



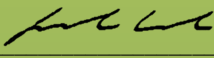
Appendix G: Risk Treatment Plan Brunswick West TSF – Ground Instability

*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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Brunswick West Tailings Storage Facility (TSF) - Ground Instability

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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

#	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)

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

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: <ul style="list-style-type: none"> • 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:

- 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)

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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

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Acceptance criteria

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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