

REPORT



Environmental Management Plan

Vulcan South Coal Mine (EPBC 2023/09708)

Queensland Coking Coal Pty Ltd (ABN 71 129 600 004)

15/11/2024



Proposed Action

The action is a proposed small-scale mining operation, which includes an open-cut mining area and a smaller highwall mining trial area. Premium hard coking coal will be extracted from three separate open-cut pits. The action will operate for approximately seven years (mid-2026 -to mid-2033), including primary rehabilitation works and following a two-year construction period (2024-2026).

The action will extract approximately 13.5 Mt of run-of-mine (ROM) coal, consisting predominately of hard coking coal (with an incidental thermal secondary product) at a rate of up to 1.95 million tonnes per annum (Mtpa). A mine infrastructure area (MIA) will be established along with a modular coal handling and processing plant (CHPP), rail loop and train load-out facility (TLO) at a location between the northern and central pits. The CHPP will include tailings dewatering technologies to maximise water recycling and to produce a dry tailings waste product for permanent storage within active waste rock dumps. At each of the three pits, out-of-pit waste rock dumps will be established prior to commencing in-pit dumping activities that will continue for the life of the operation. Ancillary infrastructure, including a ROM pad, offices, roads and surface water management infrastructure will be established to support the operation.

The project area is located approximately 35 km south of Moranbah in Queensland's Bowen Basin. The action will take place within mining lease application area (MLA) 700073.

Declaration of accuracy

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Signed  _____

Full name (please print) Michael Callan _____

Organisation (please print) Vitrinite Pty Ltd _____

Date 15/11/2024

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- APPENDIX B SURFACE AND GROUNDWATER FLOW CHARTS**

1 Introduction

1.1 Background Information

Vitrinite Pty Ltd (Vitrinite), owner of Queensland Coking Coal Pty Ltd (QCC) and Queensland Coal Aust. No. 1 Pty Ltd (QCA1), proposes to construct and operate the Vulcan South Coal Mine (the Project). The Project is located 35 km south of Moranbah, Central Queensland, adjacent to several established mining operations. The Project will extract premium coking coal (steel-making coal) and will consist of an open-cut mining area, a highwall mining trial area, rail loop loading facility, Coal Handling and Processing Plant (CHPP) and ancillary infrastructure.

The Project is a small-scale coal mine that will extract approximately 13.5 Mt of run-of-mine (ROM) coal, consisting predominately of hard coking coal with an incidental thermal secondary product, at a rate of up to 1.95 million tonnes per annum (Mtpa). The project will operate for approximately nine years, including primary rehabilitation works, following a two-year construction period. The surface area above the highwall mining trial panels has also conservatively been included in the disturbance footprint, however, is not expected to be disturbed.

An Environmental Authority (EA) was granted by the Department of Environment, Science and Innovation (DESI) (P-EA-100265081, **Appendix A**) for the Project on 5 April 2024. The EA allows the extraction of up to 1.95 million tonnes per annum (Mtpa) of ROM coal on Mining Lease (ML) 700073.

Table 1-1 Key Project Information

Project Information	
Project title	Vulcan South Coal Mine
Proponent	Queensland Coking Coal Pty Ltd, owned by Vitrinite Pty Ltd (Vitrinite)
Address	Level 6, Suite 2, 12 Creek Street, Brisbane, Qld, 4000
Objective of the action	Open-cut and trial highwall mining for the purpose of extracting premium hard coking coal, with an incidental thermal secondary product.
Location of the action	Mining will take place on MLA 700073, approximately 35 km south of Moranbah in Queensland's Bowen Basin (-22.3678, 148.2352).
Background to the action's development	The Project is a greenfield development. An application for a Mining Lease was lodged on 10 May 2022. An application for an Environmental Authority (EA) was submitted to the Queensland Department of Environment, Science and Innovation on 6 June 2022, and was approved by the Department on 5 April 2024. A Progressive Rehabilitation and Closure Plan and Schedule was submitted and approved as part of the State EA application process.
Relationship to other actions	The Project is located immediately west to mining projects operated by BHP Coal (Peak Downs and Saraji mines). Consultation has occurred between Vitrinite and BHP concerning water supply and management. The Project is located immediately south of Vitrinite's Vulcan Coal Mine (EPBC 2022/09361).
Current status of the action	The action has been approved by the Department of Environment, Science and Innovation through a finalised Environmental Authority (P-EA-100265081) (Appendix A).
Consequences of not proceeding with the action	The direct consequences of not proceeding with the action are the loss of sustained positive economic opportunities for the local area and region in the form of direct

	employment, procurement, community buy-in, royalty payments to the government and revenue to local businesses.
Identification of affected parties	<p>The following are also key affected parties:</p> <ul style="list-style-type: none"> • the Barada Barna People, as Native Title holders for the broader project area (ILUA) • Underlying landholders (O’Sullivans).

1.2 Objectives and Scope

This Environmental Management Plan (EMP) has been prepared to provide an over-arching reference document for environmental management of environmental aspects of the Vulcan South Project. The objective of the EMP is to provide a summary of the key management proposals documented within the Public Environment Report, including:

- Commitments to meeting performance criteria related to each identified impact to matters of national environmental significance
- An integrated framework for management actions and monitoring of identified impacts and risks
- A mechanism to assist project workers to meet obligations and statutory requirements
- Corrective actions if performance criteria are not met.

The EMP has been prepared in accordance with the Department of Climate Change, Energy, Environment and Water (DCCEEW) Environmental Management Plan Guidelines. (DCCEEW 2024).

The EMP is structured as follows:

Section 1	Introduction: Outlines the objectives, scope
Section 2	Project description
Section 3	Statutory Requirements and Licences: Identifies statutory environmental management and licence requirements relevant to the Project.
Section 4	Environmental Management Framework: Outlines the framework under which the practices and procedures are implemented.
Section 5	Potential Environmental Impacts and Risks: Identifies potential impacts to MNES and risks associated with those impacts.
Section 6	Environmental Management Measures: For each impact, provides avoidance and mitigation measures, monitoring and corrective actions.
Section 7	Abbreviations
Section 8	References

Once the Project has been approved subject to conditions, commitments relating to compliance with these conditions will be added to this section. The table detailing these commitments will be in accordance with the example provided in the Guidelines.

2 Project Description

The Project is a small-scale coal mine that will extract approximately 13.5 Mt of run-of-mine (ROM) coal, consisting predominately of hard coking coal with an incidental thermal secondary product, at a rate of up to 1.95 million tonnes per annum (Mtpa). The project will operate for approximately nine years, including primary rehabilitation works, following a two-year construction period. Coal extraction will occur in three open-cut pits; Vulcan North, Vulcan Main and Vulcan South. The maximum pit depth will extend to 60m bgl. Truck-and-shovel mining operations will be employed to develop the pits. Coal will be processed by a modular CHPP. The proposed CHPP will include tailings dewatering technologies to maximise water recycling and to produce a dry tailings waste product for permanent storage within waste rock dumps. No wet tailings wastes or tailings dams are proposed. Coal transportation will occur via a rail loop and load-out facility, located between the Vulcan North and Vulcan Main pits. Coal will be transported on the Goonyella Rail network to coal terminals at either Dalrymple Bay or Gladstone.

The Life of Mine (LOM) of the Project including construction, operation, decommissioning, remediation, and rehabilitation is approximately 22 years assuming a 2025 commencement and with all rehabilitation milestones being completed by the end of 2047.

No changes to the project description have occurred since the submission of the EPBC Act referral.

2.1 Location and Project Area

The Project area is located approximately 35 km south of Moranbah in Queensland's Bowen Basin (central point coordinates: -22.3678, 148.2352) (**Figure 2-1**). The Project lies to the immediate west of several established mining operations including BMA's Peak Downs and Saraji mines, and south of Vitrinite's Vulcan Coal Mine. The Project is located within ML700073. The Project area (referring to the entire MLA, of which only a portion will be impacted by the proposed action) is 3,819 ha.

The proposed development footprint (or disturbance footprint) for the action is 1,476.4 ha, which includes the proposed infrastructure and areas potentially to be impacted directly or indirectly. It should be noted that areas that fall within the disturbance footprint that are not covered by specific infrastructure at this time, have conservatively been included in the disturbance footprint to facilitate operational flexibility, however, may not be disturbed if not required to support proposed operations.

2.2 Construction Activities

The proposed Project (layout plan is provided in **Figure 2-2**) includes a two-year construction period (2025-2027). Construction of infrastructure associated with the mining operation, including the CHPP and the rail loop, is expected to be completed within two years. No wet tailings are proposed and therefore no tailings dams are required.

Realignment of the existing Saraji Road and services infrastructure to the eastern boundary of the MLA, adjacent to the existing rail easement, is also proposed in a number of locations. The realignment will occur within the MLA. Construction of the realigned Saraji Road sections will be completed progressively as the pits advance towards the location of the existing road.

Construction of the following infrastructure will also commence in 2025, which is described further below:

- Explosive magazine
- Administration buildings and warehouses
- Fuel storage and workshops
- ROM pad
- CHPP
- Rail Loop and Train Load Out (TLO).

2.2.1 Explosive Magazine

An explosives magazine will be constructed between the highwall mining area and the Vulcan North pit, a safe distance from operational areas and critical infrastructure. Separation distances have been considered for the storage of explosives measured as Net Explosive Quantity (NEQ) at the Project. Separation distances are the distances required to ensure that there will be no significant impact to humans or significant property damage as a result of stored ammonium nitrate exploding. This is to be applied for protected works and vulnerable facilities.

Appropriate separation distances for surrounding sensitive receptors and areas of public use, in accordance with AS2187.1 Explosive Storage, Transport and Use, along with Explosives Information Bulletin No. 53 being considered.

The table below presents the compliance of the site based on a maximum storage of 6 t of NEQ.

Table 2-1 Minimum separation distances for site

Separation Distances (m)				
Net Explosive Quantity (NEQ) in tonnes	Protected Class A	Protected Class B	Vulnerable Facilities	Associated Works
6 t	305	453	906	98.4

The following definitions from AS 2187.1 1998 (Explosives- Storage, transport and use Part 1:Storage) and clarification as to their application have been included.

Associated works. Other magazines, process building and storages of energetic materials, e.g. ammonium nitrate or class 5 dangerous goods. ***There are no associated works on this site.***

Protected Works A. Public street, road or thoroughfare, railway, navigable waterway, dock, wharf pier or jetty, marketplace, public recreation and sports ground or other open place where the public is accustomed to assemble, open place of work in another occupancy, river-wall, seawall, reservoir, water main (above ground, radio or television transmitter, main electrical substation, private road which is the principal means of access to a church, chapel, college, school, hospital or factory. ***The Vulcan South rail loop is classified as Protected Works A facility and located approximately 1 km from the explosive storage facility.***

Protected Works B. Dwelling house, public building, church, chapel, college, school, hospital, theatre, cinema or other building or structure where the public is accustomed to assemble, shop, factory, warehouse, store, building in which any person is employed in any trade or business, depot for keeping of flammable or dangerous goods, major dam. ***The nearest occupied building is 2.45 km away and therefore there are no relevant Protective Works B facilities for this site.***

Vulnerable facility. A category of facility that includes, but is not restricted to, the following:

1. Multistorey buildings, e.g. above 4 storeys
2. Large glass fronted building of high population
3. Health care facilities, childcare facilities, schools
4. Public buildings or structures of major historical value
5. Major traffic terminals e.g. railway stations, airports
6. Major public utilities e.g. gas, water, electricity works

There are no vulnerable facilities associated with this site.

In summary, the separation distances for key infrastructure areas and vulnerable facilities are within the approved minimum distance as described in AS 2187.1 1998 (Explosives- Storage, transport and use Part 1:Storage)

2.2.2 Administration buildings and warehouses

Onsite offices and administrative buildings are to be located just north of the MIA and adjacent to mine access roads for easy access.

2.2.3 Fuel storage and workshops

This will include mobile diesel fuel tanks, workshop containers and portable bathroom amenities. Earthmoving equipment will be required for the development of benches for the highwall miner to operate on as well as road construction and maintenance equipment to build and maintain the haul road to the CHPP/ ROM stockpile area.

2.2.4 ROM pad

ROM coal will be loaded from the discharge conveyor of the highwall miner onto a stacker belt for stockpiling on the active bench. Loaders will manage the stockpile and load B triple trucks for haulage to the CHPP. The ROM pad will be located within the MIA.

2.2.5 CHPP

The CHPP will be approximately 270m by 222m at its longest points.

2.2.6 Rail Loop and TLO

Product coal will be railed from the Project rail loop onto the Goonyella Rail network. Export options include Dalrymple Bay to the north and RG Tanna, in Gladstone, to the south.

The train load out facility will link the product stockpiles with the proposed rail loop and will utilise a two-coal valve reclaim system to load at a rate of 3,500 tph. The train load out facility will be managed via an automated system, including overload protection and load veneering. The facility will be positioned over the rail line and will incorporate a suitable under rail spillage pit.

The rail loop will be approximately 4.97 km long along its centreline.

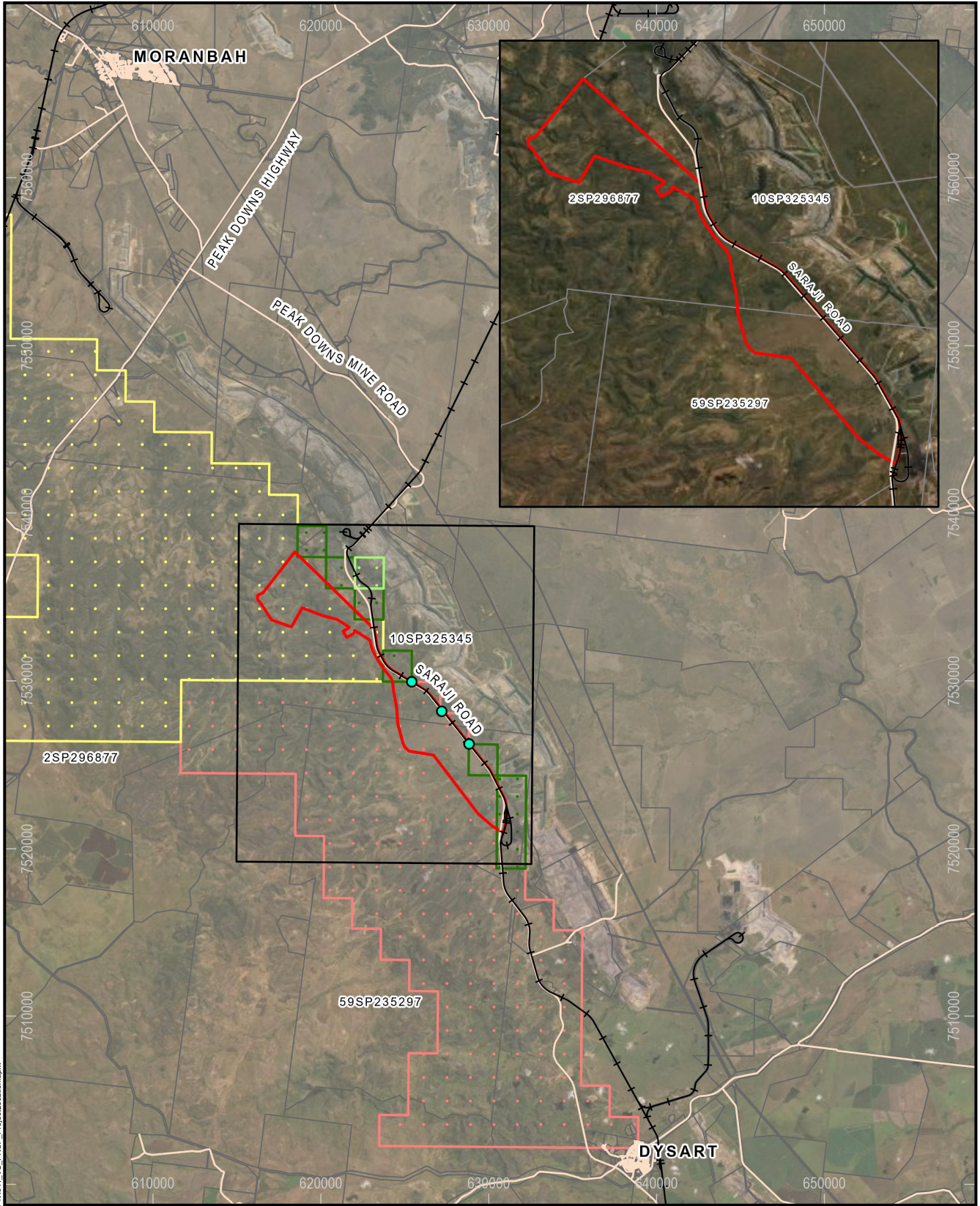
2.2.7 New and Existing Roads

The Project will include the construction and operation of the haul road, mine access road and internal roads, as well as the realignment of the Saraji Road which will remain in perpetuity following the completion of the project. Roads to be established for the Project are summarised below:

- Mine access road - A new mine access road (unsealed) will be established from Saraji Road in the centre of the MLA, between the rail loop and the northern extent of the Vulcan Main pit. This will lead to the site offices and administration and on to the Mine Infrastructure Area (MIA). This will be approximately 20m wide and 3km long (including the access road to the office)
- Main Haul Road – The main haul road (unsealed) will extend from the Highwall mining trial area in the north to the southern pit. The haul road will be approximately 80 m wide and total a length of 16.25 km.
- Highwall mining trial haul road will be between 30 and 60m wide depending on the section of the highwall mining area and approximately 4km long
- Saraji road realignment (sealed) - A realignment of the existing Saraji Road and services infrastructure to the eastern boundary of the proposed Mining Lease Application (MLA) area, adjacent to the existing rail easement, is also proposed in a number of locations. The re-alignment will occur within the MLA area. As a functioning council road that is intended to remain in place in perpetuity, Saraji Road must meet regional council requirements in its construction and maintenance. This is a condition specified in the agreement between Vitrinite and the IRC.
- The magazine access road corridor (unsealed) will be approximately 50-70m wide and approximately 1.2km long.

2.2.8 Duration of Key Infrastructure

Key infrastructure will remain until operations at the southern pit cease and infrastructure will be maintained on an as needed basis. Considering that infrastructure will only be operational for approximately 7 years, it is unlikely that extensive maintenance works will be required. Ongoing establishment of internal road networks, surface water management infrastructure and other ancillary infrastructure will continue to be developed as the pits and in-pit dumps advance.

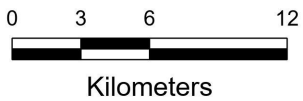


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Legend

- Prospecting Permits
- Railway
- Road
- MLA Boundary
- Cadastral Boundary
- EPC 1234
- EPC 1732
- Historical EPC 1732
- EPC 1233

**Vulcan South
Location Map Showing Resource
Tenures of Vulcan South**



Scale: 1:330,000 (A4)

13/05/2022

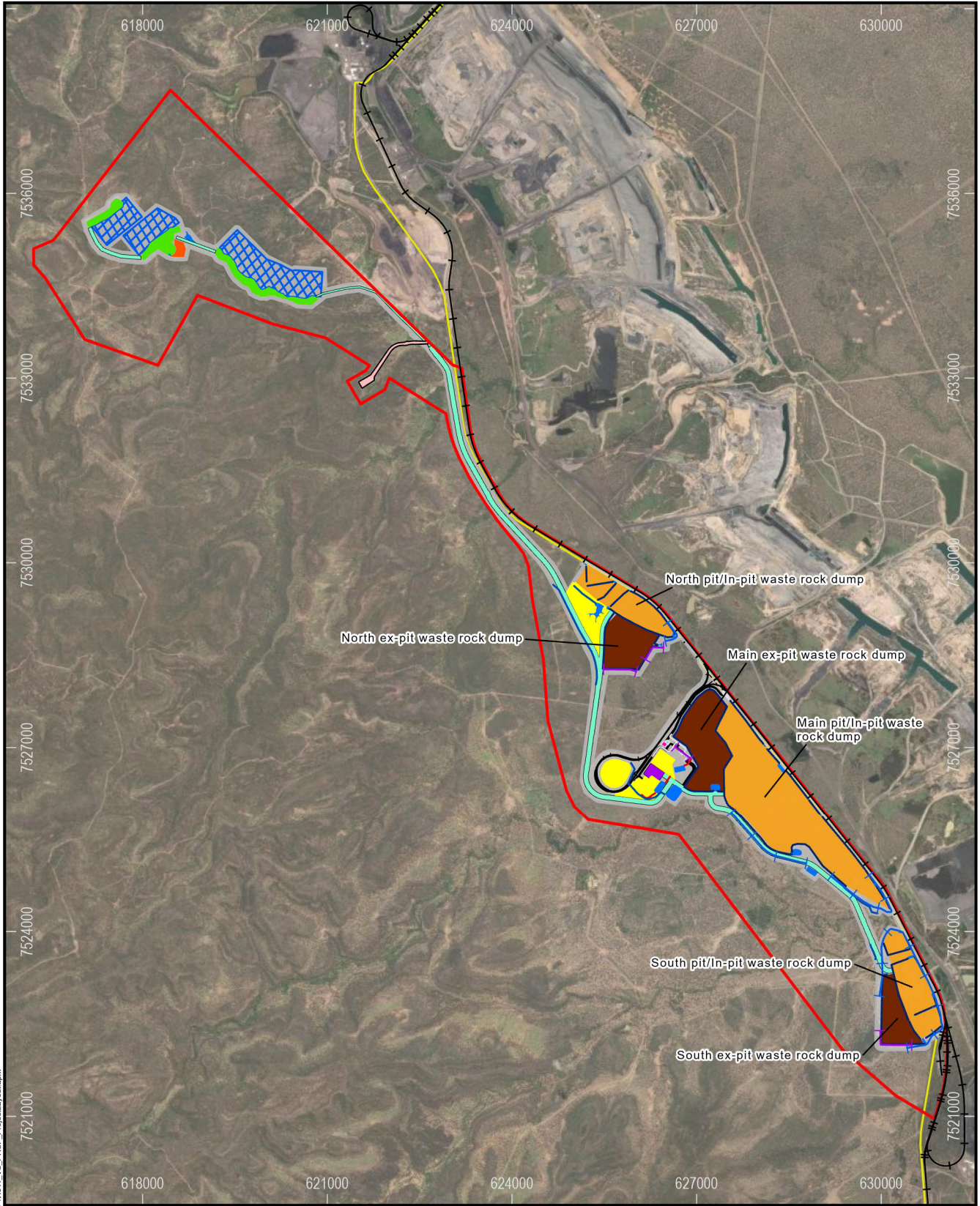
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Projection: MGA55

FIGURE 2-1

BRIGHTER COAL

Mining & Energy Technical Services Pty Ltd

Source: State of Queensland (Department of Resources) 2021-2022, Vitrinite 2022, METServe 2022, Earthstar Geographics.



Legend

Drainage Lines	CHPP
Railway	Magazine
Road	MIA
Mine Access Road	Dam
Rail Loop and Mine Roads	Office
Flood Levee	Haul Road
Diversion Bund	Ex-pit Waste Rock Dump
Diversion Drain	Open Pit/In-pit Waste Rock Dump
Mine Water Drain	Highwall Mining Bench
Surface Water Drain	Highwall Rock Dump
Vulcan South Maximum Disturbance	Highwall Plunge
MLA Area	

Source: State of Queensland (Department of Resources) 2021-2022, Vitrinite 2022-2023, WRM 2022, METServe 2022-2023, Earthstar Geographics.

Vulcan South Site Layout

0 0.75 1.5 3

Kilometers

Scale: 1:90,000 (A4)

9/11/2023

Datum: GDA2020
Projection: MGA55

VITRINITE
BRIGHTER COAL

METSERVE
Mining & Energy Technical Services Pty Ltd

FIGURE 2-2

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2.3 Operational activities

2.3.1 Open Cut Mining Activities

Vulcan South will operate for approximately seven years (mid-2026 -to mid-2033) and will target the Alex and multiple Dysart Lower coal seams. The Project will extract approximately 13.5 Mt of run-of-mine (ROM) coal, consisting predominately of hard coking coal (with an incidental thermal secondary product) at a rate of up to 1.95 Mtpa.

The three open cut pits will follow the seams as they dip eastwards. The footprints of the proposed open cut pits are provided in **Table 2-2**. Truck-and-shovel mining methods will be employed to extract waste rock and coal.

Table 2-2 Open cut pit characteristics

Open Cut Pit Name	Approximate Footprint (ha)	Approximate Maximum Depth (m)	Average Depth (m)	Mining Direction	Target Seams
Vulcan North	66	34	12.4	North to south	Alex and multiple Dysart Lower
Vulcan Main	334	60	32.0	North to south	Alex and multiple Dysart Lower
Vulcan South	77	38	23.5	North to south	Alex and multiple Dysart Lower

2.3.2 Blasting

Blasting is expected to be required to access resources below unweathered rock. Approximately 24 blasts per year are expected during the construction/operation phase (9 years). Blasts would be planned and scheduled to manage potential impacts on Saraji Road and nearby infrastructure and landholders.

The Project's EA (**Appendix A**, Schedule D, Table D2) outlines blasting noise and vibration limits for sensitive places.

2.3.3 Waste rock removal and placement

In-pit dumping (with the encapsulation of potential acid forming material with non-acid forming waste rock) will fill the majority of the pits during operations. The remaining voids will be backfilled upon cessation of mining, resulting in the establishment of low waste rock dump landforms over the former pit areas. Following backfill of the final voids, material remaining in the initial out-of-pit waste rock dumps will be rehabilitated in situ.

Waste rock extracted during the early stages of each open pit will be placed in ex-pit dumps to the west of the open pits. Following this initial ex-pit placement and once sufficient pit space has developed, in-pit placement of waste rock will commence. This will continue for the life of each pit as it is developed. The in-pit dumps will have batters shaped up to a maximum slope of 15%. A central plateau will drain to the west to minimise the requirement for significant drainage infrastructure along the eastern toe of the dump (where space is limited, due to the presence of the existing road and rail).

An assessment of waste rock geochemistry has concluded that the waste rock does not pose a significant risk of generating saline or metalliferous drainage. Therefore, no selective handling and treatment measures are proposed. Furthermore, low-permeability capping over the dump surface is considered not to be required to create a geologically stable post-mining landform. Ongoing sampling and analysis of waste rock characteristics as it is removed will confirm the geochemical assessment and inform the disposal methodology.

2.3.4 Coal extraction

Once waste rock has been removed to expose the coal seam, coal will be extracted via truck and shovel. The coal will be hauled to the CHPP. Crushing and screening will be completed as part of the CHPP raw coal handling circuit.

Coal extraction in the north and main pit are expected to begin in the first year of operations, with the completion of extraction expected in year 3 for the north pit and year 7 for the main pit. Extraction at the southern pit is expected to begin in year 5 and be complete in year 7. Backfilling of each pit will occur progressively, whereby the pit will be completely backfilled once coal extraction is complete.

2.3.5 Coal Handling and Processing Plant

Coal will be processed by a modular coal CHPP. The proposed CHPP will include tailings dewatering technologies to maximise water recycling and to produce a dry tailings waste product for permanent storage within waste rock dumps. No wet tailings wastes or tailings dams are proposed.

The Project will include a modular CHPP to process ROM Coal into a number of marketable products (coking coal and thermal coal). In summary, the CHPP will include:

- A raw coal handling circuit to size ROM coal for further processing and remove incidental wastes;
- A raw coal bypass conveyor to provide the option to direct appropriate quality raw coal to the product stockpile;
- Three CHPP circuits (coarse, secondary coarse and mid-sized) for coal beneficiation, producing a single product stream;
- A tailings thickener to thicken ultrafine reject material; and
- Tailings dewatering technology to dewater tailings to a solid cake for disposal in active waste rock dumps.

The CHPP will produce dual products at any one time with different products produced in campaigns via control of different ROM feed materials. The CHPP will operate 24 hours a day, seven days per week and is anticipated to function for approximately 6 years (it may take 2 years to construct following the beginning of coal extraction until the completion of active mining). If there is an opportunity to commence the highwall trial during the VS construction period, ROM coal extracted from the trial may be handled through the adjacent VCM infrastructure before the construction of the Vulcan South CHPP has been completed.

The following chemicals and hydrocarbons will be required for processes in the CHPP, and will be stored on site:

- 215kL of diesel;
- Anionic flocculant (dry powder) 50m³;
- Cationic flocculant (liquid) 50m³; and
- Acrylate polymer 10m³.

2.3.6 Highwall Mining Trial

The Project includes a small-scale highwall mining trial program in the north of the MLA area. The trial will involve the establishment of four highwall mining benches across a number of hillsides to facilitate extraction of coal utilising a highwall miner (similar to CAT HW300). The highwall mining trial will target up to 750 kt of coal which will be transported by truck to the CHPP via a dedicated haul road within the MLA area. The trial is scheduled to be completed within the first year of mining operations.

The highwall mining trial will commence immediately given minimal infrastructure is required to support it and the trial is anticipated to be completed within a year (2024-2025).

2.4 Decommissioning

Most infrastructure within the project area, including ancillary infrastructure (ROM pad, offices, fuel storage, haul roads and highwall benches), CHPP, Rail loop and TLO will be removed, de-contaminated, rehabilitated and decommissioned to comply with post mining land use (PMLU) milestones.

All infrastructure related waste material, such as concrete, bitumen, tyres and fencing will be demolished/removed and disposed of offsite.

Services, such as water and electricity will also be disconnected and terminated prior to post-closure to comply with rehabilitation milestones required as part of the State approved PRCP Schedule.

As part of the final landform, no final voids are proposed and all open cut pits will be backfilled with overburden material and drainage structures will be implemented on and around the final landform to ensure that the landform is free draining. When sediment dam catchments and mine affected water dams are completely rehabilitated, and water quality monitoring of the runoff has established that it is consistent with natural background conditions, the sediment dam and associated drainage infrastructure will be decommissioned.

In the highwall mining area, completed plunges will be either filled with mine affected water and barricaded or just barricaded and rehabilitation will occur around this.

Diversions will be decommissioned and rehabilitated to comply with PMLU milestone requirements. Existing natural topography will be reinstated to replicate the existing drainage line channels to minimise the impacts associated with the Post-closure Conditions landform.

2.5 Treatment of Contaminated Land

Treatment of contaminated land will be as follows:

- Detailed site investigation report, as required under the *Environmental Protection Act 1994*;
- All contamination is remediated or removed from site;
- Any contamination removed from site has been removed in accordance with relevant regulations; and
- A contaminated land investigation document has been prepared by an approved auditor, containing a site suitability statement that states that land is not contaminated and is suitable to achieve the rehabilitation.

As described above, all infrastructure related waste material, such as concrete, bitumen, tyres and fencing will be demolished/removed and disposed of offsite.

- Other sources of waste generation include the following, which will be disposed at a licenced facility:
- used machinery parts and other scrap metal, such as wire cables;
- expired diesel and lubricants;
- waste oil and filters;
- hydrocarbon drums;
- sewage;
- gaseous emissions;
- general waste;
- wooden pallets.

2.6 Rehabilitation

The Vulcan South Progressive Rehabilitation and Closure Plan (PRCP), describes the rehabilitation activities for the Project. Progressive rehabilitation will commence within the first 12 months following the completion of the highwall mining trial which is expected to commence immediately. Progressive rehabilitation within the active mining pit will occur for all three pits. The PRCP includes a rehabilitation Schedule indicating the timing of rehabilitation activities across the Project's rehabilitation areas.

3 Statutory Requirements and Licences

3.1 Environmental Protection Act 1994

The *Environmental Protection Act 1994* (EP Act) is an important element of Queensland's environmental legal system. Its objective is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains ecological processes (ecologically sustainable development).

The EP Act and its subordinate legislation provides a range of mechanisms to ensure this objective is met. These mechanisms range from a licensing system for environmentally relevant activities (ERAs) called an Environmental Authority (EA), through to response mechanisms such as environmental protection orders.

3.1.1 Environmental Authority

In Queensland, an EA is required to undertake an ERA. ERAs are industrial, resource or intensive agricultural activities with the potential to release contaminants into the environment. They include a wide range of activities such as aquaculture, sewage treatment, cattle feed lotting, mining, and resource activities such as petroleum (which includes coal seam gas), geothermal and greenhouse gas storage activities.

P-EA-100265081 authorises three ERAs to occur on ML 700073 which include:

- Schedule 3 ERA 13 - Mining Black Coal;
- Schedule 2 ERA 31 (2): Mineral Processing, in a year, the following quantities of mineral products, other than coke – (b) more than 100,000 t; and
- Schedule 2 ERA 33 - Crushing, grinding, milling or screening more than 5,000 t of material in a year.

P-EA-100265081 outlines all conditions which must be adhered to when undertaking any construction, operational, or rehabilitation activities within ML 700073. Should Vitrinite propose to implement significant departures from this description, amendment of the EA may be required (even if the conditions do not require amendment).

Along with the broader environmental duty requirements of the legislation outlined above, the Project EA is the underlying site-specific environmental compliance document that site personnel need to administer.

The Project's EA (P-EA-100265081) is provided in **Appendix A**.

Flow charts for the management and compliance of surface and groundwater at the Project are provided in **Appendix B**.

3.1.2 Regulations and Policies under the EP Act

Under the EP Act, several environmental protection policies exist to guide the assessment, management and protection of specific aspects of the environment. There are approved policies for the air environment, acoustic environment, and for water and wetland biodiversity.

The following subordinate legislation supports the operation of the EP Act:

Environmental Protection Regulation 2019—prescribes the detail for processes contained in the EP Act. For example, the EP regulation contains the list of prescribed ERAs which are regulated under the EP Act and prescribes the fees to be paid, such as application fees and annual fees for ERAs.

Environmental Protection (Air) Policy 2019—The purpose of this policy is to achieve the object of the EP Act in relation to the air environment by:

- identifying environmental values to be enhanced or protected;
- stating indicators and air quality objectives for enhancing or protecting the environmental values;
- providing a framework for making consistent, equitable, and informed decisions about the air environment.

Environmental Protection (Noise) Policy 2019—The purpose of this policy is to achieve the object of the EP Act in relation to the acoustic environment by:

- identifying and declaring the environmental values of the acoustic environment;
- stating acoustic quality objectives that are directed at enhancing or protecting the environmental values;
- providing a framework for making consistent, equitable, and informed decisions that relate to the acoustic environment.

Environmental Protection (Water and Wetland Biodiversity) Policy 2019—The purpose of this policy is to achieve the object of the EP Act in relation to waters and wetlands by:

- identifying environmental values for waters and wetlands to be enhanced or protected;
- identifying management goals for waters;
- stating water quality guidelines and water quality objectives for enhancing or protecting the environmental values of waters;
- providing a framework for making consistent, equitable and informed decisions about waters;
- monitoring and reporting on the condition of waters.

The relevant document pursuant to the EP Water and Wetland Biodiversity Policy for The Project is the *Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No.130 (part)*. The document contains all relevant environmental values (EV) and water quality objectives (WQO) for waters in the Isaac River Sub-basin.

3.2 Other Relevant Legislation

Other relevant State legislation to consider is:

- *Land Act 1994*;
- *Land Regulation 2020*;
- *Nature Conservation Act 1992*;
- *Nature Conservation (Animals) Regulation 2020*;
- *Nature Conservation (Plants) Regulation 2020*;
- *Vegetation Management Act 1999*;
- *Waste Reduction and Recycling Act 2011*;
- *Waste Reduction and Recycling Regulation 2011*;
- *Water Act 2000*; and
- *Water Regulation 2016*.

3.3 Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), provides Commonwealth protection of various Matters of National Environmental Significance (MNES).

The Project was referred under the EPBC Act to the Minister for the Environment on 1 February 2024. The Minister determined on 4 March 2024 that the Project is a controlled action and approval is required as the action has the potential to have a significant impact on the following MNES protected under Part 3 of the EPBC Act:

- Listed threatened species and ecological communities; and
- A water resource, in relation to unconventional gas development and large coal mining development.

To achieve the required environmental offsets, Vitrinite intends to procure, protect and restore areas of land that support the matters that will be impacted by Vulcan South. Identification of suitable land to achieve these goals is well advanced. Vitrinite is in the process of assessing several properties and has confirmed that all prospective properties are suitable to meet the requirements for each applicable MNES. All required species have been identified on the prospective properties. Vitrinite is confident that an appropriate area will be secured and continues to negotiate with associated landholders.

Vitrinite has developed an Environmental Offsets Strategy to articulate and commit to a process that will be undertaken to identify and assess suitable offset sites. Vitrinite will prepare a draft Offset Area Management Plan for approval prior to the approval decision being made by DCCEEW.

The principal means through which offsets will achieve environmental gains for the Koala and Squatter Pigeon is expected to be through the protection of regrowth vegetation that otherwise has a high risk of repeated clearing. This vegetation may already qualify as habitat for these two species at the procurement of the offset(s) or be expected to develop into suitable habitat in the near future. If required, supplementary water points will be installed in the offset area to maximise the amount of foraging and breeding habitat for the Squatter Pigeon and offer drinking sites for Koalas during droughts. As young regrowth is unable to support Central Greater Gliders unless mature, hollow trees were left standing during clearing, suitable offset sites must also contain ample remnant vegetation to provide a source of den sites. Nevertheless, protection of regrowth will have the benefit of increasing connectivity between habitat patches for Central Greater Gliders. Regrowth adjacent to existing den sites also increases food availability for gliders.

While the primary consideration in determining suitable offsets is delivering a conservation gain for the impacted protected matter, the delivery of offsets that establish positive social or economic co-benefits is encouraged by the EPBC Act Environmental Offsets Policy. Three examples provided within the policy include an offset:

- contributing to an area recognised as important to increasing landscape connectivity, above and beyond what is required by the impacted protected matter;
- that employs local Indigenous rangers to undertake management actions; and
- delivered by paying rural landholders to protect and manage land for conservation purposes.

In the event that any significant changes to the Project from the description provided in the EPBC application supporting documentation (site layout as per Error! Reference source not found.) are proposed, re-assessment of the significance of impact on MNES may be necessary to determine if referral under the EPBC Act is required.

4 Environmental Management Framework

The purpose of the overarching environmental management framework is to provide guidance on the appropriate management of potential impacts on environmental values as a result of the Vulcan South Project. This Environmental Management Plan sits within the framework and has been prepared specifically to meet the requirements of the Environmental Management Plan Guidelines released by the DCCEEW. This Environmental Management Plan is informed by the Public Environment Report. There are a number of other assessments that have informed a variety of other management plans as required by the State regulatory authority (DESI). These all sit under the framework in order to capture all requirements and commitments made in relation to the Vulcan South Project.

4.1 Environmental management roles and responsibilities

The implementation of the EMP requires Vitrinite to clearly define roles and responsibilities of key personnel, commit to staff training, maintain effective communication channels, adopt effective document and operational controls, and maintain sufficient awareness on environmental emergency preparedness among the staff.

Brief descriptions of each of the positions relevant to The Project EMP are provided below.

4.1.1 Site Senior Executive

The Site Senior Executive has the responsibility and authority for:

- Overall responsibility for environmental compliance of EA and EPBC approval conditions and broader environmental legislation;
- Accountable for the management structure and ultimately environmental compliance; and
- Overall financial control and assigns budget and funding for environmental compliance.

4.1.2 Construction Manager

The Construction Manager has the responsibility and authority for:

- Ensuring the EMP requirements are established, implemented and maintained in accordance relevant standards;
- Maintaining awareness of the environmental legislative requirements associated with the Project and taking measures to ensure compliance;
- Regularly reviewing the effectiveness of the EMP, and ensuring that the necessary changes are made;
- Responsible for the upload and management of environmental data;
- Liaison with regulatory authorities and the community in relation to environmental matters including external reporting requirements contained within the EA and EPBC approval; and
- Responsible for implementing appropriate management and monitoring measures including the permit to disturb process.

4.1.3 Operations Manager

The Operations Manager has the responsibility and authority for:

- Ensuring the EMP requirements are established, implemented and maintained in accordance relevant standards;
- Maintaining awareness of the environmental legislative requirements associated with The Project and taking measures to ensure compliance;
- Regularly reviewing the effectiveness of the EMP, and ensuring that the necessary changes are made;
- Responsible for the upload and management of environmental data;

- Liaison with regulatory authorities and the community in relation to environmental matters including external reporting requirements contained within the EA and EPBC approval; and
- Responsible for implementing appropriate management and monitoring measures including the permit to disturb process.

4.1.4 Environmental Officer

The Environmental Officer has the responsibility and authority for:

- Periodical environmental sampling, monitoring and inspections;
- Identifying and reporting results and non-compliances to the Safety, Health, Environment and Training Superintendent; and
- Undertaking various support roles for the Construction/Operations Manager.

4.1.5 Supervisors

Supervisors are responsible for:

- Ensuring all operations under their supervision are undertaken in accordance with the environmental policy and EMP; and
- Ensuring all employees and contractors under their supervision are appropriately trained and informed regarding their environmental responsibilities.

4.1.6 All Site Workers

All Site Workers are responsible for:

- Working in accordance with the *EP Act 1994*, environmental policy and EMP;
- Being responsible and accountable for the environmental impact of the work they perform; and
- Reporting environmental issues to their supervisor.

4.2 Environmental training

All site personnel and sub-contractors will be required to complete induction modules on all aspects of the Project, including the management of environmental impacts. The inductions will stress the importance of protecting undisturbed habitat areas, being familiar with boundaries of the disturbance footprint and avoiding impacts to threatened species and ecological communities where possible.

Training opportunities for site personnel will include inductions, pre-start meetings, toolbox talks, and required targeted training for their positions. Specific training for those undertaking activities that may impact on surface and groundwaters will be needed, particularly the procedure for determining most appropriate erosion and sediment control methods to install.

Vitrinite will ensure that appropriately qualified personnel (AQP) undertake monitoring, reporting and recommending corrective actions. This will require keeping a register of qualifications of each AQP undertaking these activities on site.

4.3 Auditing and review

Internal audits will be conducted quarterly and be informed by internal monthly reporting. Annual audits will be carried out by an independent AQP against the requirements of this EMP (and in conjunction with other management plans).

Monthly management review meetings will look at the effectiveness of implementation of this EMP and other management plans. The review will check achievement of performance criteria, results of monitoring, response to incidents, and review progressive rehabilitation targets. Planned engagement with stakeholders and the public will be reviewed as well as progress on progressing any complaints.

The document control system onsite will ensure current documentation is used. Environmental records collected as a result of this EMP will be kept in the document control system for reference for the required period of time. These records will include:

- Training records/register
- Monitoring data
- Inspection checklists/records
- Complaints, communication records and resolution outcomes
- Environmental audit reports
- Review meeting minutes and reports.

4.4 Emergency contacts and procedures

An Emergency Response Plan will be prepared to prevent serious environmental incidents from spills of coal/oil/diesel and other hazardous materials, fire and natural hazards. The objective of the Emergency Response Plan is to identify and reduce the potential for an environmental incident to occur and to provide procedures for a prompt and effective response in the event an environmental incident does occur. The Emergency Response Plan will be prepared in consultation with local authorities and emergency services prior to construction activities commencing onsite and the Senior Site Executive will be responsible for its implementation. It will also be necessary to provide appropriate training to all onsite workers, and specific training to first responders on site.

5 Potential environmental impacts and risks

5.1 Matters of National Environmental Significance

The MNES identified as confirmed to be present, likely to be present or may occur, and therefore potentially impacted by the Vulcan South Project are:

- Flora
 - Brigalow TEC (*Acacia harpophylla* dominant and co-dominant) (endangered)
 - King Blue-grass (*Dichanthium queenslandicum*) (endangered)
 - Annual Wiregrass (*Aristida annua*) (vulnerable)
 - Hairy Bluegrass, bluegrass (*Dichanthium setosum*) (vulnerable)
- Terrestrial fauna
 - Greater Glider (*Petauroides volans*) (endangered)
 - Koala (*Phascolarctos cinereus*) (endangered)
 - Northern Quoll (*Dasyurus hallucatus*) (endangered)
 - Australian Painted-snipe (*Rostratula australis*) (endangered)
 - Latham's Snipe (*Gallinago hardwickii*) (vulnerable)
 - Squatter Pigeon (*Geophaps scripta scripta*) (vulnerable)
 - White-throated Needletail (*Hirundapus caudacutus*) (vulnerable)
 - Ornamental Snake (*Denisonia maculata*) (vulnerable)
 - Yakka skink (*Egernia rugosa*) (vulnerable)
 - Red Goshawk (*Erythrotriorchis radiatus*) (vulnerable)
 - Ghost Bat (*Macroderma gigas*) (vulnerable)
- Migratory birds
 - Gull-billed Tern (*Gelochelidon nilotica*)
 - Rufous Fantail (*Rhipidura rufifrons*)
 - Fork-tailed Swift (*Apus pacificus*)
 - Oriental Cuckoo (*Cuculus optatus*)
 - Black-faced Monarch (*Monarcha melanopsis*)
 - Satin Flycatcher (*Myiagra cyanoleuca*)
 - Glossy Ibis (*Plegadis falcinellus*)
 - Sharp-tailed Sandpiper (*Calidris acuminata*)
- Surface water resources – five water access licence holders, surface water values as described in the Public Environment Report (PER)
- Groundwater resources – majority of registered bores used for investigation and monitoring, no local bores used for water supply, groundwater values as described in the PER.

5.2 Potential Impacts

All phases of the Vulcan South Project, construction, operation, decommissioning/rehabilitation, have the potential to impact on the MNES identified in the previous section. These impacts may be direct (such as vegetation/habitat clearing) or indirect (such as weeds). These potential impacts, as identified in the PER, are discussed below. Note that maps showing the location of habitat for each potentially impacted species and ecological community are provided in the PER.

5.2.1 Direct Impacts

5.2.1.1 Vegetation clearing and habitat loss

The clearing of vegetation and other habitat features within the Project area is likely to cause almost complete site alienation for all listed species, with the most likely exception being the squatter pigeon which may continue to utilise water resources within the disturbed area and forage along roads and in other suitable areas.

Habitat will be removed with a duration of approximately 19 years, due to the length of time required to successfully rehabilitate most habitat to be able to support breeding and feeding. The direct mortality risk from clearing is expected to span 24 months. The significant residual impact assessment undertaken in the PER found that during clearing activities, for most MNES threatened species, there is sufficient moderate-good quality habitat in neighbouring areas such that viable populations will be maintained for later recruitment into rehabilitated areas. However, with the removal of critical habitat, a significant residual risk may occur for the Brigalow TEC, Koala, Squatter Pigeon, and Greater Glider.

5.2.1.2 Vehicle Strike

The introduction of vehicles, machinery and trucks moving within the project area has the potential to result in injury or mortality to any species. Greater Gliders are unlikely to be struck by vehicles under normal circumstances due to their primarily arboreal nature, coming to ground only when under considerable duress. Koalas are known to be susceptible to vehicle strike when attempting to cross road corridors. Vehicle strike may occur during all phases of the project however the operational phase will involve the most truck movements.

5.2.1.3 Predation

Eight species of non-native animals were recorded within the survey area including Feral Cat (*Felis catus*), Red Fox (*Vulpes vulpes*), Dingo (*Canis lupus dingo*), European Rabbit (*Oryctolagus cuniculus*), House Mouse (*Mus musculus*), Feral Pig (*Sus scrofa*), Cane Toad (*Rhinella marina*), and Common Myna (*Acridotheres tristis*). The Feral Cat, Red Fox, Dingo and Cane Toad may cause mortality to threatened species, however, it has been determined that the Vulcan South Project will not add to the populations of feral cats, dogs and foxes. Food waste management is already suitably implemented in management plans and will not attract predator species.

Four species of owl are known to predate the Greater Glider: The powerful owl (*Ninox strenua*), masked owl (*Tyto novahollandiae*), rufous owl (*Ninox rufa*) and the sooty owl (*Tyto tenebricosa*). The Project is outside the known distribution of the powerful, sooty and rufous owl, while habitat is not considered suitable for the masked owl.

5.2.1.4 Illegal shooting

Shooting of birds is considered a direct impact to the species. This could occur anywhere at any time. Firearms are not allowed within the mining lease. The only possibility of illegal shooting comes with illegal entry to the property. Given that illegal shooting is already unlikely overall, the likelihood of it occurring on the property given access limitations and firearm bans makes this highly unlikely.

5.2.1.5 Other direct mortality impacts

During rehabilitation, there is a low possibility of stock trampling the nests of Squatter Pigeons. Squatter Pigeons are known to coexist readily with cattle. The low intensity grazing proposed during rehabilitation is consistent with current grazing which supports a reasonable sedentary population of squatter pigeons. It should be noted that cattle farming, by the provision of

water points, thinning of understorey vegetation and addition of plants that produce seeds eaten by the squatter pigeon is generally considered to be beneficial to the species overall and counteract any small chance of trampling.

Although barbed wire entanglement can occur at any time, it is extremely unlikely during construction, operation and maintenance as all of the habitats will be cleared and therefore there will be no Greater Gliders present to be entangled, or trees available for the species to glide from. Mortality is certain for entangled gliders if not rescued in a timely manner. Entanglement is most likely to occur once the trees have grown to a sufficient size for dispersal, or approximately 20 years following mine conception onwards, even then the most likely individuals to be entangled would be dispersing young males.

5.2.1.6 Direct impacts to surface water resources

Preliminary baseline monitoring indicates that water quality in the surrounding environment is of poor quality. The surrounding catchment areas are considered heavily disturbed by agriculture and operational mining activities. Much of the proposed mining area has altered flow regimes and changes to the stream geomorphology due to the downstream area being located within the operational Peak Downs coal mine. Third party users utilise surface water for nearby mining activities (Peak Downs operational coal mine) and other industrial activities. In consideration of the already heavily disturbed nature of the adjoining downstream catchment, it is unlikely that Project releases will have a measurable impact on receiving water quality or environmental values.

Overall, the impact of the Project on the hydraulic characteristics of Boomerang Creek, Hughes Creek and their tributaries do not affect the existing conditions significantly. It is expected that the channel and floodplain will undergo little, if any, adjustment to the hydraulic conditions upstream or downstream of the Project as result of the Project. The extent of flooding during the final landform configuration are generally confined within the Project area.

Third party downstream users are not expected to be impacted by the Project. **Figure 5-1** shows the location of surface water resources in relation to the Project area including Boomerang Creek, East Creek, Hughes Creek, Plumtree Creek, Barrett Creek and various unnamed drainage lines. Also shown on this figure are the monitoring locations both upstream and downstream used for baseline monitoring and conditioned in the EA.

5.2.1.7 Direct impacts to groundwater resources

The effected groundwater resource is generally of poor quality (brackish to highly saline), within a low permeability environment with a relatively deep groundwater level beneath drainage features and potential GDEs. The groundwater levels do not appear to be influenced by seasonal effects and therefore they are not sensitive to recharge. The groundwater resource directly impacted by the project and surrounding projects is not regulated, the impacted strata is not considered to be a high yielding or high-quality groundwater resource.

The magnitude of drawdown is limited to approximately 10 m within the immediate vicinity of the open pits. The extent of drawdown is limited to within 2 km of the open pit crests and extends towards the approved area of disturbance at the adjacent BHP mines. The take of groundwater as a result of the project is negligible when compared to the take of groundwater from approved mining operations. The drawdown will not affect any GDEs outside of the Project's disturbance footprint (**Figure 5-2**). As the pits will be backfilled, no residual drawdown is expected following the cessation of the project. No remnant vegetation outside the project's clearing footprint is found within the zone of drawdown.

5.2.2 Indirect Impacts

5.2.2.1 Weeds

Land disturbance and the movement of soils, vehicles and people between areas can promote weed invasion. There is a risk that the Vulcan South Project could encourage invasion by the seven restricted weeds recorded within the survey area. Controls must be in place to manage the risks posed by Rubber Vine, Harrisia Cactus, Prickly Pear, Velvet Pear and Parthenium to avoid being in violation of Queensland's *Biosecurity Act 2014*. While there are no legal obligations to manage non-declared weeds on site, the potential for these to spread and reduce habitat quality for threatened species must be considered when assessing

the significance of impacts to individual matters. Non-native plants such as Buffel Grass, Indian Couch, Sabi Grass and Natal Grass are already abundant and widespread on site and have likely already reached the limits of their potential local distribution (limited by soil type and moisture availability). Impacts, if applicable, would be short term and only occur for a maximum of 8 years.

5.2.2.2 Noise, vibration and airblast overpressure

Noise from traffic and industrial sources can have detrimental impacts on fauna (Shannon, *et al.*, 2016; Cunnington & Fahrig, 2010; Barber, *et al.*, 2010). The Project is located on a busy highway (Saraji Road), immediately west of a large mining operation. The increase in noise resulting from the Project is therefore expected to be negligible relative to existing background noise. Nevertheless, there may be localised disturbance from noise where operational areas are close to (e.g., within 500 m of) habitats for threatened fauna (e.g., Greater Gliders, Koalas). Any effects of noise will be restricted to the operational life of the Project.

Noise, vibration and airblast overpressure from blasting activities have the potential to disturb threatened species near the disturbance footprint and the open pits in particular. This may result in behavioural changes impacting the species' normal routines. These impacts will be temporary and are unlikely to be significant. Blasting in accordance with the applicable Australian Standard and conditions of the EA will ensure the impacts are not significant.

5.2.2.3 Artificial lighting

The Project will operate 24 hours per day, which requires flood-lighting around operational areas. Artificial lighting can impact fauna through interfering with the navigation of nocturnal species (Howell, *et al.*, 1954; Salmon, *et al.*, 1995; Poot, *et al.*, 2008; Longcore, *et al.*, 2012) interrupting natural patterns of sleep and cell repair (Ben-Shlomo & Kyriacou, 2010), exposing nocturnal prey to elevated predation risks (Baker & Richardson, 2006; Rotics, *et al.*, 2011; Davies, *et al.*, 2012) disturbing the timing of daily movements.

Artificial lighting will be an impact during operational and decommissioning/rehabilitation phases. During construction, night work will not occur.

5.2.2.4 Dust

Dust can impact nearby vegetation by blocking photosynthesis and increasing leaf temperature; both impacts can reduce drought tolerance (Farmer, 1993). Dust that is severe enough to inhibit plant growth is only likely where vegetation is close to (within 100 m of) the source (roads, operational areas).

Koalas and Greater Glider feed on new plant growth. It is possible dust could reduce food availability for these species. However, such effects would only occur close to highly disturbed areas, which these species will most likely avoid for other reasons (noise, light). Therefore, minimal effects from dust on these species are anticipated.

Squatter Pigeons are more likely to utilise the disturbance footprint during construction and operation. They are not anticipated to be greatly affected by dust given they are known to exist in very disturbed areas, including cattle yards where dust is usually present in high quantities. Therefore, besides the nuisance dust may cause, its unlikely to create any negative direct effects beyond which the species naturally is exposed to. Cattle farming, by the provision of water points, thinning of understorey vegetation and addition of plants that produce seeds eaten by the Squatter Pigeon is generally considered to be beneficial to the species overall and counteract any negative effects of dust.

An area of 47.8 ha of Brigalow (*Acacia harpophylla* dominant and co-dominant) is located within 500 m of the project's footprint boundary and may experience temporary effects of dust beyond the project's footprint. This is anticipated to last for approximately 3 years, coinciding with the clearing and operation of the north pit, which is adjacent to this habitat.

5.2.2.5 Fire

The potential area of impact could be considered the entire mining lease. During construction there is some probability of fires being lit by activities such as hot works (welding, grinding) or vegetation ignition from trapped twigs and leaves in bulldozer exhaust within intact areas. These areas, if connected by flammable vegetation to nearby habitat may have the potential to

allow fire to spread. The risk, however low, is expected to last for less than a year, after which it is expected that sufficient clearing will have allowed for the creation of ample firebreaks.

Areas within the Project footprint will not be vegetated, and as a result are less likely than prior to clearing to be a source of ignition, particularly considering the strict controls in place to prevent fires in coal mines.

Rehabilitation will add some risk of fire, particularly during the early stages when ground cover and shrubs are at their most dense, and only during the dry season. This slightly elevated risk is expected to last 2-5 years.

During all Project stages, mortality may occur if a fire burns hot enough to directly affect terrestrial fauna, though for the majority of the local habitat the fuel density is too low for this to be a significant risk.

5.2.2.6 Climate change

Potential indirect impacts from climate change may include increased temperatures, changes to rainfall patterns, increased intensity or frequency of drought. If weather patterns are to become more hostile to the survival of habitats that would support the listed MNES, it is unlikely that the project would exacerbate impacts on its own. The habitats along riparian areas are unlikely to be affected, though the broader area where habitat is marginal is likely to be negatively affected by reduced rainfall.

5.2.2.7 Groundwater and surface water contamination and groundwater drawdown

The Koala and Greater Glider has the potential to be impacted by groundwater contamination indirectly through the negative impact it can have on the ability for Terrestrial GDE species (*E. camaldulensis* and *E. tereticornis*) to absorb nutrients through their roots and therefore, can result in the stunted growth of these important feeding and sheltering species.

The Groundwater modelling has indicated that any effects of groundwater drawdown will be largely limited to only the area within the footprint.

Increased erosion and sedimentation of waterways may alter surface water flows and local hydrological regimes. This in turn may impact on habitat for aquatic and terrestrial species.

5.3 Water Quality Monitoring

The Project will have a groundwater and surface water monitoring program operating throughout all phases of the Project. The proposed surface water monitoring and groundwater locations are displayed in **Figure 5-1** and **Figure 5-3**, respectively. Surface water and groundwater quality objectives as per the approved EA100265081 are provided in **Table 5-1** and **Table 5-2**, respectively. Additionally, Standing Water Level trigger thresholds are presented in **Table 5-3**.

Table 5-1 Surface Water Quality Objectives (Vulcan South EA100265081)

Quality characteristic (units)	Sediment dam trigger value	Downstream monitoring point trigger value	Source	Frequency
pH	6.5-8.5	6.5-8.5	EPP WQO (aquatic ecosystems)	Monthly and daily during release (the first sample must be taken within 2 hours of commencement of release).
Electrical Conductivity (µS/cm)	864*	Baseflow: 720 Medium flow: 500 High flow: 250	EPP WQO	
Turbidity (NTU)	60*	50	EPP WQO	
Total Suspended Solids (mg/L)	102^	85	EPP WQO	

Quality characteristic (units)	Sediment dam trigger value	Downstream monitoring point trigger value	Source	Frequency
Sulphate as SO ₄ (mg/L)	37#	25	EPP WQO	
Ammonia (µg/L)	900	900	ANZG 2018	
Nitrate (µg/L)	1100	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for Total Nitrate	
<i>Filtered metals and metalloids</i>				
Aluminum (µg/L)	192*	160	Locally derived	Monthly
Arsenic (µg/L)	16*	13	ANZG 2018	and
Lead (µg/L)	4.1*	3.4	ANZG 2018	Commencement of release and thereafter weekly during release.
Mercury (µg/L)	0.72*	0.6	EPP WQO (aquatic ecosystems)	
Molybdenum (µg/L)	40.8*	34	EPP WQO (aquatic ecosystems)	
Selenium (µg/L)	6*	5	ANZG 2018	

Notes:

All metals and metalloids must be measured as 'dissolved' (from analysis of a field filtered sample) and total (unfiltered). Limits for metals and metalloids apply to dissolved results.

*20% increase on trigger value

95th percentile site specific

^locally derived trigger values (80th percentile values of natural surface water monitoring).

Table 5-2 Groundwater Quality Objectives (Vulcan South EA100265081)

Parameter	Unit	Bores	Limit	Comment
pH (field)	pH unit	All bores	5.5-8.0	ANZG (2018)
* Electrical Conductivity (Field)	(µS/cm)	MB01R^	16,000*	EPP WQO
		MB07	5,791	Site-specific 95 th percentile
		MB09	12,007	Site-specific 95 th percentile
		MB10	4,102	Site-specific 95 th percentile
		MB12	22,872	Site-specific 95 th percentile
		MB12R^	16,000*	EPP WQO
		MB14	16,000*	EPP WQO
		MB15	16,000*	EPP WQO
		MB16	16,000*	EPP WQO
		MB17	16,000*	EPP WQO

Parameter	Unit	Bores	Limit	Comment
		MB18	16,000*	EPP WQO
Sulphate	Mg/L	MB01R^	398	EPP WQO
		MB07	707	Site-specific 95th percentile
		MB09	769	Site-specific 95th percentile
		MB10	418	Site-specific 95th percentile
		MB12	874	Site-specific 95th percentile
		MB12R^	398*	EPP WQO
		MB14	398*	EPP WQO
		MB15	398*	EPP WQO
		MB16	398*	EPP WQO
		MB17	398*	EPP WQO
		MB18	398*	EPP WQO
Dissolved Metals and metalloids				
Aluminium	mg/L	All bores	0.055	ANZG (2018)
Arsenic	mg/L	All bores	0.013	ANZG (2018)
Barium	mg/L	All bores	0.10	Site-specific 95th percentile (grouped)
Boron	mg/L	All bores	0.66	Site-specific 95th percentile (grouped)
Cobalt	mg/L	All bores	0.004	Site-specific 95th percentile (grouped)
Copper	mg/L	All bores	0.0014	ANZG (2018)
Iron	mg/L	MB01R^	0.246*	EPP WQO
		MB07	0.46	Site-specific 95th percentile
		MB09	0.38	Site-specific 95th percentile
		MB10	0.2	Site-specific 95th percentile
		MB12	4.94 [#]	Site-specific 95th percentile
		MB12R^	0.246*	EPP WQO
		MB14	0.246*	EPP WQO
Lead	mg/L	All bores	0.0034	ANZG (2018)
Mercury	mg/L	All bores	0.0006	ANZG (2018)
Molybdenum	mg/L	All bores	0.034	ANZG (2018)
Selenium	mg/L	All bores	0.005	ANZG (2018)
Strontium	mg/L	MB01R^	TBD	Site-specific 95th percentile
		MB07	2.2	Site-specific 95th percentile

Parameter	Unit	Bores	Limit	Comment
		MB09	5.7	Site-specific 95th percentile
		MB10	1.2	Site-specific 95th percentile
		MB12	8.4	Site-specific 95th percentile
		MB12R [^]	TBD*	Site-specific 95th percentile
		MB14	TBD*	Site-specific 95th percentile
		MB15	TBD*	Site-specific 95th percentile
		MB16	TBD*	Site-specific 95th percentile
		MB17	TBD*	Site-specific 95th percentile
		MB18	TBD*	Site-specific 95th percentile
Uranium	mg/L	MB01R [^]	0.0005*	ANZG 2018
		MB07	0.003	Site-specific 95th percentile
		MB09	0.005	Site-specific 95th percentile
		MB10	0.0005*	ANZG 2018
		MB12	0.0005*	ANZG 2018
		MB12R [^]	0.0005*	ANZG 2018
		MB14	0.0005*	ANZG 2018
		MB15	0.0005*	ANZG 2018
		MB16	0.0005*	ANZG 2018
		MB17	0.0005*	ANZG 2018
		MB18	0.0005*	ANZG 2018
TRH (C6-C10)	µg/L	All bores	<20	LOR
TRH (C10-40)	µg/L	All bores	<50	LOR
Major Ions				
Major ions (mg/L) (calcium, chloride, potassium, magnesium, sodium, bicarbonate, carbonate)	mg/L	All bores	For interpretation purposes only	
Hardness	Mg/L	All bores	For interpretation purposes only	

All metals and metalloids must be measured as 'dissolved' (from analysis of a field filtered sample) and total (unfiltered). Limits are based on 'dissolved' measurements.

* Site-specific limits are to be provided in accordance with condition E11.

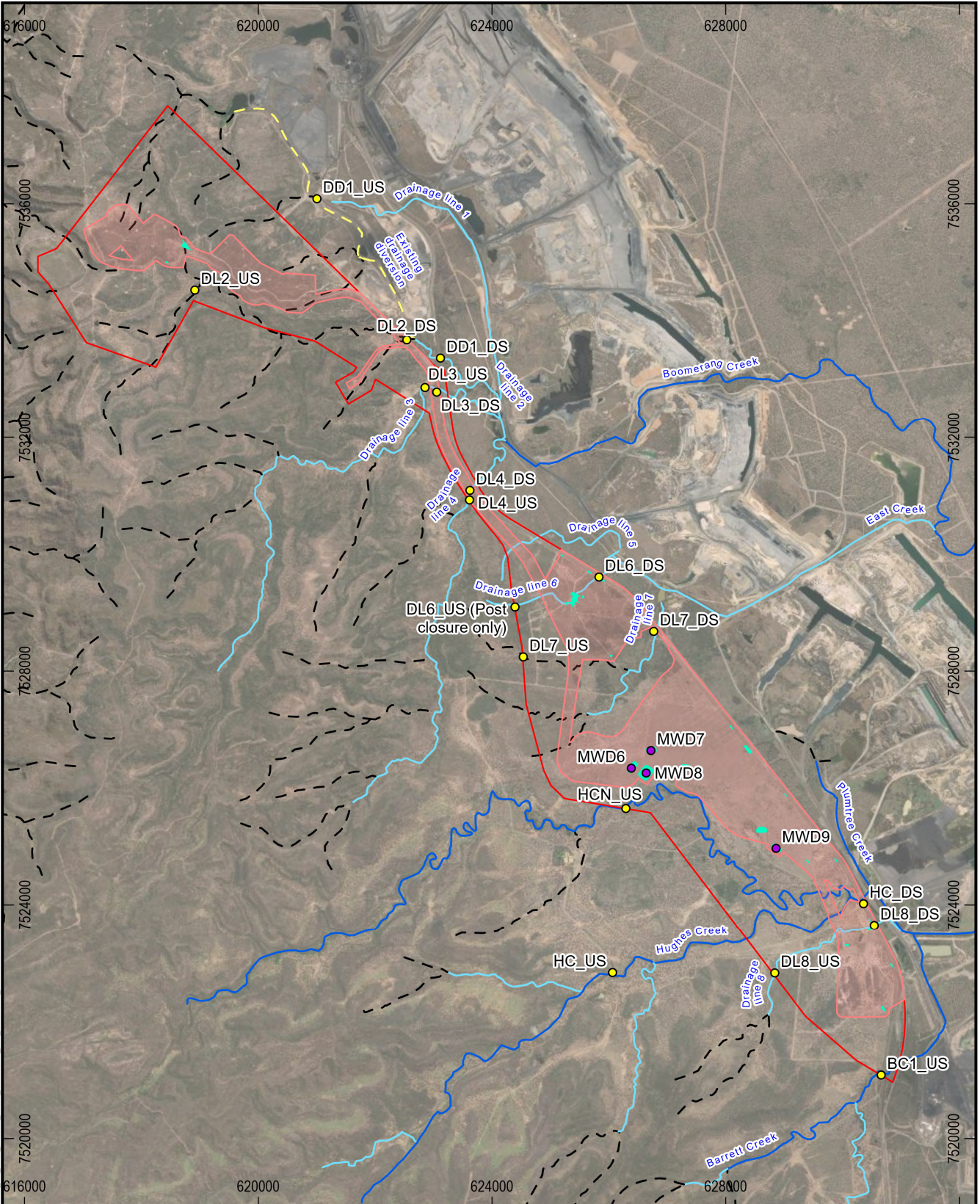
[^] indicates replacement bores to be installed to replace dry bores and bores that require relocation due to mining activities.

Requires additional investigation to ensure it is indicative of background conditions.

EPP WQO: Groundwater quality parameters derived from EPP (water) policy 2009 Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Isaac River Sub-basin (including Connors River), Zone 34-deep (80th percentile).

Table 5-3 Groundwater Standing Water Level Thresholds

Monitoring location	Hydrogeological unit	Baseline water level	SWL trigger threshold (mAHD)
MB01R	DLL coal seam	TBD	TBD
MB07	Weathered Permian	180.1	168.14
MB09	DLL coal seam	181.38	175.63
MB10	DLL coal seam	182.66	175.67
MB12	Back Creek Group	215.83	213.14
MB12R	Back Creek Group	TBD	TBD
MB14	TBD	TBD	TBD
MB15	TBD	TBD	TBD
MB16	TBD	TBD	TBD
MB17	TBD	TBD	TBD
MB18	TBD	TBD	TBD



Path: S:\Projects\0101_VCP_Stage2\ArcGIS\ProjectFiles\Project\EMR\011_VS_EMP_Surface_Water_Resources_and_Monitoring_Locations.aprx
 Source: WRM 2023, State of Queensland (Department of Resources) 2021-2024, Vitrinite 2023-2024, METServe 2023-2024, Earthstar Geographics 28/09/2023.

Legend

Project Area (ML 700073)	Mine water dam monitoring location
Disturbance Footprint	Local Drainage Features
Dams	Minor Drainage Features
Proposed Surface Water Monitoring Locations	Drainage Features
Receiving water monitoring site	Drainage Diversion
	Watercourse

Vulcan South Surface Water Resources and Monitoring Locations

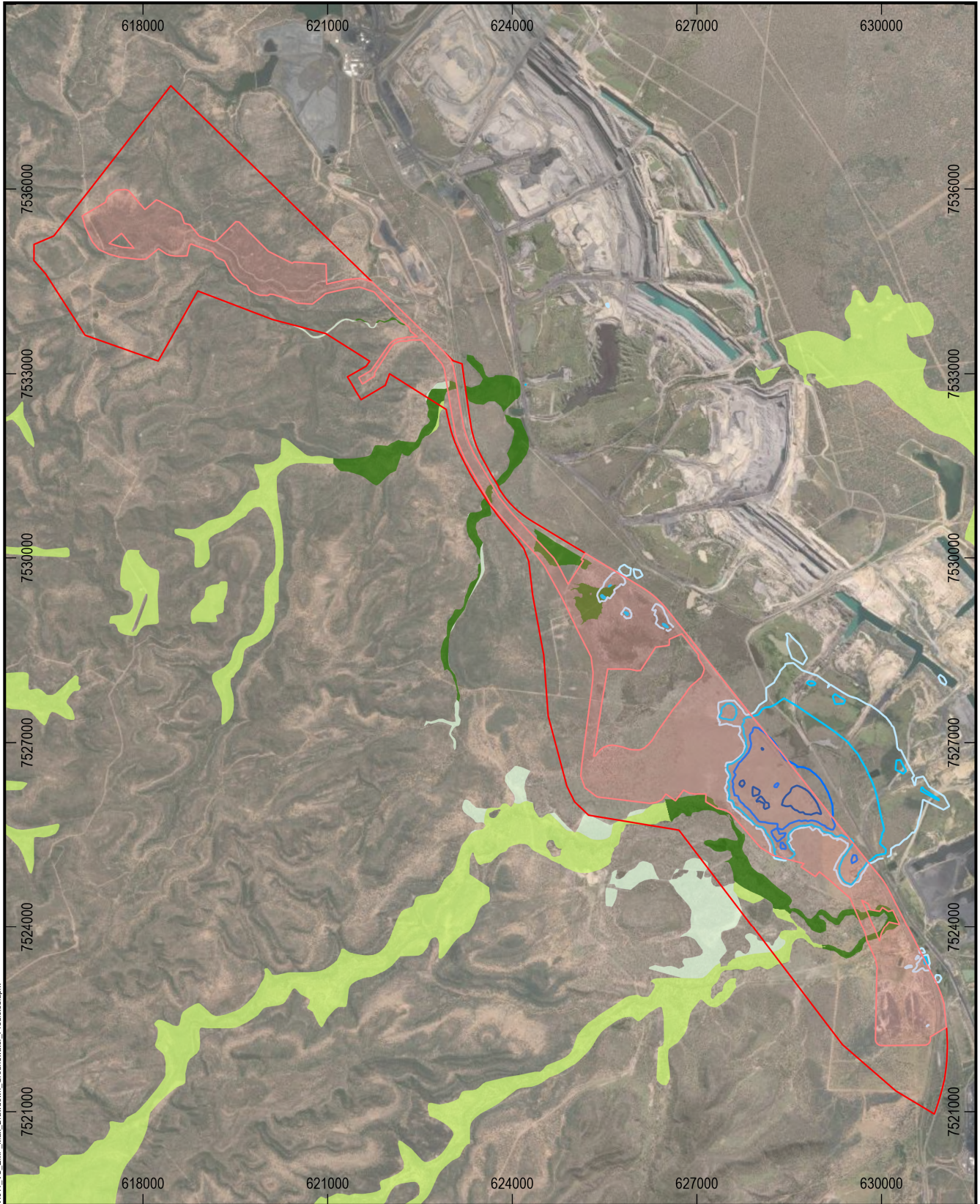
Kilometers

Scale: 1:95,000 (A4)

24/07/2024

Datum: GDA2020
Projection: MGA55

FIGURE 5-1

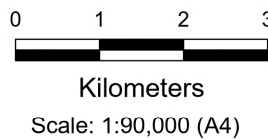


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Legend

- | | |
|--|--|
| Vulcan South Coal Mine (2023/09708) | Predicted Drawdown (m) |
| Project Area (ML 700073) | 1m |
| Disturbance Footprint | 2m |
| Groundwater Dependent Ecosystems | 5m |
| High potential GDE | 10m |
| Moderate potential GDE | |
| Low potential GDE | |

**Vulcan South
Maximum Drawdown of
Groundwater Predicted**



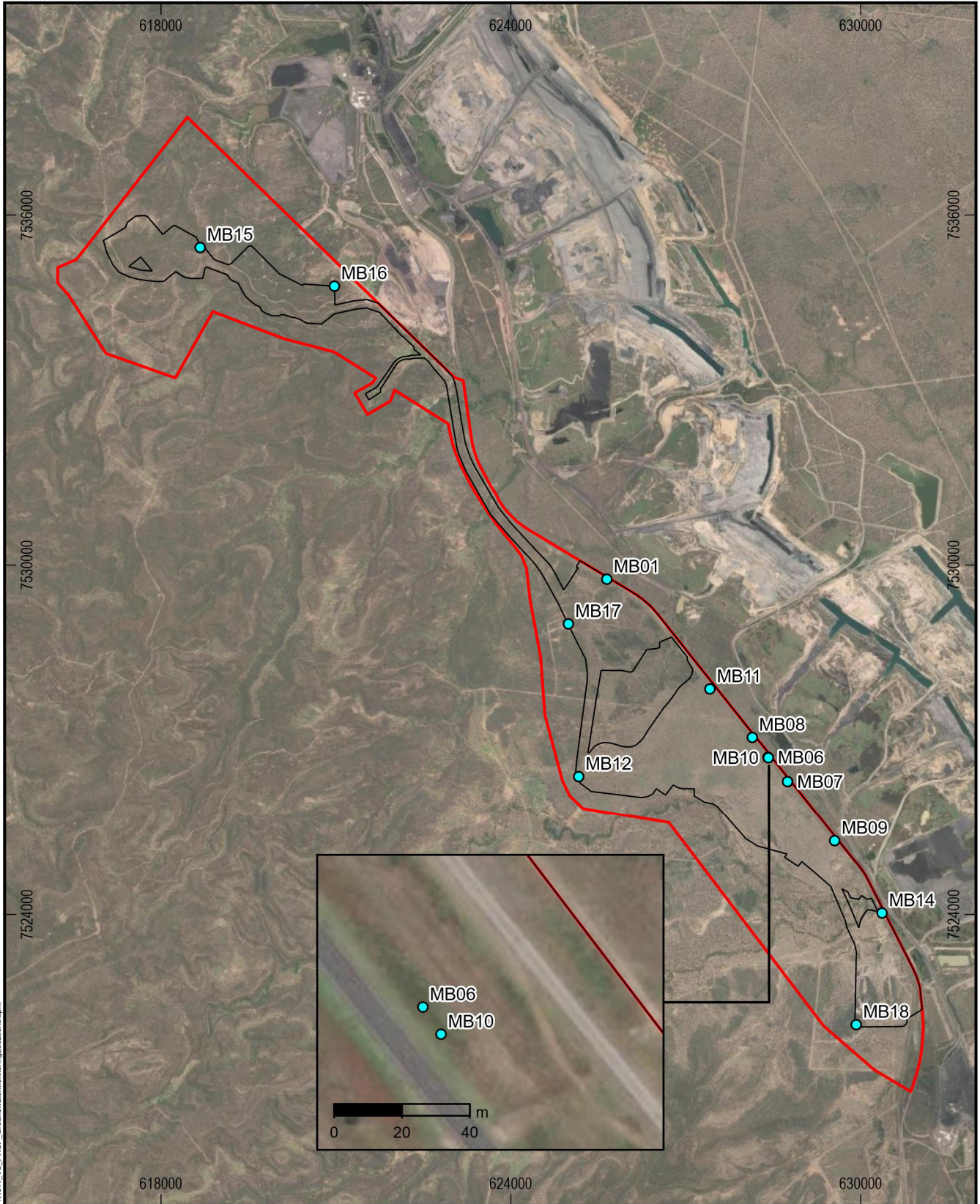
24/07/2024

Datum: GDA2020
Projection: MGA55

FIGURE 5-2



Source: Bureau of Meteorology 2012, Hydrogeologist.com.au 2020, Vitrinite 2023-2024, METSERVE 2023-2024, Esri, Maxar, Earthstar Geographics 28/09/2023.



Path: S:\Projects\W011_VCP_Stage2\ArcGIS\ProjectFiles\Projects\MonitoringLocations.aprx

Legend

- Groundwater Monitoring Bores
- Vulcan South Maximum Disturbance Footprint
- MLA Boundary

Source: Geoscience Australia 2020, hydrogeologist.com.au 2023, Vitrinite 2022, METServe 2023, Earthstar Geographics, Maxar, Esri, and the GIS User Community.

Vulcan South

Groundwater Monitoring Locations

0 1 2 3

Kilometers

Scale: 1:95,000 (A4)

7/12/2023

Datum: GDA2020
Projection: MGA55

VITRINITE
BRIGHTER COAL

METSERVE
Mining & Energy Technical Services Pty Ltd

FIGURE 5-3

5.4 Risk Assessment

This section estimates the likelihood and consequences of each potential impact identified above. Risks are scored based on definitions in **Table 5-1**. Evaluation criteria are shown in **Table 5-2**. Risks specific to each potential impact have been identified in **Table 5-3**.

Table 5-4 Risk assessment matrix

Likelihood of Occurrence (L)	Severity of Consequence				
	Catastrophic – widespread damage (5)	Major – long term impact (4)	Moderate – medium term impact (3)	Minor – short term impact (2)	Insignificant (1)
Almost certain (5)	10	9	8	7	6
Likely (4)	9	8	7	6	5
Possible (3)	8	7	6	5	4
Unlikely (2)	7	6	5	4	3
Rare (1)	6	5	4	3	2

Table 5-5 Risk evaluation criteria

Risk Score	Risk Rating	Action Required
9 – 10	Extreme	Immediate.
7 – 8	High	Action required. Senior management attention.
5 – 6	Moderate	Specific monitoring or procedures required.
2 – 4	Low	Management through routine procedures.

Table 5-6 Risk Assessment of Potential Impacts

Potential Impacts and their consequences	Risk Assessment		
	Likelihood	Consequence	Risk
Vegetation clearing and habitat loss – development of the project will result in complete removal of habitat for all listed species over the disturbance footprint, and impact will continue for longer than the project life, as it will take at least 10 years for the vegetation to rehabilitate sufficiently. Other impacts such as edge effects and fragmentation also contribute to loss of breeding and foraging habitat and shelter places.	5	4	9
Direct injury or mortality from vehicle strike – the introduction of vehicles, machinery and trucks moving within the project area has the potential to result in injury or mortality to any species if they remain present on the project area.	3	3	6
Direct injury or mortality from predation or hunting – the Project itself would not increase the presence of predator species (such as feral cat, red fox, dingo, owls), however predation or illegal hunting would reduce the number of individuals in habituating an area.	2	3	5
Direct impacts to surface water resources – baseline monitoring demonstrated the poor quality of the surface water resources due to altered flow regimes and disturbance from farming and mining activities. Nevertheless, the Project will also discharge runoff from	2	3	5

Potential Impacts and their consequences	Risk Assessment		
	Likelihood	Consequence	Risk
disturbed catchments, after it has been through erosion and sediment control structures. Greater impact would be caused by releases from mine affected water dams and pits.			
Direct impacts to groundwater resources – the effected groundwater resource is generally of poor quality (brackish to highly saline), within a low permeability environment with a relatively deep groundwater level beneath drainage features and potential GDEs. The impacted strata is not considered to be a high yielding or high quality groundwater resource. The take of groundwater as a result of the project is negligible.	2	2	4
Weeds – land disturbance and the movement of soils, vehicles and people between areas can promote weed invasion, however the risk would be short term. There is potential for weeds to spread and reduce habitat quality for listed species.	3	2	5
Noise, vibration and airblast overpressure – the increase in noise from traffic and industrial sources from the Project is expected to be negligible due to existing background noise level from Saraji Road. However, there may be localised disturbance from noise where operational areas are close to (e.g., within 500 m of) habitats for threatened species (e.g., Greater Gliders, Koalas). Noise, vibration and airblast overpressure from blasting activities have the potential to disturb threatened species near the disturbance footprint and the open pits in particular. These impacts will be temporary and are unlikely to be significant.	2	2	4
Artificial lighting – artificial lighting will be an impact during operational and decommissioning/rehabilitation phases. During construction, night work will not occur. Artificial lighting can impact fauna through interfering with the navigation of nocturnal species interrupting natural patterns of sleep and cell repair, exposing nocturnal prey to elevated predation risks and disturbing the timing of daily movements.	2	2	4
Dust – dust that is severe enough to inhibit plant growth is only likely where vegetation is close to (within 100 m of) the source (roads, operational areas). It is possible dust could reduce food availability for threatened species. However, such effects would only occur close to highly disturbed areas, which these species will most likely avoid for other reasons (noise, light). Therefore, minimal effects from dust on these species are anticipated.	2	1	3
Fire – areas within the Project footprint will not be vegetated, and as a result are less likely than prior to clearing to be a source of ignition. During all Project stages, mortality may occur if a fire burns hot enough to directly affect terrestrial fauna, though for the majority of the local habitat the fuel density is too low for this to be a significant risk.	1	3	4

6 Environmental Management Measures

The performance of the mine water management system in managing impacts to water has been investigated using a detailed site water balance model. The model simulated water inflows and outflows through the various stages of mine development, based on 122 realisations with different climatic sequences. The potential impacts of the Project on surface water resources will be effectively mitigated through the implementation of a mine site water management system to control the flow and storage of water of different qualities across the site. A surface water monitoring program (**Figure 5-1**) will be implemented to monitor potential environmental impacts and ensure that the site water management system is meeting its objectives. The Approved EA stipulates the management of surface water against site specific Water quality objectives and approved upstream and downstream monitoring locations. Sub-Plan C below details these management measures.

The Project erosion and sediment control (ESC) plan is intended to assist in the management, reduction and mitigation of erosion and consequent sediment transport within and from The Project. Preventing unacceptable levels of sediment and contaminants from leaving the lease and entering the receiving waters is one of the most important functions of ESC, which is managed by compliance with The Project's EA. As per IECA (2008), The Project ESC plan adopts the three cornerstones of ESC as follows:

- Drainage control – prevention or reduction of soil erosion caused by concentrated flows and appropriate management and separation of the movement of clean and dirty water through the area of concern.
- Erosion control – prevention or minimisation of soil erosion (from dispersive, non-dispersive or competent material) caused by rain drop impact and exacerbated overland flow on disturbed surfaces.
- Sediment control – trapping or retention of sediment either moving along the land surface, contained within runoff (i.e., from up-slope erosion) or from windborne particles.

The Project ESC Plan contains guidance on current industry best practice regarding erosion and sediment controls, including design standards for both temporary and permanent drainage control measures and sediment control structures. Additional erosion and sediment control detail and water monitoring information is outlined in the ESC Plan, Water Management Plan, and P-EA-100265081 surface water conditions (**Appendix A**, Schedule F).

Impacts to groundwater were assessed to be negligible; however, monitoring and management measures will be implemented. The Project will have a groundwater monitoring program operating throughout all phases of the Project, including through rehabilitation and closure. All the proposed groundwater monitoring bores will be installed prior to the commencement of the Project. The approved Environmental Authority stipulates the groundwater monitoring locations, water quality objectives/trigger values and the frequency of monitoring. Initially, the groundwater model will be reviewed, verified and updated within 12 months after the commencement of the Project. This commitment includes the collection, analysis and use of additional groundwater data to refine conceptualisations, as well as incorporating groundwater monitoring information and response to dewatering. Model updates should include recalibration, and clearly define bore reference levels, how they have changed over time and how these changes affect model prediction and performance. Following the initial review and updates, the groundwater model will be reviewed and updated every three years throughout the Project.

While there is no universally accepted standard for an acceptable Scaled Root Mean Square (SRMS) error, the Australian Groundwater Modelling Guidelines (Barnett et al, 2012) suggests that setting SRMS targets, such as 5% or 10%, may be suitable under certain conditions, with 10% being the most recommended industry threshold. In this study, the SRMS error for water levels is currently less than 10%. However, it is expected that, with the collection of additional data from the site monitoring network, this value may exceed 10%, necessitating model recalibration. Experience with other models in the region indicates that an SRMS greater than 10% typically correlates with a poor fit to observed groundwater levels.

Subsidence and seepage monitoring will be undertaken at the Highwall area. A pre-extraction surface survey will be completed followed by a post-extraction survey three months following completion of the trial. Annual surveys will then follow the post-extraction survey for a period of 5 years. Groundwater monitoring will continue in the Highwall area following completion of the trial. Three monthly surface inspections will also be completed to identify any evidence of surface seepage.

In response to the potential impacts identified in the previous section, strategies, measures and actions to avoid, minimise, mitigate and manage these impacts have been developed. For each impact, the following information is included:

- Environmental outcomes/objectives
- Timing/phase
- Actions to be implemented
- Performance criteria
- Monitoring
- Responsibility
- Auditing and reporting
- Corrective actions including trigger criteria.

Table 6-1 Sub-Plan A: Management of Vegetation Clearing and Habitat Loss

Sub-plan A: Management of Vegetation Clearing and Habitat Loss				
Environmental Outcome	The habitat areas outside of disturbance footprints are maintained. Relevant habitats that are disturbed are progressively rehabilitated to a standard similar to surrounding undisturbed habitat.			
Timing	Clearing of vegetation will occur during construction and operational phases of the project. Mitigation measures will carry on through the decommissioning and rehabilitation/maintenance phases of the Project.			
Responsibility	Senior Site Executive (SSE)			
Reference Documents	Site Induction Modules; Pre-clearance Survey Records; Permit to Disturb; Progressive Rehabilitation and Closure Plan and Schedule; Rehabilitation Management Plan			
Implementation	Action	Performance Criteria	Monitoring	Corrective Action when performance criteria is not met
A1	Where possible, prior to project approval, infrastructure locations will be selected to minimise fragmentation of habitat and the removal of connectivity (climate change refugia). Connectivity to be restored following rehabilitation.	Complete fragmentation of habitat is avoided. Potentially suitable climate change refugia (or connection to) is retained or reinstated.	Connectivity checked through approval process and use of the Queensland Government's connectivity tool	<ul style="list-style-type: none"> If habitat fragmented and/or connectivity removed beyond the assessed and approved footprint, the subject area will be rehabilitated to reinstate connectivity.
A2	Prior to commencement of employment, Vitrinite employees and contractors will be made aware of environmental obligations and compliance requirements through the most up to date and relevant site induction program.	The induction program is completed for all onsite personnel and contractors.	Training Advisor confirms completion of induction before site access is given.	<ul style="list-style-type: none"> Vitrinite employees will be required to repeat the inductions and will be removed from site in the event of repeated breach.
A3	Prior to clearing activities commencing in any one project area (at least 24 hours before), the edges of the disturbance footprint will be marked out to prevent unnecessary accidental clearing of neighbouring habitats.	Clear signage, fencing, spray paint or other methods is used at the edge of the project disturbance footprint to outline clearly where the boundary is.	Daily inspection of clearing activities by supervisor. Monthly comparison of satellite imagery to disturbance footprint boundaries by SSE or delegate.	<ul style="list-style-type: none"> An investigation will be undertaken and the disturbed area will be rehabilitated. Further corrective actions will be developed to improve existing processes, such as reviewing communication protocols prior to shifts.
A4	Prior to clearing activities, habitat features such as hollow-bearing trees and large woody debris will be identified by a qualified ecologist during pre-clearance surveys and recorded. If suitable, habitat features will be relocated/salvaged to use in rehabilitation areas.	Habitat/micro habitat features being retained/relocated into rehabilitated areas where possible and suitable to do so is evident.	Pre-clearance survey records. Daily inspection of clearing activities by supervisor. Monthly observations of rehabilitation areas by Environmental Officer.	<ul style="list-style-type: none"> If suitable habitat features are not salvaged during clearing, identify and harvest suitable habitat features following clearing. Further corrective actions will be developed to improve existing processes.
A5	Desktop and pre-clearance surveys will be conducted by a qualified ecologist within 72 hours prior to the clearing of vegetation during the breeding season of threatened species known from the clearance area, with the intention of: <ul style="list-style-type: none"> Identifying areas of active breeding and/or denning/nesting habitat for threatened species Identifying breeding and active seasons of threatened species 	Pre-clearance surveys are conducted by a qualified ecologist. Pre-clearance surveys are conducted within 72 hours of planned clearing. No vegetation is cleared within 100 m of identified breeding activity. Clearing of vegetation where threatened fauna actively breeding is delayed up until the breeding activity has ceased.	Pre-clearance survey records. Permit to disturb documentation.	<ul style="list-style-type: none"> All clearing activities will be stopped in the habitat where the performance criteria are not met. Additional assessment by a qualified ecologist will be undertaken to assess potential impacts on threatened species and to recommend measures to mitigate impacts caused.
A6	Overburden will be placed within either the in-pit WRDs or the ex-pit WRDs, with placement in the in-pit WRD prioritised as per the approved site layout. As part of the design, placement of waste in-pit has been maximised to limit the need for additional project footprint associated with ex-pit WRDs.	Overburden is not stored outside of the approved storage locations (WRDs).	Monthly observation by Operations Manager and comparison of backfilling operations and progressive rehabilitation of out-of-pit dump against timing milestones in the Progressive Rehabilitation and Closure Schedule.	<ul style="list-style-type: none"> An investigation will be completed, and the disturbed area will be rehabilitated. Further corrective actions will be developed to improve existing processes, such as reviewing communication protocols prior to shifts.
A7	Topsoil removed from each site in preparation for mining will be stored and managed in accordance with the PRCP, to protect a favourable growing medium for vegetation post-mining.	Different soil management units are stored separately at all times. Where practicable, topsoil is not stored for more than a 12-month period before being replaced. Topsoil stockpiles are less than 2 m high and are contoured and positioned in a manner that encourages water drainage and discourages erosion. Grass and herbaceous plants	Monthly survey of topsoil stockpiles by Environmental Officer recorded in topsoil register. Performance criteria are observed and measured.	<ul style="list-style-type: none"> Any deviation in soil management from that outlined in the PRCP will be rectified as soon as possible. Topsoil storage methodology and procedures will be reviewed and amendments made if the methodology is not successful Staff will be retrained if the procedure is not followed

		<p>germinating from the soil seed bank are maintained as a protective cover for stockpiles.</p> <p>Topsoil stockpiles are located in areas fenced to exclude livestock.</p>		<ul style="list-style-type: none"> Where necessary further corrective actions will be developed to improve existing processes
A8	<p>Disturbance areas will be revegetated once the landforms and surfaces are prepared and stable (refer to PRCP).</p>	<p>RM5.1 Seeding is completed at an average rate of:</p> <ol style="list-style-type: none"> Grazing PMLU - 0.25 kg/ha for trees and shrubs, 13-15 kg/ha for grasses and 13-15 kg/ha for sterile cover crops; Native ecosystem PMLU - 2-3 kg/ha for trees and shrubs, 9-11 kg/ha for grasses and 8-10 kg/ha for sterile cover crops; and Native ecosystem – riparian PMLU – 2-3 kg/ha for trees and shrubs, 13-15 kg/ha for grasses and 13-15 kg/ha for sterile cover crops. <p>RM5.2 With the exception of a non-permanent cover crop species, the seed mix to satisfy RM5.1 contains only those species listed in Attachment 2 (PRCP Schedule) – Seed Mix Species List for the relevant PMLU and reflect the regional ecosystem distribution to be established post-mining.</p> <p>RM5.3 Vegetation groundcover is >40%.</p>	<p>Monitoring for inadequate seed detection is conducted immediately following the wet season, after planting.</p> <p>Rehabilitation outcomes and monitoring results reviewed every two years by an AQP.</p>	<ul style="list-style-type: none"> RM5.4 Any species not establishing after seeding (as identified 12 months after seeding) will be planted as tubestock at a density suitable to establish the tree cover and shrub cover of the relevant PMLU. RM5.5 Supplementary seeding and tubestock planting will be completed within one year of sites failing to achieve vegetation establishment on initial attempt. Seed applications rates will be modified or adjusted as needed.
A9	<p>Target native vegetation will be established in relevant areas identified in the PRCP.</p>	<p>RM7.1 Rehabilitated areas have less than 0.2% cover of <i>Parthenium hysterophorus</i> AND rehabilitated areas have less than 0.1% cover of <i>Harrisia martinii</i> AND any invasive plants listed under the <i>Biosecurity Act 2014</i> do not exceed densities of 1 individual per hectare, as confirmed by an AQP from annual monitoring.</p> <p>RM7.2 Vegetation groundcover is >50%.</p> <p>RM8.3 <i>Eucalyptus camaldulensis</i> is at least 33% of the total basal area of woody vegetation.</p> <p>RM7.4 A rehabilitation performance assessment completed under RM7.3 achieves a score of at least 40/80 of the reference site and progresses to 60/80.</p> <p>RM7.5 Rehabilitation is non-polluting of surface water and achieves water quality criteria of:</p> <ol style="list-style-type: none"> pH: 6.5-8.5; TSS 110 mg/L; and EC: <310 µS/cm. <p>RM7.6 Soil testing indicates the following parameters are met:</p> <ol style="list-style-type: none"> Rootzone EC <1.5 dS/m (1,500 µS/cm); Soil pH <8.5 and >5.5 (average) as measured at any part of the root zone; Exchangeable Sodium Percentage (ESP%) <6% (at 0-10cm depth). <p>RM9.2 There is no evidence of erosion classified as 'moderate' or 'severe' as defined by Attachment 1 – Erosion classification framework in the PRCP Schedule.</p> <p>RM9.3 An AQP has certified that the final landform is geotechnically stable.</p> <p>RM9.7 Groundcover remains above 80% on all slopes with a gradient higher than 10%, and 50% on slopes with a gradient lower than 10%.</p> <p>RM9.8 Erosion monitoring is complete and the average erosion rate is <5 t/ha/year.</p>	<p>RM7.3 BioCondition assessment undertaken by an AQP using the methodology outlined in the latest version of the Queensland Herbarium's 'BioCondition Assessment Manual';</p> <p>Water quality testing of water released from rehabilitated area into receiving environment.</p> <p>Soil testing in rehabilitated area.</p> <p>Erosion monitoring.</p>	<ul style="list-style-type: none"> The AQP who undertook the BioCondition assessment or geotechnical stability assessment as applicable will make recommendations, and these will be implemented.

		<p>RM9.9 There is no active rill or gully erosion deeper than 30cm present.</p> <p>RM9.10 Rehabilitated areas have less than 0.2% cover of <i>Parthenium hysterophorus</i> AND rehabilitated areas less than 0.1% cover of <i>Harrisia martinii</i> AND any invasive plants listed under the <i>Biosecurity Act 2014</i> do not exceed 1 individual per hectare, as confirmed by an AQP from annual monitoring.</p> <p>RM9.11 At least 60% of established target species show natural recruitment.</p> <p>RM9.12 Landform is free draining, and no cracks are greater than 0.15 m deep.</p> <p>RM9.13 The extent and frequency of surface cracking and ponding of the mined land is within 10% of that measured in adjacent unmined land.</p> <p>RM9.14 Surface water quality results monitored monthly during flow at, but not limited to, downstream locations specified in Attachment 4 (PRCP Schedule) - Surface Water Monitoring Locations, do not exceed the parameters and limits defined in Table for a minimum of 5 consecutive years.</p>		
<p>A10</p>	<p>During operations and rehabilitation phases, pest/feral animals that have the potential to damage the rehabilitated MNES species habitat areas and the surrounding intact habitat will be monitored and standard species-specific control measures will be implemented.</p>	<p>Numbers of incidental sightings of pest animals remain similar to pre-project levels.</p> <p>No evidence of pest animal degradation of MNES species habitat.</p>	<p>Records of incidental sightings</p> <p>Biennial pest survey by an AQP in conjunction with the BioCondition assessment.</p> <p>Monitoring will primarily entail standardised timed visual observations as well as infrared camera trap monitoring.</p>	<ul style="list-style-type: none"> Should an increase in pest animal presence, or evidence of damage to MNES habitats be observed, an investigation will be undertaken by an AQP. Corrective action recommendations will be made such as an increase in frequency and/or duration of pest animal control methods, changing pest animal control methods, consultation with neighbouring properties.

Table 6-2 Sub-Plan B: Management of Direct Mortality and Injury of Threatened Species

Sub-Plan B: Management of Direct Mortality and Injury of Threatened Species				
Environmental Outcome	Avoid and minimise mortality and injury to threatened species.			
Timing	Direct mortality of threatened species may occur at any time during the Project.			
Responsibility	Senior Site Executive (SSE)			
Reference Documents	Site Induction Modules; Pre-clearance Survey Records; Permit to Disturb; Progressive Rehabilitation and Closure Plan and Schedule; Rehabilitation Management Plan			
Implementation	Action	Performance Criteria	Monitoring	Corrective Action when performance criteria is not met
B1	<p>Prior to commencement of employment, Vitrinite employees and contractors will be made aware of environmental obligations and compliance requirements including procedures to follow if fauna are found injured or dead.</p> <p>Unauthorised entry by any person to the mining lease will not be allowed so that threatened species are not subject to behaviour that may lead to injury or mortality (e.g. hunting/shooting)</p>	<p>The induction program is completed for all onsite personnel and contractors.</p> <p>No unauthorised entry is detected.</p>	<p>Training Advisor confirms completion of induction before site access is given.</p> <p>Incidental sighting of unauthorised persons on site.</p>	<ul style="list-style-type: none"> Vitrinite employees will be required to repeat the inductions and will be removed from site in the event of repeated breach. Unauthorised entry will be reported to appropriate authorities.
B2	<p>When clearing is undertaken, there will be a suitably qualified and experienced fauna spotter catcher who completes a preclearance survey of the area and marks any suitable habitat. This fauna spotter catcher will also be present during clearing for observation and to assist with injured wildlife.</p> <p>Breeding and denning places will be left standing for 24 to 48 hours to allow fauna to self-relocate before felling.</p> <p>If after marking, mammals or birds have not moved after 24-48 hours, then a fauna spotter catcher will be brought to site to evacuate the individual/s prior to the clearing of that tree.</p>	<p>A suitably qualified and experienced fauna spotter catcher is present during clearing and completes a preclearance survey report.</p> <p>All recommendations of preclearance survey report are implemented e.g. breeding and denning places are left standing for 24 to 48 hours to allow fauna to self-relocate before felling.</p>	<p>Preclearance survey report by AQP</p>	<ul style="list-style-type: none"> Clearing will be stopped and work methods reviewed. Individuals who have not correctly implemented recommendations of the preclearance survey report will be retrained through the induction process.
B3	<p>Clearing will occur in stages, to allow fauna the opportunity to exit the area.</p> <p>Clearing will be done methodically and progressively in line with the sites stage plans.</p>	<p>Clearing is completed in the same general direction throughout any single continuous clearing campaign to ensure connectivity is retained.</p>	<p>Daily inspection of clearing activities by supervisor.</p> <p>Records of injured or dead fauna kept by clearing crew.</p>	<ul style="list-style-type: none"> Pre-clearance surveys will be undertaken. If mortality occurs, instances will be recorded and reported to necessary agencies/departments. (i.e. DESI). Work methods will be reviewed to further reduce the risk of mortality before recommencing clearing works
B4	<p>During operations and rehabilitation phases, pest/feral animals that have the potential to prey on MNES species will be monitored and standard species-specific control measures will be implemented.</p>	<p>Numbers of incidental sightings of pest animals remain similar to pre-project levels.</p>	<p>Records of incidental sightings.</p> <p>Biennial pest survey by an AQP in conjunction with the BioCondition assessment.</p> <p>Monitoring will primarily entail standardised timed visual observations as well as infrared camera trap monitoring.</p>	<ul style="list-style-type: none"> Should an increase in pest animal presence be observed, an investigation will be undertaken by an AQP. Corrective action recommendations will be made such as an increase in frequency and/or duration of pest animal control methods, changing pest animal control methods, consultation with neighbouring properties.
B5	<p>Injured fauna will be taken to the nearest wildlife carer or veterinarian as soon as discovered.</p>	<p>Any injury and/or mortality of threatened species is communicated to DESI within 24 hours.</p>	<p>Records of injured or dead fauna made by clearing crew and kept by environmental officer.</p>	<ul style="list-style-type: none"> Pre-clearance surveys will be undertaken. Work methods will be reviewed to further reduce the risk of injury before recommencing clearing works. Where necessary further corrective actions will be developed to improve existing processes
B6	<p>No fauna will be handled by anyone other than a suitably qualified and experienced fauna spotter catcher. Records will be kept and reported to DESI in the timeframe agreed to in the Rehabilitation Permit.</p>	<p>No fauna is handled by anyone other than a suitably qualified and experienced fauna spotter catcher</p>	<p>Rehabilitation Permit records</p>	<ul style="list-style-type: none"> Information will be immediately reported to DESI upon recognition of failure to report within the agreed timeframe.

B7	Fences will be altered in dispersal corridors to prevent entanglement. At minimum, fences will have the top barbed wire replaced with smooth wire.	Fences are amended in habitat corridors.	Checklist by Environmental Officer	<ul style="list-style-type: none"> Fences will be scheduled to be altered as part of the rehabilitation maintenance program when identified to be needed.
B8	On-site speed limits will be restricted to 60 km/h on all roads through or adjacent to habitat critical to threatened species during dawn and dusk and at night. Speed signs will be visible on access roads and through critical habitat areas.	Speed limits are not exceeded.	Periodic speed checks	<ul style="list-style-type: none"> Speed limits apply and will be enforced. Where necessary further corrective actions will be developed to improve existing processes
B9	Buses will transport ~80% of workers daily from accommodation to site, to reduce the total number of vehicles using the roads.	80% of workers are being transported to site via buses.	Annual survey of works	<ul style="list-style-type: none"> Work methods will be reviewed to meet completion criteria. i.e additional buses. Where necessary further corrective actions will be developed to improve existing processes

Table 6-3 Sub-Plan C: Management of Direct Impacts to Surface Water Resources

Sub-Plan C: Management of Direct Impacts to Surface Water Resources				
Environmental Outcome	Avoid and minimise impacts to surface waters in the vicinity of the Project			
Timing	Activities during all phases of the Project will have the potential to impact surface water resources			
Responsibility	Senior Site Executive (SSE)			
Reference Documents	Erosion and Sediment Control Plan; Water Management Plan; EA conditions; International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Manual (2008).			
Implementation	Action	Performance Criteria	Monitoring	Corrective Action when performance criteria is not met
C1	The proposed mine water management system will be designed and sized to adequately dewater the catchment runoff collected in active mining pits. Clean catchment runoff will be diverted around active mining pits and infrastructure areas.	Clean catchment water is not captured within an open pit. Mine affected water collected within a pit is not discharged into the clean water diversion infrastructure.	Inspection of drainage diversions following rain events to identify any sedimentation built up within the diversions and/or erosion damage.	<ul style="list-style-type: none"> Sediment buildup and erosion damage will be remediated.
C2	Erosion and sediment controls will be implemented prior to roads construction and maintained during operations. Culverts or floodways (as designed by an AQP) will be installed at road and rail crossings of waterways. Runoff from haul and access roads will be directed to erosion and sediment controls before discharge to the downstream environment in accordance with the site ESCP or pumped back into the mine water system.	WQOs met following testing of downstream surface water monitoring sites after rainfall events per the EA.	Inspection of ESC controls, crossings and culverts at the beginning of the wet season and following significant rainfall events to remove accumulated sediment and repair damage.	<ul style="list-style-type: none"> After three consecutive exceedances of WQOs, an investigation into the cause and potential for environmental harm will be carried out by an AQP. A written report will be provided to DESI.
C3	Mine affected water captured at open pits, in the MIA and ROM will be stored in mine water dams. Mine affected water will be used on-site to meet site demands and to reduce inventory of mine water dams. Mine water dams will be designed by an RPEQ and operated with a maximum 'operating volume' which defines the maximum volume the dams can operate up to before pumped inflows cease. The operating volumes of each dam are below their respective full storage volumes to maintain storage capacity below the spillway level of the dams which will reduce the risk of overflows to the receiving environment. If mine water dams are at their operating volumes, mine water will be pumped back to the pits in emergency.	No overflow or discharge from a mine water dam into the receiving environment. Mine affected water is only stored in a mine water dam or in a pit in an emergency. WQOs met following testing of mine water dams per the EA.	Mine dams inspected by an RPEQ prior to the start of the wet season and after the wet season to identify any maintenance that is required. Daily check of mine water dam levels during significant wet weather event. Quarterly monitoring of mine water dams.	<ul style="list-style-type: none"> Recommendations from the RPEQ will be implemented. If a mine dam discharges mine affected water, an investigation by an AQP, and notification to DESI as per the EA will be undertaken. Access to mine affected water stored in a dam by wildlife and livestock will be prevented until testing demonstrates the quality meets the WQOs.
C4	Sediment dams will be designed by an RPEQ and installed in locations as per the Water Management Plan and ESC Plan such that erosion of disturbed areas and the release of sediments to receiving waters are prevented or minimised.	WQOs met following testing of sediment dams as per the EA. Bed and banks of the receiving environment are not eroded by any releases from sediment dams.	Monitoring of sediment dam release locations monthly and daily during release or weekly during release as per the EA.	<ul style="list-style-type: none"> If monitoring of a sediment dam identified an exceedance of the WQOs, all water in that structure will be transferred to a mine water dam. After three consecutive exceedances of WQOs, an investigation into the cause and potential for environmental harm will be carried out by an AQP. A written report will be provided to DESI.
C5	Sediment dams will be de-silted (removal of sediment accumulating within the sediment storage zone) as part of the sediment dam maintenance to restore the volume of the sediment dams to the original design volume.	Sediment dams are de-silted when the settled sediment has exceeded 90% of the nominated storage volume as prescribed within the ESCP or; If Total Suspended Solids reach > 50 mg/L in the basin (IECA 2008)	Monthly inspection and monitoring of water quality in sediment dams. Daily inspections of sediment dams when rain is occurring. Inspections of sediment dams within 24 hours prior to expected rainfall. Inspections of sediment dams within 2 hours of a rainfall event of sufficient	<ul style="list-style-type: none"> Desilting will commence as soon as it is discovered that performance criteria has been exceeded.

			intensity and duration to cause on-site runoff.	
C6	Review by an AQP of both the Water Management Plan and ESC Plan will be completed each year by 1 August.	Evidence of review tabled at management meeting.	Annual audit	<ul style="list-style-type: none"> The review will be carried put as soon as possible after discovery of omission.
C7	Clearing will be staged to minimise potential loss of sediment. Erosion and sediment control measures will be implemented during operation in accordance with the ESC plan.	Clearing is completed methodically and progressively in line with the sites stage plans.	Annual audit	<ul style="list-style-type: none"> Additional ESC will be installed upon recommendation of an AQP.
C8	Saturated topsoil will not be handled when wet and will be left for 72 hours to dry to at least a damp condition prior to placement. Manual handling of wet soils is logistically difficult, damages the soil's structure and leads to compaction.	Topsoil is only to be stripped and placed using either damp or dry soil, not saturated.	Register/record of topsoil removal.	<ul style="list-style-type: none"> Topsoil stripping and stockpiling will be rectified when feasible after rain event.
C9	Contour banks on slopes will be constructed at a spacing of 80 m for slopes of 1V:6H. Larger contour drains are generally more stable and longer lasting. Berms will be constructed of compacted material (IECA Erosion and Sediment Control Guidelines). Contour banks will convey water to engineered rock-lined spine drains on steep slopes. A competent basalt or alternative rock source will be used.	Earthworks and land forming is in accordance with the design plan.	Daily site works inspection by supervisor.	<ul style="list-style-type: none"> Remedial earthworks will be conducted immediately after a deviation from the design plan is identified.
C10	Post closure drainage corridors will be designed to divert floodwaters up to the 0.1% AEP event (inclusive) to mitigate the potential erosion risk of the final landform during flooding. Post closure water management system (i.e. surface water drains, sediment dams, drop structures, contours banks, etc.) will be designed and installed to manage runoff from final landforms to prevent erosion risk. These will be rehabilitated once vegetation is established, and the final landform has reduced erosion risk.	Final landform is stable and protected from flooding.	Final rehabilitation investigation and report for relinquishment of EA and mining lease	<ul style="list-style-type: none"> Investigation and report will not be finalised until landform stability is demonstrated. An AQP will recommend mediation works to ensure stability of final landform.

Table 6-4 Sub-Plan D: Management of Direct Impacts to Groundwater Resources

Sub-Plan D: Management of Direct Impacts to Groundwater Resources				
Environmental Outcome	Avoid and minimise impacts to groundwater in the vicinity of the Project. Contaminants are not released directly or indirectly to groundwater.			
Timing	Impacts to groundwater may occurring during all phases of the Project.			
Responsibility	Senior Site Executive (SSE)			
Reference Documents	Groundwater Management and Monitoring Report; EA conditions; Guidelines for Groundwater Quality Protection in Australia - Australian Government 2013; Emergency Response Plan; Progressive Rehabilitation and Closure Plan and Schedule; Rehabilitation Management Plan; Waste Management Plan; Queensland Government's 'Monitoring and Sampling Manual 2018 – Environmental Protection (Water) Policy 2009			
Implementation	Action	Performance Criteria	Monitoring	Corrective Action when performance criteria is not met
D1	Groundwater will be managed as per the Groundwater Management and Monitoring Report to ensure Groundwater quality is in line with EA trigger levels.	Groundwater quality remains below EA. specified trigger levels for each parameter. Annual monitoring report completed.	Groundwater monitoring bores, in the locations specified in the EA, monitored at the frequencies specified in the EA, for the standing water level (SWL) and groundwater quality parameters specified in the EA.	<ul style="list-style-type: none"> After three consecutive exceedances of groundwater quality limits, DESI will be notified and an investigation into the cause and potential for environmental harm will be carried out by an AQP. A written report will be provided to DESI. Appropriate mitigation measures to address the groundwater contamination and prevent recurrence of the contamination will be implemented. If SWL triggers are exceeded, DESI will be notified and an investigation into the cause will be completed by an AQP. Immediate action will be taken to ensure compliance with SWL trigger thresholds.
D2	The groundwater monitoring network will be regularly reviewed to ensure it remains representative of groundwater conditions and fit for purpose.	The groundwater monitoring network is reviewed every two years to determine whether additional monitoring bores are required.	Annual monitoring report	<ul style="list-style-type: none"> The review will be carried put as soon as possible after discovery of omission.
D3	A groundwater data sharing arrangement between Vitrinite and BHP will be established. Routine groundwater level and quality monitoring from Saraji Mine and Peak Downs Mine will be completed to provide Vitrinite with a greater understanding of the hydrogeological system responses during mining.	Vitrinite has continuous access to BHP's groundwater monitoring network data.	Annual monitoring report	<ul style="list-style-type: none"> If access to data is lost, re-engagement and negotiation with neighbouring mines will be initiated.
D4	The redevelopment and or recalibration of the numerical groundwater model will be undertaken within 12 months of the commencement of the Project, and then every three years throughout the life of the Project.	A model verification is complete with findings as to whether the existing model is fit for purpose with regard to contemporary groundwater conditions.	Annual monitoring report	<ul style="list-style-type: none"> If the model verification makes recommendations for redevelopment or recalibration of the model, these recommendations will be implemented.

Table 6-5 Sub-Plan E: Management of Weeds

Sub-Plan E: Management of Weeds				
Environmental Outcome	MNES habitats and rehabilitation areas are not degraded by the presence of weeds			
Timing	Weeds will need to be managed during all phases of the Project since movement of people, vehicles and machinery have the potential to spread weeds.			
Responsibility	Senior Site Executive (SSE)			
Reference Documents	Site Induction Modules; Pre-clearance Survey Records; Permit to Disturb; Progressive Rehabilitation and Closure Plan and Schedule; Rehabilitation Management Plan; Weed Management Plan; Biosecurity QLD (DAF) - Vehicle and machinery clean down procedures			
Implementation	Action	Performance Criteria	Monitoring	Corrective Action when performance criteria is not met
E1	All vehicles that enter undisturbed parts of the site will be washed and certified weed free prior to arrival at the project site, to restrict the introduction of new weeds.	Relevant vehicles have certification regarding weed and seed check.	Record and store vehicle hygiene certifications	<ul style="list-style-type: none"> Record and file vehicle hygiene certifications. Review weed hygiene certifications, any vehicles found to be lacking certification will immediately be required to undertake washdown and certification process.
E2	Weed management activities will control weeds in high traffic areas. As rehabilitation areas are revegetated and progress towards certification, weed management activities will be implemented.	No restricted weeds detected. Rehabilitated areas have less than 0.2% cover of <i>Parthenium hysterophorus</i> AND less than 0.1% cover of <i>Harrisia martinii</i> . Any other weeds listed under the <i>Biosecurity Act 2014</i> (Qld) present in densities of <1 individual per hectare.	Operational areas and the visitor carpark inspected one month after heavy rainfall (defined as >20 mm in 24-h period) to identify new infestations of restricted weeds.	<ul style="list-style-type: none"> Presence of Category 2 weeds will be subject to mandatory reporting within 24 hours of detection to the Queensland Department of Agriculture and Fisheries. Failure of weed management activities will be carried out by an AQP and recommendations implemented to remediate rehabilitated areas.
E3	Only native species, or species with low weed risk, will be included within seed mixes applied to rehabilitated sites.	Seed mixes have been checked prior to use and it is confirmed (by an AQP) that minimal weed seeds are present, except where exotic species, such as Buffel grass are naturally contained within the mix (as they occur throughout the region).	Monthly visual inspection of rehabilitation areas by Environmental officer. Biennial revegetation survey of rehabilitation areas by an AQP.	<ul style="list-style-type: none"> Seed germination will be reviewed following wet season after planting. Seed mix will be modified or adjusted as needed. Rectification works will be conducted as necessary.
E4	Stockpiles must be monitored annually for weeds and control measures implemented to prevent weed colonisation on the stockpiles.	Stockpiles are monitored for weeds every 12 months	Biennial weed survey by AQP.	<ul style="list-style-type: none"> Stockpiles will be monitored every 12 months. Rectification (weed control) works will be implemented.
E5	In-depth weed milestone monitoring will be completed every two years, including the development of a survey report.	The weed monitoring survey report is complete every two years and: <ul style="list-style-type: none"> maps weed species to show showing the boundaries of the weed density zones (or rehabilitation areas/domains, for rehabilitated sites); presents results from each sampling transect, along with an overall weed density score for each weed species; and, compares how the weed density scores have changed over time to assess whether the success criteria are being achieved. 	Biennial weed survey by AQP.	<ul style="list-style-type: none"> Weed monitoring survey report will be completed as soon as possible following awareness of delay of completion. Weed management programs and works will be developed. Where necessary further corrective actions will be developed to improve existing processes.

Table 6-6 Sub-Plan F: Management of Indirect Impacts to Threatened Species and Ecological Communities

Sub-Plan F: Management of Indirect Impacts to Threatened Species				
Environmental Outcome	Avoid and minimise indirect impacts to threatened species such as noise, vibration, airblast overpressure, dust, and artificial lighting			
Timing	Indirect impacts will commence with clearing activities and continue through all phases of the Project.			
Responsibility	Senior Site Executive (SSE)			
Reference Documents	Site Induction Modules; Permit to Disturb; Progressive Rehabilitation and Closure Plan and Schedule; Rehabilitation Management Plan; Specific Work Instructions; National Light Pollution Guidelines for Wildlife; Emergency Response Plan			
Implementation	Action	Performance Criteria	Monitoring	Corrective Action when performance criteria is not met
F1	Noise monitoring will be carried out in accordance with the EA conditions, the most recent version of Queensland Government’s ‘Noise Measurement Manual’ (ESR/2016/2195), the relevant Australian Standard and the <i>Environmental Protection Regulation 2019</i> (Chapter 5, Part 4).	Noise from the activity does not exceed the noise limits in the EA.	Continuous monitoring of noise emissions from the Project activities at sensitive places using a class 1 sound level meter.	<ul style="list-style-type: none"> Noise abatement measures will be immediately implemented to minimise any adverse impacts to the sensitive place and to limit any further exceedances. A report will be provided to DESI describing the factors contributing to the exceedance of noise limits and measures taken to reduce noise generated from the activities.
F2	A blast monitoring program to monitor compliance with blasting noise and vibration limits for all blasts will be developed and implemented at the nearest and most affected sensitive place(s).	Blasting does not cause airblast overpressure limits and ground vibration peak particle velocity limits in the EA to be exceeded.	Blast monitoring including location of blast, atmospheric conditions at the time of the blast and location, date and time of the recording.	<ul style="list-style-type: none"> Adjustments to blast regime will be considered. Noise abatement measures will be immediately implemented to minimise any adverse impacts to the sensitive place and to limit any further exceedances
F3	<p>Air quality will be managed by the Air Emissions Management Plan required by the EA. This Plan will be reviewed every three years by an AQP.</p> <p>Loads of material will be covered prior to transport external to the site.</p> <p>Trafficable and rail areas (including entry and exit points from Saraji Road, the rail loop and the train load out facility) must be maintained using all reasonable and practicable measures necessary to minimise the release of windblown or traffic generated dust to the atmosphere.</p>	At sensitive places within 6 km of the mine site, PM10 is less than 50 µg/L over 24-hour continuous monitoring; and monthly dust deposition is less than 120 mg/m ² /day.	<p>Air emissions and meteorological conditions monitored in accordance with EA.</p> <p>Monitoring locations reviewed annually.</p>	<ul style="list-style-type: none"> If an exceedance of EA limits is a result of the site activities, a report will be provided to DESI outlining circumstances and dust abatement measures that were implemented. Dust abatement measures will be immediately implemented in accordance with the Air Emissions Management Plan
F4	Dust producing activities will be prioritised on still days following rainfall.	Earthworks and haulage are completed on still days following rainfall where feasible.	Daily operational records	<ul style="list-style-type: none"> If feasible, dust producing activities will cease on days that are very dry and windy.
F5	<p>Artificial lighting used in operational areas will be angled away from habitats supporting sensitive species (e.g., riparian areas supporting Koalas and Greater Gliders) (Sanders, <i>et al.</i>, 2020).</p> <p>Floodlights with “low glare” louvres/attachments will be used to limit lateral transmission of light. Note that newer LED-type flood lights may have glare-reduction technology built-in (Newport, <i>et al.</i>, 2014).</p> <p>Any streetlights used will be of the “aeroscreen” type (flat glass lenses), to reduce sideways glare (Newport, <i>et al.</i>, 2014).</p> <p>Light fittings will be positioned as close to horizontally as possible (Newport, <i>et al.</i>, 2014).</p> <p>Except in the case of safety concerns, lighting will be installed and used in accordance with the National Light Pollution Guidelines for Wildlife, including the best practice lighting design principles:</p> <ul style="list-style-type: none"> j. Start with natural darkness and only add light for specific purposes. k. Use adaptive light controls to manage light timing, intensity and colour. 	<p>Artificial lighting is not directed onto habitats supporting sensitive species with shielding installed where necessary.</p> <p>Light does not spill onto areas where it is not intended.</p> <p>All floodlights near sensitive areas are approved low glare or use glare reduction technology.</p>	<p>Mobile lighting checklist for setup</p> <p>Signoff of lighting design and installation</p> <p>Check during maintenance and service</p>	<ul style="list-style-type: none"> Lighting will be redesigned or reinstalled if found to not meet performance criteria. Vitrinite employees and contractors cannot work/enter site without completing site inductions. If Vitrinite employees and contractors are not site inducted – they will be required to stop work and attend an induction as soon as possible. Quarterly monitoring will be conducted to identify any instances of lighting not pointed away from sensitive habitat areas. Rectification will be implemented works as necessary

	<ul style="list-style-type: none"> i. Light only the object or area intended – keep lights close to the ground, directed, and shielded to avoid light spill. m. Use the lowest intensity lighting appropriate for the task. n. Use non-reflective, dark-coloured surfaces. o. Use lights with reduced or filtered blue, violet and ultraviolet wavelengths. 			
F6	Standard mining fire safety and smoking protocols and procedures will be followed onsite; therefore, no additional fire mitigation measures are required during construction/operation. This includes an Emergency Response Plan which describes processes in place to control fires that originate on site.	Standard mining fire safety and smoking protocols and procedures are implemented.	Records/reports regarding the implementation of the Emergency Response Plan. Annual audit	<ul style="list-style-type: none"> • Emergency Response Plan and other procedures as necessary will be reviewed.
F7	A fire break will be maintained along the western boundary of the mine during rehabilitation, to minimise the risk of fires originating within bushland areas of the Harrow Range.	A fire break is maintained along the western boundary of the mine during rehabilitation, to minimise the risk of fires originating within bushland areas of the Harrow Range.	Review of site plans.	<ul style="list-style-type: none"> • Location of fire break will be reviewed in the event that a fire enters the mine site from outside.

7 Project Management Plans

A summary of other plans required (state and federal approval conditions) and will be implemented upon commencement of the Project, are outlined below. How the management plans crossover is outlined in **Table 7-1**.

Table 7-1 Project Management Plan Crossover

Management Plan	EA Condition	Crossover with other plans
Air Emissions Management Plan	B8	Linkages to be developed with Greenhouse Gas Abatement Plan and Environmental Management Plan
Greenhouse Gas Abatement Plan	B13	Environmental Management Plan
Mineral Waste Management Plan	C11	Linkages to be developed with Tailings, Coarse Rejects Disposal Plan and Environmental Management Plan
Non-mineral Waste Management Plan	C7	No linkages
Tailings and Coarse Rejects Disposal Plan	C13	Linkages to be developed with Mineral Waste Management Plan and Environmental Management Plan
Water Management Plan	F3	Linkages with Erosion and Sediment Control Plan and Environmental Management Plan
Erosion and Sediment Control Plan	F29	Linkages to be developed with Water Management Plan, Weed Management Plan and Environmental Management Plan
Weed Management Plan	G9	Linkages to be developed with Erosion and Sediment Control Plan and Environmental Management Plan
Rehabilitation Management Plan	-	Elements covered by the Progressive Rehabilitation and Closure Plan; linkages with water, erosion and sediment control, weed, offset area management, mineral waste, tailings and coarse rejects disposal plans and Environmental Management Plan.
Offset Area Management Plan	-	Environmental Management Plan
Environmental Management Plan	-	Linkages across all management plans

7.1 Management Plans required under the EA

The final approved Vulcan South EA requires the following management plans to be implemented for all stages of the authorised activity and submitted to the administering authority on, or before the commencement of authorised activities.

The management plans listed below will be made available for public review on the Vitrinite website (<https://vitrinite.com.au/community/sustainability/environment/>) prior to the commencement of the action

7.1.1 Air Emissions Management Plan (EA Condition B8):

The Air Emissions Management Plan required by condition B8 must incorporate a program for continuous improvement for the management of dust and particulate matter resulting from the authorised activities with respect to, but not limited to:

- the collection of air quality and meteorological data at locations and using the monitoring methods described in Table B1– Ambient air quality limits; and
- a system to identify adverse meteorological conditions likely to produce elevated levels of dust deposition, PM10 at a sensitive place due to the authorised activities; and
- a dust and particulate matter control strategy which:
 - activates a timely implementation of management control action;
 - acts in response to the system required by condition B9(b);
 - acts in response to any air quality monitoring that indicates a potential for an exceedance of the air quality limits of Table B1 – Ambient air quality limits.

7.1.2 Greenhouse Gas Abatement Plan (EA Condition B13)

The Greenhouse Gas Abatement Plan is provided within Appendix HH. The EA stipulates conditions which the plan was authored to comply with. These conditions are described below.

A greenhouse gas (GHG) abatement plan must be developed and implemented prior to the commencement of authorised activities. The GHG abatement plan must include:

- an inventory of projected unmitigated annual Scope 1 and Scope 2 emissions for each GHG over the life of the project; and
- the intended objectives, measures and performance standards to avoid and mitigate GHG emissions consistent with the latest version of the Queensland Climate Action Plan and relevant targets; and
- a process for regularly reviewing, assessing, and implementing new technologies to identify opportunities to further reduce GHG emissions and energy use and progressively improve energy efficiency; and
- a program for annual monitoring, auditing and reporting on GHG emissions from all relevant activities and the success of measures to avoid and mitigate GHG emissions and achieve reduction targets; and
- a biennial review and update of the effectiveness of the plan.

A schedule of targets for GHG reduction required under condition B13(d) will be provided to the administering authority prior to the commencement of authorised activities and be made available for each year of authorised activities on request. The results of the program conducted under condition B13(d) will be made publicly available.

This will be supplementary to the existing Projected Greenhouse Gas Emissions Assessment which includes projected Scope 1, 2 and 3 emissions associated with the action.

Over the Life of Mine (LOM), the action is estimated to contribute to a total of 960 kilo tonnes of carbon dioxide equivalent (856 ktCO₂e of scope 1 (3.42% of total GHG emissions) and 104 ktCO₂e for scope 2 (0.42% of total GHG emissions)). These are the emissions under operational control of the action. The action It is also expected to contribute to 24, 059 ktCO₂e of Scope 3 (96.16%). The total Scope 1, 2 and 3 contribution is a total of 25,019ktCO₂e. A breakdown of these projected emissions are provided in. The actions GHG emissions are a relatively small proportion of both the Australian and Queensland's total GHG emissions, accounting for 0.02% of Australia's total GHG emissions and 0.08% of Queensland's GHG emissions. The action is expected to be significantly smaller in emissions and production than other mines in the area. Mitigation and abatement measures include optimisation activities to be performed include the following:

- use of method 2 open cut fugitive GHG emissions;
- CHPP operating settings and the use of additives to optimise yield and efficiency. This will result in a high-quality export product with a lower thermal coal byproduct;
- improvements related to shift changeovers and work through crib times will improve the utilisation of excavators- which is expected to result in secondary GHG benefits;
- the implementation of variable speed drives, improving energy efficiency;
- road optimisation techniques to reduce the rolling resistance of roads, decrease water usage, decrease damage to equipment and therefore reduce the frequency of equipment replacement and repair.

7.1.3 Mineral Waste Management Plan (EA Condition C11)

The Mineral Waste Management Plan required by condition C11 must include at least:

- a program for the effective characterisation of mineral waste to predict, under the proposed placement and disposal strategy, the quality of runoff and seepage generated concerning salinity, acidity, alkalinity and dissolved metals, metalloids, and non-metallic inorganic substances;
- a program of progressive sampling and characterisation to identify dispersive and nondispersive waste rock, the salinity and metal/metalloid concentrations of waste rock and the salinity, sulphate, acid and alkali producing potential;
- a materials balance and disposal plan demonstrating how potentially acid forming and acid-forming waste rock and coal rejects will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage;
- a disposal plan demonstrating how highly sodic and dispersive waste rock is identified and selectively placed and/or encapsulated to ensure that it will not report to final landform surfaces and will not be used for construction activities;
- where relevant, a sampling program to verify encapsulation and/or placement of potentially acid-forming and acidforming waste;
- details regarding the management of seepage and leachates; and
- monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of waste rock, including the prevention and management of acid mine drainage, saline drainage, erosion minimisation and establishment of vegetation cover.

This plan will be reviewed an updated at regular intervals not exceeding two years.

7.1.4 Non-mineral waste management Plan (EA Condition C7)

The program required under condition C7 must include:

- a description of each waste stream generated by the authorised activity; and
- a description of the authorised activity that may generate waste; and
- waste management control strategies including:
 - recording of the types and amounts of wastes generated by the authorised activity;
 - segregation of the wastes;
 - storage of the wastes;
 - transport of the wastes;
 - disposal of waste including leachate management; and
 - monitoring and reporting matters concerning the waste; and
- the hazard characteristics of the wastes generated including disposal procedures for regulated wastes; and
- a program for reusing, recycling or disposing of all wastes; and
- how the waste will be dealt with in accordance with the waste and resource management hierarchy, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices in the waste management hierarchy (i.e. avoidance, reuse, recycling, energy recovery, disposal); and
- how the waste will be stored, handled and transferred in a proper and effective manner;
- procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources and improve the waste management practices employed; and
- procedures for dealing with accidents, spills, and other incidents that may impact on waste management; and
- details of any accredited management system employed, or planned to be employed, to deal with the waste; and
- how often the performance of the waste management practices will be assessed; and
- indicators or other criteria on which the performance of the waste management practices will be assessed; and
- staff training and induction to the waste management program; and
- a system for regular review.

The program will be reviewed at no greater than every 5 five years.

7.1.5 Tailings and Coarse Rejects Disposal Plan (EA Condition C13)

The Tailings and Coarse Rejects Disposal Plan required under condition C13 must at a minimum include:

- effective characterisation of the CHPP tailings and coarse rejects to predict, under the proposed placement and disposal strategy, the quality of runoff and seepage generated concerning potentially

environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances;

- a program of progressive sampling and analysis to characterise the CHPP tailings and rejects and identify dispersive and non-dispersive materials and the salinity, acid and alkali producing potential, metal and acid concentrations of tailings and rejects;
- a material balance and disposal plan demonstrating how potentially acid forming tailings and coarse rejects will be selectively placed and/or encapsulated to minimise potential generation of acid mine drainage, where relevant;
- re-testing of tailings and coarse rejects geochemistry and water quality limits of parameters;
- where relevant, a sampling program to verify encapsulation and/or placement of potentially acid forming waste rock;
- data for run-off water quality;
- how often the suitability of the plan will be assessed and triggers for plan revisions; and
- the indicators or other criteria on which the suitability of the plan will be assessed.

7.1.6 Water Management Plan (EA Condition F3)

The Water Management Plan must provide for effective water management of actual and potential environmental impacts resulting from the authorised activity; and include:

- a study of the source of contaminants; and
- a water balance model for the site; and
- a water management system for the site; and
- measures to prevent, manage and reduce mine drainage; and
- contingency procedures for incidents and emergencies; and
- a program for monitoring and review of the effectiveness of the Water Management Plan.

The Water Management Plan must be reviewed by 1 August for each calendar year. The review must be documented and:

- include a statement that the Water Management Plan has been reviewed by an AQP; and
- assess the plan against the requirements under condition F25; and
- include recommended actions to ensure actual and potential environmental impacts are effectively managed; and
- provide details and timelines of the actions to be taken; and
- identify any amendments to be made to the Water Management Plan.

A copy of the Water Management Plan must be kept up to date following each annual review and must be provided to the administering authority on request.

7.1.7 Erosion and Sediment Control Plan (EA Condition F29)

The Erosion and Sediment Control Plan must demonstrate how erosion and sediment control measures detailed in the plan adequately minimise the release of sediment to receiving waters and must include at least the following:

- an assessment of the size and characteristics of all catchment areas; and
- an assessment of relevant properties of soils and waste materials; and
- identification of receiving waters environmental values, water quality objectives and management intent; and
- specification of minimum design criteria for erosion and sediment control structures to achieve the management intent of receiving waters; and
- locations and descriptions of all erosion and sediment control measures; and
- an audit schedule to ensure erosion and sediment control measures are maintained.

This plan will be reviewed each calendar year and will:

- include a statement that the Erosion and Sediment Control Plan has been reviewed by an AQP; and
- assess the plan against the requirements of condition F30; and
- include recommended actions to ensure actual and potential environmental impacts are effectively managed; and
- provide details and timelines of the actions to be taken; and
- identify any amendments made to the Erosion and Sediment Control Plan.

7.1.8 Weed Management Plan (EA Condition G9)

A weed management plan must be developed prior to the commencement of authorised activities and implemented for MLA700073 for the duration of authorised activities and must outline:

- areas of control priority and the methods used to determine such areas; and
- strategies to promote dense pasture cover (to decrease weeds establishment) through reduced disturbance; and
- monitoring methodologies that document the spread of weeds and any new outbreaks; and
- methods for the control of weeds that include best practice management; and
- stringent wash-down and inspection procedures for both machinery involved in clearing/construction activities and those operating outside of designated roads during mine operation; and
- truck wash procedure to reduce weed infestations; and
- protocol for an annual weed inspection; and
- promotion of the awareness of weed management issues at the site.

8 Abbreviations

AQP	Appropriately Qualified Person
bgl	Below ground level
CHPP	Coal Handling and Processing Plant
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DESI	Department of Environment, Science and Innovation
EA	Environmental Authority
EMP	Environmental Management Plan
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
ERA	Environmentally Relevant Activities
GDE	Groundwater Dependent Ecosystems
ML	Mining lease
MNES	Matter of National Environmental Significance
Mtpa	Million tonnes per annum
NEQ	Net Explosive Quantity
PER	Public Environment Report
PMLU	Post Mining Land Use
PRCP	Progressive Rehabilitation and Closure Plan
QCC	Queensland Coking Coal Pty Ltd
QCA1	Queensland Coal Aust. No. 1 Pty Ltd
ROM	Run of mine
SRMS	Scaled Root Mean Square
WQO	Water Quality Objectives
WRD	Waste Rock Dump

9 References

- Baker, B. & Richardson, J., 2006. The effect of artificial light on male breeding-season behaviour in green frogs, *Rana clamitans melanota*. *Canadian Journal of Zoology*, Volume 84, pp. 1528-1532.
- Barber, J., Crooks, K. & Fristrup, K., 2010. The costs of chronic noise exposure for terrestrial organisms. *Trends in Ecology and Evolution*, Volume 25, pp. 180-189.
- Barnett, B., Townley, LR., Post, V., Evans, RE., Hunt, RJ., Peeters, L., Richardson, S., Werner, AD., Knapton, A. & Boronkay, A., 2012. *Australian Groundwater Modelling Guidelines*, Waterlines report, National Water Commission, Canberra.
- Ben-Shlomo, R. & Kyriacou, C., 2010. Light pulses administered during the circadian dark phase alter expression of cell cycle associated transcripts in mouse brain. *Cancer Genetics and Cytogenetics*, Volume 197, pp. 65-70.
- Cunnington, G. & Fahrig, L., 2010. Plasticity in the vocalizations of anurans in response to traffic noise. *Oecologia*, Volume 36, pp. 463-470.
- Davies, T., Bennie, J. & Gaston, K., 2012. Street lighting changes the composition of invertebrate communities. *Biology Letters*, Volume e20120216.
- DCCEEW, 2023. *National Light Pollution Guidelines for Wildlife*, Department of Climate Change, Energy, the Environment and Water, Canberra, Version 2.0
- DCCEEW, 2024. *Environmental Management Plan Guidelines*, Department of Climate Change, Energy, the Environment and Water, Canberra, March. CC BY 4.0.
- Farmer, A., 1993. The effects of dust on vegetation - a review. *Environmental Pollution*, Volume 79, pp. 63-75.
- Howell, J., Laskey, A. & Tanner, J., 1954. Bird mortality at airport celimeters. *The Wilson Bulletin*, Volume 66, pp. 207-215.
- Longcore, T. et al., 2012. An estimate of avian mortality at communication towers in the United States and Canada. *PLoS One*, Volume e34025.
- METServe, 2024. *Public Environment Report – Vulcan South Project*
- Newport, J., Shorthouse, D. & Manning, A., 2014. The effects of light and noise from urban development on biodiversity: Implications for protected areas in Australia. *Ecological Management & Restoration*, 15(3).
- Poot, H. et al., 2008. Green light for nocturnally migrating birds. *Ecology and Society*, 13(47 (online)).
- Rotics, S., Dayan, T., Levy, O. & Kronfeld-Schor, N., 2011. Light masking in the field: an experiment with nocturnal and diurnal spiny mice under semi-natural field conditions. *Chronobiology International*, Volume 28, pp. 70-75.
- Salmon, M. et al., 1995. Behaviour of loggerhead sea turtles on an urban beach. 2. Hatching orientation. *Journal of Herpetology*, Volume 29, pp. 568-576.
- Sanders, D. et al., 2020. A meta-analysis of biological impacts of artificial light at night. *Nature Ecology & Evolution*, Volume 5, pp. 74-81.
- Shannon, G. et al., 2016. A synthesis of two decades of research documenting the effects of noise on wildlife. *Biological Reviews*, Volume 91, pp. 982-1005.
- Standards Australia, 2017. *AS 1940-2017 The storage and handling of flammable and combustible liquids*. Sixth edition. Sydney, NSW:
- Standards Australia, 2018. *AS ISO 31000:2018 Risk management Guidelines*. Sydney, NSW

WRM, 2021. *Vulcan Coal Mine Erosion and Sediment Control Plan*. WRM Water & Environment Pty Ltd, December 2021, report prepared for METServe, Report Number 1571-17-B.

WRM, 2023. *Vulcan Coal Mine Water Management Plan*. WRM Water & Environment Pty Ltd, November 2023, report prepared for METServe, Report Number 1571-17-A2.

Appendix A – Vulcan South Environmental Authority

Permit

Environmental Protection Act 1994

Environmental authority P-EA-100265081 Vulcan South Coal Mine

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: P-EA-100265081

Environmental authority takes effect on the date that your relevant tenure is granted. This is the take effect date.

The first annual fee is payable within 20 business days of the take effect date.

The anniversary date of this environmental authority is the same day each year as the take effect date. The payment of the annual fee will be due each year on this day.

An annual return will be due each year on 01 April.

Transfers of this environmental authority are not authorised.

Environmental authority holder(s)

Name(s)	Registered address
Queensland Coking Coal Pty Ltd	Level 6, Suite 2, 12 Creek Street, Brisbane QLD 4000
Qld Coal Aust No.1 Pty Ltd	

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3, 13: Mining black coal	ML700073
Ancillary 31 - Mineral processing 2: processing, in a year, the following quantities of mineral products, other than coke— (b) more than 100,000t	ML700073
Ancillary 33 - Crushing, grinding, milling or screening more than 5,000t of material in a year	ML700073

Additional information for applicantsEnvironmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days) that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority – on the nominated day; or
- b) if the authority states a day or an event for it to take effect – on the stated day or when the stated event happens; or
- c) otherwise – on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

The anniversary day of this environmental authority is the same day each year as the effective date. The payment of the annual fee will be due each year on this day. An annual return will be due each year on 01 April. If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Juliana McCosker

Department of Environment, Science and Innovation

Delegate of the administering authority

*Environmental Protection Act 1994*Issued: **5 April 2024****Enquiries:**

Business Centre (Coal)

PO Box 3028, Emerald QLD 4720

Phone: (07) 4987 9320

Email: CRMining@des.qld.gov.au

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access State controlled roads), the Department of Resources (to clear vegetation), and the Department of Agriculture and Fisheries (to clear marine plants or to obtain a quarry material allocation).

Development Approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval. If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. Please contact the Department of Environment, Science and Innovation to ensure that you have the most current version of the environmental authority relating to this site.

Conditions of environmental authority

Schedule A: General	
Condition number	Condition
A1	All reasonable and practicable measures must be taken to prevent or minimise environmental harm caused, or likely to be caused, by the authorised activities.
A2	This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.
A3	Unless specifically authorised by a condition of this environmental authority, this environmental authority does not authorise a relevant act which is: <ul style="list-style-type: none"> a) an act that causes serious or material environmental harm or an environmental nuisance; or b) an act that contravenes a noise standard; or c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG of the <i>Environmental Protection Act 1994</i>.
A4	<p>Authorised activities</p> <p>The environmental authority holder is approved to extract up to 1.95 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal within ML700073 in accordance with this environmental authority.</p>
A5	<p>In carrying out the authorised activity, disturbance must not exceed the total maximum disturbance area for each mining area listed in Table A1. Maximum disturbance area for each mining area,¹ as shown in Figure A1 – Maximum disturbance areas.</p> <p>¹The maximum disturbance area does not include exploration conducted in accordance with condition A7 or groundwater, air and noise monitoring activities conducted in accordance with this environmental authority.</p>
A6	<p>In carrying out the authorised activity, disturbance must not occur outside the maximum disturbance area depicted in Figure A2, Project Layout – Authorised Disturbance Areas.¹</p> <p>Notes: ¹Exploration and groundwater monitoring activities can be undertaken outside of the maximum disturbance area shown in Figure A2, Project Layout – Authorised Disturbance Areas within the tenure boundary, excluding in areas of Matters of State Environmental Significance (MSES) that are not authorised to be impacted under condition H1.</p> <p>A buffer has been provided for in Figure A2, Project Layout – Authorised Disturbance Areas to the areas of maximum disturbance relevant to condition A5. The environmental authority only authorises disturbance to the extent of areas stated in Table A1 – Maximum disturbance area for each mining area, notwithstanding the note to condition A5.</p>

Table A1 – Maximum disturbance area for each mining area

Mining area	Maximum disturbance (ha)
CHPP	4.8
Ex-pit Dump	191.7
In-pit Dump	405.3
Haul Roads	152.2
Water Management Infrastructure	94.1
Highwall Mining Bench	44.2
Highwall Plunge	131.2
Highwall Rock Dump	4.3
Magazine	9.2
MIA	86
Dams	20.9
Access Roads	24.5
Rail Loop	49.4
Total disturbance authorised	1217.9ha
Existing Rail*	27.2
Saraji Road Corridor*	36.3

* Existing infrastructure

A7	Disturbance due to exploration activities in areas not scheduled to be mined must be rehabilitated within six (6) months of completion and in accordance with rehabilitation provisions detailed in the latest version of the ' <i>Eligibility Criteria and Standard Conditions for Exploration and Mineral Development Projects</i> ' (ESR/2016/1985).
A8	In accordance with condition A4 , within twenty (20) business days of 30 June each year, the environmental authority holder must report to the administering authority the tonnes of ROM coal produced in the previous calendar year.
A9	<p>Contravention of conditions</p> <p>Unless specifically authorised by a condition of this environmental authority, details of any contravention of a condition of this environmental authority must:</p> <ol style="list-style-type: none"> be reported to the administering authority within twenty-four (24) hours of becoming aware of the contravention; and include the nature and circumstances of the contravention and any immediate actions taken.

A10	As soon as reasonably practicable but no later than twenty (20) business days of a report made under condition A9(a) (or a longer period agreed to in writing by the administering authority), an investigation report must be submitted to the administering authority detailing: <ul style="list-style-type: none"> a) the potential circumstances and actions that may have contributed to the contravention; and b) reasonable and practicable measures that will be implemented to address the cause of the contravention to prevent future contraventions of this nature and to address any actual or potential environmental harm.
A11	As soon as reasonably practicable but no later than twenty (20) business days after submitting the report required under condition A10 (or a longer period agreed to in writing by the administering authority), the measures identified under condition A10(b) must be implemented.
A12	The measures implemented under condition A11 must be recorded.
A13	<p>Complaints</p> <p>The following details must be recorded for all complaints received and provided to the administering authority upon request:</p> <ul style="list-style-type: none"> a) date and time the complaint was received; and b) if authorised by the person making the complaint, their name and contact details; and c) nature and details of the complaint.
A14	As soon as reasonably practicable but no later than five (5) business days of receiving a complaint under condition A13 (or a longer period agreed to in writing by the administering authority), an investigation must be undertaken to determine: <ul style="list-style-type: none"> a) the potential circumstances and actions on site that may have contributed to the basis of the complaint; and b) reasonable and practicable measures that will be implemented to address the complaint.
A15	As soon as reasonably practicable but no later than five (5) business days of investigating a complaint under condition A14 (or a longer period agreed to in writing by the administering authority), measures identified in the investigation must be implemented under condition A14 .
A16	The outcome of the investigation carried out under condition A14 and the measures implemented under condition A15 must be recorded and provided to the administering authority upon request.

A17	<p>Environmental risk management procedures</p> <p>Written procedures must be developed prior to the commencement of authorised activities and implemented by an appropriately qualified person that ensure:</p> <ul style="list-style-type: none"> a) all potential risks to the environment from the carrying out of the activity are identified and assessed, including: <ul style="list-style-type: none"> i. during routine operations; and ii. outside routine operations (e.g., maintenance, start up and shut down); and iii. during preparation, rehabilitation, and closure; and iv. in an emergency (e.g., fire, flood or other natural disaster); and b) for each potential risk identified, any necessary measures to prevent or minimise the potential for environmental harm are implemented; and c) staff understand their obligations under this environmental authority and the <i>Environmental Protection Act 1994</i>; and d) environmental risk management procedures are continually reviewed and improved, based on best practice management.
A18	<p>Maintenance of plant and equipment</p> <p>The environmental authority holder must:</p> <ul style="list-style-type: none"> a) install all reasonable and practicable measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; b) maintain such measures, plant and equipment in a proper and efficient condition; c) operate such measures, plant and equipment in a proper and efficient manner; and d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.
A19	Records of installation, calibration and maintenance carried out under condition A18 must be kept.
A20	<p>Record keeping</p> <p>Unless otherwise specified by a condition of this environmental authority, records must be:</p> <ul style="list-style-type: none"> a) kept for the period outlined in Table A2 – Record keeping requirements; and b) provided to the administering authority upon request and in the format requested.

Table A2 – Record keeping requirements

Description of records	Retention requirement
Monitoring results	Retain for 9 years
All other records	Retain for 5 years

A21	<p>Plans, reports and programs</p> <p>Any plans, reports or programs required by a condition of this environmental authority must be developed and reviewed by an appropriately qualified person.</p>
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Environmental authority P-EA-100265081 Vulcan South Coal Mine

A22	<p>Upon request from the administering authority, copies of all records, plans, and other documentation required by the conditions of this environmental authority must be made available and provided to the administering authority within:</p> <ul style="list-style-type: none"> a) ten (10) business days; or b) an alternative timeframe agreed between the administering authority and the environmental authority holder.
A23	<p>Within twenty (20) business days; or an alternative timeframe agreed between the administering authority and the environmental authority holder, of receiving comments from the administering authority on any document, the document must:</p> <ul style="list-style-type: none"> a) be updated by an appropriately qualified person having regard to the comments; and b) re-submitted to the administering authority.
A24	<p>All plans and programs required by this environmental authority are to be published on the environmental authority holder's website within twenty-eight (28) business days of completion.</p>
A25	<p>Monitoring and sampling</p> <p>All monitoring and sampling required by the conditions of this environmental authority must be carried out, interpreted, and recorded by an appropriately qualified person.</p>
A26	<p>Unless otherwise authorised in writing by the administering authority, all laboratory analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) accreditation for such analyses, with the exception of in situ monitoring of dissolved oxygen, temperature, pH, electrical conductivity and turbidity.</p>
A27	<p>Third-party reporting</p> <p>The holder of this environmental authority must:</p> <ul style="list-style-type: none"> a) within one year of the commencement of authorised activities obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority; and b) obtain further such reports at regular intervals, not exceeding two (2) yearly intervals, from the completion of the report required by A27(a); and c) provide each report to the administering authority within ninety (90) days of its completion.
A28	<p>Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must:</p> <ul style="list-style-type: none"> a) comply with the amended or changed standard, policy or guideline within two (2) years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, the time specified in that condition; and b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.

A29	<p>Notification of commencement of authorised activities</p> <p>The holder of this environmental authority must provide the administering authority with a date in writing for when authorised activities commence under this environmental authority no later than fourteen (14) days after the commencement of authorised activities.</p>
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Schedule B: Air	
Condition number	Condition
B1	Authorised activities must not result in an exceedance of the air quality limits in Table B1 - Ambient air quality limits at a sensitive place.
B2	Air emissions and meteorological conditions must be monitored in accordance with Table B1 – Ambient air quality limits at the frequency stated in Table B1 – Ambient air quality limits .
B3	The monitoring carried out in accordance with condition B2 must commence prior to the commencement of authorised activities.

Table B1 —Ambient air quality limits

Monitoring locations	Air Quality Determination/ Indicator	Air quality limit	Averaging period	Frequency	Monitoring standard
All sensitive places within 6km of mine site*	Particulate matter less than 10µm in aerodynamic diameter (PM ₁₀)	50µg/m ³	24-hour	Continuous	AS3580.9.8 <i>Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 continuous direct mass method using tapered element oscillating microbalance analyser.</i>
All sensitive places within 6km of mine site*	Dust deposition	120 mg/m ² /day	Monthly	Monthly	AS3580.10.1 <i>Methods for sampling and analysis of ambient air—Determination of particulate matter — Deposited matter – Gravimetric method.</i>
Weather Station	Meteorological data (including but not limited to wind speed and direction, relative humidity, temperature, precipitation and rainfall intensity, solar radiation)	N/A	Continuous (minimum 1-hour average)	Continuous	<ol style="list-style-type: none"> Monitoring by automatic meteorological station(s) Australian Standard AS3580.14 <i>Methods for sampling and analysis of ambient air – Meteorological monitoring for ambient air quality monitoring applications; or</i> an alternative method approved by the administering authority.

*OR at a monitoring location representative (whether by reason of correlation or otherwise) of the sensitive place (where no measure at the sensitive place is agreed with the owner of the sensitive place).

B4	<p>Air quality monitoring exceedance</p> <p>If air quality monitoring indicates an exceedance of any relevant limit in Table B1 – Ambient air quality limits, dust abatement measures must be immediately implemented in accordance with the Air Emissions Management Plan required under condition B8, to minimise any adverse impacts to the sensitive place and to limit further exceedances.</p> <p><i>NOTE: Exceedances due to events that cannot be managed by the environmental authority holder, such as bushfires, fuel reduction burning for fire management purposes or dust storms, would not be considered to be in breach of condition B4 if the environmental authority holder can demonstrate that the exceedance was caused by such events.</i></p>
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B5	The environmental authority holder must determine if an exceedance recorded under condition B4 is a result of the authorised activities being undertaken.
B6	<p>A report must be provided to the administering authority within ten (10) business days of an exceedance in the air quality limits of Table B1 – Ambient air quality limits that is a result of authorised activities being undertaken as determined under condition B5. The report must detail:</p> <ul style="list-style-type: none"> a) the air quality data at the sensitive place; b) a description of meteorological conditions recorded in accordance with Table B1 – Ambient air quality limits occurring at the time; c) the air quality data upwind of the authorised activities (if known); d) measures taken to reduce dust generated by the authorised activities including those undertaken under condition B4; and e) the contribution of the authorised activities to the PM₁₀ concentration and dust deposition at the sensitive place.
B7	<p>The air quality monitoring required by condition B2 remains effective and targeted through the life of the project with the monitoring locations reviewed annually. The annual review should consider:</p> <ul style="list-style-type: none"> a) the frequency and cause of any exceedances of air quality limits measured by the air quality monitoring program conducted under this environmental authority over at least the preceding two (2) years; b) dust complaints; c) future progression of the mining activity; d) locations of sensitive and commercial places relative to the mining activity; and e) mining activity types.
B8	<p>Air Emissions Management Plan</p> <p>An Air Emissions Management Plan must be developed by an appropriately qualified person and implemented for all stages of the authorised activity and submitted to the administering authority on, or before the commencement of authorised activities.</p>
B9	<p>The Air Emissions Management Plan required by condition B8 must incorporate a program for continuous improvement for the management of dust and particulate matter resulting from the authorised activities with respect to, but not limited to:</p> <ul style="list-style-type: none"> a) the collection of air quality and meteorological data at locations and using the monitoring methods described in Table B1 – Ambient air quality limits; and b) a system to identify adverse meteorological conditions likely to produce elevated levels of dust deposition, PM₁₀ at a sensitive place due to the authorised activities; and c) a dust and particulate matter control strategy which: <ul style="list-style-type: none"> (i) activates a timely implementation of management control action; (ii) acts in response to the system required by condition B9(b); (iii) acts in response to any air quality monitoring that indicates a potential for an exceedance of the air quality limits of Table B1 – Ambient air quality limits.
B10	The Air Emissions Management Plan required by condition B8 must be reviewed every three (3) years by an appropriately qualified person and any recommendations incorporated into the Air Emissions Management Plan.

B11	<p>Dust control - trafficable and rail areas</p> <p>Trafficable and rail areas (including entry and exit points from Saraji Road, the rail loop and the train load out facility) must be maintained using all reasonable and practicable measures necessary to minimise the release of windblown or traffic generated dust to the atmosphere.</p>
B12	<p>Dust management – coal transport</p> <p>The environmental authority holder must take all reasonable and practicable measures necessary to prevent release of windblown dust associated with transporting coal extracted from site.</p>
B13	<p>Greenhouse gas abatement plan</p> <p>A greenhouse gas (GHG) abatement plan must be developed and implemented prior to the commencement of authorised activities. The GHG abatement plan must include:</p> <ul style="list-style-type: none"> a) an inventory of projected unmitigated annual Scope 1 and Scope 2 emissions for each GHG over the life of the project; and b) the intended objectives, measures and performance standards to avoid and mitigate GHG emissions consistent with the latest version of the Queensland Climate Action Plan and relevant targets; and c) a process for regularly reviewing, assessing, and implementing new technologies to identify opportunities to further reduce GHG emissions and energy use and progressively improve energy efficiency; and d) a program for annual monitoring, auditing and reporting on GHG emissions from all relevant activities and the success of measures to avoid and mitigate GHG emissions and achieve reduction targets; and e) a biennial review and update of the effectiveness of the plan.
B14	<p>A schedule of targets for GHG reduction required under condition B13(d) must be provided to the administering authority prior to the commencement of authorised activities and be made available for each year of authorised activities on request.</p>
B15	<p>The results of the program conducted under condition B13(d) must be made publicly available on the environmental authority holder's website, and any other website requested by the administering authority.</p>

Schedule C: Waste	
Condition number	Condition
C1	The environmental authority holder must plan and conduct activities on site to prevent any potential or actual release of a hazardous contaminant.
C2	Waste must not be released directly or indirectly to waters.
C3	Only coal mined from ML700073 can be washed on ML700073.
C4	Unless otherwise authorised by the conditions of this environmental authority, all waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.
C5	Unless otherwise authorised by the conditions of this environmental authority, non-mineral waste, except scrap tyres and green waste, must not be disposed of within ML700073.
C6	Unless otherwise permitted by the conditions of this environmental authority, waste must not be burnt.
C7	<p>Non-mineral waste management program</p> <p>The holder of this environmental authority must develop, document and implement a non-mineral waste management program for all authorised activities.</p>

C8	<p>The program required under condition C7 must include:</p> <ul style="list-style-type: none"> a) a description of each waste stream generated by the authorised activity; and b) a description of the authorised activity that may generate waste; and c) waste management control strategies including: <ul style="list-style-type: none"> i. recording of the types and amounts of wastes generated by the authorised activity; ii. segregation of the wastes; iii. storage of the wastes; iv. transport of the wastes; v. disposal of waste including leachate management; and vi. monitoring and reporting matters concerning the waste; and d) the hazard characteristics of the wastes generated including disposal procedures for regulated wastes; and e) a program for reusing, recycling or disposing of all wastes; and f) how the waste will be dealt with in accordance with the waste and resource management hierarchy, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices in the waste management hierarchy (i.e. avoidance, reuse, recycling, energy recovery, disposal); and g) how the waste will be stored, handled and transferred in a proper and effective manner; and h) procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources and improve the waste management practices employed; and i) procedures for dealing with accidents, spills, and other incidents that may impact on waste management; and j) details of any accredited management system employed, or planned to be employed, to deal with the waste; and k) how often the performance of the waste management practices will be assessed; and l) indicators or other criteria on which the performance of the waste management practices will be assessed; and m) staff training and induction to the waste management program; and n) a system for regular review.
C9	<p>The program required under condition C7 must be regularly reviewed and updated at intervals of no greater than five (5) years.</p>
C10	<p>Storage and disposal of tyres</p> <p>Tyres must be stored and disposed of in accordance with the latest version of the Operational policy - <i>Disposal and storage of scrap tyres at mine sites</i> ESR/2016/2380.</p>
C11	<p>Mineral Waste Management Plan</p> <p>A Mineral Waste Management Plan must:</p> <ul style="list-style-type: none"> a) be developed and implemented prior to the commencement of authorised activities; and b) be reviewed and updated at regular intervals, not exceeding two (2) years.

C12	<p>The Mineral Waste Management Plan required by condition C11 must include at least:</p> <ul style="list-style-type: none"> a) a program for the effective characterisation of mineral waste to predict, under the proposed placement and disposal strategy, the quality of runoff and seepage generated concerning salinity, acidity, alkalinity and dissolved metals, metalloids, and non-metallic inorganic substances; b) a program of progressive sampling and characterisation to identify dispersive and non-dispersive spoil, the salinity and metal/metalloid concentrations of waste rock and the salinity, sulphate, acid and alkali producing potential; c) a materials balance and disposal plan demonstrating how potentially acid forming and acid-forming waste rock and coal rejects will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage; d) a disposal plan demonstrating how highly sodic and dispersive waste rock is identified and selectively placed and/or encapsulated to ensure that it will not report to final landform surfaces and will not be used for construction activities; e) where relevant, a sampling program to verify encapsulation and/or placement of potentially acid-forming and acid-forming waste; f) details regarding the management of seepage and leachates; and g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of waste rock, including the prevention and management of acid mine drainage, saline drainage, erosion minimisation and establishment of vegetation cover.
C13	<p>Tailings and Coarse Rejects Disposal Plan</p> <p>A Tailings and Coarse Rejects Disposal Plan must be developed prior to the commissioning of the coal handling and processing plant (CHPP) on ML700073 and must be revised and implemented for all stages of activities.</p>

C14	<p>The Tailings and Coarse Rejects Disposal Plan required under condition C13 must at a minimum include:</p> <ul style="list-style-type: none"> a) effective characterisation of the CHPP tailings and coarse rejects to predict, under the proposed placement and disposal strategy, the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances; b) a program of progressive sampling and analysis to characterise the CHPP tailings and rejects and identify dispersive and non-dispersive materials and the salinity, acid and alkali producing potential, metal and acid concentrations of tailings and rejects; c) a material balance and disposal plan demonstrating how potentially acid forming tailings and coarse rejects will be selectively placed and/or encapsulated to minimise potential generation of acid mine drainage, where relevant; d) re-testing of tailings and coarse rejects geochemistry and water quality limits of parameters; e) where relevant, a sampling program to verify encapsulation and/or placement of potentially acid forming waste rock; f) data for run-off water quality; g) how often the suitability of the plan will be assessed and triggers for plan revisions; and h) the indicators or other criteria on which the suitability of the plan will be assessed.
C15	<p>CHPP water reuse</p> <p>Water used at the CHPP must be separated from the tailings and coarse rejects to produce as much as practicable:</p> <ul style="list-style-type: none"> a) dry tailings and coarse rejects; and b) water for reuse in the CHPP.
C16	<p>The following must be disposed of in accordance with the plans required by conditions C11 and C14 and must only be disposed to in-pit waste rock dumps:</p> <ul style="list-style-type: none"> a) waste rock identified as being Potentially Acid Forming (PAF) material; b) dry tailings; and c) rejects.

Schedule D: Noise	
Condition number	Condition
D1	<p>Noise nuisance</p> <p>Noise from the authorised activities must not cause an environmental nuisance at any sensitive place.</p>
D2	<p>Noise limits</p> <p>Noise from the activity must not exceed the levels identified in Table D1 – Noise limits – Sensitive place.</p>

Table D1 – Noise limits – Sensitive place

Noise level measured in dB(A)	Monday to Saturday			Sunday and Public Holidays		
	7am–6pm	6pm–10pm	10pm–7am	9am–6pm	6pm–10pm	10pm–9am
	Noise measured a sensitive place					
L_{Aeq} adj, 1 hr	40 dB(A)	40 dB(A)	35 dB(A)	35	35	35
L_{Amax}, 1 hr	N/A	N/A	45dB(A)	N/A	N/A	45 dB(A)

D3	<p>Noise monitoring</p> <p>Continuous monitoring of noise emissions from the activity must be undertaken at sensitive places when the activity is in operation.</p>
D4	<p>The following must be recorded when undertaking monitoring of noise emissions from the activity:</p> <ol style="list-style-type: none"> All equipment in operation at the time of the noise measurement; and The mode of operation at the time of the noise measurement.
D5	<p>Noise measurements must be taken using a class 1 sound level meter as classified under Australian Standard (IEC 61672).</p>
D6	<p>Notwithstanding condition D5, all monitoring of noise emissions from the activity must be undertaken in accordance with the most recent version of Queensland Government's 'Noise Measurement Manual' (ESR/2016/2195), the relevant Australian Standard and the Environmental Protection Regulation 2019 (Chapter 5, Part 4) and must include the following descriptors, characteristics and conditions:</p> <ol style="list-style-type: none"> L_{A10}, adj, 10 mins; and L_{A 1}, adj, 10 mins; and the level and frequency of occurrence of impulsive or tonal noise; and atmospheric conditions including wind speed and direction; and effects due to extraneous factors such as traffic noise; and location, date and time of recording.

D7	<p>Noise monitoring exceedance</p> <p>If noise monitoring indicates an exceedance of any relevant limit in Table D1 – Noise limits – Sensitive place, noise abatement measures must be immediately implemented to minimise any adverse impacts to the sensitive place and to limit any further exceedances.</p>
D8	<p>A report must be provided to the administering authority within ten (10) business days of an exceedance a noise limits of Table D1 – Noise limits – Sensitive place. The report must detail:</p> <ul style="list-style-type: none"> a) the noise emission data at the sensitive place; b) a description of meteorological conditions recorded in accordance with Table B1 – Ambient air quality limits occurring at the time; c) the air quality data upwind of the authorised activities (if known); d) measures taken to reduce noise generated by the authorised activities including those undertaken under condition D7; and e) the contribution of the authorised activities to the noise level experienced at the sensitive place.
D9	<p>When requested by the administering authority, noise and/or vibration monitoring must be undertaken at sensitive receptors and within a timeframe nominated by the administering authority.</p>
D10	<p>Blasting</p> <p>Blasting must not cause the limits prescribed in Table D2 – Blasting noise and vibration limits to be exceeded at a sensitive place.</p>
D11	<p>Blast monitoring program</p> <p>The environmental authority holder must develop and implement a blast monitoring program to monitor compliance with Table D2 – Blasting noise and vibration limits for all blasts conducted at the nearest and most affected sensitive place(s)</p>
D12	<p>Blast monitoring must include the following descriptors, characteristics, and conditions:</p> <ul style="list-style-type: none"> a) location of the blast(s) within the mining area (including which bench level); b) atmospheric conditions including temperature, relative humidity, wind speed and wind direction; and c) location, date and time of recording.
D13	<p>If monitoring indicates exceedance of the limits in Table D2 – Blasting noise and vibration limits, then the environmental authority holder must immediately implement airblast overpressure abatement measures so that airblast overpressure from the activity does not result in further environmental nuisance.</p>

Table D2 – Blasting noise and vibration limits

Blasting noise and vibration limits	Sensitive place criteria	
	7am to 6pm	6pm to 7am
Airblast overpressure	115dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time	No blasting is allowed during these times
Ground vibration peak particle velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time	No blasting is allowed during these times

Schedule E: Groundwater	
Condition number	Condition
E1	Contaminants must not be released directly or indirectly to groundwater.
E2	<p>Groundwater Monitoring Bores</p> <p>The construction, maintenance, operation and decommissioning of each groundwater monitoring bore must be undertaken by an appropriately qualified person in a manner that:</p> <ol style="list-style-type: none"> prevents contaminants entering the groundwater; and ensures representative groundwater samples from the target hydrogeological unit; and maintains the hydrogeological environment within the hydrogeological unit.
E3	<p>A bore report must be kept for each monitoring bore which includes:</p> <ol style="list-style-type: none"> a unique identification reference number and geographic coordinate location; and construction information including but not limited to the depth of bore, depth and length of casing, depth and length of screening and bore sealing details; and stratigraphy and target hydrogeological unit of the bore; and depth at which groundwater was intercepted; and the final standing water level (SWL) after bore development.
E4	<p>Any groundwater monitoring bore that is scheduled to be decommissioned due to planned authorised activities must:</p> <ol style="list-style-type: none"> be replaced at least twelve (12) months prior to decommissioning; and be replaced by a groundwater monitoring bores that targets the same hydrogeological unit in a suitable location.

E5	Any groundwater monitoring bore that is decommissioned due to unplanned events (e.g. damage to bore) must: <ul style="list-style-type: none"> a) be replaced within six (6) months of decommissioning; and b) be replaced by a groundwater monitoring bore that targets the same hydrogeological unit and in the same location and provides for the requirements of condition E24(g).
E6	Groundwater monitoring bores MB1R, MB12R, MB14, MB15, MB16, MB17 and MB18 as identified in Table E1 – Groundwater monitoring locations and frequency must be installed prior to the commencement of authorised activities.
E7	<p>Groundwater monitoring</p> <p>Groundwater quality and SWL must be monitored:</p> <ul style="list-style-type: none"> a) at the locations specified in Table E1 – Groundwater monitoring locations and frequency, as illustrated in Figure E1 – Location of groundwater monitoring bores; and b) at the frequencies specified in Table E1 – Groundwater monitoring locations and frequency; and c) for quality characteristics listed in Table E2 – Groundwater quality limits.
E8	Monitoring and sampling of groundwater must comply with the latest version of the Queensland Government's 'Monitoring and Sampling Manual 2018 – Environmental Protection (Water) Policy 2009'.
E9	By 31 December 2024 , the environmental authority holder must submit a report to the administering authority to replace all TBD values in Table E1 – Groundwater monitoring locations and frequency .
E10	By 31 December 2026 , the environmental authority holder must submit a report to the administering authority to replace all TBD values, in Table E2 – Groundwater quality limits based on at least eighteen (18) samples collected over at least an eighteen (18) month period and with considerations of the methods and matters stated in the latest version of the guideline " <i>Using monitoring data to assess groundwater quality and potential environmental impacts</i> ", February 2021.
E11	The report required in condition E10 must include a review of all groundwater quality limits indicated in Table E2 – Groundwater quality limits to assure achievement of the requirements of condition E24(g) .

Table E1 – Groundwater monitoring locations and frequency

Monitoring Bore	Hydrogeological Unit	Location (decimal degrees, GDA2020)		Surface RL (mAHD)	Screened Interval RL (depth)(mbgl)	Monitoring Frequency	
		Latitude	Longitude			Water level	Water quality
MB01R*	DLL coal seam	22.333428732° S	148.220070636° E	222.91	21.9 - 24.9	monthly	monthly
MB06	Weathered Permian	22.360790237° S	148.247150363° E	214.61	21.6 - 24.6	quarterly	quarterly
MB07	Weathered Permian	22.364540522° S	148.250437058° E	215.99	40.0 - 43.0	quarterly	quarterly
MB08	Weathered Permian	22.357739524° S	148.244501266° E	212.24	21.0 – 24.0	quarterly	quarterly
MB09	DLL coal seam	22.373728533° S	148.258356674° E	208.98	31.4 – 34.4	quarterly	quarterly
MB10	DLL coal seam	22.360862044° S	148.247209269° E	214.60	37.3 – 40.3	quarterly	quarterly
MB11	DLL coal seam	22.350287991° S	148.237375642° E	225.66	26.9 – 29.9	quarterly	quarterly
MB12	Back Creek Group	22.364028727° S	148.215646464° E	241.43	32.2 – 38.2	quarterly	quarterly
MB12R*	Back Creek Group	22.364028727° S	148.215646464° E	241.43	32.2 – 38.2	monthly	monthly
MB14*	TBD	22.384866461° S	148.266362984° E	TBD	TBD	monthly	monthly
MB15*	TBD	22.282575366° S	148.151921075° E	TBD	TBD	monthly	monthly
MB16*	TBD	22.288394573° S	148.174332028° E	TBD	TBD	monthly	monthly
MB17*	TBD	22.340395410° S	148.213732530° E	TBD	TBD	monthly	monthly
MB18*	TBD	22.402178167° S	148.262216512° E	TBD	TBD	monthly	monthly

*Bore to be installed as required by condition E6.

E12	<p>Groundwater Quality</p> <p>Results of monitoring of groundwater from the monitoring bores identified in Table E1 – Groundwater monitoring locations and frequency must not exceed any of the groundwater quality limits specified in Table E2 – Groundwater quality limits on three (3) consecutive sampling occasions.</p>
E13	<p>If monitoring bores identified in Table E1 – Groundwater monitoring locations and frequency exceed the groundwater quality limits specified in Table E2 – Groundwater quality limits on three (3) consecutive sampling occasions, the environmental authority holder must notify the administering authority within twenty-four (24) hours of receiving the results.</p>
E14	<p>Groundwater Quality Trigger investigation</p> <p>If monitoring results from groundwater monitoring bores listed in Table E1 – Groundwater monitoring locations and frequency, exceed any of the groundwater quality triggers specified in Table E2 – Groundwater quality triggers on three (3) consecutive sampling occasions the environmental authority holder must complete an investigation within fourteen (14) days of receiving the results to determine if the exceedance is a result of:</p> <ol style="list-style-type: none"> activities authorised under this environmental authority; or natural variation; or neighbouring land use resulting in groundwater impacts.

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E15	The holder of this environmental authority must provide a report of the investigation to the administering authority within fourteen (14) days of completion of the investigation under condition E14 .
E16	If the investigation under condition E14 determines that the exceedance was the result of activities authorised under this environmental authority, then a further investigation must be completed within twenty-eight (28) days of provision of the report under condition E15 .
E17	The investigation required under condition E16 must determine the source, cause and extent of contamination and implement appropriate mitigation and management measures to address any groundwater contamination and prevent recurrence of groundwater contamination.
E18	A report must be provided to the administering authority within twenty-eight (28) business days of completion of the investigation under condition E17 detailing the investigations outcomes and the measures undertaken under the investigation.

Table E2 – Groundwater quality limits

Parameter	Unit	Bores	Limit	Comment
pH (field)	pH unit	All bores	5.5 - 8.0	ANZG (2018)
Electrical Conductivity (field)	µS/cm	MB01R^	16,000	EPP WQO
		MB07	5,791	Site-specific 95th percentile
		MB09	12,007	Site-specific 95th percentile
		MB10	4,102	Site-specific 95th percentile
		MB12	22,872	Site-specific 95th percentile
		MB12R^	16,000*	EPP WQO
		MB14	16,000*	EPP WQO
		MB15	16,000*	EPP WQO
		MB16	16,000*	EPP WQO
		MB17	16,000*	EPP WQO
		MB18	16,000*	EPP WQO
Sulphate	mg/L	MB01R^	398	EPP WQO
		MB07	707	Site-specific 95th percentile
		MB09	769	Site-specific 95th percentile
		MB10	418	Site-specific 95th percentile
		MB12	874	Site-specific 95th percentile
		MB12R^	398*	EPP WQO
		MB14	398*	EPP WQO
		MB15	398*	EPP WQO
		MB16	398*	EPP WQO
		MB17	398*	EPP WQO
		MB18	398*	EPP WQO
Dissolved Metals and metalloids				
Aluminium	mg/L	All bores	0.055	ANZG (2018)
Arsenic	mg/L	All bores	0.013	ANZG (2018)
Barium	mg/L	All bores	0.10	Site-specific 95th percentile (grouped)
Boron	mg/L	All bores	0.66	Site-specific 95th percentile (grouped)
Cobalt	mg/L	All bores	0.004	Site-specific 95th percentile (grouped)
Copper	mg/L	All bores	0.0014	ANZG (2018)
Iron	mg/L	MB01R^	0.246*	EPP WQO
	mg/L	MB07	0.46	Site-specific 95th percentile
	mg/L	MB09	0.38	Site-specific 95th percentile
	mg/L	MB10	0.2	Site-specific 95th percentile
	mg/L	MB12	4.94 [#]	Site-specific 95th percentile
	mg/L	MB12R^	0.246*	EPP WQO
	mg/L	MB14	0.246*	EPP WQO

	mg/L	MB15	0.246*	EPP WQO
	mg/L	MB16	0.246*	EPP WQO
	mg/L	MB17	0.246*	EPP WQO
	mg/L	MB18	0.246*	EPP WQO
Lead	mg/L	All bores	0.0034	ANZG (2018)
Mercury	mg/L	All bores	0.0006	ANZG (2018)
Molybdenum	mg/L	All bores	0.034	ANZG (2018)
Selenium	mg/L	All bores	0.005	ANZG (2018)
Strontium	mg/L	MB01R^	TBD	Site-specific 95th percentile
		MB07	2.2	Site-specific 95th percentile
		MB09	5.7	Site-specific 95th percentile
		MB10	1.2	Site-specific 95th percentile
		MB12	8.4	Site-specific 95th percentile
		MB12R^	TBD*	Site-specific 95th percentile
		MB14	TBD*	Site-specific 95th percentile
		MB15	TBD*	Site-specific 95th percentile
		MB16	TBD*	Site-specific 95th percentile
		MB17	TBD*	Site-specific 95th percentile
		MB18	TBD*	Site-specific 95th percentile
Uranium	mg/L	MB01R^	0.0005*	ANZG 2018
		MB07	0.003	Site-specific 95th percentile
		MB09	0.005	Site-specific 95th percentile
		MB10	0.0005*	ANZG 2018
		MB12	0.0005*	ANZG 2018
		MB12R^	0.0005*	ANZG 2018
		MB14	0.0005*	ANZG 2018
		MB15	0.0005*	ANZG 2018
		MB16	0.0005*	ANZG 2018
		MB17	0.0005*	ANZG 2018
		MB18	0.0005*	ANZG 2018
TRH (C6-C10)	µg/L	All bores	<20	LOR
TRH (C10-40)	µg/L	All bores	<50	LOR
Major Ions				
Major ions (mg/L) (calcium, chloride, potassium, magnesium, sodium, bicarbonate, carbonate)	mg/L	All bores	For interpretation purposes only	
Hardness	mg/L	All bores	For interpretation purposes only	

Notes:

All metals and metalloids must be measured as 'dissolved' (from analysis of a field filtered sample) and total (unfiltered). Limits are based on 'dissolved' measurements.

* Site-specific limits are to be provided in accordance with condition **E11**.

^ indicates replacement bores to be installed to replace dry bores and bores that require relocation due to mining activities.

Requires additional investigated to ensure it is indicative of background conditions.

EPP WQO: Groundwater quality parameters derived from EPP (water) policy 2009 *Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part)*, including all waters of the Isaac River Sub-basin (including Connors River), Zone 34-deep (80th percentile).

E19	<p>Groundwater Standing Water Level (SWL)</p> <p>By 30 June 2025, or another timeframe agreed to by the administering authority, the holder must submit a report to the administering authority to replace all values for Table E3 – Groundwater SWL trigger threshold. The report must include:</p> <ul style="list-style-type: none"> a) an assessment determining if the groundwater monitoring network is fit for purpose including frequency of monitoring; and b) monitoring results of the baseline site-specific groundwater SWLs, containing a minimum of twelve (12) samples; and c) identify and interpret any trends in the groundwater network monitoring data.
E20	<p>Groundwater SWL when measured at the groundwater monitoring bores specified in Table E1 – Groundwater monitoring locations and frequency and must not exceed the SWL trigger thresholds specified in Table E3 – Groundwater SWL trigger threshold.</p>
E21	<p>If the Level Trigger Thresholds of groundwater measured at monitoring bores specified in Table E1 – Groundwater monitoring locations and frequency exceeds any of the corresponding SWL trigger thresholds specified in Table E3 – Groundwater SWL trigger threshold, the holder of the environmental authority must:</p> <ul style="list-style-type: none"> a) notify the administering authority via WaTERS within twenty-four (24) hours of becoming aware of the exceedance; and b) complete an investigation into the cause of the exceedance within ten (10) business days of becoming aware of the exceedance; and c) if the investigation carried out under E21(b) determines that the authorised activities are a potential cause or contributor to the exceedance, <ul style="list-style-type: none"> i. notify the administering authority within twenty-four (24) hours of making the determination; and ii. take immediate action to ensure compliance with condition E20 of this environmental authority and notify the administering authority of when action has been completed.

Table E3 - Groundwater SWL trigger thresholds

Monitoring location	Hydrogeological unit	Baseline water level	SWL trigger threshold (mAHD)
MB01R	DLL coal seam	TBD	TBD
MB07	Weathered Permian	180.1	168.14
MB09	DLL coal seam	181.38	175.63
MB10	DLL coal seam	182.66	175.67
MB12	Back Creek Group	215.83	213.14
MB12R	Back Creek Group	TBD	TBD
MB14	TBD	TBD	TBD
MB15	TBD	TBD	TBD
MB16	TBD	TBD	TBD
MB17	TBD	TBD	TBD
MB18	TBD	TBD	TBD

E22	All groundwater monitoring data must be submitted to the administering authority via WaTERS.
E23	<p>Groundwater Monitoring and Management Program</p> <p>Prior to the commencement of authorised activities, a Groundwater Monitoring and Management Program (GMMP) must be developed and implemented and maintained for all stages of the authorised activity.</p>

E24	<p>The GMMP required by Condition E23 must:</p> <ul style="list-style-type: none"> a) provide a hydrogeological conceptual groundwater model; and b) identify the groundwater monitoring bore locations and purpose for each bore; and c) identify all potential sources of contamination to groundwater from the activities authorised under this environmental authority; and d) identify all environmental values that may be impacted; and e) detail groundwater levels in all identified hydrogeological units present across and adjacent to the site to confirm existing groundwater flow paths; and f) ensure all potential groundwater impacts due to the activities authorised under this environmental authority are identified, monitored and mitigated; and g) ensure adequate groundwater monitoring and data analysis is undertaken to achieve the following objectives: <ul style="list-style-type: none"> i. detect any impacts to groundwater quality due to the authorised activities conducted under this environmental authority; and ii. detect any changes to groundwater level due to the authorised activities under this environmental authority; and iii. determine compliance with conditions E12 and E20; and iv. determine trends in groundwater quality; and v. determine any interaction or impact from groundwater on surface water; and h) document groundwater management and monitoring methodologies undertaken for the duration of all the activities authorised under this environmental authority; and i) document a process of how a contaminant trigger investigation will be conducted, where triggers are used in Table E2 – Groundwater quality limits; and j) identifying monitoring bores that will be replaced due to authorised activities; and k) include an adaptive management strategy to assist with the management and mitigation of drawdown and potential water quality impacts; and l) provide an appropriate quality assurance and quality control program; and m) include a review process to identify improvements to the program that includes addressing any comments provided by the administering authority.
E25	<p>The GMMP must be reviewed every three (3) years by an appropriately qualified person to determine if it continues to meet the requirements stated in condition E24.</p>
E26	<p>Annual Groundwater Monitoring Report</p> <p>Within one (1) year after the commencement of authorised activities, an Annual Groundwater Monitoring Report (AGMR) must be completed each year.</p>

E27	<p>The AGMR required by condition E26 must include:</p> <ul style="list-style-type: none"> a) a review of all the groundwater quality and SWL data of all groundwater bores listed within Table E1 – Groundwater monitoring locations and frequency; and b) an assessment of groundwater quality and SWL trends for all data from all groundwater bores listed in Table E1 – Groundwater monitoring locations and frequency; and c) details of any review undertaken of the conceptual groundwater model; and d) an assessment of any impacts on groundwater quality and level due to the authorised activities; and e) comparison with receiving environment surface water quality monitoring results to determine any interaction or impact from groundwater on surface water.
E28	<p>Groundwater Dependent Ecosystems</p> <p>The activities authorised under this environmental authority must not cause environmental harm to any groundwater dependent ecosystems located within ML700073.</p>

Schedule F: Surface Water	
Condition number	Condition
F1	<p>Release to receiving waters</p> <p>Contaminants must not be released to any waters unless otherwise permitted by a condition of this environmental authority.</p>
F2	<p>Mine affected water must not be released directly or indirectly to the receiving environment.</p>
F3	<p>Surface water runoff is permitted to be released to waters for the purpose of ensuring stormwater does not become mine affected water from:</p> <ul style="list-style-type: none"> a) erosion and sediment control (ESC) structures identified in Table F1 – ESC structure monitoring locations that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition F29 if monitoring required by condition F4 confirms water quality is compliant with the sediment dam trigger values specified in Table F3 – Surface water quality objectives; and b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F24.
F4	<p>The water from ESC structures must be monitored at the release locations detailed in Table F1 – ESC structure monitoring locations for each quality characteristic, and at the frequencies, specified in Table F3 – Surface water quality objectives.</p>

Table F1 – ESC structure monitoring locations

ESC Structure	Location Latitude (GDA2020)	Location Longitude (GDA2020)	ESC structure water source location	Downstream monitoring point	Receiving waters description
SD9	-22.3432	148.2276	Vulcan North Out of Pit Dump	DL7_DS	Drainage Line 7
SD10	-22.3469	148.224	Vulcan North Out of Pit Dump	DL7_DS	Drainage Line 7
SD11	-22.3379	148.2193	Vulcan North In Pit Dump	DL6_DS	Drainage Line 6
SD12	-22.3418	148.2297	Vulcan North In Pit Dump	DL7_DS	Drainage Line 7
SD13	-22.3353	148.2226	Vulcan North In Pit Dump	DL6_DS	Drainage Line 6
SD14	-22.3341	148.2203	Vulcan North In Pit Dump	DL6_DS	Drainage Line 6
SD15	-22.3315	148.2157	Vulcan North Out of Pit Dump	DL5_DS	Drainage Line 5
SD16	-22.3643	148.2365	Vulcan Main Out of Pit Dump	HC_DS	Hughes Creek
SD17	-22.3578	148.2441	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD18	-22.3612	148.2469	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD19	-22.3737	148.2488	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD20	-22.3682	148.2532	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD21	-22.3738	148.2582	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD22	-22.3782	148.2617	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD23	-22.3784	148.257	Vulcan Main In Pit Dump	HC_DS	Hughes Creek
SD24	-22.3852	148.2658	Vulcan South In Pit Dump	HC_DS	Hughes Creek
SD25	-22.3875	148.2673	Vulcan South In Pit Dump	HC_DS	Hughes Creek
SD26	-22.3888	148.2676	Vulcan South In Pit Dump	HC_DS	Hughes Creek
SD27	-22.3914	148.2636	Vulcan South Out of Pit Dump	HC_DS	Hughes Creek
SD28	-22.4011	148.2697	Vulcan South Out of Pit Dump	DL8_DS	Barrett Creek
SD29	-22.3944	148.271	Vulcan South In Pit Dump	HC_DS	Hughes Creek
SD30	-22.3818	148.2641	Vulcan South In Pit Dump	HC_DS	Hughes Creek
HWD1	-22.2866	148.1497	Highwall Trial Area Bench	DL2_DS	Drainage Line 2

F5	If monitoring required by condition F4 , for any ESC structure, identifies an exceedance of any of the sediment dam trigger values identified in Table F3 – Surface water quality objectives , all water in that structure must be transferred to a storage listed in Table F4 – Mine affected water storages .
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F6	If water quality sampling as specified in condition F4 identifies three (3) consecutive exceedances of sediment dam trigger values detailed in Table F3 – Surface water quality objectives , the environmental authority holder must complete an investigation into the cause of the deterioration in water quality and the potential for environmental harm.
F7	Following completion of the investigation required under condition F6 , the environmental authority holder must submit a written report to the administering authority within twenty (20) business days outlining: <ul style="list-style-type: none"> a) details of the investigation carried out including any assumptions and limitations of the investigation; and b) findings of the investigation including an explanation of the cause identified; and c) recommendations of the investigation; and d) actions taken to comply with the conditions of the environmental authority and to prevent environmental harm.
F8	The holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the monitoring results of the three (3) consecutive exceedances via WaTERS and pollution hotline.
F9	Releases from ESC structures must not cause erosion of the bed and banks of the receiving environment or cause a material build-up of sediment in such waters.
F10	The holder of the environmental authority must design, install and maintain adequate banks and/or diversion drains to minimise the potential for stormwater runoff to enter disturbed areas.
F11	Water monitoring and sampling must address and comply with the latest version of the Queensland Government's <i>'Monitoring and Sampling Manual 2018 – Environmental Protection (Water) Policy 2009'</i> .
F12	<p>Surface water monitoring</p> <p>Surface waters must be monitored:</p> <ul style="list-style-type: none"> a) for the quality characteristics in Table F3 – Surface water quality objectives; and b) at the monitoring frequency specified in Table F3 – Surface water quality objectives; and c) at the monitoring points identified in Table F2 – Surface waters monitoring locations and Figure F1 – Surface waters monitoring locations.

Table F2 – Surface waters monitoring locations

Station ID	Previous Station ID	Catchment Area	Latitude (GDA2020)	Longitude (GDA2020)	Description
Upstream sites					
DL2_US	N/A	Boomerang Creek	22.290841264° S	148.154357187° E	Drainage line 2 upstream of the highwall mining area
DL3_US	N/A	Boomerang Creek	22.305612596° S	148.192716185° E	Drainage line 3 upstream of the haul road
DL4_US	N/A	Boomerang Creek	22.323035473° S	148.200252458° E	Drainage line 4 at the upstream mining lease boundary
DL6_US	N/A	East Creek	22.339508200° S	148.207957289° E	Drainage line 6 at the upstream mining lease boundary
DL7_US	N/A	East Creek	22.347211456° S	148.209392813° E	Drainage line 7 at the upstream mining lease boundary
HCN_US	N/A	Hughes Creek	22.370485469° S	148.226638033° E	Hughes Creek north tributary approximately 5.5 km upstream of Saraji Road
HC_US	VSW5	Hughes Creek	22.395927439° S	148.224656137° E	Hughes Creek approximately 2.8 km upstream of Saraji Road
DL8_US	N/A	Hughes Creek	22.395784122° S	148.251629364° E	Drainage line 8 approximately 2.2 km upstream of Saraji Road
BC1_US	VSW6	Hughes Creek	22.411388907° S	148.269449617° E	Barrett Creek upstream of Saraji
Downstream sites					
DD1_US	VSW1	Boomerang Creek	22.276596290° S	148.174514955° E	Diversion bund approximately
DD1_DS	VSW2	Boomerang Creek	22.301050508° S	148.195240117° E	Drainage line 2, downstream of the confluence of existing diversion drain
DL2_DS	VSW11	Boomerang Creek	22.298264498° S	148.189625245° E	Drainage line 2 upstream of confluence of existing diversion drain

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DL3_DS	VSW3	Hughes Creek	22.306311857° S	148.194663612° E	Minor drainage line, upstream of confluence of Drainage Line 2
DL4_DS	VESW4	Hughes Creek	22.321553686° S	148.200307744° E	Drainage line 4 upstream of the confluence of Boomerang Creek
DL6_DS	VSW9	East Creek	22.334779125° S	148.221868903° E	Drainage line 6, at the downstream mining lease boundary
DL7_DS	VSW7	East Creek	22.343101091° S	148.231039608° E	Drainage line 7, at the downstream mining lease boundary
HC_DS	VSW4	Hughes Creek	22.384885209° S	148.266275740° E	Hughes Creek at the downstream mining lease boundary
DL8_DS	VSW10	Hughes Creek	22.388240114° S	148.268093290° E	Drainage line 8 at the downstream mining lease boundary

Table F3 – Surface water quality objectives

Quality characteristic (units)	Sediment dam trigger value	Downstream monitoring point trigger value	Source	Frequency
pH	6.5-8.5	6.5-8.5	EPP WQO (aquatic ecosystems)	Monthly and Daily during release (the first sample must be taken within 2 hours of commencement of release)
Electrical Conductivity ($\mu\text{S}/\text{cm}$)	864*	Baseflow: 720 Medium flow: 500 High flow: 250	EPP WQO	
Turbidity (NTU)	60*	50	EPP WQO	
Total Suspended Solids (mg/L)	102 [^]	85	EPP WQO	
Sulphate as SO ₄ (mg/L)	37 [#]	25	EPP WQO	
Ammonia ($\mu\text{g}/\text{L}$)	900	900	ANZG 2018	
Nitrate ($\mu\text{g}/\text{L}$)	1100	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for Total Nitrate	
Filtered metals and metalloids				
Aluminium ($\mu\text{g}/\text{L}$)	192*	160	Locally derived	Monthly and Commencement of release and thereafter weekly during release.
Arsenic ($\mu\text{g}/\text{L}$)	16*	13	ANZG 2018	
Lead ($\mu\text{g}/\text{L}$)	4.1*	3.4	ANZG 2018	
Mercury ($\mu\text{g}/\text{L}$)	0.72*	0.6	EPP WQO (aquatic ecosystems)	
Molybdenum ($\mu\text{g}/\text{L}$)	40.8*	34	EPP WQO (aquatic ecosystems)	
Selenium ($\mu\text{g}/\text{L}$)	6*	5	ANZG 2018	

Notes:

All metals and metalloids must be measured as 'dissolved' (from analysis of a field filtered sample) and total (unfiltered). Limits for metals and metalloids apply to dissolved results.

*20% increase on trigger value

[#] 95th percentile site specific

[^]locally derived trigger values (80th percentile values of natural surface water monitoring)

F13	<p>Unless otherwise advised by the administering authority, if a water quality characteristic measured at a downstream site specified in Table F2 – Surface waters monitoring locations exceeds any water quality objective specified in Table F3 – Surface water quality objectives the holder of this environmental authority must compare this result to the applicable upstream site and:</p> <ul style="list-style-type: none"> a) If the quality measured at a downstream site is equal to or less than the quality measured at the applicable upstream site, no further action is required; or b) If the quality measured at a downstream site is greater than the quality measured at the applicable upstream site, complete an investigation into the cause of the deterioration in water quality and the potential for environmental harm and submit a written report to the administering authority within twenty (20) business days outlining: <ul style="list-style-type: none"> i. details of the investigation carried out including any assumptions and limitations of the investigation; and ii. findings of the investigation including an explanation of the cause identified; and iii. recommendations of the investigation; and iv. actions taken to comply with the conditions of the environmental authority and to prevent environmental harm.
F14	<p>If an exceedance in accordance with condition F13(b) occurs, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the monitoring result via WaTERS and pollution hotline.</p>
F15	<p>All surface water monitoring data must be submitted to the administering authority via WaTERS.</p>
F16	<p>Receiving Environment Monitoring Program</p> <p>On or before 1 August 2024, a Receiving Environment Monitoring Program (REMP) Design Document must be:</p> <ul style="list-style-type: none"> a) prepared in accordance with condition F19; and b) submitted to the administering authority.
F17	<p>For the purposes of the REMP, the only receiving environment is the waters detailed in Table F2 – Surface waters monitoring locations. The REMP must encompass any sensitive receiving waters or environmental values within the area of the site that will potentially be directly affected by releases of sediment water.</p>
F18	<p>Any comments made by the administering authority on the REMP Design Document must be addressed to the reasonable satisfaction and within a timeframe specified by the administering authority.</p>

F19	<p>The REMP must at a minimum:</p> <ul style="list-style-type: none"> a) address and comply with the latest version of the administering authority’s guideline ‘Receiving environment monitoring program guideline’ (ESR/2016/2399); and b) identify, describe and monitor any adverse impacts to surface water environmental values, quality, and flows; and c) assess the long-term condition or state of surface waters and aquatic ecosystem health; and d) include monitoring from background reference sites (e.g., upstream sites) and downstream sites from the release (as a minimum, the locations specified in Table F2 – Surface water monitoring locations; e) identify and describe all environmental values of the receiving environment; and f) include monitoring and assessment of dissolved oxygen saturation, temperature and all water quality parameters listed in Table F3 – Surface water quality objectives against the surface water quality objectives in Table F3 – Surface water quality objectives. g) include an assessment of the potential impacts of the activity and propose appropriate mitigation measures; and h) assess the status of and any change to aquatic ecosystem health including aquatic flora and fauna within and immediately surrounding the project area; and i) assess the status of and any change to riparian vegetation health within and immediately surrounding the project area; and j) apply procedures and/or guidelines from ANZG 2018 and other relevant standards and guideline documents; and k) describe sampling and analysis methods and quality assurance and control; and l) incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
F20	<p>A REMP Annual Report must be prepared annually by 1 August and submitted to the administering authority on request.</p>
F21	<p>The REMP Annual Report required by condition F20 must:</p> <ul style="list-style-type: none"> a) be prepared by an appropriately qualified person; and b) outline the findings of the REMP, including but not limited to: <ul style="list-style-type: none"> i. an assessment of long-term upstream water quality; and ii. an assessment of the long-term condition or state of surface waters, including sediment and aquatic ecosystem health; and iii. recommendations for further investigation or actions; and iv. recommendations for changes or improvements to the monitoring program; and v. potential changes to management of the authorised activity to minimise impacts; and vi. all monitoring results; and vii. a description of all conclusions formed.
F22	<p>Water Storage monitoring</p> <p>The quality of water in water storages in Table F4 – Mine affected water storages must be monitored:</p> <ul style="list-style-type: none"> a) at the location in Table F4 – Mine affected water storages; and b) at the monitoring frequency in Table F4 – Mine affected water storages; and c) for all quality characteristics specified in Table F3 – Surface water quality objectives; and d) include the volume of the water storage (in megalitres) at the time of monitoring.

F23	If results of any water storage monitoring from condition F22 exceed a trigger value for the water quality characteristics specified in Table F3 – Surface water quality objectives , then all necessary actions must be taken to prevent access to the waters by wildlife and livestock.
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Table F4 – Mine affected water storages

Station ID	Latitude (GDA2020)	Longitude (GDA2020)	Description	Frequency
MWD6	22.364255447° S	148.227496324° E	MWD6 spillway	Quarterly
MWD7	22.361502986° S	148.230735154° E	MWD7 spillway	Quarterly
MWD8	22.364977354° S	148.229969352° E	MWD8 spillway	Quarterly
MWD9	22.376445088° S	148.251660294° E	MWD9 spillway	Quarterly

F24	<p>Water management plan</p> <p>On or before the commencement of authorised activities, a Water Management Plan must be developed and implemented for all stages of the authorised activity.</p>
F25	<p>The Water Management Plan must:</p> <ul style="list-style-type: none"> a) provide for effective water management of actual and potential environmental impacts resulting from the authorised activity; and b) include: <ul style="list-style-type: none"> i. a study of the source of contaminants; and ii. a water balance model for the site; and iii. a water management system for the site; and iv. measures to prevent, manage and reduce mine drainage; and v. contingency procedures for incidents and emergencies; and vi. a program for monitoring and review of the effectiveness of the Water Management Plan.
F26	<p>The Water Management Plan must be reviewed by 1 August for each calendar year. The review must be documented and:</p> <ul style="list-style-type: none"> a) include a statement that the Water Management Plan has been reviewed by an appropriately qualified person; and b) assess the plan against the requirements under condition F25; and c) include recommended actions to ensure actual and potential environmental impacts are effectively managed; and d) provide details and timelines of the actions to be taken; and e) identify any amendments to be made to the Water Management Plan.
F27	A copy of the Water Management Plan must be kept up to date following each annual review and must be provided to the administering authority on request.

F28	<p>Erosion and Sediment Control</p> <p>The holder of the environmental authority must design, install and maintain adequate erosion and sediment control structures wherever necessary to prevent or minimise erosion of disturbed areas and the release of sediment to any waters.</p>
F29	<p>On or before the commencement of authorised activities, an Erosion and Sediment Control Plan must be developed and implemented for all stages of the authorised activity.</p>
F30	<p>The Erosion and Sediment Control Plan must demonstrate how erosion and sediment control measures detailed in the plan adequately minimise the release of sediment to receiving waters and must include at least the following:</p> <ul style="list-style-type: none"> a) an assessment of the size and characteristics of all catchment areas; and b) an assessment of relevant properties of soils and waste materials; and c) identification of receiving waters environmental values, water quality objectives and management intent; and d) specification of minimum design criteria for erosion and sediment control structures to achieve the management intent of receiving waters; and e) locations and descriptions of all erosion and sediment control measures; and f) an audit schedule to ensure erosion and sediment control measures are maintained.
F31	<p>The Erosion and Sediment Control Plan must be reviewed by 1 August for each calendar year. The review must be documented and must:</p> <ul style="list-style-type: none"> a) include a statement that the Erosion and Sediment Control Plan has been reviewed by an appropriately qualified person; and b) assess the plan against the requirements of condition F30; and c) include recommended actions to ensure actual and potential environmental impacts are effectively managed; and d) provide details and timelines of the actions to be taken; and e) identify any amendments made to the Erosion and Sediment Control Plan.
F32	<p>A copy of the Erosion and Sediment Control Plan must be kept up to date following each annual review and must be provided to the administering authority on request.</p>
F33	<p>Fitzroy Regional REMP (FRREMP)</p> <p>Conditions F17, F18, F19, F20, and F21 do not apply if the environmental authority holder is a demonstrated participant of the FRREMP.</p>
F34	<p>The environmental authority holder must notify the administering authority in a written statement within twenty (20) business days of ceasing to be a participant of the FRREMP. The written statement must detail how the environmental authority holder is going to fulfil the requirements of conditions F17, F18, F19, F20, and F21.</p>

Schedule G: Land	
Condition number	Condition
G1	Land disturbed by authorised activities must be rehabilitated in accordance with the approved Progressive Rehabilitation and Closure Plan (PRCP) schedule for this environmental authority.
G2	<p>Contaminated land</p> <p>Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition G1.</p>
G3	<p>Chemicals and flammable or combustible liquids</p> <p>The holder of the environmental authority must not directly or indirectly release hazardous contaminants to the receiving environment.</p>
G4	All flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current edition of AS1940 – Storage and Handling of Flammable and Combustible Liquids.
G5	All chemicals and flammable or combustible liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian standard exists, store such materials within an effective on-site containment system. The environmental authority holder must minimise the potential for contamination of land and water by diverting stormwater around contaminated areas and facilities used for the storage of chemicals and flammable or combustible liquids.
G6	The holder of the environmental authority must ensure that spills of hazardous contaminants are cleaned up as quickly as practicable.
G7	<p>Topsoil</p> <p>The environmental authority holder must ensure that:</p> <ol style="list-style-type: none"> topsoil is removed and stockpiled prior to carrying out any activity; and measures are implemented to ensure that the mixing and erosion of topsoil and overburden stockpiles is prevented; and a topsoil inventory is maintained and provide to the administering authority on request.
G8	<p>Topsoil stockpiles must:</p> <ol style="list-style-type: none"> be located away from drainage areas, roads, machinery, transport corridors, and stock grazing areas; and seeded or covered with a water-shedding lining to prevent unnecessary erosion of topsoil.

G9	<p>Weed Management</p> <p>A weed management plan must be developed prior to the commencement of authorised activities and implemented for ML700073 for the duration of authorised activities and must outline:</p> <ul style="list-style-type: none"> a) areas of control priority and the methods used to determine such areas; and b) strategies to promote dense pasture cover (to decrease weeds establishment) through reduced disturbance; and c) monitoring methodologies that document the spread of weeds and any new outbreaks; and d) methods for the control of weeds that include best practice management; and e) stringent wash-down and inspection procedures for both machinery involved in clearing/construction activities and those operating outside of designated roads during mine operation; and f) truck wash procedure to reduce weed infestations; and g) protocol for an annual weed inspection; and h) promotion of the awareness of weed management issues at the site.
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Schedule H: Biodiversity	
Condition number	Condition
H1	<p>Prescribed environmental matters - Matters of State environmental significance</p> <p>Impacts to Matters of State environmental significance (MSES) as a result of carrying out the activity must only occur within the maximum extents stated in Table H1 – Authorised residual impacts to MSES and within the disturbance footprint shown in Appendix 5 - Figures H1 to H7 (inclusive).</p>
H2	<p>Environmental Offsets</p> <p>An environmental offset must be made in accordance with the <i>Environmental Offsets Act 2014</i> and the Queensland Environmental Offsets Policy [EPP/2015/1658], for the maximum extent of impact to each prescribed environmental matter as requiring an offset as listed in Table H1 – Authorised residual impacts to MSES.</p> <p><i>Note: Deemed conditions provided in section 16 of the Environmental Offsets Act 2014 also apply to this authority. Any contravention of a deemed condition will be dealt with under the Environmental Protection Act 1994.</i></p>

Table H1 – Authorised residual impacts to MSES

Prescribed environmental matters	Delineation of habitat usage or quality (where relevant)	Maximum extent of impact (ha)	Location	Offset required?
Endangered Regional Ecosystem 11.4.8/11.4.9/HVR 11.4.8 (Brigalow TEC)*		67	Figure H1	No*
Regional ecosystem 11.3.2 Of concern		3.3	Figure H6	Yes
Vegetation Management Watercourse REs				
11.3.25		20.5	Figure H7	Yes
11.5.9				
11.5.9b				
11.10.1				
11.10.3				
11.10.7				
Threatened, Vulnerable and Special Least Concern Fauna Species listed under the Nature Conservation Act 1992				
Habitat for an animal that is endangered - Greater Glider (<i>Petauroides volans</i>)*	NA	39.4	Figure H4	No*
Habitat for an animal that is endangered - Koala (<i>Phascolarctos cinereus</i>)*	Total	770.4	Figure H2	No*
	High-quality habitat	3.9		
	Moderate-quality habitat	329.6		
	Low-quality habitat	436.9		
Habitat for an animal that is vulnerable - Squatter Pigeon (<i>Geophaps scripta scripta</i>)*	Total	1023.5	Figure H3	No*
	Breeding and Foraging habitat	338		
	Dispersal habitat	621.4		
	Foraging habitat	64.1		
Habitat for an animal that is vulnerable - Glossy Black Cockatoo (<i>Calyptorhynchus lathami</i>)	NA	36.3	Figure H5	Yes
Note: * This matter is proposed to be offset under the EPBC Act approval conditions.				

H3	<p>Koala management</p> <p>The environmental authority holder must identify and implement management measures in high-risk areas for koala movement. Management measures must include, but not limited to, the following;</p> <ul style="list-style-type: none"> a) the identification of high-risk management areas for koala movement on site, in particular vehicle corridors; and b) establish vehicle management protocols on site that reduce the likelihood of vehicles intercepting koalas; and c) the design and construction of koala exclusion fencing, which includes a fauna detection system, around higher risk areas such as heavy vehicle routes that cross riparian vegetation with high koala habitat and where these intersect with operational mining areas.
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Schedule I: Structures	
Condition number	Condition
I1	<p>Assessment of consequence category</p> <p>The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the latest version of the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933) at the following times:</p> <ul style="list-style-type: none"> a) prior to the design and construction of the structure; or b) prior to any change in its purpose or the nature of its stored contents.
I2	A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
I3	Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the latest version of the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933).
I4	<p>Design and construction of a regulated structure</p> <p>All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the latest version of the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933).</p> <p>NOTE:</p> <p>Certification of design and construction may be undertaken by different persons.</p>

I5	<p>Construction of a regulated structure is prohibited unless:</p> <ul style="list-style-type: none"> a) the environmental authority holder has submitted a consequence category assessment report and certification to the administering authority; and b) certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this environmental authority.
I6	<p>Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the latest version of the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933), and must be recorded in the Register of Regulated Structures.</p>
I7	<p>Regulated structures must:</p> <ul style="list-style-type: none"> a) be designed and constructed in compliance with the latest version of the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933); b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of: <ul style="list-style-type: none"> i. floodwaters from entering the regulated dam from any watercourse or drainage line; and ii. wall failure due to erosion by floodwaters arising from any watercourse or drainage line. c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
I8	<p>Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:</p> <ul style="list-style-type: none"> a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; and b) construction of the regulated structure is in accordance with the design plan.
I9	<p>Notification of affected persons</p> <p>All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure for each of the following:</p> <ul style="list-style-type: none"> a) prior to the operation of the new regulated structure; and b) if the emergency action plan is amended, within five (5) business days of it being amended.

I10	<p>Operation of a regulated structure</p> <p>Operation of a regulated structure is prohibited unless the holder has submitted to the administering authority in respect of regulated structure, all of the following:</p> <ul style="list-style-type: none"> a) One electronic copy of the design plan and certification of the 'design plan' in accordance with condition I5; b) a set of 'as constructed' drawings and specifications; c) certification of the 'as constructed drawings and specifications' in accordance with condition I8; d) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the Design Storage Allowance (DSA) volume across the system, a copy of the certified system design plan; e) the requirements of this environmental authority relating to the construction of the regulated structure have been met; f) the holder has entered the details required under this environmental authority, into a Register of Regulated Structures; and g) there is a current operational plan for the regulated structure.
I11	<p>Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.</p>
I12	<p>Mandatory reporting level</p> <p>Conditions I13 to I16 (inclusive) only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.</p>
I13	<p>The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.</p>
I14	<p>The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.</p>
I15	<p>The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.</p>
I16	<p>The holder must record any changes to the MRL in the Register of Regulated Structures.</p>
I17	<p>Design storage allowance</p> <p>The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.</p>

I18	By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the DSA volume for the dam (or network of linked containment systems).
I19	The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
I20	The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
I21	<p>Annual inspection report</p> <p>Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.</p>
I22	At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.
I23	The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the latest version of the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933).
I24	<p>The holder must within twenty (20) business days of receipt of the annual inspection report, provide to the administering authority:</p> <ul style="list-style-type: none"> a) The recommendations section of the annual inspection report; and b) If applicable, any actions being taken in response to those recommendations; and c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder, provide this to the administering authority within ten (10) business days of receipt of the request.
I25	<p>Transfer arrangements</p> <p>The holder must provide a copy of any reports, documentation and certifications prepared under this environmental authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this environmental authority.</p>
I26	<p>Register of Regulated Structures</p> <p>A Register of Regulated Structures must be established and maintained by the holder for each regulated structure.</p>

I27	The holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated dam is submitted to the administering authority
I28	The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition I10 has been achieved.
I29	The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.
I30	All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct.
I31	The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.

END OF CONDITIONS

Definitions

Key terms and/or phrases used in this document are defined in this section. Where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

'Ambient' in relation to air quality means the immediate and extended surroundings of the authorised activity or receiving environment.

'Airblast overpressure' means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

'ANZG 2018' means ANZG 2018; Australian and New Zealand Guidelines for Fresh and Marine Water Quality. This is available at <https://www.waterquality.gov.au/anz-guidelines>.

'Appropriately qualified person' means a person who:

- a) has qualifications and experience relevant to performing the function, including but not limited to:
 - i. a bachelor's degree in science or engineering; and
 - ii. at least 3 years' experience relevant to evaluating compliance with the requirements of the environmental authority conditions being audited; and
- b) has an ability to give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods, or literature; and
- c) is a member of at least one organisation prescribed in Schedule 8 of the Environmental Protection Regulation 2019; and
- d) is not an employee of, nor have a financial interest in, the holder(s), or person acting under the environmental authority, or any involvement with the holder(s) of the environmental authority which could lead to a conflict of interest.

'authorised activity' or **'authorised activities'** means the activities conducted under this environmental authority including but not limited to:

- a) authorised as per the definition in section 110 of the *Environmental Protection Act 1994*;
- b) all environmentally relevant activities authorised under this environmental authority;
- c) all mining disturbance including land clearing, construction of infrastructure, overburden removal and active mining, and the ancillary activities that support these activities, for example, but not limited to access and use of tracks and roads within the mining lease a.
- d) all activities referenced in a condition of the environmental authority.
- e) all care and maintenance activities; and
- f) rehabilitation.

'Background', with reference to the water schedule, means the average of samples taken prior to the commencement of the authorised activities from the same waterway that the current sample has been taken.

'Blasting' means the use of explosive materials to fracture:

- a) Rock, coal and other minerals for later recovery, or
- b) Structural components or other items to facilitate removal from a site or for reuse

‘Certified’, with respect to watercourse diversions, means assessed and approved by a suitably qualified and experienced person. In relation to ‘as constructed’ drawings and specifications, the certification must be by the suitably qualified person who supervised the construction of the watercourse diversion, or re-establishment of the watercourse.

‘Chemical’ means:

- a) an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994* (Commonwealth), or
- b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council, or
- c) a lead hazardous substance within the meaning of the *Workplace Health and Safety Regulation 1997*, or
- d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers’ Advisory Council and published by the Commonwealth, or
- e) any substance used as, or intended for use as:
 - i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product, or
 - ii. a surface active agent, including, for example, soap or related detergent, or
 - iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide, or
 - iv. a fertiliser for agricultural, horticultural or garden use, or
 - v. a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater, or
 - vi. manufacture of plastic or synthetic rubber.

‘Commencement of authorised activities’ the day ‘authorised activities’ commence. For the purpose of this definition only, this does not include the following activities:

- a) access tracks for land management,
- b) fire breaks or
- c) disturbance associated with environmental monitoring and exploration.

‘Construction’ or **‘Constructed’**, in relation to a regulated structure, includes building a new regulated structure and lifting or otherwise modifying an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

‘Contaminant’ is defined in section 11 of the *Environmental Protection Act 1994* as:

- a) a gas, liquid or solid; or
- b) an odour; or
- c) an organism (whether alive or dead), including a virus; or
- d) energy, including noise, heat, radioactivity and electromagnetic radiation;
- e) a combination of contaminants.

‘Disturbance’ of land includes:

- a) compacting, removing, covering, exposing or stockpiling of earth
- b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion
- c) carrying out mining within a watercourse, waterway, wetland or lake
- d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls
- e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased
- f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of ‘disturbance’:

- a) areas off lease (e.g. roads or tracks which provide access to the mining lease)
- b) areas previously disturbed which have achieved the rehabilitation outcomes
- c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions)
- d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner
- e) disturbance that pre-existed the grant of the tenure.

‘EC’ means electrical conductivity.

‘Environmental offset’ has the meaning in section 7 of the *Environmental Offsets Act 2014*.

‘FRREMP’ means a Fitzroy Basin Receiving Environment Monitoring Program for the region in which the EA is located, that has been endorsed in writing by the administering authority.

‘Hazard category’ means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in Manual for Assessing Hazard Categories and Hydraulic Performance of Dams.

‘Holder’, for a mining tenement, means a holder of the tenement under the *Mineral Resources Act 1989*, and the holder of the associated environmental authority under the *Environmental Protection Act 1994*.

‘Hazardous contaminant’ means hazardous contaminant means a contaminant, other than an item of explosive ordnance, that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm because of—

- a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity or flammability; or
- b) its physical, chemical or infectious characteristics.

‘Hydrogeological unit’ is any soil or rock unit or zone that by virtue of its hydraulic properties has a distinct influence on the storage or movement of groundwater.

‘Infrastructure’ means water storage dams, levees, roads and tracks, buildings and other structures built for the purpose of the mining activity.

‘Land use’ means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

‘Leachate’ means a liquid that has passed through or emerged from or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

‘m’ means metres.

‘Maximum extent of impact’ means the total, cumulative, residual extent and duration of impact to a prescribed environmental matter that will occur over a project’s life after all reasonable avoidance and reasonable on-site mitigation measures have been, or will be, undertaken.

‘Mine affected water’:

- a) means the following types of water:
 - i. pit water, tailings dam water, processing plant water
 - ii. water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2019 if it had not formed part of the mining activity
 - iii. rainfall runoff which has been in contact with any areas disturbed by authorised activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water
 - iv. groundwater which has been in contact with any areas disturbed by authorised activities which have not yet been rehabilitated
 - v. groundwater from the mine’s dewatering activities
 - vi. a mix of mine affected water (under any of paragraphs i)-v) and other water.
- b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by authorised activities that have not yet been completely rehabilitated, has only been in contact with:
 - i. land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success, or
 - ii. land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:
 1. areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site, or

2. evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff, or
3. both.

‘Mineral waste’ means waste materials resulting from the extraction of coal including overburden, inter-burden, waste rock and rejects (including coarse and fine).

‘Minimise’ is to reduce to the smallest possible amount or degree.

‘Monitoring bore’ means a groundwater bore that provides access to groundwater for measuring its quality and level; and allows groundwater samples to be withdrawn for laboratory analysis.

‘NATA’ means National Association of Testing Authorities, Australia.

‘Non-mineral waste’ all other waste generated by the authorised activities not identified in the definition for ‘mineral waste’

‘Participant of the FRREMP’ means an environmental authority holder that is identified as a current participant by the organisation carrying out the Regional REMP.

‘Peak particle velocity (ppv)’ means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s).

‘Prescribed environmental matters’ has the meaning in section 10 of the *Environmental Offsets Act 2014*, limited to the matters of State environmental significant listed in schedule 2 of the *Environmental Offsets Regulation 2014*.

Receiving environment in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

- a) a watercourse;
- b) groundwater; and
- c) an area of land that is not specified in condition **A5** of this environmental authority.

‘Receiving waters’ means the waters into which this environmental authority authorises releases of mine affected water.

‘Register of Regulated Structures’ includes:

- a) Date of entry in the register;
- b) Name of the structure, its purpose and intended/actual contents;
- c) The consequence category of the dam as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933);
- d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
- e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and ‘as constructed’ drawings;
- f) For the regulated dam, other than in relation to any levees –

- i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
 - ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area;
 - iii. Dam crest volume (megalitres);
 - iv. Spillway crest level (metres AHD);
 - v. Maximum operating level (metres AHD);
 - vi. Storage rating table of stored volume versus level (metres AHD);
 - vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD);
 - viii. Mandatory reporting level (metres AHD);
- g) The design plan title and reference relevant to the dam;
 - h) The date construction was certified as compliant with the design plan;
 - i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;
 - j) Details of the composition and construction of any liner;
 - k) The system for the detection of any leakage through the floor and sides of the dam;
 - l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
 - m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;
 - n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

‘Regulated structures’ means any structure in the significant or high consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority. A regulated structure does not include:

- a) a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container;
- b) a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities.

‘Rehabilitation’ the process of reshaping and revegetating land to restore it to a stable landform.

‘Representative’ means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the authorised activities.

‘RL’ means reduced level, relative to mean sea level as distinct from depths to water.

‘Sensitive place’ includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or

- c) a kindergarten, school, university or other educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
- f) a public park or garden; or
- g) for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2019, with the exception of commercial and retail activity areas.

‘Significant residual impact’ has the meaning in section 8 of the *Environmental Offsets Act 2014*.

‘Substantial low frequency noise’ means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurements, with a predominant component within the frequency range 10 to 200 Hz. It includes any noise emission likely to cause an overall sound pressure level at a noise sensitive place exceeding 55 dB(Z).

‘Suitably qualified and experienced person’ means a person who is a Registered Professional Engineer of Queensland under the provisions of the Professional Engineers Act 2002, who has an appropriate level of expertise in the structures, geomechanics, hydrology, hydraulics and environmental impact of watercourse diversions.

An appropriate level of expertise includes:

- a) demonstrable competency, experience and expertise in:
 - i. investigation, design or construction of watercourses diversions
 - ii. operation and maintenance of watercourse diversions
 - iii. geomechanics with particular emphasis on channel equilibrium, geology and geochemistry
 - iv. hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology
 - v. hydraulics with particular reference to sediment transport and deposition and erosion control
 - vi. hydrogeology with particular reference to seepage and groundwater
 - vii. solute transport processes and monitoring thereof, or
- b) sufficient knowledge and experience to certify that where the suitably qualified and experienced person has relied on advice and information provided by other persons with relevant expertise*:
 - i. they consider it reasonable to rely on that advice and information
 - ii. the expert providing the advice and information has knowledge, competency, suitable experience and demonstrated expertise in the matters related to watercourse diversions.

*Persons with relevant expertise include:

- a) Geomorphologist: person who has demonstrated competency and relevant experience in stream geomorphology and watercourse diversions.
- b) Geotechnical Expert: person who has demonstrated competency and relevant experience in geotechnical assessment of soil characteristics suitable for watercourse diversions.
- c) Vegetation Expert: person who has demonstrated competency and relevant experience in the identification, role and function of vegetation with watercourses and adjoining floodplains, and has

demonstrated competency and relevant experience in revegetation of watercourse diversions and adjoining floodplains.

- d) Groundwater Expert: person who has demonstrated competency and relevant experience in groundwater systems.
- e) Surface Water Expert: person who has demonstrated competency and relevant experience in hydrology.
- f) Engineer: person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Persons Act 2002 or has similar qualifications under a respected professional registration association, and has demonstrated competency and relevant experience in design and construction of watercourse diversions.
- g) Soils Expert: person who has demonstrated competency and relevant experience in soil classification including the physical, chemical and hydrologic analysis of soil.

'The Act' means the *Environmental Protection Act 1994*.

' μ S/cm' means micro siemens per centimetre.

'Water' is defined under Schedule 4 of the *Water Act 2000*.

'Waters' includes all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed, and bank of any waters, non-tidal or tidal waters (including sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, water confined in natural or artificial structures and underground water (or groundwater).

'WaTERS' means Water Tracking and Electronic Reporting System or subsequent updated system, used to submit monitoring data and notify the Queensland Government. It is available at www.waters.des.qld.gov.au or by contacting psd.help@qld.gov.au.

'Watercourse' has the same meaning given in the *Water Act 2000*.

'Water quality' means the chemical, physical and biological condition of water.

'Water Quality objective (WQO)' - A numerical concentration limit or narrative statement that has been established to support and protect the designated uses of water at a specified site. It is based on scientific criteria or water quality guidelines but may be modified by other inputs such as social, cultural or economic constraints. WQOs are specified in the EPP Water and Wetland Biodiversity (Part 4, Section 11).

END OF DEFINITIONS

Appendices

Appendix 1. Figure A1. Maximum Disturbance Areas

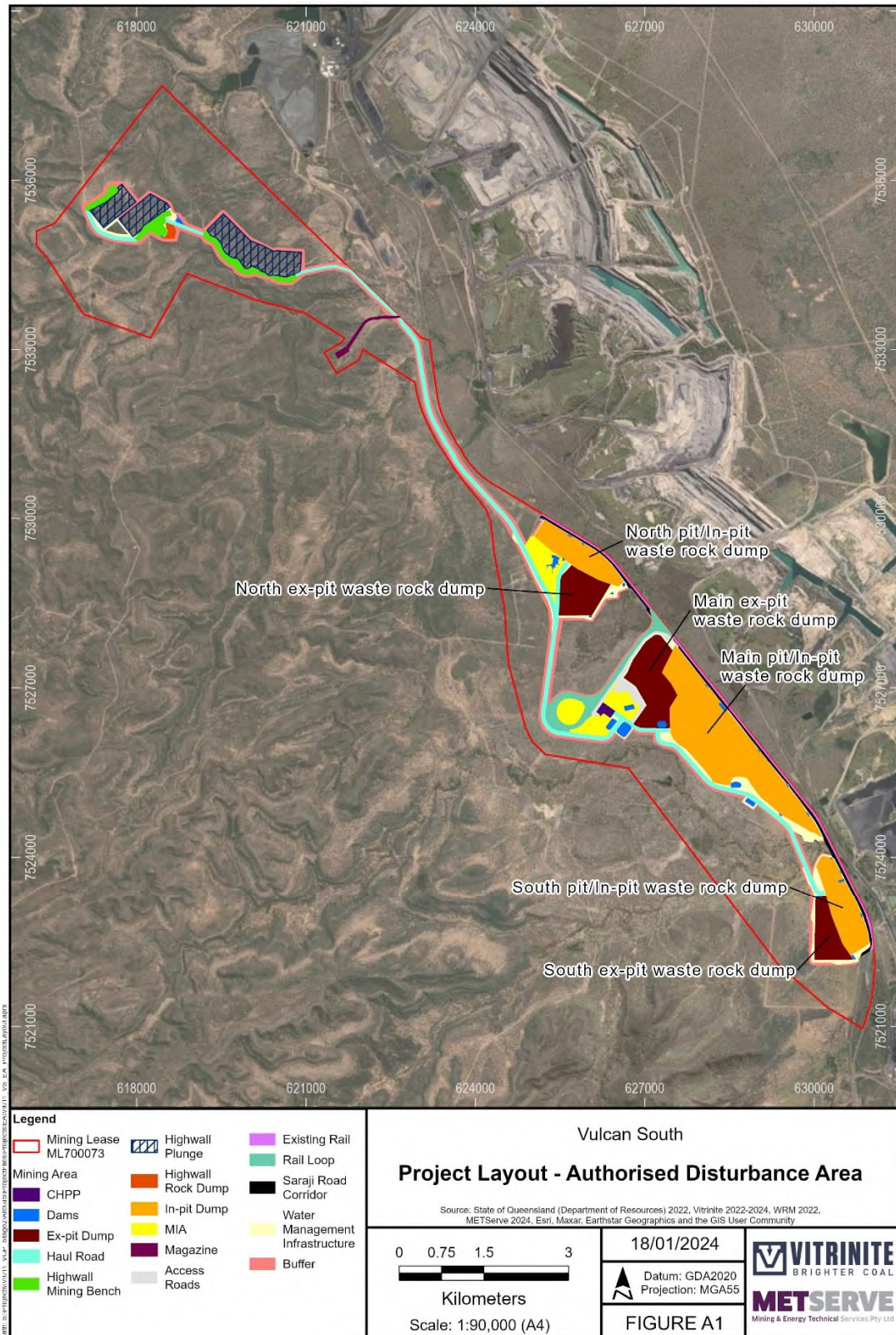
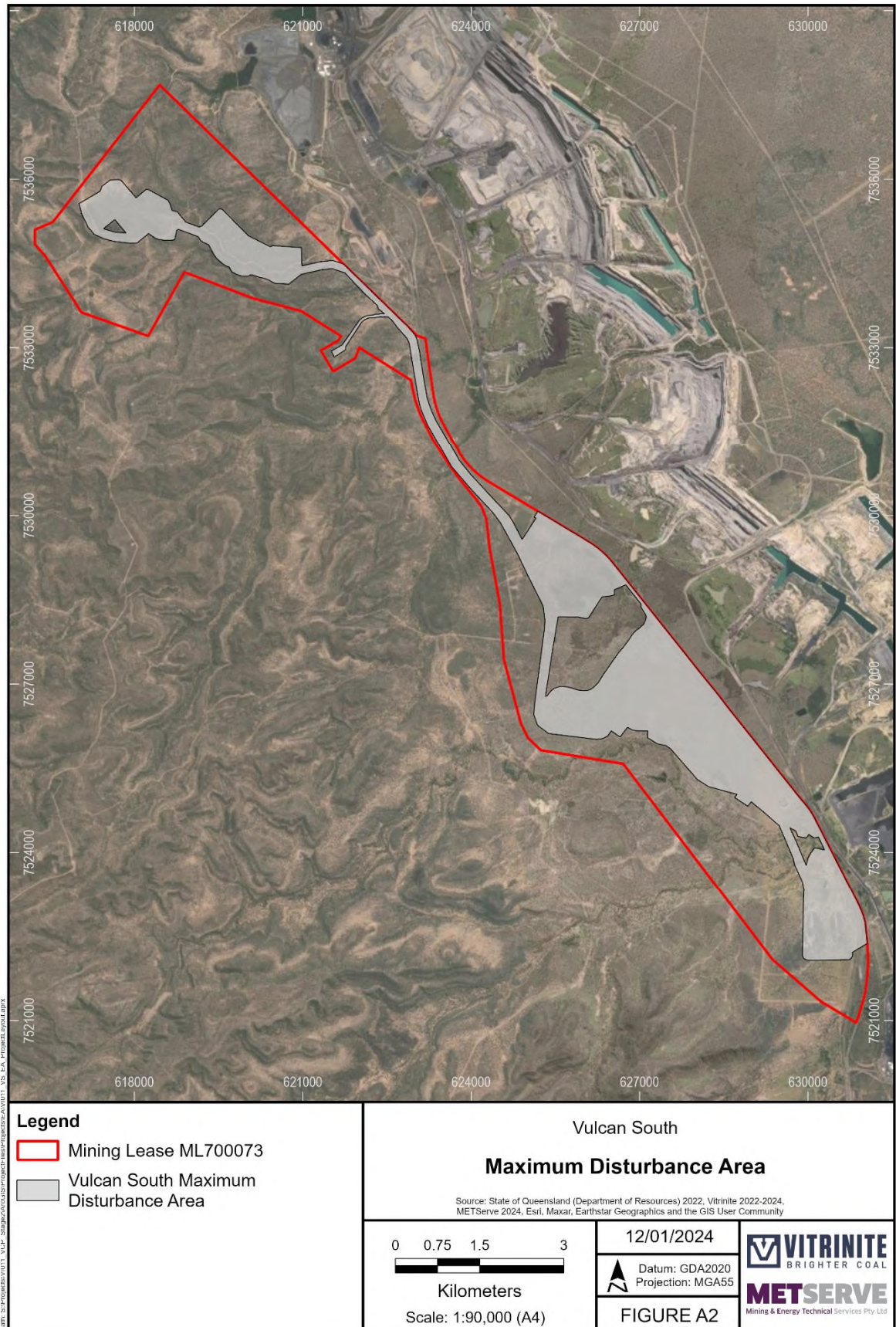
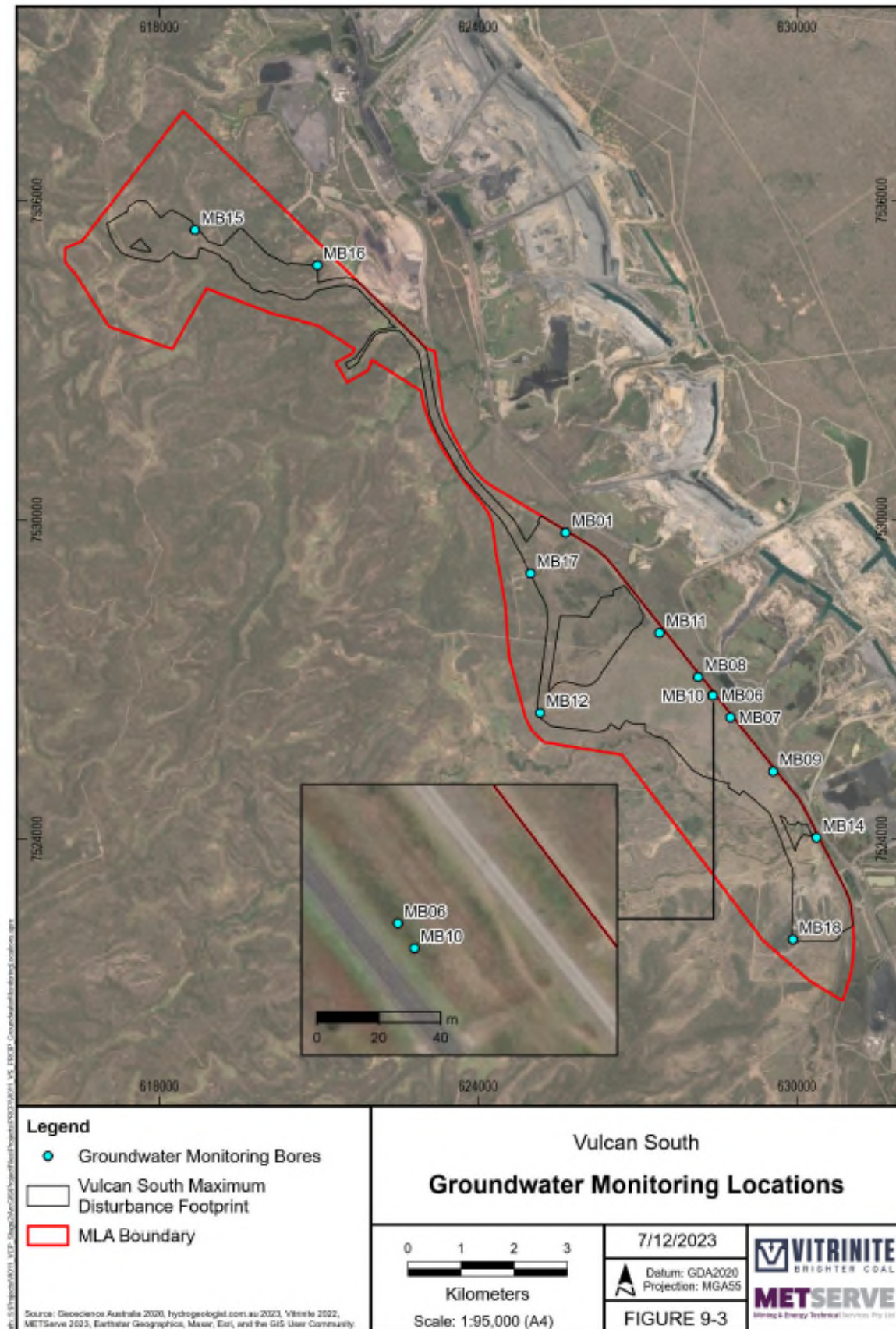


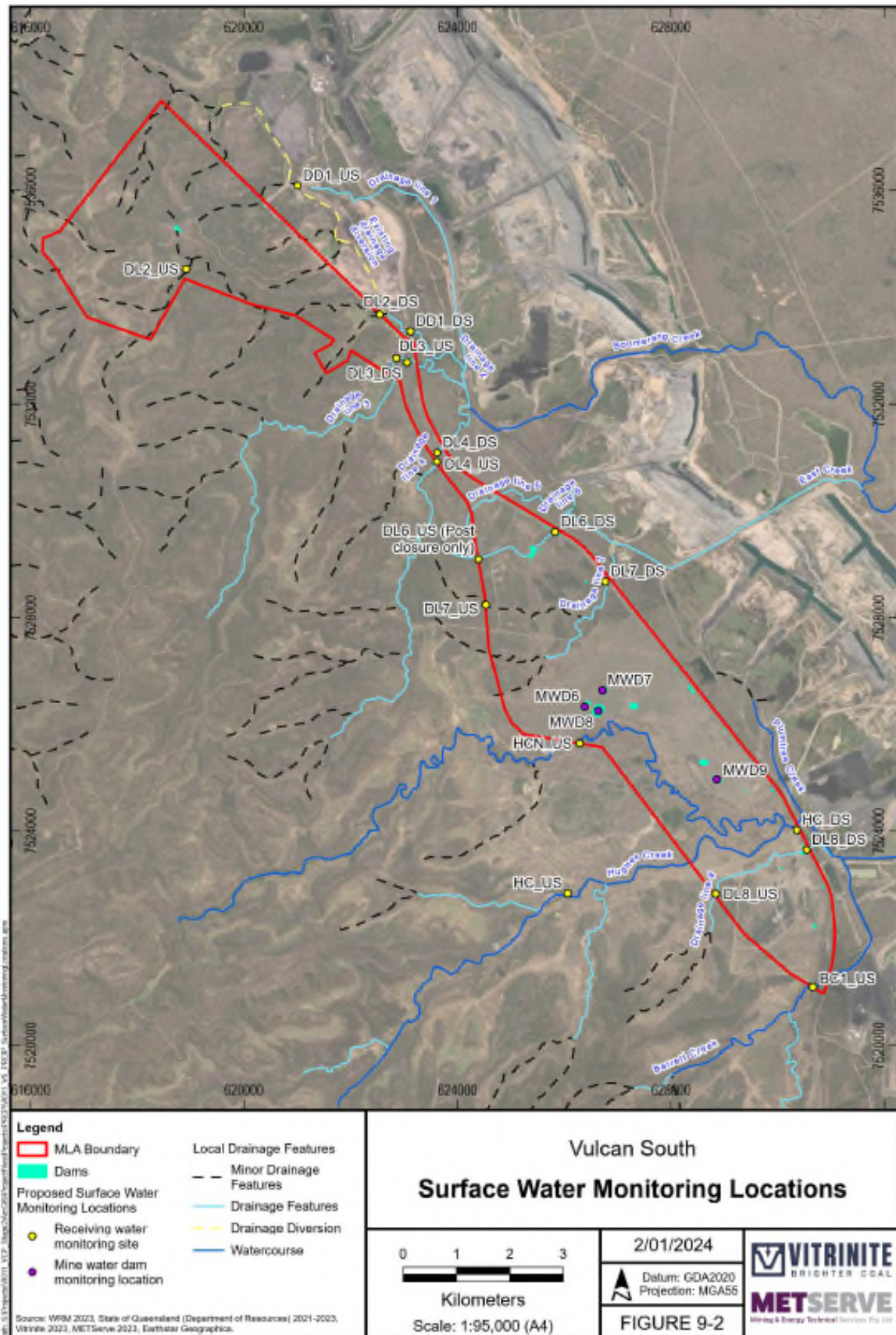
Figure A2. Project Layout – Authorised Disturbance Areas



Appendix 2. Figure E1 - Location of groundwater monitoring bores



Appendix 4. Figure F1 - Surface waters monitoring locations



Appendix 5. Impacted matters

Figure H1. Project footprint relative to Brigalow

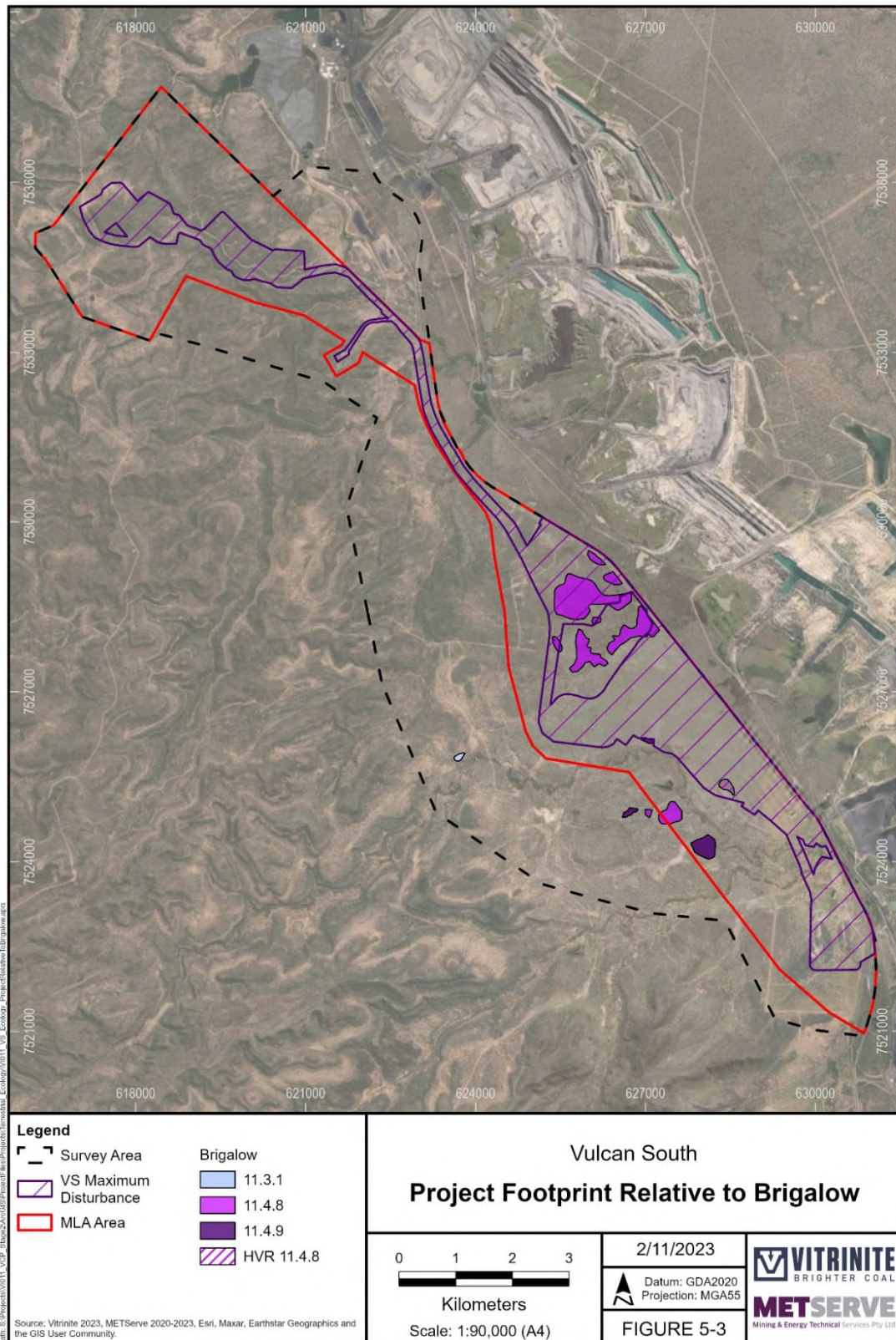


Figure H2. Project footprint relative to koala habitat

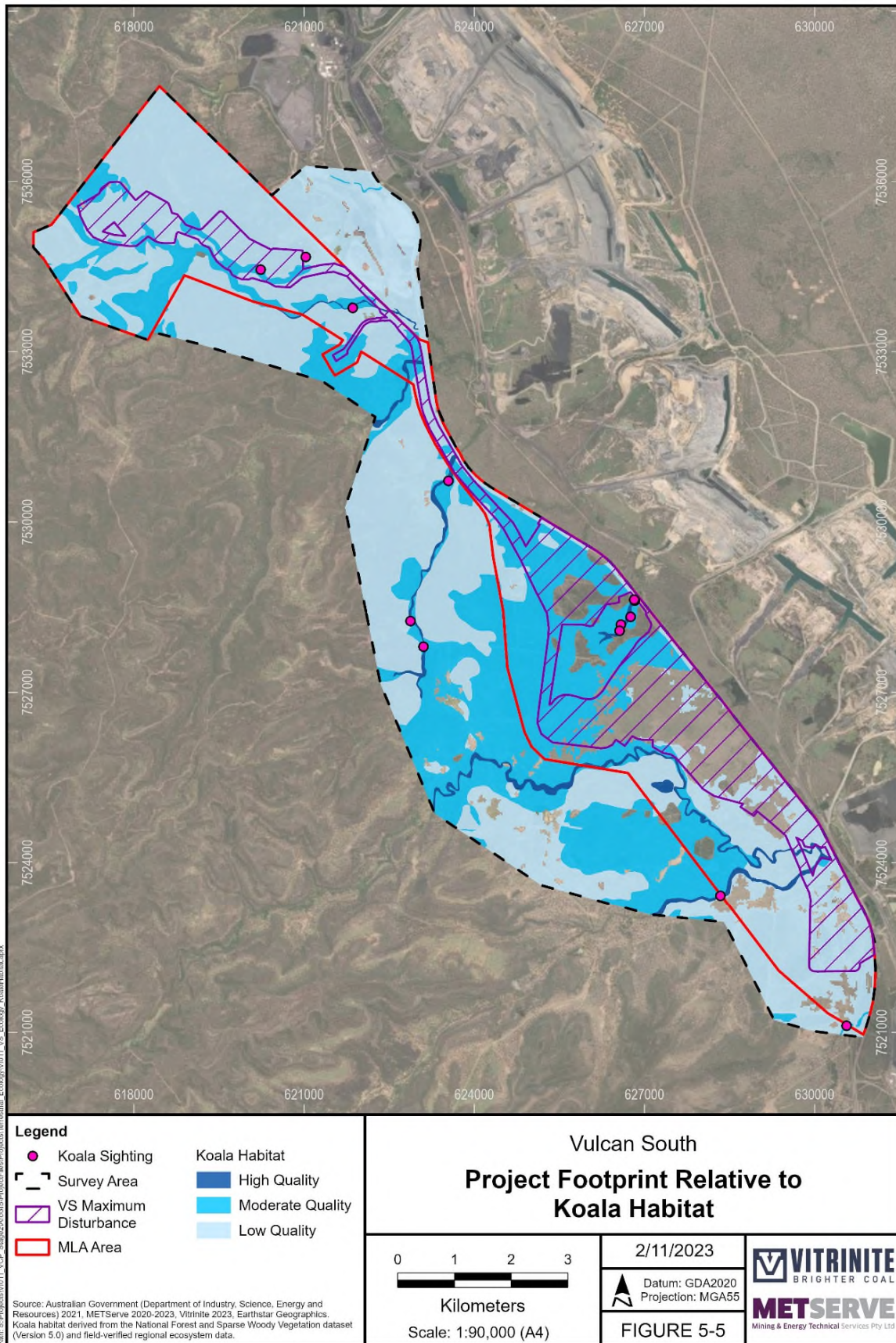


Figure H3. Project footprint relative to existing squatter pigeon habitat

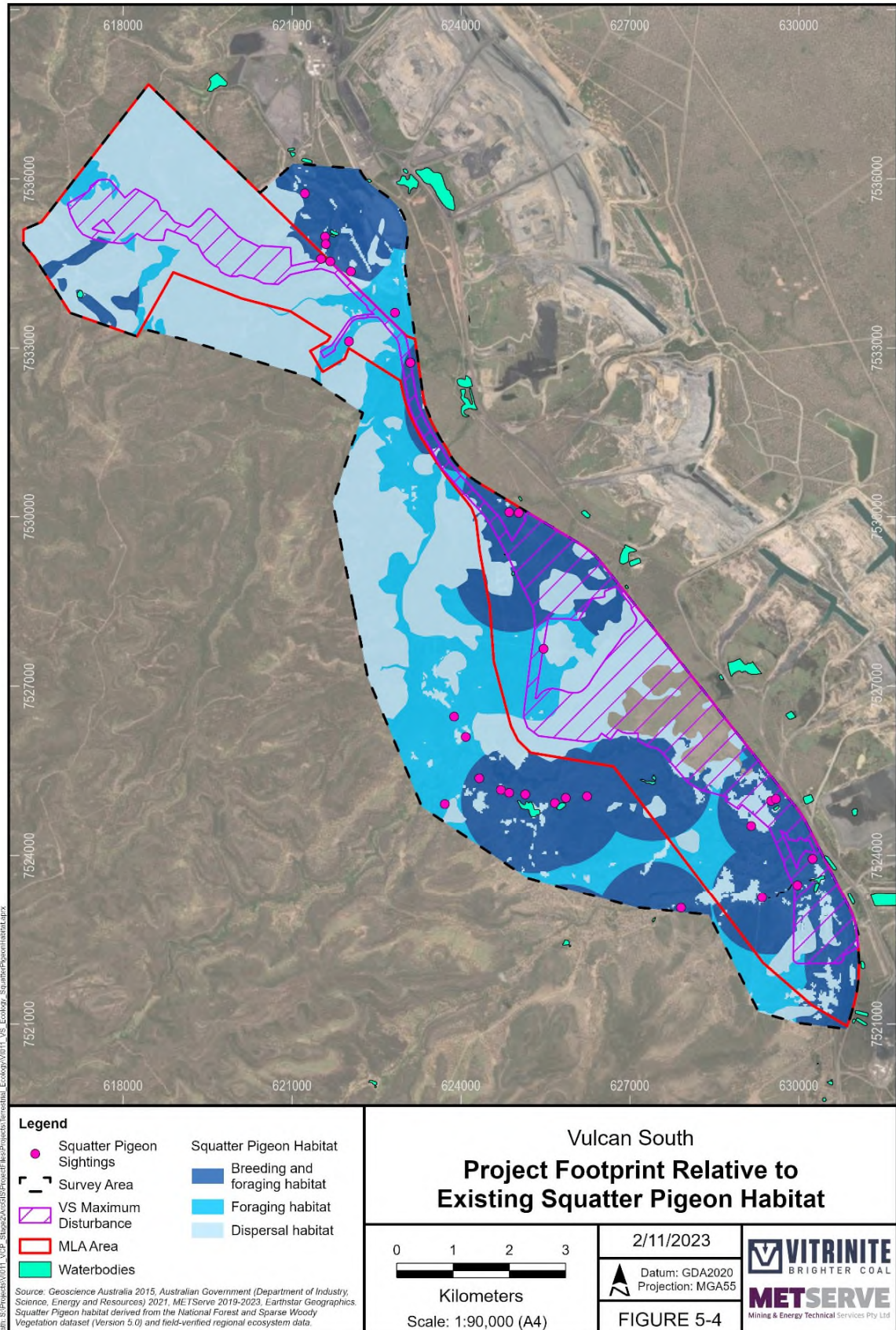


Figure H4. Project footprint relative to central greater glider habitat

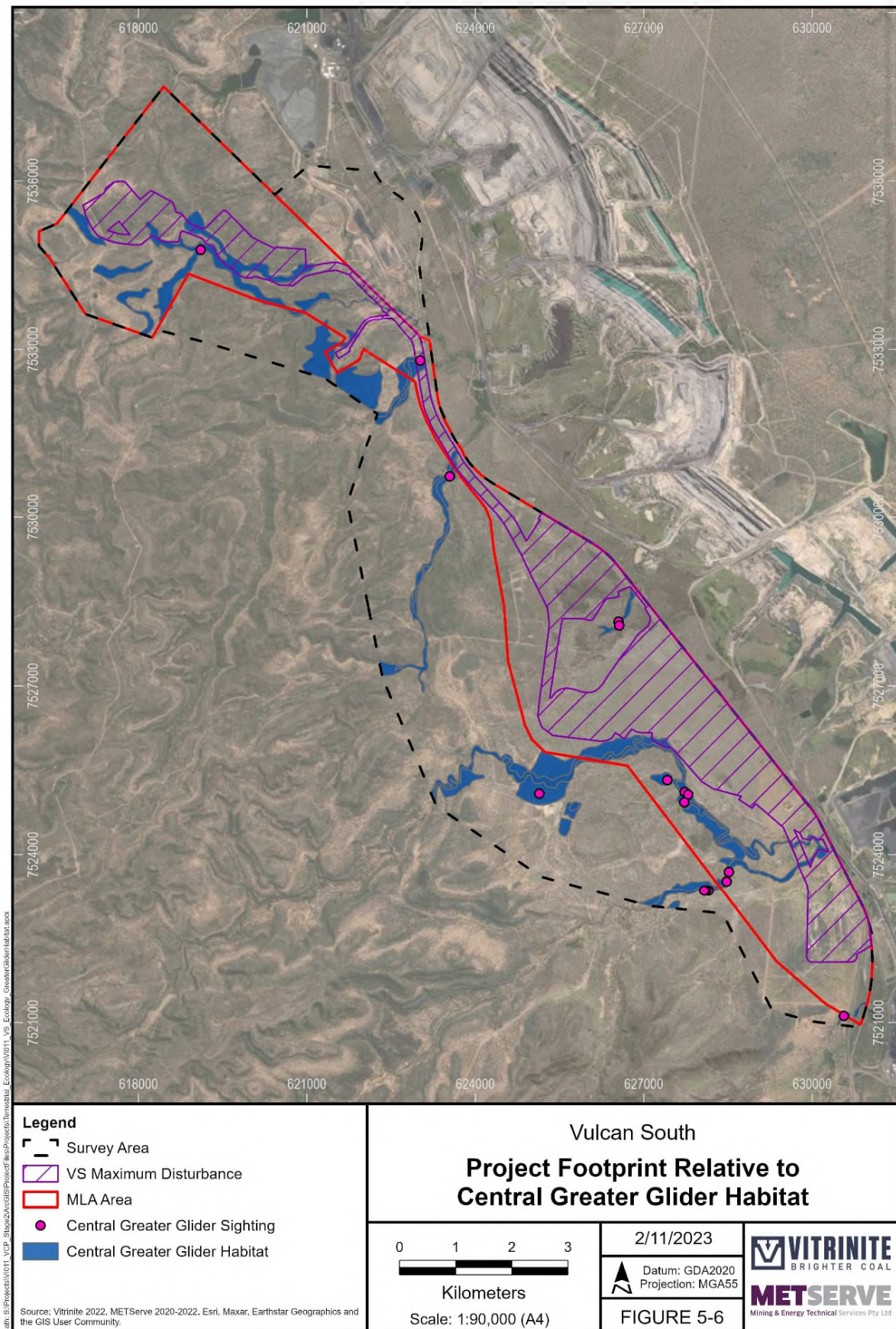


Figure H5. Project footprint relative to Glossy Black Cockatoo habitat

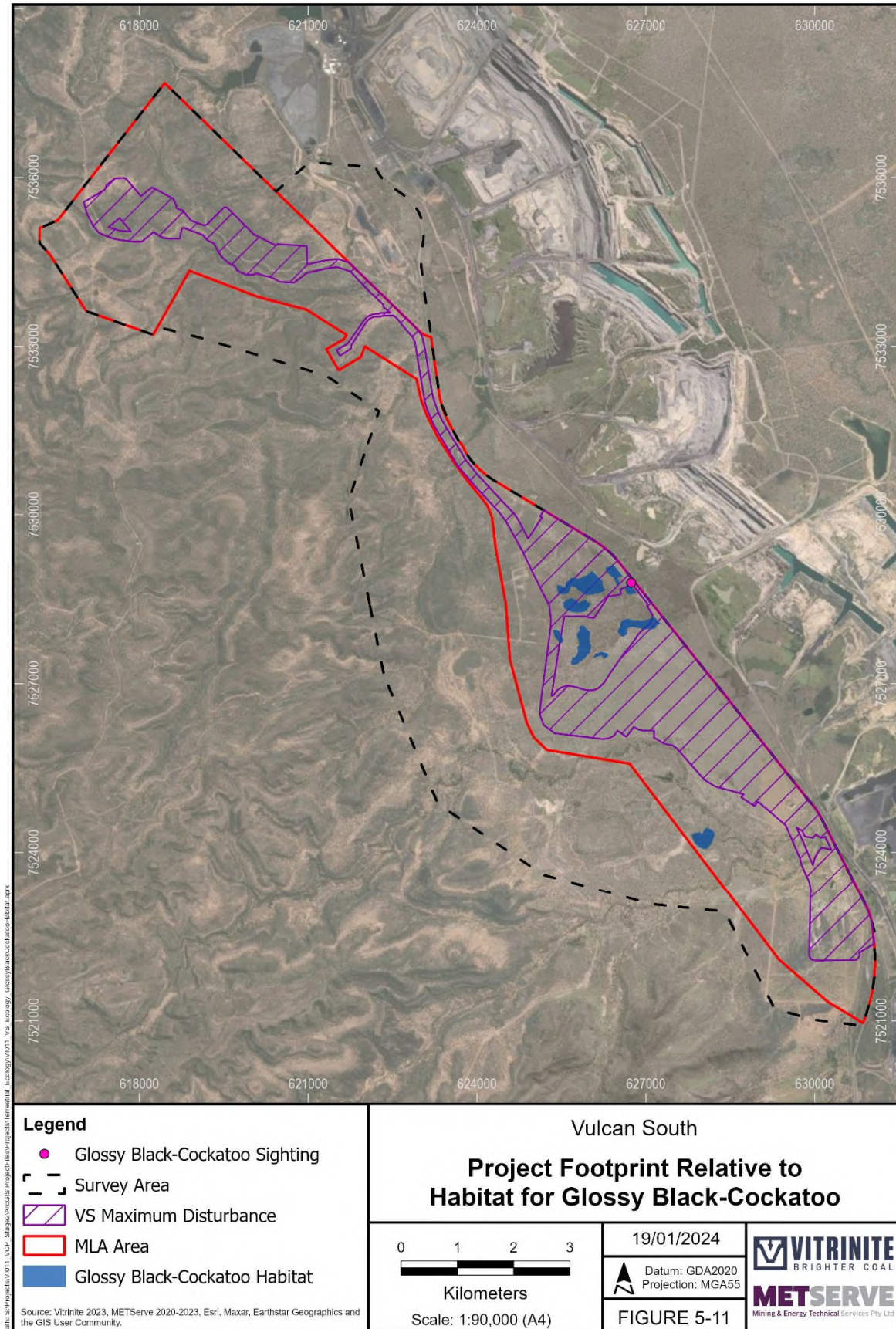


Figure H6. Project footprint relative to Of Concern Regional Ecosystem 11.3.2

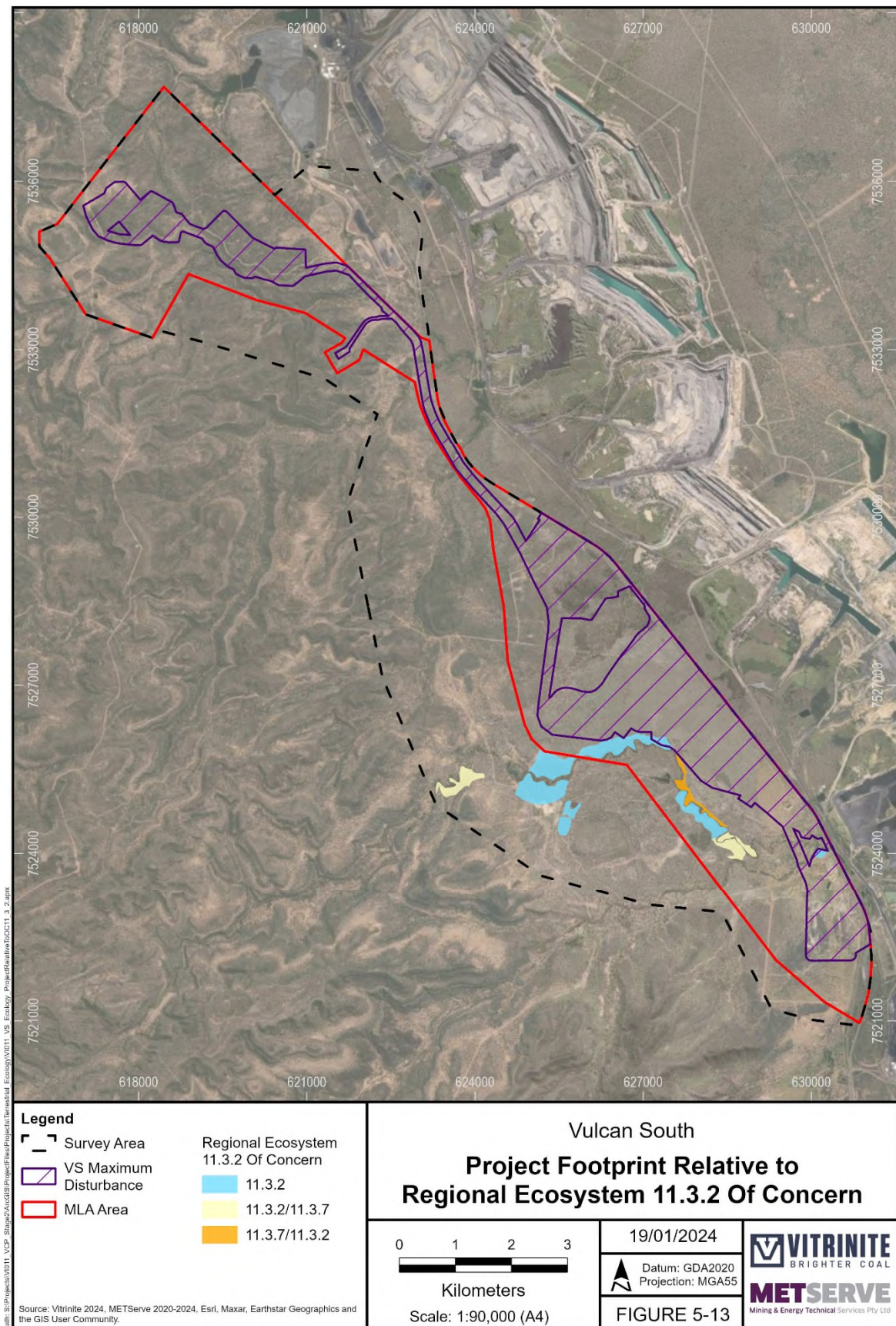
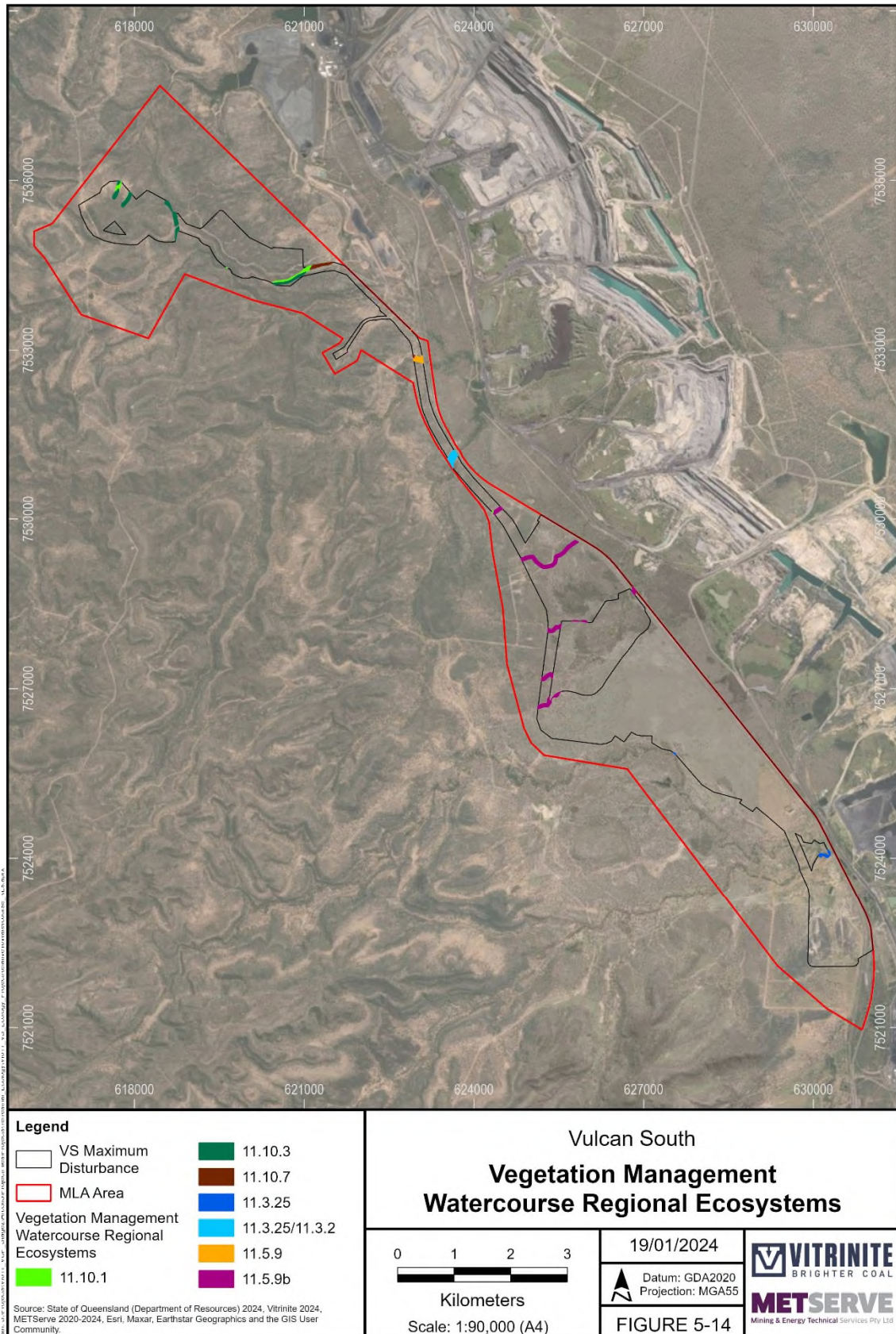


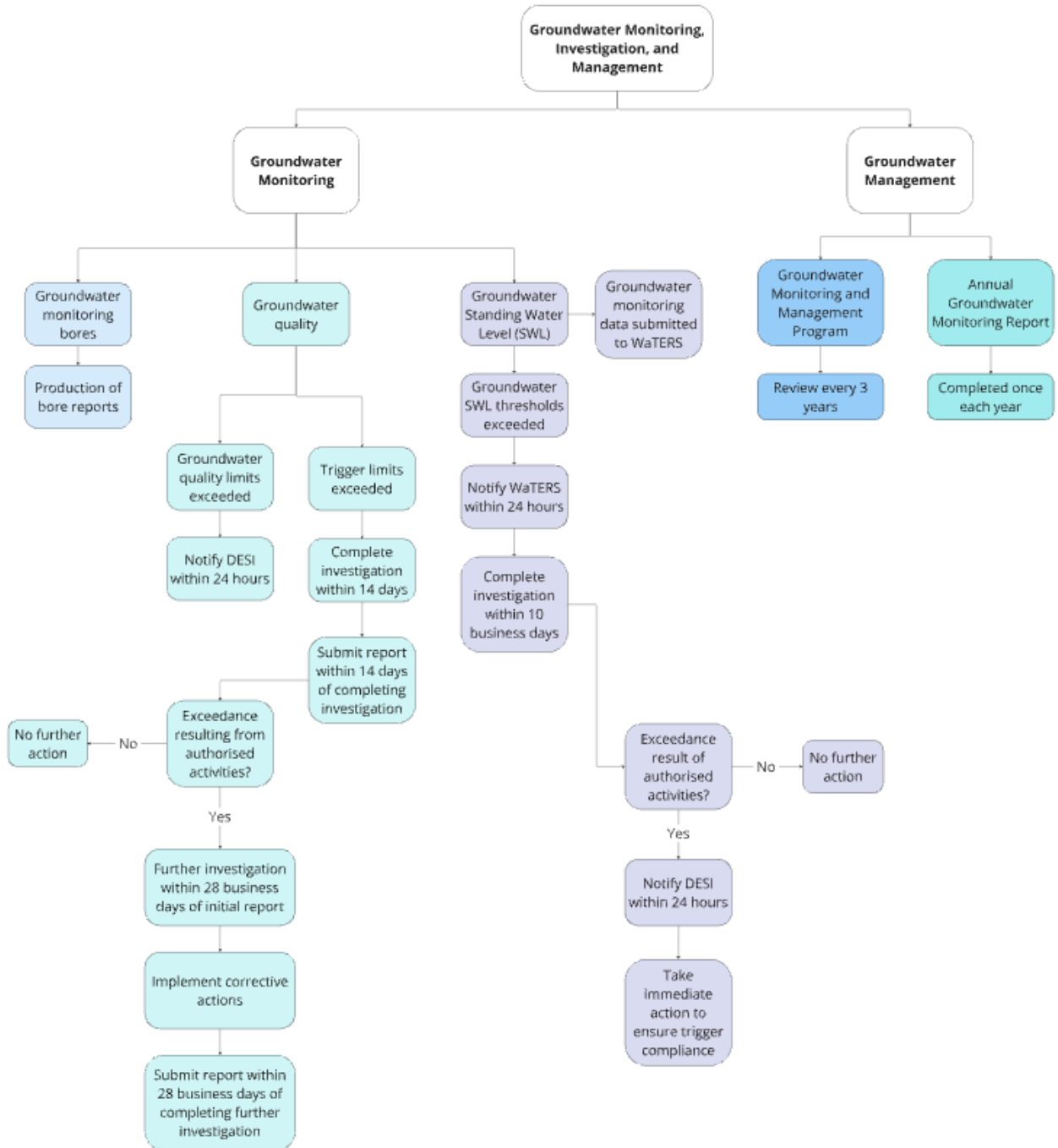
Figure H7. Project footprint relative to regional ecosystems within the defined distance of the defining banks of a watercourse



END OF ENVIRONMENTAL AUTHORITY

Appendix B – Surface and Groundwater Flow Charts







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