 to support WPV (PLN001290).

This RMP V7 has been reviewed to consider the addition of the Brunswick West TSF WPV (PLN001702). This RMP document updates the operation details and mining risks associated with the approved Work Plan. The document has been prepared in accordance with the requirements *Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects* (ERR 2020a) (the Guidelines).

1.3 Objectives of report

The objectives of this RMP are to:

- describe the mining hazards associated with the Costerfield Operations and the sensitive receptors that may be impacted
- identify, evaluate and manage the risks associated with the potential mining hazard impacts
- provide additional detail in support of the risk management component of the Consolidated Work Plan for the Costerfield Operations.

1.4 Scope and structure

The Augusta underground mine and Brunswick processing plant facilities are located on mining licence MIN4644. The Splitters Creek Evaporation Facility is located on a separate mining licence, MIN5567 (see Figure 1). This RMP covers the mining operations within MIN4644.

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Mandalay also holds a number of exploration licences; however, these are not covered by the RMP.

The plan includes information under the following headings:

- overview of Costerfield operations
- the risk assessment process
- the hazards identified
- sensitive receptor identification
- risk identification, assessment and management.

2 Overview of Costerfield Operations

2.1 Locality

The Costerfield Operations are located within the Costerfield mining district of Central Victoria, approximately 10 km northeast of the township of Heathcote (see Figure 2.1), 50 km east of the City of Greater Bendigo and 100 km north of Melbourne.

2.2 Land ownership and tenure

Land property descriptions for the Costerfield Operations sites are presented Table 2.1.

Table 2-1 Operational sites and land tenure

Site	Lot/Plan	Tenure	Ownership/ land manager
Augusta Infrastructure, Boxcut and waste rock storage	(AB3, AB3G, AB3A) Lot 1 TP246611	Freehold	Tobin Family
Augusta Storage Dams/Evaporation Facility	Allot 8 Sec1 Parish of Costerfield	Freehold	Mandalay Resources
Cuffley Ventilation Shaft and facilities	Allot 34 Sec1 Parish of Costerfield	Freehold	Mandalay Resources
Mine dewatering rising main and pipeline	Allot 39 Sec1 Parish of Costerfield	Crown Land	DEECA
Brunswick Processing Plant, Brunswick TSF and Bombay TSF	Allot 37 Sec1 Parish of Costerfield	Crown Land	DEECA
Youle ventilation shaft and rising main	Allot 13 Sec6 Parish of Costerfield	Freehold	Mandalay Resources
Brunswick Open Pit and core storage area	Lot 1 PS404811	Freehold	Mandalay Resources
Brunswick West TSF	Lot 2 PS404811	Freehold	Harris Family

AE1046.9 Mandalay Resou
- Costerfield Operation
Figure 1.1. Regional plan a
tenements

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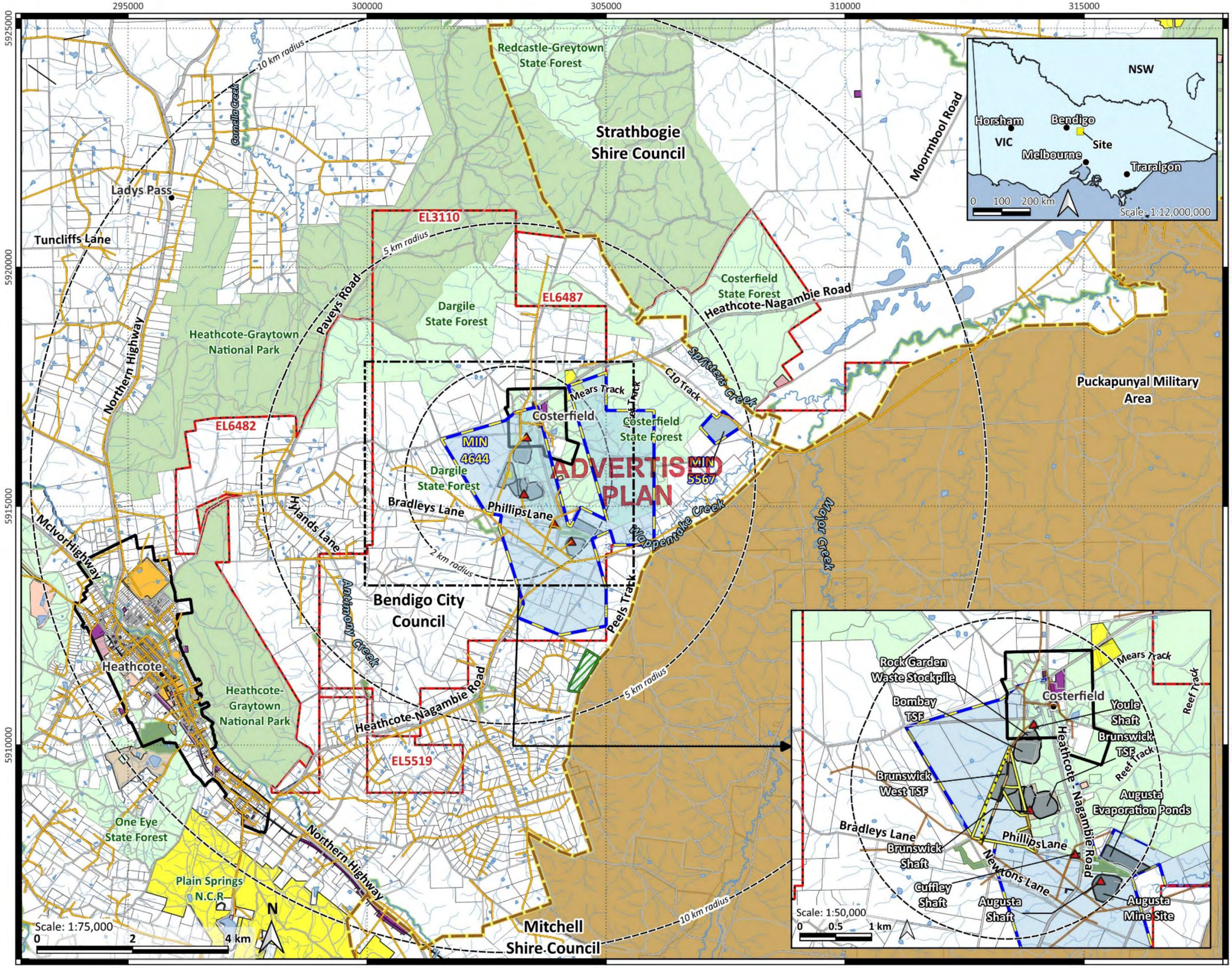

- Vent shaft (inset ma
- Town
- Road
- Railway
- Main watercourse
- Watercourse - tributa
- Existing power transmission line
- Power transmission to be relocated
- Relocated power transmission line
- Exploration Licence
- Mineral Licence
- Mine site domain
- Offset area
- Lot 2 PS404811
- Private land lot bour
- LGA boundary
- Radius circle
- Water body

Crown Land

- Commonwealth Lan
- Community Use Area
- Earth Resources
- Historic and Cultural Features Reserve
- National Park
- Natural Features Res
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crow
- Other Crown Land

Additional data, main map: VIC_TR
TRANSPORT (Road, Rail), VIC_locali
point, VIC_PLM25, VIC_MINTEN, VI
HY_WATERCOURSE, VIC_HY_WATE
VIC_LGA_POLYGON, VIC_TOWNSHI
POLYGON, VIC_POWERLINE, VM_PA
Inset map (upper):
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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.1. Surface layout

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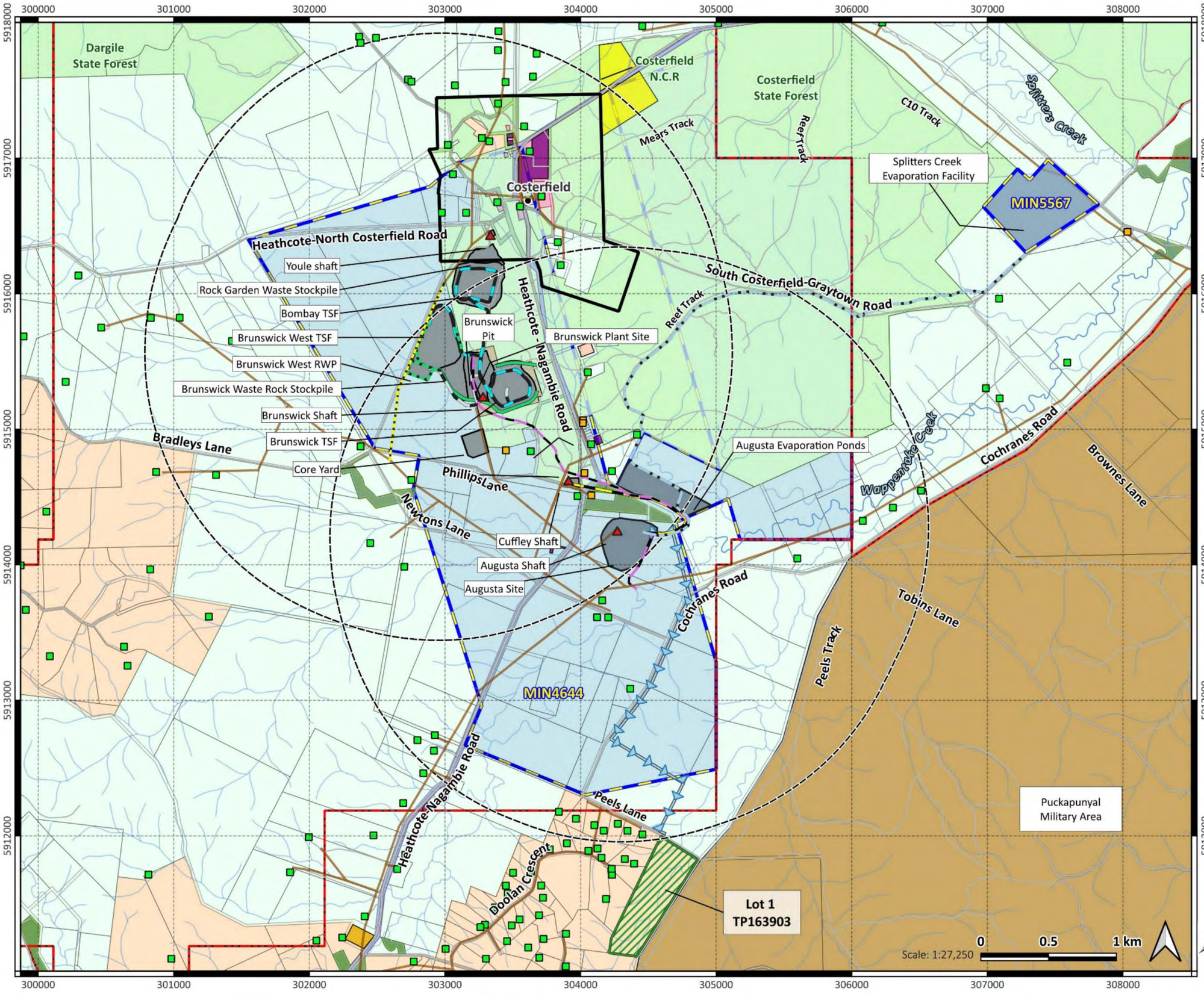

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Town
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Process water return pipeline
- Process water delivery pipeline
- Existing power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain
- Vegetation offset area
- Private land lot boundary
- Costerfield township
- Water body
- Radius circle - 2km

Crown Land

- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_TOWNSHIP-POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Land.

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MANDALAY RESOURCES

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2.2.1 Historic context

Gold and antimony were first discovered at Costerfield in 1860 and underground mining has taken place periodically since this time. Historic mining of the Costerfield–Bombay–Minerva complex occurred between surface level and 300 m below ground level, initially via shaft, and later in some areas as open cut mining.

The current mining operations at the site commenced in 2006. Mandalay purchased the operations on December 1, 2009, from AGD Operations Pty Ltd.

2.3 Overview of operations

Costerfield operates a continuous mining operation 24 hours a day 365 days per year with a workforce of approximately 220 employees.

Mining at Costerfield targets several individual lodes (including the Youle and Shepherd lodes). Mining is currently not active at Augusta, Cuffley or Brunswick. Access to the lodes is either via the Augusta Portal or Brunswick Portal and associated declines.

Ore extraction is achieved through three different mining methods: full face development, uphole stoping and predominantly longhole cemented rock fill (CRF) stoping.

Mining at Youle follows a bottom-up sequence mining from the northern and southern extents retreating towards the central access. The practice of placing CRF in stope voids has been undertaken at Youle to improve local ground stability using waste rock from development with the addition of a cement slurry mix. Mobile equipment includes underground haulage trucks, loaders, jumbos, integrated tool carriers, cement agitator trucks, fork lifts and light vehicles.

Underground ore from the Youle and Shepherd lodes is trucked to the surface via the Brunswick Portal and placed on the a Run of Mine (ROM) ore pad located adjacent to the Brunswick Processing Plant.

The ore is transferred to the Brunswick ROM pad where it is stockpiled, screened and blended prior to being fed into the Brunswick Processing Plant. The Brunswick Processing Plant throughput is typically around 13,000 tonnes/month.

The surface crushing and screening system processes underground ore down to a particle size suitable for milling through a two-stage closed circuit ball milling circuit. Centrifugal style gravity concentrators are used on the combined primary milling product and secondary mill discharge, to recover a gold rich gravity concentrate that is sold as a separate gold concentrate and sent to a local refinery.

Secondary milled products are classified by size and processed through a simple floatation circuit comprising a single stage of rougher, scavenger and cleaning. The concentrate is thickened through dewatering and filtration to produce a final antimony/gold concentrate product that is then bagged and transported to Melbourne Port for packing into shipping containers for shipment to overseas customers. The tailings is thickened before being sent to a TSF.

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Tailings have been stored in the Bombay TSF and the Brunswick TSF. Once the currently active Bombay TSF is at capacity, both these facilities will be closed. The Brunswick West TSF to be constructed so that it can receive tailings once existing TSF capacity has been reached.

Mine ventilation comprises fresh air being sourced from surface intakes including the Brunswick Portal, Augusta Portal, Augusta ladderway, Brunswick Fresh Air Rise and Augusta Fresh Air Rise.

Exhaust ventilation flows exit the active mine workings via two airways comprising the Youle Return Air Rise and Cuffley Return Air Rise.

Groundwater is pumped to the surface via the Cuffley rising main. Water is pumped to the Augusta Mine Dam before being distributed for re-use in mining operations as well as feed to the Reverse Osmosis (RO) Plant located at Brunswick. Permeate from the RO plant meets applicable water quality criteria and is discharged under licence to a local waterway (Wappentake Creek).

Excess water and RO brine is sent to the Splitters Creek Evaporation Facility.

2.4 Costerfield Operations components

The surface components of the Costerfield Operations are located at the following three main locations:

- Augusta site;
- Brunswick site; and
- Splitters Creek (MIN5576).

The current components of the site are shown in Figure 2.1. Approximate areas for the facilities are shown in Table 2.2.

Table 2-2 Disturbance areas and features

Disturbance site	Area (ha)	Details
Augusta site	21.2	Boxcut, portal pads, offices, workshop, waste rock storage evaporation ponds, water storage and shafts
Brunswick site	49.15	Open pit, portal, ROM, process plant, TSFs, offices, core storage, waste rock storage and shafts
Splitters Creek site	30	Evaporation facilities
Cuffley shaft	0.5	Ventilation shaft
Youle shaft	<0.01	Ventilation shaft

2.4.1 Augusta site

The Augusta site comprises the following components (see Figure 2.2):

- underground mine

- boxcut (including the access portal to the mine, mine workshop and refuelling bay)
- mine administration area
- crib rooms
- evaporation dams
- mine dam
- waste rock stockpile
- noise bund and bund around administration area
- switch room and compressor shed
- laydown yard and stores building
- Augusta fresh air rise ventilation shafts
- Phillips Lane (i.e. Cuffley) return air rise ventilation shaft
- Phillips Lane (i.e. Cuffley) electrical substation and infrastructure
- rising main mine dewatering pipeline
- site access roads
- pipeline to Splitters Creek
- pipeline to injection bores on Peels Lane.

The Augusta mine also provides access to the Cuffley underground workings. The only surface expression of the Cuffley workings is the Cuffley vent shaft and rising main collar.

2.4.2 Brunswick site

The Brunswick site comprises the following components (see Figure 2.3):

- processing plant
- mill workshop and administration buildings
- ROM pad and crushing plant
- Brunswick Waste Rock Stockpile
- Brunswick Pit
- Brunswick Portal
- Brunswick Return Air Raise
- Youle Return Air Raise
- Brunswick TSF
- Brunswick West TSF
- Bombay TSF

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- reverse osmosis water treatment plant and pipelines
- cement storage hopper
- laydown area
- exploration core shed and storage yard
- Mill Stormwater Dam
- Rock Garden Waste Stockpile.

2.4.3 Splitters Creek site

The Splitters Creek Evaporation Facility (MIN5567) is located approximately 2.5 km northeast of the Augusta mine and comprises a series of clay-lined evaporation terraces following the sloping contour of the land and an HDPE lined storage dam. Groundwater extracted from the mine and brine from the RO plant is pumped to the evaporation facility for disposal by evaporation via an above-ground pipeline on an as-needs basis.

MIN5567 is not covered by this RMP.

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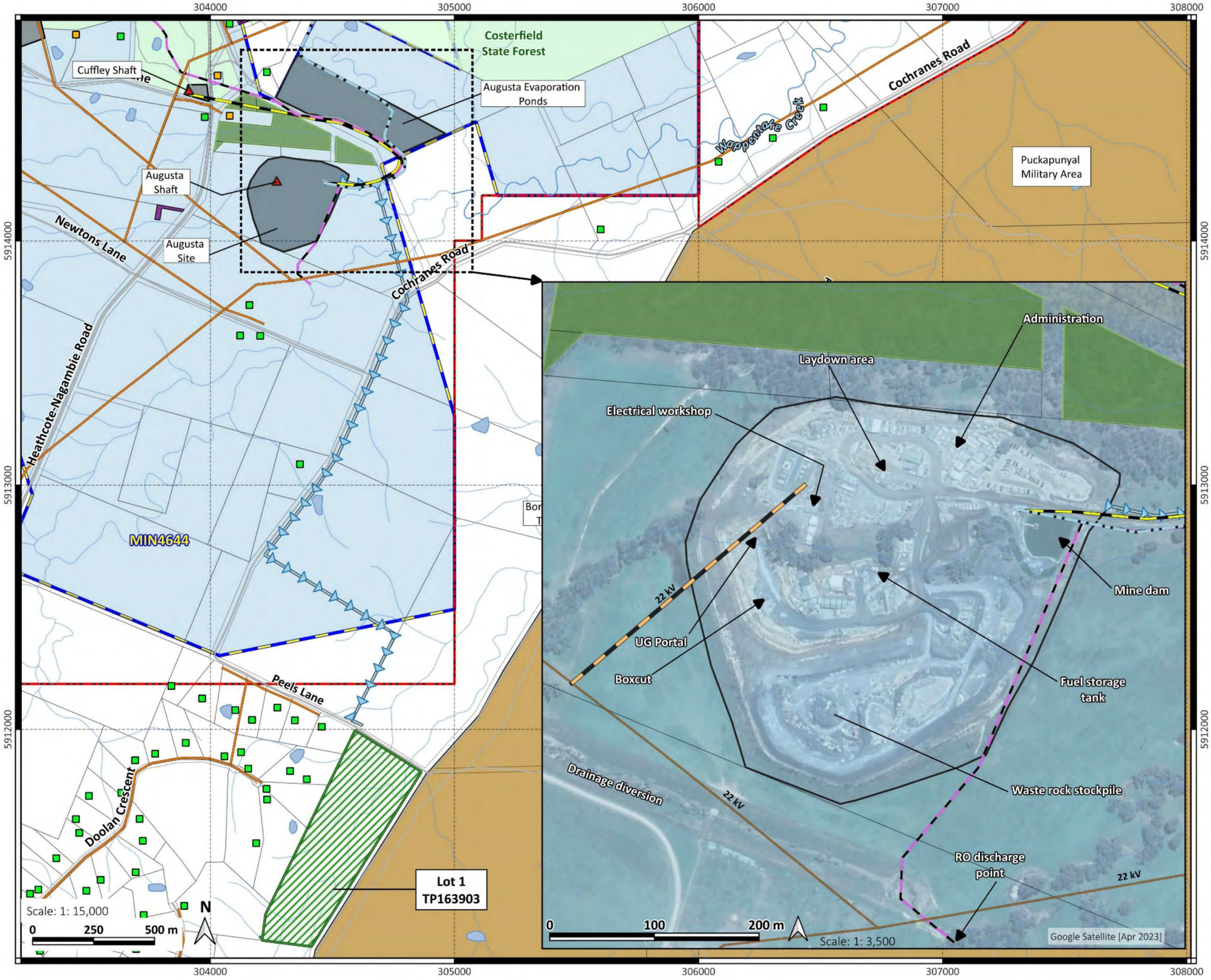

AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.2. Site layout - Augusta site
Created 3/11/2022, revised 21/04/2023
CRS: GDA 20 MGA 55
Scale: 1:15,000 @ A3 (main map)
Page size: A3

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- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Rising main pipeline
- Existing power transmission line
- Power transmission line to be disconnected (inset map)
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain (main map)
- Vegetation offset area
- Private land lot boundary
- Water body
- Aboriginal Cultural Overlay

Crown land (main map)

- Commonwealth Land
- Natural Features Reserve
- State Forest
- Uncategorised Crown Land

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Lands.

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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.3. Site layout - Brunswick site
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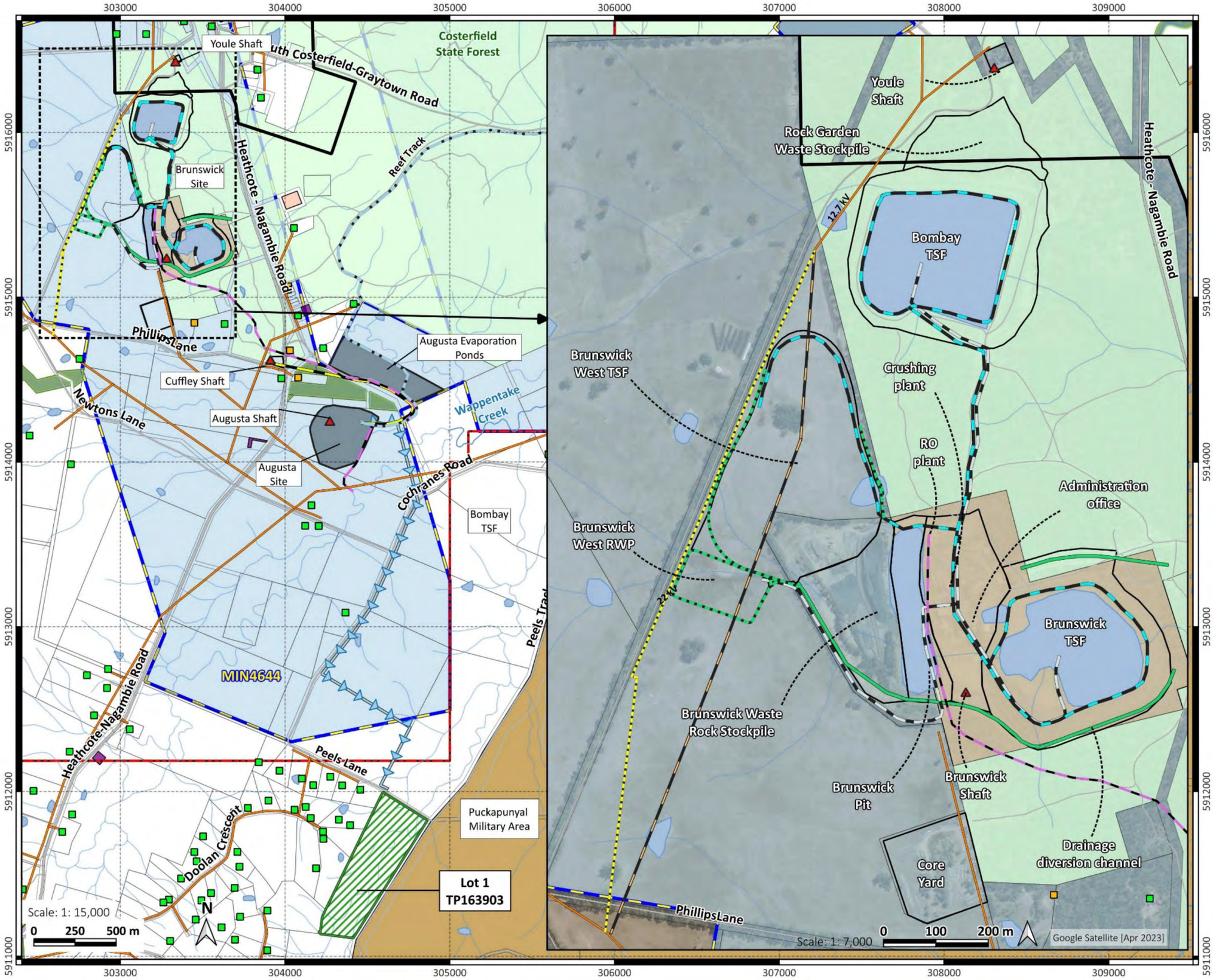

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- Power transmission line to be disconnected (inset map)
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- Watercourse - tributary
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- Mining Licence
- Mine site domain (main map)
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- Water body

Crown land (main map)

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2.5 Obligations and commitments

Mandalay has identified the legal and other requirements listed below to be relevant to environmental risks associated with the Costerfield Operations. The list encompasses Acts, Regulations and Codes of Practice, some of which are legal obligations and others which are obligations to which the Company subscribes. This is not an exhaustive list of all legal obligations for the operations.

The primary legislative instruments that regulates the operation of a mine in Victoria are the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) and the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (MRSD (MI) Regulations).

Acts

- *Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*
- *Flora and Fauna Guarantee Act 1988 (Cwlth)*
- *Native Title Act 1993 (Cwlth)*
- *Mineral Resources (Sustainable Development) Act 1990*
- *Environment Protection Act 2017*
- *Planning and Environment Act 1987*
- *Catchment and Land Protection Act 1994*
- *Dangerous Goods Act 1985*
- *Aboriginal Heritage Act 2006*
- *Water Act 1989*
- *Heritage Act 2017*

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Regulations

- Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019
- Environment Protection Regulations 2021
- Aboriginal Heritage Regulations 2018

Planning

- City of Greater Bendigo Planning Scheme

Codes of practice and guidelines

- Leading Practice Sustainable Development Program for the Mining Industry Handbooks. Mine Closure. Department of Industry, Tourism and Resources (DITR 2016)
- Strategic Framework for Mine Closure - Australian and New Zealand Minerals and Energy Council and Minerals Council of Australia (MCA 2000)
- Ministerial Guidelines for Description of a Mineral Resource (ERR 2013)
- Imported-Materials-Management-Guideline-Earth-Resources-Regulation (ERR 2017)
- Ministerial Guidelines for notices and injunctions relating to the Regulation of Earth Resources in Victoria (ERR 2013)
- Technical Guideline Design and Management of Tailings Storage Facilities ERR (2017)
- Preparation of Rehabilitation Plans Guideline for Mining & Prospecting Projects. Version 1.0. (ERR 2020)

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- Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects. Version 1.3. (ERR 2020)
- Mining Licence Guidelines [#]
- Reportable events and reportable incidents [#]
- Rehabilitation and Other Environmental Aspects of Work Plans [#]
- Rehabilitation bonds - minerals exploration, mines and quarries [#]
- Guidelines for the management of water in mines and quarries [#]
- Groundwater Licensing and Trading [#]
- Community Engagement Guidelines for Mining and Mineral Exploration in Victoria [#]
- Mineral tenements and the Native Title Act 1993 [#]
- Ground Vibration and Airblast Limits for Blasting in Mines and Quarries [#]
- Guidance Material for the Assessment of Geotechnical Risks in Open Pit Mines [#]
- Rehabilitation Bond Guidelines [#]
- Rehabilitation Liability Calculator for Mining and Extractive Operations [#]
- GeoVic interactive map website. Accessed online 16/03/2023 at https://earthresources.vic.gov.au/geology-exploration/maps-reports-data/geovic
- Victorian Heritage Database. Heritage Council Victoria. Accessed 16/03/2023 http://vhd.heritagecouncil.vic.gov.au/places/10180

[#] Accessed online 16/03/2023 at https://earthresources.vic.gov.au/legislation-and-regulations/guidelines-and-codes-of-practice (ERR 2023)

Other guidelines and policies

- Australia Standard AS 1940-2004 - The storage and handling of flammable and combustible liquids (Standards Australia 2004)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines (ANZG 2018)
- Environment Reference Standard (EPA Victoria 2021)
- Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute with the Institute of Environmental Management and Assessment 2013)
- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017)
- National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM) (National Environmental Protection Council 2013)
- Publication 275 Construction Techniques for Sediment Pollution Control (EPA Victoria 1991)
- Publication 1834 Civil construction building and demolition guide (EPA Victoria 2020)
- Publication 1698 Liquid storage and handling guidelines (EPA Victoria 2018)
- Publication 1823.1: Mining and quarrying - guide to preventing harm to people and the environment (EPA Victoria 2021)
- Publication 1827.1 Waste classification assessment protocol (EPA Victoria 2021)
- Publication 1828 Waste Disposal Categories – Characteristics and Thresholds (EPA Victoria 2020)
- Publication 1961 - Guideline For Assessing and Minimising Air Pollution (EPA Victoria 2022)
- Publication 2048 – Guideline for minimising greenhouse gas emissions (EPA Victoria 2022).

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3 Risk assessment process

The MRSD (MI) Regulations require operators to identify and assess all risks that the new or changing works may pose to the environment, to the public, or to nearby land, property or infrastructure (known as mining hazards). The identified risks are to be eliminated or minimised as far as reasonably practicable with risk treatments that specify the measures to be used to eliminate or minimise those risks and monitor performance.

3.1 Regulatory requirements

In relation to risk assessment, under the MRSD (MI) Regulations (ERR 2020a):

> *Regulation 45 Information required in work plans—risk management plan*
>
> *For the purposes of regulation 40(c), the specified information is a risk management plan that sets out the following information relating to the requirement in section 40(3)(c) of the Act to specify what the licensee will do to eliminate or minimise the identified risks as far as reasonably practicable—*
>
> - *measures to be applied to eliminate or minimise the risks as far as reasonably practicable;*
> - *the performance standards to be achieved by either individual measures or some combination of measures;*
> - *management systems, practices and procedures that are to be applied to monitor and manage risks and compliance with performance standards;*
> - *an outline of the roles and responsibilities of personnel accountable for the implementation, management and review of the risk management plan.*

3.2 Risk process

The risk assessment process adopted for this report follows the risk identification and assessment framework detailed in the Guidelines (ERR 2020a).

The aim of the process is to identify and assess the risk that the development may pose to the environment, to any member of the public, or to land, property or infrastructure in its vicinity. The assessment is to identify site-specific issues, constraints or characteristics requiring specific management to eliminate or minimise those mining hazards.

The risk assessment process can be summarised as follows:

- Step 1. Identify the risk hazards and risk sources that are applicable to the Costerfield Operations. The applicability of the risk hazard categories listed in the RRAM online system have been considered (see Section 4).
- Step 2. Identify the sensitive receptors. The sensitive receptors that have been considered are the 'at risk' components of the environment listed in the RRAM online system (see Section 5).
- Step 3 Apply a risk rating to the risk sources identified within each category of risk hazard, using the risk matrix from the Guidelines (ERR 2020a). Risk ratings are applied both before (inherent risk) and after (controlled risk) the application of standard controls, by assigning a likelihood and consequence of the event occurring. Likelihoods and consequences have been defined using the definitions within the RRAM online system.

- Step 4. Assess whether the controlled risk is acceptable or whether a risk treatment plan is required to further reduce the risk. If the risk rating taking standard controls into account is low or medium, a risk treatment plan not considered necessary. However, if the risk rating taking standard controls into account is significant or high, a risk treatment plan is required.

3.3 Risk assessment

Likelihood, consequence, and risk rating tables are provided in, Table 3-1, Table 3-2 and Table 3-3 following the criteria outlined in the Guidelines (ERR 2020a). In the Guidelines, the consequence categories are further defined in relation to the potential consequences of impacts on 'public health and safety', 'land, property and infrastructure', and 'the environment' (air, water, soil, vegetation, flora and fauna).

Table 3-1 Consequence categories and definition (ERR 2020a)

Category	Definition
Critical	*Hazard has critical impact, in terms of severity and/or duration.* *Treatment or remediation effort is required, although some effects may be irreversible.* *Remediation of environmental contamination would require significant private and public resources.* *Hazard event would be the subject of widespread community outrage.*
Major	*Hazard has major impact, in terms of severity, duration and/or frequency of occurrence. Treatment or remediation effort is required. Some effects may be irreversible.* *Remediation of environmental contamination would require significant private and public resources.* *Hazard event would be the subject of widespread community concern.*
Moderate	*Hazard has moderate, noticeable impact, in terms of severity, duration and/or frequency of occurrence. Moderate treatment or remediation effort may be required.* *Hazard event would be the subject of limited community concern.*
Minor	*Hazard is perceived but has minor and typically temporary effects. Some remediation may be required.*
Insignificant	*Impacts are barely recognised and/or quickly recovered from. No specific remediation required.*

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Table 3-2 Likelihood categories and description (ERR 2020a)

Category	Definition
Rare	*Highly unlikely, but the risk event may occur in exceptional circumstances. (likelihood <5%).*
Unlikely	*The risk event could occur at some time. (likelihood 5% to 30%).*
Possible	*The risk event might occur at some time. (likelihood >30% to 70%).*
Likely	*The risk event will probably occur in most circumstances. (likelihood >70% to 90%).*
Almost certain	*The risk event is expected to occur in most circumstances. (likelihood >90%).*

Table 3-3 Risk matrix showing classification of risk ratings (ERR 2020a)

Likelihood					
Almost Certain	Medium	High	Very High	Very High	Very High
Likely	Medium	Medium	High	Very High	Very High
Possible	Low	Medium	Medium	High	Very High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Medium	Medium	High
	Insignificant	Minor	Moderate	Major	Critical

Consequence

Once the risk rating has been established some risks will need to have controls in place to reduce them to an acceptable level. Higher risk levels should take priority. Table 3-4 provides guidance on what steps need to be taken depending on the risk rating.

Table 3-4 Risk Rating Acceptability (ERR 2020a)

Category	Definition
Very High	*Totally unacceptable level of risk. Controls must be put in place to reduce the risk to lower levels.*
High	*Generally unacceptable level of risk. Controls must be put in place to reduce the risk to lower levels or seek specific guidance from ERR.*
Medium	*May be acceptable provided the risk has been minimised as far as reasonably practicable.*
Low	*Acceptable level of risk provided the risk cannot be eliminated.*

For mining operations, the following key terms are defined:

- **Mining hazards** are any mining activities and circumstances that may pose a risk to the environment, to any member of the public, or to land, property or infrastructure in the vicinity of work carried out at a mine.
- **Sensitive receptors** are those aspects of the natural or human environment that may be impacted by mining operations.
- **Risk** is the potential for a hazard to impact on a sensitive receptor.
- **Consequence** is the consequence of the event occurring and is applied to public safety, property and infrastructure, and land and environment (see Table 3-1).
- **Likelihood** is the likelihood of the event occurring and is a judgment based on the history of similar incidents occurring in the mining industry in Victoria (see Table 3-2).
- **Standard control** mechanism is considered to be accepted practice in the mining industry for addressing a potential impact on a sensitive receptor. Standard controls are recognised procedures, guidelines, methods, and codes of practice that can be sourced from regulations, policies, guidelines and leading practice references.
- **Additional treatment (control)** is a non-standard control used as part of a Risk Treatment Plan to reduce the residual risk to an acceptable level.

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4 Risk hazards identified

An essential component of the risk management process is to identify the hazards created by the mining operations. Potential mining hazards as listed within the RRAM system are shown in Table 4-1, along with their applicability to the Costerfield Operations. Each hazard is further discussed in the following subsections.

Table 4-1. Potential mining hazards and applicability to the Costerfield operations

Potential mining hazard	Construction	Operation	Closure	Post Closure
Air blast	Yes	Underground only	No	No
Altered visual amenity	Yes	Yes	Yes	Yes
Dust/air emissions	Yes	Yes	Yes	No
Erosion and sedimentation	Yes	Yes	Yes	Yes
Fire	Yes	Yes	Yes	No
Flood	Yes	Yes	Yes	No
Fly rock	No	No	No	No
Ground disturbance	Yes	Yes	Yes	Yes
Ground instability	Yes	Yes	Yes	Yes
Ground vibration	Yes	Yes	Yes	No
Hazardous waste	No	Yes	Yes	Yes
Light emissions	No	Yes	No	No
Noise pollution	Yes	Yes	Yes	No
Security breach	Yes	Yes	Yes	Yes

4.1 Air blast

Air blast is a hazard created when explosive charges associated with mining create high-pressure air waves which can impact the environment. As mining activity involving air blast is contained entirely underground, there is no potential for this hazard to impact on any sensitive receptors.

This hazard is present during the construction and operation phases of the mine. However, there is potential for air blasts to generate ground vibration and these potential impacts are considered in Section 4.10 and 4.13 below.

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4.2 Altered visual amenity

The altered visual amenity of an area is a hazard created when activities associated with mining impact the visual environment to the detriment of those people using the environment. Mining activities associated with the work plan that may result in visual amenity impacts on potential sensitive receptors include:

- presence and operation of plant and equipment
- presence and operation of facilities such as TSFs, waste and ore stockpiles, vent shafts, dams and evaporation ponds
- presence and operation of infrastructure such as access roads, power generators and transmission lines, water management pipelines, and water treatment facilities
- permanent landforms such as the decommissioned TSFs.

This hazard is present during all phases of the mine-life. Following the successful revegetation and rehabilitation of disturbed areas this risk should be minimised post closure.

4.3 Ground disturbance

Ground disturbance of an area is a hazard created when activities associated with mining impacts the land. For the purposes of this RMP it is also considered to include impacts on groundwater or surface water. Mining activities associated with the work plan that may impact on potential sensitive receptors include:

- disturbance associated with the operation of plant and equipment – for example potential impacts associated with any additional ground disturbance outside the current footprint of project facilities
- operation of processing facilities
- mine dewatering activities
- operation of dams and use of waterways – overtopping, breach of containment or seepage may result in environmental impacts
- operation of TSFs – overtopping, breach of containment or seepage may result in environmental impacts.

This hazard is present during the construction, operation and closure phases of the mine life. Following the revegetation and rehabilitation of disturbed areas this risk does not exist post closure.

4.4 Dust/air emissions

Emissions of dust and/or gaseous substances can have an adverse impact on air quality

The most likely sources of dust generation are:

- operation of plant and equipment – this includes crushing/screening of mined material, use of the cement silo
- vehicle movements – the hazard is generated when vehicles (particularly heavy vehicles) drive on unsealed roads (such as those on and around the mine site)

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- blasting and underground workings – as these activities occur underground, the hazard is generated when particulates from blasting, or exhaust gasses/fumes from blasting or diesel vehicles, is potentially released through the ventilation shafts
- construction and operation of waste rock and ore stockpiles – the hazard is generated when material is placed onto stockpiles/dumps or excavated from those areas
- operation of TSFs – the hazard is generated when material in the TSF dries and is entrained by wind
- construction and rehabilitation activities cause dust emissions.

This hazard is present during all phases of the mine-life. Following the successful revegetation and rehabilitation of disturbed areas this risk should not exist post closure.

Emissions of other substances such as engine exhausts (particularly from combustion of diesel) can have an adversity impact on air quality. The most likely sources of engine exhaust generation are:

- operation of plant and equipment
- vehicles.

This hazard is present during the construction, operation and closure phases of the mine life. Following the decommissioning and rehabilitation of the site this risk does not exist post closure.

4.5 Erosion and sedimentation

Erosion and sedimentation can adversely impact on the environment, particularly downstream waterways. The most likely sources of erosion and sedimentation are:

- disturbance associated with the operation of plant and equipment
- operation of processing facilities
- construction and operation of waste rock and ore stockpiles
- operation of dams and use of waterways
- operation of TSFs
- discharge of treated water from RO plant to waterways
- land clearance during the construction of new facilities or infrastructure
- presence of disturbed, un-rehabilitated ground
- construction and rehabilitation activities also cause dust emissions.

This hazard is present during all phases of the mine-life. Following the successful revegetation and rehabilitation of disturbed areas this risk should not exist post closure.

4.6 Fire

Fire ignited as a result of project activities has the potential to impact on many aspects of the mine and its surrounds. Potential sources of fire include:

- operation of plant and equipment – such as vehicle exhausts, un-enclosed engines, rotating equipment
- use of spark or flame generating equipment – such as cutting and welding equipment

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- personal use of cigarettes and matches
- explosives – these are securely stored underground and are not considered likely to be a source of fire
- fuel/additive storage (fuel source) – use of flammable fuels and chemicals.

There is also the potential for a bushfire to reach project facilities causing damage and associated environmental risk.

This hazard is present during construction, operation and closure phases of the mine life. Following the decommissioning and closure of the site this risk does not exist post closure.

4.7 Flood

Flood risk (including engulfment) is a hazard that mining activity (particularly underground mining) must be aware of. The most likely sources of flooding are:

- operation of dams and TSFs – the uncontrolled discharge of water contained in water storage facilities and TSFs could present a local flood risk
- the uncontrolled discharge of other waters stored or used on site could present a local flood risk
- inundation from TSF flooding into current underground workings.

There is also the potential for a natural flood to reach project facilities (such as facilities located within a flood plain) causing damage and associated environmental risk.

This hazard is present during operation until the closure phase of the mine life. Following the decommissioning and closure of each dam or TSF facility this risk does not exist.

4.8 Fly rock

Fly rock is a hazard generated by blasting and, as blasting at Costerfield is confined to underground operations, this hazard is very unlikely to impact any sensitive receptors. Therefore, this risk is not considered present at the Costerfield Operations and is not discussed further.

4.9 Ground instability

The stability of the ground in the vicinity of mining operations can be compromised by:

- pits, underground workings and voids – failures in open pit walls, underground workings, or other voids such as the boxcut can result in ground movement or subsidence and consequent impacts on the surrounding environment including private property and public infrastructure
- blasting – vibration caused by blasting can impact on built structures
- waste and ore stockpiles – slumping of these can impact on the surrounding environment
- dams and TSFs – failure of embankments can impact on the surrounding environment.

This hazard is present during the construction, operation, closure and post closure phases of the mine life. Following the successful revegetation and rehabilitation of disturbed areas this risk should be minimised post closure.

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4.10 Ground vibration

As with ground stability the ground vibrations in the vicinity of mining operations can be caused by:

- blasting – vibration caused by blasting can impact on built structures
- during the construction of new facilities or infrastructure
- vibration from machinery, equipment and vehicles (e.g. drill rigs, crushers, haul trucks) can also affect built structures.

This hazard is present during the construction, operation and closure phases of the mine life. Following the decommissioning and rehabilitation of the site this risk does not exist post closure.

4.11 Hazardous materials and waste

Hazardous materials such as fuels and processing chemicals are stored and used on site, and hazardous waste is generated as part of the mining operations. When these materials are either not managed appropriately or structures used to contain them are compromised, they can present a hazard to the environment. These hazards include:

- fuel/additive storage and use, potentially resulting in unplanned spills, discharges and leaks from compromised tanks
- explosives storage and use, potentially resulting in contamination
- waste from the use of fuels and chemicals such as waste oils or empty drums/containers pose an environmental hazard and require appropriate handling and disposal
- leaching of metals from waste rock or ROM stockpiles into the environment (in particular, acid rock drainage) has the potential to impact on soil, groundwater and surface water.

This hazard is only present during the operation phases of the mine. Following the cessation of mining operations this risk does not exist during rehabilitation or post closure.

4.12 Light emissions

Light (particularly at night) can impact on the environment, principally causing amenity impacts to residents in the vicinity of the site. As the Costerfield Operations are a 24-hour per day operation, light emission is a potential hazard, predominantly:

- flood lights associated with night work operation of the Brunswick processing plant and the Augusta mine site (including mine workshop and car park)
- headlights associated with vehicle movement.

This hazard is only present during the operation phases of the mine. Following the cessation of mining operations this risk does not exist during rehabilitation or post closure.

4.13 Noise pollution

As with light, noise can impact on the environment, particularly the amenity of residents in the vicinity of the site. Processes as the Costerfield Operations that have the potential to generate noise at levels high enough to cause offsite amenity impacts include:

- operation of plant and equipment – this includes crushing/screening of mined material, use of the cement silo
- vehicle movement – vehicles (particularly heavy vehicles) on roads on and around the mine site
- blasting – as this is conducted underground, the impact of this is less than would be expected from surface blasting works
- the construction, decommissioning or rehabilitation of facilities or infrastructure
- nightworks – night-time mining activities are less intensive than those that occur during the day. However, even with restricted vehicle movements and surface activities, some night-time activities may result in noise impacts.

This hazard is present during the construction, operation and closure phases of the mine life. Following the decommissioning and rehabilitation of the site this risk does not exist post closure.

4.14 Security breach

Unauthorized entry to the site in general and/or to particular areas/processes at the site has the potential to be hazardous. Unless invited onto site and accompanied by site personnel, public entry to the site is forbidden and can cause a danger to the unauthorised entrant or to others. Additionally, some restrictions are placed on site personnel having access to particular areas/uses of equipment or materials (such as explosives). As such, unauthorised entry to or use of the following, are considered security breaches:

- entry into pit and underground mine workings
- entry into site buildings
- entry to mine dams
- use of site plant and equipment
- use of site vehicles
- use of explosives
- access to fuel or hazardous materials storages.

This hazard is present during the construction, operation, closure and post closure phases of the mine life. Following the decommissioning and rehabilitation the site this risk should be minimised post closure.

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5 Sensitive receptor identification

Sensitive receptors are those aspects of the natural or human environment that may be impacted by mining operations. Under the MRSD Act, ERR has a duty when determining the consequence of a risk event to consider the potential impacts to (ERR 2020a):

- *Members of the public:*
  - *Public health, safety, amenity and Aboriginal heritage*
- *Land, property and infrastructure:*
  - *Neighbouring property, land use and nearby infrastructure such as highways, transmission lines, pipelines, schools and hospitals*
- *Environment:*
  - *Air, water, soil, vegetation, and flora and fauna species.*

The guidance for a risk based approach to the submission of Work Plans that requires the identification of sensitive receptors and the risk of the project creating a hazard to (or impact on) these receptors.

Mandalay has identified the following potential sensitive receptors at risk that need to be considered. The particular aspects of these sensitive receptors are described below.

For certain aspects of the environment (surface water, groundwater and built environment) Mandalay has produced an environmental monitoring figure which shows the main Costerfield Operations, distances to residences, waterways and the road network and monitoring locations for noise, dust, surface water and groundwater. The Sensitive Receptors and Environmental Monitoring Plan shown in Figure 5.1.

5.1 Aboriginal heritage

The Taungurung Clan Aboriginal Corporation is the Registered Aboriginal Party designated as the traditional owners of the land on which mining licence MIN4644 is located (SRK 2017).

Certain areas within MIN4644 and close to current operational areas are designated as Areas of Cultural Heritage Sensitivity. These include:

- Wappentake Creek (a waterway that traverses the southern portion of the eastern half of the mining licence) and 200 m either side of the drainage line
- Mountain Creek South (a waterway that traverses the southern portion of the eastern half of the mining licence) and 200 m either side of the drainage line
- Tin Pot Gully Creek (a waterway that traverses the eastern portion of the western half of the mining licence) and 200 m either side of the drainage line

There is the potential to disturb Aboriginal Cultural Heritage (where present) if vegetation clearance or ground disturbance activities take place outside of current disturbance areas without appropriate checks and approvals.

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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 5.1. Sensitive receptors - Brunswick and Augusta sites
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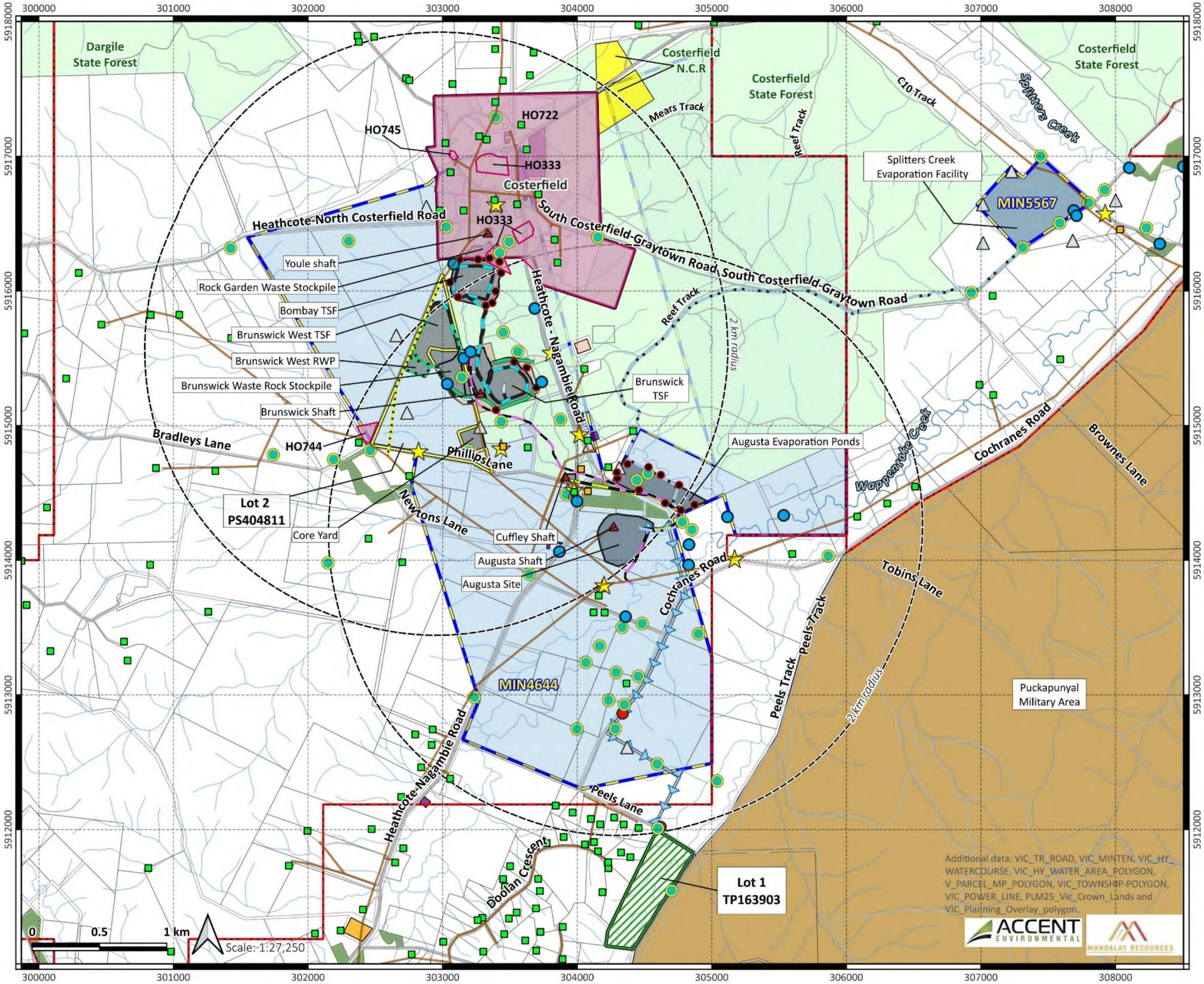

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Dust monitoring site
- Groundwater monitoring site
- Injection site
- Noise monitoring site
- Seepage detection bore
- Surfacewater monitoring
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Rising main pipeline
- Process water return pipeline
- Process water delivery pipeline
- Relocated power transmission line
- Existing power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain
- Vegetation offset area
- Private land lot boundary
- Costerfield township
- Water body
- Site radius - 2 km

Crown Land
- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Planning Overlay
- Heritage Overlay (HO)

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5.2 Historic heritage

The Costerfield Gold and Antimony Mining Precinct consists of three sites (Bombay Mine and Cyanide Works, Minerva Mine and Costerfield Main shaft) that are located within MIN4644 to the northwest of the Brunswick TSF. The precinct is considered to be of historical, archaeological and scientific importance to the State of Victoria (HCV 2005).

In addition, the following features of local cultural heritage significance associated with historic mining have been identified within MIN4644 between the Augusta and Brunswick sites:

- South Costerfield Mine Shaft
- Old Alison Mine Shaft
- New Alison Mine Shaft.

The current mine operations do not disturb any historic mine workings. However, there is the potential to impact historic heritage by ground disturbance outside of current disturbance areas or the movement of equipment or vehicles through heritage areas.

The current underground operations do not disturb any historic mine workings. However, the proposed Youle Ventilation Shaft and Rising Main are located within 500m of the 3 sites. There is also the potential to impact historic heritage by ground disturbance outside of current disturbance areas during construction, operation or rehabilitation, or the movement of equipment or vehicles through heritage areas.

The Youle Ventilation Shaft and Rising Main are located on a site where an old Miner's Cottage stands, identified as a 'Contributory Place' number 32610 within the Costerfield Precinct (HO722) A contributory place contributes to the significance of a heritage precinct, note due to the limitations of the Eaglehawk and Bendigo Heritage Study, 1993 all buildings located within a heritage precinct in this study which were constructed prior to 1960 are considered contributory. (E+ Architecture CA13 Section 6 Heritage Assessment).

Costerfield Precinct (HO722)

Significant place				
Costerfield gold and antimony mining precinct	Heathcote-Nagambie Road	Costerfield	32611	HO333
Uniting Methodist Church (former)	66 Donnellys Lane	Costerfield	32607	
Contributory places				
House	3 Costerfield Redcastle Road	Costerfield	32603	
School (former)	8 Crossley Road	Costerfield	32605	
House	9 Donnellys Lane	Costerfield	32606	
House	74 Donnellys Lane	Costerfield	32608	
Post office (former) and residence	1133 Heathcote Nagambie Road	Costerfield	32613	
Hall	1136 Heathcote Nagambie Road	Costerfield	32614	
House	CA 10 Cnr Heathcote Nagambie and Reservoir Road	Costerfield	32616	
House	1 Ward Lane	Costerfield	32621	
House	CA 13 Heathcote North Costerfield Road	Costerfield	32610	

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5.3 Groundwater

Groundwater extraction in the Costerfield area is regulated by Goulburn-Murray Water (G-MW). In the vicinity of the mine operations, groundwater is at approximately 20 metres below ground level (SRK 2017). Depending on quality, groundwater can be suitable for a number of uses, which in Victoria are protected by EPA Victoria's Environmental Reference Standard.

The regional groundwater aquifer is confined to semi-confined and consists of Silurian siltstones and mudstones. Groundwater flow within this regional aquifer is through fractures and fissures within the rock. This is overlain by a perched alluvial aquifer comprising recent gravels, sands and silt. The perched alluvial aquifer is connected to the surface water system.

Mining activities have the potential to impact on groundwater quality, levels, seepage from TSFs or water dams or hydrology such as by the release of contaminants or from mine dewatering.

5.4 Surface water

Surface water includes dams and waterways, including drains, streams and ponds. Regulation of surface water comes under the jurisdiction of rural water authorities and catchment management authorities.

The Costerfield gold mine lies within the G-MW and the Goulburn-Broken Catchment Management Authority (GBCMA) areas. As a delegated authority under the Water Act 1989, the GBCMA is able to declare designated waterways in the Costerfield area. Designated waterways can be named or un-named, permanent or seasonal, and can range in size from a natural depression to a river. Water quality in Victoria is protected by EPA Victoria's Environmental Reference Standard.

The waterways that may be impacted by the Costerfield Operations, particularly during construction and operation, are shown in Figure 5.1, above, and include:

- Wappentake Creek and anabranch, which are the main waterways downstream of the project area
- Mountain Creek, which runs north of the open pits and southwest of the evaporation ponds before joining Wappentake Creek
- Mountain Creek South, which traverses the southern portion of the eastern half of the mining licence and has been diverted around the Brunswick site
- Tin Pot Gully Creek, which starts just to the northwest of the Brunswick TSF and then runs east and south towards the evaporation pond.

In addition to those named waterways, there are other smaller creeks and channels that are potentially impacted by mining activities and these activities have the potential to impact on the quality and hydrology of surface waters such as by the release of contaminants or from the physical disruption or diversion of waterways.

5.5 Biodiversity and ecosystems

In the RRAM system 'biodiversity' and 'ecosystems' are categorised as separate sensitive receptors but for the purposes of this risk management plan, they have been considered together. The receptors include those ecosystems (flora and fauna) that exist on land, in surface water and in groundwater and the associated variety or plant and animal life (biodiversity) associated with them.

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The Costerfield Operations are partly located within the Costerfield State Forest and in a Public Conservation and Resource Zone (PCRZ). The Department of Environment, Land, Water and Planning (DELWP) maps the following Ecological Vegetation Classes (EVCs) as potentially occurring in the vicinity of the Costerfield Operations site: EVC 175 Low Rises Grassy Woodland (conservation status: vulnerable); and 61 Box Ironbark (conservation status: depleted). For EVC evaluation purposes, Costerfield mining operations lies within the Goldfields Bioregion.

Activities during construction, operation and rehabilitation have the potential to impact on terrestrial and aquatic biodiversity and ecosystems such as by vegetation clearance, erosion and sedimentation, the release of contaminants, changes to hydrology or ignition of fires.

5.6 Significant landscape

Significant landscape is landscape which is be deemed significant for a combination of historic, aesthetic, scientific, religious or social reasons – or where vegetation is deemed integral to the amenity of the area.

This sensitive receptor is not impacted as there are no such designated areas in or near MIN4644.

5.7 Crown land

Crown land is land that is held by the Crown in right of the State of Victoria.

The following components of the Costerfield Operations are located on Crown land (see Table 2-1) – the mine dewatering rising main and pipeline, and the Brunswick processing plant and TSF.

Figure 5.1 shows the crown land affected or potentially affected by the operations described in this work plan.

Mining activities, particularly during construction, operation and rehabilitation, have the potential to impact on Crown land such as by vegetation clearance, erosion and sedimentation, breaches of containment facilities, changes to hydrology or ignition of fires.

5.8 National Park

A National Park is crown land is land that has been reserved because it is characterised by its predominantly unspoilt landscape, and its flora, fauna or other features.

The Heathcote-Graytown National Park is approximately to 1.5 km to 3 km to the north, northeast and northwest of the Costerfield Operations.

Figure 5.1 shows the location of the Heathcote-Graytown National Park in relation to MIN4644.

There is the potential for mining activities during construction, operation or rehabilitation, to impact on the National Park by ignition of fire.

5.9 Public safety

Public safety is the protection from injury and disease of persons other than employees of an employer, from risks arising from the workplace or the conduct of the employer at the workplace. There is the potential for mining activities during construction, operation or rehabilitation, to impact on public safety by the movement of vehicles on public roads, blasting, dust generation, ground

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instability, operation of plant and equipment, transport and handling of mined materials, and use of hazardous materials.

5.10 Private property

Private land is that land that has been alienated from the Crown by a grant of freehold or by leasing. Private land includes residential structures and other buildings, farmed animals and crops.

Figure 5.1 shows the extent of private land and crown land covered by MIN4644 and the location of residences with respect to the Augusta and Brunswick sites. The plan shows:

- six residences within 500 m of Youle Ventilation Shaft/Rising Main site
- fifteen residences within 1000 m of Youle Ventilation Shaft/Rising Main site
- six residences within 1000 m of the Augusta site
- four residences within 1000 m of the Brunswick site.

There are a number of residences located within 300 and 500 m of the Bombay TSF and three residences located between 150 and 500 m of the Augusta evaporation ponds.

Mining activities potentially may impact on private property during construction, operation or rehabilitation, by vegetation clearance, erosion and sedimentation, breaches of containment facilities, changes to hydrology or ignition of fires.

In addition, mining activities may result in amenity impacts on residences on private land such as by altered visual amenity, dust, noise and vibration.

5.11 Public infrastructure

Public infrastructure includes public roads and public buildings.

Figure 5.1 above, shows public roads and public buildings with respect to the Augusta and Brunswick sites. The plan shows:

- Heathcote-Nagambie Road is within 500 m of the Augusta site
- Heathcote-Nagambie Road is within 1000 m of the Brunswick site
- McNicholls Lane is within 500 m of the Augusta site
- Cochranes Road, Newtons Lane, Peels Lane, Tobins Lane are within 1000 m of the Augusta site
- Bradleys Lane is within 1000 m of the Brunswick Plant site
- Bradleys Lane is within 50m of the Brunswick West TSF site
- Bradleys Lane is within 20m of the Youle Ventilation Shaft site

An investigation of infrastructure in the vicinity of the mining operations revealed:

- no railways are within 10 km
- no power transmission lines are within 10 km
- no gas pipelines are within 10 km
- no flood spillways are within 10 km.

Mining activities potentially may impact on public infrastructure during construction, operation or rehabilitation, by the movement of vehicles on public roads, erosion and sedimentation, breaches of containment facilities, blasting, ground instability or ignition of fires.

5.12 Community facility

Community facilities are similar to public infrastructure and are used by the community for events. Such facilities include recreational parks and ovals (and associated infrastructure), libraries and halls, etc.

The Costerfield Public Hall (located at 1136 Heathcote-Nagambie Road) is approximately 1.3 km northeast of the Brunswick processing plant. Figure 5.1 shows the Costerfield Public Hall in relation to the mining operations. Apart from the public hall, there are no community facilities in the vicinity of the mining operations. The Costerfield Public Hall is within 300m of the Youle Ventilation Shaft/Rising Main site.

Mining activities potentially may impact on the public hall by ignition of fires.

5.13 Visual amenity

Visual amenity, in its usual meaning is the pleasant or normally satisfactory aspects of a location which contribute to its overall character and the enjoyment of residents or visitors. It can have a physical component such as the character and appearance of building and works, proximity to facilities, quality infrastructure and absence of noise, unsightliness or offensive odours.

The Costerfield Operations are located within a relatively flat, undulating plain and the facilities are located adjacent to or within State Forest. In general, therefore, the site is not visually prominent from vantage points such as nearby landholders or public roads. In addition, as an underground operation, it has a smaller footprint than an equivalent open cut operation.

However, project facilities and activities do result in visual amenity impacts during construction, operation or rehabilitation. Condensation plumes from the warm air being emitted from the ventilation shafts may create visible clouds immediately above the shafts.

5.14 Air quality

Air quality is the quality of ambient air that may be adversely impacted by work processes and practices. At the Costerfield Operations, background air quality would be expected to be typical of a relatively remote rural location, distant from other large-scale industry.

Mining activities during construction, operation or rehabilitation, have the potential to impact on air quality by generating dust or releasing other gaseous emissions and particulates such as from diesel exhaust or blasting activities.

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6 Risk assessment and management

6.1 Risk identification and assessment

A risk assessment has been undertaken for the Mandalay and processing operations by using the process described in Section 3 and applying it to each of the risk hazards identified in Section 4, taking into account potential impacts on the sensitive receptors identified in Section 5.

The risk assessment is tabulated in the sections below for the following risk hazard categories:

- altered visual amenity
- dust/air emissions
- erosion and sedimentation
- fire
- flood
- ground disturbance
- ground instability
- ground vibration
- hazardous materials and waste
- light emissions
- noise pollution
- security breach.

Where new activities are assessed to require the preparation of a new risk treatment plan these will be included and uploaded to RRAM.

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6.1.1 Altered visual amenity

Table 6-1 Risk assessment: altered visual amenity

Objectives or outcomes to be met	
In terms of altered visual amenity, the goal of the Costerfield Operations is to acceptably minimise impacts on visual amenity from mining and processing. To achieve this, the following objectives shall be met: • No significant impact on the amenity of neighbouring residences by the height of TSF or waste rock and ROM pad stockpiles above natural ground level • Height of TSF to be kept to a minimum to meet short-term operational needs	
Risk source	**Possible consequence**
Plant and equipment - Cuffley vent shaft	Visible plume of steam from Phillips Lane vent shaft on cold mornings on neighbouring landowners or residences
Plant and equipment Heathcote North-Costerfield rd Vent shaft and Rising Main	Visible plume of steam from Heathcote North-Costerfield Rd vent shaft on cold mornings on neighbouring landowners or residences
Plant and equipment Bradleys Lane Youle vent shaft	Visible plume of steam from Youle vent shaft on cold mornings on neighbouring landowners or residences Visual impact of Youle vent shaft on the Miner's Cottage.
Overburden dumps and stockpiles - waste rock and ROM pad stockpiles	Visual impact of waste rock and ROM pad stockpiles on neighbouring landowners or residences
TSF	Visual impact of height of TSFs above natural ground level on neighbouring landowners or residences
Standard controls	
Consult with stakeholders regarding presence of plume and respond to concerns.	
Consult with stakeholders regarding height of stockpiles and respond to concerns.	
Limit stockpile heights to ensure comparable to surrounding tree heights.	

Minimise TSF heights as far as reasonably practical - height kept to a minimum to meet short term operational needs.
Revegetation of embankments and disturbed areas as soon as practicable.
Maintain screening vegetation, where present, between residences and TSFs.
Decommissioning and rehabilitation to agreed post-mining landuse and landforms
Relevant associated procedures
Community Engagement Plan (uploaded to RRAM)
Tailings Storage Facility Management/Operation Plan (uploaded to RRAM)
Traffic Management Procedure (uploaded to RRAM)
Rehabilitation Plan (uploaded to RRAM)
CA13 Section 6 Heritage Assessment (uploaded to RRAM)

Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Cuffley / Heathcote North-Costerfield rd/ Youle vent shafts	Private Property	Cold mornings	Insignificant	Unlikely	Low	Insignificant	Unlikely	Low
Waste rock/ROM stockpiles	Private Property	Daily	Minor	Possible	Medium	Minor	Unlikely	Low
TSF	Private Property	Daily	Minor	Possible	Medium	Minor	Unlikely	Low
Outcome of risk assessment								

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The maximum inherent risks are rated **medium**. The preparation of risk treatment plans is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.

6.1.2 Dust

Table 6-2 Risk assessment: dust

Objectives or outcomes to be met	
In terms of dust emissions, the requirements to be met by the Costerfield Operations are set out in the *Environment Reference Standard*. The goal of the Costerfield Operations is to comply with applicable guidelines for particulate emissions from mining and processing, and to acceptably minimise community amenity impacts. To achieve this, using the applicable guidelines, the following objectives shall be met: • For a 24 hr average: particles with mean aerodynamic diameter less than 10 microns (PM_{10}) must not exceed 50 µg /m^3 or particles with mean aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) must not exceed 25 µg /m^3.	
Risk source	**Possible consequence**
Vehicle movement	Vehicle movements on un-sealed roads creating dust that may impact on amenity, air quality and/or public health
Plant and equipment	Plant such as crushers generating fine dust or filling of cement from silo creating dust that may impact on amenity, air quality and/or public health Screening operations, heavy vehicle and loader movements creating dust that may impact on amenity, air quality and/or public health Mobile crusher, screening plant at the Brunswick mine creating dust that may impact on amenity, air quality and/or public health
Overburden dumps and stockpiles	Movement of mined materials, such as the recovery of waste rock for beneficial re-use, creating dust that may impact on amenity, air quality and/or public health
TSF	Dust emissions created by winds blowing across dried out tailings surface creating dust that may impact on amenity, air quality and/or public health

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Standard controls
Deploy portable DustTrak monitoring unit as an early warning, proactive dust monitoring tool.
Reduce vehicle speed.
Water exposed areas during dry periods and restrict site traffic to areas serviced by water tankers.
Add dust suppression agent to water tankers to aid in dust suppression.
Minimise vehicle movement.
Minimise exposed areas.
Wheel washes installed at the entrances of both the Augusta and Brunswick mines.
Seal access roads after the wheel washes at both the Augusta and Brunswick mines prevent offsite road dust.
Use fixed and mobile sprinkler systems.
Use water cart on roads within the site.
Use dust covers for dust generating equipment (e.g. the crusher).
Fit a dust filter to cement silo.
Implement a cement silo maintenance program.
Control moisture level in stockpiles.
Limit stockpile heights to ensure comparable to surrounding tree heights (provides protection from wind).
Orientation and position equipment appropriately.
Moisture control of tailings surface through use of spigots and supplementary water if required.
Maintain supernatant on TSFs.

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Overall shape of the Brunswick West TSF (narrow at the deposition point, and widening out towards the tail end will result in tailings being continually deposited over the same general area, limiting the potential for evaporation to completely dry the tailings beach out.								
Speed limit of no more than 10km/hr on TSF embankment crest and site access roads.								
Decommissioning and rehabilitation of TSF with appropriately designed cover system and vegetation.								
Relevant associated procedures								
Ambient Air Quality Management Plan (uploaded to RRAM)								
Rehabilitation Plan (uploaded to RRAM)								
Community Engagement Plan (uploaded to RRAM)								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Vehicle movement	Air quality / Public safety	Daily	Moderate	Almost certain	Very High	Moderate	Possible	Medium
Plant and equipment	Air quality / Public safety	Daily	Moderate	Almost certain	Very High	Moderate	Possible	Medium
Filling and use of cement silo	Air quality / Public safety	Daily	Moderate	Possible	Very High	Insignificant	Unlikely	Low
Screening operations, heavy vehicle and loader movements	Air quality / Public safety	Daily	Moderate	Almost certain	Very High	Moderate	Possible	Medium
Mobile crusher operations	Air quality / Public safety	Daily	Moderate	Almost certain	Very High	Moderate	Possible	Medium

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Movement and stockpiling of mined materials	Air quality / Public safety	Daily	Moderate	Almost certain	Very High	Moderate	Possible	Medium
Tailings stored in TSF	Air quality / Public safety	Daily	Minor	Unlikely	Low	Minor	Rare	Low
Outcome of risk assessment								
The maximum inherent risks are rated **Very High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.								

6.1.3 Air emissions

Table 6-3 Risk assessment: air emissions

Objectives or outcomes to be met	
In terms of emissions from plant and machinery, the requirements to be met by the Costerfield Operations are set out in the *Environment Reference Standard*. The goal of the Costerfield Operations is to comply with applicable guidelines and General Duty of Care. The current EPA licence does not impose any specific conditions for emissions to air but requires that offensive odours are not discharged beyond the boundaries of the premises for amenity reasons.	
Risk source	**Possible consequence**
Vehicle movement	Emissions of carbon dioxide and particulates from mobile plant that may impact on amenity, air quality and/or public health
Machinery	Emissions of carbon dioxide and particulates from mobile plant that may impact on amenity, air quality and/or public health
Process Plant	Emissions of carbon dioxide and particulates from mobile plant that may impact on amenity, air quality and/or public health
Blast fume from vent shafts	Blast fumes from vent shafts that may impact on amenity, air quality and/or public health
Standard controls	
Maintain plant/equipment and follow procedures	

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Implement preventative maintenance work on mobile diesel equipment								
Ensure adequate underground ventilation and implement air quality monitoring program								
Meet OHS standards for work force and undertake monitoring (spot tests)								
Initial modelling was undertaken to show levels are significantly below limits								
Undertake ongoing modelling of underground vent network								
Relevant associated procedures								
Ambient Air Quality Management Plan (uploaded to RRAM)								
Traffic Management Procedure (uploaded to RRAM)								
Equipment maintenance schedules								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Vehicle movement	Air quality / Public safety	Daily	Minor	Almost certain	High	Minor	Possible	Medium
Machinery	Air quality / Public safety	Daily	Minor	Almost certain	High	Minor	Possible	Medium
Process Plant	Air quality / Public safety	Daily	Minor	Almost certain	High	Minor	Possible	Medium
Blast fume from vent shafts	Air quality / Public safety	Daily	Minor	Unlikely	Low	Minor	Rare	Low
Outcome of risk assessment								

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The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.

6.1.4 Erosion and sedimentation

Table 6-4 Risk assessment: erosion and sedimentation

Objectives or outcomes to be met	
In terms of erosion and sedimentation, the requirements to be met by the Costerfield Operations are set out in *Environment Reference Standard* and supported by EPA Publication 1834: *Civil construction, building and demolition guide*. The goal of Costerfield Operations is to minimise impacts on downstream water quality as a result of mining-related erosion and sedimentation, and to comply with EPA licence conditions. To achieve this, using the applicable guidelines, the following objectives shall be met: • No significant deviation in water quality from background (non-mine affected) conditions • Surface water discharged from the premises is not contaminated with waste as per EPA licence conditions, where applicable, including turbidity with a 75th percentile limit of 10 Nephelometric Turbidity Units	
Risk source	**Possible consequence**
Dams and waterways	Impact on private property, crown land, surface water and aquatic ecosystems from unplanned, sediment-bearing or erosive discharge from the: • Augusta Mine dam • Augusta Mine evaporation ponds • Brunswick Mill stormwater dam • Brunswick Mill process water dam • Brunswick West Process water dam
TSF	Unplanned, sediment-bearing or erosive discharge from the TSFs resulting in impacts on private property, crown land, surface water and aquatic ecosystems

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Activity – plant and equipment	Erosion and sedimentation caused by the use of plant and equipment resulting in impacts on surface water and aquatic ecosystems
Activity – overburden dumps and stockpiles	Erosion and sedimentation caused by runoff from waste dumps and stockpiles resulting in impacts on surface water and aquatic ecosystems
Disturbed, unrehabilitated ground	Erosion and sedimentation caused by rainfall runoff from disturbed, unrehabilitated land or material stockpiles resulting in impacts on surface water and aquatic ecosystems
Standard controls	
Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity	
Drainage control works to divert surface water away from disturbance areas	
Drainage collection system at Brunswick Process Plant site to direct stormwater into settling pond for re-use or for pumping into the disused tailings dam	
Culvert and channel capacity that can convey the relevant flood event design criteria (i.e. 1:100 AEP, Critical Duration)	
Minimise disturbance areas	
Rehabilitation of areas of exposed soil	
Create and implement a sediment and erosion control plan for the construction and rehabilitation phases	
Control drainage in areas where activities are being undertaken to ensure captured rainfall is directed to a sediment retention basin	
Use of appropriately sized sediment retention basin	
For erosion control of TSF embankments, final slopes of 1V:4H will be adopted. Topsoil will be placed and vegetation established to further stabilize the embankment slope.	
Heavy vehicles to be cleaned and be free of soil prior to leaving construction/rehabilitation site	
Re-use of captured water for construction purposes	
Standard controls as documented in the Costerfield Surface Water Management Plan and Tailings Management Plan	
Relevant associated procedures	

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Surface Water Management Plan (uploaded to RRAM)								
Rehabilitation Plan (uploaded to RRAM)								
Community Engagement Plan (uploaded to RRAM)								
Tailings Storage Facility Management/ Operation Plan (uploaded to RRAM)								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Dams and waterways	Private property / crown land / surface water / aquatic ecosystems	Rarely	Moderate	Unlikely	Medium	Moderate	Rare	Medium
TSFs	Private property / crown land / surface water / aquatic ecosystems	Rarely	Moderate	Unlikely	Medium	Moderate	Rare	Medium
Activity – plant and equipment	Surface water / aquatic ecosystems	Rarely	Minor	Likely	Medium	Minor	Unlikely	Low
Activity – overburden dumps and stockpiles	Surface water / aquatic ecosystems	Rarely	Minor	Likely	Medium	Minor	Unlikely	Low
Disturbed, unrehabilitated ground	Surface water / aquatic ecosystems	Rarely	Minor	Likely	Medium	Minor	Unlikely	Low

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Outcome of risk assessment
The maximum inherent risks are rated **medium**. The preparation of risk treatment plans is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.

6.1.5 Fire

Table 6-5 Risk assessment: Fire

Objectives or outcomes to be met	
In terms of fire, the responsible authorities are the Police and the Country Fire Authority. The objective of the Costerfield Operations is no impact to public safety, private property, community facilities or crown land as a result of mine-related fire ignition.	
Risk source	**Possible consequence**
Plant and equipment - fire generating activity (ignition source)	Fire ignited as a result of mining activities may impact on air quality and/or public health, as well as causing damage to private property, community facilities, crown land, public land or the Heathcote-Graytown National Park.
Fuel/additive storage – above-ground storage tanks	Fire ignited as a result of mining activities or a bushfire in the vicinity of the operation may pose a risk to the integrity of above-ground storage tanks or other hazardous goods storage areas, potentially causing flammable materials to ignite.
Standard controls	
Maintenance of firebreaks	
Preventative maintenance program on mobile equipment and fixed plant to ensure the risk of spark generation is minimised	
Maintenance of adequate on-site water storages for fire-fighting purposes	
Inclusion of bushfire authority in community engagement plan and emergency risk management plan	
Trained Emergency Response Team personnel across the mining workforce	

Employee induction								
Ensuring fire management plans (including fire extinguisher maintenance) are up to date								
Safe storage of flammable materials in accordance with applicable Australian Standards								
Relevant associated procedures								
Site Emergency Plan								
Community Engagement Plan (uploaded to RRAM)								
Tailings Storage Facility Management/ Operation Plan (uploaded to RRAM)								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Plant and equipment - fire generating activity (ignition source)	Air quality / public safety / private property / community facility / crown land / National Park	Very rarely	Critical	Unlikely	High	Critical	Rare	High
Fuel/additive storage – above-ground storage tanks	Air quality / public safety / private property / community facility / crown land / National Park	Very rarely	Critical	Unlikely	High	Critical	Rare	High
Outcome of risk assessment								

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The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk is rated as **High**. The preparation of risk treatment plan is therefore considered necessary and can be found in RRAM.

6.1.6 Flood

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Table 6-6 Risk assessment: flood

Objectives or outcomes to be met	
In terms of mitigating the risk of mining-related flood impact, specifications are set out in *Guidelines on Tailings Dams* (ANCOLD 2019) and *Guideline for the design and management of tailings storage facilities* (ERR 2017). Guidance is also provided in EPA Publication 1834: *Civil construction, building and demolition guide*. The goal of the Costerfield Operations is to minimise any flood risks associated with TSF or associated activities. To achieve this, water holding structures be designed, constructed, operated and decommissioned in strict accordance with applicable engineering standards and practice.	
Risk source	**Possible consequence**
Dams and waterways	Impacts on public safety, private property, crown land, water quality and aquatic ecosystems from flooding due to unplanned discharge from the: • Augusta Mine dam • Augusta Mine evaporation ponds • Brunswick Mill stormwater dam • Brunswick Mill process water dam
	Flooding of local waterways reaching mine facilities and causing the erosion of mined materials or release of mining-related contaminants impacts on water quality and aquatic ecosystems
TSFs	Impact on public safety, private property, crown land, water quality and aquatic ecosystems from unplanned discharge from the TSFs.
Standard controls	

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Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity								
Inclusion of relevant authority in the community engagement plan and emergency risk management plan (i.e. Dam Safety Emergency Plan)								
Employee induction								
Location of at-risk project facilities away from floodplains								
Standard controls as documented in the Costerfield Surface Water Management Plan and Tailings Management Plan								
Augusta mine noise bund has been designed to withstand a 1:100-year flood level event								
Appropriately designed, constructed and maintained clean water diversion drains								
TSF and Return Water Pond to be constructed as turkeys nest facilities to minimize catchment area								
Construction of external Return Water Pond to aid the removal of water that may accumulate on the Brunswick West TSF post a rainfall event								
Post closure monitoring to include key aspects of current operational monitoring programs including surface water monitoring and groundwater monitoring								
Relevant associated procedures								
Surface Water Management Plan (uploaded to RRAM)								
Brunswick West TSF Dam Safety Emergency Plan								
Tailings Storage Facility Management/Operation Plan (uploaded to RRAM)								
Rehabilitation Plan (uploaded to RRAM)								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Dams and waterways	Public safety / private	Yearly	Major	Unlikely	High	Major	Rare	Medium

	property / crown land							
TSFs	Public safety / private property / crown land	Very rarely	Major	Unlikely	High	Major	Rare	Medium
Dams and waterways	Water quality / aquatic ecosystems	Yearly	Moderate	Unlikely	Medium	Moderate	Rare	Medium
TSFs	Water quality / aquatic ecosystems	Very rarely	Moderate	Unlikely	Medium	Moderate	Rare	Medium

Outcome of risk assessment

The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.

6.1.7 Ground disturbance

Table 6-7 Risk assessment: ground disturbance (including water quality)

Objectives or outcomes to be met

In terms of surface water impact, the requirements to be met by the Costerfield Operations are set out in *Environment Reference Standard* and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) (as referenced in the ERS). The goal of the Costerfield Operations is to minimise impacts on downstream water quality as a result of mining-related activities, and to comply with EPA licence conditions. To achieve this, using the applicable guidelines, the following objectives shall be met:

- No significant deviation in water quality from background (non-mine affected) conditions

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- No significant elevated antimony levels in downstream surface waters (taking into account ANZG/ Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ 2000) trigger levels and background concentrations)
- No impact on designated beneficial uses of water as measured by the appropriate environmental quality objectives and indicators specified in the *Environment Reference Standard*
- Discharge of waste to surface water must comply with EPA licence conditions, where applicable, including:
  - stormwater diverted around the premises must not be contaminated with waste
  - discharge of waste to surface waters must be in accordance with the limits specified in the licence

In terms of land impact, the requirements are set out in *Environment Reference Standard*, the *National Environment Protection Measures (NEPM*) and the EPA licence. The following objective shall be met, as outlined in the EPA licence:

- No contamination of land

In terms of groundwater impact, the requirements are set out in the *Environment Reference Standard* and the EPA licence. The following objective shall be met, as outlined in the EPA licence:

- No contamination of groundwater

For historic heritage impacts, requirements for protection are set out at the local government level in Heritage Overlays and at a state level under the *Heritage Act 2017*. The objective at the Costerfield mine is to avoid harm or disturbance to historic heritage places.

For aboriginal cultural heritage impacts, requirements for protection are set out under the Aboriginal Heritage Regulations 2018. The objective at the Costerfield mine is to avoid harm or disturbance to aboriginal cultural heritage places.

No establishment or spread of weeds and pest species.

Additionally, during the closure phase of the mine, the following criteria shall be met (see Rehabilitation Plan):

- site is safe for final land use
- site is non-polluting
- vegetation is self-sustaining
- site rehabilitation supports future land use
- site does not require long-term monitoring and maintenance.

Risk source	Possible consequence
Dams and waterways	Potential seepage from Augusta Evaporation Dams resulting in impacts on groundwater and surface waters (affecting terrestrial or aquatic ecosystems, private land or crown land)

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	Discharge of surface drains (containing salinity and metals) potentially resulting in impacts on surface waters and soil (affecting terrestrial or aquatic ecosystems, private land or crown land) Discharge of treated water from RO Water Treatment Plant potentially resulting in impacts on surface waters or hydrology (affecting aquatic ecosystems) Potential leakage of brine from RO Water Treatment Plant from pipelines to surface waters and soil (affecting terrestrial or aquatic ecosystems, private land or crown land) Potential for discharges to impact on designated Areas of Cultural Heritage Sensitivity (e.g. creek lines), requiring approvals for certain surface disturbing works
TSFs	Potential impact on groundwater and surface water quality associated with seepage or discharge from the TSFs, affecting terrestrial or aquatic ecosystems, private land or crown land Potential for TSF earthworks (construction/rehabilitation) to affect terrestrial ecosystems, private land or crown land
Activity – plant and equipment	Potential impact on groundwater aquifer levels or quality associated with mine dewatering program, affecting beneficial uses or surface water quality or hydrology Potential for land clearance activities to affect terrestrial ecosystems Potential for activities from mobile equipment to impact heritage listed 'Bombay Mine and Cyanide Works' northwest of the TSF Potential for activities from mobile equipment to impact on certain areas designated as Areas of Cultural Heritage Sensitivity (e.g. creek lines), requiring approvals for certain surface disturbing works
Disturbed and rehabilitated ground	Potential for weed and pest to establish and spread on disturbed ground from mobile equipment, seeding or wind blown sources
Standard controls	
Appropriately designed, constructed and maintained water and tailings structures with adequate retention and controlled discharge capacity	
HDPE liner in Augusta evaporation dams	
Freeboard and water level management in Augusta evaporation dams and TSFs	
Seepage detection trenches	
Bunding placed around processing facilities to contain any water or hazardous substance spillage (e.g. hydrocarbons)	
Pipelines inspected regularly to ensure structural integrity and no leakages	

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Controlled discharge of RO-treated water to Wappentake Creek in accordance with monitoring requirements and compliance limits in EPA licence
Drainage control works to divert water away from extraction areas and culvert and channel capacity able to convey the relevant flood event design criteria (e.g. 1 in 20 years)
Ongoing sampling and monitoring of surface water and groundwater to ensure no contamination
TSF liner constructed with low permeability (as per ERR 2017)
Apply high standards in design, construction, operation, maintenance and decommissioning of TSF groundwater monitoring bores
Planning to ensure that sufficient material (rock, clay, sand and soil) is available for covering of tailings in final rehabilitation
Remove direct pathway to groundwater of any seepage from Brunswick TSF by lowering groundwater levels below the pit
Provision of adequate surface water drainage control along TSF embankment
Rip-rap protection for TSF bench toes and use of erosion matting
Planning to ensure that sufficient material (rock, clay, sand and soil) is available for covering of tailings in final rehabilitation (as per Mandalay Mine Closure Plan)
For erosion control of waste dump stockpiles, final slopes of 1V:3H or shallower will be adopted, with benches to break long slopes
Independent hydrogeological review and advice
Erosion and sedimentation management as outlined in Section 4.4
Hazardous materials and waste management as outlined in Section 4.11
Procedures requiring regulatory approval to carry out surface disturbing works in areas of Cultural Heritage Sensitivity
Procedures describing contingency measures in the event of the discovery of new archaeological relics (s.24 of Aboriginal Heritage Act 2006)
Site inspections to include observations to confirm that the heritage site remains undisturbed
Fencing installed to delineate and prevent disturbance of 'Bombay Mine and Cyanide Works' heritage site
When engaging contractors for activities that may impact on cultural heritage, Mandalay requests contracts to include mandatory reporting by contractors of any minerals, fossils or relics. All personnel are made aware as part of the site induction to stop works, barricade and inform supervisor and relevant authorities

Heritage Victoria will be contacted if any archaeological relics are discovered during excavation. Where works are near known historical sites, Mandalay will contact Heritage Victoria to seek approval prior to the commencement of works
Additional control measures are detailed in the Cultural Heritage Report.
Annual independent hydrogeological review and advice
Vehicle and equipment hygiene checks
Native vegetation removal will be offset at the Mandalay Peels Lane Native vegetation offset site
Brunswick West TSF embankments, built to final slope and rehabilitated after construction
Revegetation program to follow after final earthworks as per Rehabilitation Plan
Monitor disturbed areas to allow early treatment of identified weed species will reduce weed species seedbanks and assist in controlling emergent weeds prior to the commencement of decommissioning. During decommissioning works and any rehabilitation of disturbed areas, weeds will be treated and removed as appropriate.
Relevant associated procedures
Surface Water Management Plan (uploaded to RRAM)
Groundwater Management Plan (uploaded to RRAM)
Tailings Storage Facility Management/Operation Plan (uploaded to RRAM)
Chemical and Waste Management Procedure (uploaded to RRAM)
Traffic Management Procedure (uploaded to RRAM)
EPA Victoria Operating Licence 109992 (uploaded to RRAM)
Rehabilitation Plan (uploaded to RRAM)
Cultural Heritage Report (uploaded to RRAM)

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Risk source, receptor and frequency of exposure			Risk assessment					
			Inherent risk			Residual risk		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Dams and waterways	Groundwater / surface water / ecosystems	Rarely	Moderate	Possible	Medium	Moderate	Rare	Medium
Dams and waterways	Private land / crown land	Rarely	Moderate	Possible	Medium	Minor	Rare	Low
Dams and waterways	Areas of cultural heritage sensitivity	Unlikely	Moderate	Possible	Medium	Moderate	Rare	Medium
TSF	Groundwater / surface water / ecosystems	Rarely	Moderate	Possible	Medium	Moderate	Rare	Medium
TSF earthworks	Ecosystems Private land / crown land	Daily	Minor	Almost certain	High	Insignificant	Almost certain	Medium
Activity – plant and equipment	Groundwater levels and hydrology	Daily	Minor	Almost certain	High	Insignificant	Almost certain	Medium
Activity – plant and equipment	Groundwater / surface water quality	Rarely	Moderate	Possible	Medium	Moderate	Rare	Medium
Activity – plant and equipment	Ecosystems	Rarely	Moderate	Possible	Medium	Moderate	Unlikely	Medium

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Activity – plant and equipment	Areas of historic or cultural heritage sensitivity	Unlikely	Moderate	Possible	Medium	Moderate	Rare	Medium
Construction/ Rehabilitation Activity – plant and equipment	Public infrastructure	Rarely	Moderate	Possible	Medium	Minor	Rare	Low
Disturbed and rehabilitated ground (weeds and pests)	Private land / crown land / ecosystems	Daily	Minor	Likely	Medium	Minor	Possible	Medium
Outcome of risk assessment								
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.								

6.1.8 Ground instability

Table 6-8 Risk assessment: ground instability

Objectives or outcomes to be met	
In terms of ground instability, the requirements applicable to the Costerfield Operations are set out by *Geotechnical guideline for terminal and rehabilitated slopes* (ERR 2020) *Assessment of Geotechnical Risks in Open Pit Mines* and *Technical Guideline for Design and Management of Tailings Storage Facilities* (ERR 2017). Requirements are also set out in applicable ANCOLD guidelines for the planning, design, construction, operation and closure of TSFs. The goal of the Costerfield Operations is to have no impact on public safety, private property or crown land due to ground disturbance associated with TSFs. To achieve this, structures will be designed, constructed, operated and closed in strict accordance with the above geotechnical and engineering standards and practice.	
Risk source	**Possible consequence**

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Mine voids and underground workings, including ventilation and egress shafts	Possible subsidence of land in the vicinity of underground mine voids may impact on public safety, private property, crown land and public infrastructure
Mine voids	Failure of pit walls may impact on public safety
Activity – overburden dumps and stockpiles	Possible slumping of waste stockpiles, or constructed landforms may impact on public safety, private property, crown land and public infrastructure
TSF	Possible failure of TSF embankments may impact on public safety, private property, crown land and public infrastructure
Standard controls	
Pre-calculations on the blasting effect to ensure that the charge load is correct	
Blasting techniques that include consideration of geology, face heights and orientation of geological structures, stemming heights, blast hole to burden ratios, etc.	
Appropriately designed, constructed and maintained water and tailings structures with adequate retention and controlled discharge capacity	
Geotechnical assessments of the stability of existing and proposed underground workings, pit walls, TSF embankments and other constructed landforms	
Regular facility inspections by operator staff to confirm safety and absence of stability issues	
Standard controls as documented in the Costerfield Tailings Storage Facility Management/Operation Plan	
Earthen safety bunds established around the perimeter of pits at closure	
The Augusta mine decline will be backfilled with waste rock at closure (down to 4 level)	
Potential stability issues associated with raise boring, including those associated with fault intersections, are considered prior to commencement of works. Works are planned with reference to the document Bored Reinforced Piles for Raisebore Support – Four Case Studies, and Guidelines Developed from Lessons Learnt	
Appropriately designed, constructed and maintained water and tailings structures with adequate freeboard capacity and controlled discharge capacity	
Geotechnical assessments of the stability of the proposed Brunswick West TSF and RWP embankments taking into account the proximity of the Brunswick Pit and underground workings	
Regular facility inspections by operator staff to confirm no abnormal conditions or circumstances that could affect the stability of the TSFs or RWP	

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Independent surveillance of TSFs and dams as specified by ANCOLD								
Closure and rehabilitation of TSFs with appropriately designed cover system and vegetation								
Relevant associated procedures								
Tailings Storage Facility Management/Operation Plan (uploaded to RRAM)								
Rehabilitation Plan (uploaded to RRAM)								
Bored Reinforced Piles for Raisebore Support – Four Case Studies, and Guidelines Developed from Lessons Learnt (uploaded to RRAM)								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Mine voids and underground workings, including ventilation and egress shafts	Public safety / private property / crown land/ public infrastructure	Daily	Major	Rare	Medium	Major	Rare	Medium
Mine voids	Public safety	Daily	Critical	Rare	High	Critical	Rare	High
Activity – overburden dumps and stockpiles	Public safety / private property / crown land/ public infrastructure	Daily	Moderate	Rare	Medium	Moderate	Rare	Medium
TSF	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
TSF	Private property / crown land/	Daily	Moderate	Rare	Medium	Moderate	Rare	Rare

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	public infrastructure
Outcome of risk assessment	
The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk is rated as **High**. The preparation of risk treatment plan is therefore considered necessary and can be found in RRAM.	

6.1.9 Ground vibration

Table 6-9 Risk assessment: Ground vibration

Objectives or outcomes to be met	
In terms of ground vibration, the requirements applicable to the Costerfield Operations are set out by ERR in the document *Ground Vibration and Airblast Limits for Blasting in Mines and Quarries*. The goal of the Costerfield Operations is to have no impact on private property or public infrastructure due to ground vibration associated with mining and processing activities. To achieve this, using the applicable guidelines, the following objectives shall be met: • Ground vibration at sensitive sites should be below 10 mm/s peak particle velocity (ppv) at all times • For ERR-approved night time blasting, it is considered appropriate to apply more stringent limits to ground vibration during the hours usually devoted to sleep. In these circumstances, the ground vibration level at sensitive sites should not exceed 3 mm/s and airblast should not exceed 115 dB (Lin Peak) between the hours 10:00 pm and 7:00 am	
Risk source	**Possible consequence**
Blasting (underground)	Vibration impacts on neighbouring landowners, private property or public infrastructure
Standard controls	
Pre-calculations on the blasting effect to ensure that the charge load is correct	
Blasting techniques that include consideration of geology, face heights and orientation of geological structures, stemming heights, blast hole to burden ratios etc.	
Relevant associated procedures	

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Covered by mine operational and safety procedures								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Blasting (underground)	Private property / public infrastructure	Daily	Moderate	Possible	Medium	Moderate	Rare	Medium
Outcome of risk assessment								
The maximum inherent risks are rated **Medium**. The preparation of risk treatment plans is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.								

6.1.10 Hazardous materials and waste

Table 6-10 Risk assessment: Hazardous materials and waste

Objectives or outcomes to be met	
In terms of hazardous materials and waste, the objectives are set out in *Environment Reference Standard*, EPA publication IWRG701, *Sampling and analysis of waters, wastewaters, soils and wastes*, EPA Industrial Waste Resource Guidelines, EPA's Bunding Guidelines and AS1940-2004. The goals of the Costerfield Operations are to: • Minimise impacts on land, surface water or groundwater as a result of the management and use of hazardous materials and the generation and management of waste • Avoidance of contamination of land and groundwater, as required by the EPA licence • Ensuring stormwater diverted around the premises is not contaminated with waste, as required by the EPA licence	
Risk source	**Possible consequence**

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Fuel / additive storage	Spills, uncontrolled discharges or leaks from compromised containment structures (such as storage tanks and bunded areas) have the potential to impact on soil and/or groundwater quality on-site and / or off-site (private property and crown land)
Activity – overburden dumps and stockpiles	Leaching of metals from waste rock or ROM stockpiles into the environment (in particular, acid rock drainage) has the potential to impact on soil, groundwater and surface water
Activity – Tailings storage	Leaching of metals from TSF into the environment (in particular, acid rock drainage) or spill from tailings delivery pipeline has the potential to impact on soil, groundwater and surface water
Standard controls	
Minimise chemical use and use environmentally benign alternatives where practical	
Quantities of chemicals stored on site kept to a minimum	
Chemicals stored away from surface waters, drainage lines or floodplains, unless the storage facilities prevent them from coming into contact with surface waters	
Bunding of oil and fuel storage areas	
Bunding placed around processing facilities to contain any water or hazardous substance spillage (e.g. hydrocarbons)	
Electronic tagging system in place to ensure fuel is dispensed to authorised vehicles only	
Any major servicing/repairs conducted in a contained facility	
Oil/water separator for collection of runoff water in workshop	
Spill kits available where hazardous materials stored or used	
Contaminants spill kit is available at all times when mobile equipment is being refuelled near waterways or when any minor servicing and/or simple maintenance tasks are undertaken on site	
Procedures for the storage and handling of chemicals	
Procedures for managing and remediating chemical spills	
Staff induction and training	
Ongoing sampling and monitoring of surface water and groundwater to ensure no contamination	

Closure plan contains an allowance for offsite removal and remediation of hydrocarbon contaminated soils		
TSFs located away from surface waters, drainage lines and floodplains		
Waste rock located away from surface waters, drainage lines or floodplains, unless the storage facilities prevent them from coming into contact with surface waters		
Ongoing geochemical testing of tailings (confirm Arsenic levels are low and tailings are non-acid forming)		
Brunswick West TSF liner constructed with low permeability (as per ERR 2017)		
Appropriately designed, constructed and maintained tailings structures with adequate freeboard capacity and controlled discharge capacity		
TSF decant contaminants of concern (antimony and arsenic) are known to naturally occur at elevation concentrations, with respect to environmental values, within the regional groundwater system		
The siltstone bedrock, which is host to the regional aquifer system is also understood to have a strong attenuation capacity for elevated metals (antimony and arsenic)		
At closure, the TSF will be capped and rehabilitated to reduce mounding recharge		
Post closure monitoring to include key aspects of current operational monitoring programs including surface water monitoring and groundwater monitoring		
Relevant associated procedures		
Groundwater Management Plan (uploaded to RRAM)		
Surface Water Management Plan (uploaded to RRAM)		
Capture, Storage and Disposal of Waste Hydrocarbons Procedure		
Hazardous Chemical Management Procedure		
Rehabilitation Plan (uploaded to RRAM)		
Risk source, receptor and frequency of exposure	**Risk assessment**	
	Inherent risk	**Residual risk**

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Risk source	Receptor	Consequence	Likelihood	Risk	Consequence	Likelihood	Risk
Fuel / additive storage	Private property / crown land – soil / ecosystems	Minor	Almost certain	High	Minor	Possible	Medium
Fuel / additive storage	Private property / crown land – groundwater / surface water / ecosystems	Minor	Possible	Medium	Minor	Possible	Medium
Activity – overburden dumps and stockpiles	Private property / crown land – soil / ecosystems	Moderate	Possible	Medium	Moderate	Rare	Medium
Activity – overburden dumps and stockpiles	Private property / crown land – groundwater / surface water / ecosystems	Moderate	Possible	Medium	Moderate	Rare	Medium
Activity – Tailings storage	Private property / crown land – soil / ecosystems	Moderate	Possible	Medium	Moderate	Rare	Medium
Activity – Tailings storage	Private property – Groundwater / surface water / ecosystems	Moderate	Possible	Medium	Moderate	Rare	Medium

Outcome of risk assessment

The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk does not exceed the **Medium** rating. The preparation of risk treatment plans is therefore not considered necessary.

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6.1.11 Light emissions

Table 6-11 Risk assessment: light emissions

Objectives or outcomes to be met	
In terms of light emissions, the goal of the Costerfield Operations is to acceptably minimise amenity impacts from mining-related light emissions and to protect the safety of road users who may be adversely affected by lightspill.	
Risk source	**Possible consequence**
Night works	Light emissions (lightspill) associated with night time mining and processing activities may impact on neighbouring landowners or residences and/or public safety (road users)
Standard controls	
Keep lights off when not needed	
Mount lights low down, with lowest intensity for the job	
Prevent light from escaping upwards and outwards	
Relevant associated procedures	
Covered by mine operational procedures	

Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Night works	Amenity	Nightly	Minor	Possible	Medium	Minor	Unlikely	Low
Night works	Public safety	Nightly	Minor	Unlikely	Low	Minor	Unlikely	Low

Outcome of risk assessment
The maximum inherent risks are rated **Medium**. The preparation of risk treatment plans is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.

6.1.12 Noise pollution

Table 6-12 Risk assessment: noise pollution

Objectives or outcomes to be met	
In terms of noise emissions, the aim of the Costerfield Operations is to not exceed the noise emission levels that are set out in Planning Permit (AM/2248/1997/C) and *Environment Reference Standard* and EPA Publication 1834: *Civil construction, building and demolition guide*. The goal of the Costerfield Operations is to comply with requirements for noise emissions from mining and processing activities, and to acceptably minimise community amenity impacts. To achieve this, using the applicable planning permit limits, the maximum noise levels at adjoining residences during operations shall be: • Monday-Friday (Day) – 0700 to 1800 hours 45 A-weighted decibels (dB(A)) • Saturday (Day) – 0700 to 1300 hours 45 dB(A) • Saturday (Day) – 1300 to 1800 hours 42 dB(A) • Sunday and Public holidays (Day) – 0700 to 1800 hours 42 dB(A) • Monday-Sunday (Evening) – 1800 to 2200 hours 42 dB(A) • Monday-Sunday (Night) – 2200 to 0700 hours 36 dB(A) Additionally, during the construction (and rehabilitation) phase, the Planning Permit states : • noise levels to be 10 dB(A) above maximum day period limit In terms of blasting, the requirements applicable to the Costerfield Operations are set out by ERR in the document *Ground Vibration and Airblast Limits for Blasting in Mines and Quarries*. • Air blast should be below 120 dB(Linear) peak at all times at sensitive receptors	
Risk source	**Possible consequence**

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Activity - blasting	Noise from underground blasting (and surface) may impact on amenity, neighbouring landowners or residences.
Activity – plant and equipment	Noise from: mobile crusher; screening plant; loader; process plant equipment; equipment accessing and being serviced in the workshop in the boxcut; and screening of cemented rock fill in the boxcut; may impact on amenity, neighbouring landowners or residences. Noise from: filling and discharging cement silo; and use of agitator trucks sourcing cement from silo; may impact on amenity, neighbouring landowners or residences. Noise from: construction or rehabilitation activities may impact on amenity, neighbouring landowners or residences
Activity – ventilation shaft operation	Noise from ventilation fans may impact on amenity, neighbouring landowners or residences
Activity – overburden dumps and stockpiles	Noise from: operation of excavators and trucks; placement of rock in boxcut; ore truck movements and placement of ore on ROM pad; placement of rock on waste rock stockpiles; and recovery of waste rock for beneficial re-use; may impact on amenity, neighbouring landowners or residences.
Night works	Noise during night works may impact on amenity, neighbouring landowners or residences.
Standard controls	
Blast design plan	
Equipment orientation and position	
Equipment maintenance regime in accordance with manufacturer specifications	
Engineering attenuation controls i.e. mufflers, acoustic screens and enclosures	
Restricted operation of noise generating equipment	
Heavy vehicles restricted from travel at night (i.e. no heavy vehicles outside of the Augusta boxcut at night)	
Vehicle speed limits restricted at Costerfield Operations entrance (i.e. reduced speed limit on McNicholls Lane near the Augusta mine site)	
Overburden stockpiles located to reduce noise emissions at sensitive receptors	
Noise / acoustic barriers or bunds to be considered if required	

Engineered noise abatement of crushers, mills grizzlies, pumps, conveyors, trommels and vibrating screens
Filling of cement silo by supplier restricted to day period
Placement of the crusher in the recessed lower level of the ROM to reduce noise emissions and exposure to wind
Establishment of noise bund/wind protection around three sides of the screening plant
Ventilation fans will be situated underground to minimise the impact.
Relevant associated procedures
Noise Management Plan (uploaded to RRAM)
Traffic Management Procedure (uploaded to RRAM) Community Engagement Plan (uploaded to RRAM)
Community Engagement Plan (uploaded to RRAM)

Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Activity – blasting	Private property	Daily	Minor	Unlikely	Low	Minor	Rare	Low
Activity – plant and equipment	Private property	Daily	Minor	Likely	Medium	Minor	Possible	Medium
Activity – plant and equipment (Cement silo)	Private property	Daily	Minor	Likely	Medium	Minor	Possible	Medium
Activity – plant and equipment (construction, decommissioning or rehabilitation)	Private property	Daily	Minor	Likely	Medium	Minor	Possible	Medium

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Activity – ventilation shaft operation	Private property	Daily	Minor	Likely	Medium	Minor	Possible	Medium
Activity – overburden dumps and stockpiles	Private property	Daily	Minor	Likely	Medium	Minor	Possible	Medium
Night works	Private property	Nightly	Minor	Likely	Medium	Minor	Possible	Medium

Outcome of risk assessment
The maximum inherent risks are rated **Medium**. The preparation of risk treatment plans is therefore not considered necessary. However, in accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks.

6.1.13 Security breach.

Table 6-13 Risk assessment: security breach

Objectives or outcomes to be met	
In terms of site security, Costerfield Operations is targeting zero security breaches.	
Risk source	**Possible consequence**
Mined voids and underground workings – open mine portals and shafts	Harm to unauthorised persons entering into open cut or underground workings
TSF	Harm to unauthorised persons or animals entering TSF and becoming trapped in tailings that appears to be a solid surface
Surface water – dams and waterways	Harm to unauthorised persons or animals entering into dams and waterways
Activity – plant and equipment	Harm to unauthorised persons using explosives and associated public safety and environmental risks Harm to unauthorised persons using site vehicles and equipment and associated public safety risks

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	Harm to unauthorised persons entering into site buildings and associated public safety risks
Fuel / additive storage	Harm to persons due to unauthorised use of fuel or hazardous materials and associated public safety and environmental risks
Standard controls	
Augusta mine site entrance surrounded by a fence with lockable gates	
Brunswick processing plant is surrounded by a fence with lockable gates	
Underground workings where current access is required, including the Youle ventilation shaft site, are secured by lockable gates	
Underground workings where future access may be required are secured by fencing	
Underground workings where no access is required are secured by permanent closure	
Water storages such as TSFs are enclosed by chain-link fence with lockable gates	
Buildings are secured by lockable doors/gates and locked at the completion of working shifts	
Plant and equipment (including vehicles) are kept in gated and locked enclosures and/or individually locked at the completion of working shifts	
Explosives are kept underground in a designated secure explosives repository	
Fuel storage tanks are secured with an electronic tagging system for dispensing fuel	
TSFs and water storages are enclosed by chain-link fence with lockable gates that are to be locked when site is unattended	
No-unauthorized signage to be erected	
Regular inspections by operating personnel	
Control access to site when site is attended	
Site is rehabilitated to a safe landform	
Relevant associated procedures	
Tailings Management Plan (uploaded to RRAM)	

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Chemical and Waste Management Procedure (uploaded to RRAM)								
Site Access Procedure								
Rehabilitation Plan (uploaded to RRAM)								
Risk source, receptor and frequency of exposure			**Risk assessment**					
			Inherent risk			**Residual risk**		
Risk source	**Receptor**	**Frequency of exposure**	**Consequence**	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Mined voids and underground workings – open mine portals and shafts	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
TSF	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
Surface water – dams and waterways	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
Activity – plant and equipment (explosives)	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
Activity – plant and equipment (explosives)	Air quality / surface water / ecosystem	Daily	Major	Unlikely	High	Major	Rare	Medium
Activity – plant and equipment (vehicles and plant)	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
Activity – plant and equipment (buildings)	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High

Fuel / additive storage	Public safety	Daily	Critical	Unlikely	High	Critical	Rare	High
Fuel / additive storage	Air quality / surface water / ecosystem	Daily	Major	Unlikely	High	Major	Rare	Medium

Outcome of risk assessment

The maximum inherent risks are rated **High**. In accordance with current regulations and industry best practice, a number of standard risk control measures (as described above) are existing practices included as part of the Costerfield Mine management system to further reduce risks. When these standard controls are taken into account, the maximum residual risk is rated as **High**. The preparation of risk treatment plan is therefore considered necessary and can be found in RRAM.

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7 Risk monitoring and reporting

Risk monitoring and reporting are key components of risk management and are required under the MRSD (MI) Regulations, which state that a monitoring program must include a program to measure performance against all the specified objectives, standards and acceptance criteria and which specifies arrangements for reporting against those specified objectives, standards and acceptance criteria.

7.1 Risk monitoring

At Costerfield risk management performance is monitored in a program that is described in the following documents, which have been uploaded to RRAM:

- Ambient Air Quality Management Plan
- Chemical and Waste Management Procedure
- Community Engagement Plan
- Environmental Monitoring Plan _ Schedule
- Groundwater Management Plan
- Native Vegetation Offset Management Strategy
- Noise Management Plan
- Sensitive Receptor Plan
- Surface Water Management Plan
- Tailings Management Plan
- Traffic Management Procedure.

Additionally, the document Costerfield Mine – Environmental Monitoring Plan summarises information including monitoring locations, monitoring frequency, parameters measured and regulatory limits for each of the different aspects of the environment that is monitored. Figure 5.1 shows the location of the monitoring points in relation to the mining operations and sensitive receptors.

Each of the individual management plans and the Environmental Monitoring Plan have been uploaded to RRAM. The monitoring program for each of the identified risks is described in more detail in the subsections below and these should be considered in conjunction with the individual management plan documents and the Environmental Monitoring Plan.

All environmental monitoring results are communicated to the Costerfield Environment Review Committee (ERC), who meet quarterly.

Table 7-1 summarises Mandalay risk monitoring for each of risk hazard.

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Table 7-1 Summary of risk monitoring

Risk hazard	Comment	Parameters Measured	Sample Frequency	Regulatory Limit	Monitoring Location ID	Responsible Persons	Relevant Management Plans/Procedures
Altered visual amenity	Altered visual amenity is monitored by responding to stakeholder concerns if and when required	Visual amenity (subjective)	Dependent on stakeholder complaint	Not applicable	Dependent on stakeholder complaint	Environmental Officer	Community Engagement Plan Tailings Storage Facility Management/ Operation Plan Traffic Management Procedure Rehabilitation Plan
Dust emissions/ emissions from plant and machinery	Dust emissions are monitored monthly and as-required basis. Emissions from plant and machinery are monitored on an as- required basis. Emissions from the Augusta Mine vents are monitored on an annual basis.	Dust levels; Carbon dioxide levels	As per EPA Victoria-approved monitoring program	As per EPA Victoria-approved monitoring program or WorkSafe Victoria's regulations for vehicle emissions	See Figure 5.1 A per Mandalay's Environmental Monitoring Plan As per Ambient Air Quality Management Plan	Environmental Officer	Ambient Air Quality Management Plan Community Engagement Plan Traffic Management Procedure
Erosion and sedimentation	Erosion and sedimentation impacts are monitored on an annual basis by visual inspections of diversion and containment structures for potential weaknesses that may lead to structure failure.	Potential containment structure weakness	Annually	Not applicable	Containment structures and monitoring points as per Mandalay's Environmental Monitoring Plan (see Figure 5.1) and the Surface Water Management Plan	Structural engineer	Environmental Monitoring Plan Surface Water Management Plan Tailings Storage Facility Management/ Operation Plan Rehabilitation Plan
Fire impacts	Fire impacts are monitored by periodic maintenance of firebreaks, yearly maintenance of firefighting equipment, site inductions for site personnel on first site engagement, as required.	Visual evidence	Annually	Not applicable	Equipment, firebreaks	Site manager/ all site personnel	Community Engagement Plan Tailings Storage Facility Management/ Operation Plan
Flood impacts	Flood impacts are monitored by visual inspections of diversion and containment structures for potential weaknesses that may lead to structure failure.	Visual evidence	Annually	Not applicable	Containment structure	Structural engineer	Surface Water Management Plan Tailings Storage Facility Management/ Operation Plan Rehabilitation Plan
Ground disturbance impacts	Ground disturbance is monitored by groundwater and surface water and heritage impact monitoring programs.	Surface water and groundwater: As per Mandalay's monitoring plan Historic heritage: Visual inspection	Surface water and groundwater: As per Mandalay's monitoring plan Historic heritage: Ongoing	Surface water and groundwater: EPA Victoria-approved monitoring program and compliance limits Historic heritage: Site inspections to include observations that heritage sites remain undisturbed	See Figure 5.1 Surface water and groundwater: As per Mandalay's Environmental Monitoring Plan Historic heritage: Bombay TSF and Cyanide Works, other sites as required	Surface water and groundwater: Environmental Officer Historic heritage: Environmental Officer	Groundwater Management Plan Surface Water Management Plan Tailings Storage Facility Management/ Operation Plan Chemical and Waste Management Procedure Traffic Management Procedure Rehabilitation Plan

Risk hazard	Comment	Parameters Measured	Sample Frequency	Regulatory Limit	Monitoring Location ID	Responsible Persons	Relevant Management Plans/Procedures
Ground instability impacts	Ground instability impacts are monitored by an inspection and survey program in place for the TSF's and at Heathcote-Nagambie Road to detect any potential movement.	Visual evidence	Annually	Not applicable	Heathcote- Nagambie Road	Structural engineer	Tailings Storage Facility Management/ Operation Plan Rehabilitation Plan
Ground vibration impacts	Ground vibration impacts are monitored by temporary blast vibration monitoring to be implemented in the event of complaint or request from legitimate receptor.	Peak particle velocity	As required	Ground vibration (peak particle velocity) below 5 mm/s in at least 95 per cent of cases in a 12- month period, and not exceeding 10 mm/s at any time	As required	Shift supervisors responsible for ensuring appropriate charging of headings in accordance with approved design.	Covered by mine operational and safety procedures
Hazardous materials and waste impacts	A preventative maintenance program is in place to ensure on- going integrity of fuel and lube storage facilities at the Costerfield Operations.	Integrity of fuel and lube storage structures measured by visual inspection. Spill impact parameters are dependent on the nature of the spill. ARD impacts are measured as per the monitoring plan.	Integrity of fuel and lube storage structures are inspected annually. Spill impact sampling frequency is on an as-required basis. ARD sampling frequency is annually, as per the monitoring plan.	Fuel and lube waste impact is dependent on type of waste. ARD impact assessment is as per Mandalay's monitoring plan.	Integrity of fuel and lube storage structures at source. ARD impact monitoring locations are as per Mandalay's monitoring plan.	.	Groundwater Management Plan Surface Water Management Plan Tailings Storage Facility Management/ Operation Plan Chemical and Waste Management Procedure Rehabilitation Plan
Light emissions impacts	Light emissions impacts are monitored by responding to stakeholder concerns if and when required.	Light intensity (lumina)	As required	Not applicable	As required	Environmental Officer	Covered by mine operational procedures
Noise emissions impacts	Noise emissions are monitored as per Mandalay's monitoring plan. However, specific impacts are monitored by responding to stakeholder concerns if and when required.	Sound levels (dB)	As per Mandalay's monitoring plan	As per Mandalay's monitoring plan	As per Mandalay's Environmental Monitoring Plan and Noise Management Plan	Environmental Officer	Noise Management Plan Traffic Management Procedure Community Engagement Plan
Security breach impact	Security breach is monitored by daily checking of perimeter fence gates, building locks, portal gate and explosive container.	Visual integrity	Daily	Not applicable	Site gates, site fences, internal site gates and doors, secure explosives repository locks, vehicle locks	The general manager, all site personnel.	Tailings Management Plan Chemical and Waste Management Procedure Rehabilitation Plan

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7.2 Risk reporting

All environmental monitoring results are communicated to the Costerfield Environment Review Committee (ERC), who meet quarterly. Risk reporting procedures are summarised in Table 7-2.

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Table 7-2 Summary of risk reporting

Risk hazard	Reported To	Reporting Frequency	Responsible Person
Altered visual amenity **Altered visual amenity impacts are reported to the Costerfield ERC. A complaints register and reporting program is in place.**	Costerfield ERC	As required	Environmental Officer
Dust emissions/ emissions from plant and machinery **Dust emissions and emissions from plant and machinery are reported as part of the annual vent shaft emission testing to the Costerfield ERC. A complaints register and reporting program is in place and any dust-related complaints are reported to the Costerfield ERC. Particulate levels are also reported, as required, under National Pollutant Inventory (NPI) reporting requirements.**	Costerfield ERC	Monthly to internal management; Quarterly to ERC	Environmental Officer
Erosion and sedimentation **Erosion and sedimentation impacts are reported by Mandalay incident report system. Any significant, off-licence, erosion or sedimentation events are reported to the Costerfield ERC and EPA Victoria.**	Costerfield ERC EPA Victoria	As required	Structural engineer
Fire impacts **Fire impacts are reported to appropriate emergency services and regulatory agencies.**	Police Country Fire Authority Costerfield ERC ERR	As required	Site manager/ all site personnel

Risk hazard	Reported To	Reporting Frequency	Responsible Person
Flood impacts **Flood impacts are reported by Mandalay incident report system. Any significant flooding impacts are reported to the Costerfield ERC and EPA Victoria.**	Costerfield ERC EPA Victoria	As required	Structural engineer
Ground disturbance impacts **Erosion and sedimentation impacts are reported by Mandalay incident report system. Any significant, off-licence, disturbance events are reported to the Costerfield ERC, EPA Victoria and ERR.**	Costerfield ERC EPA Victoria ERR	Surface water quality is reported to the Costerfield ERC and included in the EPA Victoria Annual Performance Report. Groundwater quality is reported to the Costerfield ERC on a quarterly basis and included in the EPA Victoria Annual Performance Report. The procedure for reporting any pipework and/or dam liner leaks to the Costerfield ERC on a quarterly basis and included in the and included in the EPA Victoria Annual Performance Report. The procedure to describe reporting requirements in the event of discovery of aboriginal archaeological relics. Annual independent hydrogeological review and recommendations Facility inspections by operations personnel each shift.	Environmental Officer
Ground instability impacts	Costerfield ERC ERR	Quarterly	Structural engineer

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Risk hazard	Reported To	Reporting Frequency	Responsible Person
Ground vibration impacts	Costerfield ERC	Annually	Shift supervisors responsible for ensuring appropriate charging of headings in accordance with approved design.
Hazardous materials and waste impacts **Incident reporting system is in place for the management of spills. Results of annual testing of waste rock to confirm non-acid generating properties are reported to the Costerfield ERC.**	Costerfield ERC	Annually (waste rock)	.
Light emissions impacts	Costerfield ERC	Quarterly	Environmental Officer
Noise emissions impacts	Costerfield ERC	Quarterly	Environmental Officer
Security breach impact	Police Costerfield ERC	As required Quarterly	The general manager, all site personnel.

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8 Roles and responsibilities

The following Table 8-1 provides an outline of the roles and responsibilities of personnel accountable for the implementation, management and review of the risk management plan.

The Manager Sustainability or their delegate is responsible for ensuring all reports are completed within the prescribed timeframe and is responsible for maintain this RMP, the risk register and specific risk treatment plans.

Table 8-1 Roles and responsibilities

Personnel	Roles and Responsibilities
General manager	Ensure operation complies with relevant regulatory
Manager Sustainability	Ensure the RMP is implemented and maintain the RMP, risk register and risk treatment plans Review RMP and provide support to the Site team to enable them to meet their commitments Review compliance with all relevant statutes, regulations, rules, procedures, standards and policies Address complaints and maintain the complaint register Report monitoring to ERC Report environmental incidents to the Council and/or State Agencies
Technical Services Manager	Ensure that design, monitoring and audit of built features comply with relevant regulations, codes and guidelines
Shift supervisors	Ensure that personnel comply with relevant regulations, codes and guidelines
Structural engineer	Prepare design, monitoring and audit of built features complying with relevant regulations, codes and guidelines
Environmental officer	Undertake monitoring and reporting of conformance and non-conformances

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9 Plan review

The RMP will undergo routine internal revision, as required, in response to:

- changes in legislation or WPV approval requirements
- changes in site activities, operations, facilities or footprint (e.g. see Section 2.1.4)
- the findings of rehabilitation studies and trials
- the results of environmental monitoring
- completion of progressive rehabilitation activities
- the outcomes of stakeholder consultation
- improvements in the knowledge of rehabilitation practice or technologies
- opportunities for improvements to the plan being identified.

Notwithstanding the above, the RMP will be fully updated every three years or as required following consultation with ERR.

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10 References

ANZG (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Access: *www.waterquality.gov.au/anz-guidelines*

ERR (2017). *Guideline for the design and management of tailings storage facilities*. April 2017. Earth Resources Regulation.

ERR (2020a). *Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects*. Version 1.3. December 2020. Earth Resources Regulation.

ERR (2020b). *Geotechnical guideline for terminal and rehabilitated slopes*. September 2020. Earth Resources Regulation.

HCV (2022). Victorian Heritage Database. Accessed 18 October 2022. Heritage Council Victoria. http://vhd.heritagecouncil.vic.gov.au/places/10180

Mandalay (2022). Community Engagement Plan. Version 6.3. October 2022. Mandalay Resources Costerfield Operation.

SRK (2017). Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report. Prepared for Mandalay Resources Corporation by SRK Consulting (Australia) Pty Ltd. 17 March 2017.

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ACCENT ENVIRONMENTAL

Appendix A:
Risk Treatment Plans

Uploaded to RRAM

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Appendix B: Risk Register

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RISK REGISTER FOR MINING LICENCE NUMBER: 4644

Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Altered visual amenity	1	Plant and equipment - Cuffley vent shaft	Visible plume of steam from Phillips Lane vent shaft on cold mornings on neighbouring landowners or residences	Private property	No	Yes	No	Unlikely	Insignificant	Low	Unlikely	Insignificant	Low
Altered visual amenity	2	Plant and equipment Heathcote North-Costerfield rd Vent shaft and Rising Main	Visible plume of steam from Heathcote North-Costerfield Rd vent shaft on cold mornings on neighbouring landowners or residences	Private property	No	Yes	No	Unlikely	Insignificant	Low	Unlikely	Insignificant	Low
Altered visual amenity	3	Plant and equipment Bradleys Lane	Visible plume of steam from Youle vent shaft on cold mornings on neighbouring landowners or residences	Private property	No	Yes	No	Unlikely	Insignificant	Low	Unlikely	Insignificant	Low
Altered visual amenity	4	Overburden dumps and stockpiles - waste rock and ROM pad stockpiles	Visual impact of waste rock and ROM pad stockpiles on neighbouring landowners or residences	Private property	Yes	Yes	No	Possible	Minor	Medium	Unlikely	Minor	Low
Altered visual amenity	5	TSF	Visual impact of height of TSF above natural ground level on neighbouring landowners or residences	Private property	Yes	Yes	Yes	Possible	Minor	Medium	Unlikely	Minor	Low
Dust	6	Vehicle movement	Vehicle movements on un-sealed roads creating dust that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Moderate	Very High	Possible	Moderate	Medium
Dust	7	Plant and equipment	Plant such as crushers generating fine dust that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Moderate	Very High	Possible	Moderate	Medium
Dust	8	Filling and use of cement silo	Dust emissions created by filling of cement from silo creating dust that may impact on amenity, air quality and/or	Air quality / Public safety	Yes	Yes	No	Almost Cert	Moderate	Very High	Unlikely	Insignificant	Low
Dust	9	Screening operations, heavy vehicle and loader	Dust emissions created by Screening operations, heavy vehicle and loader movements creating dust that may	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Moderate	Very High	Rare	Moderate	Medium
Dust	10	Mobile crusher operations	Dust emissions created by Mobile crusher, screening plant at the Brunswick mine creating dust that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Moderate	Very High	Rare	Moderate	Medium
Dust	11	Movement and stockpiling of mined materials	Movement of mined materials, such as the recovery of waste rock for beneficial re-use, creating dust that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Moderate	Very High	Possible	Moderate	Medium

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Dust	12	Tailings stored in TSF	Dust emissions created by winds blowing across dried out tailings surface creating dust that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Unlikely	Minor	Low	Rare	Minor	Low
Air emissions	13	Vehicle movement	Emissions of carbon dioxide and particulates from mobile plant that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Minor	High	Possible	Minor	Medium
Air emissions	14	Machinery	Emissions of carbon dioxide and particulates from mobile plant that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	Yes	Almost Cert	Minor	High	Possible	Minor	Medium
Air emissions	15	Process Plant	Emissions of carbon dioxide and particulates from mobile plant that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	No	Almost Cert	Minor	High	Possible	Minor	Medium
Air emissions	16	Blast fume from vent shafts	Blast fumes from vent shafts that may impact on amenity, air quality and/or public health	Air quality / Public safety	Yes	Yes	No	Unlikely	Minor	Low	Rare	Minor	Low
Erosion and sedimentation	17	Dams and waterways	Impact on private property, crown land, surface water and aquatic ecosystems from unplanned, sediment-bearing or erosive discharge from the: •Augusta Mine dam •Augusta Mine evaporation ponds •Brunswick Mill stormwater dam •Brunswick Mill process water dam •Brunswick West Process water dam	Private property / crown land / surface water / aquatic ecosystems	Yes	Yes	Yes	Unlikely	Moderate	Medium	Rare	Moderate	Medium
Erosion and sedimentation	18	TSFs	Unplanned, sediment-bearing or erosive discharge from the TSFs resulting in impacts on private property, crown land, surface water and aquatic ecosystems	Private property / crown land / surface water / aquatic ecosystems	Yes	Yes	Yes	Unlikely	Moderate	Medium	Rare	Moderate	Medium
Erosion and sedimentation	19	Activity – plant and equipment	Erosion and sedimentation caused by the use of plant and equipment resulting in impacts on surface water and aquatic ecosystems	Surface water / aquatic ecosystems	Yes	Yes	Yes	Likely	Minor	Medium	Unlikely	Minor	Low
Erosion and sedimentation	20	Activity – overburden dumps and stockpiles	Erosion and sedimentation caused by runoff from waste dumps and stockpiles resulting in impacts on surface water and aquatic ecosystems	Surface water / aquatic ecosystems	Yes	Yes	Yes	Likely	Minor	Medium	Unlikely	Minor	Low
Erosion and sedimentation	21	Disturbed, unrehabilitated ground	Erosion and sedimentation caused by the use of plant and equipment during construction/rehabilitation resulting in impacts on surface water and aquatic ecosystems	Surface water / aquatic ecosystems	Yes	Yes	Yes	Likely	Minor	Medium	Unlikely	Minor	Low

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Fire	22	Plant and equipment - fire generating activity (ignition source)	Fire ignited as a result of mining-related activities where the ignition source is plant and equipment. The fire generating activity may impact on air quality and/or public health, as well as causing damage to private property, community facilities, crown land, public land or the Heathcote-Graytown National Park.	Air quality / public safety / private property / community facility / crown land / National Park	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Fire	23	Fuel/additive storage – above-ground storage tanks	Fire ignited as a result of mining activities where the ignition source is fuel / additive storage or use. The fire generating activity may impact on or a bushfire in the vicinity of the operation may pose a risk to the integrity of above-ground storage tanks or other hazardous goods storage areas, potentially causing flammable materials to ignite.	Air quality / public safety / private property / community facility / crown land / National Park	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Flood	24	Dams and waterways	Impacts on public safety, private property, crown land, water quality and aquatic ecosystems from flooding due to unplanned discharge from the: •Augusta Mine dam •Augusta Mine evaporation ponds •Brunswick Mill stormwater dam •Brunswick Mill process water dam	Public safety / private property / crown land	No	Yes	Yes	Unlikely	Major	High	Rare	Major	Medium
Flood	25	TSFs	Impact on public safety, private property, crown land, water quality and aquatic ecosystems from unplanned discharge from the TSFs.	Public safety / private property / crown land	No	Yes	Yes	Unlikely	Major	High	Rare	Major	Medium
Flood	26	Dams and waterways	Impacts on public safety, private property, crown land, water quality and aquatic ecosystems from flooding due to unplanned discharge from the: •Augusta Mine dam •Augusta Mine evaporation ponds •Brunswick Mill stormwater dam •Brunswick Mill process water dam	Water quality / aquatic ecosystems	No	Yes	Yes	Unlikely	Moderate	Medium	Rare	Moderate	Medium
Flood	27	Dams and waterways	Flooding of local waterways reaching mine facilities and causing the erosion of mined materials or release of mining-related contaminants	Water quality / aquatic ecosystems	No	Yes	Yes	Unlikely	Moderate	Medium	Rare	Moderate	Medium
Flood	28	TSFs	Impact on public safety, private property, crown land, water quality and aquatic ecosystems from unplanned discharge from the TSFs.	Water quality / aquatic ecosystems	No	Yes	Yes	Unlikely	Major	High	Rare	Major	Medium

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Ground disturbance	29	Dams and waterways	Potential seepage from Augusta Evaporation Dams resulting in impacts on groundwater and surface waters (affecting terrestrial or aquatic ecosystems, private land or crown land)	Groundwater / surface water / ecosystems/ Private land / crown land	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	30	Dams and waterways	Discharge of surface drains (containing salinity and metals) potentially resulting in impacts on surface waters and soil (affecting terrestrial or aquatic ecosystems, private land or crown land)	Groundwater / surface water / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	31	Dams and waterways	Discharge of treated water from RO Water Treatment Plant potentially resulting in impacts on surface waters or hydrology (affecting aquatic ecosystems)	Groundwater / surface water / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	32	Dams and waterways	Potential leakage of brine from RO Water Treatment Plant from pipelines to surface waters and soil (affecting terrestrial or aquatic ecosystems, private land or crown land	Private land / crown land	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	33	Dams and waterways	Potential for discharges to impact on designated Areas of Cultural Heritage Sensitivity (e.g. creek lines), requiring approvals for certain surface disturbing works	Areas of cultural heritage sensitivity	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	34	TSF	Potential impact on groundwater and surface water quality associated with seepage or discharge from the TSFs, affecting terrestrial or aquatic ecosystems, private land or crown land	Groundwater / surface water / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	35	TSF earthworks	Potential impact on terrestrial private land or crown land	Ecosystems / Private land / crown land	No	Yes	Yes	Almost Cert	Minor	High	Almost Certain	Insignificant	Medium
Ground disturbance	36	Activity – plant and equipment	Potential impact on groundwater aquifer levels or quality associated with mine dewatering program, affecting beneficial uses or surface water quality or hydrology	Groundwater levels and hydrology	Yes	Yes	Yes	Almost Cert	Minor	High	Almost Certain	Insignificant	Medium
Ground disturbance	37	Activity – plant and equipment	Potential for land clearance activities to affect terrestrial ecosystems	Groundwater / surface water quality	Yes	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	38	Activity – plant and equipment	Potential for activities from mobile equipment to impact heritage listed 'Bombay Mine and Cyanide Works' northwest of the TSF	Ecosystems	Yes	Yes	Yes	Possible	Moderate	Medium	Unlikely	Moderate	Medium

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Ground disturbance	39	Activity – plant and equipment	Potential for activities from mobile equipment to impact on certain areas designated as Areas of Cultural Heritage Sensitivity (e.g. creek lines), requiring approvals for certain surface disturbing works	Areas of historic or cultural heritage sensitivity	Yes	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Ground disturbance	40	Disturbed and rehabilitated ground	Potential for weed and pest to establish and spread on disturbed ground	Private land / crown land /ecosystems	Yes	Yes	Yes	Likely	Minor	Medium	Possible	Minor	Medium
Ground instability	41	Mine voids and underground workings, including ventilation and egress shafts	Possible subsidence of land in the vicinity of underground mine voids may impact on public safety, private property, crown land and public infrastructure	Public safety / private property / crown land/ public infrastructure	No	Yes	Yes	Rare	Major	Medium	Rare	Major	Medium
Ground instability	42	Mine voids	Failure of pit walls may impact on public safety	Public safety	No	Yes	Yes	Rare	Critical	High	Rare	Critical	High
Ground instability	43	Activity – overburden dumps and stockpiles	Possible slumping of waste stockpiles, or constructed landforms may impact on public safety, private property, crown land and public infrastructure	Public safety / private property / crown land/ public infrastructure	No	Yes	Yes	Rare	Moderate	Medium	Rare	Moderate	Medium
Ground instability	44	TSFs	Possible failure of TSF embankments may impact on public safety, private property and crown land	Public safety	No	Yes	Yes	Rare	Critical	High	Rare	Critical	High
Ground instability	45	TSFs	Possible failure of TSF embankments may impact on public safety, private property and crown land	Private property / crown land/ public infrastructure	No	Yes	Yes	Rare	Moderate	Medium	Rare	Moderate	Medium
Ground vibration	46	Blasting (underground)	Vibration impacts on neighbouring landowners, private property or public infrastructure	Private property / public infrastructure	No	Yes	No	Possible	Moderate	Medium	Rare	Moderate	Medium
Hazardous materials and waste	47	Fuel / additive storage	Spills, uncontrolled discharges or leaks from compromised containment structures (such as storage tanks and bunded areas) have the potential to impact on soil and/or groundwater quality on-site and / or off-site (private property and crown land)	Private property / crown land – soil / ecosystems	Yes	Yes	Yes	Almost Cert	Minor	High	Possible	Minor	Medium
Hazardous materials and waste	48	Fuel / additive storage	Spills, uncontrolled discharges or leaks from compromised containment structures (such as storage tanks and bunded areas) have the potential to impact on soil and/or groundwater quality on-site and / or off-site (private property and crown land)	Private property / crown land – groundwater / surface water / ecosystems	Yes	Yes	Yes	Possible	Minor	Medium	Possible	Minor	Medium

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Hazardous materials and waste	49	Activity – overburden dumps and stockpiles	Leaching of metals from waste rock or ROM stockpiles into the environment (in particular, acid rock drainage) has the potential to impact on soil, groundwater and surface water	Private property / crown land – soil / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Hazardous materials and waste	50	Activity – overburden dumps and stockpiles	Leaching of metals from waste rock or ROM stockpiles into the environment (in particular, acid rock drainage) has the potential to impact on soil, groundwater and surface water	Private property / crown land – groundwater / surface water / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Hazardous materials and waste	51	Tailings	Leaching of metals from TSF into the environment (in particular, acid rock drainage) has the potential to impact on soil, groundwater and surface water	Private property / crown land – soil / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Hazardous materials and waste	52	Tailings	Leaching of metals from TSF into the environment (in particular, acid rock drainage) has the potential to impact on soil, groundwater and surface water	Private property / crown land – groundwater / surface water / ecosystems	No	Yes	Yes	Possible	Moderate	Medium	Rare	Moderate	Medium
Light emissions	53	Night works	Light emissions (lightspill) associated with night time mining and processing activities may impact on neighbouring landowners or residences and/or public safety (road users)	Amenity	No	Yes	No	Possible	Minor	Medium	Unlikely	Minor	Low
Light emissions	54	Night works	Light emissions (lightspill) associated with night time mining and processing activities may impact on neighbouring landowners or residences and/or public safety (road users)	Public safety	No	Yes	No	Unlikely	Minor	Low	Unlikely	Minor	Low
Noise pollution	55	Activity – blasting	Noise from underground blasting may impact on amenity, neighbouring landowners or residences	Private property	No	Yes	No	Unlikely	Minor	Low	Rare	Minor	Low
Noise pollution	56	Activity – plant and equipment	Noise from: mobile crusher; screening plant; loader; process plant equipment; equipment accessing and being serviced in the workshop in the boxcut; and screening of cemented rock fill in the boxcut; may impact on amenity, neighbouring landowners or residences.	Private property	No	Yes	No	Likely	Minor	Medium	Possible	Minor	Medium
Noise pollution	57	Activity – plant and equipment (Cement silo)	Noise from: filling and discharging cement silo; and use of agitator trucks sourcing cement from silo; may impact on amenity, neighbouring landowners or residences.	Private property	No	Yes	No	Likely	Minor	Medium	Possible	Minor	Medium

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
Noise pollution	58	Activity – plant and equipment (construction, decommissioning or rehabilitation)	Noise from: construction or rehabilitation activities may impact on amenity, neighbouring landowners or residences	Private property	No	Yes	Yes	Likely	Minor	Medium	Possible	Minor	Medium
Noise pollution	59	Activity – ventilation shaft operation	Noise from ventilation fans may impact on amenity, neighbouring landowners or residences	Private property	No	Yes	No	Likely	Minor	Medium	Possible	Minor	Medium
Noise pollution	60	Activity – overburden dumps and stockpiles	Noise from: operation of excavators and trucks; placement of rock in boxcut; ore truck movements and placement of ore on ROM pad; placement of rock on waste rock stockpiles; and recovery of waste rock for beneficial re-use; may impact on amenity, neighbouring landowners or residences.	Private property	No	Yes	Yes	Likely	Minor	Medium	Possible	Minor	Medium
Noise pollution	61	Night works	Noise during night works may impact on amenity, neighbouring landowners or residences.	Private property	Yes	Yes	No	Likely	Minor	Medium	Possible	Minor	Medium
Security breach	62	Mined voids and underground workings – open mine portals and shafts	Harm to unauthorised persons entering into open cut or underground workings	Public safety	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Security breach	63	Surface water – dams and waterways	Harm to unauthorised persons entering into dams and waterways	Public safety	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Security breach	64	Activity – plant and equipment (explosives)	Harm to unauthorised persons using explosives and associated public safety	Public safety	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Security breach	65	Activity – plant and equipment (explosives)	Harm to unauthorised persons using explosives and associated environmental risks	Groundwater / surface water / ecosystems	Yes	Yes	Yes	Unlikely	Major	High	Rare	Major	Medium
Security breach	66	Activity – plant and equipment (vehicles and plant)	Harm to unauthorised persons using site vehicles and equipment and associated public safety risks	Public safety	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Security breach	67	Activity – plant and equipment (vehicles and plant)	Harm to unauthorised persons entering into site buildingsand associated public safety risks	Public safety	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Security breach	68	Fuel / additive storage	Harm to persons due to unauthorised use of fuel or hazardous materials and associated public safety	Public safety	Yes	Yes	Yes	Unlikely	Critical	High	Rare	Critical	High
Security breach	69	Fuel / additive storage	Harm to persons due to unauthorised use of fuel or hazardous materials and associated environmental risks	Groundwater / surface water / ecosystems	Yes	Yes	Yes	Unlikely	Major	High	Rare	Major	Medium

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Hazard	Risk No	Risk Event	Causes/Background	Receptors	Phase of Project			Risk Assessment prior to additional risk controls - project inherent risk			Risk Assessment after including risk controls - project residual risk		
					Construction	Operation	Closure	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating

Accountable Personnel

List Personnel accountable for the implementation, management and review of the Risk Management Plan

Personnel	Roles and Responsibilities
General manager	Ensure operation complies with relevant regulatory
Manager Sustainability	Ensure the RMP is implemented and maintain the RMP, risk register and risk treatment plans Review RMP and provide support to the Site team to enable them to meet their commitments Review compliance with all relevant statutes, regulations, rules, procedures, standards and policies Address complaints and maintain the complaint register Report monitoring to ERC
Technical Services Manager	Ensure that design, monitoring and audit of built features comply with relevant regulations, codes and guidelines
Shift supervisors	Ensure that personnel comply with relevant regulations, codes and guidelines
Structural engineer	Prepare design, monitoring and audit of built features complying with relevant regulations, codes and guidelines
Environmental officer	Undertake monitoring and reporting of conformance and non conformances

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 28/09/2023

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Appendix G: Risk Treatment Plan Brunswick West TSF – Ground Instability

Mineral Resources (Sustainable Development) Act 1990

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Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed: _____

Delegate of the Department Head

Date: 28/09/2023

Brunswick West Tailings Storage Facility (TSF) - Ground Instability

Contents

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Licence Number

MIN4644

Scope

This risk treatment plan is for the control of: *Brunswick West TSF - Ground Instability*

Key sensitive receptors

The key sensitive receptors associated with this hazard include:

#	Details of the Sensitive Receptor	Location and proximity to site
1	Public safety	All surrounding areas.
2	Private property	The land on which the TSF is situated is private land.
3	Crown land	The land adjacent to the TSF is crown land.

Project Design and Context

Operation of the proposed Brunswick West TSF.

Risk Events

#	Details of the Risk Event	Phase	Consequence	Likelihood	Inherent Risk Rating
1	Possible failure of TSF embankments may impact on public safety, private property and crown land	Operation	Critical	Unlikely	High

Objectives

The key objectives of this risk treatment plan are to:

- Avoid harm or impact on public safety, private property or crown land due to ground instability associated with TSF.

Compliance standards

The compliance standards for this risk treatment plan are:

- Technical Guideline for Design and Management of Tailings Storage Facilities (ERR 2017); and
- Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure (ANCOLD 2019).

Acceptance criteria

The acceptance criteria for this risk treatment plan are:

- No harm or impact on public safety, private property or crown land.

Controls to address hazard

The controls for this risk treatment plan are:

#	Details of controls being used	Risk Events being managed (number from above)	Performance measures
1	Planning, Design, Construction, Operation and Closure of TSF to best practice	*1*	Detailed Design Report prepared by a globally recognized tailings consultant who specializes in life-of-mine tailings management Dam Safety Emergency Plan established and reviewed by TSF Design Engineer
2	Seismic Criteria	*1*	ANCOLD specifies a design criteria for Safety Evaluation Earthquake (SEE) of 1:5,000 AEP

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#	Details of controls being used	Risk Events being managed (number from above)	Performance measures
			event, however, design adopted a higher criteria of 1:10,000 AEP event
3	Environmental Spill Consequence Category	*1*	ANCOLD specifies a design criteria of Low, however, design adopted Significant and increased spillway height from 0.3 metres to 0.5 metres
4	Independent Review of Detailed Design Report	*1*	Independent TSF specialist who provides strategic consulting engineering services and technical advice on tailings management to provide review of the Detailed Design Report in accordance with ERR 2017 and ANCOLD 2019
5	TSF Design Engineer responds to independent Review of Detailed Design Report	*1*	TSF Design Engineer revises Detailed Design Report in response to Independent Review of Detailed Design Report
6	Dam Break Investigation	*1*	Dam break investigation undertaken by TSF Design Engineer Prepare report of outcomes of Dam Break modelling and incorporate key findings/summary into Detailed Design Report Prepare inundation maps
7	Credible Failure Mode Assessment	*1*	TSF Dam Engineer undertook a credible failure mode assessment to quantify the risks
8	Dam Safety Emergency Plan	*1*	Prepare Dam Safety Emergency Plan in accordance with findings by Dam Break Investigation Dam Safety Emergency Plan reviewed by TSF Design Engineer
9	Construction of TSF to best practice	*1*	Civil construction undertaken in strict adherence to quality assurance standards including full time QAQC to ensure design specification for foundation preparation, material placement and compaction as well as design geometry are met Dedicated liner installation crew including testing regime and QAQC program to ensure BGM liner and HDPE liner are installed and tested correctly
10	Operation, Maintenance and Surveillance (OMS) Plan - This will include hydraulic performance criteria and instructions to cover all necessary monitoring, daily and weekly routine inspections and surveillance activities. Tailings deposition, decant and return water management procedures will also be documented.	*1*	Prepare and implement OMS Plan OMS Plan prepared or reviewed by TSF Design Engineer
11	Train personnel in emergency procedures in accordance with Dam Safety Emergency Plan	*1*	All personnel trained
12	Train personnel in operation, maintenance and monitoring of TSF in accordance with OMS Plan	*1*	Processing and Sustainability personnel trained
130	Monitoring of geotechnical stability	*1*	Routine monitoring of factors related to geotechnical stability in accordance with OMS Plan (see Table below)

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#	Details of controls being used	Risk Events being managed (number from above)	Performance measures
14	Annual Independent Dam Safety Inspection in accordance with ANCOLD	*1*	Annual Dam Safety Inspection Report undertaken by independent qualified and experienced dams engineer
15	Closure of TSF to best practice	*1*	Prepare a Detailed Closure Plan in accordance with relevant industry publications (see Table below)
16	Rehabilitation of TSF	*1*	Earthworks undertaken in accordance with Detailed Closure Plan and in strict adherence to quality assurance standards

Residual Risk Assessment

Considering the controls being put in place the assessment of the residual risk associated with the risk events identified for this hazard is shown in the table below.

#	Details of the Risk Event	Phase	Consequence	Likelihood	Inherent Risk Rating
1	Possible failure of TSF embankments may impact on public safety, private property and crown land	Operation	Critical	Rare	High

Monitoring

#	Aspect to be monitored	Details of monitoring
1	Daily surveillance of TSF	Visual observations and records of embankment and water levels in accordance with OMS manual
2	Annual Independent Surveillance	Audit operation of TSF, incidents and undertake inspection of TSF in accordance with ANCOLD
3	Geotechnical stability	Quarterly drone survey and analysis to ensure TSF in in accordance with the design intent and criteria specified in the OMS manual
4	Abnormalities in embankment (cracking, movement…)	Reported as an incident
5	Overtopping events	Reported as an incident

Reporting

#	Aspect being reported	Who will the information be reported to and at what frequency?	How will it be used?
1	Daily monitoring	Internally to Process Plant Manager	The safe operation and management of TSF
2	TSF operation, monitoring and incidents	Monthly ERC	Stakeholder briefing
3	Independent surveillance of TSF	Report to ERR as required	To determine the need for remediation or changes to operation and maintenance of TSF
4	TSF incidents (embankment abnormalities)	Report to ERR as required	To determine the cause of incident, need for remediation or changes to management to ensure safe operation and management of TSF
5	TSF incidents (overtopping)	Report to ERR and EPA	To determine the cause of incident, impact on the environment, need for remediation or changes to management to ensure safe operation and management of TSF

Relevant industry publications

#	Document	Source (e.g. URL, appendix number)
1	*Technical Guideline for Design and Management of Tailings Storage Facilities* (ERR 2017)	*https://earthresources.vic.gov.au/legislation-and-regulations/guidelines-and-codes-of-practice*
2	*Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure* (ANCOLD 2019)	*https://www.ancold.org.au/?page_id=334*

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Operator's reference documents

#	Document	Location (e.g. work plan appendix number)
1	Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report 109014.15 R04 (Rev 1) ATC Williams (2022a)	[WPV Appendix A]
2	Independent Peer Review of Design Report (WSP – Golders 2022)	[WPV Appendix B]
3	Brunswick West Tailings Storage Facility Dam Break Investigation 109014.15 R02 ATC Williams (2022b)	[Major findings are incorporated into the Detailed Design Report]
4	Dam Safety Emergency Plan	[WPV Appendix C]
5	Brunswick West TSF Operations, Maintenance and Surveillance Manual	To be developed prior to placement of tailings
6	Rehabilitation Plan	[Attached with WPV]

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Licence Number

4644

Scope

This risk treatment plan is for the control of: *Fire*

A mining hazard means any mining activity and circumstance that may pose a risk to the environment, to any member of the public or to land, property or infrastructure in the vicinity of work carried out at a mine site.

Key sensitive receptors

The key sensitive receptors associated with this hazard include:

#	Details of the Sensitive Receptor	Location and proximity to site	How Hazard may harm or damage Sensitive Receptor	Evidence to support assessment
1	Public safety	Facilities are located on both Crown land and private land. The following roads all traverse the tenement:	Fire/smoke may impact causing injury/fatality	RMP Sensitive receptors
2	Air quality	At the Facilities, background air quality would be expected to be typical of a relatively remote rural location, distant from other large-scale industry.	Fire/smoke may impact on air quality	RMP Sensitive receptors
3	Private property	The distances and directions to residences from the Facilities: • fifteen residences within 1000 m of Youle Ventilation Shaft at the north of Costerfield Operations • six residences within 1000 m of the Augusta site at south of Costerfield Operations • four residences within 1000 m of the Brunswick Processing Plant	Fire may impact causing damage	RMP Sensitive receptors
4	Community facility	Costerfield Public Hall is approximately 1.3 km northeast of the Brunswick processing plant	Fire may impact causing damage	RMP Sensitive receptors
5	Crown land	The Brunswick site is largely located on Crown land (which extends to the east of the site): Brunswick TSF, Bombay TSF, Rock Garden waste rock stockpile, Process plant and associated pipelines	Fire may impact causing damage	RMP Sensitive receptors
6	National Park	Heathcote-Graytown National Park is approximately to 1.5 km to 3 km to the north, northeast and northwest of the Costerfield Operations	Fire may impact causing damage	RMP Sensitive receptors

Risk Events

#	Details of the Risk Event	Phase	Consequence	Likelihood	Inherent Risk Rating
1	Fire ignited as a result of mining-related activities where the ignition source is plant and equipment. The fire generating activity may impact on air quality and/or public health, as well as causing damage to private property, community facilities, crown land, public land or the Heathcote-Graytown National Park.	Construction, operation and closure	Critical	Rare	High
2	Fire ignited as a result of mining activities or a bushfire in the vicinity of the operation may pose a risk to the integrity of above-ground storage tanks or other hazardous goods storage areas, potentially causing flammable materials to ignite. The fire generating activity may impact on air quality and/or public health, as well as causing damage to private property, community facilities, crown land, public land or the Heathcote-Graytown National Park.	Construction, operation and closure	Critical	Rare	High

Objectives

The key objectives of this risk treatment plan are to:

- To prevent any impact to public safety, private property, community facilities or crown land as a result of mine-related fire ignition.

Compliance standards

The compliance standards for this risk treatment plan are:

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- *County Fire Authority Act (1958)*
- Country Fire Authority Regulations (2015)
- *Planning and Environment Act (1987)*
- Code of Practice for Bushfire Management on Public Land (2012)
- Australia Standard AS 1940-2004 - The storage and handling of flammable and combustible liquids (Standards Australia, 2004)

Acceptance criteria

The acceptance criteria for this risk treatment plan are:

- Any fire ignitions originating within the licence area are contained within it.
- Bushfires burning onto the licence area do not cause health or safety incidents and result in minimal environmental harm.

Controls to address hazard

The controls for this risk treatment plan are:

#	Details of controls being used	Risk Events being managed (number from above)	Performance standards/ measures *(specifying how the control is being implemented –if not implicit in the control)*
1	Site Emergency Plan	1,2	Plan implemented and maintained
2	Prepare fire response and readiness	1,2	Plan produced and available on site
3	Maintenance of firebreaks	1,2	Firebreaks are maintained
4	Preventative maintenance program on mobile equipment and fixed plant to ensure the risk of spark generation is minimised	1,2	Fire-fighting equipment maintained as per maintenance schedule
5	Maintenance of adequate on-site water storages for fire-fighting purposes	1,2	OHS audits

#	Details of controls being used	Risk Events being managed (number from above)	Performance standards/ measures *(specifying how the control is being implemented –if not implicit in the control)*
6	Inclusion of bushfire authority in community engagement plan and emergency management plan	1,2	
7	Trained Emergency Response Team personnel across the mining workforce	1,2	
8	Employee induction	1,2	All employees undertake site induction
9	Ensuring fire management plans (including fire extinguisher maintenance) are up to date	1,2	Maintenance performed annually
10	Safe storage of flammable materials in accordance with applicable Australian Standards	1,2	OHS audits

Residual Risk Assessment

Considering the controls being put in place the assessment of the residual risk associated with the risk events identified for this hazard is shown in the table below.

#	Details of the Risk Event	Phase	Consequence	Likelihood	Residual Risk Rating
1	Fire ignited as a result of mining-related activities where the ignition source is plant and equipment. The fire generating activity may impact on air quality and/or public health, as well as causing damage to private property, community facilities, crown land, public land or the Heathcote-Graytown National Park.	Construction, operation and closure	Critical	Rare	High
2	Fire ignited as a result of mining activities where the ignition source is fuel / additive storage or use. The fire generating activity may impact on or a bushfire in the vicinity of the operation may pose a risk to the integrity of above-ground storage tanks or other hazardous goods storage areas, potentially causing flammable materials to ignite.	Construction, operation and closure	Critical	Rare	High

Monitoring

#	Aspect to be monitored	Details of monitoring
1	Monitoring of fire breaks	As required in accordance with the Site Emergency Plan
2	Maintenance of fire extinguishers and fire-fighting equipment	Monitored annually or as required by OHS
3	Site inductions & training	Emergency training for all personnel

Reporting

#	Aspect being reported	Who will the information be reported to and at what frequency?	How will it be used?
1	Fire impacts	Reported to ERR, police, CFA as required	To notify agencies for fire fighting
2	Site inductions & training	Internally monthly	Ensure personnel are appropriately trained
3	Fire-fighting equipment	Internally monthly	Ensure equipment is available for fire fighting

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Relevant industry publications

#	Document	Source (e.g. URL, appendix number)
1	CFA Bushfire Management Template: Pathway 2	*https://www.cfa.vic.gov.au/plan-prepare/bushfiremanagement-statement-bms-templates*

Operator's reference documents

#	Document	Location (e.g. work plan appendix number)
1	Site Emergency Plan	RRAM: Site Emergency Plan
2	Community Engagement Plan	RRAM: Community Engagement Plan
3	Hazard Identification and Risk Management Procedure	RRAM: Hazard Identification and Risk Management Procedure

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Licence Number

MIN4644

Scope

This risk treatment plan is for the control of: *Security breach*

Key sensitive receptors

The key sensitive receptors associated with this hazard include:

#	Details of the Sensitive Receptor	Location and proximity to site	How Hazard may harm or damage Sensitive Receptor	Evidence to support assessment
1	Public safety	Facilities are located on both Crown land and private land with multiple access points. The facilities are accessible from the local roads that traverse the tenement: Heathcote-Nagambie Road, Bradleys Lane, Phillips Lane, Cochranes Road, Newtons Lane, Peels Lane and Tobins Lane.	Access to hazardous work sites that result in injury/fatality to public and/or damage to equipment and facilities.	

Risk Events

#	Details of the Risk Event	Phase	Consequence	Likelihood	Inherent Risk Rating
1	Harm to unauthorised persons entering into open mine portals and shafts or underground workings	Construction, operation and closure	Critical	Unlikely	High
2	Harm to unauthorised persons entering into dams and waterways	Construction, operation and closure	Critical	Unlikely	High
3	Harm to unauthorised persons using explosives and associated public safety	Construction, operation and closure	Critical	Unlikely	High
4	Harm to unauthorised persons using site vehicles and equipment and associated public safety risks	Construction, operation and closure	Critical	Unlikely	High
5	Harm to unauthorised persons entering into site buildings and associated public safety risks	Construction, operation and closure	Critical	Unlikely	High
6	Harm to persons due to unauthorised use of fuel or hazardous materials and associated public safety	Construction, operation and closure	Critical	Unlikely	High

Objectives

The key objectives of this risk treatment plan are to:

- Avoid harm or impact on public safety as a result of unauthorised access to the by members of the public and to provide for safe authorised access.

Compliance standards

The compliance standards for this risk treatment plan are:

- Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019

- *Safety on Public Land Act* (2004)
- Licence conditions

Acceptance criteria

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The acceptance criteria for this risk treatment plan are:

- No security breaches of sites and facilities
- No unauthorised access resulting in harm or safety incidents

Controls to address hazard

The controls for this risk treatment plan are:

#	Details of controls being used	Risk Events being managed (number from above)	Performance standards/ measures *(specifying how the control is being implemented –if not implicit in the control)*
1	Site Emergency Plan	1-6	Plan implemented and maintained
2	Augusta mine site entrance surrounded by a fence with lockable gates	1	Gates and equipment are secured
3	Brunswick processing plant is surrounded by a fence with lockable gates	1	Gates and equipment are secured
4	Underground workings where current access is required, including ventilation shaft site, are secured by lockable gates	1	Gates and equipment are secured
5	Underground workings where future access may be required are secured by fencing	1	Gates and equipment are secured
6	Underground workings where no access is required are secured by permanent closure	1	Access is sealed as per work plan/rehabilitation plan specifications
7	Water storages such as TSFs are enclosed by chain-link fence with lockable gates	2	Gates and equipment are secured
8	Buildings are secured by lockable doors/gates and locked at the completion of working shifts	5	All locks in working order, gates and equipment are secured
9	Plant and equipment (including vehicles) are kept in gated and locked enclosures and/or individually locked at the completion of working shifts	4	All locks in working order, gates and equipment are secured
10	Explosives are kept underground in a designated secure explosives repository	3	All locks in working order, gates and equipment are secured
12	Fuel storage tanks are secured with an electronic tagging system for dispensing fuel	6	All locks in working order, gates and equipment are secured
13	No-unauthorized signage to be erected	1-6	Maintain signs
14	Regular inspections by operating personnel	1-6	Routine inspections
15	Control access to site when site is attended	1-6	Entrance via reception
16	Visitors safety induction and site escort accompany visitors onsite	1-6	All visitors undertake a safety induction
17	All redundant sites to be made safe through decommissioning and closure activities	1-6	Sites and facilities meet closure criteria as per work plan/rehabilitation plan specifications

Residual Risk Assessment

Considering the controls being put in place the assessment of the residual risk associated with the risk events identified for this hazard is shown in the table below.

#	Details of the Risk Event	Phase	Consequence	Likelihood	Residual Risk Rating
1	Harm to unauthorised persons entering into open mine portals and shafts or underground workings	Construction, operation and closure	Critical	Rare	High
2	Harm to unauthorised persons entering into dams and waterways	Construction, operation and closure	Critical	Rare	High
3	Harm to unauthorised persons using explosives and associated public safety	Construction, operation	Critical	Rare	High
4	Harm to unauthorised persons entering into site buildings and associated public safety risks	Construction, operation and closure	Critical	Rare	High
5	Harm to persons due to unauthorised use of fuel or hazardous materials and associated public safety	Construction, operation and closure	Critical	Rare	High

Monitoring

#	Aspect to be monitored	Details of monitoring
1	Site entry by visitors	Register of all visitors to site
2	Induction of visitors	Maintain records of induction
3	Site security breach	Security is monitored by daily checking of perimeter fence gates. Checks are performed for site gate, site fences, internal site gates and vehicle locks
4	Site security breach	Records kept of site security breaches

Reporting

#	Aspect being reported	Who will the information be reported to and at what frequency?	How will it be used?
1	Visitor site entry and induction	Daily internal reporting.	Ensure all visitors have safe access while onsite and have exited site prior to end of operating hours.
2	Site security breach	Police, ERR as required	To address impacts of a security breach
3	Site security breach	Reported to site management and regulatory authority as required or six monthly.	Improve site security to limit unauthorised site access.

Relevant industry publications

#	Document	Source (e.g. URL, appendix number)

Operator's reference documents

#	Document	Location (e.g. work plan appendix number)
1	Site Emergency Plan	RRAM: Site Emergency Plan
2	Rehabilitation Plan	RRAM: Rehabilitation Plan

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MANDALAY RESOURCES

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 28/09/2023

Rehabilitation Plan

Costerfield Operations

3 July 2023

Project name	Mandalay Resources Costerfield Operations
Licence nos.	MIN4644
Licence holder	Mandalay Resources Costerfield Operations Pty Ltd
Company name	Mandalay Resources Costerfield Operations Pty Ltd
Document	Rehabilitation Plan, Costerfield Operations, AE1046.9 Version 1
Date submitted	4th July 2023
Contact details	Ross Laity, Sustainability Manager Mandalay Resources Costerfield Operations, PO Box 667, Heathcote Vic 3523

Rehabilitation Plan

Costerfield Operations

AE1046.9_RP

July 2023

Version 4			
Issued to			
Ross Laity, Sustainability Manager, Mandalay Resources Costerfield Operations			
Prepared by		Reviewed by	Approved by
Neil Wines (Principal Environmental Consultant)		Michael Cramer (Director - Accent)	
Previous versions			
Version:	1	18/10/2022	Draft
	2	30/10/2022	Final Draft
	3	06/04/2023	Respond to ERR comments
	4	03/07/2023	Respond to ERR comments

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Abbreviations

ANCOLD	Australian National Committee on Large Dams
AHD	Australian Height Datum
ANZMEC	Australian and New Zealand Minerals and Energy Council
CEP	Community Engagement Plan
CRS	Community Reference Subcommittee
DEECA	Department of Energy, Environment and Climate Action (formerly DEWLP)
DELWP	former Department of Environment, Land, Water and Planning
EPA	Environment Protection Authority (Victoria)
ERC	Environmental Review Committee
ERS	Environmental Reference Standard
ERR	Earth Resources Regulation
GIS	geographic information system
ha	hectares
DJPR	Department of Jobs, Precincts and Regions
Mandalay	Mandalay Resources Australia Pty Ltd
MRCO	Mandalay Resources Costerfield Operations
km	kilometre
M	million
m	metres
m^2	square metres
m^3	cubic metres
MRSD Act	*Mineral Resources (Sustainable Development) Act 1990*
MRSD (MI) Regulations	Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019
ROM	run-of-mine
TSF	tailings storage facility
WP	work plan
WPV	work plan variation

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1 Introduction

1.1 Context

The Costerfield Operations are located within the Costerfield mining district of Central Victoria, approximately 50 km east of the City of Greater Bendigo, on Mining Licences MIN4644 and MIN5567. The licences are held by Mandalay Resources Costerfield Operations Pty Ltd (MRCO), a wholly owned subsidiary of Mandalay Resources Australia Pty Ltd (Mandalay).

Figure 1.1 shows the location of these tenements.

The Costerfield Operations are owned and operated by MRCO and comprise the underground Augusta, Cuffley, Brunswick and Youle gold and antimony mines, and associated infrastructure including the Brunswick Processing Plant, the Brunswick and Bombay tailings storage facilities (TSFs) and the Splitters Creek Evaporation Facility. The mining and processing activities are located within MIN4644, while the evaporation facility at Splitters Creek is within MIN5567. Exploration drilling activities occur within MIN4464 but also in the surrounding exploration licence areas.

The existing Rehabilitation Plan (MRCO 2019) and Closure Plan (Accent 2017) were prepared prior to the release of the current Earth Resources Regulation (ERR) guidelines *Preparation of Rehabilitation Plans Guideline for Mining & Prospecting Projects* (the Guidelines) (ERR 2020a).

MRCO has engaged Accent Environmental (Accent) to prepare an updated Rehabilitation Plan for the Costerfield Operations in accordance with the Guidelines. This report has been prepared by Accent based on discussions with and information provided by MRCO and integrates the previous rehabilitation and closure plans into a single document.

1.2 Scope and structure

This Rehabilitation Plan covers the closure and rehabilitation activities associated with the mining, processing and supporting facilities and infrastructure within MIN4644 (only). MRCO also holds adjacent exploration licences; however these are not covered by this Rehabilitation Plan.

Consistent with the requirements of the Guidelines, the Rehabilitation Plan includes information under the following headings:

- site information and setting
- rehabilitation obligations and commitments
- stakeholder identification and community engagement
- proposed post-mining land uses and post-mining landform
- rehabilitation domains
- objectives
- criteria

- schedule for rehabilitation milestones
- post-rehabilitation risk identification and assessment
- financial costing and provision for closure
- plan review.

This Rehabilitation Plan has been revised to meet the requirements of the new Guidelines, and to incorporate the Brunswick West TSF and work plan notification for the Brunswick Portal.

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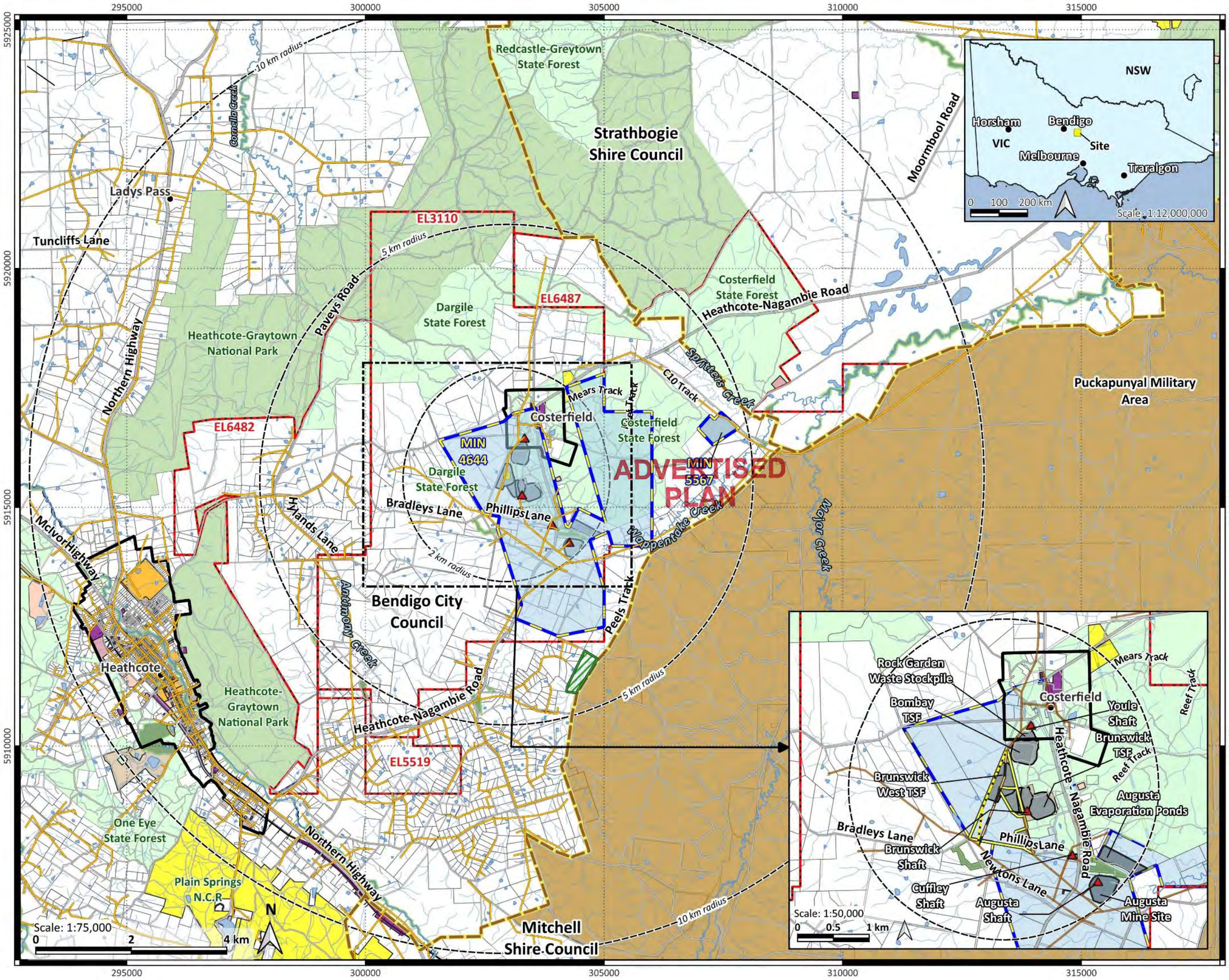

AE1046.9 Mandalay Resources - Costerfield Operation

Figure 1.1. Regional plan and tenements

Created 3/11/2022 and revised 21/04/2023
CRS: GDA 20 MGA 55
Scale: 1:75,000 @ A3 (main map)
Page size: A3

- Vent shaft (inset map)
- Town
- Road
- Railway
- Main watercourse
- Watercourse - tributary
- Existing power transmission line
- Power transmission line to be relocated
- Relocated power transmission line
- Exploration Licence
- Mineral Licence
- Mine site domain
- Offset area
- Lot 2 PS404811
- Private land lot boundary
- LGA boundary
- Radius circle
- Water body

Crown Land

- Commonwealth Land
- Community Use Area
- Earth Resources
- Historic and Cultural Features Reserve
- National Park
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Additional data, main map: VIC_TR_TRANSPORT (Road, Rail), VIC_locality_point, VIC_PLM25, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATERAREA, VIC_LGA_POLYGON, VIC_TOWNSHIP_POLYGON, VIC_POWERLINE, VM_PARCEL
Inset map (upper): STE_2021_AUST_GDA2020

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1.3 Rehabilitation plan checklist

Error! Reference source not found. provides a checklist of the information required to be i ncluded in a rehabilitation plan in accordance with Appendix 8.1 of the Guidelines (ERR 2020a), cross-referencing the sections within the report where the required information is provided.

Table 1-1 Rehabilitation plan checklist

Information required	Section of report
Does the rehabilitation plan have a cover page?	Cover
Knowledge base Does the rehabilitation plan include:	
• Project summary – rehabilitation specific content as well as relevant cross refences to summaries provided in the work plan?	Section 2.1
• Rehabilitation obligations and commitments – a comprehensive list of all rehabilitation related obligations, conditions and commitments, and an explanation of how these obligations will be met through the proposed rehabilitation activities?	Sections 3 and 5
• Environmental and social setting – a detailed description of the local and regional environmental setting and inclusion of all environmental data relevant to rehabilitation planning?	Section 2.2
Community engagement Does the rehabilitation plan detail the stakeholder engagement undertaken, and set out how community views (including views of landowners and Traditional Owners on Crown Land) have been considered in the post-mining land uses?	Section 4
Proposed post-mining land uses and landform Does the rehabilitation plan: • propose post-mining land use(s) • include post-mining landforms?	Section 5
Rehabilitation domains Does the rehabilitation plan include rehabilitation domains that in sum cover the whole site?	Section 6
Rehabilitation objectives Does the rehabilitation plan include a whole of site objective and objectives for each rehabilitation domain that articulate what the post-mining landform will be?	Section 7
Rehabilitation criteria Have 'SMART' closure criteria linked to the site's closure objectives been developed, and does the rehabilitation plan provide detailed information on how the criteria were developed?	Section 8

Information required	Section of report
Schedule for rehabilitation milestones	
Are progressive and final rehabilitation milestones clearly outlined? Is there sufficient detail on what and how rehabilitation actions will be undertaken for each rehabilitation domain with a supporting schedule and consider unplanned and temporary closure scenarios?	Section 9
Rehabilitated land risk assessment	
Does the rehabilitation plan identify and detail all risk that the rehabilitated land may pose?	Section 10

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2 Site information and setting

This section provides a brief description of the operations and the site setting. More detailed information is provided, as required, in subsequent chapters.

2.1 Project summary

2.1.1 Locality

The Costerfield Operations are located within the Costerfield mining district of Central Victoria, approximately 10 km northeast of the township of Heathcote (see Figure 2.1), 50 km east of the City of Greater Bendigo and 100 km north of Melbourne.

2.1.2 Land ownership and tenure

Land property descriptions for the MRCO sites are presented Table 2-1.

Table 2-1 Operational sites and land tenure

Site	Lot/Plan	Tenure	Ownership/ land manager
Augusta Infrastructure, Boxcut and waste rock storage	(AB3, AB3G, AB3A) Lot 1 TP246611	Freehold	Tobin Family
Augusta Evaporation Ponds/Storage Dams	Allot 8 Sec1 Parish of Costerfield	Freehold	MRCO
Cuffley Ventilation Shaft and facilities	Allot 34 Sec1 Parish of Costerfield	Freehold	MRCO
Mine dewatering rising main and pipeline	Allot 39 Sec1 Parish of Costerfield	Crown Land	DELWP
Brunswick Processing Plant, Brunswick TSF and Bombay TSF	Allot 37 Sec1 Parish of Costerfield	Crown Land	DELWP
Youle ventilation shaft and rising main	Allot 13 Sec6 Parish of Costerfield	Freehold	MRCO
Brunswick Open Pit and core storage area	Lot 1 PS404811	Freehold	MRCO
Brunswick West TSF	Lot 2 PS404811	Freehold	Harris Family

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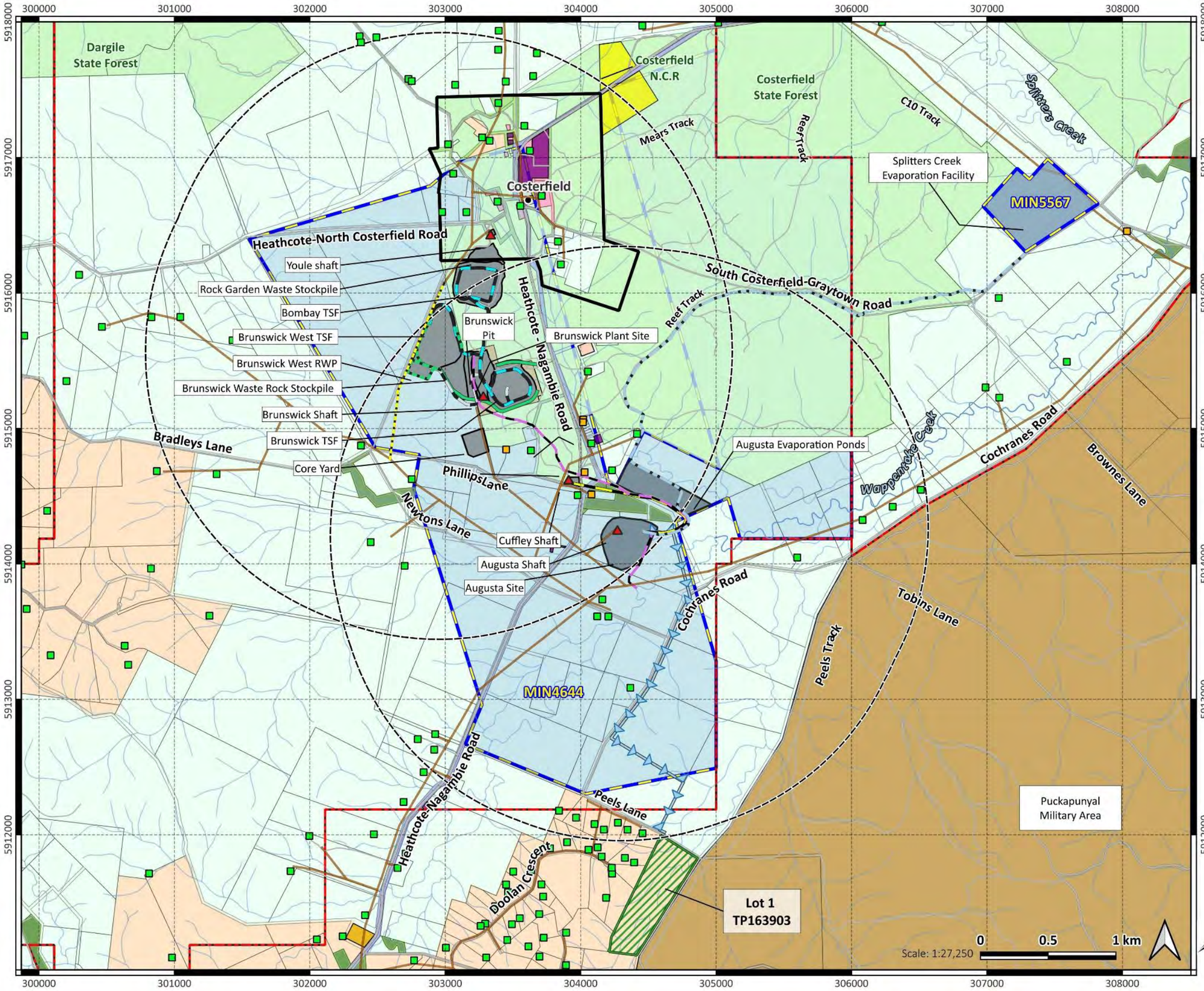
AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.1. Surface layout

Created 3/11/2022 and revised 2/04/2023
CRS: GDA 20 MGA 55
Scale: 1:27,500 @ A3
Page size: A3



- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Town
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Process water return pipeline
- Process water delivery pipeline
- Existing power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain
- Vegetation offset area
- Private land lot boundary
- Costerfield township
- Water body
- Radius circle - 2km

Crown Land

- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_TOWNSHIP-POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Land.

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2.1.3 Historic context

Gold and antimony were first discovered at Costerfield in 1860 and underground mining has taken place periodically since this time. Historic mining of the Costerfield–Bombay–Minerva complex occurred between surface level and 300 m below ground level, initially via shaft, and later in some areas as open cut mining.

The current mining operations at the site commenced in 2006. MRCO purchased the operations on December 1, 2009, from AGD Operations Pty Ltd.

2.1.4 Overview of operations

Costerfield operates a continuous mining operation 24 hours a day 365 days per year with a workforce of approximately 220 employees.

Mining at Costerfield targets several individual lodes (including the Youle and Shepherd lodes). Mining is currently not active at Augusta, Cuffley or Brunswick. Access to the lodes is either via the Augusta Portal or Brunswick Portal and associated declines.

Ore extraction is achieved through three different mining methods: full face development, uphole stoping and predominantly longhole cemented rock fill (CRF) stoping.

Mining at Youle follows a bottom-up sequence mining from the northern and southern extents retreating towards the central access. The practice of placing CRF in stope voids has been undertaken at Youle to improve local ground stability using waste rock from development with the addition of a cement slurry mix. Mobile equipment includes underground haulage trucks, loaders, jumbos, integrated tool carriers, cement agitator trucks, fork lifts and light vehicles.

Underground ore from the Youle and Shepherd lodes is trucked to the surface via the Brunswick Portal and placed on the Run of Mine (ROM) ore pad located adjacent to the Brunswick Processing Plant.

The ore is transferred to the Brunswick ROM pad where it is stockpiled, screened and blended prior to being fed into the Brunswick Processing Plant. The Brunswick Processing Plant throughput is typically around 13,000 tonnes/month.

The surface crushing and screening system processes underground ore down to a particle size suitable for milling through a two-stage closed circuit ball milling circuit. Centrifugal style gravity concentrators are used on the combined primary milling product and secondary mill discharge, to recover a gold rich gravity concentrate that is sold as a separate gold concentrate and sent to a local refinery.

Secondary milled products are classified by size and processed through a simple floatation circuit comprising a single stage of rougher, scavenger and cleaning. The concentrate is thickened through dewatering and filtration to produce a final antimony/gold concentrate product that is then bagged and transported to Melbourne Port for packing into shipping containers for shipment to overseas customers. The tailings is thickened before being sent to a TSF.

Tailings have been stored in the Bombay TSF and the Brunswick TSF. Once the currently active Bombay TSF is at capacity, both these facilities will be closed [ATC Williams 2022]. The Brunswick West TSF to be constructed so that it can receive tailings once existing TSF capacity has been reached.

Mine ventilation comprises fresh air being sourced from surface intakes including the Brunswick Portal, Augusta Portal, Augusta ladderway, Brunswick Fresh Air Rise and Augusta Fresh Air Rise.

Exhaust ventilation flows exit the active mine workings via two airways comprising the Youle Return Air Rise and Cuffley Return Air Rise.

Groundwater is pumped to the surface via the Cuffley rising main. Water is pumped to the Augusta Mine Dam before being distributed for re-use in mining operations as well as feed to the Reverse Osmosis (RO) Plant located at Brunswick. Permeate from the RO plant meets applicable water quality criteria and is discharged under licence to a local waterway (Wappentake Creek).

Excess water and RO brine is sent to the Splitters Creek Evaporation Facility.

2.1.5 Costerfield Operations components

The surface components of the Costerfield Operations are shown in

Figure 2.1 and located at the following three main locations:

- Augusta site
- Brunswick site
- Splitters Creek (MIN5567).

The current components of the site are shown in Figure 2.1. Approximate areas for the facilities are shown in Table 2-2.

Table 2-2 Disturbance areas and features of MIN4644

Disturbance site	Area (ha)	Details
Augusta site	21.2	Boxcut, portal pads, offices, workshop, waste rock storage evaporation ponds, water storage and shafts
Brunswick site	49.15	Open pit, portal, ROM, process plant, TSFs, offices, core storage, waste rock storage and shafts
Cuffley shaft	0.5	Ventilation shaft
Youle shaft	<0.01	Ventilation shaft

Augusta site

The Augusta site comprises the following components (see

Figure 2.2):

- underground mine
- boxcut (including the access portal to the mine, mine workshop and refuelling bay)
- mine administration area
- crib rooms
- evaporation dams
- mine dam
- waste rock stockpile
- noise bund and bund around administration area
- switch room and compressor shed

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- laydown yard and stores building
- Augusta fresh air rise ventilation shafts
- Phillips Lane (i.e. Cuffley) return air rise ventilation shaft
- Phillips Lane (i.e. Cuffley) electrical substation and infrastructure
- rising main mine dewatering pipeline
- site access roads
- pipeline to Splitters Creek
- pipeline to injection bores on Peels Lane.

The Augusta mine also provides access to the Cuffley underground workings. The only surface expression of the Cuffley workings is the Cuffley vent shaft and rising main collar.

Brunswick site

The Brunswick site comprises the following components (see Figure 2.3):

- processing plant
- mill workshop and administration buildings
- ROM pad and crushing plant
- Brunswick Waste Rock Stockpile
- Brunswick Pit
- Brunswick Portal
- Brunswick Return Air Raise
- Youle Return Air Raise
- Brunswick TSF
- Brunswick West TSF
- Bombay TSF
- reverse osmosis water treatment plant and pipelines
- cement storage hopper
- laydown area
- exploration core shed and storage yard
- Mill Stormwater Dam
- Rock Garden Waste Stockpile.

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Splitters Creek site

The Splitters Creek Evaporation Facility (MIN5567) is located approximately 2.5 km northeast of the Augusta mine and comprises a series of clay-lined evaporation terraces following the sloping contour of the land and an HDPE lined storage dam. Groundwater extracted from the mine and brine from the RO plant is

pumped to the evaporation facility for disposal by evaporation via an above-ground pipeline on an as-needs basis. MIN5567 is not covered by this Rehabilitation Plan.

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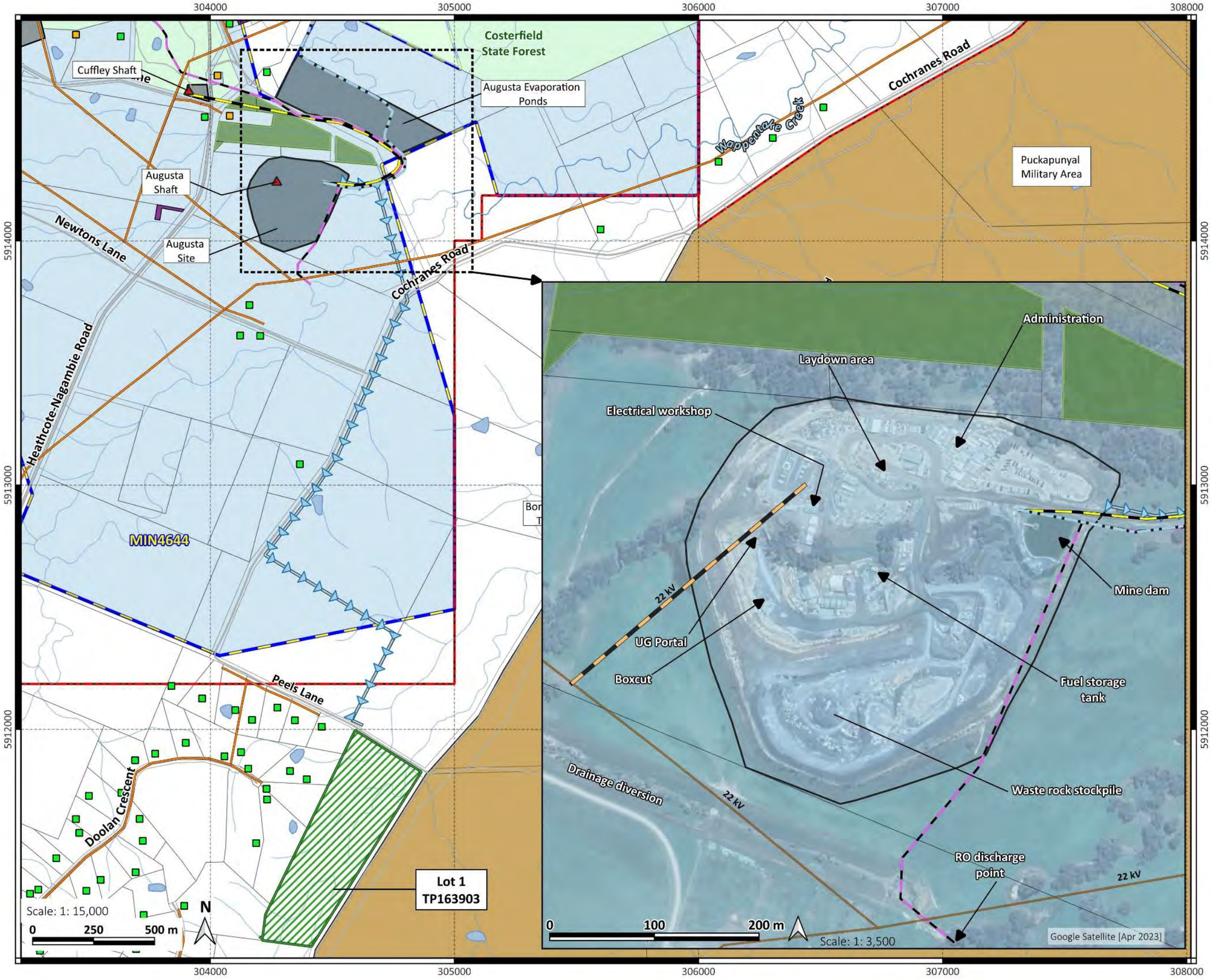
Figure 2.2. Site layout - Augusta site
Created 3/11/2022, revised 21/04/2023
CRS: GDA 20 MGA 55
Scale: 1:15,000 @ A3 (main map)
Page size: A3



Owned by Mandalay Resources
Sensitive receptor (residence)
Vent shaft
Injection site
Splitters Creek pipeline
RO discharge pipeline
Rising main pipeline
Existing power transmission line
Power transmission line to be disconnected (inset map)
Road
Main watercourse
Watercourse - tributary
Exploration Licence
Mining Licence
Mine site domain (main map)
Vegetation offset area
Private land lot boundary
Water body
Aboriginal Cultural Overlay

Crown land (main map)

Commonwealth Land
Natural Features Reserve
State Forest
Uncategorised Crown Land

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Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Lands.

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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.3. Site layout - Brunswick site
Created 3/11/2022, revised 21/04/2023
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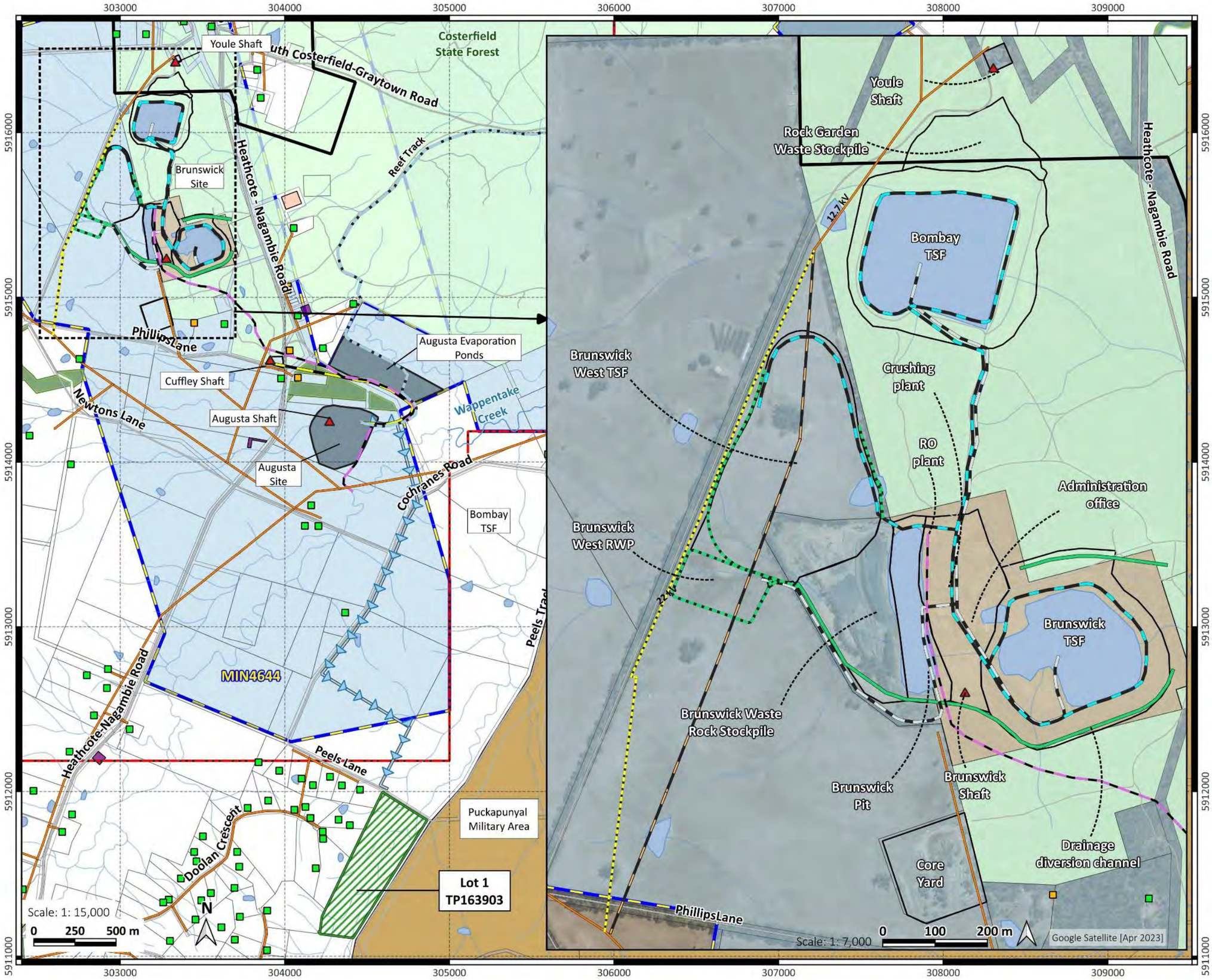

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Process water return pipeline
- Process water delivery pipeline
- Rising main pipeline
- Existing power transmission line
- Power transmission line to be disconnected (inset map)
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain (main map)
- Vegetation offset area
- Private land lot boundary
- Water body

Crown land (main map)

- Commonwealth Land
- Natural Features Reserve
- State Forest
- Uncategorised Crown Land

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Lands.

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2.2 Environmental and social setting

2.2.1 Climate

The Costerfield area has a Mediterranean climate with temperatures ranging from -2°C in winter (May to August) to +40°C in summer (November to February). Annual rainfall in the area is approximately 500 mm to 600 mm, with the majority occurring between April and October. The annual pan evaporation is between 1,300 mm and 1,400 mm.

Construction activities are generally restricted to the summer months as high winter rainfall can lead to saturated ground conditions that affect surface activities.

2.2.2 Geology

Mineralised veins in the Costerfield district are hosted by Silurian Costerfield siltstone, exposed in the core of the Costerfield Anticline. Historically, Costerfield mineralisation has been mined over a length of approximately 8 km north to south. Auriferous quartz-stibnite veins strike north-northwest and dip steeply to the west or east. They occur as either discrete, near vertical veins or in mineralized zones that range in thickness from a few millimetres up to a maximum of 4 m. Despite their narrow width, the veins tend to be persistent along strike and down dip. Individual ore shoots have been traced over 800 m strike length and have been worked down to 550 m depth.

Lodes typically comprise quartz (laminated to brecciated) and sulphides. The dominant sulphide mineral is stibnite (Sb_2S_3). In addition to stibnite, arsenopyrite and pyrite are observed. Gold mineralisation occurs within the stibnite as small grains, less than 20 micron, and is often associated with the presence of arsenopyrite. Stibnite mineralisation is fine-grained and is present as either massive mineralisation or as a matrix support to quartz breccias.

2.2.3 Landscape and landuse

The Costerfield Operations are located within a relatively flat, undulating plain, with several shallow waterway cut into it. The vegetation in the area consists of sparse woodland with little understory, typical of Box Ironbark forest in this area.

Land use surrounding the site is mainly small-scale farming, State forest and some low intensity residential properties. Vegetation in the farmed areas comprises mainly grasses used for grazing, with small copses of trees in natural waterholes and along waterways. State forest is located adjacent to the site.

Refer to Figure 2.4 and 2a for planning zones and overlays.

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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.4. Planning zones

Created 3/11/2022 and revised 3/04/2023
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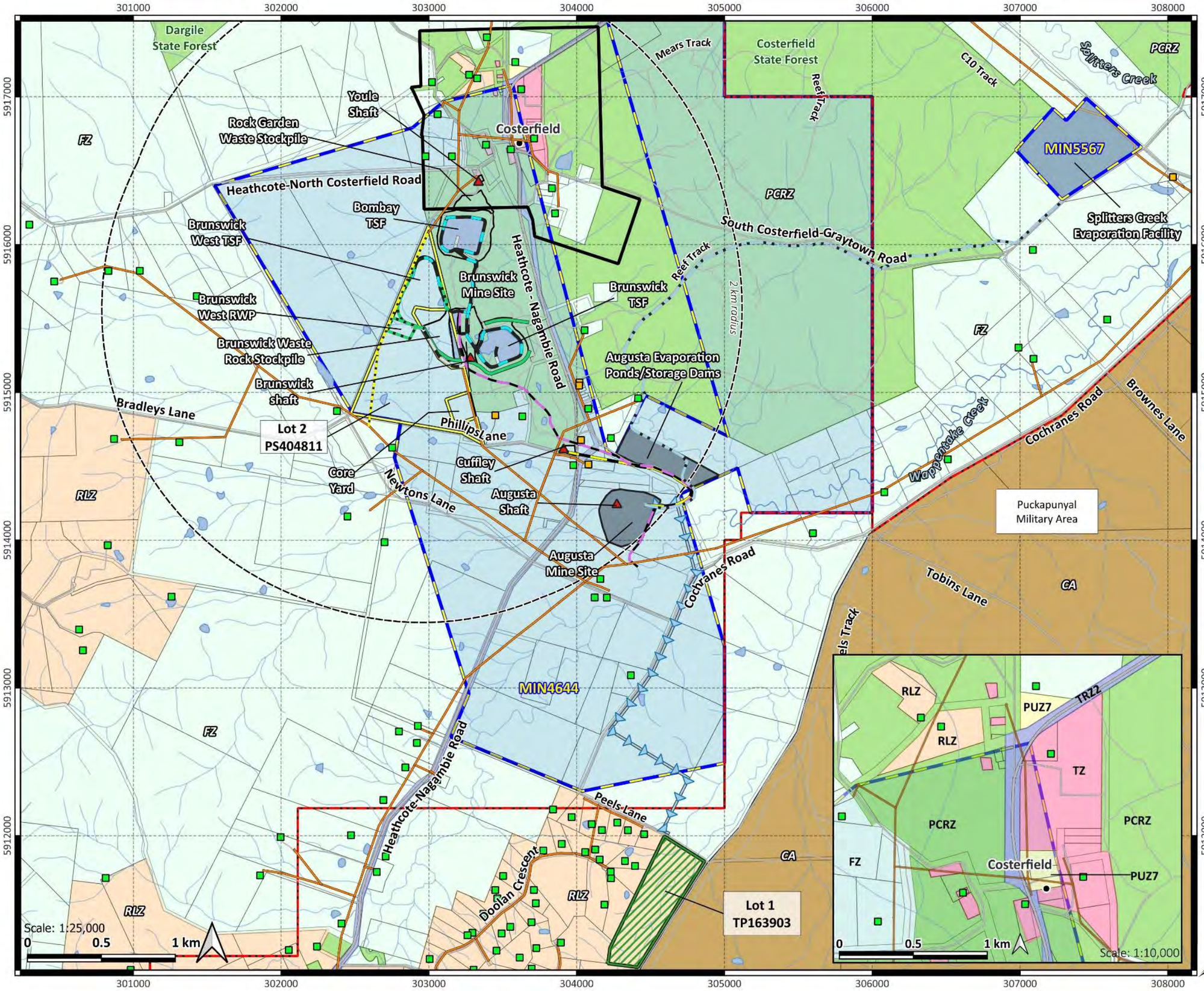
Page size: A3



- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Town
- Splitters Creek pipeline
- RO discharge pipeline
- Process water return pipeline
- Process water delivery pipeline
- Rising main pipeline
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Existing power transmission line
- Relocated power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain
- Lot 2 PS404811
- Vegetation offset area
- Private land lot boundary
- Costerfield township
- Water body
- Radius circle

Planning Overlay

- Commonwealth Land (Planning zone category - CA)

Planning Zone

- FZ- Farming zone
- PCRZ - Public Conservation and Resource
- TZ - Township
- RLZ - Rural Living Zone
- TRZ2 - Principal Road Network
- PUZ7 - Public Use Zone - Other Public Use

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_TOWNSHIP-POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Lands, PLAN_ZONE wms (http://services.land.vic.gov.au/catalogue/publicproxy/guest/dv_geoserver/wms?VERSION=1.1.1

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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.4a. Planning overlayss

Created 3/11/2022 and revised 1/04/2023
CRS: GDA 20 MGA 55
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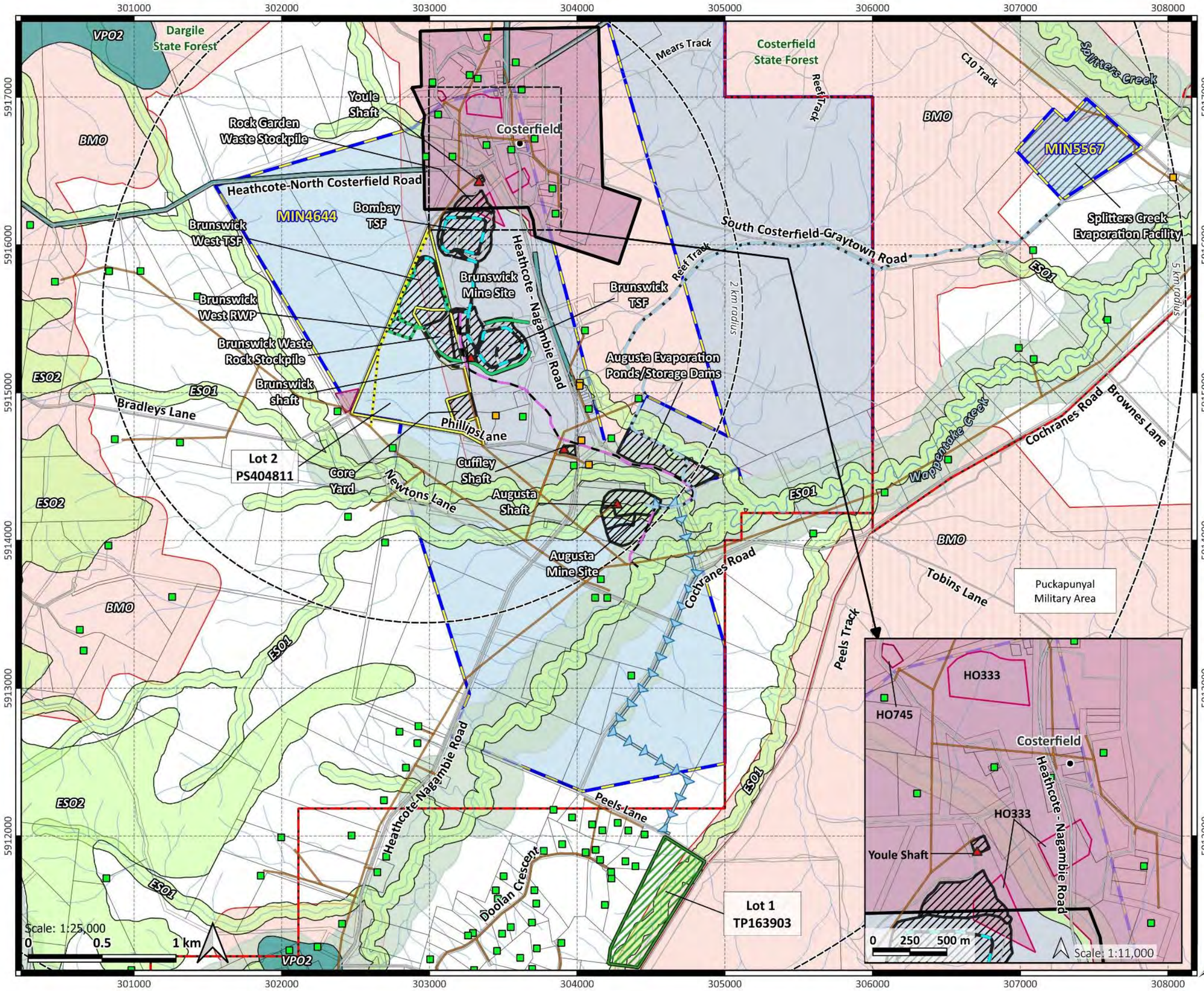

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Town
- Splitters Creek pipeline
- RO discharge pipeline
- Process water return pipeline
- Process water delivery pipeline
- Rising main pipeline
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Existing power transmission line
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- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain
- Lot 2 PS404811
- Vegetation offset area
- Private land lot boundary
- Costerfield township
- Water body
- Radius circle

Planning Overlay

- Environmental Significance Overlay (ESO) - Schedules 1 and 2
- Heritage Overlay (HO)
- Vegetation Protection Overlay (VPO) - Schedules 2 and 3
- Aboriginal Cultural Heritage Overlay

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_TOWNSHIP-POLYGON, VIC_POWER_LINE and VIC_PLAN_OVERLAY

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2.2.4 Surface water and groundwater

There are a number of ephemeral creeks in the vicinity of the mining operations, including Wappentake Creek and its tributaries. The surrounding plains are considered to be alluvial, and the lower-lying areas occasionally flood during heavy rainfall events.

The regional groundwater aquifer is confined to semi-confined and consists of Silurian siltstones and mudstones. Groundwater flow within this regional aquifer is through fractures and fissures within the rock. This is overlain by a perched alluvial aquifer comprising recent gravels, sands and silt. The perched alluvial aquifer is connected to the surface water system.

Based on monitoring and hydrogeological modelling, dewatering from the Augusta, Cuffley and Youle underground workings does not affect the alluvial aquifer. There are no beneficial users of groundwater in the area due to the poor quality of the water.

The pre-mining groundwater level at Brunswick shaft is approximately 178 AHD (WSP-Golder 2023). Currently the groundwater level is at approximately 120 m RL below the pit floor and thus 66 metres below its pre-existing level, due to mine associated dewatering activities.

There are no registered users of groundwater within at least 3 km of the Costerfield Mine site. Naturally occurring groundwater in the vicinity of the Costerfield Mine generally contains elevated levels of salt and dissolved metals, with low yield making it unsuitable for most stock and domestic purposes.

2.2.5 Flora

Part of the operation is located within the Costerfield State Forest and in a Public Conservation and Resource Zone (PCRZ). The Department of Environment, Land, Water and Planning (DELWP) maps the following Ecological Vegetation Classes (EVCs) as potentially occurring in the vicinity of the Costerfield Operations site: EVC 175 Low Rises Grassy Woodland (conservation status: vulnerable); and EVC 61 Box Ironbark (conservation status: depleted). For EVC evaluation purposes, Costerfield mining operations lies within the Goldfields Bioregion.

A field inspection identified EVC 20 Heathy Dry Forest in areas adjacent to the Brunswick site (Cheers 2016). The Heathy Dry Forest was identified to be a low overstorey, open eucalypt forest which is poor in form to 20 m tall with an open crown cover. The understorey is dominated by a low, sparse to dense layer of ericoid-leaved shrubs including heaths and peas. Graminoids and grasses are frequently present in the ground layer, but do not provide much cover.

MRCO has procured a native vegetation offset site located at Peels Lane, Costerfield, to compensate for the clearing of vegetation for all mining-related activities.

2.2.6 Heritage

Aboriginal cultural heritage

The Taungurung Clan Aboriginal Corporation is the Registered Aboriginal Party designated as the traditional owners of the land on which mining licence MIN4644 is located (SRK 2017).

Certain areas within MIN4644 and close to current operational areas are designated as Areas of Cultural Heritage Sensitivity. These include:

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- Wappentake Creek (a waterway that traverses the southern portion of the eastern half of MIN4644) and 200 m either side of the drainage line.
- Mountain Creek South (a waterway that traverses the southern portion of the eastern half of MIN4644) and 200 m either side of the drainage line.

Mining heritage

The Costerfield Gold and Antimony Mining Precinct consists of three historic heritage sites (Bombay Mine and Cyanide Works, Minerva Mine and Costerfield Main shaft) that are located within MIN4644 to the northwest of the Brunswick TSF. The precinct is considered to be of historical, archaeological and scientific importance to the State of Victoria (HCV 2022).

In addition, the following features of local cultural heritage significance associated with historic mining have been identified within MIN4644 between the Augusta and Brunswick sites:

- South Costerfield Mine Shaft
- Old Alison Mine Shaft
- New Alison Mine Shaft.

The mine operations do not disturb any historic mine workings or other heritage features.

2.2.7 Community

Costerfield township is located 120 km north of Melbourne, has a total population of 75, and falls within the City of Greater Bendigo (MRCO 2022).

2.2.8 Sensitive receptors

Sensitive receptors are those aspects of the natural or human environment that may be impacted by mining operations. Under the MRSD Act, ERR has a duty when determining the consequence of a risk event to consider the potential impacts to (ERR 2020a):

- *Members of the public:*
  - *Public health, safety, amenity and Aboriginal heritage*
- *Land, property and infrastructure:*
  - *Neighbouring property, land use and nearby infrastructure such as highways, transmission lines, pipelines, schools and hospitals*
- *Environment:*
  - *Air, water, soil, vegetation, and flora and fauna species.*

In 2015, ERR released guidance for a risk based approach to the submission of Work Plans that requires the identification of sensitive receptors and the risk of the project creating a hazard to (or impact on) these receptors.

MRCO has identified the following sensitive receptors around MIN4464. The sensitive receptors closest to the project sites are listed in

Table 2-3 and shown in

Receptor	Facility	Direction from site	Distance
Heathcote-Graytown National Park	Brunswick site	North, northeast and northwest	1.5 -3.0 km
Costerfield State Forest	Rock Garden, Bombay TSF Brunswick TSF and processing plant	-	Within
	Augusta site	North	500 m
Mountain Creek	Brunswick site	south	500 m
	Augusta site	West to east	Within
Tin Pot Gully Creek	Augusta sites	East	100 m
	Augusta evaporation ponds	Northeast	20 m
	Brunswick site		300 m
Wappentake Creek	Augusta site	South	200 m
Heritage area (HO330)	Rock Garden/Bombay TSF		Within
Heritage place (Miner's cottage 326110)	Rock Garden/Bombay TSF	North	500 m
Residences			
Three residences	Augusta evaporation ponds		150-300 m
Six residences	Augusta site		250-1000 m
Eleven residences	Both Augusta and Brunswick		<2000 m
Six residences	Youle Ventilation Shaft		100 -500 m
Six residences	Rock Garden/Bombay TSF		300-500 m
Four residences	Brunswick site		500-1000 m
Four residences	Cuffley Ventilation Shaft		150-300 m
Infrastructure			
McNichols Lane	Augusta site		100 m
	Augusta evaporation ponds		20 m
Cochranes Road, Newtons Lane, Peels Lane, Tobins Lane	Augusta site		<1000 m
Phillips Lane	Cuffley Ventilation Shaft		20 m
Bradleys Lane	Youle Ventilation		20 m
	Brunswick West TSF		50 m
Heathcote-Nagambie Road	Augusta site		200 m
Heathcote-Nagambie Road	Brunswick Plant site		200 m

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Figure 2.5.

Table 2-3 Sensitive receptors within 2km of MRCO.

Receptor	Facility	Direction from site	Distance
Heathcote-Graytown National Park	Brunswick site	North, northeast and northwest	1.5 -3.0 km
Costerfield State Forest	Rock Garden, Bombay TSF Brunswick TSF and processing plant	-	Within
	Augusta site	North	500 m
Mountain Creek	Brunswick site	south	500 m
	Augusta site	West to east	Within
Tin Pot Gully Creek	Augusta sites	East	100 m
	Augusta evaporation ponds	Northeast	20 m
	Brunswick site		300 m
Wappentake Creek	Augusta site	South	200 m
Heritage area (HO330)	Rock Garden/Bombay TSF		Within
Heritage place (Miner's cottage 326110)	Rock Garden/Bombay TSF	North	500 m
Residences			
Three residences	Augusta evaporation ponds		150-300 m
Six residences	Augusta site		250-1000 m
Eleven residences	Both Augusta and Brunswick		<2000 m
Six residences	Youle Ventilation Shaft		100 -500 m
Six residences	Rock Garden/Bombay TSF		300-500 m
Four residences	Brunswick site		500-1000 m
Four residences	Cuffley Ventilation Shaft		150-300 m
Infrastructure			
McNichols Lane	Augusta site		100 m
	Augusta evaporation ponds		20 m
Cochranes Road, Newtons Lane, Peels Lane, Tobins Lane	Augusta site		<1000 m
Phillips Lane	Cuffley Ventilation Shaft		20 m
Bradleys Lane	Youle Ventilation		20 m
	Brunswick West TSF		50 m

Receptor	Facility	Direction from site	Distance
Heathcote-Nagambie Road	Augusta site		200 m
Heathcote-Nagambie Road	Brunswick Plant site		200 m

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AE1046.9 Mandalay Resources - Costerfield Operation
Figure 2.5. Sensitive receptors - Brunswick and Augusta sites
Created 3/11/2022 and revised 1/04/2023
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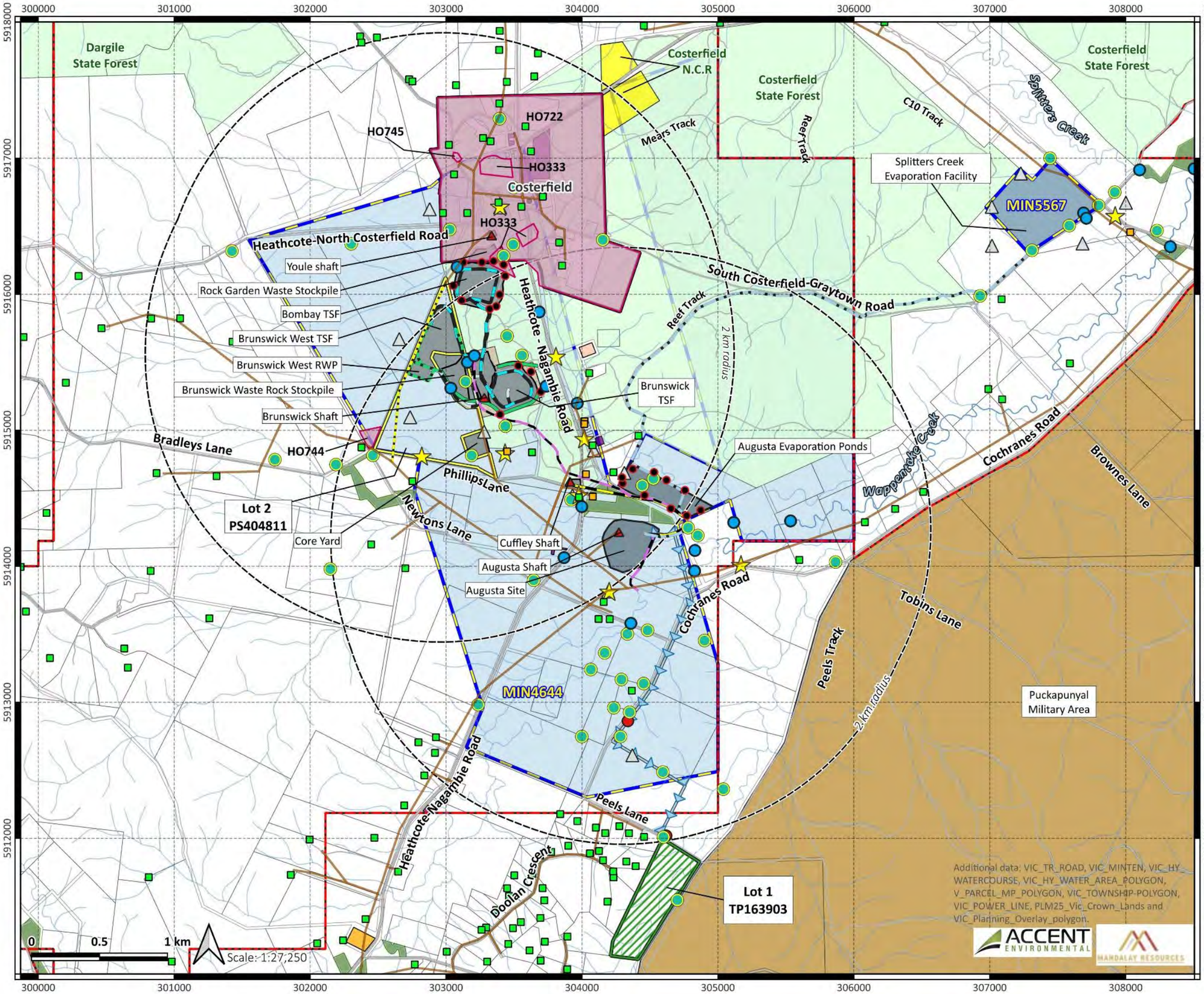

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Dust monitoring site
- Groundwater monitoring site
- Injection site
- Noise monitoring site
- Seepage detection bore
- Surfacewater monitoring
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Rising main pipeline
- Process water return pipeline
- Process water delivery pipeline
- Relocated power transmission line
- Existing power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain
- Vegetation offset area
- Private land lot boundary
- Costerfield township
- Water body
- Site radius - 2 km

Crown Land
- Commonwealth Land
- Community Use Area
- Earth Resources
- Natural Features Reserve
- Nature Conservation Reserve
- Services and Utilities
- State Forest
- Uncategorised Crown Land
- Other Crown Land

Planning Overlay
- Heritage Overlay (HO)

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3 Rehabilitation obligations and commitments

MRCO has identified the legal and other requirements listed below relevant to the rehabilitation of the Costerfield Operations.

3.1 Legislation

The primary legislative instruments that regulates the operation of a mine in Victoria are the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act) and the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (MRSD (MI) Regulations). Both the MRSD Act and the Regulations include requirements for a rehabilitation plan.

Section 79 of the MRSD Act sets out what a rehabilitation plan must take into account:

> *A rehabilitation plan must –*
>
> *a) take into account –*
>
> *i) any special characteristics of the land; and*
>
> *ii) the surrounding environment; and*
>
> *iii) the need to stabilise the land; and*
>
> *iv) the desirability or otherwise of returning agricultural land to a state that is as close as is reasonably possible to its state before the mining licence, prospecting licence or extractive industry work authority was granted; and*
>
> *v) any potential long-term degradation of the environment; …*

The Regulations further specify what information must be included in a rehabilitation plan lodged on or after 1 July 2020 at regulation 43(2):

> *a) proposed land uses for the affected land after it has been rehabilitated, that considers community views expressed during consultation; and*
>
> *b) a land form that will be achieved to complete rehabilitation, which must—*
>
> *i) be safe, stable and sustainable; and*
>
> *ii) be capable of supporting the proposed land uses referred to in paragraph (a); and*
>
> *c) objectives that set out distinct rehabilitation domains that collectively amount to the land form described in paragraph (b); and*
>
> *d) criteria for measuring whether the objectives described in paragraph (c) have been met; and*
>
> *e) a description of, and schedule for, rehabilitation milestones; and*
>
> *f) an identification and assessment of relevant risks that the rehabilitated land may pose to the environment, to any member of the public or to land, property or infrastructure in the vicinity of the rehabilitated land, including—*
>
> *i) the type, likelihood and consequence of the risks; and*

ii) the activities required to manage the risks; and

iii) the projected costs to manage the risks; and

iv) any other matter that may be relevant to risks arising from the rehabilitated land.

Relevant risk is defined at regulation 43(5):

In this regulation—

a) "relevant risks" means risks that may require monitoring, maintenance, treatment or other ongoing land management activities after rehabilitation is complete.

3.2 Workplan approvals

The final rehabilitation of the land and infrastructure on site will be in accordance with requirements set out in Work Plans (WPs) and Work Plan Variations (WPVs) that have been approved by ERR.

The following approved WP/WPV submissions contain key rehabilitation information for mining licences MIN4644 and MIN5567 are shown in Table 3-1:

Table 3-1 List approved WP/WPV submissions containing key rehabilitation information

WP/WPV date	Nature of work
MIN4644	
08/11/2005	WPV Augusta open cut excavations, decline access for underground mining, associated surface facilities
08/02/2006	WPV Brunswick upgrade/modification of processing plant, ROM area, pipelines to tailings area and return
25/06/2012	WPV Augusta Waste Rock Storage Facility
24/09/2013	WPV Vent Shaft and Associated Infrastructure for the Cuffley Mine
29/01/2014	WPV Bombay Tailings Storage Facility Embankment Raise
13/02/2014	WPV Brunswick Tailing Storage Facility Embankment Raise
16/02/2018	WPV Consolidated Work Plan
21/06/2019	WPV Vent Shaft and Associated Infrastructure for the Youle Mine
TBC	WPV Brunswick West Tailing Storage Facility

The WP/WPVs have been reviewed to determine the rehabilitation concepts that have been approved for the site. The sections below list key commitments that have been made in relation to rehabilitation.

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3.2.1 Open cut mining of oxide ore from the Augusta deposit (2005)

Table 3-2 Augusta mine WP/WPV commitments

WP/WPV date	Heading	Relevant text
08/11/2005	6 Rehabilitation Plan 6.1 End use of site [page 14]	*The majority of land to be utilised for mining and associated activities will be returned to its current use. The only exception to this rule is the area to be occupied by the works associated with the waterway diversion, to be managed so as to protect the waterway environment rather than being used for agriculture, as is now the case.* *Appendices B and C include detailed descriptions of the rehabilitation works to be completed on the waterways while the rehabilitation works on the other land affected are described below.*
	6 Rehabilitation Plan 6.2 Rehabilitation schedule [page 14]	*The scheduling of rehabilitation works depends on both the schedule of completion of works in a particular area and the season.* *Table 6.1 shows the seasons in which rehabilitation works need to be completed in order to minimise adverse impacts of earthworks and provide a high degree of success in revegetation.* [Table 6.1 of Timing of Rehabilitation Works]…
		[Table 6.2 of Schedule of Availability for Rehabilitation]… *At all times the principle of rehabilitating the land at the earliest practical time will be adopted. Examples of the application of this principle are provided by the following:* *Rehabilitation works on the waterway diversion channel will commence immediately following construction.* *The back filling of the pit using barren rock enables rehabilitation of the area occupied by the temporary barren rock storage to rehabilitate at the earliest possible time.* *In addition to the final rehabilitation of disturbed land, structures that will be in place throughout the life of the mine will be treated with temporary rehabilitation works to promote stability and to lessen visual impacts such structures include the acoustic barrier and the wall of the evaporation pond.* *The outside of the acoustic barrier and evaporation pond wall will be covered with topsoil and planted with pasture species.*
	6 Rehabilitation Plan 6.3 Rehabilitation techniques [page 16]	*The only area of disturbed land that will be subject to rehabilitation aimed at a return to its existing ecological state is the point where the mine road access crosses McNichols Lane. In this area rehabilitation will consist of the following:* *Testing of the disturbed area for contamination and removal of any contaminated material for disposal in the pit or the underground mine.*

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WP/WPV date	Heading	Relevant text
		Deep ripping of any compacted areas *Earthworks will be completed to:* *profile the surface to fit in with that of the surrounding area and provide free draining non eroding surface* *return of original topsoil to the surface* *shallow ripping (approximately 300 mm) on contour* *Direct seeding and planting of seedlings* *Monitoring, as described in the section 7.8* [8.7] *with replanting and control of erosion weeds and vermin as necessary.*
		The rehabilitation of agricultural land will be completed in consultation with the landowner but in general terms the rehabilitation work will leave the land in a suitable condition for cropping or pasture by: *Removal of all equipment and infrastructure including structural and building foundations not required by the landowner.* *Profiling to match with the existing topography of adjacent areas and to provide a free draining non eroding surface.* *Return the topsoil originally removed and stored.* *Planting of a crop or pasture species selected by the landowner.*
		The rehabilitation of the area disturbed by the construction of the waterway diversion will consist of the following: *Return of topsoil to disturbed area.* *Placement and securing of large logs at various locations along the constructed waterway. These logs which will number 10 to 12, will be partially laid across the low flow channel and extend at least a metre into the side of the channel so they are firmly secured.* *Fencing to prevent access by stock and vermin with fences running along the outside of the small bund walls on either side of the channel.* *In the vicinity of the low flow channel in 6 to 8 metres wide strip, species found in the Creekline Grassy Woodland association with the waterways in the local area will be planted. Plantings will include tree, sedge, rush and grass species.* *In the remainder of disturbed area a crop of rye grass will initially be sown, as this is the fastest way of stabilising the surface of the channel. In subsequent years a variety of native grasses such as wallaby grass, common wheat-grass and weeping grass will be sown and in time will replace the rye grass.*

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WP/WPV date	Heading	Relevant text
		The rehabilitation of the evaporation pond, the ventilation rises collars, McNichols Lane and the underground mine will be as described in the existing Work Plan.
	8 Environmental Monitoring Program 8.7 Flora and Fauna [Page 50]	*All sites that are subjected to revegetation will be monitored as follows:* *Quarterly site inspections for erosion, weed invasion, vermin and vandalism with results being recorded and remedial action taken as required. The quarterly site inspection regime will continue for a period of 18 months to two years following initial planting.* *18 months to two years after initial planting a survey of vegetation establishment and other relevant aspects will be conducted.* *After the formal survey site inspections will be conducted at six monthly intervals for a two-year period.* *Two years after the formal survey a more thorough survey will be undertaken of both flora and fauna. The results of this survey will be used to determine the need for on-going monitoring.*
	Appendix B Waterway Crossing - Description of Works 7. Rehabilitation and Revegetation [page 2]	*If, at the cessation of mining, the landowner has no further use for the crossing and wishes it to be removed the following works will be performed.* *All concrete, including the crown units and the slabs will be broken up and removed.* *The land surface will be profiled to match in with the surrounding topography and provide a stable, non-eroding profile.* *The disturbed area will be revegetated with species selection for the area in close proximity to the centre of the waterway being made to duplicate the areas immediately upstream and downstream of the crossing. The remaining disturbed area will be revegetated with species selected by the landowner.*

3.2.2 Upgrading and operation of the Brunswick treatment (2006)

Table 3-3 Brunswick plant WP/WPV commitments

WP/WPV date	Heading	Relevant text
8/2/2006	5 Rehabilitation Plan 5.1 End use of site [page 22]	*The proposed end use of the site is as part of the surrounding forest. The aims of rehabilitation of the site are therefore to provide a stable landform suitable for use for passive recreation with vegetation of a form and a standard that adds to the ecological value of the surrounding forest.*

WP/WPV date	Heading	Relevant text
	5 Rehabilitation Plan 5.2 Rehabilitation schedule [page 22]	*The nature of the work in the plant area is such that there is limited opportunity for progressive rehabilitation so rehabilitation works will commence after plant operations have been discontinued.* *When this occurs the precise scheduling of rehabilitation works depends on the climatic conditions.* *Table 5.1 shows the seasons in which rehabilitation works need to be completed in order to minimise adverse impacts of earthworks and provide a high degree of success in rehabilitation.* [Table 5.1 timing of rehabilitation works] …
	5 Rehabilitation Plan 5.3 Rehabilitation techniques [page 22]	*Rehabilitation of the site will involve the following:* *Removal of all plant, equipment and buildings from the site.* *Testing of the disturbed area for contamination and removal of any contaminated material for disposal in the pit or the underground mine* *Earthworks will be completed to:* *deep rip all compacted areas* *profile the surface to fit in with that of the surrounding area and provide free draining non eroding surface* *place topsoil* *shallow ripping (approximately 300 mm) on contour* *Direct seeding and planting of seedlings* *Monitoring, as described in the section 7.8 of the currently approved work plan for MIN4644, with replanting and control of erosion weeds and vermin as necessary.*

3.2.3 Augusta Waste rock storage facility (2012)

Table 3-4 Waste rock storage facility (Augusta) WP/WPV commitments

WP/WPV date	Heading	Relevant text
25/6/2012	4 Impacts and Mitigation Rehabilitation [page 4]	*The stockpile is a temporary structure which shall be removed and returned to pasture on closure of the mine in accordance with the approved Work Plan.* *Waste rock from the stockpile shall be used to rehabilitate various areas around the site on closure including the mine boxcut, Brunswick pit and Tailing Storage Facilities. Excess material may be considered for off-site beneficial reuse pending relevant approvals.*

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3.2.4 Ventilation Shaft and associated infrastructure for Cuffley the Mine (2013)

Table 3-5 Ventilation Shaft (Cuffley) WP/WPV commitments

WP/WPV date	Heading	Relevant text
24/9/2013	3.6 Security and Rehabilitation [page 15]	*On the completion of mining operations, company owned infrastructure will be removed and an engineered concrete cap will be installed over the shaft, similar to the design shown in Figure 14. The access to be utilised will be the pre-existing track. This track will be improved to an acceptable standard; therefore no future rehabilitation requirement is foreseeable.* [Figure 14…]

3.2.5 Bombay TSF Embankment Raise (2014)

Table 3-6 Bombay TSF WP/WPV commitments

WP/WPV date	Heading	Relevant text
29/1/2014	11.0 Rehabilitation and Closure [page 23]	*The primary closure objective for the Bombay TSF is to design and construct an engineered cover system utilising available on-site materials to ensure long-term tailings containment. Once constructed, the covered tailings impoundment should require minimal and ideally no ongoing supervision.* *The TSF Closure Plan will ultimately be developed prior to closure of mining operations in consultation with state regulators. The TSF Closure Plan will address key post-closure issues such as embankment stability, surface water erosion, flora and fauna impacts, dust, seepage and visual amenity.* *The proposed cover design is envisaged to be graded at 1% from the centre point of the TSF and rehabilitated to Box Ironbark forest. Rehabilitation of the site shall include the following measures:* *All infrastructure, equipment, structures and pipelines are to be removed;* *the existing embankment slopes will be flattened to 3H:1V forming the footprint as shown on the drawings, refer to Appendix A;* *A suitably qualified Engineer shall develop a detailed design for encapsulation of the tailings and rehabilitation of the external embankment on closure. It is anticipated that a layer of inert material and topsoil will cap the tailings;* *The inert material will likely be excavated waste rock from the Augusta Mine and will undergo geochemical characterization to confirm its suitability for use in the final rehabilitation;* *Topsoil, stripped and stockpiled during the various construction stages shall be spread across the site; and*

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		The site shall be revegetated as Box Ironbark forest.
		The closure design proposed for the effective management of the key post closure risks will aim to: *Maintain the stability and integrity of the embankments, crests and surfaces into perpetuity.* *Provide erosion protection for any intermediate cover layer materials and the underlying tailings.* *Provide sufficient thickness of rock cover so that burrowing animals cannot access the tailings.* *Minimise dust by preventing uncontrolled erosion and release of the fine tailings material.* *Minimise seepage.*

3.2.6 Brunswick TSF Embankment Raise (2014)

Table 3-7 Brunswick TSF WP/WPV commitments

WP/WPV date	Heading	Relevant text
13/2/2014	11.0 Rehabilitation and Closure [Page 22] Brunswick TSF 2014	*The primary closure objective for the Brunswick TSF is to design and construct an engineered cover system utilising available on-site materials to ensure long-term tailings containment. Once constructed, the covered tailings impoundment should require minimal and ideally no ongoing supervision.* *The TSF Closure Plan will ultimately be developed prior to closure of mining operations in consultation with state regulators. The TSF Closure Plan will address key post-closure issues such as embankment stability, surface water erosion, flora and fauna impacts, dust, seepage and visual amenity.* *The proposed cover design is envisaged to be graded at 1% from the centre point of the TSF and rehabilitated to Box Ironbark forest. Rehabilitation of the site shall include the following measures:* *All infrastructure, equipment, structures and pipelines are to be removed;* *the existing embankment slopes will be flattened to 3H:1V forming the footprint as shown on the drawings, refer to Appendix A;* *A suitably qualified Engineer shall develop a detailed design for encapsulation of the tailings and rehabilitation of the external embankment on closure. It is anticipated that a layer of inert material and topsoil will cap the tailings;* *The inert material will likely be excavated waste rock from the Augusta Mine and will undergo geochemical characterization to confirm its suitability for use in the final rehabilitation;*

		Topsoil, stripped and stockpiled during the various construction stages shall be spread across the site; and *The site shall be revegetated as Box Ironbark forest.*
		The closure design proposed for the effective management of the key post closure risks will aim to: *Maintain the stability and integrity of the embankments, crests and surfaces into perpetuity.* *Provide erosion protection for any intermediate cover layer materials and the underlying tailings.* *Provide sufficient thickness of rock cover so that burrowing animals cannot access the tailings.* *Minimise dust by preventing uncontrolled erosion and release of the fine tailings material.* *Minimise seepage.*

3.2.7 WPV for the Youle ventilation shaft and Rising Main (2019)

Table 3-8 Youle shaft WP/WPV commitments

WP/WPV date	Heading	Relevant text
21/6/2019	RRAM: WPV for the Youle ventilation shaft: Construction and Operation	*The Rehabilitation Plan will include the shaft/rising main site as an additional site to be rehabilitated using existing shaft rehabilitation procedures.*

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3.2.8 WPV for Brunswick West Tailings Storage Facility (2022)

Table 3-9 Brunswick West TSF WP/WPV commitments

WP/WPV date	Heading	Relevant text
TBC	WPV for the Brunswick West TSF 4.1.9 Conceptual Closure	*A Conceptual Closure concept for the TSF has been developed as follows:* *A domed (convex), self-shedding cover with a nominal 5% grade.* *The cover layers will comprise a low permeability earthfill material, overlain by inert (i.e., non-acid generating) earthfill and weathered rockfill, and a final layer of topsoil to support revegetation.* *The low permeability earthfill material will be placed directly over the tailings surface and will be:* - *a minimum thickness of 0.5m at the perimeter embankment, and increase in thickness over the tailing surface to the centre of the TSF to form a minimum 5% grade from the centre of the TSF towards the perimeter embankment.* - *be connected to the BGM clayey subgrade and BGM liner around the entire perimeter of the TSF to fully encapsulate the tailings.* - *designed to a thickness to support a revegetated surface without plant roots intercepting the tailings below.* *The earthfill and weathered rockfill will be placed over the earthfill material to a minimum thickness of 0.5 m, matching the minimum underlying 5% grade of the landform.* *The topsoil material will be placed over the weathered rockfill to a nominal thickness of 300 mm.* *If early closure of the facility is expected, the final TSF landform can be achieved by partial deconstruction of the embankment to the tailings level, and reclamation of embankment materials for impoundment backfilling/cover construction.*
	8 Rehabilitation 8.1.1 Post-mining land uses	*The Costerfield Operations operate under agreements with the state and landowners that commit MRCO to return the disturbed land to the pre-mining land uses, where practical.* *Brunswick* *The planned final land use for the Brunswick West TSF site is grazing.* *Alternative land uses* *The current planned final land use represents the base-case and will be subject to review and stakeholder consultation as part of the closure planning process.*

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WP/WPV date	Heading	Relevant text
	8.1.2 Post-mining landforms	*The rehabilitated site of the Brunswick West TSF will be returned in the form of pastoral grassland. Rehabilitation of areas disturbed by Brunswick West TSF shall be implemented to achieve the following outcomes:* • *long-term stable landform compatible with the surrounding landscape;* • *turkey nest style TSF to become water shedding hill with non-eroding slopes; and* • *suitable for grazing land use.*
	8.1.3 Closure concept	*The proposed TSF has been the subject of detailed design and assessment by consulting engineers, ATC Williams and their report "Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report 109014.15 R04 (Rev 1)" includes details of the Conceptual Closure Plan in accordance with ANCOLD (2019). An outline of this concept is presented in Section 4.1.9.* *A detailed closure design and plan will be prepared for the decommissioning and closure of the facility in accordance with the ANCOLD Guidelines on Tailings Dams (2019).*

3.3 Planning

The Costerfield Mine operates under planning consent in the form of various planning permits issued by the City of Greater Bendigo. Text from the planning permits relevant to rehabilitation is provided below.

3.3.1 Permit No. 1834 - Mining (8 May 1996)

THE PERMIT ALLOWS: Mining

Condition 16. On the completion of mining, the tailings dam, pit surrounds the waste rock emplacement site, the open pits and the site generally shall be rehabilitated generally in accordance with the requirements of the work plan, and to the satisfaction of the Department of Conservation and Natural Resources and the Department of Agriculture, Energy and Minerals in consultation with the responsible authority.

3.3.2 Permit No. AM/2248/1997/C – Brunswick open cut (Amended 12 November 2014)

THE PERMIT ALLOWS: Open cut mining and gold antimony recovery and existing treatment plant (located at the Brunswick mine site) and works allowed by the Victorian Civil and Administrative Tribunal in its determination of permit amendment proceedings P842/2014 and P846/2014 authorising the raising of the dam walls of the Bombay tailings dam and the Brunswick tailings dam

Condition 1.3. In relation to the raising of the height of the Bombay tailings dam and the Brunswick tailings dam authorised by the amendments to this permit granted by the Victorian Civil and Administrative Tribunal in its determination of proceedings P842/2014, and P846/2014

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such works are not to commence until plans thereof have been submitted to and approved by the responsible authority. Such plans are to be drawn to scale with dimensions and three copies are to be submitted. When approved, such plans will be endorsed as evidence of their approval and will thereby become the part of the endorsed plans under this permit relating to the elevation of the heights of the dam walls of the Bombay tailings dam and the Brunswick tailings dam such plans are to depict or specify:

…

(h) plans for the ultimate closure of the said tailing dams with specifications including capping and rehabilitation but on the basis that the provision of such closure and rehabilitation plans may be deferred with the consent of the responsible authority pending the report of the independent reviewer required by condition 1.4 in so far as it relates to such capping and rehabilitation.

Note that: In determining what it will approve in relation to such plans the responsible authority will take into consideration reports and recommendations submitted to it in accordance with condition 1.4 below.

Condition 1.4. A report or reports from a suitably qualified independent reviewer whose qualifications are to the satisfaction of the responsible authority is to be submitted to the responsible authority prior to its approval of the plans required by condition 1.3 above.

Such a report and recommendations are to review the stages of design construction and operation of the tailings dams as extended and their capping and rehabilitation including whether a closing cap with a gradient of 1:100 is appropriate and if not what gradient should be required save that insofar as plans, report and recommendations might relate to final capping and rehabilitation, their submission can be delayed with the consent of the responsible authority granted in writing which consent can be granted from time to time.

The report or reports are to confirm that the tailings dams raisings have been designed, constructed, operated, closed and rehabilitated in accordance with ANCOLD Guidelines on Tailings Dams – Planning, Design, Constructions, Operation and Closure (ANCOLD 2012) and that the dams have been designed as High C consequence category dams.

Condition 1.5. All works and rehabilitation works allowed or required by amendments to this permit granted by the Victorian Civil and Administrative Tribunal in its determination of proceedings P842/2014 and P846/2014 are to be carried out in accordance with the plans approved under 1.3 above and such plans, after approval, are not to be altered or varied except with the written consent of the responsible authority.

Condition 11.4. Following completion of mining approved by this permit, all roads that have been temporarily closed must be reopened on the original alignments by construction to at least a comparable standard as existing prior to operations, to the satisfaction of the Responsible Authority.

Condition 11.5. Any and all buildings and works, including waste dumps, erected or constructed within 20 metres of the Heathcote-Nagambie Road reserve shall be removed and the site restored to the satisfaction of and at no cost to the Responsible Authority within three months of the termination of the use hereby permitted.

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Condition 11.6 Any vegetation or other planting within the Heathcote-Nagambie Road reserve shall be in accordance with the requirements of VicRoads.

Condition 11.8. If required, the permit holder shall enter into a Section 173 Agreement under the Planning and Environment Act 1987 with the Responsible Authority and the Department of Natural Resources and Environment to ensure that buildings, works and waste dumps are removed and the site restored.

Condition 14. Rehabilitation

The approved pit must be progressively backfilled and rehabilitated generally in accordance with the endorsed plans, except that the drainage area shown in Figure 19D may be restored as a water feature in accordance with detailed landscape plans developed in consultation with the Responsible Authority, Department of Natural Resources and Environment and the local community.

3.3.3 Permit No. DM/753/03 - UG mine (14 January 2004)

THE PERMIT ALLOWS: Underground mining

Condition 11. Upon completion of mining operations further rehabilitation efforts in the form of native vegetation plantings should be considered where practicable to the satisfaction of the responsible authority.

3.3.4 Permit No. DM/253/2005 - Boxcut (11 August 2005)

THE PERMIT ALLOWS: Establishment & operation of open pit Gold/Antimony mine

Condition 8. Upon completion of mining operations, further rehabilitation efforts in the form of native vegetation plantings, should be considered where practicable, to the satisfaction of the responsible authority.

3.3.5 Planning Permit No. DM/576/2013 - Cuffley Vent Shaft (20 September 2013)

THE PERMIT ALLOWS: use an developed earth resources industry (ventilation shaft and associated infrastructure for existing underground mining operation)

3.3.6 Planning Permit No. DM/621/2018 – Vent Shaft (7 June 2019)

THE PERMIT ALLOWS: Construct an exhaust mine ventilation shaft

Condition 7. Rehabilitation of the vent shaft

Prior to use of the vent shaft commencing a copy of the rehabilitation plan which forms part of the Work Plan must be submitted to the responsible authority. If the use of the vent shaft ceases, rehabilitation of the site must be undertaken in accordance with the rehabilitation plan.

3.4 Other licences, permits and agreements

Other licences permits and agreements held by MRCO are shown in Table 3-10.

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Table 3-10 Table Other licences permits and agreements

I.D.	Entity	Description
#HAR001	Harris	Landholders agreements 12/03/1988 Details for retention of features and land end use
#TOB001	Tobin	Landholders agreements 12/03/1988 Agreements for retention of features and land end use
109992	EPA	EPA Works Approval and EPA Discharge Licence (updated: 05/07/2018) The licence holder operates a gold and antinomy underground mining operation. This licence allows the discharge of 2ML/day of reverse osmosis treated groundwater into mountain Creek South diversion channel.
210974	EPA	EPA Research, Development And Demonstration Approval (Issued: 31/10/2019) This approval allows construction and operation of works to dispose of 730ML of mine wastewater via injection to groundwater in Margaret's Aquifer on a trial basis over an operation period of 24 months in accordance with the conditions of this approval.
BEE006479	Goulburn-Murray Water	Licence to Take and Use Permits extraction of up to 700 ML of groundwater per annum

3.5 Guidelines

3.5.1 ERR guidelines

Approval processes under the MRSD Act are administered by ERR within the Department of Jobs, Precincts and Regions (DJPR).

This Rehabilitation Plan for the MRCO has been prepared with consideration of the following ERR guidance documents:

- *Preparation of Rehabilitation Plans Guideline for Mining & Prospecting Projects* (ERR 2020a) (the Guidelines)
- *Preparation of Work Plans and Work Plan Variations. Guideline for Mining Projects* (ERR 2020b)
- *Establishment and Management of Rehabilitation Bonds for the Mining and Extractive Industries* (ERR 2022)
- *Geotechnical Guideline for terminal and rehabilitated sloped* (ERR 2020)
- *Technical Guideline Design and Management of Tailings Storage Facilities* (ERR 2017).

The primary guidance document is the Guidelines (ERR 2020a), which sets out the regulatory requirements for rehabilitation under the MRSD Act and the MRSD (MI) Regulations.

The Guidelines outline the process for developing a rehabilitation plan as follows:

- Develop a knowledge base.

- Compare current plan against new requirements.
- Propose post-mining land uses.
- Identify post-mining landforms.
- Identify domains.
- Develop rehabilitation objectives.
- Develop rehabilitation criteria.
- Identify rehabilitation milestones.
- Assess residual risks from rehabilitated land.

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3.5.2 Industry leading practice

Industry leading practice has also been considered in the development of this Rehabilitation Plan, as outlined below.

Leading Practice Sustainable Development Program

The mining industry has been working with Australian governments through the Leading Practice Sustainable Development Program to improve the mutual understanding of how rehabilitation can minimise the future impacts of mining activities. The Commonwealth Government has supported the development of a series of leading practice handbooks on Best Practice Environmental Management in Mining. These handbooks are relevant to all stages of a mine's life (exploration, feasibility, design, construction, operation, rehabilitation and closure) and to all facets of its operation.

Mine rehabilitation handbook

The mine rehabilitation handbook (DIIS 2016a) outlines the key principles and procedures recognised as leading practice for planning, implementing and monitoring rehabilitation, comprising:

- understanding the importance of rehabilitation and its business case for the mining sector
- establishing rehabilitation objectives, targets and success criteria
- planning to rehabilitate through engaging with stakeholders, setting objectives and completion criteria, and establishing rehabilitation baselines
- integrating and implementing rehabilitation plans during the life of the operation
- monitoring and reporting mine-site rehabilitation performance.

The following definition of rehabilitation is adopted in the handbook:

> *Rehabilitation comprises the design and construction of landforms as well as the establishment of sustainable ecosystems or alternative vegetation, depending upon desired post-operational land use*.

Mine closure handbook

The mine closure handbook (DIIS 2016b) is primarily intended for use as a management tool to improve closure planning and execution on mine sites. The handbook considers mine closure through the lens of sustainable development and considers all life-of-mine phases; exploration; feasibility; planning and design; construction and commissioning; operations; decommissioning and closure; and post-closure management and monitoring.

The handbook incorporates a new phase in life-of-mine management which it terms 'post-closure management'. This phase has been added to the handbook to "*accommodate longer term considerations for companies to manage post-decommissioning conditions en route to relinquishment*".

Strategic Framework for Mine Closure

The Australian and New Zealand Minerals and Energy Council (ANZMEC) and the Minerals Council of Australia jointly published the Strategic Framework for Mine Closure (ANZMEC 2000). The overall objective of the framework is "*to encourage the development of comprehensive closure plans that return all mine sites to viable, and wherever practicable, self-sustaining ecosystems, and that these plans are adequately financed, implemented and monitored within all jurisdictions*".

The Strategic Framework for Mine Closure is structured around a set of objectives and principles grouped under six key areas:

- Stakeholder involvement: objective is to enable all stakeholders to have their interests considered during the mine closure process.
- Planning: objective is to ensure the process of closure occurs in an orderly, cost-effective and timely manner.
- Financial provision: objective is to ensure the cost of closure is adequately represented in company accounts and that the community is not left with a liability.
- Implementation: objective is to ensure there is clear accountability, and adequate resources, for the implementation of the closure plan.
- Standards: objective is to establish a set of indicators which will demonstrate the successful completion of the closure process.
- Relinquishment: objective is to reach a point where the company has met agreed completion criteria to the satisfaction of the Responsible Authority.

ANCOLD

The following is a list of current ANCOLD engineering best practice documentation upon which TSF design had been based:

- Australian National Committee on Large Dams (ANCOLD 2012) – Guidelines on the Consequence Categories for Dams
- Australian National Committee on Large Dams (ANCOLD 2019) – Guidelines on Tailings Dams
- Australian National Committee on Large Dams (ANCOLD 2019) – Guidelines for Design of Dams and Appurtenant Structures for Earthquake
- Australian National Committee on Large Dams (ANCOLD 2003) – Guidelines on Risk Assessment.

3.6 Policy

MRCO's environmental policy is provided in Appendix A.

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4 Stakeholder identification and community engagement

4.1 Community Engagement Plan

MRCO's 2021 Community Engagement Plan (CEP) sets the framework for engaging with the mine's stakeholders and provides tools for employees to utilise when making operational decisions. In doing so, the Plan ensures that any adverse impacts of the mining operation on stakeholders are minimised and well managed, and that transparent and ongoing consultative relationships are developed and maintained.

The CEP is relevant to all operational phases of mining and exploration at Costerfield including pre-planning, exploration, project approval, project development, operation and mine closure. The principles and methodologies identified relate to changes in operational circumstance, both planned and unplanned. The CEP provides strategic direction for both pro-active consultation with stakeholders, prior to a change or event, and re-active consultation as it may relate to an incident or complaint. It also addresses the Company and the mine's material risks and provides a preventative approach to managing and mitigating such risks.

In relation to mine rehabilitation, the CEP describes aims and strategies of MRCO in relation to consultation associated with rehabilitation and closure. Various forms of stakeholder engagement and information sharing are prescribed in the CEP, which will be utilised through various stages of mine operation and closure.

Rehabilitation and closure consultation will be consistent with the requirements of the CEP, and will include:

- identifying stakeholder attitudes and expectations
- providing information to stakeholders
- receiving feedback from stakeholders
- analysing stakeholder feedback and considering community concerns or expectations.

Refer to the CEP for further details.

4.2 Stakeholder identification

The following stakeholders (in no particular order) have been identified as being impacted by or interested in the Costerfield Operations. These stakeholders have been identified over the course of the operation's life and the list continues to be amended based on operational or stakeholder changes:

- neighbours <500 m
- Costerfield community <5 km
- Costerfield & Heathcote surrounding community <20 km
- Environment Review Committee (ERC)
- ERC Community Reference Subcommittee (CRS)
- employees
- business partners

- regulators
- local government
- public service
- state and national government
- political parties and their representatives
- indigenous communities (Taungurung People)
- media
- unions (Australian Workers Union (AWU))
- education facilities
- special reference groups
- emergency services (Country Fire Authority (CFA), State Emergency Service (SES), police, ambulance).

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4.2.1 Stakeholder concerns

In 2016, a stakeholder survey was commissioned by Mandalay Resources Corporation and undertaken in each of the company's operating locations. At Costerfield, the survey was undertaken by company personnel and a total of 32 community members were surveyed.

The Costerfield Community Survey revealed that MRCO is held in good regard by the majority of respondents. More than 70% of respondents believe the community would be worse off without the mine.

Although landholders close to the mine were the most likely to feel negative about issues such as traffic, water quality and noise, none of these respondents complained about the way Mandalay staff communicated with them or dealt with their concerns. When asked about Mandalay's response to community issues, 84% of all respondents said it had been either 'about right' or 'better than expected'. Most respondents were able to identify particular concerns that Mandalay had responded to as well as the outcomes in each case.

The following potential, project-related impacts have either been identified by community members through the 2016 community survey or in discussions with MRCO personnel:

- increased traffic
- ground vibration
- noise
- ground water changes, level or quality
- surface water changes, redirection of flow or quality
- dust
- air quality
- visual amenity
- loss of property value
- soil erosion
- loss of natural environment
- safety

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- failure to consult with parties.

The potential impacts identified in the 2016 community survey have been addressed in a Community Risk Action Plan (refer to the CEP) to determine what actions are required both internally within MRCO and externally with stakeholders to minimise the risk of impacts. The action plan considers operational activities that have the potential to cause impacts and assigns mitigating actions to MRCO personnel or departments to achieve the desired risk reduction. These actions are used to plan and schedule activities or communications throughout the year.

The potential impacts identified are all relevant to the process of rehabilitation and closure. Some impacts, such as increased traffic and noise, are relevant to the activities undertaken during the process of rehabilitation. Other impacts, such as soil erosion and the loss of natural environment, are also relevant to the achievement of acceptable and stable post-closure landforms and landuses. The potential impacts identified above and their associated risk factors will be a key focus of rehabilitation consultation and planning.

4.3 Environmental Review Committee

The role of the ERC is to achieve review of environmental and social monitoring and compliance data and review annual reports, audit reports and outcomes in line with the licence conditions and the MRSD Act.

Information presented to and discussed by the ERC includes:

- corporate quarterly reports
- environmental monitoring data gathered during the reporting period
- WPV proposals and updates
- complaints
- incidents
- reports from the CRS
- other relevant environmental or social issues raised by members of the committee or the company.

The ERC membership includes relevant regulatory authorities, community members (who are all CRS members) and relevant mine personnel.

A report to the ERC membership is circulated quarterly. Members are encouraged to contact the mine to discuss any content that may be relevant to their business/interest or to discuss any areas of concern as soon as possible after the minutes are circulated. Where appropriate, MRCO may address any concerns, issues or queries via email to the ERC membership to ensure all members are equally and fairly provided with the same information.

The ERC meets every three months to discuss data presented during the previous quarter.

The ERC provides a key forum for informing stakeholders in relation to rehabilitation and closure planning and identifying and discussing any issues of concern.

4.3.1 Community Reference Subcommittee

The aim of the CRS is to resolve issues or concerns before complaints are generated and to assist MRCO in their planning and decision making. The role of the CRS is to promote a good working relationship between the mine and the community by providing a platform for information sharing, collaborative discussion, constructive input and meaningful feedback on project proposals and future mine operations. The CRS works under the auspices of the ERC but affords more time to relevant discussion regarding community affairs. The group may also provide feedback on planning or execution of consultation initiatives with the broader Community and guidance around philanthropic contributions made to the Community.

The scope of discussion at the CRS meetings may include:

- new project proposals and draft approvals (i.e. WPVs)
- feasibility studies
- rehabilitation and mine closure
- philanthropic contributions
- complaints and current issues
- recent changes to the mine plan
- communication methods.

The CRS therefore provides an important mechanism for the detailed discussion and resolution of any community concerns regarding rehabilitation and closure. Such concerns could relate to proposed final land uses, potential community impacts, or the potential retention of on-site infrastructure for post-closure use by landholders or the broader community.

4.4 Crown land manager consultation

MRCO has regularly undertaken consultation with the Crown Land Manager (DEECA) for Bombay TSF, Brunswick TSF and Brunswick Pit. Most recent discussion was in 2022 for landowner consent for the construction of a core shed on Crown Land, and in 2021 for the construction of an embankment raise on the Bombay TSF.

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5 Proposed post-mining land uses and post-mining landform

The general rehabilitation concepts described in the WP/WPVs (see Section 3.2) involve:

- decommissioning and removal of the mine facilities
- securing portals
- covering and stabilising TSFs
- reshaping disturbed areas including the Brunswick Pit
- revegetating disturbed areas.

5.1 Post-mining land uses

The Costerfield Operations operate under agreements with the state and landowners that commit MRCO to return the disturbed land to the pre-mining land uses, where practical. Currently, the anticipated final land use is to return disturbed land to productive grazing land and areas of rehabilitated native vegetation.

Augusta site

The Augusta site is to be rehabilitated where practical to the land use that existed prior to mining, which was pastoral land. With the exception of the water dams (the local landholder has an option to retain these), the site will therefore be levelled to the original surface and seeded with grasses suitable for grazing sheep.

Brunswick site

The areas of the Brunswick site located on Crown Land are to be rehabilitated to re-instate Box Ironbark Woodland and grasslands, consistent with the surrounding Crown Land.

The Brunswick Pit surrounds, core yard and Brunswick West TSF are to be rehabilitated where practical to the land use that existed prior to mining, which was pastoral land, predominantly seeded with grasses suitable for grazing sheep.

Alternative land uses

The currently proposed end land uses represent the base-case and will be subject to review and stakeholder consultation as part of the closure planning process. It may be that alternative land uses are also incorporated into the post-closure landscape depending upon their technical and economic feasibility, and the requirements and expectations of regulators, council, local landholders and the broader community. Such alternative land uses could include:

- renewable energy (solar farm, pumped hydropower, wind power generation etc.)
- horticulture or other forms of intensive agriculture
- aquaculture
- recreational use.

In addition, facilities such as water storage dams, roads and other infrastructure may be retained if safe, structurally sound and of benefit to the local council, landholders or other parties.

5.2 Post-mining landforms

As outlined above, the rehabilitated sites of the operation will be returned in the form of native vegetation for areas of Crown Land and pastoral grassland for private land.

The currently proposed post mining landforms are:

- The Augusta Mine Dam will be retained as a water dam for post mining agricultural use.
- The Augusta boxcut will be backfilled to natural surface level, with material from the Augusta waste rock storage stockpile, to form a flat-lying landform consistent with the surrounding topography.
- The Brunswick, Bombay and Brunswick West turkey nest style TSFs will become water shedding hills with non-eroding slopes.
- The Augusta, Bombay and Brunswick waste rock stockpiles will be returned to natural surface levels, with a flat-lying landform consistent with the surrounding topography.
- The Brunswick Pit void will remain, with pit faces above 175m AHD be battered at 3H:1V to ensure long term stability..
- All infrastructure areas will be returned to natural surface level and pre-existing drainage.

5.2.1 Modified landforms

The closure landforms to be retained are the Brunswick, Brunswick West and Bombay TSFs and the Brunswick Pit. Plans and section details of these features can be found in Appendix B.

5.3 Outcomes of past rehabilitation

The area was first developed for mining in the 1860's. Since then, there has been natural revegetation of areas of disturbed land. The results of this natural revegetation can help define future revegetation methods and inform the concepts for end land uses and landforms. The seeding and planting of Box Ironbark Woodland on Crown Land will mimic the natural revegetation using species as detailed in Section 9.2.12.

Progressive rehabilitation provides valuable information to enable refinement of the rehabilitation design and methods. The closure and rehabilitation of the Brunswick TSF and waste rock stockpile areas will potentially provide years of monitoring before it is envisaged that the Bombay TSF and Rock Garden and Augusta waste rock stockpiles will be prepared for rehabilitation. The lessoned learned from these two campaigns will influence the final closure and rehabilitation of the site.

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6 Rehabilitation domains

Specific rehabilitation domains can be identified for mining projects by dividing operational sites into areas requiring similar closure processes and outcomes. This approach allows each domain to be treated as a separate detailed entity within an overall plan that deals with common issues and has similar risks like drainage and site monitoring (ICMM 2008).

The rehabilitation domains developed for the Costerfield Operations are listed in Table 6.1 and shown on Figure 6.1 and

Figure 6.2.

Table 6-1 Rehabilitation domains

Location	Domain	Area
Augusta	Augusta Infrastructure Areas	5.4 ha
	Augusta Evaporation Ponds/Storage Dams	10.0 ha
	Augusta Shafts	<0.1 ha
	Cuffley Shaft	0.5 ha
	Augusta Waste Rock Stockpile	3.8 ha
	Augusta Boxcut	2.0 ha
Brunswick	Brunswick Infrastructure Areas	3.3 ha
	Brunswick Core Yard	2.75 ha
	Brunswick Shaft	<0.1 ha
	Youle Shaft	<0.1 ha
	Brunswick Tailings Storage Facility	10.5 ha
	Bombay Tailings Storage Facility	11.8 ha
	Brunswick West Tailings Storage Facility	11.8 ha
	Brunswick Waste Rock Stockpile	5.0 ha
	Rock Garden Waste Stockpile	2.4 ha
	Brunswick Pit	1.6 ha

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Figure 6.1. Rehabilitation domains - Augusta site

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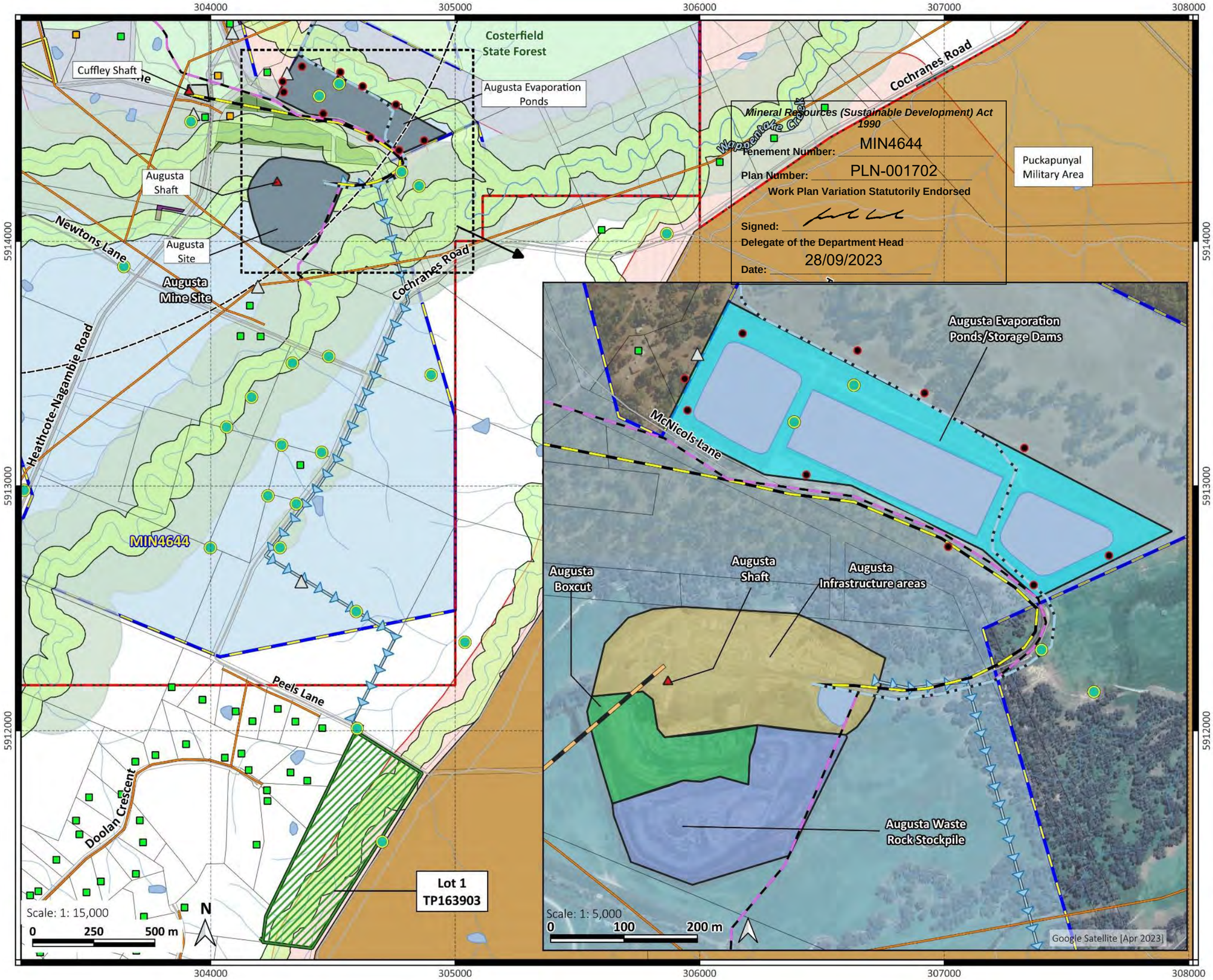
Scale: 1:15,000 @ A3 (main map)
Page size: A3



Owned by Mandalay Resources
Sensitive receptor (residence)
Dust monitoring site
Groundwater monitoring site
Seepage detection bores
Injection site
Splitters Creek pipeline
RO discharge pipeline
Rising main pipeline
Existing power transmission line
Power transmission line to be disconnected (inset map)
Road
Main watercourse
Watercourse - tributary
Exploration Licence
Mining Licence
Mine site domain (main map)
Vegetation offset area
Private land lot boundary
Water body

Agusta domains (inset map)

Boxcut area
Infrastructure area
Overburden and waste dump area
Evaporation Pond area

Planning overlay (main map)

Bushfire Management Overlay
Environmental Significance Overlay
Aboriginal Cultural Overlay

Crown land (main map)

Commonwealth Land
Natural Features Reserve
State Forest
Uncategorised Crown Land

Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA_POLYGON, V_PARCEL_MP_POLYGON, VIC_POWER_LINE, PLM25_Vic_Crown_Lands.

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MANDALAY RESOURCES

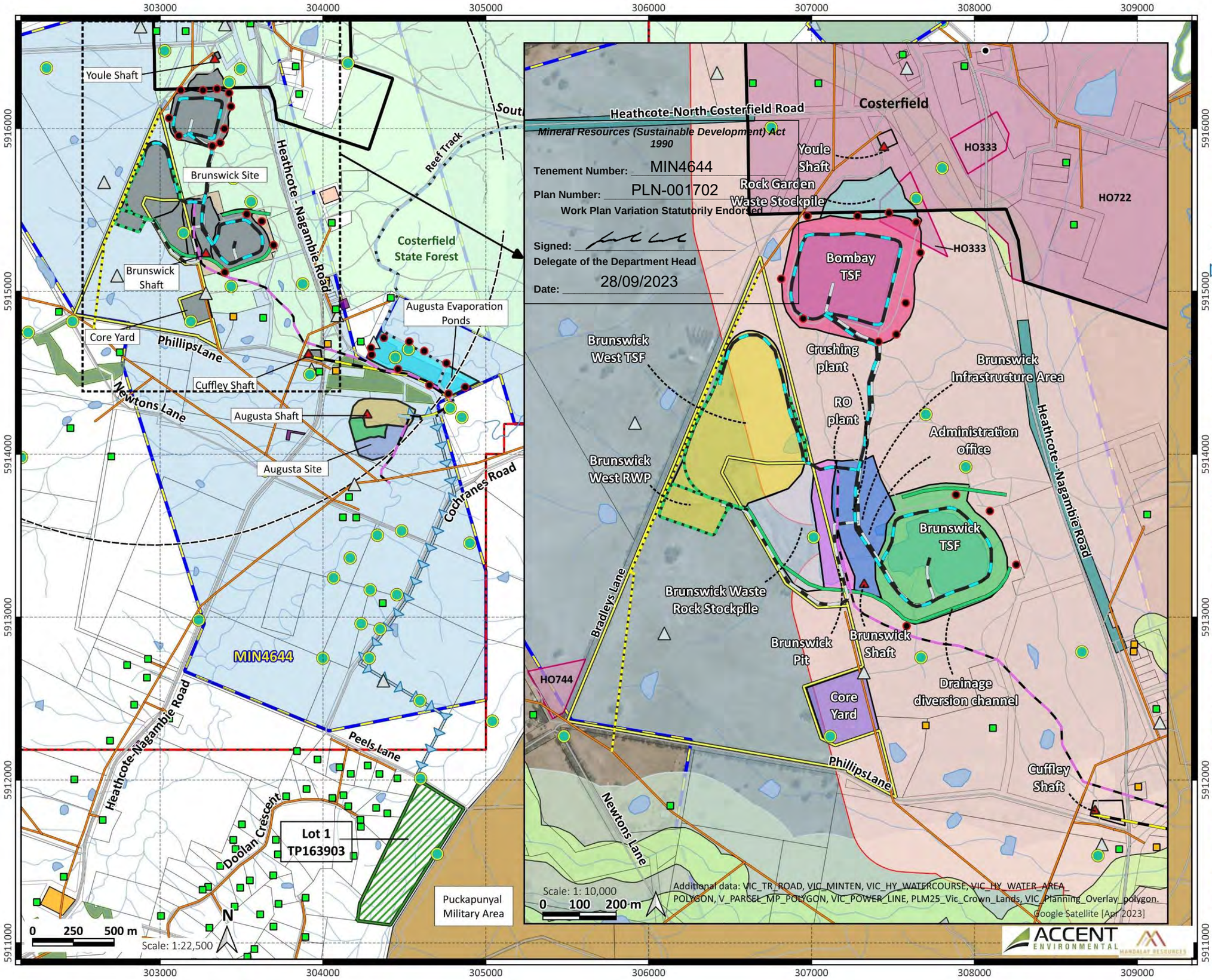

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Figure 6.2. Rehabilitation domains - Brunswick site

Created 3/11/2022, revised 3/04/2023
CRS: GDA 20 MGA 55
Scale: 1:22,500 @ A3 (main map)
Page size: A3

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Dust monitoring site
- Groundwater monitoring site
- Seepage detection bores
- Existing clean water diversion drain
- Brunswick West TSF clean water diversion drain
- Injection site
- Splitters Creek pipeline
- RO discharge pipeline
- Rising main pipeline
- Process water return pipeline
- Process water delivery pipeline
- Existing power transmission line
- Power transmission line to be relocated
- Relocated power transmission line
- Road
- Main watercourse
- Watercourse - tributary
- Exploration Licence
- Mining Licence
- Mine site domain (main map)
- Vegetation offset area
- Vegetation screen
- Private land lot boundary
- Water body

Planning overlay

- Bushfire Management Overlay
- Environmental Significance Overlay
- Heritage Overlay
- Vegetation Protection Overlay
- Aboriginal Cultural Overlay

Crown land

- Commonwealth Land
- Natural Features Reserve
- State Forest
- Uncategorised Crown Land

Brunswick domains

- Brunswick West RWP
- Brunswick infrastructure area
- Bombay TSF
- Brunswick TSF
- Brunswick West TSF
- Core storage area
- Bombay overburden and waste dump
- Brunswick overburden and waste dump
- Brunswick Pit

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6.1 Domain rehabilitation concepts

The proposed rehabilitation concepts for each domain are outlined below, based on the rehabilitation obligations and commitments outlined in Section 3 and the land uses, landforms and outcomes of past rehabilitation outlined in Section 5. The rehabilitation concepts are also being developed and refined in discussion with the community and regulatory stakeholders, as outlined in Section 4.

The modified landforms to be retained are the Brunswick, Brunswick West and Bombay TSFs and the Brunswick Pit. Plans and section details of these features can be found in Appendix B. The rehabilitation work activities for each domain, including areas and quantities, are set out in Appendix C. Appendix D provides details on the capping of shafts. The materials mass balance is shown in Section 9.2.10.

6.1.1 Augusta Infrastructure Areas

It is envisaged this site will be decommissioned at the cessation of mining activities and be available for rehabilitation at closure.

All services (including main power supply connection) will be disconnected and removed.

All plant will be demolished and or removed from site. Buildings will be removed. If the landowner has no further use for the crossing it will be broken up and removed.

Any contaminated material will be excavated and sent to an appropriate waste disposal facility.

The area will be contoured to match existing surface topography and final surface preparation will include contour ripping, topsoiling and seeding. Augusta site to be returned to agricultural pasture.

All pipelines (including Splitters Creek and Peels Lane) will be removed and re-used/ recycled/ disposed of.

All groundwater bores will be decommissioned and grouted by a licenced contractor (including Peels Lane injection bores).

All dust gauges will be removed at the end of the closure monitoring period.

6.1.2 Augusta Evaporation Ponds/Storage Dams

It is envisaged this site will be decommissioned at the cessation of mining activities and be available for rehabilitation at closure.

Once the water is fully evaporated, the sediments will be contained within in the HDPE liner in the central dam and encapsulated on site.

The eastern and western dam HDPE liners will be removed and taken to a licenced landfill.

The material in the embankments will be pushed back into the excavation and compacted.

All pipelines will be removed and re-used/recycled/disposed of.

Augusta site to be returned to agricultural pasture with exception of water dams which landowner has option to retain.

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The areas to return to agriculture will be contoured to match pre-mining surface topography and final surface preparation will include contour ripping, topsoiling and seeding.

6.1.3 Augusta and Cuffley Shafts

It is envisaged this site will be decommissioned at the cessation of mining activities and be available for rehabilitation at closure.

All services will be disconnected and removed.

All plant will be demolished and or removed from site. Buildings will be removed.

A concrete plug will be installed over each shaft.

6.1.4 Augusta Waste Rock Stockpile

It is envisaged this site will be decommissioned at the cessation of rehabilitation activities and be available for rehabilitation at closure.

Material from the waste rock stockpile will be used for the cover of the TSFs and to backfill the boxcut. Depending upon the volumes of material used for progressive rehabilitation this domain may also be partially rehabilitated prior to site closure.

The area will be contoured to match pre-mining surface topography and final surface preparation will include contour ripping, topsoiling and seeding. Augusta site to be returned to agricultural pasture.

6.1.5 Augusta Boxcut

It is envisaged this site will be decommissioned at the cessation of mining activities and be available for rehabilitation at closure.

All services will be disconnected and removed.

All plant will be demolished and/or removed from site.

The boxcut will be backfilled from the Augusta waste rock stockpile and noise bunds.

The area will be contoured to match pre-mining surface topography and final surface preparation will include contour ripping, topsoiling and seeding. Augusta site to be returned to agricultural pasture.

6.1.6 Brunswick Infrastructure Areas and Core Yard

It is envisaged this site will be decommissioned at the cessation of processing activities and be available for rehabilitation at closure.

All services will be disconnected and removed.

All plant will be demolished and or removed from site. Buildings will be removed. Core material will be used as fill.

Any contaminated material will be excavated and sent to an appropriate waste disposal facility.

The area will be contoured to match existing surface topography and final surface preparation will include contour ripping, topsoiling and seeding.

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Brunswick site (private land) to be returned pastoral land suitable for sheep grazing, Crown land returned to pre-existing Box-Ironbark woodland

6.1.7 Brunswick and Youle Shafts

It is envisaged this site will be decommissioned at the cessation of mining activities and be available for rehabilitation at closure.

All services will be disconnected and removed.

All plant will be demolished and/or removed from site. Buildings will be removed.

A concrete plug will be installed over each shaft.

6.1.8 Brunswick Tailings Storage Facility

It is envisaged this site will be decommissioned in 2024 and be available for progressive rehabilitation.

All plant and equipment will be demolished and or removed from site.

All pipelines will be removed and re-used/recycled/disposed of.

Embankments batters currently 1:2.5 (V:H) slope will be reduced to 1:3 (V:H) slope by buttressing with waste rock from site (Refer to Appendix B).

Tailings will be contained by a waste rock cover as a domed mound.

The area will be contoured to shed water from the landform and final surface preparation will include contour ripping, topsoiling and seeding. Brunswick TSF and surrounds on crown land to be returned to pre-existing Box-Ironbark woodland.

6.1.9 Bombay Tailings Storage Facility

It is envisaged this site will be decommissioned in 2025 and be available for progressive rehabilitation.

All plant and equipment will be demolished and or removed from site.

All pipelines will be removed and re-used/recycled/disposed of.

Embankments batters currently 1:2.5 (V:H) slope will be reduced to 1:3 (V:H) slope by buttressing with waste rock from site (Refer to Appendix B).Tailings will be contained by a waste rock cover as a domed mound.

The area will be contoured to shed water from the landform and final surface preparation will include contour ripping, topsoiling and seeding. Bombay TSF and surrounds on crown land to be returned to pre-existing Box-Ironbark woodland.

6.1.10 Brunswick West Tailings Storage Facility

It is envisaged this site will be decommissioned at the cessation of processing activities and be available for rehabilitation at closure.

All pipelines will be removed and re-used/recycled/disposed of.

All plant and equipment will be demolished and or removed from site.

The embankments batters have been built as final slopes and rehabilitated as part of the TSF construction (Refer to Appendix B).

Tailings will be contained by a waste rock cover as a domed mound with 5% grade.

The area will be contoured to shed water from the landform and final surface preparation will include contour ripping, topsoiling and seeding. Brunswick West TSF and surrounds on private land to be returned pastoral land suitable for sheep grazing.

Return Water Pond

Removal of the HDPE liner, pipelines and pumps.

Demolishing the return water pond (RWP) embankments.

Re-filling excavation within RWP and surrounding RWP toe drains to 0.5m below previous natural surface level.

Replacement of 0.5m of topsoil over the previous RWP and toe drains area to match the previous topography of the area.

The area will be contoured to shed water from the landform and final surface preparation will include contour ripping, topsoiling and seeding. Brunswick West TSF surrounds on private land to be returned pastoral land suitable for sheep grazing.

6.1.11 Brunswick Waste Rock Stockpile

It is envisaged this site will be decommissioned in 2025 and be available for progressive rehabilitation.

Material from the waste rock stockpile will be used for the cover of the TSFs. The volumes of material utilised during progressive rehabilitation will likely allow this domain to be rehabilitated prior to site closure.

The area will be contoured to match pre-mining surface topography and final surface preparation will include contour ripping, topsoiling and seeding. Brunswick site surrounds on private land to be returned pastoral land suitable for sheep grazing.

6.1.12 Rock Garden Waste Stockpile

It is envisaged this site will be decommissioned in 2027 and be available for progressive rehabilitation.

Material from the waste rock stockpile will be used for the cover of the TSFs. The volumes of material utilised during progressive rehabilitation will likely allow this domain to be rehabilitated prior to site closure. The area will be contoured to match pre-mining surface topography and final surface preparation will include contour ripping, topsoiling and seeding. Rock Garden site and surrounds on crown land to be returned to pre-existing Box-Ironbark woodland.

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6.1.13 Brunswick Pit

It is envisaged this site will be decommissioned at the cessation of mining activities and be available for rehabilitation at closure.

The Brunswick Pit runs roughly north-south and is approximately 80 m wide by 300 m long with a maximum depth of 25 m. The existing floor/ramp has a gradient of approximately 1:12, sloping from the existing surface at the north to a depth of 25 m at the southern end. The pit faces to the east, west and south are at approximately 1:1 V:H grades (refer Appendix B).

The portal will be backfilled or plugged.

The Brunswick Pit faces above 175m AHD will be battered at 3H:1V to ensure long term stability and the floor will be graded to provide a uniform slope up to ground level at the northern end of the pit.

Allow groundwater to recover to 178.0 AHD, forming a pit lake with a maximum height of approximately 14 m below the pit crest at the southern end.

The final surface preparation will include contour ripping, topsoiling and seeding for any areas above the pit lake. Brunswick pit surrounds on private land to be returned pastoral land suitable for sheep grazing.

Safety bunding and fencing will be maintained.

6.2 Key uncertainties and risks

6.2.1 Uncertainties

Key uncertainties in relation to the proposed rehabilitation of the domains are listed below.

TSFs:

The current closure design for the TSFs, such as that outlined by ATC Williams Detailed Design Report (2023) for the Brunswick West TSF, is currently conceptual and conservative (see further discussion in Section 6.3, below). Uncertainties include:

- the optimal final gradients of the TSF embankments
- cover design and thickness
- final land use for TSF
- the sourcing of sufficient and suitable rehabilitation materials.

Brunswick Pit:

- stability of pit faces and requirement (if any) for further setbacks than currently proposed 3H:1V slope.

6.2.2 Rehabilitation risks

Risks arising during the operational and rehabilitation phases of the mine are covered in MRCO's risk management plan for the Costerfield Operations. The plan includes identification of the hazards, receptors and potential consequences associated with project activities, and the associated risks, taking standard controls and risk treatment into account.

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The risk management plan includes risks of relevance to rehabilitation (and requirements for risk mitigation), including the following:

- Public safety – the need for decommissioning and final rehabilitation to achieve landforms that do not pose a risk to public safety.
- Landform stability – the need for final landforms to be stable, in particular, land located in the vicinity of voids, and TSF embankments.
- Erosion – the need for post-closure landforms to be stable with respect to erosion and to avoid posing a downstream water quality or sedimentation risk.
- Water management – the need for post-closure landforms to retain or shed stormwater in a manner that does not present an erosion, sedimentation or flood risk.
- Pollution – the need for post-closure drainage from disturbed areas to be of sufficient quality that it does not pollute surface waters or groundwaters and result in impacts on beneficial uses or environmental values.
- Revegetation – the need for rehabilitation to result in vegetation that is self-sustaining and supports end land use.

6.2.3 Risk and management of premature closure

Premature or unplanned closure is a rehabilitation risk at all mining operations. Unplanned, interim or unexpected closure scenarios can occur including operations being placed under care and maintenance while waiting for market conditions to improve or for the operation to be purchased by another company. MRCO will mitigate the rehabilitation risks associated with premature closure, or care and maintenance, by:

- Keeping the rehabilitation liability estimate for the site up to date. The estimate is based on the rehabilitation liability at the time of estimation and therefore provides sufficient funds for rehabilitation in the event of premature closure.
- Keeping this Rehabilitation Plan up to date, so that rehabilitation concepts and activities align with current site configuration and risks and therefore cover the rehabilitation activities required in the event of premature closure.
- Maintaining a mass balance of required and available rehabilitation resources (see Section 9.2.10), so that at any one time, the source of materials is known (along with the associated costs of transportation and use).

Whether the site proceeded directly to premature closure or was placed under care and maintenance, a key issue would be to ensure that landforms are geotechnically, erosionally and geochemically stable during the period before closure commences or operations resume, which could be several years depending on circumstances.

Constructed facilities such as waste stockpiles or low-grade ore stockpiles are only likely to be geotechnically unstable if they are awaiting re-use (e.g. as underground fill or processing) when operations cease or have active faces. Any geotechnically unstable faces would be either dozed down to a stable angle, or buttressed.

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Erosional stability would be achieved by sowing groundcover species on any exposed areas, such as newly constructed slopes.

The first step in rehabilitating the operational TSFs will be to leave the tailings material to dry after cessation of deposition. There would therefore be no immediate need to cap the TSFs in the event of care and maintenance and, based on site water quality monitoring data, the geochemical risk posed by the TSFs to downgradient surface water and groundwater quality would be low.

The Brunswick Processing Plant and other site equipment would be placed under a standard program of care and maintenance prior to either closure commencing or operations resuming. The program would maintain the equipment in serviceable order, and also include routine inspection for contaminant spills or leaks (and clean-up/remediation where required).

General land management would be maintained at the site, including erosion control and weed and pest control. Environmental monitoring would also be continued and site security maintained.

Final rehabilitation, decommissioning and closure would be undertaken as soon as a decision was made to prematurely close the site.

6.3 Further investigation

Additional investigation is required to further understand rehabilitation issues and risks and to further refine rehabilitation concepts and activities over the remaining project life. The key areas of additional investigation are outlined below.

1. If the requirement for successful closure of the existing Bombay and Brunswick TSF is to provide for a 5% capping gradient cover then the earthfill/rockfill material shortfall will be 167,000 m³.

	Bombay TSF	Brunswick TSF
Bulk earthfill over tailings	69,000 m³	60,000 m³
Rockfill/earthfill over earthfill (0.5m thick)	39,200 m³	25,000 m³
Topsoil cover (100mm thick)	10,800 m³	10,000 m³
Rockfill Buttressing (3:1 batter slopes)	118,200 m³	105,000 m³
Additional material to crown to 5%	**89,500 m³**	**77,500 m³**

2. Additional investigations and design work to reduce the closure material shortfall of the Brunswick West TSF will be conducted by Mandalay as the existing Bombay and Brunswick facilities move into a nonoperational stage of their life. These investigations will include:
   - reshaping of the tailings in the facility
   - reprocessing of the tailings and disposal in the Brunswick West TSF
   - decontamination and reuse of the tailings for building products or soil
   - increasing production of rockfill materials from the underground mine.

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6.3.1 Final void design

At closure, the concept design is for the groundwater to recover to 178.0 AHD to form a pit lake and for the pit faces above 175m AHD to be battered to 3H:1V to ensure long term stability. A zone of rock armouring is to be installed at the pit lake water level to ensure slope stability is maintained during reductions in water level as well as address the risk of wave action.

Around the perimeter of the pit, a safety bund 2.0 metres in height will be constructed 5 metres from the pit crest. A security fence 1.8 metres in height will be installed outside the safety bund and maintained. The floor of the pit will be graded at the northern end, to provide a beach zone to aid egress in the event the pit is accessed by public, livestock or native animals. Battering the slopes to 3H:1V will further allow egress from the pit lake, in the event the constructed beached zone is not accessible.

6.3.2 TSF detailed design

The current closure design for the TSFs, such as that outlined by the ATC Williams Detailed Design Report (2023) for the Brunswick West TSF, is currently conceptual. In the absence of more detailed investigation and modelling, the design is conservative, particularly in terms of cover design (e.g. cover thickness, slope angle and material volumes).

The final TSF closure design will need to demonstrate compliance with ANCOLD (2019) and other relevant guidance. The capping/covering of the surface of the tailings and external slope design will be based on erosion/geomorphic studies supported by evidence to show that the design will prevent escape of tailings. The design will acceptably minimise the risk of surface runoff coming into contact with the tailings and generating problematic tailings seepage.

The detailed closure design will demonstrate that capping/covering of the tailings has been designed using sound science and engineering approaches and meets multiple objectives for geotechnical and geochemical stability. The design will account for site-specific conditions and be able to achieve a landform that is permanently safe, stable and non-polluting.

The detailed closure design needs to demonstrate that the TSFs require no long-term care and maintenance or, if they do, arrangements are made to do so with appropriate institutional controls (e.g. legal, land use zoning, post-rehabilitation risk funding and responsible party identified and agreed) (ERR 2019).

6.3.3 TSF embankment stability

Ongoing monitoring and review of the geotechnical stability of the TSF embankments will confirm the suitability of the structures and provided recommendations for the final rehabilitation and closure.

6.3.4 TSF cover systems and revegetation

The land uses approved for the TSFs need to be compatible with design and rehabilitation standards. The nature reserves proposed for the Brunswick and Bombay TSFs are potentially inconsistent with leading practice, as the presence of trees (either planted or self-sown) may adversely affect the integrity of the TSF covers.

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The conceptual closure concept for the Brunswick West TSF, described in the ATC Williams Detailed Design Report (2023), specified that the cover is designed to support a revegetated surface without vegetation intercepting the tailings below. However, as the proposed final land use is pasture, the risk of tree growth is reduced and a thinner cover may be justified (with provision for post-closure maintenance to remove any self-sown tree saplings), subject to the successful attainment of other performance criteria.

The geotechnical stability of the TSF and its geochemical performance with respect to different cover designs and options for final vegetation will require further assessment to identify an optimal design.

6.3.5 Geochemical assessment

Geochemical risks associated with tailings, materials used to construct final landforms (including TSF covers), pit walls and underground workings (particularly where above predicted final level of groundwater rebound) will require further assessment as part of final rehabilitation planning to confirm the findings of earlier testwork (that the risk of acid and metalliferous drainage (AMD) is low).

Such investigations will include additional static and kinetic testwork under the supervision of a suitably experienced geochemist to enable the long-term, post-closure quality of site drainage waters to be predicted in relation to pH, metals and salinity.

6.3.6 Mass balance

Requirements for rehabilitation materials could also change as a result of updated rehabilitation design (such as changes to TSF cover design and thickness).

Accordingly, MRCO will maintain and routinely update a mass balance of required and available rehabilitation materials to ensure that adequate materials are available for rehabilitation across the life of the project. The mass balance will include locations and volumes of:

- topsoil
- rock/earthfill
- capping materials/clay.

The current mass balance is included in Section 9.2.10.

MRCO will assess options for optimising the mass balance across the life of the project to maintain. The primary use of materials is for the rehabilitation of the TSFs. Sufficient material exists in existing waste rock/overburden stockpiles to complete rehabilitation for both the Bombay and Brunswick TSFs at current approved design concept of 1% gradient.

Prior to commencing any rehabilitation or construction campaign analysis of materials balance and options for resolving a site wide materials shortfall should be undertaken.

A materials contingency options analysis was undertaken during the design of the Brunswick West TSF using a 1% cover slope gradient on all TSFs and a 5% cover slope gradient on all TSFs, as has been designed for Brunswick West TSF, to compare the volumes available and potential cover material requirements.

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A 1% cover slope gradient on all three TSF would provide a surplus of approximately 160,000 m^3 volume of cover material. This is within the current volumes of materials onsite. A 5% cover slope gradient on all three TSF would require in the order of an additional 167,000 m^3 volume of cover material. This is in excess of the current volumes of materials onsite and would potentially require the importation of materials. Any importation of material will require an imported materials management plan.

Where possible, MRCO intend to achieve a positive materials balance while minimising (or avoiding) the need to import materials from off site. Such options may include:

- reducing the design thickness and gradient of TSF covers if shown to be achievable without compromising performance criteria
- final shaping of tailings to provide a domed beach that mimics cover gradients and minimises the volume of material required for infilling prior to TSF cover construction
- the use of materials from the Brunswick pit walls for rehabilitation if further setback than the current 3H:1V slope is required to achieve geotechnical stability
- the use of TSF embankment materials above the final tailings level as a source of TSF cover materials
- managing the mine schedule in a way that reduces underground fill requirements and frees up waste rock for use in rehabilitation.

6.3.7 Rehabilitation trials and investigations

Rehabilitation trials and investigations will be undertaken as areas of the site become available for decommissioning to:

- confirm and/or refine rehabilitation assumptions
- provide the site-specific information required to plan and design for final rehabilitation and closure
- help develop appropriate closure criteria
- enable more accurate costing of, and provisioning for, rehabilitation and closure.

Trials and investigations are anticipated to include:

- confirmation of soil and waste material categories and volumes for use in rehabilitation (backfilling, cover construction, topsoiling etc.)
- assessment of long-term geochemical stability of waste materials and tailings
- cover design for TSFs
- procedures for revegetation, habitat establishment and related weed management.

Other investigations, such as geotechnical assessments and the identification of any soil contamination, will be outlined in the Detailed Decommissioning and Closure Plan to be prepared towards the end of life of each TSF and the operations.

6.3.8 Revegetation trials

Revegetation trials conducted during the remaining mine life will be an important input into rehabilitation planning. The aim of undertaking trials is to determine the optimum means of revegetation ahead of the need to undertake it on a broad scale.

Trials will be established as disturbed areas become available for rehabilitation to help inform future revegetation, particularly if the outcome of an earlier TSF cover design is unsuitable for vegetation and there is a need to change the cover design to enable the successful revegetation of further TSFs.

The efficient use of topsoil material and vegetation outcomes are to be explored. Pasture areas may benefit from topsoil depth while tree seeding is often most successful in areas with no topsoil – as there is no competition with grass species and should only be undertaken on flatter areas with lower erosion potential. The depth of topsoil required for successful revegetation can be tested through a series of trials.

6.3.9 Alternative revegetation methods

MRCO may wish to adopt alternative revegetation methods successfully used elsewhere to achieve standards at least equal to those that would be expected using conventional methods.

Where alternative methods other than those described above are proposed, a program to investigate and trial the methods will be developed.

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7 Objectives

Closure planning is a process that extends over the life-of-mine with the objective of achieving lease relinquishment. Relinquishment is the formal approval by the regulator indicating that the completion criteria for the mine have been met to the satisfaction of the regulatory authority (ICMM 2008). Following relinquishment, ongoing responsibility for the lease area can be legally transferred to government or private entities (such as the land holders).

To achieve relinquishment, the site should not endanger public health and safety, should alleviate or eliminate environmental damage, and allow a productive use of the land similar to its original use or an acceptable alternative (ANZMEC 2000).

Whole-of-site and domain-specific rehabilitation objectives have been developed and are outlined below in Sections 7.1 and 7.2. The rehabilitation objectives will be further refined, where appropriate, over the remaining mine life in consultation with landowners and other key stakeholders (see Section 4).

7.1 Whole-of-site objectives

MRCO's aim is to decommission and rehabilitate the Costerfield Operations in a manner that leaves the site safe, stable and non-polluting; consistent with agreed post mining outcomes and land uses and the MRSD Act.

The whole-of-site rehabilitation objectives for the closure of the MRCO are to:

- protect the environment and public health and safety by using safe and responsible closure practices
- to progressively stabilise, rehabilitate and revegetate land affected by mining activities
- to undertake landscaping to minimise the visual impact of the mine site
- reduce or eliminate adverse environmental effects once the operations cease
- establish conditions which are consistent with the pre-determined, sustainable, end land-use objectives
- reduce the need for long-term monitoring and maintenance by establishing effective physical and chemical stability of disturbed areas
- enable relinquishment to be achieved in an efficient and timely manner.

In support of the above objectives, MRCO will seek to achieve the following rehabilitation outcomes:

- constructed landforms that are safe, represent minimal risk to the public, native fauna or livestock, and have rates of erosion comparable to surrounding lands
- re-established landforms that, where possible, blend in with surrounding natural landforms
- land returned to a condition that has minimal off-site impacts by ensuring the rehabilitated site is free draining and non-polluting (e.g. by controlling infiltration, erosion, sedimentation, and degradation of drainage and groundwater resources)

- land that has been rehabilitated using technically effective and cost-efficient methods and proven engineering practices to ensure that no or minimal ongoing maintenance is required beyond closure
- re-established self-sustaining vegetation communities consistent with the final land use (with protective cover and species distribution broadly comparable to surrounding sites).

7.2 Domain-specific objectives

Domain-specific rehabilitation objectives are set out in Table 7.1. The final rehabilitated landforms and land uses once rehabilitation has been completed and the rehabilitation objectives have been achieved are shown on

Figure 7.1 Final landuse

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Table 7.1 Domain-specific rehabilitation objectives

Location	Domain	Rehabilitation objectives
Augusta	Infrastructure	• No infrastructure remains onsite • No contaminated soils or substrates remain on site • Area contoured to match existing surface topography • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Disturbed lands are restored suitable for grazing land use as agreed with landowner
	Augusta and Cuffley Shafts	• Prevent access to safeguard public safety • Disturbed lands are restored to pre-existing land use as agreed with landowner
	Waste Rock Stockpile	• Re-use material for rehabilitation • Area contoured to match existing surface topography • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Disturbed lands are restored suitable for grazing land use as agreed with landowner
	Boxcut	• Prevent access to safeguard public safety • Backfill boxcut • Area contoured to match existing surface topography • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Disturbed lands are restored suitable for grazing land use as agreed with landowner

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Location	Domain	Rehabilitation objectives
	Evaporation Ponds/Storage Dams	• Push down embankments with area contoured to match existing surface topography • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Disturbed lands are restored suitable for grazing land use as agreed with landowner
Brunswick	Infrastructure	• No infrastructure remains onsite • No contaminated soils or substrates remain on site • Area contoured to match existing surface topography • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Disturbed private lands are restored suitable for grazing land use as agreed with landowner • Disturbed Crown Lands are restored to a landscape suitable for recreation/conservation land use (Box-Ironbark forest) as agreed by Parks Victoria or a satisfactorily agreed landform
	Brunswick and Youle Shafts	• Prevent access to safeguard public safety • Disturbed lands are restored to pre-existing land use as agreed with landowner
	Brunswick and Bombay TSFs	• Disturbed Crown Lands are restored to a landscape suitable for recreation/conservation land use (Box-Ironbark forest) as agreed by Parks Victoria or a satisfactorily agreed landform • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Final TSF landforms are geotechnically and erosionally stable • Geochemistry of tailings is understood and TSF covers acceptably reduce the risk of impacts on surface water and groundwater quality • Monitoring program records long term trends that demonstrate water quality does not exceed agreed criteria
	Brunswick West TSF	• Disturbed pasture lands are restored to a landscape suitable for grazing land use as agreed with landowner • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities • Final TSF landform is geotechnically and erosionally stable • Geochemistry of tailings is understood and TSF covers acceptably reduce the risk of impacts on surface water and groundwater quality • Monitoring program records long term trends that demonstrate water quality does not exceed agreed criteria
	Brunswick Waste Rock Stockpile	• Re-use material for rehabilitation • Area contoured to match existing surface topography • Disturbed pasture lands are restored to a landscape suitable for grazing land use as agreed with landowner • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities

Location	Domain	Rehabilitation objectives
		• Disturbed lands are restored suitable for grazing land use as agreed with landowner
	Rock Garden Waste Rock Stockpile	• Re-use material for rehabilitation • Area contoured to match existing surface topography • Disturbed Crown Lands are restored to a landscape suitable for recreation/conservation land use (Box-Ironbark forest) as agreed by Parks Victoria or a satisfactorily agreed landform • Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities
	Brunswick Pit	• Prevent access to pit crest to safeguard public safety • Pit walls are structurally stable and waste rock stockpiles erosionally stable • Geochemistry of waste rock is understood and confirmed not to require encapsulation • Monitoring program records long term trends that demonstrate water quality does not exceed agreed criteria

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AE1046.9 Mandalay Resources - Costerfield Operations
Figure 7.1. Final Land Use

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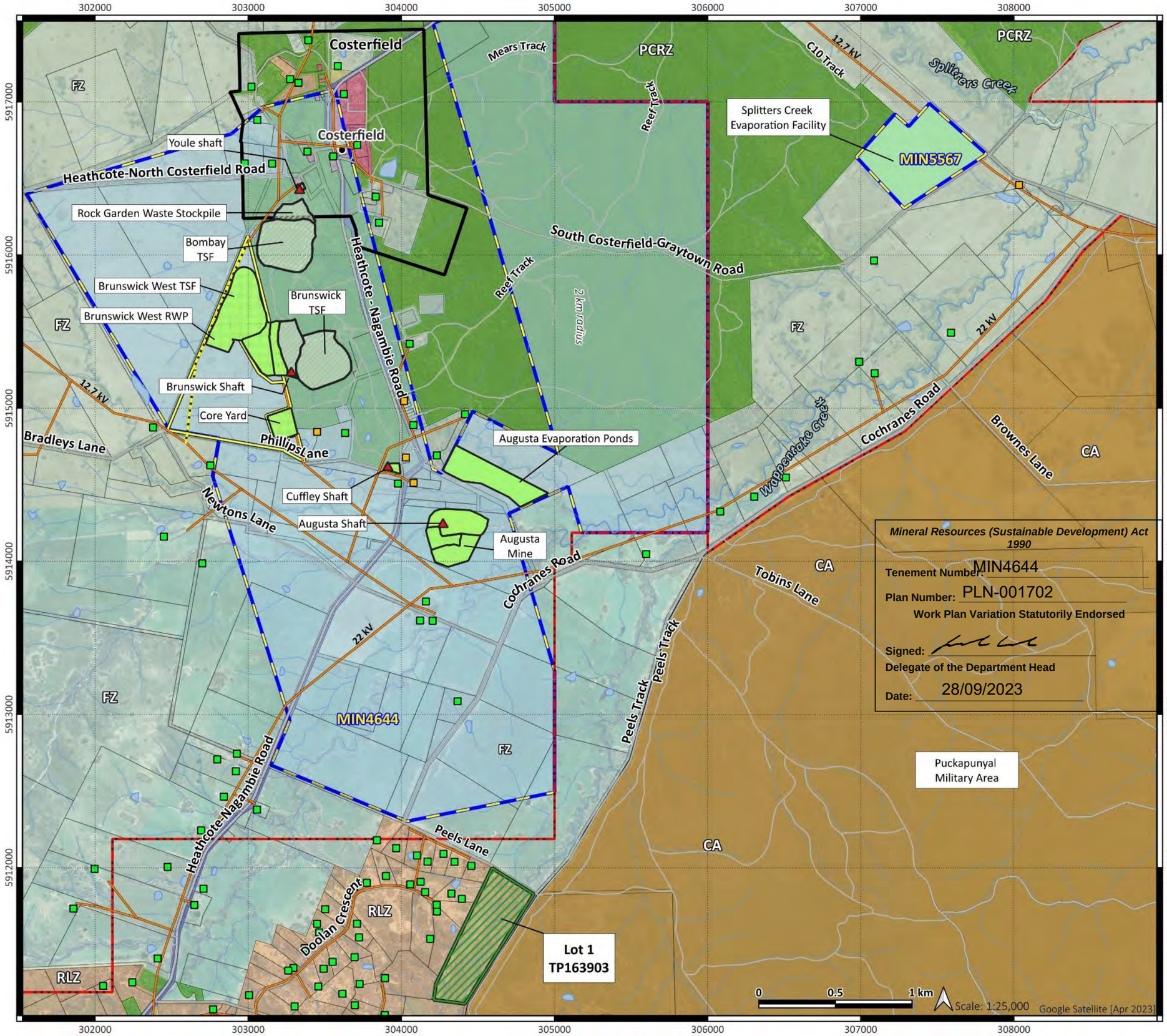

Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed:

Delegate of the Department Head

Date: 28/09/2023

- Owned by Mandalay Resources
- Sensitive receptor (residence)
- Vent shaft
- Road
- Existing transmission line
- Relocated transmission line
- Main watercourse
- Watercourse - tributary
- Mineral Licence boundary
- Lot 2 PS404811
- Private land lot boundary
- Township boundary
- Vegetation offset area

Rehabilitation domains - final land use category

- Pastoral
- Box Ironbark woodland

Planning Zone

- FZ- Farming zone
- PCRZ - Public Conservation and Resource
- TZ - Township
- RLZ - Rural Living Zone
- TRZ2 - Principal Road Network
- PUZ7 - Public Use Zone - Other Public Use

Crown Land

- Commonwealth Land (Planning zone category - CA)

Additional data: VIC_TR_Road, VIC_locality_point, VIC_MINTEN, VIC_HY_WATERCOURSE, VIC_HY_WATER_AREA, VIC_TOWNSHIP POLYGON, VIC_POWERLINE, PLM25_Crown_land_POLYGON and PLAN_ZONE wms (http://services.land.vic.gov.au/catalogue/publicproxy/guest/dv_geoserver/wms?VERSION=1.1.1&WIDTH=512&HEIGHT=512&LAYERS=VMPLAN_PLAN_ZONE&STYLES=&SRS=EPSG%3A4283&BBOX=141%2C-39%2C150%2C-34)

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7.3 Collection and analysis of data

The existing environmental management plan includes the identification, management and monitoring of key operational environmental issues along with corresponding performance indicators and monitoring activities. It is expected that the monitoring program will be readily adapted into a closure and post-closure monitoring program once operations cease.

The existing environmental monitoring program includes:

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- dust
- surface water
- groundwater
- noise.

Key aspects of the current monitoring program to continue post rehabilitation include:

- Surface water monitoring including collecting upstream and downstream water quality samples from designated points in waterways potentially affected by the operations.
- Groundwater monitoring including monitoring the effects of mine dewatering activities on groundwater levels and seepage from TSFs.

The monitoring information will provide both baseline environmental data and information on operational impacts that will be used to help identify closure issues, develop rehabilitation and closure procedures, and develop completion criteria. The collection and analysis of data in support of rehabilitation objectives and completion criteria is set out in more detail in Table 8-1 in Section 8.

In addition to monitoring, investigations will be undertaken as required into closure issues and rehabilitation trials will be established to develop and refine rehabilitation procedures.

7.3.1 Subsidence monitoring

Subsidence monitoring of the Heathcote-Nagambie Rd has been conducted by MRCO to detect any potential movement due to subsidence. The results submitted to ERR confirmed that subsidence was not of concern for the monitored section of Heathcote-Nagambie Road.

7.3.2 Surface and groundwater monitoring

The current operations monitoring program covers matters relevant to both the operation and closure of the Costerfield Operations including:

- EPA-approved monitoring program and compliance limits
- additional groundwater and surface water monitoring programs.

It is expected that the current monitoring program will be readily adapted into a closure and post-closure monitoring program once operations cease.

Routine monitoring of surface water quality in the Wappentake Creek and tributaries will continue after mining and throughout the closure and post-closure period until the relevant performance criteria are satisfied.

Routine monitoring of groundwater quality and levels will continue after mining and throughout the closure and post-closure period until the relevant performance criteria are satisfied.

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8 Criteria

Completion criteria are qualitative or quantitative principles or standards that measure whether a mining project has met its rehabilitation objectives (ERR 2020a).

The criteria must be sufficiently stringent to ensure that the overall objectives of rehabilitation have been met. They must also be designed to allow effective reporting and auditing to define an endpoint for rehabilitation activities where sites can be handed over to a third party. It is widely accepted (e.g. ANZMEC 2000) that completion criteria should be:

- specific enough to reflect unique set of environmental, social and economic circumstances
- flexible enough to adapt to changing circumstances without compromising objectives
- include environmental indicators suitable for demonstrating that closure efforts and rehabilitation trends are heading in the right direction
- subject to periodic review resulting in modification if required due to changed circumstances or improved knowledge
- based on targeted research which results in more informed decisions.

Completion criteria have been developed for each of the domain-specific rehabilitation objectives set out in Section 7.2 and are listed in Table 8-1, along with the specific environmental aspect to which they relate.

The completion criteria have been developed based on current understanding of the sites and their rehabilitation risks. However, the criteria will be further refined over the remaining mine life based on:

- consultation with landowners and other key stakeholders (see Section 4)
- past rehabilitation outcomes (see Section 5.3)
- the findings of rehabilitation investigations and trials (see Section 6.3.7)
- evaluation of environmental monitoring data (see Section 7.3).

In particular, criteria relating to rehabilitation aspects such as geotechnical stability, erosion control, geochemical stability, revegetation success, and post-closure land uses will be refined based on a process of ongoing stakeholder consultation and a program of further investigations.

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Table 8-1 Completion criteria

No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
1	No infrastructure remains onsite	All domains	No infrastructure remains onsite, unless authorised by ERR, or third party with ERR agreement (e.g. Parks Victoria)	Decommissioning completed within 12 months of cessation of operations by end post closure year (PCY) 1 NB: Active monitoring infrastructure to be removed at relinquishment by PCY 8 During operations and closure phases: • Records of stakeholder consultation Prior to MIN relinquishment: • Decommissioning and rehabilitation completion reports • ERR and regulatory agency site inspection
2	Prevent access to pit crest and portals to safeguard public safety	Augusta Shaft Cuffley Shaft Brunswick Shaft Youle Shaft Augusta Boxcut Brunswick Pit	Portals and Ventilation shafts have been secured in accordance with ERR requirements. Safety bund and security fencing has been erected to prevent public access to pit walls. Floor graded providing a beaching zone at the northern end of Brunswick Pit.	Review of Brunswick Pit closure plan to assess proposed safety features with consideration of pit water levels, battering of pit slopes above pit water levels, installation of rock armouring and provision of a beaching zone by closure by PCY 0. Assessment is to confirm that 3H:1V pit slopes will achieve the designed design acceptance criteria of a Factor of Safety (FoS) of 1.3 Access restriction completed within 12 months of cessation of operations by end PCY 1 Backfill of Augusta boxcut by the completion of earthworks by end PCY 2 Site made safe, stable and compatible with proposed land end use of grazing PCY 8. During operations and closure phases: • Records of stakeholder consultation

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No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
				Prior to MIN relinquishment: • Decommissioning and rehabilitation completion reports • ERR and regulatory agency site inspection
3	No contaminated soils or substrates remain on site	Process plant, office, hardstand and infrastructure, including: Augusta infrastructure Areas Augusta Evaporation ponds Brunswick Infrastructure Areas	Contaminated soils or substrate: • remediated to achieve compliance with applicable EPA standards (such as the National Environmental Protection (Assessment of Contaminated Sites) Measure), or • excavated and sent to an appropriate waste disposal facility in accordance with EPA requirements	Assessments and disposal of contaminated material completed within 12 months by end PCY 1 During operations and closure phases: • Contamination assessment and remediation reports • EPA contaminated materials transport and disposal certificates (if relevant) Prior to MIN relinquishment: • Surface water and groundwater monitoring results • ERR and regulatory agency site inspection
4	Area contoured to match existing surface topography	All domains Except: Brunswick Pit, Brunswick TSF Bombay TSF Brunswick West TSF	Final gradients and contours consistent with pre-existing topography and integrate with surrounding topography No pooling of drainage or uncontrolled erosion	Earthworks commence in PCY2 and revegetation is completed within 12 months by end PCY 3 Topography confirmed by PCY 3 During closure phase: • GIS analysis to confirm final topography/landform and visual inspection prior to revegetation in PCY 3 Prior to MIN relinquishment: • ERR and regulatory agency site inspection
5	Final TSF landforms are geotechnically and erosionally stable	All tailing facilities, including: Brunswick TSF, Bombay TSF, Brunswick West TSF	Design and construction of final TSF landforms has been verified as geotechnically stable and compliant with ANCOLD 2019 requirements by a suitably qualified and experienced TSF specialist	Incorporate information from further investigations into final closure design by PCY 2 Final detailed closure design and report by PCY2 Earthworks commence in PCY 3 following cessation of tailings deposition (drying period) and revegetation is completed by end PCY 3

No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
			Annual geotechnical audits have been undertaken by a suitably qualified and experienced TSF specialist during remaining mine life and closure period, and have confirmed stability of final landform Landform modelling of final landform has predicted erosional stability No ponding of water is observed to occur on top of a TSF No visible erosion gullies, evidence of tunnel erosion or slumping Vegetative groundcover of >50% maintained year-round on slopes	Construction of TSF landforms verified PCY 3 Monitoring, annual audits and reports to continue until relinquishment by PCY 8 Stability of TSF landforms verified PCY 8 During operations and closure phases: • Outcomes of landform assessment and modelling, including how landform design accounts for closure and post-closure erosion and drainage, and how water interacts with slopes, created landforms and catchments after rehabilitation/closure • Detailed design of batters for TSF for decommissioning, rehabilitation and long-term management. • As-completed construction reports • Results of regular TSF risk reviews, geotechnical audits and erosional stability monitoring • Results of vegetation coverage monitoring • Any closure deviations from design explained, justified and approved in advance with new knowledge incorporated that demonstrates there is no threat to objectives of containment or land use • GIS analysis and visual inspection of landforms • Records of stakeholder consultation During post-rehabilitation phase: • Monitoring and reporting of landform stability and percentage vegetation coverage during the 4 years post-rehabilitation period by a land management specialist

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No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
				• Records of maintenance to repair landform instability or erosion, and to revegetate disturbed/bare areas, during the 4 years post-rehabilitation period Prior to MIN relinquishment: • Summary of geotechnical audit outcomes and erosional stability monitoring • ERR and regulatory agency site inspection
6	Pit walls are structurally and erosionally stable	Brunswick Pit	The long-term structural stability of the pit walls has been verified by a suitably qualified and experienced geotechnical engineer after completion of works No visible evidence of slumping or erosional instability	Incorporate information from further investigations into final closure design by PCY 1 Earthworks commence in PCY 2 and revegetation is completed within 12 months by end PCY 3 Long-term structural stability verified PYC 5 Monitoring, annual audits and reports continue for 2 years to end PCY 5 During operations and rehabilitation phases: • Engineered design and as-completed construction reports • Results of geotechnical and erosional stability monitoring, including prism monitoring program of pit wall stability • Where problems are detected, records of control measures adopted and clear rationale for measures • GIS analysis and visual inspection of landforms • Records of stakeholder consultation During post-rehabilitation phase: • Monitoring and reporting of landform stability during the 4 years post-rehabilitation period

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No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
				• Records of maintenance to repair landform instability or erosion during the 4 years post-rehabilitation period Prior to MIN relinquishment: • Summary of geotechnical and erosional stability monitoring • ERR and regulatory agency site inspection
7	Disturbed lands are restored to forested landscape suitable for recreation/ conservation land use (as agreed, where relevant, by Parks Victoria)	All disturbance sites on Crown Land, including: Brunswick Infrastructure Brunswick TSF Bombay TSF Rock Garden Waste Rock Stockpile	Native vegetation on Crown Land is sustainably established on disturbed land using local species agreed to by Parks Victoria Species composition and community structure has been established such that it is (or will become) comparable to that of the surrounding wooded landscape	Incorporate information from further investigations into final closure design by PCY 2 Earthworks commence in PCY 2 and revegetation is completed within 12 months by end PCY 3 Monitoring, maintenance, surveys and annual reports continue until relinquishment by PCY 8 Restored to end landuse by PCY 8 During operations and rehabilitation phases: • Reporting of revegetation trial outcomes (trials undertaken to test options and confirm procedures before the need to apply them) During post-rehabilitation phase: • Records (including photographic evidence) of reseeding programs, including species lists, method and date of activities • Monitoring and reporting of revegetation outcomes during the 4 years post-rehabilitation by a land management specialist • Undertaking maintenance to replant losses or increase biodiversity during the 4 years post-rehabilitation • Records of stakeholder consultation Prior to MIN relinquishment:

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No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
				• Summary of revegetation outcomes • ERR and regulatory agency site inspection
8	Disturbed lands are restored suitable for grazing landuse	All sites on private land, including: Augusta infrastructure Areas Augusta Evaporation ponds Augusta Boxcut Augusta Waste Rock Stockpiles Brunswick Brunswick Pit Brunswick Waste Rock Stockpiles Brunswick Core yard Brunswick West TSF	Vegetation establishment consistent with land use	Incorporate information from further investigations into final closure design by PCY 2 Earthworks commence in PCY 2 and revegetation is completed within 12 months by end PCY 3 Formal survey report at end of quarterly monitoring end PCY 5 Detailed survey report at end of 6 monthly monitoring end PCY 7 Monitoring, maintenance, surveys and annual reports continue until relinquishment by PCY 8 Restored to end landuse by PCY 8 During operations and rehabilitation phases: • Reporting of revegetation trial outcomes (trials undertaken to test options and confirm procedures before the need to apply them) During post-rehabilitation phase: • Records (including photographic evidence) of reseeding programs, including species lists, method and date of activities • Records of stakeholder consultation During post-rehabilitation phase: • Monitoring and reporting of revegetation outcomes during the 4 years post-rehabilitation period by a land management specialist • Records of maintenance to replant during the 4 years post-rehabilitation period

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No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
				Prior to MIN relinquishment: • Summary of geotechnical and erosional stability monitoring • Summary of revegetation outcomes • ERR and regulatory agency site inspection
9	Revegetation of disturbed lands does not introduce noxious weeds, new weed species or increase local weed densities	All domains	No State prohibited weeds (listed on the Agriculture Victoria website (agriculture.vic.gov.au) or Weeds of National Significance (listed on the Weeds Australia website weeds.org.au) present in rehabilitated land No weed species present that are not also present in comparable, nearby land (where the weeds on the nearby land have not been introduced by the mining operation) Density of individual weed species does not exceed that of comparable, nearby land (where the weeds on the nearby land have not been introduced by the mining operation)	Earthworks commence in PCY 2 and revegetation is completed within 12 months by end PCY 3 Monitoring and maintenance commence following revegetation and continue until relinquishment by PCY 8 During operations and rehabilitation phases: • Records (incl. photographic) of weed occurrence, prevalence and eradication during operations • Development of biosecurity procedures for vehicle hygiene prior to rehabilitation of disturbed lands and records of implementation • Records of stakeholder consultation During post-rehabilitation phase: • Records of weed occurrence, prevalence and eradication during the 4 years post-rehabilitation period by a land management specialist Prior to MIN relinquishment: • Summary of weed management outcomes • ERR and regulatory agency site inspection
10	Geochemistry of tailings is understood and TSF covers acceptably reduce the risk of impacts on	All tailing storage facilities, including: Brunswick TSF Bombay TSF	The geochemistry of the tailings has been characterised sufficiently to understand geochemical risk TSF covers have been designed, constructed and revegetated to	Incorporate information from further investigations into final closure design by PCY 2 Final detailed closure design and report by PCY2

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No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
	surface water and groundwater quality	Brunswick West TSF	effectively manage the identified geochemical risk A surface water and groundwater monitoring program are in place that is able to confirm that geochemical risks are being effectively managed Surface water and groundwater monitoring results are consistent with the indicators and objectives of the Environment Reference Standard (ERS) under the *Environment Protection Act 2017*	Earthworks commence in PCY 3 following cessation of tailings deposition (drying period) and revegetation is completed by end PCY 3 Monitoring and annual reports to continue from closure PCY 0 until relinquishment by PCY 8 NB: Active monitoring points to be removed prior to relinquishment PCY 8 During operations and closure phases: • Tailings geochemical assessment reports • Detailed engineering design of TSF cover systems, showing how TSF meets design criteria for closure and post-closure including how water interacts with covers and tailings after rehabilitation/closure • Materials mass balance showing availability and sourcing of cover materials • As-completed construction reports • Any closure deviations from design explained justified and approved in advance with new knowledge incorporated that demonstrates there is no threat to objectives of containment or land use • Results of surface water and groundwater quality monitoring program and consistency with ERS indicators and objectives • Records of stakeholder consultation During post-rehabilitation phase: • Monitoring and reporting of surface water and groundwater quality during the 4 years post-rehabilitation period Prior to MIN relinquishment:

No	Objective	Applicable domains	Criteria	Milestone and timing of evidence gathering/reporting
				• Summary of surface water and groundwater quality monitoring • ERR and regulatory agency site inspection
11	Monitoring program records long term trends that demonstrate water quality does not exceed agreed criteria	All tailing storage facilities, including: Brunswick TSF Bombay TSF Brunswick West TSF	A surface water and groundwater monitoring program are in place that is able to confirm that geochemical risks are being effectively managed Surface water and groundwater monitoring results are consistent with the indicators and objectives of the Environment Reference Standard (ERS) under the *Environment Protection Act 2017*	Monitoring and annual reports to continue from closure PCY 0 until relinquishment by PCY 8 NB: Active monitoring points to be removed prior to relinquishment PCY 8 During operations and closure phases: • Results of surface water and groundwater quality monitoring program and consistency with ERS indicators and objectives • Records of stakeholder consultation During post-rehabilitation phase: • Monitoring and reporting of surface water and groundwater quality during the 4 years post-rehabilitation period Prior to MIN relinquishment: • Summary of surface water and groundwater quality monitoring • ERR and regulatory agency site inspection

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9 Schedule for rehabilitation milestones

9.1 Progressive rehabilitation

Costerfield Operations consists of underground mining operations where ore is recovered from underground while waste rock is backfilled in stopes for local stability and tailings is placed in a tailings storage facility.

The disturbed surface areas are limited in size (total approximately 71 ha) and are typically active sites occupied by fixed plant, infrastructure and facilities and not available for rehabilitation until site closure.

Progressive rehabilitation is an important component of site environmental management and a requirement under section 81 of the MRSD Act. The first opportunity for major progressive rehabilitation will likely occur following the decommissioning of the Brunswick TSF. This will allow the site to be rehabilitated and will provide an opportunity to undertake rehabilitation trials (including both cover and revegetation trials).

Decommissioning of the Brunswick TSF is currently scheduled to occur in 2025/2026. The next opportunity will likely follow in 2026/2027 with the decommissioning of the Bombay TSF.

The rehabilitation earthworks for these TSFs will use material from the rock stockpiles at the Rock Garden, Brunswick and Augusta waste rock stockpiles. At this stage the Rock Garden, Brunswick and Augusta (partially) waste rock stockpiles may also be available to be rehabilitated once the stockpiles are consumed. Further progressive rehabilitation could be undertaken as facilities are no longer operational and with each campaign the rehabilitation concepts and details will be further refined. At closure it would be anticipated that the only TSF that would require decommissioning and rehabilitation is the Brunswick West TSF.

9.1.1 Season-related activities

Table 9-1 shows the seasons in which rehabilitation works need to be completed to minimise adverse impacts of earthworks and promote a high degree of success in revegetation.

Table 9-1 Seasons for activities

Activity	Autumn	Winter	Spring	Summer
Seed collection				X
Plant propagation			X	X
Final shaping	X			
Soil placement	X			
Ripping	X			
Tubestock planting	X	X		
Direct seeding	X	X	X	

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9.2 Construction sequence for final rehabilitation works

The construction sequence for rehabilitation works comprises two main phases – a decommissioning phase and an earthworks phase.

The likely construction sequence, integrated across the domains and assuming that progressive rehabilitation of the Brunswick and Bombay TSFs and the Rock Garden and Brunswick Waste Rock Stockpiles has occurred, has been identified as follows:

- decommissioning and remediation
- landform shaping and erosion control
- bulk earthworks and materials
- topsoil management and soil conditioning
- revegetation.

Refer to the Domain Action Plans in Appendix B for additional details regarding rehabilitation actions.

9.2.1 Decommissioning overview and schedule

Decommissioning will involve the removal of all equipment and infrastructure, with the exception of the Augusta water dams or other facilities/infrastructure to be retained for future use. Only those light vehicle tracks and monitoring equipment necessary for monitoring and maintenance are currently anticipated to remain at the site following decommissioning. The removal of surface facilities and site remediation will clear all disturbed sites of hazards and allow final rehabilitation activities to proceed.

MRCO will obtain consent from the landowners and any relevant regulatory authorities that any infrastructure that is to remain after mining is in a safe and acceptable condition. Such infrastructure will be maintained as appropriate by MRCO until handover.

The proposed schedule for the removal of plant and equipment will include:

- demobilisation of mobile plant, rolling stock and temporary facilities
- decommissioning of fixed plant, including decontamination where required and the removal and disposal of hazardous materials
- demolition, refurbishment or reuse of buildings or facilities, including a description of expected waste and disposal methods.

A detailed schedule will be prepared for the removal/demolition of supporting infrastructure within each domain to provide a framework for management. The relevant actions from this will be included in the Detailed Decommissioning and Closure Plan and will include:

- remove all portable plant, equipment and rubbish from Augusta site
- secure the portal at Augusta
- remove all portable plant, equipment and rubbish from Brunswick site
- secure the portal at Brunswick
- remove all portable plant, equipment and rubbish from the Cuffley and Youle ventilation shafts

- secure the ventilation shafts at Augusta, Cuffley, Brunswick and Youle
- assessment of contamination
- remove and dispose of contaminated material.

9.2.2 Decommissioning activities

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Expected decommissioning activities are outlined below.

General

General decommissioning activities will include:

- removal of fuels, waste oils and other hydrocarbons
- removal of chemicals and processing reagents
- selling of equipment, infrastructure and buildings
- demolition and removal of unsold infrastructure
- selling/recycling of material (e.g. scrap steel, pipelines, concrete)
- disposal of contaminated materials in accordance with EPA requirements.

Site services

It is envisaged that electricity services to any remaining infrastructure will be removed prior to the commencement of building demolition works. Other services such as telecommunication and water supply will also be removed

Buildings and fixed plant

All buildings and fixed plant (including workshops, office, storage sheds, etc.) will be demolished and removed from the site. Where appropriate, the materials recovered during demolition will be sold for re-use or recycled. It is envisaged that concrete footings and pads (where not sold for recycling) along with other potential inert building waste will be broken up and buried on site in a TSF or the boxcut.

Redundant plant or equipment

As part of closure, if not already undertaken, any redundant plant or equipment will either be sold to scrap dealers or disposed of at an appropriate landfill facility by a licensed waste contractor in accordance with EPA requirements.

Other infrastructure

MRCO will obtain consent from the landowners that any infrastructure that is to remain after operations cease, is in a safe and acceptable condition and will be maintained as appropriate by MRCO until handover.

9.2.3 Remediation

MRCO's Environmental Management System (EMS) includes safeguards and responses to ensure contamination sources and high-risk activities do not result in pollution of soil and/or groundwater. As a result, it is not anticipated that any significant level of contamination of the site will occur. However, minor levels of contamination requiring remediation and/or offsite removal and disposal

are likely to be present. Testing for contamination will be undertaken as part of the closure process and any contamination identified will be managed (e.g. by on-site remediation and/or disposal at a registered landfill) in accordance with EPA requirements.

Dam liners

HDPE liners will be removed and disposed of within contained structures such as a previous specified water dams and/or taken to a licenced landfill.

Buildings, storage areas and fixed plant

Where potential contamination may have occurred as a result of site activities (e.g. re-fuelling areas, workshops, etc.), appropriate investigations will be undertaken to determine the presence and extent of any potential contamination (e.g. hydrocarbons) and determine the appropriate management in accordance with EPA requirements.

Removal of sediments/contaminated material

Any remaining sediments/sludge/contaminated material remaining at closure will be scraped-up and either re-processed or disposed of within contained structures such as a TSF, or a previous specified water dam.

9.2.4 Final rehabilitation overview

The bulk of rehabilitation activities will occur following the decommissioning phase of the operation and will be undertaken as part of the final rehabilitation works, including the following activities:

- making voids, portals and shafts safe
- bulk earthworks and capping
- reshaping final landforms and drainage
- topsoiling
- re-seeding and planting
- erosion control.

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9.2.5 Underground mine workings

On completion of mining, surface access to the underground mining works by shafts or declines will be permanently closed off to the public and the site made secure, as follows:

- The boxcut will be backfilled, which will seal the Augusta mine portal.
- The Brunswick mine portal will be sealed.
- A concrete slab will be installed over ventilation and emergency egress shafts (see Appendix C).
- The underground workings will be backfilled with waste rock (down to 4 level, including crosscut to E-lode at 1 level) to prevent subsidence.
- The underground workings will then be allowed to fill naturally with groundwater. There will be no discharge of groundwater offsite.

9.2.6 Landform shaping and erosion control

Rehabilitation will be undertaken to ensure a safe and stable landform that is compatible with the surrounding landscape. In general, the concept for the final landscape is to reform the sites as close as possible to the topography that existed prior to disturbance, as follows:

- Infrastructure, waste rock storage, boxcut and mine dam areas (including the evaporation pond) will be returned to natural surface level.
- The TSFs and pit will remain as permanent changes to the pre-mining landform.
- The rehabilitation and closure of TSFs and voids will be subject to specific detailed planning for safety and stability reasons.

Steep slopes, clearance of vegetation, failure to adequately revegetate and inadequate drainage controls can cause runoff and erosion problems. The control of runoff and erosion is best achieved by:

- reducing slope angles of constructed landforms
- minimising exposed areas (i.e. areas with low to no vegetation cover)
- installing cutoff drains to direct stormwater away from disturbed areas
- appropriate design and construction of exit drains to direct stormwater from the site and reduce flow velocities
- construction of sediment traps and dams to minimise sediment discharge from the site.

The landform design will detail drainage and erosion control measures. As a general guide, drains and sediment traps will be designed for a one-in-100 year AEP critical rainfall event.

9.2.7 Infrastructure areas

Unless assessed as being contaminated, infrastructure areas made available for rehabilitation following final decommissioning will be treated in accordance with the rehabilitation prescriptions relevant to the final land-use plan, such as ripping, replacement of topsoil and re-establishment of cover species.

Roads, tracks and other compacted areas

The rehabilitation of tracks and roads should only be undertaken following agreement with the landowner or land manager as to whether the road or track should be retained after operations cease.

The hardstand areas around the Augusta administration buildings, stores area and electrical workshop will be ripped up with any waste material being placed in a TSF or the boxcut. Other hardstands, roads subject to rehabilitation, offices and workshop areas will be cleared and ripped.

Infrastructure located in the boxcut (including the maintenance workshop) will be removed prior to backfilling the boxcut.

Other highly compacted areas such as loading areas, carparks and stockpile pads may require special treatment, such as deep ripping or removal of compacted material, prior to respreading of topsoil.

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Evaporation dams

Dams will be drained and the material in the embankments will be pushed back into the excavation. Accumulated sediments will be transferred to central dam and the sediments will be contained within in the HDPE liner and encapsulated on site in the HDPE liner before it being covered by the embankment material. Areas will be graded to natural levels.

9.2.8 Waste storages and voids

Waste rock storage and ROM pad

Waste rock material will be removed, used as backfill or in cover construction, and the areas stripped back to natural surface levels. The top 0.2 m of the ROM pad will be scraped off and run through the Processing Plant.

Voids

The Augusta boxcut is to be backfilled to natural surface level with waste rock and oxidised material.

The perimeter of the Brunswick Pit will be cleared, a 2.0 metre high earthen safety bund constructed around it, and a 1.8 metre security fence topped with barbed wire erected.

If either Augusta or Brunswick access to the underground workings become redundant there is an opportunity to commence the closure activities for either the Augusta Boxcut or Brunswick Pit.

If access via the Brunswick portal is no longer required. MRCO can investigate the possibility of sealing the portal and commence battering the pit slope to 3H:1V.

Post mining, a void is to remain above the groundwater recharge height in the pit. The modelled groundwater recovery level will be 178.0 AHD resulting in a maximum pit depth of approximately 14 m. A beaching zone at northern end of pit will be constructed to aid egress. Shafts will be rehabilitated as outlined in Section 9.2.5.

9.2.9 Tailing Storage Facilities

The proposed cover design for the TSFs is envisaged to be a gently domed landform graded at 1% from the centre point for the Bombay and Brunswick TSFs and 5% for the Brunswick West TSF. The TSFs will also include the following measures:

- The existing embankment slopes of Brunswick and Bombay TSFs shall be reduced to 1:3 (V:H).
- The embankment slopes of Brunswick West TSF shall remain as constructed 1:4 (V:H) slope.
- A suitably qualified engineer shall develop a detailed design for an earthen cover over the tailings and for the rehabilitation of the external embankments on closure. It is currently anticipated that a layer of inert material and topsoil will cap the tailings (to an approximate depth of 1 m).
- The inert material will likely be excavated waste rock from the Augusta mine and will undergo geochemical characterisation to confirm its suitability for use in the final landform.

The detailed design of the TSF rehabilitation will be incorporated into the Detailed Decommissioning and Closure Plan. The detailed design will take into account the findings of cover and revegetation trials, geochemical investigations and geotechnical assessments.

TSF drying period

- leave tailing material exposed to dry to form a suitable strength crust within 2-3 years from cessation of deposition.

TSF stage 2

- material for rehabilitation from stockpiles for covering tailings
- reshape to provide suitable drainage and minimise erosion risk
- topsoil, trim, scarify and seed disturbed areas as required.

9.2.10 Bulk earthworks materials

The mass balance for materials available to be used in bulk earthworks is shown in the tables below. The tables show:

- sources and volumes of waste rock and topsoil
- volumes of waste rock and topsoil required to rehabilitate mine facilities
- the allocation of sources to meet rehabilitation needs.

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Waste rock

Approximately 769,550 m^3 of waste rock will be removed from current storage areas during rehabilitation, with the material used for backfill and covering TSFs as shown in Table 9-2.

Table 9-2 Waste Rock Inventory

Location	Quantity	Destination Domain					
	m^3	1a	4ug	4	7	8	9
Augusta Waste Rock Stockpile	**188,000**		14,000	25,500	109,000	39,500	
Augusta Noise Bund	**87,000**			87,000			
Augusta Evaporation Ponds/Storage Dams	**123,500**	123,500					
Brunswick Waste Rock Stockpile	**16,000**				16,000		
Brunswick Pit Oxidised Waste Stockpile	**43,850**					43,850	
Brunswick Pit Waste Rock Stockpile	**173,500**				13,500		160,000
Rock Garden Waste Stockpile	**53,000**					53,000	
Road base recovered from onsite roads	**4,200**				4,200		
Source to be confirmed	**81,000**						81,000
Total	**769,550**	**123,000**	**14,000**	**112,500**	**142,700**	**136,350**	**241,000**

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Key to destination Domains:

Domain 1a	Augusta Evaporation Ponds/Storage Dams
Domain 4ug	Underground mine backfill
Domain 4	Boxcut backfill
Domain 5	Brunswick Infrastructure Areas
Domain 7	Brunswick TSF
Domain 8	Bombay TSF
Domain 9	Brunswick West TSF

Note: The Brunswick West TSF will require 210,000 m^3 of earthfill and 31,000 m^3 of rockfill generated largely from the Brunswick Pit Waste Rock Stockpile and other onsite sources. Any short fall in material will need to be imported and an imported materials management plan will be required.

Topsoil

Approximately 70,800 m^3 of topsoil will be respread across all major areas of disturbance as shown in Table 9-3.

Table 9-3 Topsoil Inventory

Location	Quantity	Destination Domain											
	m^3	1	1a	2a	3	4	5	7	8	9	10	11	12
Augusta Noise Bund	**2,700**				2,700								
Augusta Evaporation Ponds 1	**2,000**	2,000											
Augusta Evaporation Ponds 2	**13,400**	3,400	10,000										
Splitters Creek 1	**11,200**			500	1,100	2,000	2,500	1,700			3,400		
Core Yard	**2,600**										2,600		
Brunswick TSF	**5,000**							5,000					
Bombay TSF	**8,600**								7,000				1,600
Brunswick West TSF	**25,300**							2,200	2,200	18,500		2,400	
Total	**70,800**	**5,400**	**10,000**	**500**	**3,800**	**2,000**	**2,500**	**8,900**	**9,200**	**18,500**	**6,000**	**2,400**	**1,600**

Key to destination Domains:

Domain 1	Augusta Mine Site
Domain 1a	Augusta Evaporation Ponds/Storage Dams
Domain 2a	Cuffley Shaft
Domain 3	Augusta Waste Rock Stockpile
Domain 4	Augusta Boxcut
Domain 5	Brunswick Plant Site
Domain 7	Brunswick TSF
Domain 8	Bombay TSF
Domain 9	Brunswick West TSF
Domain 10	Brunswick Waste Rock Stockpile
Domain 11	Rock Garden Waste Stockpile
Domain 12	Brunswick Pit

Note: The Brunswick West TSF will require 18,500 m^3 of topsoil for rehabilitation, however the topsoil surplus generated during construction will be 40,500 m^3. A further 6,800 m^3 of this material has been allocated to be used in Domains 7, 8 and 11.

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9.2.11 Topsoil management and soil conditioning

Subsoil conditioning

Compaction

Prior to re-spreading of the topsoil, the subsoil should be scarified to break up any compacted areas and to enable the appropriate keying of the two soils. Lightly compacted soils should be scarified to a depth of 50 to 100 mm and heavily compacted soils to a minimum depth of 300 mm, ensuring all ripping and cultivation operations occur along the contour.

Soil structure

Prior to re-spreading the topsoil, laboratory testing of subsoil should be undertaken to confirm pH, salinity, and sodicity. Application of gypsum onto the subsoil may be required where there are dispersive sub-soils, or soil has become compacted or 'hard setting' as a result of construction earthworks, or where subsoil has inadvertently been brought to the surface and mixed with topsoil. The addition of gypsum will reduce the effects of soil 'crusting' and improve the friability of soil. This will improve water infiltration into plant roots, and therefore improve germination responses. Gypsum should be applied directly to the subsoil before topsoil is replaced.

Depending on soil test results agricultural lime may also need to be applied at calculated rates to ensure subsoil pH is within a range that plants are able to establish successfully.

Topsoil management

Topsoil management will be undertaken as follows:

- Topsoil will be stripped progressively ahead of construction.
- Where possible, topsoil will be stripped when moist to help maintain soil structure and to reduce dust generation.
- Stockpiles will be generally no greater than two metres high to maximise surface exposure and biological activity.
- Stockpiles will be shaped to minimise erosive runoff and protected from upgradient surface flows by cut-off drains.
- Stockpiles to be kept longer than three months will be sown with a suitable cover crop to minimise soil erosion and invasion of weed species.
- Weed growth will be monitored and, if necessary, controlled.
- Prior to re-spreading, weed growth will be scalped from the top of the stockpiles to minimise the transport of weeds into rehabilitated areas.
- Stockpile locations will be identified on mine plans to minimise the potential for unauthorised use or disturbance.

Topsoil re-spreading

Topsoil re-spreading will be undertaken as follows:

- All contractor machinery used to handle and transport topsoil will be washed down both prior to and at the completion of works to minimise the risk of transfer of weeds.
- Stockpiled topsoil will be re-spread evenly over the whole disturbance area.
- Topsoil will not be re-spread when wet, to avoid excessive compaction.

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- At all times topsoil respreading will be undertaken so that no visible dust leaves site.
- Topsoil will be placed at the top of a slope and spread down slope to a minimum depth of approximately 100 mm.

Where topsoil is insufficient to sustain plant growth, or if topsoil is unavailable, soil amelioration may be required. Soil ameliorants such as gypsum, wood and hay mulch, biosolids, municipal waste composts and other organic wastes are utilised based on availability. Soil ameliorants can prevent surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination.

Fertiliser

To ensure soil fertility is adequate to encourage successful germination and establishment of pasture in areas to be returned to agriculture, it may be necessary to apply phosphorous (in the form of superphosphate). Soil laboratory testing should be undertaken to determine the correct rate of phosphorous application.

Weeds

Weed controls, such as applying pre- and post-emergent weed sprays, may be necessary for the reinstated topsoil. Advice should be sought from an agronomist.

9.2.12 Revegetation

Revegetation is to be established to produce sustainable woodland and grazing land uses. Revegetation will be undertaken as follows:

- Revegetation will be undertaken from autumn to spring.
- After surface soil amelioration and surface preparation is completed for any given area, revegetation will commence as soon as practicable.
- Seed and tubestock supply will preferentially be of local provenance.
- Seed collected onsite will be incorporated into the revegetation mix or propagated to produce tubestock for planting.

Box Ironbark Woodland

The post-closure land use for Crown Land requires rehabilitation to achieve Box Ironbark Woodland. This will be undertaken as follows:

- The revegetation process will aim to re-establish Box Ironbark Woodland on designated rehabilitation areas, consistent with the surrounding vegetation.
- A suitable species list will be prepared with advice from an ecologist and DELWP.
- Revegetation will be undertaken via a combination of direct seeding and tubestock planting.
- Species selection will include a combination of overstorey, middlestorey and understorey strata.

Provision of habitat resources

The habitat resources will be incorporated into rehabilitation as follows:

- Nesting boxes and structures (benefiting local mammals - Phascogale and avian wildlife) will be provided in suitable locations within the rehabilitated site.

- Large woody debris and hollow bearing timber will be placed (both vertical and horizontal) within revegetated areas.

Pasture

The post-closure land use for private land requires the re-establishment of pastures. Pasture should be established as soon as practicable to provide ground cover and reduce the likelihood of erosion. Pasture establishment will be undertaken as follows:

- Topsoil will be spread to a depth of approximately 200 mm.
- Logs, rocks or other large materials will be removed from the area.
- The area will be seeded using a mix of pasture and legume species blended with an appropriate application rate of fertiliser.
- A suitable species list will be prepared with input from the landowner.
- Fertiliser will be applied at the time of sowing and as required during the rehabilitation maintenance period.

9.3 Timeframes

9.3.1 Progressive rehabilitation

The indicative timeframes for progressive rehabilitation and post-rehabilitation activities are as follows and shown in Table 9-5:

- studies on the design of TSF rehabilitation – prior to closure
- final design report – prior to rehabilitation
- decommissioning TSFs – six months
- drying period for Brunswick/Bombay TSF tailings material (last deposition) – 2 years
- final earthworks stage – six months
  - Brunswick/Bombay TSF (shape and cover)
  - Rock Garden/Brunswick/Augusta (partial) waste rock stockpile (as they are reused)
- Post closure monitoring – 4 years
  - Revegetation failure
  - Revegetation success.

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Table 9-4 Progressive rehabilitation activities indicative timeline

Item	Year								
	2022	2023	2024	2025	2026	2028	2029	2030	2031
Brunswick TSF									
Incorporate information from further investigations* into closure design									
Final detailed closure design report									
Decommissioning									
• **Brunswick TSF infrastructure**									
• **Brunswick TSF**			***Drying period***						
• **Brunswick Waste Rock Stockpile**									
Earthworks & revegetation									
• **Brunswick TSF**									
• **Brunswick Waste Rock Stockpile**									
Monitoring									
• **Earthwork monitoring (monthly)**									
• **Post-closure monitoring (quarterly)**									
• **Post-closure monitoring (6 monthly)**									
Bombay TSF									
Incorporate information from further investigations* into closure design									
Final detailed closure design report									
Decommissioning									
• **Bombay TSF infrastructure**									
• **Bombay TSF**			***Drying period***						
• **Rock Garden Waste Stockpile**									
Earthworks & revegetation									
• **Bombay TSF**									
• **Rock Garden Waste Stockpile**									
Monitoring									

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Item	Year								
	2022	2023	2024	2025	2026	2028	2029	2030	2031
• Earthwork monitoring (monthly)									
• Post-closure monitoring (quarterly)									
• Post-closure monitoring (6 monthly)									

* The closure design will take into account the findings of cover and revegetation trials, geochemical investigations and geotechnical assessments (Refer to Section 6.3).

9.3.2 Cessation of mining activities

The assumed timeframes for rehabilitation and post-rehabilitation activities are as follows and shown in Table 9-5:

- decommissioning at All sites – 1 years
- earthworks stage at All sites (with exception of Brunswick West TSF) – 1 year
- drying period for Brunswick West tailings material (last deposition) – 2 years
- final earthworks stage for Brunswick West TSF (shape and cover) – six months
- decommissioning and earthwork - monthly monitoring and maintenance – 2 years
- initial rehabilitation establishment - quarterly monitoring and maintenance – 2 years
- post-rehabilitation development - six monthly monitoring and maintenance – 2 years.

Table 9-5 Closure activities timeline

Item	Year after cessation of operations								
	-1	1	2	3	4	5	6	7	8
Incorporate information from further investigations* into final closure design									
Decommissioning									
• **All sites (except TSF)**									
• **Brunswick West TSF infrastructure**									
• **Brunswick West TSF**			*Drying period*						
Earthworks & revegetation									
• **Augusta site**									
• **Brunswick site**									
• **Cuffley Shaft site**									
• **Youle Shaft site**									

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Item	Year after cessation of operations								
	-1	1	2	3	4	5	6	7	8
Monitoring									
• **Earthwork monitoring (monthly)**									
• **Post-closure monitoring (quarterly)**									
• **Post-closure monitoring (6 monthly)**									
Brunswick West TSF site									
Incorporate information* from further investigations into final closure design									
Final detailed closure design and report									
Earthworks & revegetation									
• **Brunswick West TSF site**									
Monitoring									
• **Earthwork monitoring (monthly)**									
• **Post-closure monitoring (quarterly)**									
• **Post-closure monitoring (6 monthly)**									
Relinquishment									

* The closure design will take into account the findings of cover and revegetation trials, geochemical investigations and geotechnical assessments (Refer to Section 6.3).

9.4 Post-rehabilitation monitoring and maintenance

9.4.1 Monitoring

Monitoring of rehabilitation will determine whether rehabilitation objectives and requirements are being achieved. In particular, performance against 'completion criteria' should be monitored during and following rehabilitation. Rehabilitation monitoring will include revegetation monitoring for both pastures and native vegetation.

Revegetation monitoring

All sites subject to revegetation during rehabilitation will be monitored as follows:

- Quarterly inspections for erosion, weed invasion, vermin and vandalism with results being recorded and remedial action taken as required. The quarterly inspections will continue for a period of 18 to 24 months following initial planting.
- 18 to 24 months following initial planting, a survey of vegetation establishment and other relevant aspects will be conducted.

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- After the formal survey site inspections will be conducted at six monthly intervals for a two year period.
- Two years after the formal survey a detailed survey will be undertaken of both flora and fauna. The result of this survey will be used to determine the need for ongoing monitoring.

Outcomes of the rehabilitation inspection and any mitigation actions that are identified as part of the inspection are to be recorded. Where necessary, rehabilitation procedures will be amended accordingly with the aim to continually improve rehabilitation standards.

Subsidence

Subsidence monitoring of the Heathcote-Nagambie Rd has been conducted by MRCO to detect any potential movement due to subsidence. The results submitted to ERR confirmed that subsidence was not of concern for the monitored section of Heathcote-Nagambie Road.

Surface and groundwater monitoring

The current operations monitoring program covers matters relevant to both the operation and closure of the Costerfield Operations including:

- EPA-approved monitoring program and compliance limits
- additional groundwater and surface water monitoring programs.

It is expected that the current monitoring program will be readily adapted into a closure and post-closure monitoring program once operations cease.

Routine monitoring of surface water quality in the Wappentake Creek and tributaries will continue after mining and throughout the closure and post-closure period until the relevant performance criteria are satisfied.

Routine monitoring of groundwater quality and levels will continue after mining and throughout the closure and post-closure period until the relevant performance criteria are satisfied.

The rehabilitation and post-rehabilitation monitoring program has been developed based on the rehabilitation risk assessment and is set out in Table 9-6.

Table 9-6 Monitoring during rehabilitation and post-rehabilitation phases

Aspect	Monitoring	Frequency	Locations	Duration#	Post-rehabilitation risk
Public safety	Visual monitoring	Quarterly	Shafts, portal and pit fencing	2 years	Low risk
Slope failure	Visual and prism monitoring	Quarterly	Brunswick Pit walls TSF embankments	2 years 4 years	Low risk
Erosion	Visual monitoring	Bi-monthly and after 25 mm rainfall event	TSF covers and embankments	4 years	Low risk

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Aspect	Monitoring	Frequency	Locations	Duration#	Post-rehabilitation risk
Water quality	Sampling and analysis*	Monthly during rehabilitation, Quarterly post-rehabilitation	>20 locations including surface water and groundwater	4 years	Low risk
Drainage diversions	Visual monitoring	Quarterly and after 25 mm rainfall event	All	2 years	Low risk
Erosion	Visual monitoring	Quarterly	Revegetated areas	2 years	Low risk
Weed outbreaks	Visual monitoring	Quarterly	Revegetated areas	2 years	Low risk
Revegetation failure	Visual monitoring	Quarterly	Revegetated areas	2 years	Low risk
	Survey of vegetation establishment	After 2 years	Revegetated areas		
Revegetation success	Visual monitoring	6 mthly	Revegetated areas	2 years#	Low risk
	Survey of vegetation establishment	After 2 years	Revegetated areas		

* assumes field analysis for pH and conductivity and sample collection and analysis for arsenic, and a suite of general water quality parameters.

Revegetation success monitoring commences after Revegetation failure monitoring is completed.

9.4.2 Maintenance of rehabilitation

Undertaking maintenance activities on rehabilitated areas is important to ensure erosion control is effective and revegetation is successful. Maintenance of revegetation will be required, in the form of replanting or reseeding in failed areas, weed control, watering, pest control and installation/repair of tree guards and fencing for protection from grazing. Rehabilitation maintenance will be guided by the results of the monitoring program.

The following activities will be undertaken as part of rehabilitation maintenance:

- conduct inspections
- manage erosion issues
- maintain drains and water/sediment control structures
- re-establishment of degraded or failed vegetation
- weed control
- prevent and manage damage from pests, vehicles and plant.

Once rehabilitation is stable, supports final land uses, and satisfies completion criteria (as determined by monitoring), additional maintenance will not be required.

9.4.3 Intervention

Where revegetation efforts are found to be failing, the following intervention methods may be investigated for suitability:

- undertaking a soil assessment to identify any nutrient deficiencies, and applying an appropriate fertiliser / soil ameliorant, at an appropriate rate
- re-seeding with a different and more appropriate seed mix
- growing of tube-stock and hand planting hardened seedlings, where tree species are identified as being depauperate on rehabilitation areas.
- mulching at time of planting tube-stock and hardened seedlings.

Where slopes are found to be unstable, with erosion evident, the following intervention methods may be investigated for suitability:

- irrigate in-filled areas to improve revegetation success
- re-profile (this should be seen as a last resort).

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10 Post-rehabilitation risk identification and assessment

As set out in the Guidelines (ERR 2020a), the MRSD (MI) Regulations require operators to identify and assess the risks that the rehabilitated land may continue to pose after rehabilitation is complete. Such post-rehabilitation risks are the residual risks that remain after ERR has assessed that all the rehabilitation criteria in the rehabilitation plan have been met and the site is suitable for relinquishment.

10.1 Regulatory requirements

In relation to risk assessment, under the MRSD (MI) Regulations (ERR 2020a):

> *"Regulation 43(2)(f) requires a rehabilitation plan to include an identification and assessment of relevant risks that the rehabilitated land may pose to the environment, to any member of the public or to land, property or infrastructure in the vicinity of the rehabilitated land, including—*
>
> *(i) the type, likelihood and consequence of the risks; and*
>
> *(ii) the activities required to manage the risks; and*
>
> *(iii) the projected costs to manage the risks; and*
>
> *(iv) any other matter that may be relevant to risks arising from the rehabilitated land.*
>
> *Relevant risks are defined in Regulation 43(5) as risks that may require monitoring, maintenance, treatment or other ongoing land management activities after rehabilitation is complete".*

10.2 Risk process

The post-rehabilitation risk assessment process adopted for this report follows the risk identification and assessment framework detailed in the Guidelines (ERR 2020a).

The aim of the process is to identify and assess the residual risks that the rehabilitated land may pose to the environment, to any member of the public, or to land, property or infrastructure in its vicinity. Such residual risks may require action or incur a cost (or ongoing costs) after rehabilitation is complete. The assessment is to identify site-specific issues, constraints or characteristics requiring specific management to ensure that stated rehabilitation objectives can (continue to) be achieved after rehabilitation criteria have been met.

10.3 Post-rehabilitation risk assessment

The post-rehabilitation risk assessment template from the Guidelines (ERR 2020a) has been adapted for use to summarise post-rehabilitation risks, as shown in

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Table 10-1.

Likelihood, consequence, and risk rating tables are provided in Appendix D following the criteria outlined in Preparation of Work Plans and Work Plan Variations – Guideline for Mining Projects (ERR 2020b). A risk register, expanding upon, is provided in Appendix D, using the risk register template from ERR (2020a).

The likelihood and consequence ratings listed in are post-treatment (i.e. they assume that the 'activities to manage risk' have been implemented).

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Table 10-2 provides the reasoning for the risk ratings.

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Table 10-1 Post-rehabilitation risk assessment

No	Risk	Activities to manage risk	Likelihood	Consequence	Treated risk	Projected costs to manage risk*
1	Public safety – access to underground workings resulting in injury	Shafts and portals will be sealed Boxcut will be backfilled Brunswick Pit lake	Not applicable	Not applicable	*De minimis* risk following backfilling	None
2	Public safety – access to Brunswick Pit crest resulting in injury	2 metre high safety bund located 5 metres from pit crest 1.8 metre security fence outside safety bund Grade floor in the north end of Brunswick Pit to allow egress from pit lake Batter Brunswick Pit slope above 175 m RL at 3H:1V Pit lake water level invert at 178 m RL (maximum of 14 metres below pit crest)	Rare	Critical	High risk	Maintain fence after site relinquishment (replace fence every 25 years 800m @ $59/m ~$47,200)
3	Slope failure – geotechnical instability causing failure of pit walls	Ensure the geotechnical stability of final landforms, including water dam embankments, Brunswick Pit walls, crests and underground workings	Unlikely	Insignificant	Low risk	None

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No	Risk	Activities to manage risk	Likelihood	Consequence	Treated risk	Projected costs to manage risk*
		Batter Brunswick Pit slope above 175 m RL at 3H:1V to ensure long term stability Installation of rock armouring at the pit lake water level				
4	Slope failure – geotechnical instability causing failure of TSF embankments	Prepare TSF Closure Plans, including measures to ensure long-term geotechnical stability of TSF embankment and tailings mass Capping and reshaping Revegetation types are compatible with embankment integrity Compliance with ANCOLD 2019	Unlikely	Major	High risk	Potential need for ongoing removal of self-sown tree saplings to maintain cover integrity (every 3-5 years 24 ha of "Weed management" @ $590/Ha ~$14,160)
5	Water quality – drainage containing contaminants from TSFs	Mine waste materials are regularly tested and have been found to be non-acid forming Reagents present low risk to the environment Cyanide not used in processing	Unlikely	Moderate	Medium risk	Potential need for ongoing removal of self-sown tree saplings to maintain cover integrity (cost as above)

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No	Risk	Activities to manage risk	Likelihood	Consequence	Treated risk	Projected costs to manage risk*
		Cease tailings deposition Cover system including low permeability layer Cover system and revegetation types are compatible Water shedding final surface				
6	Water quality – drainage containing contaminants from underground workings	Non-mining waste materials to be disposed in appropriate manner – within a contained structure or removal to an appropriate landfill facility Proper storage and handling of hazardous materials and in-situ remediation or licensed disposal of contaminated soils Groundwater table expected to rebound close to pre-mining levels when dewatering ceases at end of mining, minimising long term oxidation of wallrock and therefore geochemical risk	Unlikely	Minor	Low risk	None

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No	Risk	Activities to manage risk	Likelihood	Consequence	Treated risk	Projected costs to manage risk*
7	Re vegetation failure – vegetation not sustainable	Seeding with local species Plan season for earthworks, seed collection, propagation and planting appropriately Undertake revegetation trials	Rare	Insignificant	Low risk	None
8	Introduction of weeds	Equipment hygiene/ weed control	Unlikely	Minor	Low risk	None
9	Erosion – causing damage to TSF embankments	Capping and reshaping Drainage controls Revegetation Monitoring and maintenance until landform stable	Unlikely	Minor	Low risk	None
10	Water quality – drainage containing sediment from erosion of rehabilitated surfaces	Return topography to natural ground levels Revegetate as soon as practicable Conduct cover and revegetation trials Producing a free-draining, non-eroding surface	Unlikely	Minor	Low risk	None

No	Risk	Activities to manage risk	Likelihood	Consequence	Treated risk	Projected costs to manage risk*
		Revegetate as soon as practicable to limit erosion and sedimentation Conduct revegetation trials Maintenance and monitoring of revegetation				

*Post-relinquishment of MIN

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Table 10-2 Reasoning for post-rehabilitation risk ratings

No	Risk	Reasoning
1	Public safety – access to underground workings resulting in injury	Although the potential consequence of a member of the public gaining access to the underground workings (major injury/fatality) is critical, the proposal to decommission the Augusta portal by backfilling and the Brunswick portal by sealing and allowing a pit lake to form that will cover the Brunswick portal entrance, effectively removes this as a risk.
2	Public safety – access to pit crests resulting in injury	The potential consequence of a member of the public gaining access to the Brunswick Pit (major injury/fatality) is critical. The proposal to isolate the risk by bunding and fencing the Brunswick Pit as well as battering the pit slopes above the pit lake water level to 3H:1V. These controls effectively reduce but cannot eliminate this as a risk. There will be a requirement for fencing to be continued to be maintained after MIN relinquishment.
3	Slope failure – geotechnical instability causing failure of pit walls	The current state of the pit walls is considered safe for mining operations. The pit slopes will be battered at 3H:1V above the pit lake water level and a rock armouring zone be constructed at the modelled pit lake water level. The stability of the pit walls will be assessed to ensure the long term pit slopes at 3H:1V are safe and stable. The assessment will provide recommendations for the final floor profile as well as further any reduction in pit slopes or installation of catchment bunds.
4	Slope failure – geotechnical instability causing failure of TSF embankments	All tailing storage facilities were designed and constructed to contemporary standards. The preparation of TSF Closure Plans, including measures to ensure long-term geotechnical stability of TSF embankment and tailings mass will provide modern-day recommendations at the time of the closure of the facilities. The proposed final buttressing and any required re-shaping of the Brunswick and Bombay TSF embankments is expected to further increase their long-term stability. The design of the final slope of the TSF embankments, using 3H:1V for the Brunswick and Bombay TSFs and 4H:1V for the Brunswick West TSF, is expected to effectively mitigate the risk of geotechnical failure. The closed TFSs will also be compliant with the requirements of ANCOLD 2019. The long-term compatibility of embankment vegetation (both planned and self-seeded) with embankment stability will be assessed. It is expected that the embankments will be sufficiently stable to accommodate self-seeded vegetation, such as deep-rooted trees without a loss of structural integrity. However, if required, provision will be made for long-term ongoing maintenance of embankment vegetation. Post-rehabilitation slope failure is therefore considered unlikely and, if it occurs, to be major in nature. MRCO proposes commissioning a specialist assessment of the stability of the embankments that will be used to inform final closure planning.

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No	Risk	Reasoning
5	Water quality – drainage containing contaminants from TSFs	The main risk of post-rehabilitation water contamination from the TSF is considered to be the potential for AMD to occur. As discussed below, the risk of impacts from AMD are considered to be low. The results of the geochemical testing showed that the maximum contamination concentration limits defined by EPA (EPA 2020) were only exceeded for the arsenic content from the Brunswick tailings (2/3 samples), which were believed to have been deposited in the mid 2000's. The more recent samples collected from Bombay (deposited around 2010-2011) had arsenic concentrations lower than the maximum concentration limits. In consideration that there has been very little change to the ore body and processing methods since 2011, the Bombay tailings are considered to be more representative of the future tailings that will be deposited into Brunswick West TSF. Ongoing testing is required to confirm the chemical characteristics and non-acid forming nature of tailings materials and a final specialist assessment of AMD is proposed prior to final rehabilitation. Notwithstanding the low AMD risk, the TSF covers will be designed such that they can accommodate vegetation (both planned and self-seeded) over the long-term without loss of cover integrity. It may be that self-seeded, deep-rooted vegetation adversely affects the functional integrity of the cover. If so, provision will be made for long-term ongoing maintenance of cover vegetation.
6	Water quality – drainage containing contaminants from underground workings	Site water monitoring in general does not indicate any major presence of AMD (such as might be evidenced by low pH, elevated metals concentrations and high salinity) so this risk is considered low. Water quality potentially could drop temporarily if dewatering ceases (as would occur under the current rehabilitation scenario due to the backfilling of the Augusta portal and sealing of the Brunswick portal) and the rebounding groundwater comes into contact with oxidised sulfides in the exposed wallrock, resulting in acid and metalliferous (AMD) drainage inputs into the water, lowering pH and raising the level of metals such as antinomy and arsenic. However, AMD risk is considered low and there are no nearby beneficial users of groundwater.
7	Re vegetation failure – vegetation not sustainable	Based on the natural revegetation of the area, and in the absence of contamination such as may prevent/impede plant growth, it is considered highly unlikely that the area will not revegetate. Revegetation of native vegetation using seed from local species, planning the seasons for earthworks, seed collection, propagation and planting and adjusting methods based on the outcomes of revegetation trials will enhance the likelihood of successful revegetation of Box Ironbark Woodland.

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No	Risk	Reasoning
		The re-introduction of pasture species can follow the local practices of the region as agreed with the land owners.
8	Introduction of weeds	The open woodland vegetation in the area already contains many common weeds and the adjacent farmland provides a source of weeds. The main post-rehabilitation weed risk is that new weeds will be introduced due to site activities and spread to the surrounding vegetation. It is assumed that weeds will be managed during the rehabilitation phase through the adoption of standard equipment hygiene controls, and managed during the post-rehabilitation monitoring and maintenance phase by the application of weed controls such as targeted spraying. Such measures are expected to minimise the risk of introducing new weeds to the surrounding environment.
9	Erosion – causing damage to TSF embankments	All TSFs were designed and constructed to contemporary standards. The preparation of TSF Closure Plans, including measures to ensure long-term geotechnical stability of TSF embankment and tailings mass will provide modern-day recommendations at the time of the facilities closure. Erosion could potentially cause damage to the TSF embankments, leading to slumping and loss of containment. This risk is increased by the presence of dispersive soils in the area. Ponding near the crests of the TSFs could lead to tunnel erosion through the embankments and concentrated flow down the embankments as a result of inadequate shaping and drainage controls could cause gully erosion. Effective capping, reshaping and revegetation, along with appropriate drainage controls and post-closure monitoring and maintenance, are expected to effectively minimise this risk. This risk can also be effectively mitigated by final design and shaping, including the placement, if required, of rock armouring. It is noted that the upstream drainage has minimal catchment. Due to the consolidated nature of the tailings, it is unlikely that any substantial loss of containment would result even if erosion and slumping was to expose the tailings.
10	Water quality – drainage containing sediment from erosion of rehabilitated surfaces	Revegetation should be promoted as soon as practicable to limit erosion and sedimentation. Rehabilitation trials will inform the methods and procedures providing the best outcomes for revegetation. This risk can also be effectively mitigated by final landscape design and shaping to reinstate the natural drainage pattern over disturbed areas, including the installation of rock armouring, if required.

11 Financial costing and provision for closure

11.1 Closure costing methodology

Closure and rehabilitation costs have been calculated for the operations, in accordance with ERR requirements, including the document Establishment and Management of Rehabilitation Bonds for the Mining and Extractive Industries (ERR 2021a). These costs will be reviewed regularly as factors influencing rehabilitation liability change. Such factors include increases or decreases to the un-rehabilitated disturbance area (e.g. due to project expansion or progressive rehabilitation), and changes to rehabilitation concepts or activities.

Key cost items include:

- decommissioning
- sealing underground access
- reshaping slopes and embankments
- covering tailings material
- revegetation re-establishment
- monitoring and maintenance.

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11.2 Closure cost assumptions

The closure cost provisioning for the operations was undertaken based on the following assumptions:

- the operations will be rehabilitated as approved in the WPVs for MIN4644
- there will be opportunities for future progressive rehabilitation during the operational phase with the decommissioning of the current TSFs
- the rehabilitation is based on the existing facilities and current disturbance areas
- the final land use objectives and completion criteria will be fully met by the approved rehabilitation methodologies
- all built infrastructure will be decommissioned.

11.3 Current financial assurance estimate

An updated rehabilitation bond estimate was prepared using applicable rates within the current version of the ERR bond calculator (ERR 2021a), released on 16 March 2021.

In 2022, the estimated rehabilitation liability was assessed for MIN4644 to be $9.7M (including $3.0M in management & contingencies).

The Brunswick West TSF domain will add $1.4M (not including Third Party Project Management & Contingencies) to the total.

In addition, MRCO maintains internal provisioning to ensure that adequate funds are available to meet closure commitments using the company's existing workforce and resources.

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12 Plan review

The Rehabilitation Plan will undergo routine internal revision, as required, in response to:

- changes in legislation or WPV approval requirements
- changes in site activities, operations, facilities or footprint (e.g. see Section 2.1.4)
- the findings of rehabilitation studies and trials
- the results of environmental monitoring
- completion of progressive rehabilitation activities
- the outcomes of stakeholder consultation
- improvements in the knowledge of rehabilitation practice or technologies
- opportunities for improvements to the plan being identified.

Notwithstanding the above, the Rehabilitation Plan will be fully updated every three years or as required following consultation with ERR.

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13 References

ANCOLD (2019). *Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure – Revision 1*. Australian National Committee on Large Dams (ANCOLD). July 2019.

ANZG (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines.

ANZMEC/MCA (2000). *Strategic Framework for Mine Closure*. Australian and New Zealand Minerals and Energy Council 2000.

ATC Williams (2022). Mandalay Resources Costerfield Operations - Costerfield Gold Mine, "Brunswick West Tailings Storage Facility Investigation and Design - Detailed Design Report". Reference 109014.15-R04-Rev1. October 2022.

Bureau of Meteorology (2022). Climate statistics for Australian locations - Costerfield.

DITR (2016). *Leading Practice Sustainable Development Program for the Mining Industry Handbooks. Mine Closure*. Department of Industry, Tourism and Resources 2016.

EPA (2020). "Waste Disposal Categories – Characteristics and Thresholds", Environmental Protection Authority Victoria, Publication 1828. March 2020.

ERR (2017). *Technical Guideline Design and Management of Tailings Storage Facilities.* Earth Resources Regulation. April 2017.

ERR (2020a). *Preparation of Rehabilitation Plans Guideline for Mining & Prospecting Projects*. Version 1.0. February 2020. Earth Resources Regulation.

ERR (2020b). *Preparation of Work Plans and Work Plan Variations Guideline for Mining Projects*. Version 1.3. December 2020. Earth Resources Regulation.

ERR (2021a) GeoVic interactive map website. Earth Resources Regulation. Accessed online 16/08/2022 at https://earthresources.vic.gov.au/geology-exploration/maps-reports-data/geovic

ERR (2021b). Rehabilitation Bond Guidelines. Earth Resources Regulation. Accessed online 16/08/2022 at *https://earthresources.vic.gov.au/legislation-and-regulations/guidelines-and-codes-of-practice/rehabilitation-bonds.*

ERR (2021c). Rehabilitation Liability Calculator for Mining and Extractive Operations. Earth Resources Regulation. 2 June 2021. Accessed online 16/08/2022 at https://earthresources.vic.gov.au/legislation-and-regulations/guidelines-and-codes-of-practice/rehabilitation-bonds/bond-calculator

HCV (2022). Victorian Heritage Database. Heritage Council Victoria. Accessed 18 October 2022 http://vhd.heritagecouncil.vic.gov.au/places/10180

ICMM (2008). Planning for Integrated Mine Closure: Toolkit. International Council on Mining and Metals. 2008.

MRCO (2022). Community Engagement Plan. Version 6.3. Mandalay Resources Costerfield Operation. October 2022.

SRK (2017). Costerfield Operation, Victoria, Australia, NI 43-101 Technical Report. Prepared for Mandalay Resources Corporation by SRK Consulting (Australia) Pty Ltd. 17 March 2017.

WSP-Golder (2023). Brunswick West Tailings Storage Facility Groundwater Assessment. Prepared for Mandalay Resources Costerfield Operations by WSP Australia Pty Ltd. 29 March 2023.

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ACCENT ENVIRONMENTAL

Appendix A: Environmental policy

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MANDALAY RESOURCES

MANDALAY RESOURCES CORPORATION

(the "**Company**")

ENVIRONMENTAL POLICY

PURPOSE

One of our six core Values is:

"RESPONSIBILITY-- We are responsible for our actions and their consequences, operating with social and environmental responsibility and promoting sustainable development."

Following from this is one of our Key Success Factors:

"*Our environmental impact is minimized and causes no permanent harm."*

This Policy is designed to guide all employees in pursuing their shared responsibility with the Company to produce this environmental outcome in ways that are consistent with local laws, permitting and regulation and that are commercially reasonable.

PRINCIPLES

Mandalay Resources is committed to maintaining the highest level of integrity in its corporate responsibilities toward resource development and environmental stewardship. Mandalay is committed to environmental protection throughout the exploration, development, operation and eventual closure and rehabilitation of each of its projects by applying sound judgment, by meeting or exceeding legislative requirements and by minimizing adverse impacts its activities may have on the environment.

GUIDELINES

To achieve these goals, Mandalay and each of its subsidiaries will:

- Be responsible for its actions and their consequences on the environment.
- Instill the ethics of environmental responsibility through education and communication with all employees, contractors, consultants and suppliers.
- Instill in all employees the recognition that environmental management is an important priority of the Company and integrate environmental considerations into all mine exploration, development, operation and closure planning.
- Implement and maintain ethical business practices and an effective risk management system, including an up-to-date timeline of all permits, expiration

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dates, and planned permit renewal activities.

- As part of its design and operating philosophy, to the extent practicable and commercially reasonable, minimize potential adverse impacts on the natural environment, for example, including, but not limited to:

    - minimizing land disturbances in the design, construction and operation of our projects with the goal, to the extent practicable and commercially reasonable, of remediating disturbed areas in such a way that they can revert to their original state or to some other beneficial use.

    - maximizing energy efficiency of our mining and process equipment to reduce absolute energy needs per unit of output;

    - reviewing options and alternatives to utilize renewable energy and low-carbon energy sources;

    - minimizing water use and recycling water as much as possible;

    - minimizing discharges (reportable or otherwise) and conducting prompt remediation and required regulatory reporting should they occur;

    - reducing use of consumables and reusing or recycling them where practical;

    - reducing degradation of equipment through wear and damage that causes needs for premature capital equipment replacement.

- Evaluate environmental performance by conducting operational and environmental monitoring programs required by law, as well as independent third party audits and other monitoring activities not necessarily required by law but that may be useful in measuring our performance and identify opportunities for improvement.

- Keep up-to-date with changes and potential changes to environmental regulations and evolving government guidelines.

- Keep up to date on technological developments that could be used to mitigate or avoid impacts.

- Encourage conservation and pollution prevention measures by requiring contractors and suppliers to provide operational guidelines that outline their own procedures and responsibilities to reduce, recycle and reuse materials when working on Mandalay-related activities.

- Assess environmental conditions regularly at all stages of mine development and closure in order to identify issues or areas in need of attention and to establish strategies for their management.

- Be consistent with the current state of practice in the industry for environmental protection and management.

- Implement effective and transparent engagement and communication with our stakeholders when significant environmental issues arise. Respond to concerns in a timely and productive manner, identifying concerns, and where Mandalay activities are the cause, taking corrective measures to alleviate the concerns and prevent their recurrence.

- Mandalay will ensure that it maintains feasible reclamation plans at each site as well as the adequate required financial reserves to reclaim each site after completion of commercial activities.

ENVIRONMENTAL REPORTING AND MONITORING

Mandalay views adherence to these environmental guidelines as a continual improvement process. Mandalay managers will report to executive management on a timely basis, and at minimum on a monthly basis all government-reportable environmental incidents, and instances of non-compliance with environmental permits according to their local jurisdictions, together with likely consequences and committed remedial actions.

NON-COMPLIANCE

Failure to comply with this policy may lead to disciplinary action, up to and including termination of employment.

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Appendix B: Modified landforms

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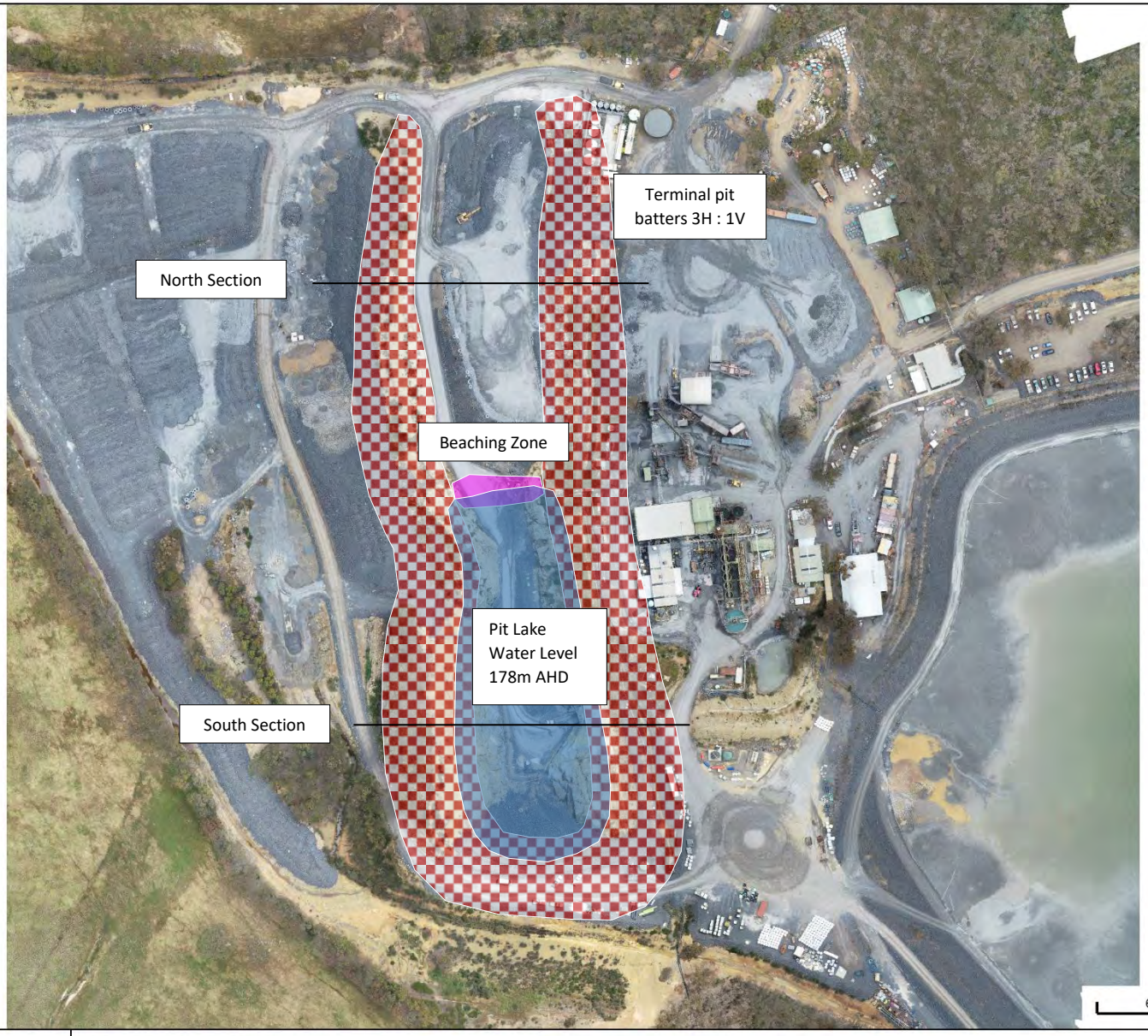


LEGEND

Water

Extent of 3:1 batter

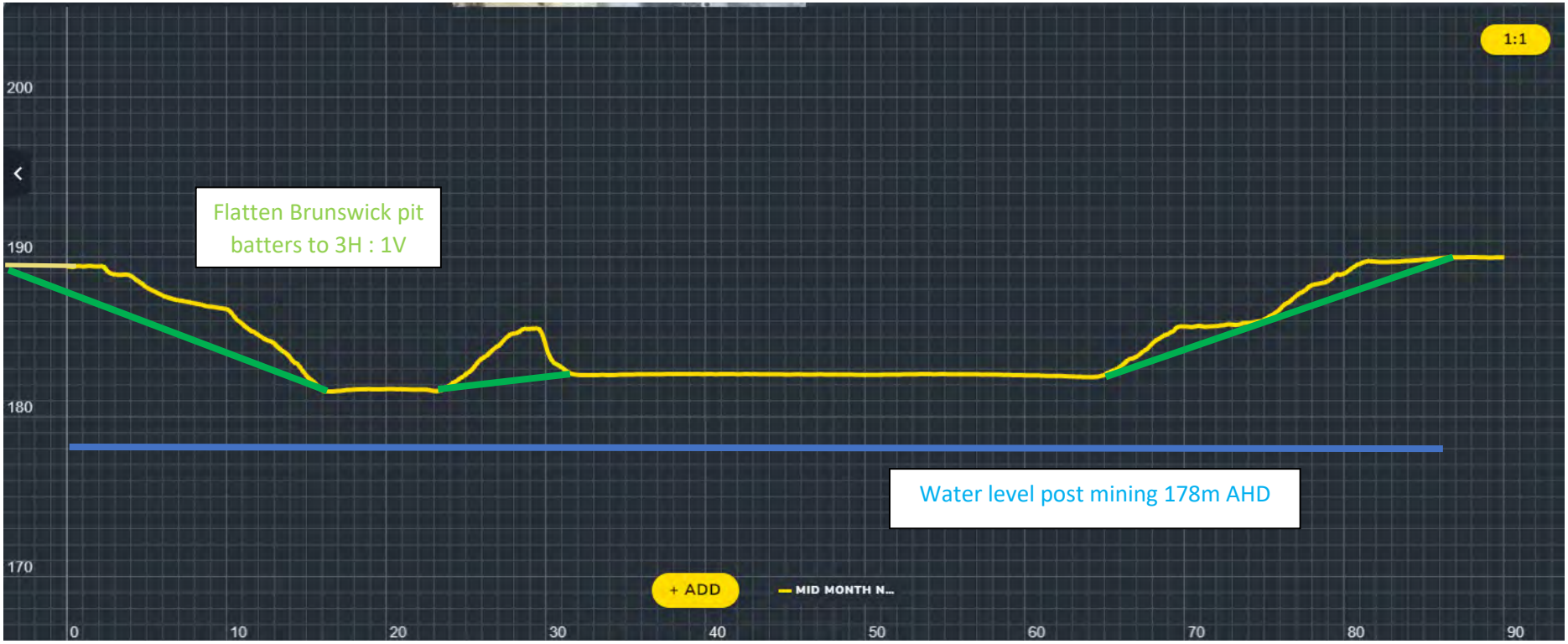
Beaching Zone

MANDALAY RESOURCES

Site: Mandalay AHD
Survey: Mid Month Nov 231122
File Created: Jun 30, 2023

propeller

Brunswick Pit Rehabilitation - Section North



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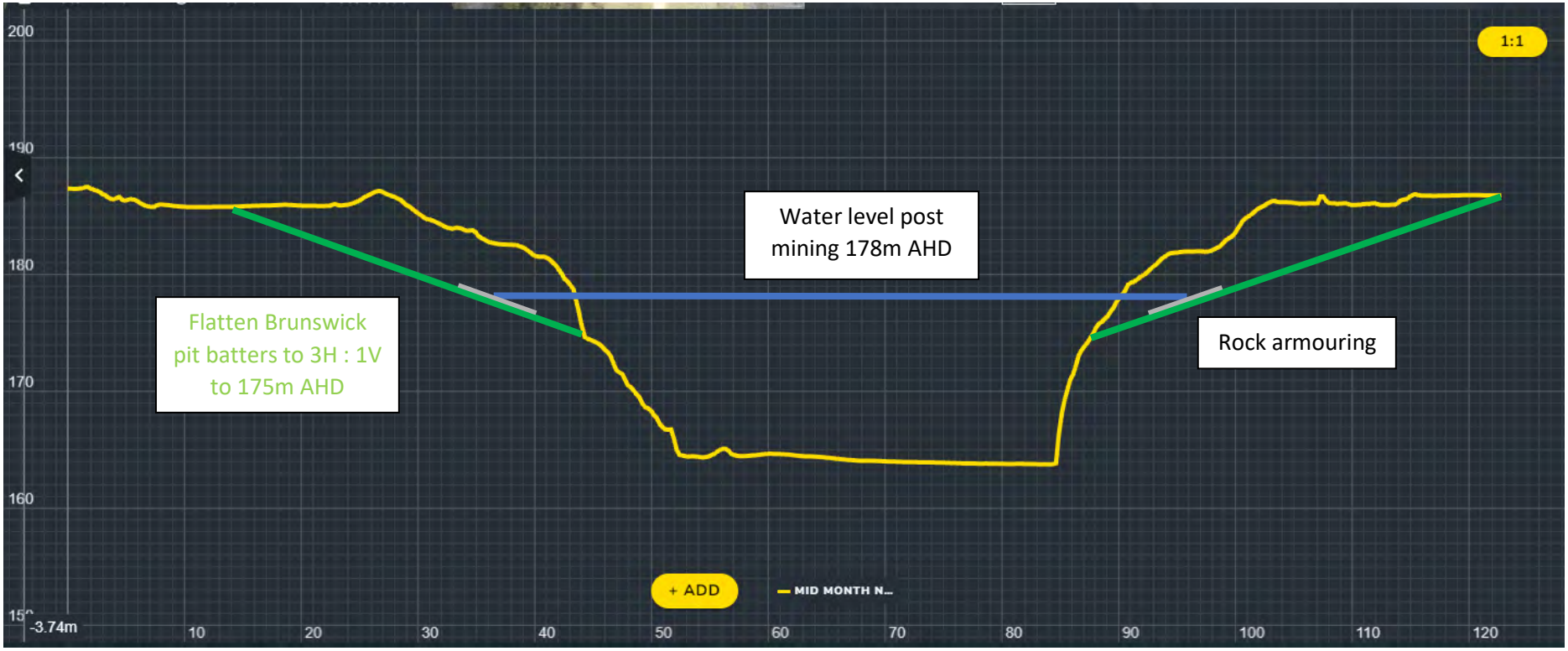
Brunswick Pit Rehabilitation - Section South



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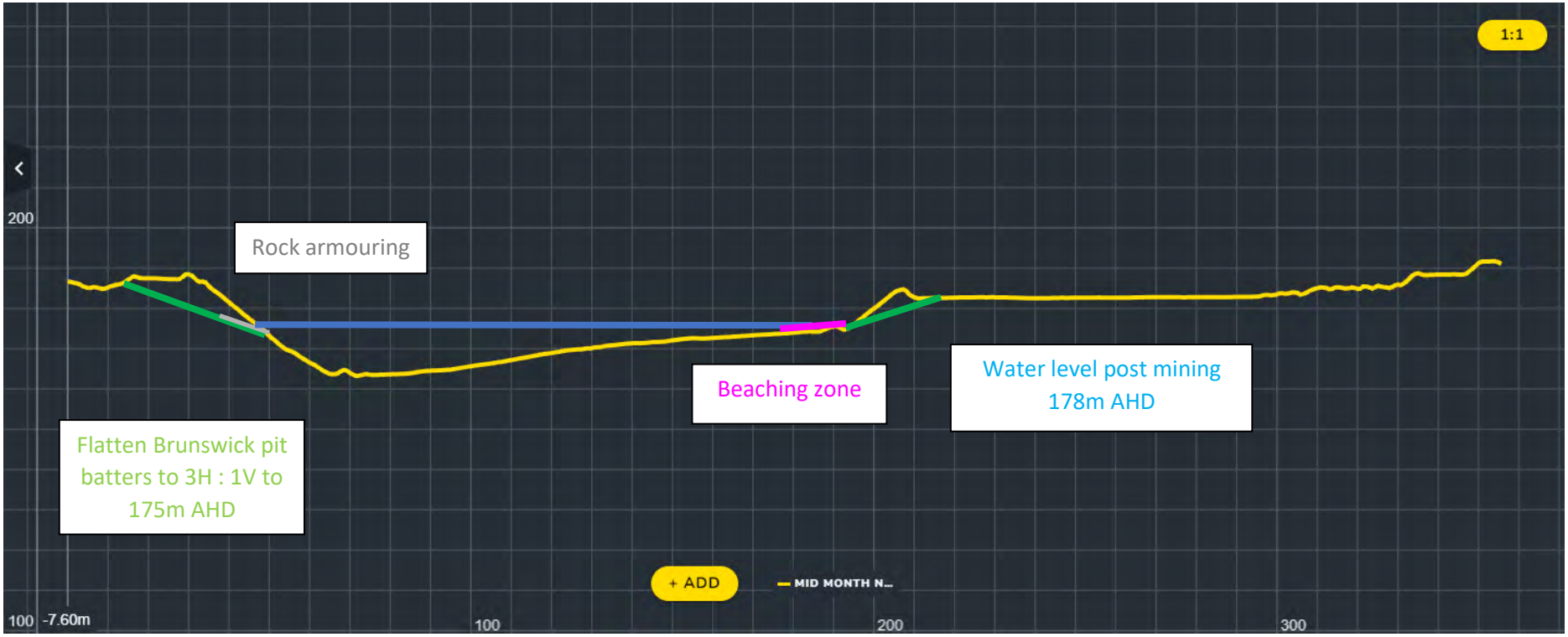
Brunswick Pit Rehabilitation - Long Section



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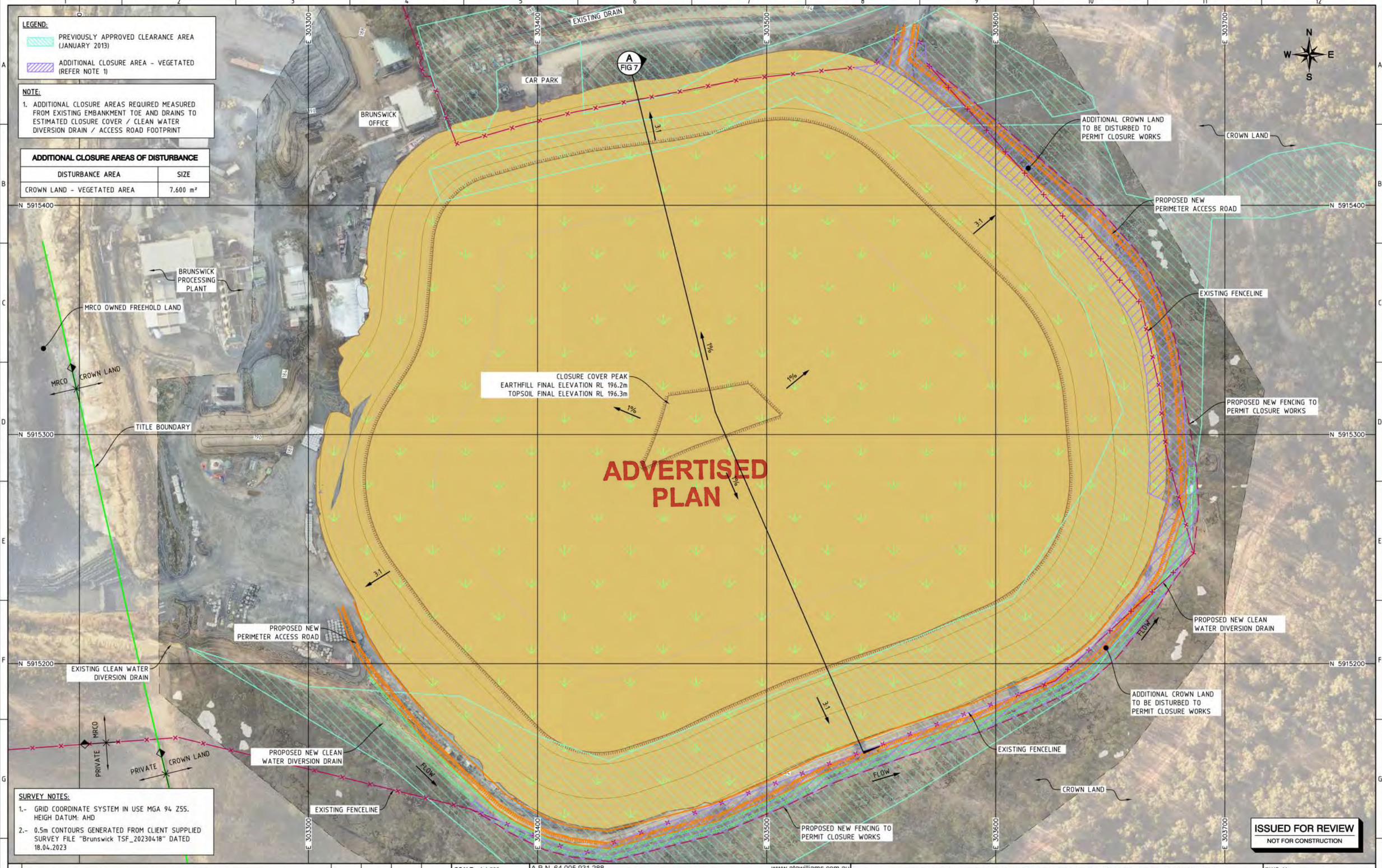

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D

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JOB No.	109014.15
DATE	23.06.23
DESIGN	AC
DRAWN	AC
CHECKED	-
APPROVED	-

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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BRUNSWICK TAILINGS STORAGE FACILITY
CLOSURE CONCEPT
GENERAL LAYOUT

DWG. No.
FIGURE 7

SHEET SIZE	A3	Rev.	0

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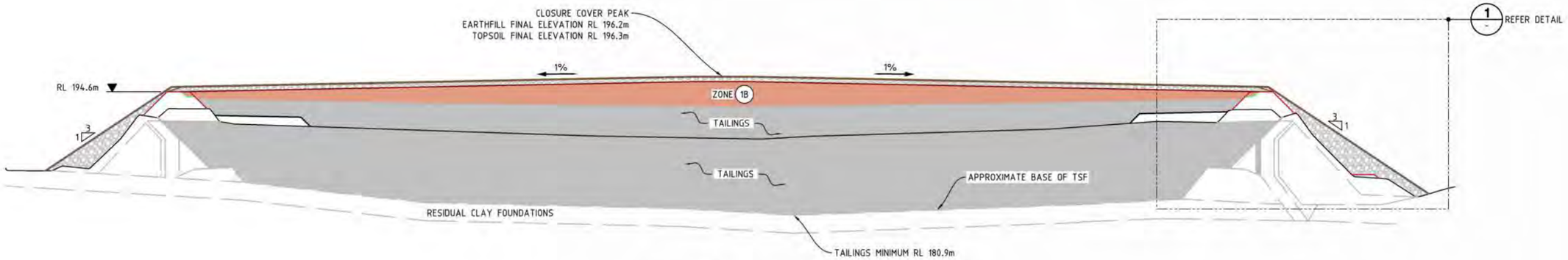
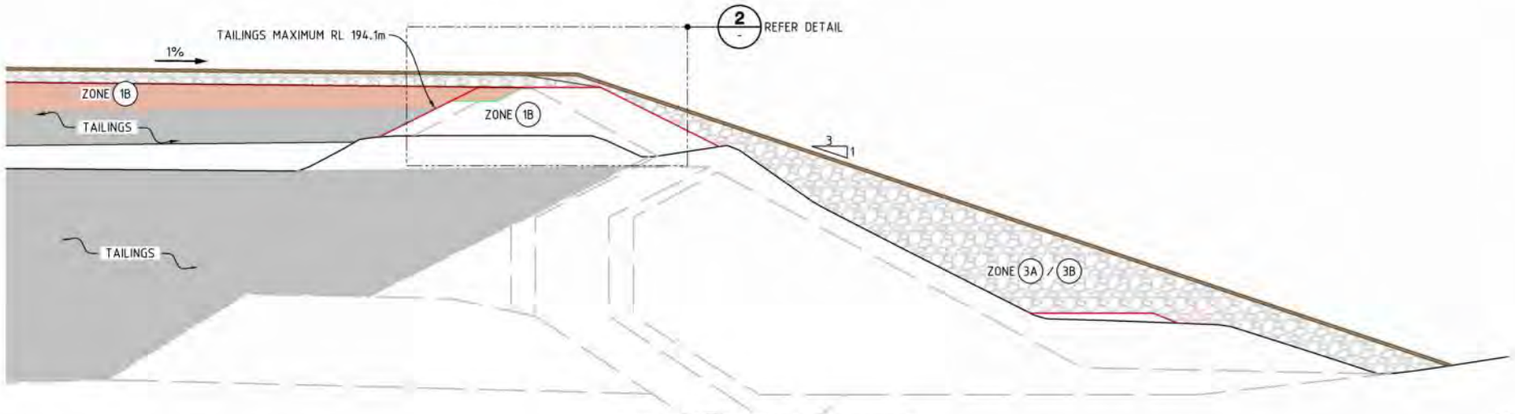
SHEET 1 OF 1

K:\Projects\109\109014 Costerfield Mine, Costerfield\15 New TSF Investigation and Design\CADD\CAD\Closure Plans\Figure 7@B - Brunswick Closure Layout & Sections.dwg Monday 26, June 2023 10:03:09

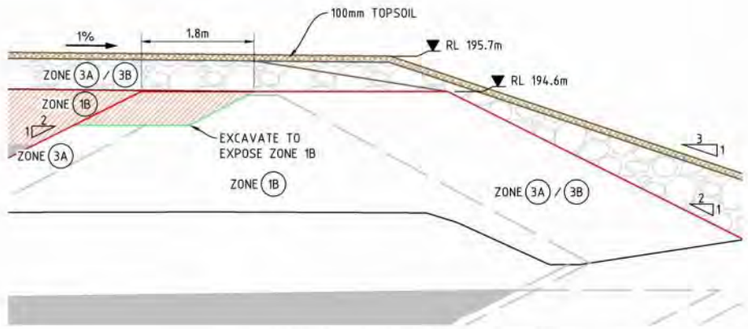
ADVERTISED PLAN



SECTION A CLOSURE CONCEPT
SCALE 1:1,000 (H) 1:500 (V)
FIG 8



DETAIL 1 CLOSURE CONCEPT
SCALE 1:250



DETAIL 2 CLOSURE CONCEPT
SCALE 1:100

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No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D

SCALE:	1:1,500
JOB No.	109014.15
DATE	13.06.23
DESIGN	AC
DRAWN	AC
CHECKED	-
APPROVED	-

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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BRUNSWICK TAILINGS STORAGE FACILITY
CLOSURE CONCEPT
SECTIONS & DETAILS

DWG. No.
FIGURE 8

SHEET SIZE	A3	Rev.	0

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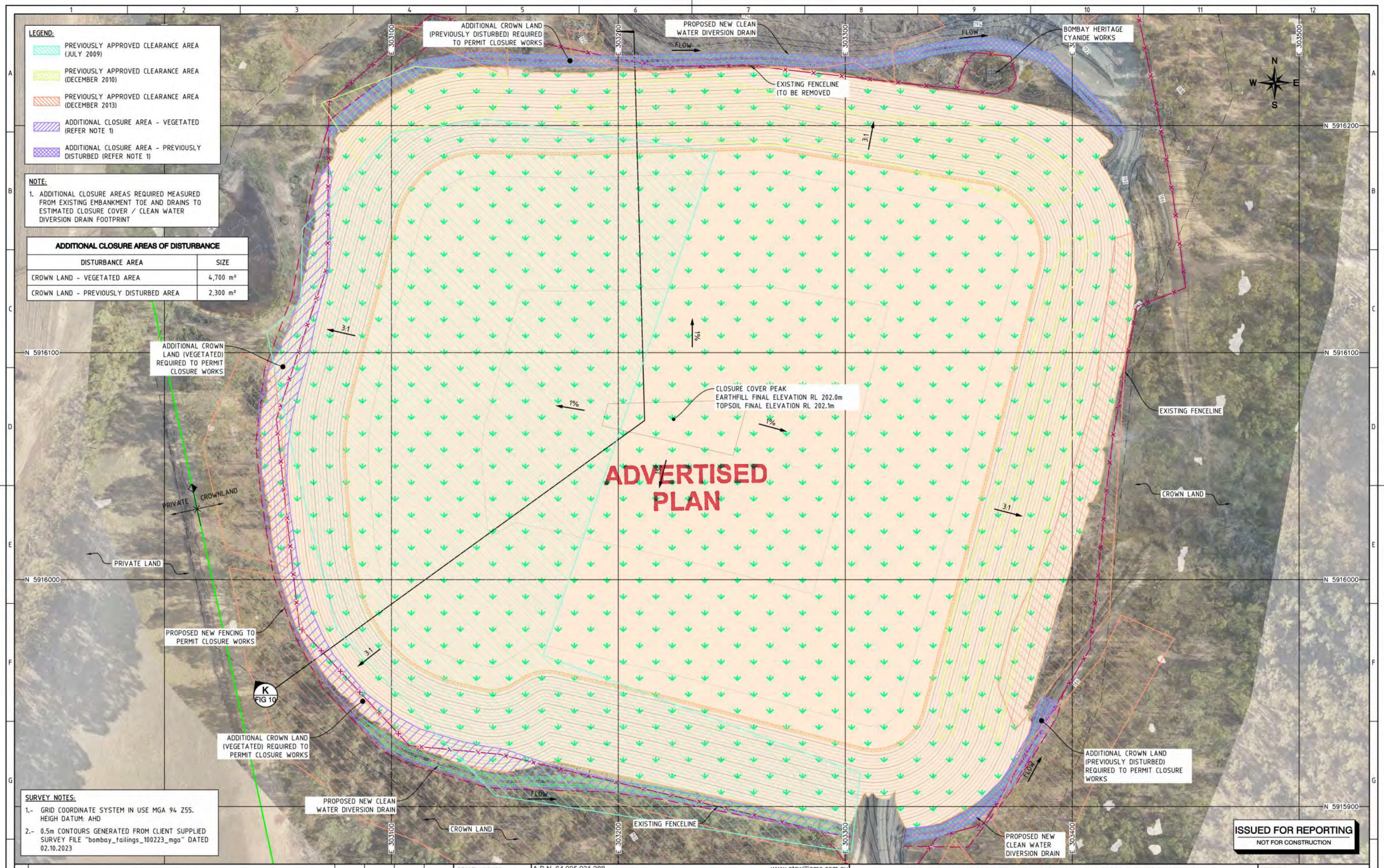
SHEET 1 OF 1



ADDITIONAL CLOSURE AREAS OF DISTURBANCE

DISTURBANCE AREA	SIZE
CROWN LAND - VEGETATED AREA	4,700 m²
CROWN LAND - PREVIOUSLY DISTURBED AREA	2,300 m²

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D

SCALE:	1:1,500
JOB No.	109014.15
DATE	23.06.23
DESIGN	AC
DRAWN	AC
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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BOMBAY TAILINGS STORAGE FACILITY
CLOSURE CONCEPT
GENERAL LAYOUT

DWG. No.

FIGURE 9

SHEET SIZE	A3	Rev.	0

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SHEET 1 OF 1

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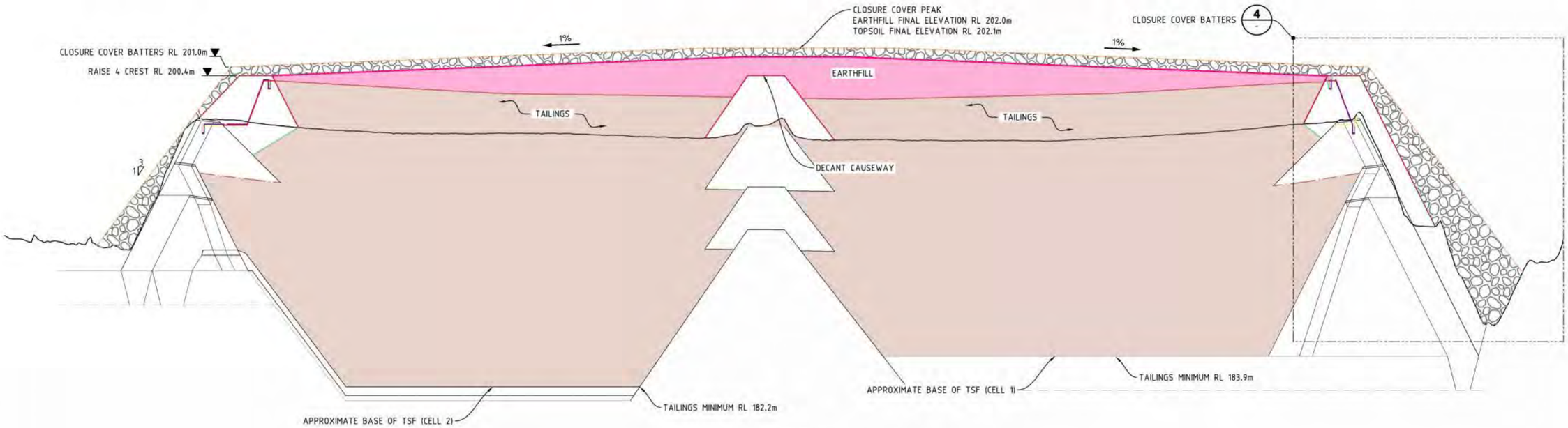
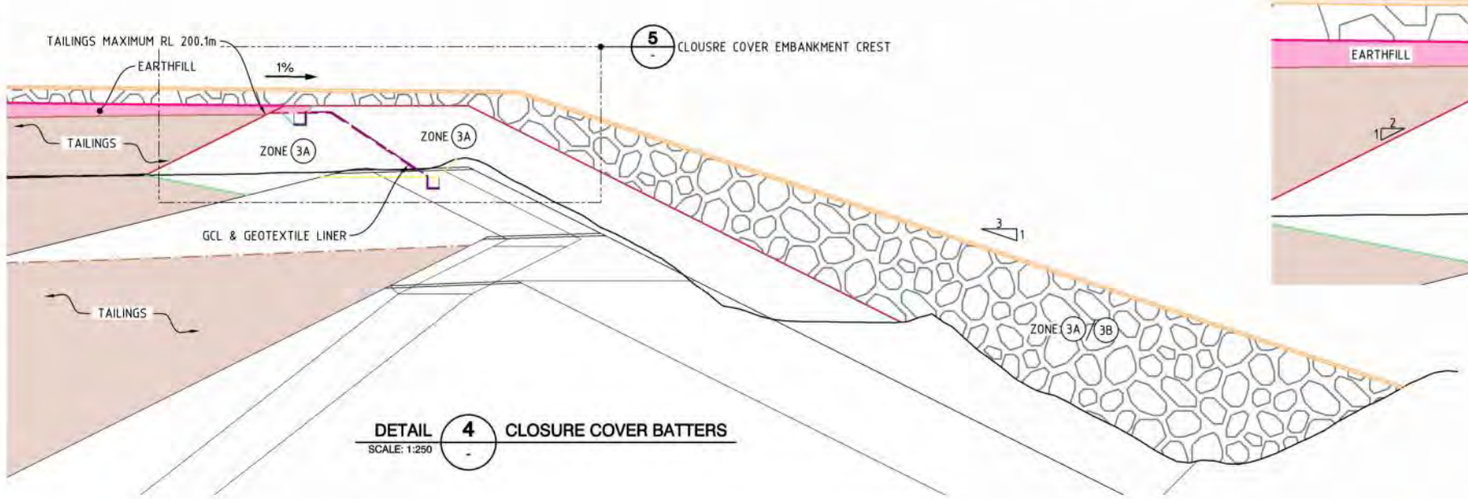
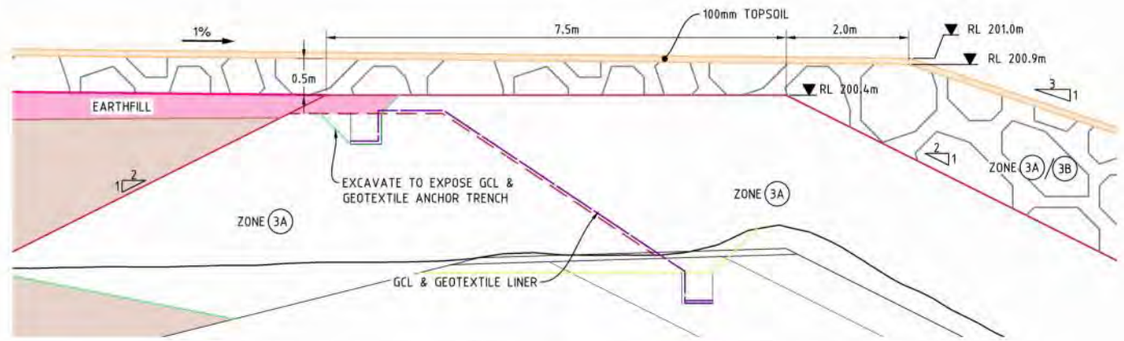


SECTION K FIG 9 CLOSURE CONCEPT
SCALE 1:1,000 (H) 1:250 (V)



DETAIL 4 CLOSURE COVER BATTERS
SCALE: 1:250



DETAIL 5 CLOSURE COVER EMBANKMENT CREST
SCALE: 1:100

ISSUED FOR REPORTING
NOT FOR CONSTRUCTION

No.	DESCRIPTION	DATE	DRAWN	CHECK'D	APPR'D

SCALE:	AS SHOWN
JOB No.	109014.12
DATE	21.11.21
DESIGN	AC
DRAWN	AC
CHECKED	-
APPROVED	-

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MANDALAY RESOURCES COSTERFIELD OPERATIONS
COSTERFIELD GOLD MINE

BOMBAY TAILINGS STORAGE FACILITY
EMBANKMENT RAISE 4 DETAILED DESIGN
CLOSURE CONCEPT SECTIONS

DWG. No. FIGURE 10

SHEET SIZE A3 Rev. A

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SHEET 1 OF 1

ACCENT ENVIRONMENTAL

Appendix C: Domain Action Plans

ADVERTISED PLAN

ADVERTISED PLAN

Domain 1: Augusta Infrastructure Areas

Domain 1: Augusta Infrastructure Areas			
Description	Augusta Offices & buildings (incl. training room and crib rooms)		
Status	Active	**Owner**	Tobin family
Current area of disturbance	5.4 ha	**Final area to be disturbed**	5.4 ha
Closure date	2028	**Infrastructure to be retained**	Some roads and creek crossing TBC
Final Landuse	Pasture	**Area for final landuse**	5.4 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Augusta Offices & buildings (including training room and crib rooms)	Offices and other buildings are portable and will be sold or returned to hire company. Non-portable buildings (such as store, compressor shed, workshop etc.) will be with sold or demolished and removed as waste, and/or recycled. All services and concrete footings will be removed. The concrete will be crushed and either sold for recycling or placed as backfill in the Augusta boxcut, or Brunswick West/Bombay TSFs.		
Roads	All roads (except the bitumen road onto the Augusta Site) are assumed to be ripped and graded. However, the landowner may choose to retain these and the waterway crossing. The material (if to be removed) will be stripped back and placed in the boxcut or Brunswick West/Bombay TSFs.		
Mine Dam and Silt Ponds	Water to be evaporated and sludge/silt will be removed and placed into the Bombay or Brunswick West TSF. The dam and ponds will be backfilled to natural surface level.		
Power lines	Power lines and poles to be disconnected and removed.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Seeded with grazing pasture grasses		
Remediation or waste disposal	Stripping contaminated soil if required		
Material	None	**Topsoil**	5,400 m^3
Post-closure activities	Rehabilitation maintenance and monitoring		

	Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Site is free of contamination Topsoil from Augusta Central Dam topsoil stockpile (3,400 m^3) and Central Dam stockpile (2,000 m^3)		

ADVERTISED
PLAN

ADVERTISED PLAN

Domain 1a: Augusta Evaporation Ponds/Storage Dams

Domain 1a: Augusta Evaporation Ponds/Storage Dams			
Description	Evaporation Ponds/Storage Dams		
Status	Active	**Owner**	Tobin family
Current area of disturbance	10.0 ha	**Final area to be disturbed**	10.0 ha
Closure date	2028	**Infrastructure to be retained**	Dam(s) TBC
Final Landuse	Pasture	**Area for final landuse**	10.0 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Augusta Evaporation Ponds/Storage Dams	Landowner has the option to retain or remove water dams. **Decommission dams** All pipelines will be removed and re-used/recycled/disposed of. Once the water is fully evaporated, the sediments will be contained within in the HDPE liner in the central dam and encapsulated on site. The eastern and western dam HDPE liners will be removed and taken to a licenced landfill. The material in the embankments will be pushed back into the excavation and compacted.		
Pipeline to Splitters Creek	All pipelines will be removed and re-used/recycled/disposed of.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Seeded with grazing pasture grasses		
Remediation or waste disposal			
Material	123,500 m^3	**Topsoil**	10,000 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Site is free of contamination Backfill material - central (50,000 m^3), west (45,000 m^3), east (28,500 m^3) Topsoil from Augusta Central Dam topsoil stockpile (10,000 m^3)		

Domain 2: Augusta Shafts

Domain 2: Augusta Shafts			
Description	Both Augusta fresh air intake shafts		
Status	Active	**Owner**	Tobin family
Current area of disturbance	<0.1 ha	**Final area to be disturbed**	<0.1 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	<0.1 ha
Completion criteria	Safe stable landform		
Closure activities			
Facility	**Activities**		
Underground Mine	All underground equipment and mobile plant will be sold. The underground mine will be backfilled with waste rock (down to 4 level).		
Noise Bund	The Noise Bund will be removed and stripped back to natural surface. Material from the noise bund comprises oxidized material and soil. These materials will be identified and separated. All fill material will be used to backfill the Augusta boxcut. Topsoil will be used across the Augusta site Install concrete slabs over shaft		
Remediation or waste disposal	None		
Material	None	**Topsoil**	None
Post-closure activities	None		
Monitoring start	None	**Finish**	None
Assumptions			

ADVERTISED PLAN

Domain 2a: Cuffley Shaft

Domain a2: Cuffley Shaft			
Description	Cuffley exhaust shaft		
Status	Active	**Owner**	Mandalay
Current area of disturbance	0.5 ha	**Final area to be disturbed**	0.5 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Residential	**Area for final landuse**	0.5 ha
Completion criteria	Safe stable landform		
Closure activities			
Facility	**Activities**		
Cuffley shaft	Non-portable buildings (such as sub shed) will be with sold or demolished and removed as waste, and/or recycled. All services and concrete footings will be removed. The concrete will be crushed and either sold for recycling or placed as appropriate in the Augusta boxcut, or Brunswick West/Bombay TSF. Install concrete slab over shaft		
Remediation or waste disposal	None		
Material	None	**Topsoil**	500 m^3
Post-closure activities	None		
Monitoring start	None	**Finish**	None
Assumptions	Topsoil from Splitters Creek topsoil stockpile (500 m^3)		

ADVERTISED
PLAN

Domain 3: Augusta Waste Rock Stockpile

Domain 3: Augusta Waste Rock Stockpile			
Description	Waste rock storage		
Status	Active	**Owner**	Tobin family
Current area of disturbance	3.8 ha	**Final area to be disturbed**	3.8 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	3.8 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Waste Rock Landform	Waste rock material will be removed and used as capping/backfill and stripped back to natural surface.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Seeded with grazing pasture grasses		
Remediation or waste disposal	None		
Material	None	**Topsoil**	3,800 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (to restore pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Site not available for progressive rehabilitation. Site is free of contamination Topsoil from Augusta Noise bund (2,700 m^3) and Splitters Creek topsoil stockpile (1,100 m^3)		

ADVERTISED PLAN

ADVERTISED PLAN

Domain 4: Augusta Boxcut

Domain 4: Augusta Boxcut			
Description	Boxcut (incl. workshops and refuelling bay)		
Status	Active	**Owner**	Tobin family
Current area of disturbance	2.0 ha	**Final area to be disturbed**	2.0 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	2.0 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Boxcut	Boxcut will be backfilled to natural surface level. All concrete footings within the boxcut could remain in-situ or be placed in the Bombay/Brunswick West TSF.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Seeded with grazing pasture grasses		
Remediation or waste disposal	Residual waste oils or fuel will be removed offsite by a licensed contractor. Any impacted soils from the refuelling area or truck parking bays will be transported to a licensed facility or placed into the Bombay/Brunswick West TSF (depending on quality against EPA IWRG guidelines).		
Material	126,500 m^3	**Topsoil**	2,000 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Contamination tests indicate a low level of contamination Backfill Box Cut - Noise Bund (87,000 m^3), Waste rock (25,500 m^3) and Box Cut u/g (14,000 m^3) Topsoil from Splitters Creek topsoil stockpile (2,000 m^3)		

ADVERTISED PLAN

Domain 5: Brunswick Infrastructure Areas

Domain 5: Brunswick Infrastructure Areas			
Description	Processing plant and infrastructure incl. cements silo and RO Plant		
Status	Active	**Owner**	Crown land
Current area of disturbance	3.3 ha	**Final area to be disturbed**	3.3 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Nature reserve	**Area for final landuse**	3.3 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		

Closure activities	
Facility	**Activities**
Processing Plant	All reagents in processing plant will be returned to the supplier, removed and placed in the Bombay/Brunswick West TSF or taken to a licenced disposal facility. All flotation tanks and associated buildings with either sold or recycled as scrap metal. The top 0.3 m in the area (or as necessary) around the process plant will be stripped and placed in the Bombay/Brunswick West TSF. Concrete slabs will be crushed and either sold for recycling or placed in the Brunswick TSF.
Mill Workshop and Administration Buildings	The Administration Buildings and crib rooms around the mill are portable and will be removed and sold or returned to hire company. The Workshop Building will also be sold. All concrete footings will be removed, crushed and either sold for recycling or placed in the Brunswick West/Bombay TSF.
ROM Pad and Mobile Crushing Plant	All ore will be processed. The mobile crushing plant will be sold. The top 0.2 m of the ROM will be scraped off and processed.
Laydown area	The shipping containers will be removed and sold.
Mill Stormwater Dam	The Mill Pond will be dried out and any sediment will be removed and placed in the Brunswick West TSF.
Groundwater Bores	Groundwater monitoring bores will be decommissioned and grouted by licenced contractor, after appropriate monitoring period determined by regulators.
Roads around site	All roads (except the bitumen road onto the Augusta Site) are assumed to be ripped and graded. However, the landowner may choose to retain these.

	The material (if to be removed) will be stripped back and placed in the boxcut or Brunswick TSF. All road base will be removed and placed in either the Bombay or Brunswick West TSF.		
Surface drainage	Structural water management works to be completed to manage surface water flow including; banks, drains, rock lined waterways, sediment dams.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Fertiliser application Revegetated with Box Ironbark species		
Remediation or waste disposal	All reagents in processing plant will be returned to the supplier, removed and placed in the Bombay TSF or taken to a licenced disposal facility. The top 0.3 m in the processing plant area (or as necessary) around the process plant will be stripped and placed in the Bombay TSF. The top 0.2 m of the ROM will be scraped off and processed.		
Material	None	**Topsoil**	2,500 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Contamination tests indicate a low level of contamination Topsoil from Splitters Creek topsoil stockpile (2,500 m^3)		

ADVERTISED
PLAN

ADVERTISED PLAN

Domain 5a: Brunswick Core yard

Domain 5a: Brunswick Core yard			
Description	Core yard		
Status	Active	**Owner**	Mandalay
Current area of disturbance	2.75 ha	**Final area to be disturbed**	2.75 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	2.75 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Exploration Core Shed and Core Storage Yard	The Exploration Core Sheds will be sold along with the infrastructure inside. The concrete foundations will be removed, crushed and placed in the Bombay or Brunswick West TSF. ERR will be contacted to determine whether any core is to be kept by the State Government. Unwanted core will be disposed of in Brunswick West TSF. Core trays will go to licenced landfill. Land will be ripped (if required) and seeded with grazing pasture grasses.		
General	Ripping compacted areas Fertiliser application Seeded with grazing pasture grasses		
Remediation or waste disposal	None		
Material	None	**Topsoil**	None
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Site is free of contamination		

Domain 6: Brunswick Shaft

Domain 6: Brunswick Shafts			
Description	Brunswick fresh air intake shaft Historic shafts (Bombay)		
Status	Active	**Owner**	Crown
Current area of disturbance	<0.1 ha	**Final area to be disturbed**	<0.1 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	<0.1 ha
Completion criteria	Safe		
Closure activities			
Facility	**Activities**		
Historic Bombay Shaft	Shaft has secure steel cap. Six foot security fence with barbed wire to be erected around perimeter (Completed).		
Brunswick Shaft	Install concrete slab over shaft		
Remediation or waste disposal	None		
Material	None	**Topsoil**	None
Post-closure activities	None		
Monitoring start	None	**Finish**	None
Assumptions			

ADVERTISED
PLAN

Domain 6a: Youle Shaft

Domain 6a: Youle Shaft			
Description	Youle exhaust shaft		
Status	Active	**Owner**	Mandalay
Current area of disturbance	<0.1 ha	**Final area to be disturbed**	<0.1 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Residential	**Area for final landuse**	<0.1 ha
Completion criteria	Safe stable landform		
Closure activities			
Facility	**Activities**		
Youle shaft	Youle evase will be with sold or demolished and removed as waste, and/or recycled. All services and concrete footings will be removed. The concrete will be crushed and either sold for recycling or placed as appropriate in the boxcut, or Brunswick West TSF. Install concrete slab over shaft		
Remediation or waste disposal	None		
Material	None	**Topsoil**	None
Post-closure activities	None		
Monitoring start	None	**Finish**	None
Assumptions			

ADVERTISED
PLAN

ADVERTISED PLAN

Domain 7: Brunswick Tailings Storage Facility

Domain 7: Brunswick Tailings Storage Facility			
Description	Tailings Storage Facility (not active)		
Status	Closed	**Owner**	Crown land
Current area of disturbance	11.0 ha	**Final area to be disturbed**	11.0 ha
Closure date	2025	**Infrastructure to be retained**	None
Final Landuse	Nature reserve	**Area for final landuse**	11.0 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Brunswick TSF	Minimum 1m cap of waste rock/oxidised material. Contour outer embankment slope to 3H:1V.		
General	Graded and then topsoiled Planted/seeded with light covering of Box Ironbark species.		
Remediation or waste disposal	None		
Material – waste rock	142,700 m^3	**Topsoil**	8,900 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2025	**Finish**	2029
Assumptions	Site is available for progressive rehabilitation post decommissioning in 2025. TSF is not a contamination risk and does not need a designed and engineered cap to prevent AMD seepage Capping from Brunswick Pit Waste Rock Stockpile (13,500 m^3), Brunswick TSF Waste Rock Stockpile (16,000 m^3), Recovered road base (4,200 m^3) & Augusta Waste Rock Stockpile (109,000 m^3) Topsoil from Brunswick TSF capping stockpile (5,000 m^3), Splitters Creek stockpile (1,700 m^3) and Brunswick West TSF topsoil stockpile (2,200 m^3)		

ADVERTISED PLAN

Domain 8: Bombay Tailings Storage Facility

Domain 8: Bombay Tailings Storage Facility			
Description	Tailings Storage Facility (operational)		
Status	Active	**Owner**	Crown land
Current area of disturbance	11.8 ha	**Final area to be disturbed**	11.8 ha
Closure date	2026	**Infrastructure to be retained**	None
Final Landuse	Nature reserve	**Area for final landuse**	11.8 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Bombay TSF	TSF will receive crushed concrete, road base from around the site and sediments from the mine silt ponds and stormwater dam. Minimum 1m cap of waste rock/oxidised material. Contour outer embankment slope to 3H:1V.		
General	Graded and then topsoiled Planted/seeded with light covering of Box Ironbark species.		
Remediation or waste disposal	None		
Material – waste rock	136,350 m^3	**Topsoil**	9,200 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2025	**Finish**	2029
Assumptions	Site is potentially available for progressive rehabilitation post decommissioning 2026. TSF is not a contamination risk and does not need a designed and engineered cap to prevent AMD seepage Capping from Brunswick Pit Oxidised Waste Stockpile (43,850 m^3) and Bombay TSF Waste Rock Stockpile (53,000 m^3). Rock from Augusta Waste Rock Stockpile (39,500 m^3) separated out and is located in 'other' to allow haulage distance to be accounted for.		

	Topsoil from Bombay TSF topsoil stockpile (7,000 m^3) and Brunswick West TSF topsoil stockpile (2,200 m^3)

ADVERTISED
PLAN

ADVERTISED PLAN

Domain 9: Brunswick West Tailings Storage Facility

Domain 9: Brunswick West Tailings Storage Facility			
Description	Tailings Storage Facility		
Status	To be constructed	**Owner**	Private land
Current area of disturbance	0 ha	**Final area to be disturbed**	11.8 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	11.8 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Brunswick West TSF	TSF will receive crushed concrete, road base from around the site and sediments from the mine silt ponds and stormwater dam. Shape to create domed water shedding landform with 5% grade. Minimum 1.8m cap of fill materials over tailings increasing in thickness of the earthfill material towards the centre of the TSF. Topsoil depth 0.3 m. NB: During construction establish outer embankment slope to 4H:1V, topsoil and revegetated.		
General	Graded and then topsoiled Seeded with grazing pasture grasses		
Remediation or waste disposal	None		
Material – Earthfill	210,000 m^3	**Topsoil**	18,500 m^3
Rockfill	31,000 m^3		
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2030	**Finish**	2034
Assumptions	TSF is not a contamination risk and does not need a designed and engineered cap to prevent AMD seepage		

	The conceptual design for the Brunswick West TSF will require 210,000 m^3 of earthfill and 31,000 m^3 of rockfill generated largely from the Brunswick Pit Waste Rock Dump (160,000 m^3) and other onsite sources. Any short fall in material will need to be imported (81,000 m^3). Topsoil from Brunswick West TSF topsoil stockpile (18,500 m^3).

ADVERTISED
PLAN

ADVERTISED PLAN

Domain 10: Brunswick Waste Rock Stockpile

Domain 10: Brunswick Waste Rock Stockpile			
Description	Waste rock storage and ROM Pad		
Status	Active	**Owner**	Mandalay
Current area of disturbance	6.0 ha	**Final area to be disturbed**	6.0 ha
Closure date	20282028	**Infrastructure to be retained**	None
Final Landuse	Pasture	**Area for final landuse**	6.0 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Waste Rock Landform	Waste rock material will be removed and used as capping/backfill and stripped back to natural surface.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Fertiliser application Seeded with grazing pasture grasses		
Remediation or waste disposal	None		
Material	None	**Topsoil**	6,000 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Site is potentially available for progressive rehabilitation post earthworks for Brunswick TSF 2028. Site is free of contamination Topsoil from Splitters Creek topsoil stockpile (3,400 m^3) and core yard stockpiles (2,600 m^3)		

Domain 11: Rock Garden Waste Stockpile

Domain 11: Rock Garden Waste Stockpile			
Description	Waste rock storage		
Status	Active	**Owner**	Crown land
Current area of disturbance	2.4 ha	**Final area to be disturbed**	2.4 ha
Closure date	2027	**Infrastructure to be retained**	None
Final Landuse	Nature reserve	**Area for final landuse**	2.4 ha
Completion criteria	Safe stable landform Non-polluting Self-sustaining vegetation Support post-closure land use		
Closure activities			
Facility	**Activities**		
Waste Rock Landform	Waste rock material will be removed and used as capping/backfill and stripped back to natural surface.		
General	Ripping compacted areas Graded to natural surface levels and then topsoiled Fertiliser application Seeded with grazing pasture grasses		
Remediation or waste disposal	None		
Material	None	Topsoil	2,400 m^3
Post-closure activities	Rehabilitation maintenance and monitoring Erosion Revegetation (pasture) Weed management Drain management Surface water monitoring		
Monitoring start	2028	**Finish**	2032
Assumptions	Site is potentially available for progressive rehabilitation post earthworks for Bombay TSF 2027. Site is free of contamination Topsoil from Brunswick West TSF topsoil stockpile (2,400 m^3)		

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Domain 12: Brunswick Pit

Domain 12: Brunswick Pit			
Description	Pit		
Status	Active	**Owner**	Mandalay
Current area of disturbance	1.6 ha	**Final area to be disturbed**	1.6 ha
Closure date	2028	**Infrastructure to be retained**	None
Final Landuse	Pasture/Void	**Area for final landuse**	TBC
Completion criteria	Safe stable landform		
Closure activities			
Facility	**Activities**		
Pit	The perimeter of Brunswick Pit will have perimeter earthen bunding, screening and a six foot high security fence topped with barbed wire erected. Topsoil and vegetation to screen fence line whilst maintaining access to fence line. Backfilled pit area to be contoured		
Portal (if constructed)	The entrance to the decline will be sealed (backfilled with waste rock and/or have a concrete plug) as per ERR requirements.		
General	Ripping compacted areas Graded surface and then topsoiled Fertiliser application Seeded with pasture grasses		
Remediation or waste disposal	None		
Material	none	**Topsoil**	1,600 m^3
Post-closure activities	Existing trees and vegetation to be maintained. Allowance made for second year fertiliser application		
Monitoring start	2028	**Finish**	2032
Assumptions	Materials available to complete earthworks Topsoil from Bombay TSF topsoil stockpile (1,600 m^3)		

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ACCENT ENVIRONMENTAL

Appendix D: Concrete slab for sealing shafts

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OBJECTIVE

The objectives of this program are to :

- Manage risks to public health and safety
- Conserve items of heritage value
- Provide a consistent approach to risk management

Concrete slabs are to be provided to cover exposed shafts and prevent access when retention of the visual aspects of the shaft is not warranted. Provision is to be made for ventilation through the slab.

DESIGN FEATURES

- Slabs are to be seated on a firm foundations
- Vent pipes are to be provided to allow for ventilation of gases and fluctuations of air and water pressure.
- Ply or ribbed steel sheet deck and reinforcing to be assembled away from the shaft.
- Ribbed steel sheet deck to manufacturers specifications. Steel supporting beams to engineers specification.
- Regional mine warning sign to be located adjacent to site.
- Surface drainage to be directed beyond the foundation footprint.

MATERIALS

Reinforcing mesh and bars to conform with AS/NZS 4671
Concrete to conform with AS3600
Concrete to be - for trafficked areas 32 Mpa
- for untrafficked areas 20 Mpa

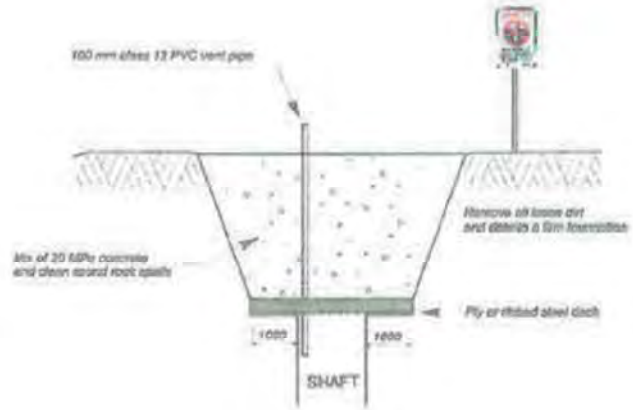
Max. nominal aggregate size
- for slabs 20 mm
- conical plugs 40 mm

Slump 80 mm
Concrete cover to reinforcement
- Top mesh or bars - 60 mm
- Ply or ribbed steel deck sheets - 50 mm
- Ground - 60 mm

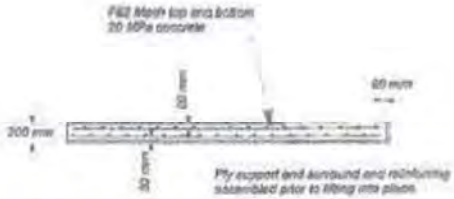
PVC Vent pipe Class 12 to AS/NZS 1477

CONSTRUCTION

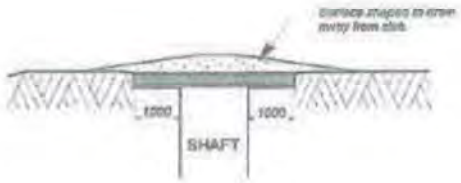
- Formwork and reinforcing to be assembled away from the shaft and lifted into place with a crane or other suitable plant to avoid unnecessary worker activity around the shaft.
- The edges of the shaft are to have all loose material removed and be excavated and trimmed to provide a minimum width of 1.0 metres of stable level foundation on all sides of the shaft.
- Any personnel working in the vicinity of the shaft must be harnessed.



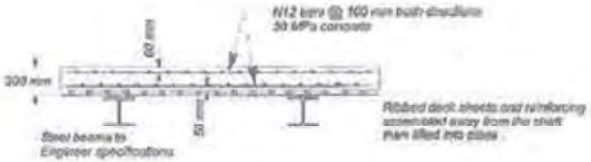
CONCRETE CONICAL PLUG - where surface expression is wide



CONCRETE SLAB - Non Trafficked



CONCRETE SLAB SECTION



CONCRETE SLAB - Trafficked

REVISION			SCALE	TREVOR CLARK & ASSOC. (AUST.) PTY LTD.	CLIENT DSE	TITLE CONCRETE SLABS OVER SHAFTS	DRAWING No. DSE-DM-0607
			DESIGNED TTC		PROJECT ABANDONED MINES RISK MANAGEMENT		DRAWING SIZE A3
			DRAWN TMC				SHEET 4 OF 4
			CHECKED				
DATE			APPROVED				

ACCENT ENVIRONMENTAL

Appendix E:
Risk assessment tables

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Risk assessment tables

Likelihood, consequence, and risk rating tables are provided in Table 13-1, Table 13-2 and Figure 13.1 following the criteria outlined in the Guidelines (ERR 2020b).

Table 13-1 Consequence categories and definition (ERR 2020b)

Category	Definition
Critical	Hazard has critical impact, in terms of severity and/or duration. Treatment or remediation effort is required, although some effects may be irreversible. Remediation of environmental contamination would require significant private and public resources. Hazard event would be the subject of widespread community outrage.
Major	Hazard has major impact, in terms of severity, duration and/or frequency of occurrence. Treatment or remediation effort is required. Some effects may be irreversible. Remediation of environmental contamination would require significant private and public resources. Hazard event would be the subject of widespread community concern.
Moderate	Hazard has moderate, noticeable impact, in terms of severity, duration and/or frequency of occurrence. Moderate treatment or remediation effort may be required. Hazard event would be the subject of limited community concern.
Minor	Hazard is perceived but has minor and typically temporary effects. Some remediation may be required.
Insignificant	Impacts are barely recognised and/or quickly recovered from. No specific remediation required.

Table 13-2 Likelihood categories and description (ERR 2020b)

Category	Definition
Rare	Highly unlikely, but the risk event may occur in exceptional circumstances. (likelihood <5%).
Unlikely	The risk event could occur at some time. (likelihood 5% to 30%).
Possible	The risk event might occur at some time. (likelihood >30% to 70%).
Likely	The risk event will probably occur in most circumstances. (likelihood >70% to 90%).
Almost certain	The risk event is expected to occur in most circumstances. (likelihood >90%).

Likelihood	**Almost Certain**	**Medium**	**High**	**Very High**	**Very High**	**Very High**

Likely	Medium	Medium	High	Very High	Very High
Possible	Low	Medium	Medium	High	Very High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Medium	Medium	High
	Insignificant	Minor	Moderate	Major	Critical

Consequence

Figure 13.1 Risk matrix showing classification of risk ratings (ERR 2020a)

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MANDALAY RESOURCES

Costerfield Operations

COMMUNITY ENGAGEMENT PLAN

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Mineral Resources (Sustainable Development) Act 1990

Tenement Number: MIN4644

Plan Number: PLN-001702

Work Plan Variation Statutorily Endorsed

Signed: _____

Delegate of the Department Head

Date: 28/09/2023

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ABBREVIATIONS

CAP	Community Action Plan
CEP	Community Engagement Plan
CFA	Country Fire Authority
CRS	Community Reference Subcommittee
DJPR	Department of, Jobs, Precincts and Regions
EMP	Environment Management Plan
ERC	Environment Review Committee
SES	State Emergency Service
SRC	Sponsorship Review Committee

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1 Aims of Plan

The Costerfield mining operation is located on MIN4644 and MIN5567 which are held under licence by Mandalay Resources Costerfield Operations Pty Ltd, a wholly owned subsidiary of Mandalay Resources Australia Pty Ltd (**Mandalay**).

The Costerfield Community Engagement Plan sets the framework for engaging with all of the mine's stakeholders and provides tools for employees to utilise when making operational decisions. In doing so the Plan ensure that the impact of the mining operation on stakeholders is minimised and well managed, and that transparent and ongoing consultative relationships are developed and maintained.

The plan does not prescribe the way in which each consultation must occur or how relationships should be developed. By nature, each stakeholder relationship will evolve differently depending on the needs, abilities and desires of each party. This plan therefore enables a flexible approach to community engagement. This Community Engagement Plan (CEP) is a live document and shall be altered and amended intermittently throughout the evolution of the operation. It will also be comprehensively reviewed and updated every year and is a reviewed and approved document by members of the Senior Leadership Team.

Mandalay Resources' Corporate Community Action Plan (CAP) can be referred to in **Appendix A: Community Action Plan Guidelines** attached.

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2 Scope

Mandalay Resources Costerfield Operations (Mandalay) 100% owns and operates the underground Augusta, Cuffley, Brunswick and Youle mines and associated infrastructure in Victoria, Australia. The mine is located within the Mining Licence MIN4644.

The Augusta mine site is located within the Costerfield mining district of Central Victoria, approximately 50 km east of the City of Greater Bendigo. The Costerfield Operations includes underground mining of the Augusta, Cuffley, Brunswick and Youle lode, the Splitters Creek evaporation facility, the Brunswick Processing Plant and associated infrastructure. Exploration drilling activities occur within the MIN4464 but also in the surrounding exploration licence areas.

This CEP is relevant to all operational phases of mining and exploration at Costerfield including pre-planning, exploration, project approval, project development, operation and mine closure. The principles and methodologies identified herein relate to any change in operational circumstance, whether that be planned or unplanned change. The CEP provides strategic direction for both pro-active consultation with stakeholders, prior to a change or event, and re-active consultation as it may relate to an incident or complaint. It also should address the Company and the mine's material risks and provide a

preventative approach to managing and mitigating risks such as doing what is needed to achieve timely permit approval by engaging with stakeholders long before their consultation is required, managing potential concerns identified in the community survey such as water quality with proactive community programming, and other evident risk management practices.

The communication of potentially sensitive information should be managed, and how this may be used by corporate Stakeholders such as the investment community, and local Stakeholders such as near neighbours or Local Government. It should however be recognised that on occasion these stakeholders are one and the same, for example a neighbour with small personal shareholding in the Company.

This CEP does not relate to the direct and specific engagement of corporate Stakeholders including the investment, banking and trade community. However information distributed to Local Stakeholders must comply with the scope of information being distributed to the Corporate Stakeholders. The same shall occur for information being distributed to Corporate Stakeholders. In instances where information, of perceived or real significance, is distributed to Corporate Shareholders regarding a particular mine, that mine's reputation with Local Stakeholders may become rightfully compromise if the same information is not distributed to them in a timely and relevant manner.

This CEP relates to the actions of all Costerfield Personnel, not just the Sustainability Department, further information can be obtained regarding roles and responsibilities in Section 7.

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3 Terminology

The following terminology has been used throughout this document, the accurate meaning of which is often confused or miss-used. The following definitions are consistent with the leading practice handbook[1] adopted by the Minerals Council of Australia, and should be applied to terminology used herein.

Community – Geographical community in the operation's area of interest or a network of people linked by a shared set of interests or experiences.

Stakeholder – Persons or groups who are affected by or can affect the outcome of a project (e.g. individuals, public sector, groups, Governments, NGOs, institutions, unions, media, emergency services etc)

Community Engagement – Activity between the mine and community that is mainly based on dialogue

Community Development – Activities that have a strong planning and implementation focus (e.g designing programs, facilitation, linking with Government etc)

[1] Australian Government (2016) Community Engagement and Development: Leading Practice Sustainable Development Program for the Mining Industry

Community Relations – Community Engagement plus Community Development

Sensitive Receptor - A sensitive receptor is a fixed location such as a house, building, other premises or open area where human health or property is affected by emissions that increase the concentration of the emitted parameter above background levels.

The following definitions are identified as public participation goals from the IAP2 Public Participation Spectrum.

Inform - To provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.

Consult - To obtain public feedback on analysis, alternatives and/or decisions.

Involve - To work directly with the public throughout the process to ensure that public issues and concerns are consequently understood and considered.

Collaborate - To partner with the public in each aspect of the decision including the development of alternatives and he identification of preferred solutions.

Empower - To place final decision-making in the hands of the public.

4 Compliance

The primary legislation which regulates the operation of a mine in Victoria is the Mineral Resources Sustainable Development Act (1990) '**The Act**' and the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 '**The Regulations'**. The Act specifies that licensees have a duty to consult with their community across the entire life cycle of a licence from exploration, through to development, operation, closure and rehabilitation. In addition, the Act further requires that community engagement plans are prepared, to document the commitments that a mining licensee (undertaking mining) has made to engage with the community. The Regulations stipulate the minimum requirements to be included in a CEP. Together, these measures aim to improve engagement opportunities between miners and the communities in which they work.

The Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019, Section 46 states:

46 Information required in work plans—community consultation

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The specified information is how the licensee will comply with their duty to consult with the community under section 39A of the Act throughout the period of the licence, in the form of a plan that—

(a) identifies the community likely to be affected by the work under the licence; and

(b) sets out how the licensee will share information with the community; and

(c) sets out how the licensee will receive feedback from the community; and

(d) sets out how the licensee will manage complaints and other communications from members of the community; and

(e) in the case of a work plan for a mining licence that covers an area of more than 5 hectares, sets out how the licensee will—

(i) identify community attitudes and expectations; and

(ii) analyse community feedback, taking into account community concerns or expectations; and

(iii) register, document and respond to complaints and other communications from members of the community in relation to the mine operations.

Mandalay corporate guidelines for a community action plan require that a values-based approach be used in communicating with stakeholders.

A community action plan requires a review of material risks and how the community engagement process mitigates those risks.

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5 Existing Relationships

In 2016 the Mandalay Resources Corporation commissioned a Stakeholder Survey that was executed in each of the Company's operating locations. At Costerfield, the survey was executed by company personnel and a total of 32 community members were surveyed.

The survey revealed that Mandalay is held in good regard by the majority of respondents. Using an open and responsive approach to issues has allowed Mandalay to develop many positive relationships in both the local and broader communities. More than 70% of respondents believe the community would be worse off without the mine.

Although landholders close to the mine were the most likely to feel negative about issues such as traffic, water quality and noise, none of these respondents complained about the way Mandalay staff communicated with them or dealt with their concerns. When asked about Mandalay's response to

community issues, 84% of all respondents said it had been either 'about right' or 'better than expected'. Most were able to identify particular concerns that Mandalay had responded to as well as the outcomes in each case.

Most of those surveyed were also very happy with the level and quality of communication they received from Mandalay, with 70% saying the level of communication was 'About right' and 79% saying they believe the mine is proactive in seeking the views of the community. In general there seems to be a transparency and reliability about Mandalay's communication that is highly valued by the community.

Sponsorship emerged as a crucial part of Mandalay's relationship with the community. 100% of survey respondents believe that 'the Costerfield mine supports a range and variety of community activities and groups '. It was listed by 68% of respondents in the top three most positive impacts of the mine.

6 Identification of Stakeholders

The following Stakeholders (in no particular order) have been identified as being impacted by or interested in the Costerfield operations. These Stakeholders have been identified over the course of the operation's life and continue to be amended to include new Stakeholders based on operational or Stakeholder changes.

a) Neighbours < 500m (**Appendix B**)
b) Costerfield Community < 5km
c) Costerfield & Heathcote surrounding community < 20km
d) Environment Review Committee (ERC)
e) ERC Community Reference Subcommittee (CRS)
f) Employees
g) Business Partners
h) Regulators
i) Local Government
j) Public Service
k) State and National Government
l) Political Parties and their representatives
m) Indigenous Communities (Taungurung People)
n) Media
o) Unions (Australian Workers Union AWU)
p) Education Facilities
q) Special Reference Groups
r) Emergency Services (CFA, SES, Police, Ambulance)

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6.1 Sensitive Receptors

The Department within DJPR Responsible for the regulation of Mining in Victoria is Earth Resources Regulation (ERR). In 2015 ERR released guidance for the submission of Mining Work Plans in a risk-based approach, that requires the identification of sensitive receptors and the risk of the project creating a hazard (or Impact) to these receptors.

Mandalay has identified the sensitive receptors around MIN4464 & MIN5567 shown on the following figures.

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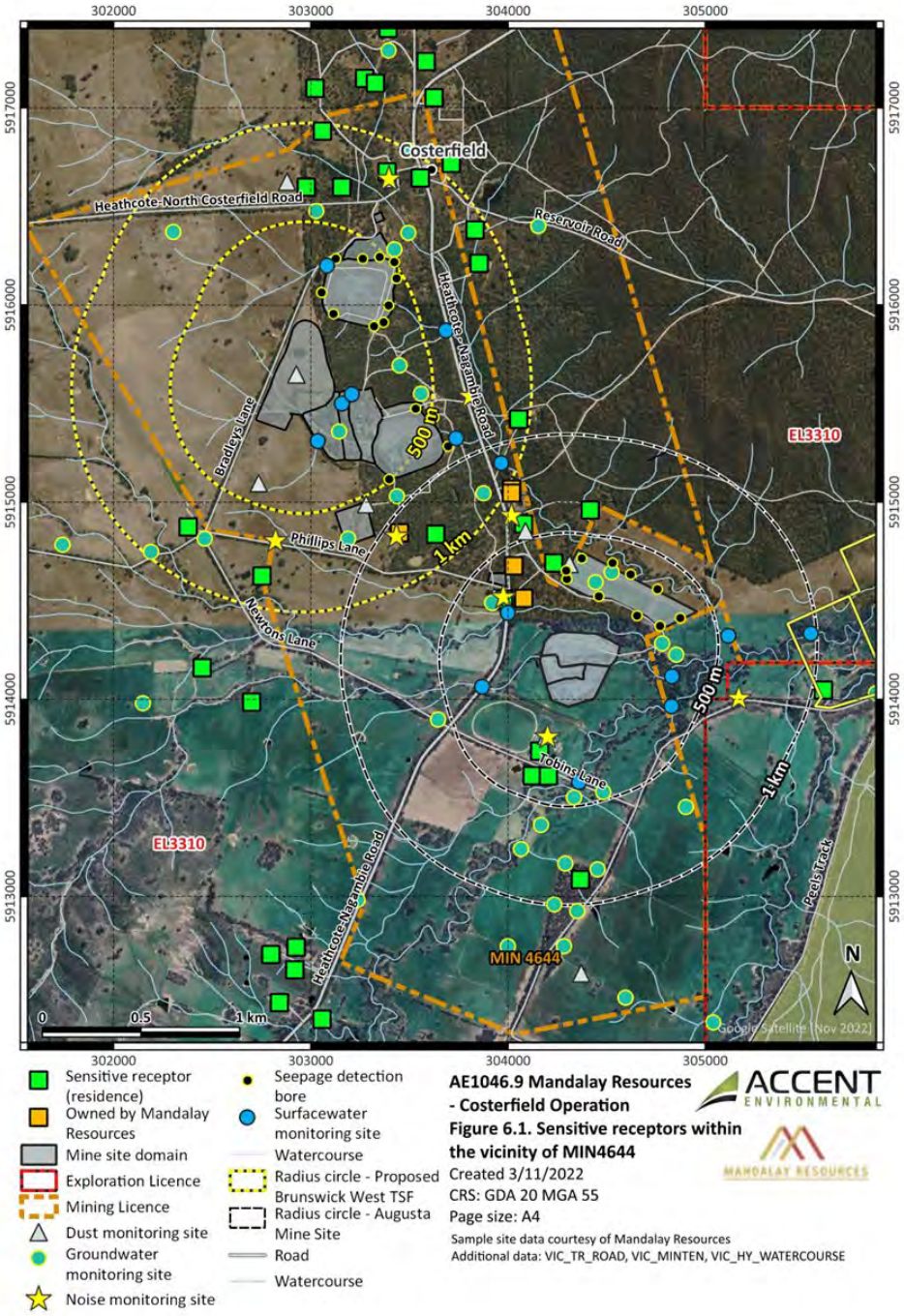

Fig 6.1

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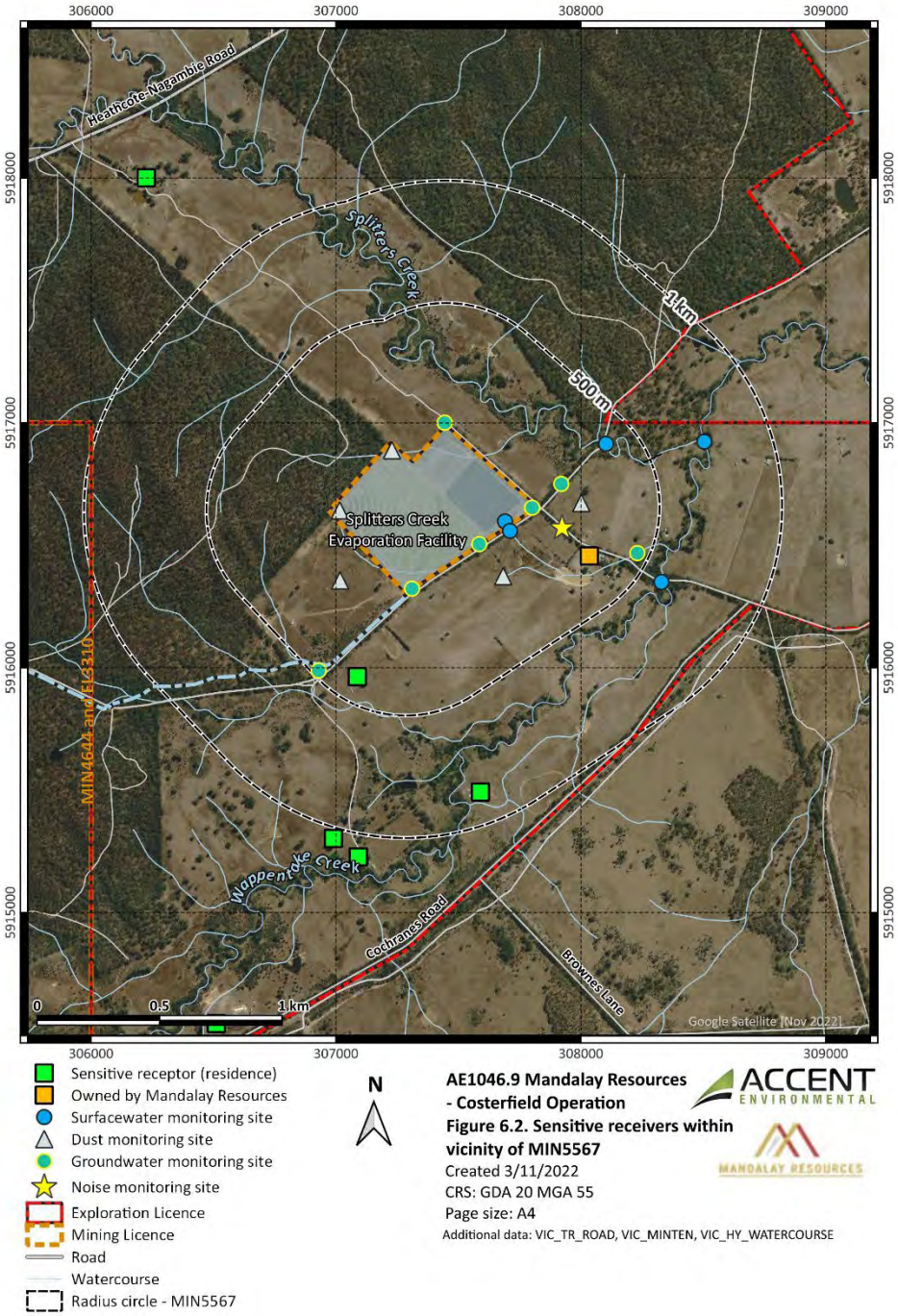

Fig 6.2

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6.2 Impacts

The following impacts have either been identified by community members through the 2016 Community Survey or through discussion with community members by Mandalay, which could affect community members or stakeholders:

a) Increased traffic
b) Ground vibration
c) Noise
d) Ground water changes, level or quality
e) Surface water changes, redirection of flow or quality
f) Dust
g) Air quality
h) Visual amenity
i) Loss of property value
j) Soil erosion
k) Loss of natural environment
l) Safety
m) Failure to consult with parties

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6.3 Community Risk Action Plan

The main risks identified in the 2016 Community survey (Section 6.2) have been reviewed in the Community Risk Action Plan (CRAP) **(Appendix C)** to determine what actions are required to occur both internally within Mandalay and externally with Stakeholders including Community members to minimise the impacts of the risks. Within the CRAP, risks are broken down into operational activities that have the potential to cause them; mitigating actions are assigned to Mandalay personnel or departments to achieve the desired outcomes identified. These actions are used to plan and schedule activities or communications throughout the year.

The effectiveness of this plan is monitored through the number of issues or complaints reported by community members directly to either the Mandalay staff or in future community surveys. Risks and actions within the CRAP are updated as changes in operational activities occur, as current actions are complete or as new risks are identified through future community surveys.

6.4 Community Expectations

For each phase of a mining project being startup, operation, rehabilitation and land use post closure, community expectations must be understood. Engagement for post closure land uses is included in an annual review at CRS meetings and during regular discussions with landowners. Current community sentiment to towards mine closure is that the site is closed and rehabilitated to end land uses identified in a timely manner upon cessation of operations.

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7 Stakeholder Engagement Matrix

Table 2 below provides guidance on how Mandalay engages with its stakeholders.

Stakeholder	Consultation Techniques	Consultation Timelines	Operational Phase	Stakeholder interest
Neighbours < 500m	• Door knock/ telephone • Letter drop/email • CRS meetings • ERC meetings • Newsletters • Quarterly reports • Community Open Day • 1:1 meetings	Quarterly or as required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Mine noise • Dust • Ground water • Surface waters • Native Vegetation • Road conditions • Traffic • Size of operation • Sponsorship • Employment
Costerfield Community < 5km	• Door knock/ telephone • Email/letter • 1:1 meetings • Newsletters • CRS meetings • ERC meetings • Community Open Day • Community Meetings • Local Newspaper articles	As required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Mine noise • Dust • Ground water • Surface waters • Road conditions • Traffic • Size of operation • Native Vegetation • Sponsorship • Employment

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Costerfield & Heathcote surrounding community <20km	• Information booths at events • Local newspaper articles • Community Open Day	Annually or as required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Road conditions • Traffic • Sponsorship • Employment
Environment Review Committee (ERC)	• Telephone • Email/letters • ERC meetings • Newsletters • Community Open Day	Quarterly or as required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Mine noise • Dust • Water Use • Ground water • Surface waters • Native Vegetation • Rehabilitation • Heritage • Road conditions • Traffic • Size of operation
Community Reference Subcommittee (CRS)	• Telephone • Email/ letters • ERC meetings • CRS meetings • Newsletters • Community Open Day	Monthly or as required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Community issues • Engagement method feedback • Mine noise • Dust • Water Use • Ground water • Surface waters • Native Vegetation • Rehabilitation • Heritage

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				• Road conditions • Traffic • Size of operation • Sponsorship • Employment • Permits
Sponsorship Review Committee (SRC)	• Email/letters • SRC Meetings	Quarterly or as required	• Project development • Operation • Closure planning • Closure	• Sponsorship • Employment
Employees	• Management communication • Email/letters • Informal verbal • Newsletters	As required	• Exploration • Project approval • Project development • Operation • Closure Planning	• Employment • Sponsorship • Mine life • OH & S
Business partners	• Informal verbal • Letter	As required	• Exploration • Project approval • Project development • Operation • Closure planning	• Financial • Size of operation • Sponsorship
Shareholders	• Public reports	Quarterly	• Exploration • Project approval • Project development • Operation • Closure	• Environmental performance • Financial • Size of operation

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Regulators	• ERC meetings • Telephone • Email/letter • In person	Quarterly or as required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Regulatory compliance • Permits • Community complaints
Native Title Claimants	• Email/letters • In person	Annual or as required	• Exploration • Project approval • Project development • Operation • Closure planning • Closure	• Aboriginal heritage areas • Permits • Regulatory compliance • Sponsorship • Employment
Schools	• Email/letters • Guest speaking • Community Open Day	As required	• Exploration • Project approval • Project development • Operation	• Sponsorship • Environment • Employment • Size of operation
Media	• Media releases • Interviews • Community Open Day	As required	• Exploration • Project approval • Project development • Operation	• Mine noise • Dust • Ground water • Road conditions • Traffic • Size of operation • Sponsorship • Employment • Financial • Aboriginal heritage areas

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				• Heritage listed areas
Unions	• Email/ letters • In person • Telephone	As required	• Exploration • Project approval • Project development • Operation • Closure planning	• Employment • OH & S • Financial • Size of operation • Regulatory compliance
Special reference groups	• Guest speaking	As required	• Exploration • Project approval • Project development • Operation • Closure planning	• Mine noise • Dust • Ground water • Road conditions • Traffic • Size of operation • Sponsorship • Employment • Financial • Aboriginal heritage areas • Heritage listed areas • Employment • OH & S • Regulatory compliance
Emergency Services	• Email/ letter • Telephone • In person • Community Open Day	As required	• Pre-planning • Exploration • Project approval • Project development • Operation • Closure planning	• OH & S • Emergency Planning • Regulatory compliance

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			• Closure	

Table 1 - Stakeholder engagement matrix

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8 Facilitating Operational Change

Many Mandalay personnel frequently make change to the mining process or equipment, whether this be for performance improvement, economic efficiency or practicality. No matter how large or small, these operational changes may result in an impact to the Community and/or a sensitive receptor.

The following administrative controls assist in the identification of increased impact to the Community and/or Sensitive Receptors.

1. Change Management Procedure **(Appendix D)**
2. Change Modification Approval Form **(Appendix E)**
3. Surface drill pad site inspection

Prior to initiating a change in process or equipment all personnel shall complete the Change Management Procedure, to identify and manage impact to the Community.

9 Engagement Techniques

The following engagement methods are employed by Mandalay, as identified in Table 1.

9.1 Environment Review Committee

In May 2016 an independent review of the Environment Review Committee (ERC) was undertaken to identify potential improvements to the Group's role and function. Subsequent to this review changes were officially adopted by the ERC members and implemented by the group.

The role of the ERC is to achieve review of environmental and social monitoring and compliance data and review annual reports, audit reports and outcomes in line with the licence conditions and the MRSDA 1990.

Information presented to and discussed by the ERC includes;

- Corporate quarterly reports
- Environmental monitoring data gathered during the reporting period
- Work Plan (Variation) proposals and updates
- Complaints
- Incidents
- A report from the Community Reference Subcommittee
- Other relevant environmental or social issues raised by members of the committee or the Company

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The ERC membership includes relevant regulatory authorities, Community Members (who are all Community reference sub-committee members) and relevant mine personnel. Attendance at meetings

by Government agencies is at the discretion of the agency based on the relevance of information being presented, or unless requested by another ERC member via the ERC Chair. Members of the Costerfield community are permitted to attend the ERC meeting as an observer however pre-notification to the Chair is required at least 1 week prior to the meeting.

Mandalay provides an independent Chairperson to chair all ERC meetings. This chairperson has proven skills and experience in facilitating Community meetings, has no conflict of interest and must meet the requirements set out in a position description created for this role. Whilst the Chair may be paid for by Mandalay, their actions must be independent and impartial to perceptions of bias for or against the Company, Government, individual or Community groups. The Chair's role is to convene the meeting to time and agenda, facilitate respectful discussion and negotiate conflict.

A report to the ERC membership is circulated quarterly as per the current content and structure. Members are encouraged to contact the mine to discuss any content that may be relevant to their business/interest or to discuss any areas of concern as soon as possible after the minutes are circulated. Where appropriate Mandalay may address any concerns, issues or queries via email to the ERC membership to ensure all members are equally and fairly provided with the same information.

The ERC meets every 3 months to discuss data presented during the previous quarter.

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The Terms of Reference and Code of Behaviour for the ERC is presented in **Appendix F: ERC Terms of Reference and Code of Behaviour**.

9.2 ERC Community Reference Subcommittee

The aim of the Community Reference Sub-Committee (CRS) is to resolve issues or concerns before complaints are generated and to assist Mandalay in their planning and decision making. The role of the Sub-committee is to promote a good working relationship between the mine and the Community by providing a platform for information sharing, collaborative discussion, constructive input and meaningful feedback on project proposals and future mine operations. The Sub-committee works under the auspice of the ERC, but affords more time to relevant discussion regarding Community affairs. The group may also provide feedback on planning or execution of consultation initiatives with the broader Community and guidance around philanthropic contributions made to the Community.

The scope of the Sub-committee is not to lodge complaints or make claims regarding the mine's performance, this should be achieved using the Mandalay Community Issue Resolution Process. The Sub-committee does not carry authority to make decisions regarding the Companies operation, planning or communications. It is the Chair's role to ensure the Sub-committee operates within the scope of the Terms of Reference.

Scope of discussion at the Sub-committee meetings may include, but are not limited to:

- New project proposals and draft approvals (ie Work Plans)

- Feasibility studies
- Rehabilitation and mine closure
- Philanthropic contributions
- Complaints and current issues
- Recent changes to the mine plan
- Communication methods

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The Community Reference Sub-Committee shall meet on a monthly basis unless otherwise determined by the Chair in response to requests from members.

Membership of the Sub-committee shall consist of Mandalay personnel and no more than 8 appointed Community members. Four of the eight Community members shall be Community representatives on the ERC. Additional temporary Community members may be invited by Mandalay to attend particular Sub-committee meetings based on proximity to or impact by proposed projects being discussed. Members of the Costerfield community are permitted to attend the Community Reference Sub-committee meeting as an observer however pre-notification to the Chair is required at least 1 week prior to the meeting.

The Sub-committee and ERC Chair shall elect a suitable Chair from the Sub-committee Committee membership. This may be a community member or mine representative.

The Terms of Reference and Code of Behaviour for the CRS is presented in **Appendix G: CRS Terms of Reference and Code of Behaviour**.

9.3 Door knocking, letter drops and the use of e-mail

As an outcome of the survey (refer to section 5) people expressed a strong preference for direct communication. 89% of participants said they would use the phone or in person visit to the site to express a concern. Some recipients even requested more face to face communication with mine representatives by having mine representatives more visible in the community and at public events.

A number of the immediate neighbours surrounding the Costerfield operations have in the past advised that they prefer to receive written information via email or hand/post delivered letters. This request is registered on the Costerfield Contact REGISTER and those people receive relevant information as per their preferred method.

Residents frequently respond to this printed material by telephoning the nominated representative at the site to further discuss any concerns or comments that they wish to discuss, this contact is recorded in the Costerfield Contact REGISTER.

Occasional 'door knocking' is also used to obtain feedback or communicate information where written correspondence is deemed inadequate to effect good communication pathways. Written information may be provided for community members to review to supplement information discussed.

Mandalay adapted

9.4 Newsletters and information sheets

Community newsletters provide pro-active communication with Costerfield employees and the neighbouring community. Newsletters will contain updates on the mine's development, any new projects, relevant issues or changes, current community issues and other relevant material.

Feedback gleaned from the community survey indicates the distribution of the newsletter could be improved (currently patchy) and the language could be more centred towards 'plain English'. This feedback has been acknowledged and will be addressed in future newsletters.

Newsletters and/or information sheets will be published regularly throughout the year or as required.

All newsletters should contain a reference to company values.

9.5 Community Open Day

Mandalay held its first annual Community Open Day in 2012 with over 300 visitors in attendance. This enabled the company to pro-actively engage with community members. An open day provides a forum for management to speak with local residents to better understand perceptions about the operation and address concerns. Mandalay held a subsequent Community Open Day in 2014 with over 200 people in attendance. Mandalay aims to hold a Community Open Day every two years.

9.6 Guest speaking

Mandalay staff members will make themselves available as guest speakers to special interest groups, schools and community groups where required, once approved by a member of the management team.

9.7 Media releases

Media releases are used to communicate any relevant newsworthy information to local media sources. Mandalay has existing policies on continuous disclosure to ensure timely disclosure of material information is reviewed and approved by the Disclosure Committee prior to distribution to local media. A specialist media agent may be engaged by Mandalay to ensure media statements are both professional and newsworthy and are directed through the appropriate media contacts.

9.8 Information booths

Communication with the Heathcote and surrounding community is primarily achieved by establishing an information booth at local events. This facilitates the distribution of Company and operational information to the community and provides an opportunity for management to understand the community's perception of the operation and any particular issues of concern they may have.

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10 Roles and responsibilities

Mandalay employs a permanent full-time Community Advisor to assist in the coordination of community engagement for the site, however all Departmental Managers have a responsibility to initiate, prepare information and assist in the delivery of engagement exercises.

Community feedback obtained in the 2016 community survey offered resounding support for the Community Advisor, not only the Company's commitment to the position but the high calibre of the individual presently in that position. It was evident that the current Advisor has developed a very positive relationship with the Community based on trust, honesty, compassion and respect. It is critical that Senior Management not only support this role adequately, but continue to participate in the engagement activities to develop their own positive relationship with members of the Community.

General Manager

- Ensure all operations are executed in compliance with the MRSD Act and Regulations, and with all relevant mining licence conditions

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Sustainability Manager

- Assist in the preparation and delivery of information to the ERC and CRS
- Advise Senior Management on the requirement to obtain additional project approvals
- Facilitate monitoring and modelling associated with Change Management Procedure
- Ensure Change Modification Form is adhered to by all personnel
- When nominated by the Out of Hours Answering Service PROTOCOL, respond to community complaints as per the Complaints PROCEURE or media enquiries as required
- Ensure action items logged in the Corrective Action database are executed within the required timeframe
- Support the Community Advisor
- Update this CAP annually and incorporate the recommendations as well fulfil the guidelines provided
- Monitor and update the document to account for material risks of the company and their mitigation using all the tools available to the Manager

Community Advisor

- Support senior management in the design and execution of community engagement
- Gather feedback from stakeholders and pass it on to relevant management
- Be present in the community to establish strong relationships with Community members
- Maintain the Community Issue Resolution process

Project and Department Managers

- Management of contractors and projects in compliance with project approval conditions
- Execute actions required by Change Modification Form
- Initiate monitoring and modelling associated with Change Management Procedure
- Obtain relevant project approvals as required
- Keep the Community Advisor and Sustainability Manager informed of all changes, issues or incidents that may impact on the Community
- Respond to complaints as per the Complaint Procedure
- Brief ERC and CRS Members on project proposals
- Ensure all employees and contractors participate in the site induction
- When nominated by the Out of Hours Answering Service PROTOCOL, respond to community complaints as per the Complaints PROCEURE

Employees and Contractors

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- Participate in site induction
- Adhere to site procedures and policies
- Report all accidents, incidents near misses
- Report any formal or in-formal community complaint or feedback to the Community Advisor

All staff and contractors are made aware in the site induction of their duty to act in a responsible manner whilst on site. Personnel understand the very close operating proximity of the mine to neighbouring residences and public places and the need to minimise any noise or disruption accordingly. Site personnel are also made aware of their duty to report any community concerns to their supervisor immediately.

11 Issue Resolution

Mandalay maintains documentation that facilitates the management and resolution of community complaints and concerns. A member of the Mandalay management team is available 24 hours per day, 7 days per week, to take and respond to a complaint.

During office hours community concerns may be directed to the relevant department manager or to the Sustainability Manager, who will in turn involve the relevant department manager in the resolution of the issue as per the Complaints PROCEDURE.

An out of hours answering service receives, and immediately re-directs, any complaints to the Manager nominated in the Out of Hours Answering Service PROTOCOL. This ensures all complaints received out of business hours is responded to in an appropriate time frame.

The following site documents form part of the Mandalay Management System and provide specific detail in relation to the management of Community complaints. The following suite of documents can be

observed in **Appendix H: Community Complaints Documentation** or for a more up-to-date version on the Company's internal internet:

- Community Issue Resolutions PROCESS
- Complaint Issue Resolution FORM
- Out of Hours Answering Service PROTOCOL
- Community Complaints REGISTER (Table 2: Community Complaints Register)

COMPLAINANT	MEANS OF CONTACT	DATE	TIME OF INCIDENT (24hr)	COMPLAINT DETAILS	FOLLOW UP ACTION (INCLUDE DATE)	COMPLETION DATE	ISSUE	STAFF MEMBER HANDLING COMPLAINT
Gil Cochrane	email	30/01/2017	N/A	Complaint about wetlands project being constructed near his property and the profligation of wildlife	letter sent to him in response by Adam	7/02/2017	wetlands, wildlife	Adam Place
Archie Ackermen	phone	22/02/2017	11:45	Archie rang to complain about 4-5 mine vehicles driving at speed past his house on Peels lane. He stated they were travelling too fast and creating a lot of dust that was entering his property. I apologised to him, and that I would find out who was responsible. He was happy with this outcome.	Spoke to Mark Andrew who investigated and discussed the complaint with the responsible staff member. Tracey followed up With Archie to reassure him this will not occur again.	23/02/2017	dust	Joel North

Table 2 – Community Complaints Register

Mandalay Resources Corporation maintains a Whistleblower Policy which governs the process through which stakeholders can anonymously and confidentially report any potential violation or concern contrary to the Company's policies or local laws or regulations. Mandalay has retained the services of WhistleBlower Security, an independent service provider to receive reports on an anonymous and confidential basis. A Whistleblower report can be filed online, by phone hotline, email or mail. Details can be found at the company website.

12 Information Management

All contact with the community is recorded in the Costerfield Contact REGISTER that resides on the Company server.

All community complaints are logged in Costerfield's Complaints REGISTER that resides on the Company server.

13 Feedback Opportunities

All communications initiated by Mandalay provide opportunity for and encourage feedback by initiating personal discussion or providing the contact details of relevant personnel for a follow up conversation.

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The Community Advisor will frequently initiate platforms of engagement that enable **involvement**[2] or **collaboration**[3] with the community such as telephone calls and 1:1 meetings. This enables an exploration of any matters of concern, and input into the resolution of issues as appropriate.

In addition to engagement with individuals the ERC and CRS meetings each follow a Terms of Reference that enables **involvement** and/or **collaboration** of matters of significance and decision making. Feedback, commitments and decision making outcomes are recorded via minutes and tracked through regulator processes.

Mandalay actively seek feedback from the broader community via information booths, open days, and via independent community surveys. All feedback is recorded in the Costerfield Contact REGISTER.

13.1 Twenty four hour contact number

The Costerfield Operation reception telephone number is: 03 5431 0400, which is staffed during business hours.

Mandalay has engaged a call answering service (Bonran Pty Ltd) specifically to deal with out of hours contact from stakeholders. If the call is a general out of hours reception call, a media enquiry or a concerned community member, a message is taken and immediately emailed and sent via text message to the staff member specified in the Protocol. If the out of hours call relates to an emergency situation, the call taker will first record details of the emergency, then contact any emergency services that may be required. The call taker will then commence calling a list of contacts, contained in the protocol, until he/she is able to speak directly to someone from that list.

It is reassuring for the community to know that a Mandalay representative can always be contacted, should issues arise on weekends or overnight.

14 Identification and Analysis of Attitudes and Expectations

14.1 Identification

Community attitudes and expectations are identified through discussion and/or formal feedback mechanisms. Mandalay resource a full time Community Advisor to ensure the relationship between Company and Community is such that dialogue between both is regular, open and honest at all times. This

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[2] **Involve** - To work directly with the public throughout the process to ensure that public issues and concerns are consequently understood and considered.

[3] **Collaborate** - To partner with the public in each aspect of the decision including the development of alternatives and he identification of preferred solutions.

regular dialogue and familiar trustworthy point of contact enables the Community to be **involved**[4] in the operation.

Mandalay identifies community attitudes and expectations in the following ways:

a. Discussion at ERC meetings;
b. Discussion at CRS meetings;
c. Receipt of complaints and comments or occasional telephone conversations;
d. One-on-one discussion during Door Knocking exercises;
e. One-on-one discussion at public gatherings and events or;
f. Feedback gathered in response to from the newsletter; and
g. Results from periodic Mandalay Resources Corporation Questionnaire.

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14.2 Analysis and Input

Information collected during consultation activities is routinely used in decision making processes and informs the development of a project scope, monitoring and procedures.

The Community Reference Subcommittee is one if the primary sources of feedback on the operation's performance and project proposals. In the early planning phase of a new project (operational change or improvement), Mandalay presents the proposal to this group with the aim of identifying potential issues, concerns or expectations. It is this adjusted 'scope' that is presented to the broader community for feedback via newsletter, letter drop or door knocking exercises. This is undertaken prior to the project being presented to the Government for consideration and approval. The feedback obtained from this group is used to inform the project planning and is incorporated into the final 'scope' (or design) of the project.

With the feedback gained from Community engagement exercises, a project scope can be finalised and either implemented or submitted to the Government for consideration.

All dialogue held with Stakeholders, including feedback on proposed projects is recorded in the Costerfield Contact REGISTER and action items generated as a result of the feedback is logged in the Isystain Corrective Actions database. These actions items are then tracked regularly through internal reporting mechanisms and are auditable.

When the mine receives a complaint from a member of the Community it is immediately recorded in the Complaints REGISTER and managed via the procedure identified in Section 25. The action items identified during the course of a complaint investigation is tracked in the Isystain Corrective Actions database.

[4] **Involve** - To work directly with the public throughout the process to ensure that public issues and concerns are consequently understood and considered.

This CEP is updated biannually to reflect the evolutionary change in operational needs and stakeholder expectations. The CRS undertake an independent review of the CEP as part of the biannual review progress.

Mandalay records all incidents, safety, equipment damage, production loss, environmental or community related in an online database called Isystain. Its purpose is to support clear and prompt reporting of injuries & incidents to the appropriate Managers, the Sustainability Department and Site Nurse.

15 Stakeholder Reporting

Mandalay provide reports to a rage of Stakeholders on a regular basis. The reports cover aspects such as operational performance, safety, operational change, project approvals, philanthropic contributions, complaints and incidents and environmental monitoring. The Reporting Schedule presented in Table 3 sets the public reporting requirements for the calendar year and is aligned with reporting required in the site's Environment Management Plan (EMP).

Report	Audience	Due Date
NPI	Publicly available via www.npi.gov.au	August
NGER	Regulators	October
APS	Regulators	October
ERC Quarterly Report	ERC Members	February, May, August, November
CRS Report	CRS Members	Monthly
Community Newsletter	Costerfield and Heathcote community	Quarterly or as required
MRSDA reporting	DJPR	July
Annual Sustainability Report	Publicly available via www.mandalayresources.com	Released by Mandalay Corporate

Table 3 - Stakeholder Reporting Schedule

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16 Community Support and Participation

Mandalay is committed to supporting the local community in which it operates, and aims to increase the mine's level of community support and involvement as the operation evolves.

Mandalay has established a Sponsorship Review Committee (SRC), which is comprised of both Mandalay staff and ERC Community Representatives. This involves the community in decisions regarding sponsorship and donations to local organisations with a particular focus on initiatives which focus initiatives which incorporate an educative element, provide for a transfer of skills where Mandalay personnel can assist groups or provides for a lasting impact on the infrastructure on the community to create value beyond the life of the mine. All sponsorship applications are made in writing to the

Environment and Community Adviser, and are assessed quarterly by the SRC using the Mandalay Resources Costerfield Mine Sponsorship Program Score Sheet (**Appendix I: Costerfield Sponsorship Program Score Sheet**). The Sponsorship Review Committee then makes recommendations to the General Manager who approves sponsorship funds.

A diverse range of projects have received funding under the sponsorship program over the last 5 years. Sponsorships have ranged from a First Aid table for the Central Victorian Junior Motocross Club to an ongoing phascogale nest box program by the Central Victorian Conservation Management Network. Other groups sponsored include local CFA and SES brigades, Heathcote Farmers' Market, local schools and kindergartens, "Assist a Sister', Heathcote Community House, Football, Netball and Basketball clubs, and individuals participating in fundraising events such as 'Shave for a Cure'.

Contributions by Mandalay to the local community have been largely monetary, but also include 'in kind' support such as staff hours or use of equipment. The size of the sponsorship has grown significantly over the past 5 years: in 2012 Mandalay allocated just over $9,300 to 14 community groups. In 2016 that figure had grown to over $54,000 shared between 30 community groups. Mandalay's 2016 Corporate Stakeholder survey revealed that its generous sponsorship program is highly valued by the community.

Results of the 2016 community survey indicated that communication regarding the positive impacts and contributions of the mine on the Community should be improved. Sponsorship partnerships should be highlighted using naming rights, signage and additional publicity. The survey observed a general feeling that the Community doesn't realise how much the mine contributes.

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17 Annual Community Engagement Plan

Mandalay plans Community Engagement events and communications in advance to ensure that adequate advertising occurs and that planning can go into resourcing and developing any information required. Additional activities and communications occur outside of these planned engagement activities will occur as required to respond to operational and community needs. As an event, required permit or approval, incident or community significant matter etc occurs, appropriate community engagement will occur with relevant stakeholders in formats appropriate to the messages being communicated. The community engagement events listed in Table 4 are planned to occur annually.

Date	Event
February	• Environmental Review Committee • Community Reference Subcommittee • Community Newsletter
March	• Community BBQ • Community Reference Subcommittee

April	• Community Reference Subcommittee • Community Sponsorship Program
May	• Community Reference Subcommittee • Community Newsletter • Environmental Review Committee
June	• Community Reference Subcommittee
July	• Community Reference Subcommittee
August	• Community Reference Subcommittee • Community Newsletter • Environmental Review Committee
September	• Community BBQ • Community Reference Subcommittee
October	• Community Reference Subcommittee • Community Sponsorship Program
November	• Environmental Review Committee • Community Newsletter • Community Reference Subcommittee
December	• Community Reference Subcommittee

Table 4 – Planned Community Engagement Events

Further Reading

IAP2 Public Participation Spectrum

Australian Government (2016) *Community Engagement and Development: Leading Practice Sustainable Development Program for the Mining industry*

DEDJTR (2016) *Community Engagement Guidelines for Mining and Mineral Exploration*

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Appendices

Appendix A: Community Action Plan Guidelines

20 Site level Community Action Plan (CAP) guidelines

Relationship Identification & Management	Incorporate into Strategic Planning & Budgeting	Implement through Risk Management System	Management of Issues, Activities & External Communications	Monitor Effectiveness
1. Identify all stakeholders and assets & levels of engagement based on intersection of interests (slide 9) 2. Determine consultations and methodologies annually (outside of compliance levels) 3. Assess and identify possible community, NGO and association partnerships 4. Include initiatives that incorporate A) Education B) transfer of skills and C) infrastructure development	5. All sites to develop an annual plan for review & budget approval (July – August) 6. All sites to include vision statement, statement of values and success drivers in CAP and external materials for community relations (slide 12 and 13) 7. Establish an annual approved budget (Sept) for community relations activities locally 8. Identify community relations coordinator 9. Establish actions to reduce operational risks and engagement risks with GM through annual risk management process 10. Assess investment opportunities in local procurement, energy conservation	11. Every two years (2015) conduct community survey to assess/ inform community action plans 12. Review community action plan with Office of Stakeholder Engagement and Corporate Affairs (July – August) 13. GM to update risk register incorporating new management actions for communication action plans	14. Establish Community Resolution Process 15. When necessary, develop documented engagement agreements with stakeholders and partners as sub-agreement to CAP 16. Reporting: Tracking of defined and specific material impacts	17. Communicate internally social impacts both positive and negative 18. Participate in training as required (i.e. media training/ human rights training/ conflict resolution techniques) 19. Ensure an inclusive process 20. Monitor transparency of communications with community on procurement, hiring, public health, financial contributions and partnerships

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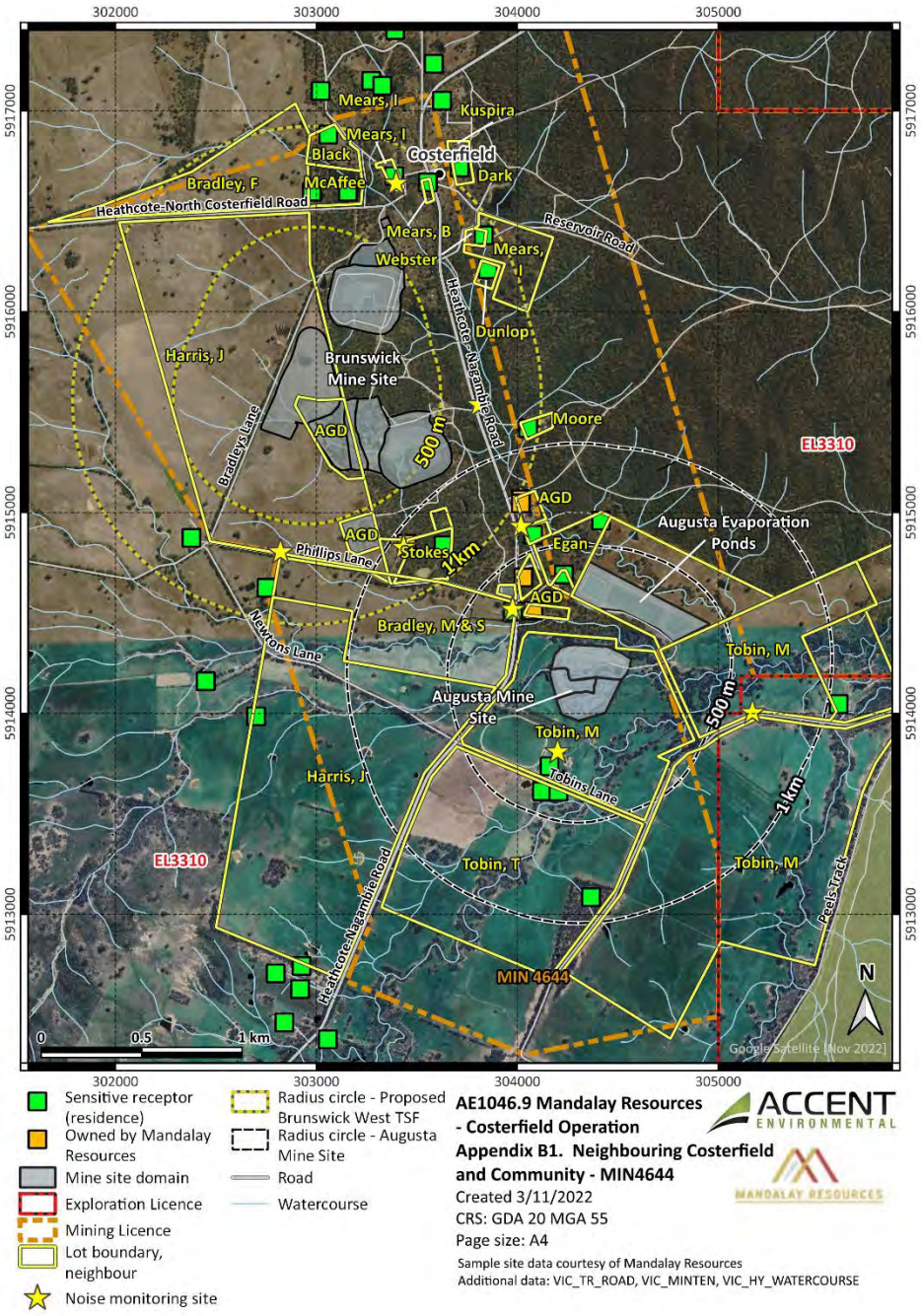
Appendix B: Neighbouring & Costerfield Community



Sensitive receptor (residence)
Owned by Mandalay Resources
Mine site domain
Exploration Licence
Mining Licence
Lot boundary, neighbour
Noise monitoring site
Radius circle - Proposed Brunswick West TSF
Radius circle - Augusta Mine Site
Road
Watercourse

AE1046.9 Mandalay Resources - Costerfield Operation
Appendix B1. Neighbouring Costerfield and Community - MIN4644
Created 3/11/2022
CRS: GDA 20 MGA 55
Page size: A4
Sample site data courtesy of Mandalay Resources
Additional data: VIC_TR_ROAD, VIC_MINTEN, VIC_HY_WATERCOURSE

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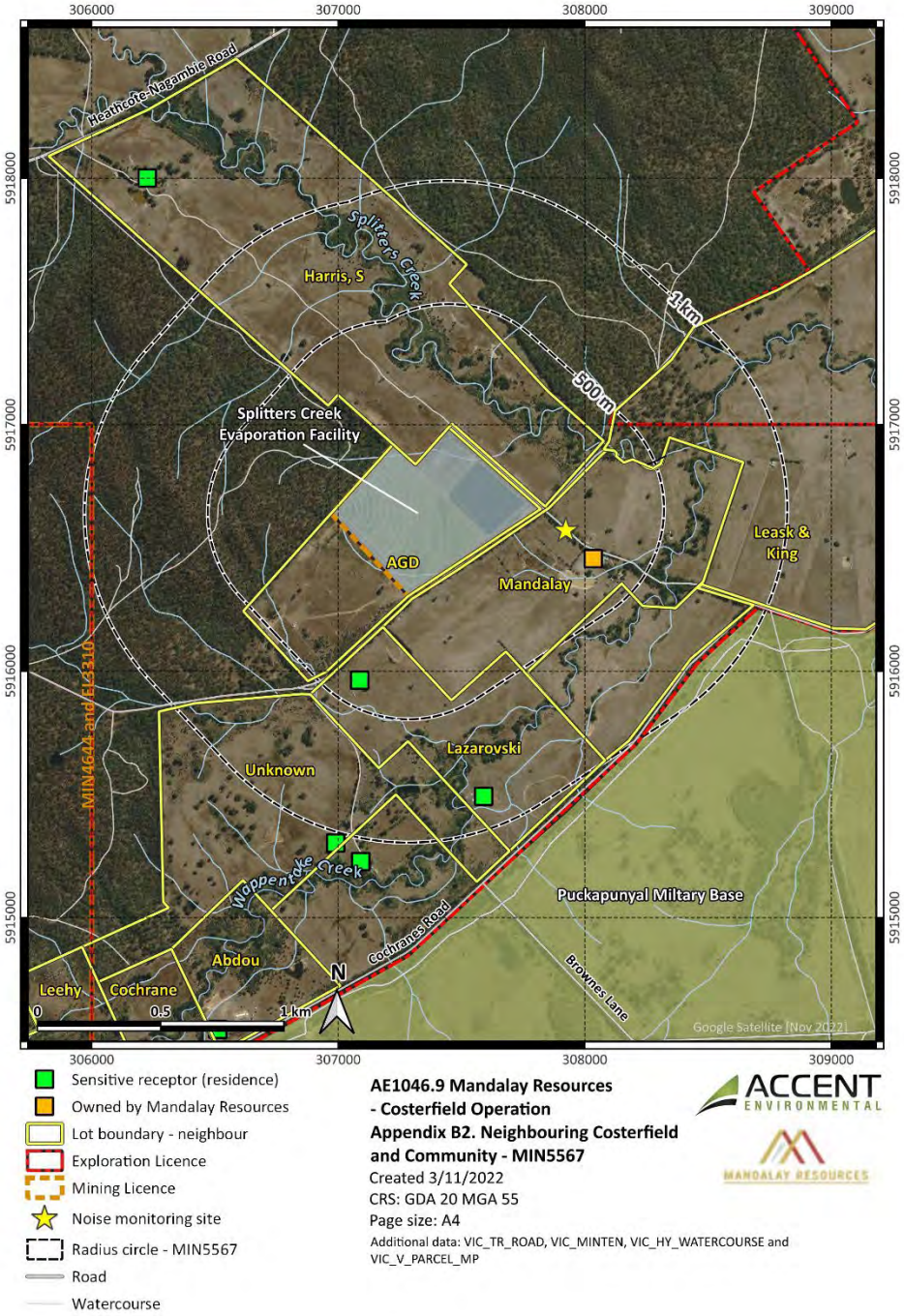

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Appendix C: Community Risk Action Plan

Mandalay Resources Community Risk Action Plan				
Material Community Risks	Action	By Whom	When	Desired Outcome
Traffic	Internal **Speed and volume** -Discussion with work force, contractors and suppliers about safe driving habits -Encourage people to use main roads -Advise suppliers, couriers and delivery vehicles that we will report unsafe driving	Department Managers	Ongoing	-Increased responsible driving -Reduction of people using back roads
	External **Haul Trucks** -Notification to residents when trucks operate on Sundays	Community Advisor Sustainability Manager	Ongoing	-Increased awareness of shift time and when to expect shift related traffic. -Reduction of the number of incidences where residents feel mine traffic is an issue
Blast Vibrations	Internal **Vibration** -Understanding for our workforce about the impact of blasting on our community	Mine manager Community Advisor	End of the year 2020	-Greater understanding of the minimal impact that Mandalay Resources blasting activity has on the community.

	Monitoring Ensure the annual Blast Vibration monitoring is conducted and results communicated	Sustainability Department	Annual	Greater understanding of the minimal impact that Mandalay Resources blasting activity has on the community
	External **Blasting Awareness** -Awareness of blasting times -Education about who is creating the vibrations; Puckapunyal or Mandalay Resources. -Reiteration of residents contacting the Community Advisor if they feel vibrations	Community Advisor	Ongoing	Ability for residents to distinguish between vibrations from Puckapunyal and Mandalay Resources
Noise	Internal **Mill Crushing & Operating** -Engineering assessment for noise mitigation for night shift crushing - Closing doors in float shed on Night Shift	Plant manager and supervisor	Ongoing	Awareness of the impact of Mill operation on residents

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	Exploration drilling -Weekend hours and rigs closer to community members -Review of operating practices to mitigate noise -Early notification and communication to resident of drilling plans -Appropriate resourcing and placement of noise barriers	Exploration manager & exploration contractors Sustainability Department	Drilling ongoing	-Awareness of the impact of exploration drilling on residents -Integration of notification to community as part of future planning
	Construction activities -Early communication to community members about upcoming construction. -Where possible, an adaption of construction activities to support residents requirements (eg Night Shift workers) -Communication to community members of the	Community Advisor Relevant project manager	Ongoing	Awareness and correct reporting mechanism, -Fewer community members experiencing issues as a result of mine related noise

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	extra construction noise allowance, an extra 10 decibels			
	Haul truck operation -Notification to residents when trucks operate on Sundays	Emu Downs Sustainability Department	Ongoing	-Fewer community members experiencing issues as a result of mine related noise
	Delivery Vehicles/Trucks -Early delivery and entry times at the mine -Conversation from Procurement to the delivery drivers. -Advise the drivers who arrive early that we will not unload until the correct time	Russel Banfield	Ongoing	-Fewer community members experiencing issues as a result of mine related noise
	General mine nightshift noise -Reiterating to the night shift workers and workshop that noise needs to be minimised	Plant manager Shift boss	Ongoing	- Awareness of the impact of Mining operation on residents
	<u>External</u> -Reiteration of residents contacting the Community	Community Advisor	Ongoing	-To ensure the community is aware of what is happening on site

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	Advisor at the time if they experience noise			-Residents contacting Community Advisor at the time of noise enabling investigation of the sources
Water Quality	<u>Internal</u> **RO Plant** -Correct operation and maintenance of RO plant. -Compliance to permit conditions	-Plant manager for RO Plant operations -Sustainability team for monitoring, reporting and communication	Ongoing	-Improved RO plant output -Timely communication of RO plant results
	Monitoring correctly -Early notification and prompt compliance to the permit conditions -Early monitoring and results available to community	Relevant project managers and department managers	Ongoing	-Sustainable long term on site water management system
	On site water management -Accurate water model. -Accurate resourcing of water quality requirements -Early initiation of required water management infrastructure and permitting	Sustainability Manager	Ongoing	-Sustainable long term on site water management system

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	Drinking water -Provision of a long term sustainable drinking water supply for Costerfield	Sustainability manager	Completed	- Sustainable long term water supply for Costerfield residents
	Offsite discharges -Inadequate preparation for heavy rain event or unplanned pipeline rupture	Sustainability manager	Ongoing	-No unplanned discharge of mine water or runoff
	External **Understanding of long term water model** -Appreciation of the investment and resources that are allocated to long term water management -Notify the company of any concerns regarding water discharge to the Community Advisor so we can respond	Sustainability Manager	Ongoing	-An appreciation of the responsibility for water management that Mandalay Resources adopts
	Quarterly site tours of evaporation facility & tailings storage facilities (TSFs)	Community Advisor	Quarterly	-Greater community understanding of the operation of the evaporation facility & TSFs.
Water Extraction	Internal		annually	

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	Drawing down of the surface water by mining activities. -Monitoring of shallow and deep aquifer levels. -Planning of future groundwater bores -Annual consultant ground water reviews. -Consultant to discuss with community members when conducting studies	Project Manager and Sustainability Department		-Robust hydro-geological model.
	<u>External</u> **Understanding ground water** -Relevant community discussions with residents about ground water including our annual extraction licence -Annual presentation of water model & annual groundwater consultants' review	Sustainability Department	Ongoing	-Understanding of the differences between surface and deep aquifers -Understanding of LT water model and precautions undertaken by Mandalay
Air Quality/Dust	<u>Internal</u> **Haul roads and surface trucks** -Dust suppression activities carried out across site inc.	Sustainability Department	Predominantly a summer activity	-Mitigate dust potentially created from trucking activities

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	Wheel washes, covered loads, dust suppression additive			
	Crushing activities -Covered crushing area and sprays and windbreaks -Dampening down of stockpiles	Plant manager and supervisor	Predominantly a summer activity	-Mitigate dust potentially created from crushing activities.
	Monitoring -Proactive monitoring of potential dust generation with the use of Dustrak monitors -Supervisors responding to dust track monitors. -Transparent disclosure of dust tracking results at the ERC	Sustainability department Plant supervisors	Predominantly a summer activity	-Proactive responding to monitoring information
	<u>External</u> -Communication with residents and regulators about new activities and what dust mitigation activities are occurring	Residents to contact Community Advisor when dust is being generated	Predominantly a summer activity	-Understanding dust mitigation controls that are used on site.
Tailings storage facilities	<u>Internal</u> Correct operation and inspections of TSFs	Plant supervisor	every shift	Adherence to TSF operating plans to ensure a safe and effective

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				operational facility.
	Monitoring of surface and ground water to ensure there is no leakage from the facility	Sustainability department	Ongoing	Early identification of potential leakage from the facility
	Annual independent audit	Plant manager	Annual	
	Ensuring that an expert reviews the operation, construction and maintenance of the facility			Compliance with licence conditions and early identification of issues of the facility
	<u>External</u>			
	-Communication with stake holders of any concerns with monitoring or annual reviews	Sustainability manager	As required	Transparent reporting of issues identified and development of trust with stakeholders
	Regular site tours of the TSFs to familiarise residents	Community advisor Plant manager	Quarterly	Greater understanding and appreciation of the construction and operation of TSFs

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Appendix D: Change Management Procedure

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Change of Management Procedure

1. Purpose:

Define the methodology to identify, assess, establish and Management of Changes in physical, operational, procedural, organizational etc. situations that can affect the standards of the Mandalay Resources Costerfield Operations Health, Safety, and environment Management System.

2. Scope:

This document applies to Change Management of situations having the potential to alter hazards or the level of risk at the facility, or conditions that may affect or change the normal operation of processes at MRCO.

3. Responsibilities:

Requester: Involve workers (including contractors) and to consult with their health and safety representatives (HSR) in identification of hazards and assessment of safety.

Supervisors: Representatives of all relevant and affected groups (workers and where appropriate, emergency services) should be involved in the review of all significant proposed changes. The persons who should be involved may vary from case to case but, in general, should include representatives of the safety, operations, maintenance and engineering departments.

Technical reviewer: Reviews of proposed changes should involve personnel with seniority reflecting the scale of the change project and the level of the associated hazard and risk. It is essential that the reviewers have adequate knowledge, skills and experience to be able to identify all hazards associated with a proposed change and to consider them thoroughly.

Department Manager: Responsible Approver (Department Manager): Verify all the evidence and document support, to create the change in the process according to this procedure.

Sustainability Manager: For ensuring the requirements of the Environmental, Health and safety Management system are implemented.

General Manager: Provide resources to make changes when are required. Approve the change suggested in the process.

4. Associated Documents:

Change/Modification Approval Form

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5. Key definitions

Hazard: Any activity, procedure, plant, process, substance, situation or any other circumstance that could cause, or contribute to causing, a major incident.

Modification defines this as including:
(A change to any plant, operating methods, processes or substances used in processes, including the introduction of new plant, operating methods or substances

Change: The definition of change includes anything having potential to alter hazards or the level of risk at the facility. This is not limited to physical changes and includes changes to management systems, procedures, organizational structure and personnel.

The information below provides examples of the range of circumstances that may be considered a 'change' and may therefore require management.

- Introduction of new dangerous goods or other hazardous materials.
- Alteration of the activities performed (e.g. the chemical process technology or mining method)
- Addition of new processes, buildings, plant and equipment.
- Changes in the design and construction of existing processes, buildings, plant and equipment.
- Introduction of temporary processes, buildings, plant or equipment.
- Changes to organizational structure, such as de-manning, out-sourcing, or relocation of personnel.
- Introduction of a contractor group.

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6. Identifying Changes

Changes originating within the facility or the operator's organization can be addressed by requiring all proposed changes to be formally requested, via a standard procedure and form. New people can be introduced to the procedure and form as necessary and subsequently trained in the process.
It may be more difficult to identify changes external to the facility as this will require either that third parties reliably notify the operator of all relevant changes or that the operator periodically requests the necessary information.
Examples of external changes that may affect hazards and risks at the facility include:

- Changes to the capacity or reliability of the water supply or grid electricity supply
- Construction of new residences or creation of other sensitive land uses near to the facility
- Changes to emergency response arrangements at an adjacent facility.

Managing urgent changes

There may be a requirement from time to time to make urgent changes, e.g. to prevent a major incident from occurring or to prevent serious loss of production or serious loss of product quality. In such cases, it may be undesirable to delay the change for official review and assessment. However, the change should still be reviewed and assessed as soon as possible after implementation and only then formally adopted.

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7. Use of Change/Modification Approval Form

Step	ACTIVITY	RESPONSIBLE	RECORD
1	Provide information about the current practice and describe the change/modification, specify details of and other alternatives for the change	Requester	Change/Modification approval form
2	Identify the risks involved with the change/modification. Consider risks associated with related actives. Consult with relevant/experienced employees.	Requester	Change/Modification approval form
3	Identify the control measures with a JSA or Risk Assessment	Requester Supervisor Department Mng.	Risk assessment form Or JSA
4	Necessary changes to documentation and drawings if applicable should be drafted before any change is implemented i.e. before equipment is modified or activity starts	Requester Technical reviewer	Change/Modification approval form technical documents and records
5	Check that identified controls have been implemented.	Requester Technical reviewer	Change/Modification approval form
6	Set a date to review the effectiveness of the change, or any corrective actions remaining.	Requester Department Manager	Change/Modification approval form
7	Approval requirements for the modifications	Requester Supervisor Technical reviewer Department Mng	Change/Modification approval form
8	If the change impacts the Safety Management System, Commercial or Legal risk or the risk remains high or extreme, approval is required from Management	Sustainability Manager General Manager	Change/Modification approval form

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Appendix E: Change Modification Approval Form

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CHANGE / MODIFICATION APPROVAL Form

1. CHANGE / MODIFICATION MANAGEMENT FORM

Modification Title		Supervisor's name	
Requester's Name		Plant Area / Work Group	
Current Practice (What do we do now?)			
Modification Description (What do we want to do?)			
Reason for Change (Why?) What is the benefit?			
Alternatives Considered (Are there any Alternatives?)			

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2. COMPLETE SAFETY CHECKLIST

What are the risks or hazards? Include Safety Checklist items		
What are the controls? Include Safety Checklist items		
What is the Risk Score? (Conduct risk assessment if risk score is High or Extreme)	Consequence: …… Likelihood: …… Score: ……	
Statutory Approval required?	Yes / No: Which Regulator? : ……	Approved / Rejected (Documentation Attached)

CONSEQUENCE	LIKELIHOOD					
	Remote	Highly unlikely	Unlikely	Possible	Quite possible	Likely
Massive	A0	A1	A2	A3	A4	A5
Major	B0	B1	B2	B3	B4	B5
Moderate	C0	C1	C2	C3	C4	C5
Minor	D0	D1	D2	D3	D4	D5
Slight	E0	E1	E2	E3	E4	E5

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CHANGE /MODIFICATION APPROVAL Form

Activity List the tasks required to perform the activity in the sequence they are carried out	Potential Hazards Against each task list the hazards that could cause injury when the task is performed	Consequence	Likelihood	Risk Level	Risk Control Measure List the control measures required to eliminate or minimise the risk of injury arising from the identified hazard	Responsible Person

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CHANGE / MODIFICATION APPROVAL Form

3. SAFETY CHECKLIST – INITIATOR & DEPARTMENT MANAGER TO COMPLETE

Will any of these factors be affected by the proposed modification? ...(☒ =Yes / ☐ = No) Any item selected must be included in a risk assessment to ensure adequate controls in place

ENGINEERING HARDWARE AND DESIGN

- ☐ Line Diagram
- ☐ Radioactivity
- ☐ Wiring diagram
- ☐ Rate of corrosion
- ☐ Plant layout
- ☐ Rate of erosion
- ☐ Design pressure
- ☐ Isolation for maintenance
- ☐ Design temperature
- ☐ Electrical
- ☐ Materials of construction
- ☐ Mechanical
- ☐ Loads on or strength of
- ☐ Fire protection of
  - ☐ Foundations
  - ☐ Cables
  - ☐ Structures
  - ☐ Hydrocarbons
  - ☐ Vessels
  - ☐ Other flammables
  - ☐ Pipe work / supports
  - ☐ Tripping hazards
- ☐ Access for:
  - ☐ Structures
  - ☐ Operation
  - ☐ Pipe work / supports
  - ☐ Maintenance
  - ☐ Ventilation or Ventilation Equipment
- ☐ Valves
- ☐ Vehicles
- ☐ Electrical rating
- ☐ Plant
- ☐ Instrument control systems
- ☐ Firefighting / other emergency
- ☐ Trips and alarms
- ☐ Buried / overhead services or equipment
- ☐ Bridging
- ☐ Working at Height
- ☐ Static electricity
- ☐ Confined Space
- ☐ Lightning protection
- ☐ Risk Register / previous controls

PROCESS CONDITIONS

- ☐ Temperature
- ☐ Pressure
- ☐ Flow
- ☐ Level
- ☐ Composition
- ☐ Density
- ☐ Toxicity
- ☐ Flash Point
- ☐ Reaction
- ☐ New Chemicals
- ☐ Services

ENVIRONMENT & OCCUPATIONAL HYGIENE

- ☐ Liquid / solid / gaseous effluent
- ☐ Noise
- ☐ Light
- ☐ Odour
- ☐ Dust & fumes
- ☐ On site Waterways or Storage
- ☐ Off-site water ways
- ☐ Temperature
- ☐ Flora and Fauna
- ☐ Archaeological or Heritage Sites
- ☐ Community

OPERATING METHODS

- ☐ Start-up
- ☐ Routine operation
- ☐ Shutdown
- ☐ Preparation for maintenance
- ☐ Abnormal operation
- ☐ Emergency operation
- ☐ Layout & positioning of controls and instrumentation

ENGINEERING METHODS & SAFETY EQUIPMENT

- ☐ Trip & alarm testing
- ☐ Maintenance procedures
- ☐ Inspection
- ☐ Portable equipment
- ☐ Fire protection and detection systems
- ☐ Means of escape
- ☐ Safety equipment for personnel
- ☐ Emergency procedures

Within the categories listed below, will the modification...(☒ =Yes / ☐ = No)

- ☐ Introduce or alter any potential cause of over or under pressuring the system or part of it?
- ☐ Introduce a risk of creating a vacuum in the system or part of it?
- ☐ In anyway affect equipment already installed for the purpose of preventing or minimising over or under pressure?
- ☐ Introduce or alter the location of potential leaks of flammable material?
- ☐ Introduce new or alter existing hardware or control software?
- ☐ Require consideration of the relevant Codes of Practice?
- ☐ Affect the process or equipment upstream or downstream of the change?
- ☐ Require revision of equipment inspection frequencies?

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CHANGE /MODIFICATION APPROVAL Form

☐ Alter the chemical composition or the physical properties of the process material? ☐ Introduce new or alter existing electrical equipment? ☐ Require additional safety equipment? ☐ Affect existing safety equipment?	☐ Affect existing operating or maintenance procedures or require new procedures? ☐ Alter the composition of, or means of disposal of effluent? ☐ Increase or alter the noise level / pitch? ☐ Require connection to, alteration of, or disconnection from any site utilities?

Checks:	Yes / NA
1. Has modification approval form, with all attachments been reviewed and modified equipment inspected?	
2. Any Statutory approvals for the modification have been approved and documentation received.	
3. Have all the risk assessment actions been incorporated?	
4. Is the implementation in accordance with the approved proposal?	
5. Are there any potential, previously overlooked, hazards or operability problems?	
6. Are fire risks acceptable?	
7. Has consultation with relevant affected/ experienced employees occurred?	
8. Has the modified equipment been tested as required?	
9. Have all relevant plant documentation, operating instructions, etc. been updated?	
10. Has a note with information about the modification been issued to production and other affected personnel?	
11. Has sufficient training of required personnel been completed?	
12. Have the requirements of relevant regulations, codes, etc. been met?	
13. Is there adequate first aid and fire protection equipment readily available?	

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Any Corrective actions remaining	Responsible Person	Due Date

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CHANGE / MODIFICATION APPROVAL Form

4. APPROVAL

I/we have assessed this modification for potential safety, health, environment and/or operability problems, and noted any reservations or actions in the action table.

Position	Name	Approved / Rejected	Signature	Date
Requester				
Supervisor Crew 1 Apply Just if change affects more than one crew				
Supervisor Crew 2 Apply Just if change affects more than one crew				
Supervisor Crew 3 Apply Just if change affects more than one crew				
Supervisor Crew 4 Apply Just if change affects more than one crew				
Technical Reviewer if change affects more than one Department				
Department Manager				

5. **The approvals of the signatories below are only required for:**
- Changes that have a high or extreme risk as assessed in the risk assessment
- The change will affect the site Safety Management System
- There is a commercial or legal risk that the change will affect site operations.

I/we have assessed this modification for potential safety, health, environment and/or operability problems, and noted any reservations or actions in the action table.

Sustainability Manager				
General Manager				

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Appendix F: ERC Terms of Reference and Code of Behaviour

MANDALAY RESOURCES

ENVIRONMENT REVIEW COMMITTEE
TERMS OF REFERENCE

November 2010

PURPOSE

Review, discuss and provide feedback on the environment and community relations performance associated with the Costerfield mining and exploration operations, and future development of the mine. These terms of reference set the operating parameters for the group to ensure that meetings are held in a professional, pleasant, productive and timely manner.

TERMS OF REFERENCE

a) All members will make effort to **attend** meeting or send an apology to the Chairman where required
b) A meeting **agenda** will be distributed by the mine at least 2 weeks prior to the meeting. If a committee member requires additional agenda items, the Chairman must be notified at least 1 week prior to the meeting date and a revised agenda circulated prior to the meeting to allow appropriate preparation or representation where required
c) Meeting **minutes** will be circulated to the ERC no later than 4 weeks after the meeting
d) All **information** discussed **and material** distributed at the meeting is to be treated as commercial in confidence and prior permission must be sought from the Mine Management prior to the further distribution of such material; the mine reserves the right to withhold distribution of certain material to non decision-making bodies should this information be considered commercially sensitive
e) An ERC has no legislative **authority**, however ERC members from decision-making bodies do have the power to follow up on issues of non-compliance or environmental concerns
f) Communication with press and other oraganisations -The Chairman can only speak for the entire committee and his/her comments should accurately reflect the committee's activities as documented in the meeting minutes.
g) All ERC members must **respect** to views and opinions of others and must not dominate the conversation or meeting agenda with one's personal objective
h) All members have responsibility to maintain dialogue within the **scope** of the meeting agenda and to assist in keeping the meeting to time
i) All members have a responsibility to be **prepared** for each meeting by pre-reading and informing themselves appropriately where required
j) The Chairman will not tolerate **verbal abuse** or personal attack or criticism. constructive feedback should be directed towards an issue or problem

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Appendix G: CRS Terms of Reference and Code of Behaviour

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Costerfield Operations

Community Reference Subcommittee

TERMS OF REFERENCE

March 2022

These Terms of Reference set the operating parameters for the Community Reference Sub-committee to ensure that meetings are held in a professional, productive and timely manner.

Purpose

The purpose of the Community Reference Sub-Committee is to resolve issues or concerns before complaints are generated, and to assist Mandalay in planning and decision-making. The role of the Sub-committee is to promote a good working relationship between the mine and the Community by providing a platform for information sharing, collaborative discussion, constructive input and meaningful feedback on project proposals and future mine operations. The Sub-committee works under the auspice of the ERC, but affords more time to discussion regarding Community affairs. The group may also provide feedback on consultation initiatives with the broader Community.

The purpose of the Sub-committee is not to lodge complaints or make claims regarding the mine's performance. The Sub-committee does not carry authority to make decisions regarding the Companies operation, planning or communications. The Sub-committee may wish to make submissions to regulators if there is a majority consent amongst members present at the meeting. It is the Chair's role to ensure the Sub-committee operates within the scope of the Terms of Reference.

Terms of Reference

Scope of discussion at the Sub-committee meetings may include, but is not limited to:

- New project proposals and draft approvals (Work Plans)
- Feasibility studies
- Rehabilitation and mine closure
- Complaints and current issues
- Recent changes to the mine plan

Membership

Membership of the Sub-committee shall consist of Mandalay personnel and no more than 8 appointed Community members. Up to three of the eight Community members shall be Community representatives on the ERC. Additional temporary Community members may be invited by Mandalay to attend Sub-committee meetings as observers based on proximity to or impact of proposed

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projects. Non Sub-committee community observers are only permitted to attend the meeting after the 90 minutes has elapsed so the regular sub-committee members can deal with any confidential matters. Members of the Costerfield community that wish to attend the Sub-committee meeting as observers must notify the Company at least 24hrs prior to the meeting. General members of the public (non-local) wishing to attend a Community Reference Sub-committee meeting as observers are required to submit a request to the Company at least one week prior to the meeting, outlining their reason for attendance.

- Membership term shall be 12 months with all positions to be considered at the first meeting of each calendar year. Membership vacancies shall be published in the Mandalay Newsletter and other media. Potential new members will be discussed during a meeting and a decision made as to the suitability of the candidate to become a member of the group to be made. The company will communicate the outcome of the decision to the community member. Applicants should demonstrate a valid reason for membership on the Sub-committee and evidence of membership of a local Community group or neighbourhood must be provided. The company may also approach Community members to be on the committee. The nominated chair will inform the ERC chair of the members of the Sub-committee each year including any interim changes.
- Members of local or state Government departments may attend meetings at the request of Sub-committee members. Requests must be received by the Chair at least one week, but preferably more, prior to the scheduled meeting. From time-to-time Mandalay may invite company personnel, contractors or visitors to attend the Sub-committee meeting and provide additional information regarding proposed projects, or to gather feedback on proposed projects.

Structure

Meeting Schedule	Second Wednesday of every month except January.
Location	Costerfield Hall
Day/Time	Wednesday 12:00 – 2:00 pm
Circulation of Information	Several days prior to meeting
Circulation of Agenda	At least 24hrs prior to meeting
Additional Agenda items	Request to Chair no later than 48 hours prior to meeting
Circulation of Revised Agenda	Up to commencement of meeting
Recording of Minutes	Prepared by nominated minute taker
Circulation of Minutes	Within 2 weeks after meeting to Sub-committee and ERC members
Additional Meetings	Upon request direct to Chair
Site Inspections (Group)	Biennial or as required or requested
Reporting to ERC	Minutes circulated with ERC quarterly reports Sub-committee Chair to report at each ERC meeting.

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Public Attendance	As outlined above
Commercial in Confidence	Any material identified as commercial in confidence at the discretion of the Company shall not be recorded or circulated.

Governance

The Sub-committee shall operate under the governance documents of the ERC, these include, but are not limited to:

- Terms of Reference
- Code of Conduct

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MANDALAY RESOURCES

Costerfield Operations

Community Reference Subcommittee

CODE OF CONDUCT

April 2016

Prepared by: Laura Conroy, Ensolve Pty Ltd

Purpose

This Code of Conduct sets the operating parameters for the Community Reference Subcommittee (the Subcommittee) to ensure that meetings are held in a professional, pleasant, respectful and productive manner. All members are expected to abide by this Code.

Member Behaviour

Members will:

a) Make every effort to attend all meetings or send an apology to the Chairperson;
b) Act with honesty, integrity and in accordance with an open and transparent process;
c) Perform their functions impartially and in the best interests of the local and broader communities;
d) Respect the views and opinions of members, colleagues, visitors and other stakeholders at all times. Disrespectful behavior will not be tolerated;
e) Refrain from non-constructive, threatening, intimidating or disorderly behaviour;
f) Refrain from any form of conduct which may cause any reasonable person unwarranted offence or embarrassment;
g) Treat all information and material presented at meetings as commercial in confidence. Permission must be sought from Mine Management prior to distribution of such material. Mandalay reserves the right to withhold distribution of certain material where it is considered commercially sensitive;
h) Refrain from communicating with any media organisations. The publication of material discussed or distributed in a subcommittee meeting is not permitted by any member of the subcommittee;
i) Respect the views and opinions of others and will not dominate the conversation or meeting agenda with their personal objective;
j) Maintain dialogue within the scope of the meeting agenda and assist in keeping the meeting to time;
k) Be prepared for each meeting by pre-reading and informing themselves appropriately where required; and

l) Understand that the Chair will not tolerate verbal abuse or personal attack or criticism. Constructive feedback should be directed towards an issue or problem.

Conflict Resolution

Where conflict exists between subcommittee members and/or the Chair, a mediation will be convened between parties. The mediation will be conducted by the ERC Chairperson at a mutually agreeable time and location outside of the subcommittee meeting. This shall occur within 2 weeks of the event or meeting that triggered the mediation.

At the mediation both members shall be given fair time to outline their position, without interruption by the other party. The mediator shall listen carefully to the members and attempt to resolve the dispute collaboratively. A successful mediation results in problems being solved and respectful working relationships being maintained.

The mediator shall follow the following five step guidance process:

Step 1: Identify the source of the conflict. The more information the mediator has about the cause of the conflict, the more easily it can be resolved. The mediator shall ask questions to identify the source of conflict.
Step 2: Look beyond the incident. Often, it is not the situation but the perspective on the situation that causes anger to fester and ultimately leads to a shouting match or other visible and disruptive evidence of a conflict. The mediator will try to determine if there is an underlying or historic cause of conflict.
Step 3: Request solutions. After getting each party's view, the the mediator shall encourage each member to identify how the situation could be changed. Questions may be asked such as: "How can you make things better between you?"
Step 4: Identify solutions both disputants can support. The mediator shall listen for the most acceptable course of action. Pointing out the merits of various ideas, not only from each other's perspective, but in terms of the benefits to the subcommittee.
Step 5: Agreement. The mediator shall ask the two parties to shake hands and agree to one of the solutions identified in Step 4. Some mediators may prepare a written agreement in which actions and time frames are specified.

In the event that the mediator determines that a member has acted outside the Terms of Reference or this Code of Conduct, the member may be subject to disciplinary action.

Disciplinary Action

The following behaviours or actions of any member of the Subcommittee may result in disciplinary action being taken:

- acting illegally;
- acting outside of the Subcommittee Terms of Reference; and/or
- breaching the Subcommittee Code of Conduct.

In the event of the above misconduct the Chair will adopt the following procedure:

1. First and final writing warning to relevant member advising of their misconduct
2. Mediation if deemed appropriate by the Chair
3. Dismissal of the Member from the Subcommittee

Grievance Resolution

In the event that a member of the subcommittee has a grievance regarding the conduct of the Sub-committee, or regarding another member of the Subcommittee, the person shall make contact with the Subcommittee Chair to arrange a suitable time to meet and discuss the grievance. The Chair shall make all reasonable effort to resolve the grievance at this time. If the grievance is regarding another member of the Subcommittee, the Chair shall initiate mediation as per the procedure outlined herein.

In the event that a member has a grievance regarding the Chair of the Subcommittee, the member shall make contact with the Chair of the ERC to discuss this grievance. The Chair shall make all reasonable effort to resolve the grievance at this time. If appropriate, the ERC Chair shall initiate mediation between the member and the Subcommittee Chair as per the procedure outlined herein.

If the grievance relates to the performance of the Subcommittee Chair the ERC Chair shall make Mandalay Resources and the ERC aware of the grievance to seek resolution, and to initiate disciplinary action if required.

Where three or more members are concerned about the manner in which the chairperson is fulfilling the role (eg there is an ongoing perception of bias, inappropriate control, refusal to share information or to adhere to the wishes of the committee), they may request that the ERC review the chairperson's appointment, with a view to making a new appointment.

All grievances shall be treated as anonymous in nature. The member who has voiced the grievance shall not be named in discussion with any other member or group unless otherwise agreed by that Member.

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Conflict of Interest

Members should declare any pecuniary or other interest which may be considered to prevent them undertaking their role impartially and in the best interests of the local and broader communities.

Examples include holding a private contract with the company or holding voluntary acquisition rights. These guidelines establish no requirement in respect of personal interests other than declaration. However, the subcommittee may determine that a personal interest is sufficient that a member should withdraw from discussion on a particular issue.

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Appendix H: Community Issues Resolution Documentation

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MANDALAY RESOURCES

MANDALAY RESOURCES CORPORATION

(the "**Company**")

COMMUNITY ISSUE RESOLUTION PROCESS GUIDELINES

PURPOSE

The Community Issue Resolution Process applies to all of the Company's suppliers, customers and community members or government (collectively, the "**Community Member**" or "**Community Members**") at all jurisdictions of operations and projects; it provides direction for resolving community issues locally in a culturally appropriate mechanism. This process for resolving issues at Mandalay aims to be consistent, auditable, predictable and transparent. It also supports and promotes the Company's values so that *the communities in which we operate value our presence*, extending to how we resolve and respond to issues. The performance of the issue resolution process will be measured inside Mandalay's "Living Our Values" metrics by the number of issues arising (forms submitted) and the degree to which satisfactory resolutions are found.

GENERAL PRINCIPLES

- All issues will be handled with the utmost confidentiality. Only people directly involved will have access to information about the issue.
- No decisions will be made and no action will be taken until reasonable efforts have been made to obtain, collate, investigate and consider all relevant information.
- The Company encourages all the Community Members to seek resolution using the community issue resolution process; however the Company recognizes that all the Community Members may seek resolution with the assistance of an appropriate external body.
- The Company is committed to ensuring that no negative repercussions will occur to anyone who has submitted an issue for resolution.
- Resolving issues brought forward by the Community Members is a key aspect of community engagement. All issues brought forward will be dealt with in a timely manner and where time is of the essence.

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As in effect December 2015

CONFIDENTIALITY

- All parties have rights and responsibilities in relation to confidentiality. Any information relating to an issue will only be provided on a 'need to know' basis, and will not be provided to any third party who has no legitimate involvement in the matter and process. Those involved in an issue have both the right to confidentiality as well as the responsibility to maintain confidentiality. This includes confidentiality of the identity of those involved as well as the subject matter.
- Any person found to be releasing information relating to an issue or a person involved in a process, with no legitimate involvement in the process, will face disciplinary action, which may include termination of employment.

RIGHTS AND RESPONSIBILITIES

Staff Receiving the Issue

The Community Relations Manager or Mandalay employee responsible for community relations matters has the responsibility to:

- Recognize their role in establishing and maintaining harmonious community relations;
- Raise matters of concern at an early stage and actively participate in the issue resolution process;
- Contact subject matter experts and legal counsel, if deemed necessary;
- Call on witnesses, if necessary;
- Not release information relating to an issue to any third party who has no legitimate involvement in the process; and
- Follow the community issue resolution process defined below, and inform all relevant parties of this process by providing copies.

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As in effect December 2015

Page 3

Should the community issue resolution process fail to satisfy the Community Member who raised the issue, the Community Member may escalate the issue further using the Whistleblower Policy.

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As in effect December 2015

Page 4

COMMUNITY ISSUE RESOLUTION PROCESS

1

- **ISSUE IDENTIFICATION**
- The Community Member experiences an action or interaction that they identify as unfair, unjustified or causes distress, and/or is contrary to Mandalay Resources values and policies.

2

- **DIRECT ISSUE COMMUNICATION**
- The Community Relations manager should resolve the issue in keeping with the principles, rights and responsibilities described in this document.
- The Community Relations Manager and the Community Member will complete an Issue Resolution Form (attached herewith). The Community Relations manager will facilitate the steps 3 through 8.
- If the issue is described verbally, the Community Relations Manager is responsible to complete the form for the Community Member to review and sign.

3

- **ISSUE ACKNOWLEDGEMENT BY COMMUNITY RELATIONS MANAGER**
- The Community Relations Manager is responsible for facilitating resolution of the any issue submitted using an Issue Resolution Form. Within one week, the Community Relations Manager will acknowledge to the Community Member that they understand the issue and provide the Community Member with a date by which to expect further communication.
- The acknowledgement notice will include an outline of the process that will be followed in resolving the issue.

4

- **ISSUE ACKNOWLEDGEMENT BY THE COMMUNITY MEMBER**
- The Community Member responds by accepting the community issue resolution process and timeline provided or may propose improvements.
- The Community Member may choose to exit the process and retains their right to submit their issue via the Whistleblower process.

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5

- **ISSUE RESOLUTION TIMING**
- Once an Issue Resolution Form is completed and signed by the Community Member, the submission will be addressed with a sense of urgency. The Community Relations Manager is bound by all laws and regulations and will seek legal guidance, if needed.
- The Community Relations Manager faciliates the agreed actions documented in the issue submission form and subsequent actions documentations in the acknowledgement notice.

6

- **ISSUE RESOLUTION**
- On the completion of the process, the Community Relations Manager will document the resolution to the Community Member.
- The Community Member responds that they are either satisfied or not. If the Community Member and respondent are satisfied with the outcome of the process, both parties sign off on the Community Resolution Form. If the Community Member or respondent is not satisfied with the outcome of the process, they may escalate their concerns through the Whistleblower policy.

7

- **CLOSURE**
- The Community Relations Manager will, within 30 days, speak or email directly with the Community Member to ensure that resolution has been maintained, and that no repercussions, has occurred as a result of the issue being raised and addressed.

8

- **ONGOING LEARNING**
- At the completion of the issue resolution process, the Community Relations Manager will conduct a briefing with the General Manager to determine if any learnings from the process can or should lead to change within the operation or workplace culture or processes.

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COMMUNITY ISSUE RESOLUTION FORM	
DETAILS	
Date Received:	
Name of the Community Member:	
The Community Member's contact address:	
Phone Number:	
Email:	
Site and Department attached to issue:	
Issue received by (Mandalay Community Relations Manager):	
Issue Description:	
Issue Recommended Process:	
Community Member's comments, if any, on process, and date:	

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As in effect December 2015

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FOLLOW UP ACTION/ REVIEW	
Proposed Actions for Resolution:	
Action taken by: (Name and Department)	
Date Action/ Review Completed:	
Name of staff involved:	
Date Issue Resolved:	
Community Member Confirmation of Resolution:	

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As in effect December 2015

Appendix I: Costerfield Sponsorship Program Score Sheet

MANDALAY RESOURCES

Site Office : 1023 Nagambie Road
Costerfield, VIC 3523
PO Box 667
Heathcote, VIC 3523
Tel: 03 5431 0400

Mandalay Resources Costerfield Mine Sponsorship Program – Score Sheet

PROJECT NAME: _____

APPLICANT: _____

Criteria	Weighting	Score Out of 5	Points
Benefits local community and stakeholders.	5		
Delivers educational, wellbeing or environmental benefits.	4		
Utilises locally sourced goods and services.	2		
Recognition for Costerfield Mine available.	1		
Clear and effective use of funds.	3		
		Total Sore	

RECOMMENDATION: _____

Action: _____

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Revision History

Revision Date	Ver	Section	Revision Description	Prepared by	Reviewed by	Approved By	Critical Change[5] Y/N
1/2/20	6.1	All	Update document according to the use of SharePoint Document control system		H.Featonby		N
26/03/21	6.2	All	Review and minor changes		H.Featonby	R.Laity	N
3/11/22	6.3	All	Review and minor changes		N.Wines	R.Laity	N
26/04/23	6.4	6.4	New subsection to address community expectation			R.Laity	N

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[5] The document owner/reviewer is responsible to identify any critical changes of the procedure in this document and is required to notify employees of any change.