# VULCAN COAL MINE

## Water Management Plan

Prepared for Vitrinite Pty Ltd owner of Qld Coal Aust No. 1 Pty Ltd and Queensland Coking Coal Pty Ltd

26 September 2024

1571-31-D4

## DETAILS

| | |
|---|---|
| **Report Title** | Vulcan Coal Mine, Water Management Plan |
| **Client** | Prepared for Vitrinite Pty Ltd owner of Qld Coal Aust No. 1 Pty Ltd and Queensland Coking Coal Pty Ltd |

## THIS REVISION

| | |
|---|---|
| **Report Number** | 1571-31-D4 |
| **Date** | 26 September 2024 |
| **Author** | RN |
| **Reviewer** | JO |

| Revision number | Report date | Report author | Reviewer |
|---|---|---|---|
| 0 | 26 November 2021 | LZ | JO |
| 1 | 29 November 2021 | LZ | JO |
| 2 | 30 November 2023 | RN | JO |
| 3 | 14 March 2024 | RN | JO |
| 4 | 5 April 2024 | RN | JO |
| 5 | 18 September 2024 | RN | JO |
| 6 | 26 September 2024 | RN | JO |

## FORM OF CERTIFICATION

**Name of Registered Professional Engineer providing certification:**

Julian Orth RPEQ No 15706

Employed by WRM Water & Environment Pty Ltd

**Address of Registered Professional Engineer providing certification:**

WRM Water & Environment

Level 1, 369 Ann Street, Brisbane City

PO Box 10703

Adelaide St Brisbane QLD 4000

**Statement of Relevant Experience:**

I hereby state that I am a Registered Professional Engineer of Queensland and meet the requirements of the definition of 'suitably qualified and experienced person'.

**Statement of Certification:**

All relevant material relied upon by me, including subsidiary certifications of specialist components, where required by the environmental authority, is provided in the attached report 'Vulcan Coal Mine - Water Management Plan', dated 5 April 2024.

I hereby certify that the Water Management Plan prepared for the Vulcan Coal Mine has been prepared in accordance with the engineering practice consistent with the standards required for this assessment, and in accordance with the Model Mine Conditions.

I, Julian Orth, declare that the information provided as part of this certification is true to the best of my knowledge. I acknowledge that it is an offence under Section 480 of the Environmental Protection Act 1994 to give the administering authority a document containing information that I know is false, misleading or incomplete in a material particular.

**Signed: Julian Orth**

**Date: 26 September 2024**

## TABLE OF CONTENTS

## FIGURES

## TABLES

# 1 INTRODUCTION

## 1.1 BACKGROUND

The Vulcan Coal Mine (the Project or VCM), which is managed by Vitrinite Pty. Ltd., owner of Qld Coal Aust No.1 Pty. Ltd. and Queensland Coking Coal Pty. Ltd. (Vitrinite), is an open pit coal operation located to the southeast of Moranbah, in Central Queensland. The Project Mining Lease (ML 700060) is situated to the south of the Peak Downs Mine, operated by BMA Australia.

The location of the Project in relation to surrounding mines and regional drainage features is shown in Figure 1.1. Figure 1.2 and Figure 1.3 shows the conceptual drainage plan for the mining and post-mining stages of the Project.

## 1.2 PURPOSE AND SCOPE

This Water Management Plan (WMP) has been prepared to meet the requirement of Condition F17 and Condition F18 of Environmental Authority (EA) EA0002912 (Department of Environment and Science [DES], 2023) which was issued for the Project.

The WMP examines and addresses all issues relevant to the importation, generation, use, and management of water on a mining project in order to minimise the quantity of water that is contaminated and released by and from the Project.

The actual and potential risks of environmental harm to natural water flows posed by mining activities have been identified and management actions that will effectively minimise these risks have been presented.

## 1.3 RELATED DOCUMENTS

This WMP should be read in conjunction with the following reports:

- *Receiving Environment Monitoring Program Vulcan Coal Mine* (REMP) (Vitrinite Pty Ltd, 2021); and
- *Vulcan Coal Mine EA Amendment Surface water assessment* (WRM Water & Environment, 2022); and
- *Vulcan Coal Mine Erosion and Sediment Control Plan* (WRM Water & Environment, 2024).

## 1.4 REPORT STRUCTURE

The report is structured as follows:

- Section 2 describes the environmental values of the regional and local drainage receiving waters;
- Section 3 presents the site operating activities including a study of the potential for generating contaminants on the site;
- Section 4 presents the surface water management system including the management objectives and principles;
- Section 5 provides a description of the site water balance;
- Section 6 describes measures to manage/prevent saline and acid rock drainage;
- Section 7 provides an overview of the surface water monitoring program;
- Section 8 provides a summary of the emergency and contingency planning information related to water management; and
- Section 9 gives a list of references.

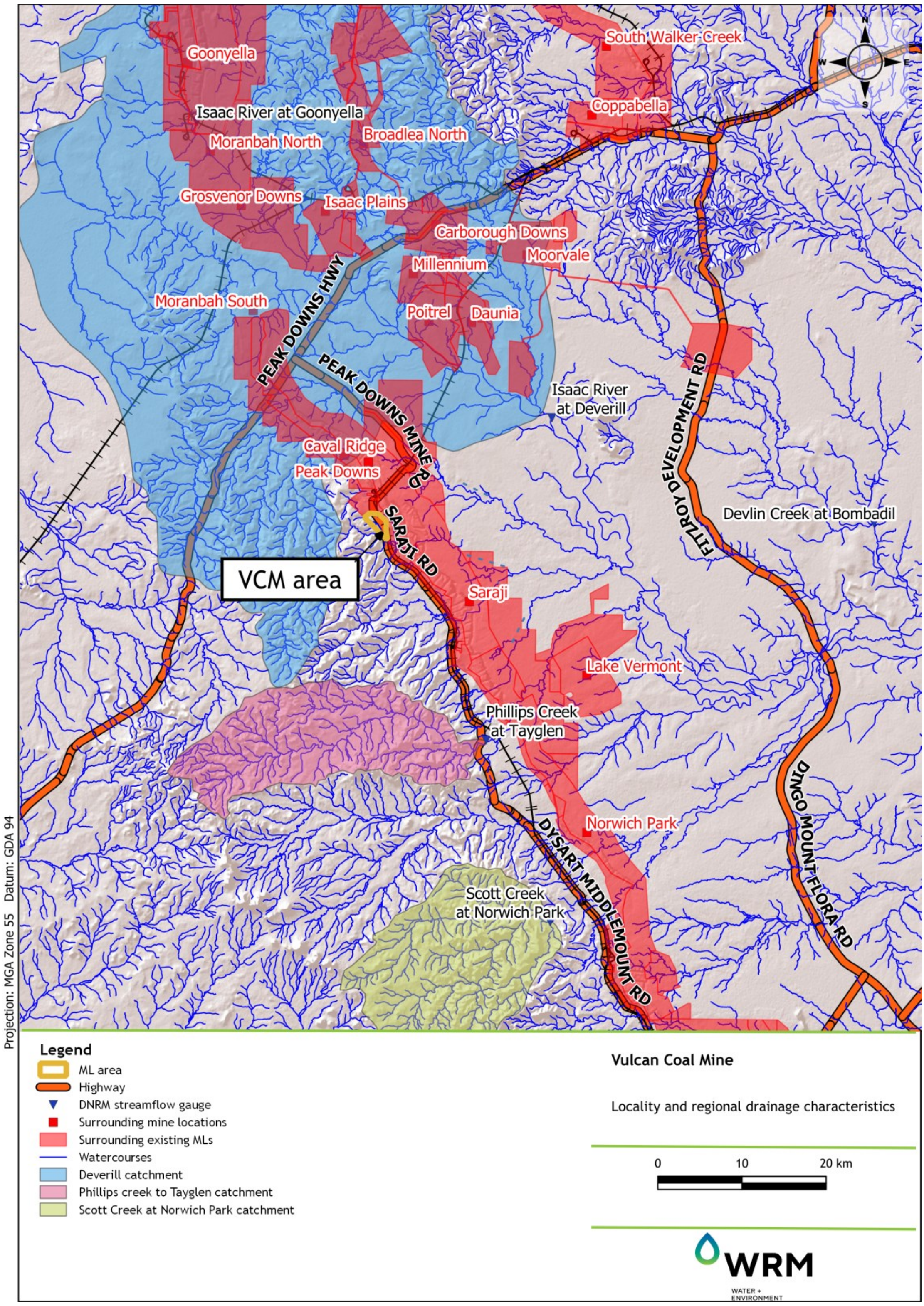


**Figure 1.1 Locality and regional drainage characteristics**

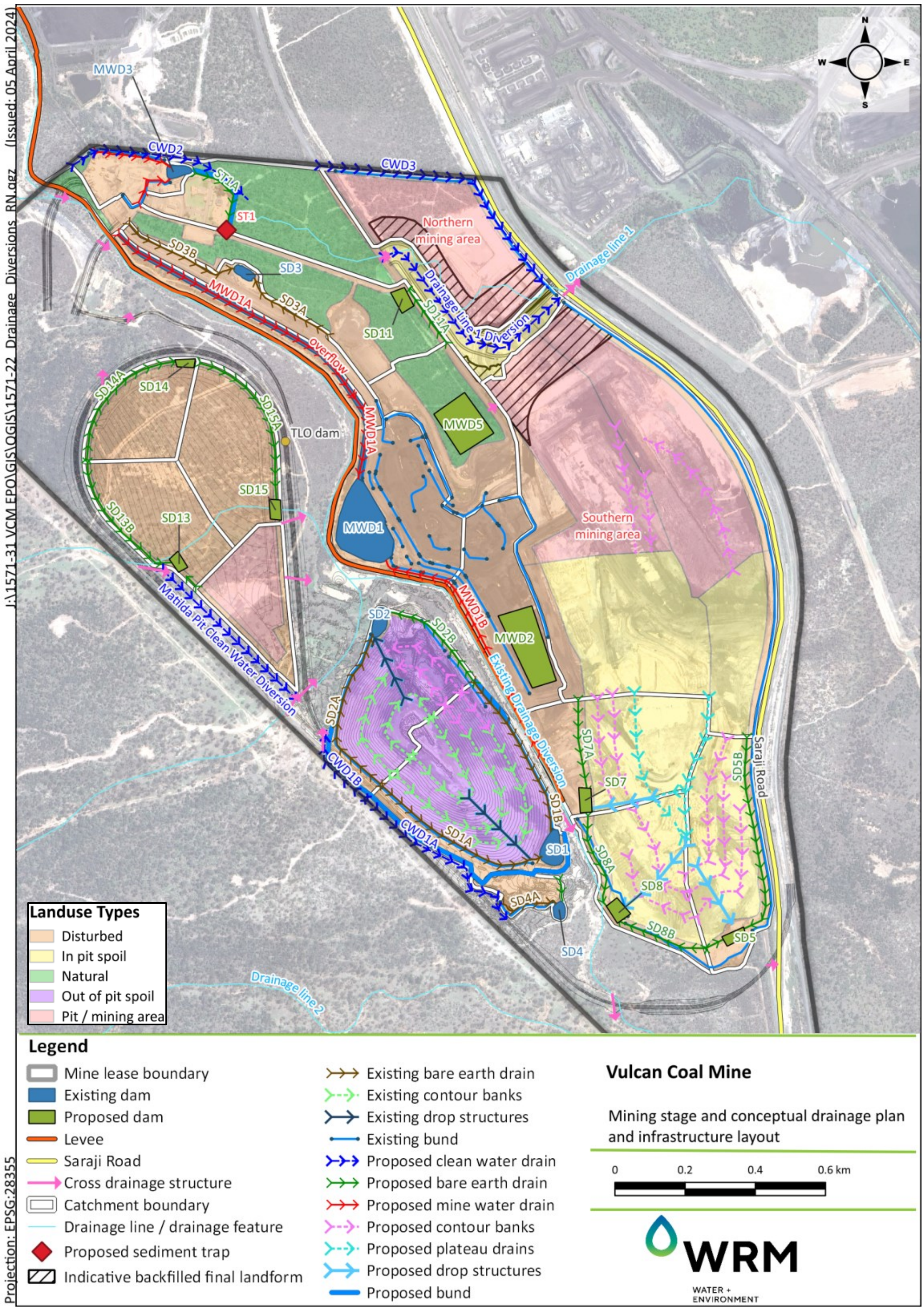


**Figure 1.2 Mining stage conceptual drainage plan**

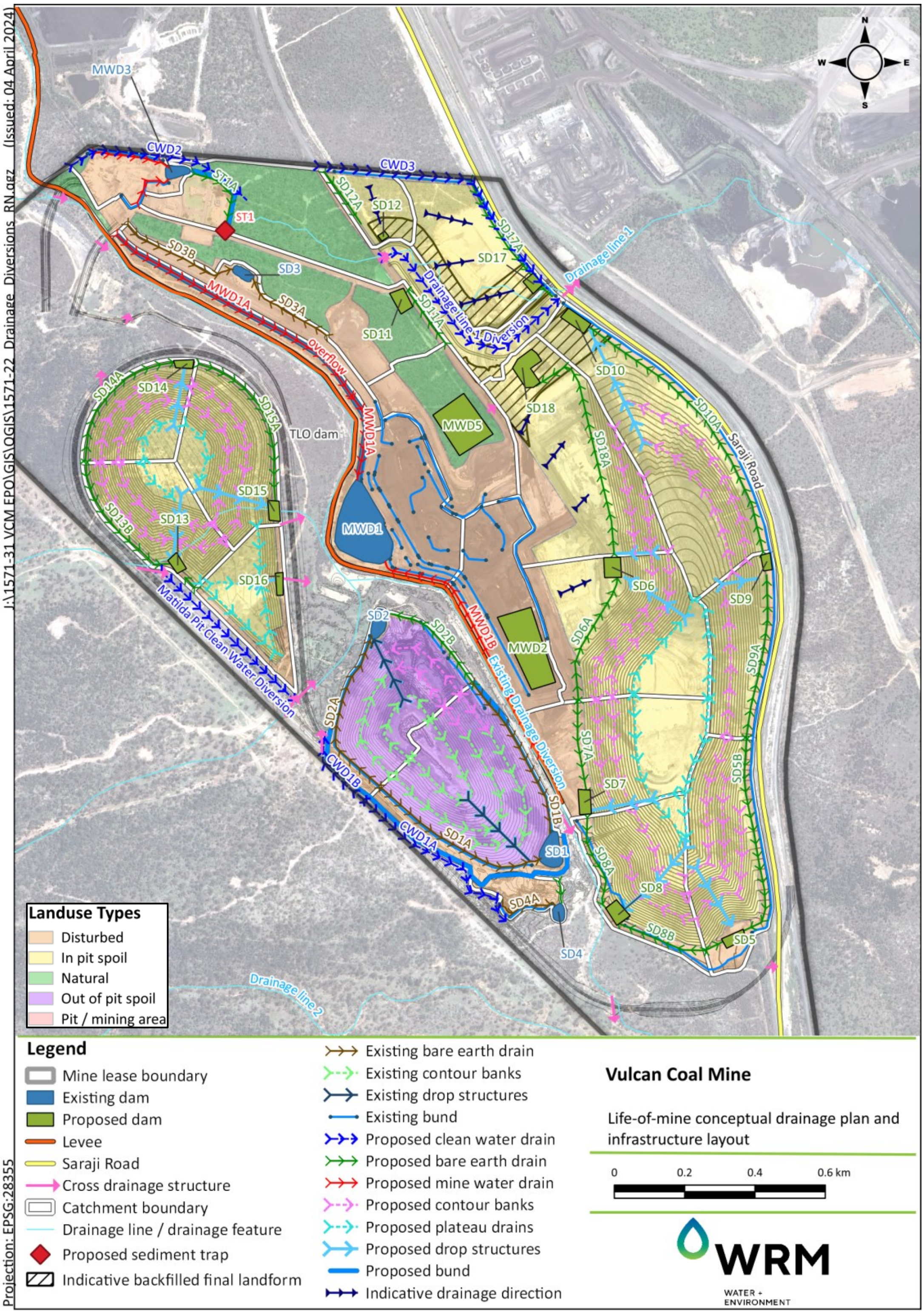


**Figure 1.3 Life-of-mine (post-mining) stage conceptual drainage plan**

# 2 CATCHMENT HYDROLOGY AND ENVIRONMENTAL VALUES

## 2.1 GENERAL

This section of the WMP describes the regional drainage characteristics in the vicinity of the Project. The environmental values (EVs) and water quality objectives (WQOs), as defined by the various environmental protection policies and guidelines and regulations relevant to these waterways, are also described.

## 2.2 REGIONAL DRAINAGE NETWORK

The Project is located within the Isaac River sub-basin of the greater Fitzroy Basin. Figure 1.1 shows the Isaac River catchment to the Deverill gauging station. The catchment area of the Isaac River to Boomerang Creek (the main drainage feature in proximity to the Project) is 5,226 square kilometres ($km^2$).

The Isaac River commences approximately 100 km to the north of the Project within the Denham Range. It drains in a southwesterly direction through the Carborough and Kerlong Ranges before turning in a south easterly direction near the Goonyella Riverside Mine. It drains approximately 30 km to the east of the Project, and eventually flows to the Mackenzie River some 150 km to the southeast. Three open water bodies are located in the upper catchment including Lake Elphinstone, Teviot Creek Dam and Burton Gorge Dam.

Other than along the ranges, the majority of the Isaac River catchment has been cleared for agricultural use or for mining. There are several existing coal mines in the catchment, including Burton, North Goonyella, Goonyella Riverside, Broadmeadow, Broadlea North, Isaac Plains, Moranbah North, Millennium, Daunia, Poitrel, Grosvenor, Peak Downs, Saraji, Norwich Park and Lake Vermont.

## 2.3 LOCAL DRAINAGE NETWORK

Figure 2.1 and Figure 2.2 show the drainage features in the vicinity of the Project ML. The Project ML is located in the headwaters of the Boomerang Creek catchment. The Project contains an existing drainage diversion which outlets to Boomerang Creek to the southeast of the Project. Boomerang Creek is a watercourse and tributary of the Isaac River. Ripstone Creek is located immediately north of the Project ML. Boomerang Creek and Ripstone Creek are ephemeral streams which experience flow only after sustained or intense rainfall in the catchment.

The Boomerang Creek and Ripstone Creek catchments commence in the Harrow Range to the west of the Project ML and drain in an easterly direction towards Saraji Road and the Norwich Park Branch Railway before entering the existing Peak Downs operations. The predominant catchment land uses include undeveloped with some stock grazing to the west of Saraji Road and stock grazing and coal mining to the east. The catchment area of Boomerang Creek and Ripstone Creek is 788 $km^2$ and 300 $km^2$ respectively. The Peak Downs operation has existing diversions of Boomerang Creek and Ripstone Creek and has approval to release to both creeks.

The headwaters of Ripstone Creek are diverted through the Project ML and into Boomerang Creek via the existing drainage diversion, which was built to allow the construction of a Tailings Dam within Peak Downs operations. The diversion flows in a southeasterly direction through the Project ML and has a catchment area of approximately 16.0 $km^2$.

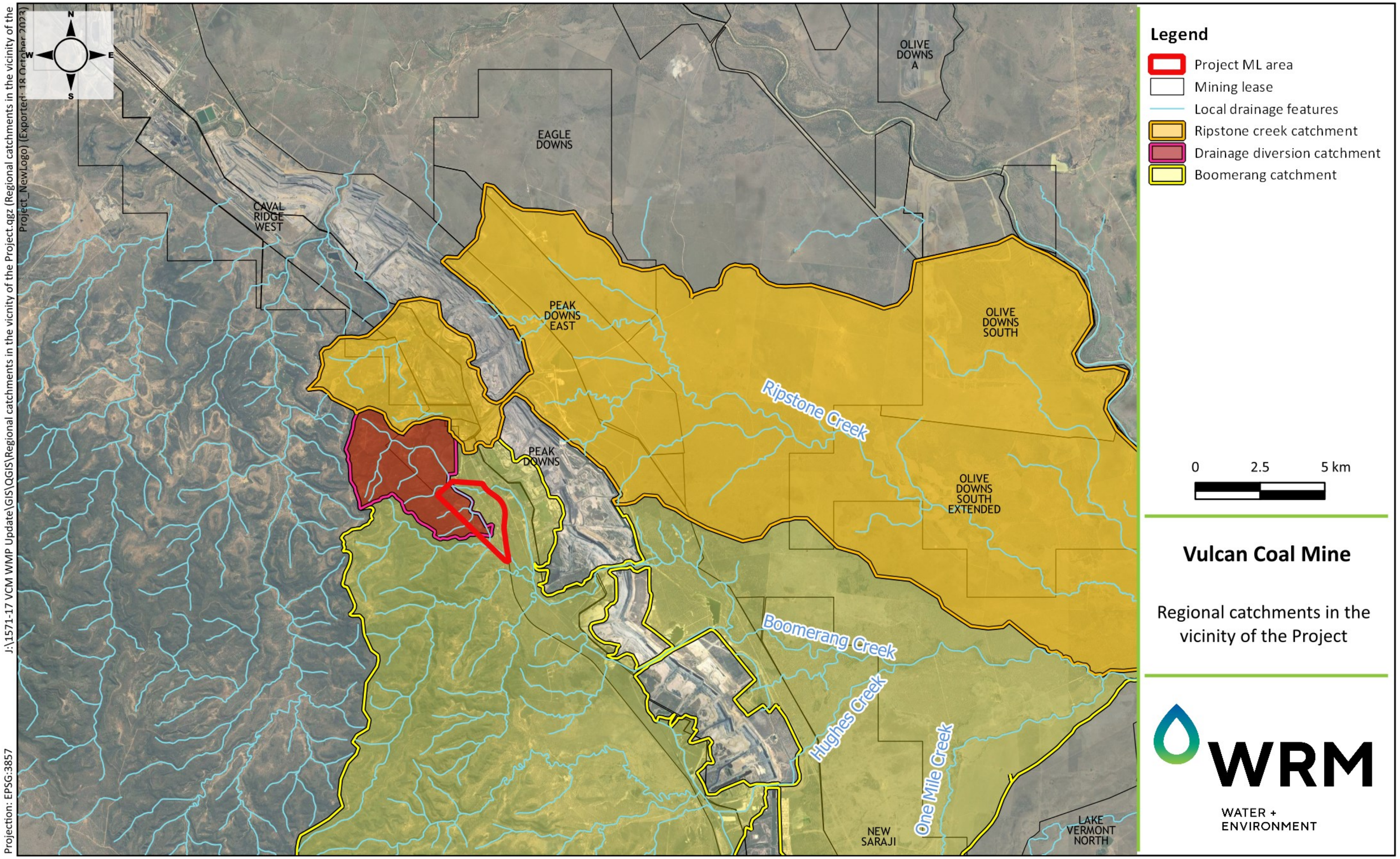


**Figure 2.1 Regional catchments in the vicinity of the Project**

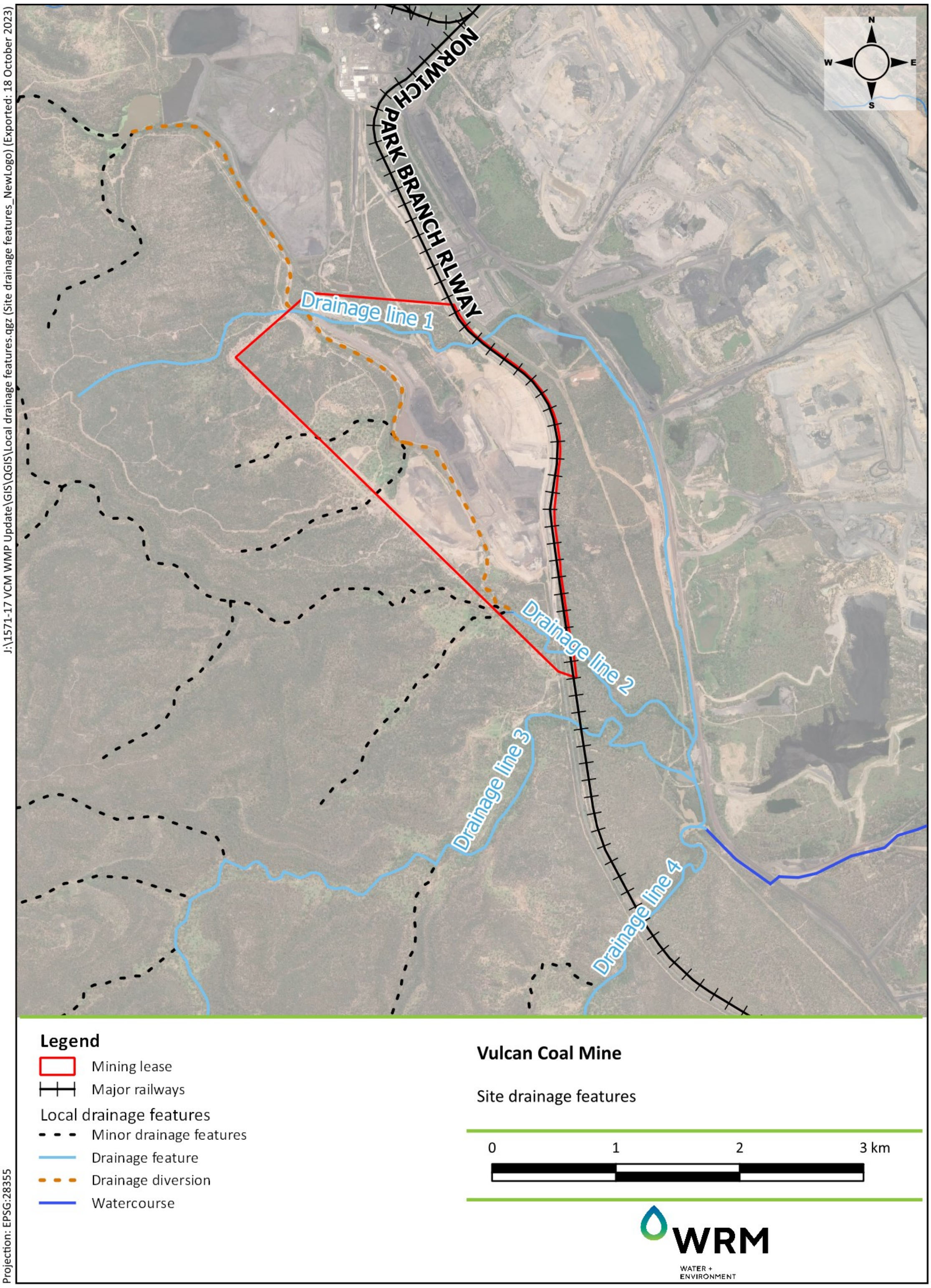


**Figure 2.2 Site drainage features**

Runoff from the Project ML drains to three locations as follows (see Figure 2.2):

- The drainage diversion discharges into Drainage line 2, which crosses the southern boundary of the Project ML. The western and southern portions of the Project ML flow into the diversion;
- The railway culvert at the northern corner of the Project ML. The northern and eastern portions of the Project ML flow in a northeasterly direction via Drainage line 1 into Saraji Road, before draining to the railway culverts; and
- Overland across the southeastern corner of the Project ML. The southeastern corner of the Project ML flows towards the Saraji Road culvert before draining south into Drainage line 2, upstream of Norwich Park Branch Railway.

All runoff from the Project ML drains towards Boomerang Creek, which commences approximately 1.5 km to the southeast of the Project.

## 2.4 STREAM FLOW

There are four streamflow gauges operated by the Department of Natural Resources, Mines and Energy (DNRME) in the vicinity of the Project including (see Figure 1.1):

- Isaac River at Deverill (approximately 25 km northeast of the Project);
- Phillips Creek at Tayglen (approximately 30 km southeast of the Project);
- Scott Creek at Norwich Park (approximately 50 km south of the Project); and
- Devlin Creek at Bombandy (approximately 60 km east of the Project).

The closest stream gauge is located on the Isaac River at Deverill (Station ID: 130410A). This gauge is located approximately 20 km upstream of where Boomerang Creek meets the Isaac River.

Historical flow and river height monitoring data (1968-2018) for the Isaac River at Deverill, provides an indication of the flow regime (refer Figure 2.3). Surveyed cross section data for this gauging station in September 2014 (DNRME, 2017) indicates that sediment covers the bottom one metre of the gauge range. The mean river height data shown in Figure 2.3 suggests that surface flow above the sand is more likely to occur only in the wetter months from November to April, reducing to shallow subsurface flows from about May to October in an average year.

The Phillips Creek at Tayglen Creek streamflow gauge (Station ID: 130409A) is located on Phillips Creek. Phillips Creek is an easterly draining tributary of the Isaac River. DNRME maintains data for the gauge between 1968 and 1988. The catchment area to the gauge location (see Figure 1.1) is 344 $km^2$.

A typical sequence of recorded flows from this station is shown in Figure 2.4. The creek is characterised by brief periods of flow interspersed by long periods of no flow. This ephemeral behaviour is typical for streams in this part of the Fitzroy Basin.

The median annual flow over the period of record was approximately 12,730 ML/a (52 mm of runoff), most of which occurred in the summer months (as shown in Figure 2.5). Figure 2.6 compares flow frequency curves for a number of gauged catchments in the Isaac River catchment which are located in the vicinity of the Project. Figure 2.6 shows that for Phillips Creek at Tayglen, flow only occurred approximately 22% of the time, which would be similar to other creeks in the vicinity of the Project.

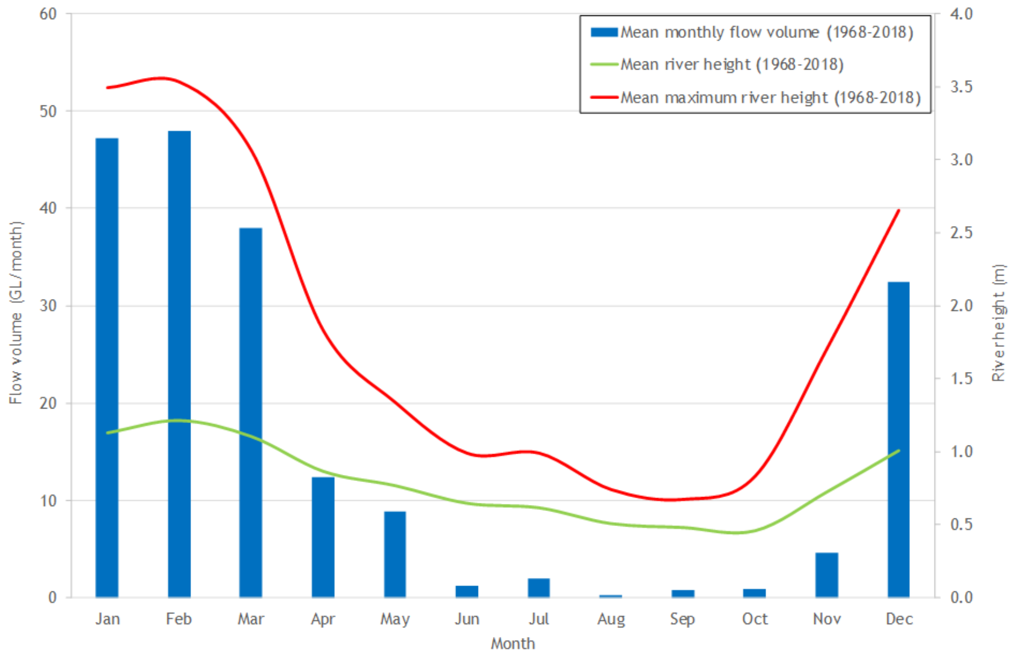


**Figure 2.3 Flow volume and river height in the Isaac River at Deverill**

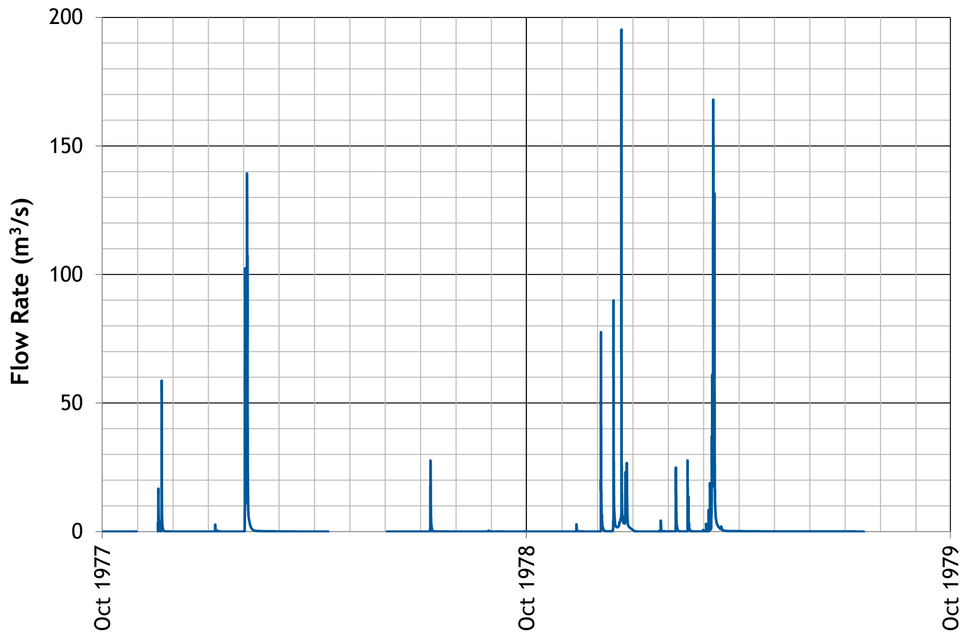


**Figure 2.4 Sample flow sequence – Phillips Creek at Tayglen 1977 - 1979**

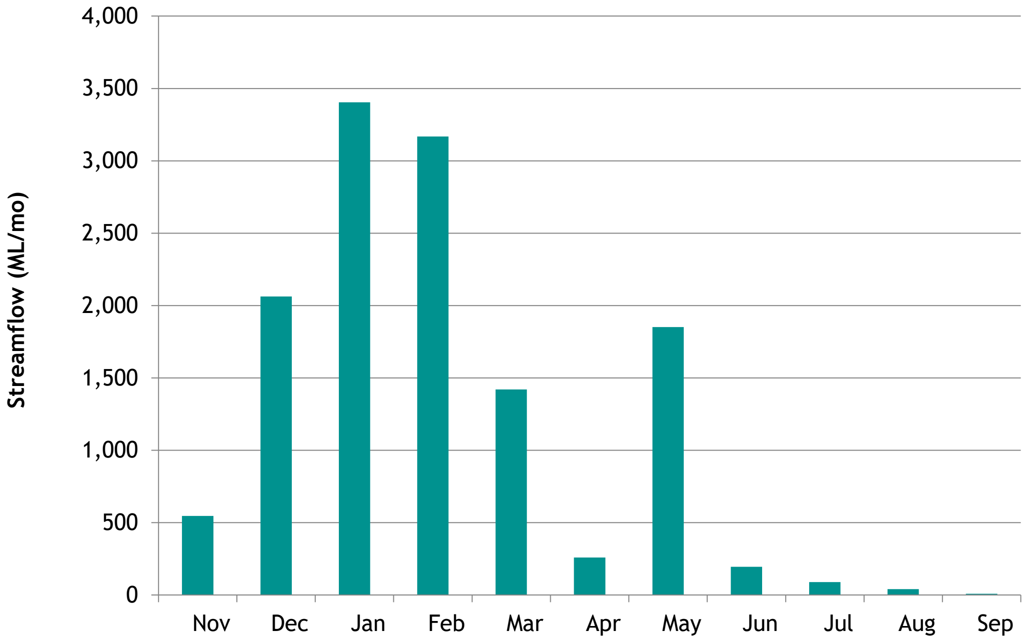


**Figure 2.5 Measured mean monthly streamflow – Phillips Creek at Tayglen 1968-1988**

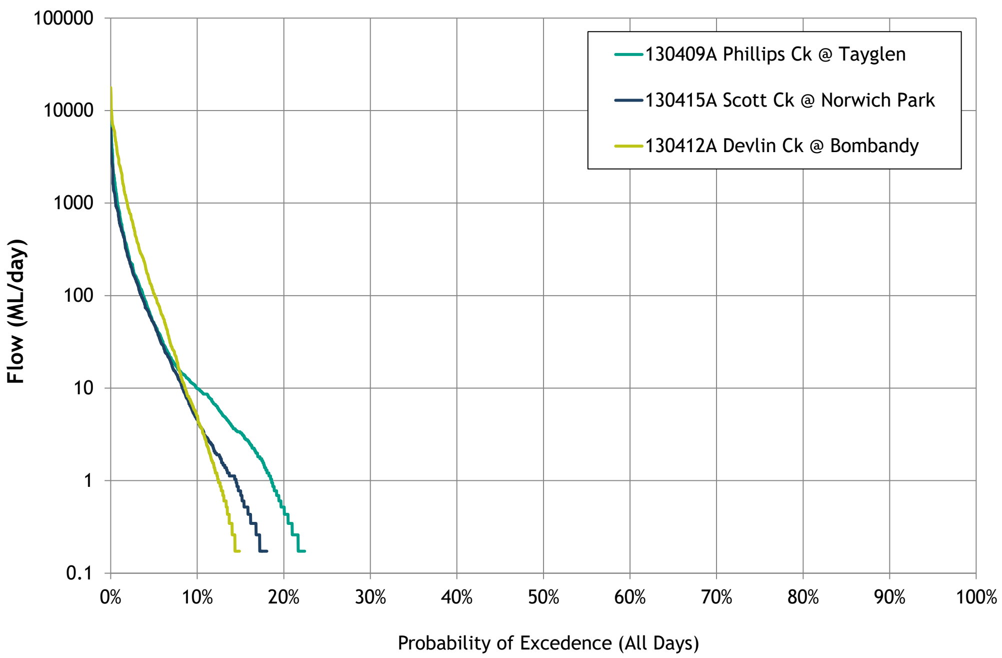


**Figure 2.6 Recorded frequency curves at nearby DNRME gauges (no flow days included)**

## 2.5 EXISTING WATER USE ENTITLEMENTS

There are two active water licences for Boomerang Creek (Authorisation 55570L & 617686) both held by Peak Downs Mine. Licence authorisation #55570L allows impounding of water and licence #617686 allows the take of the impounded water (at a max rate of 2,000 L/s).

## 2.6 ENVIRONMENTAL VALUES

The Queensland Water Quality Guidelines and Environmental Protection (Water and Wetland Biodiversity) Policy (EPP Water) guidelines establish environmental values (EVs) and water quality objectives (WQOs) for natural waters in Queensland. The VCM is located within the 'Isaac western upland tributaries' area of the Isaac River sub-basin. Under the EPP Water, the following EVs have been nominated for this area:

- Aquatic ecosystems;
- Irrigation;
- Farm supply/use;
- Stock water;
- Aquaculture;
- Human consumption;
- Primary recreation;
- Secondary recreation;
- Visual recreation;
- Drinking water;
- Industrial use; and
- Cultural and spiritual values.

## 2.7 GROUNDWATER

Groundwater inflows to the open pits were provided by Hydrogeologist.com.au as a daily rate for six-monthly periods over the mine life. The predicted groundwater inflows were small and were found to have a negligible effect on the water balance.

The modelled groundwater rates to the pits were:

- 4.3 $m^3$/day for the first 2 years; and
- 26.2 $m^3$/day for the next 2 years.

## 2.8 WATER QUALITY

### 2.8.1 Regional Isaac River water quality

DNRME has collected daily electrical conductivity (EC) data at the Isaac River at Deverill gauge. The Deverill gauge is located upstream of the point where Boomerang Creek drains into the Isaac River. The gauge would therefore be representative of water quality in the receiving waters of the Isaac River from the Project.

Figure 2.7 presents a time history of recorded instantaneous EC and stream flow for the Isaac River at Deverill gauging station. Figure 2.8 details the relationship between instantaneous flow and EC at the

Isaac River at Deverill gauging station. The data collected by DNRME at the Deverill gauging station spans the period from 2011 to 2018 and indicates:

- The EC values for high flows greater than 200 $m^3/s$ are generally below the high flow WQO EC of 250 µS/cm;
- The EC of instantaneous flows below 100 $m^3/s$ vary significantly from 50 µS/cm to 1,870 µS/cm with many recorded values exceeding the low flow WQO EC of 720 µS/cm but are below the Peak Downs EA receiving waters trigger value of 2000 µS/cm;
- The mean daily EC has exceeded the low flow WQO on a total of 23 days over this period and all of these days experienced some flow (not stagnant flow); and
- The stream flows are highly ephemeral with baseflows ceasing within a few days or weeks of a runoff event, or at least flowing below the top of the sandy bed.

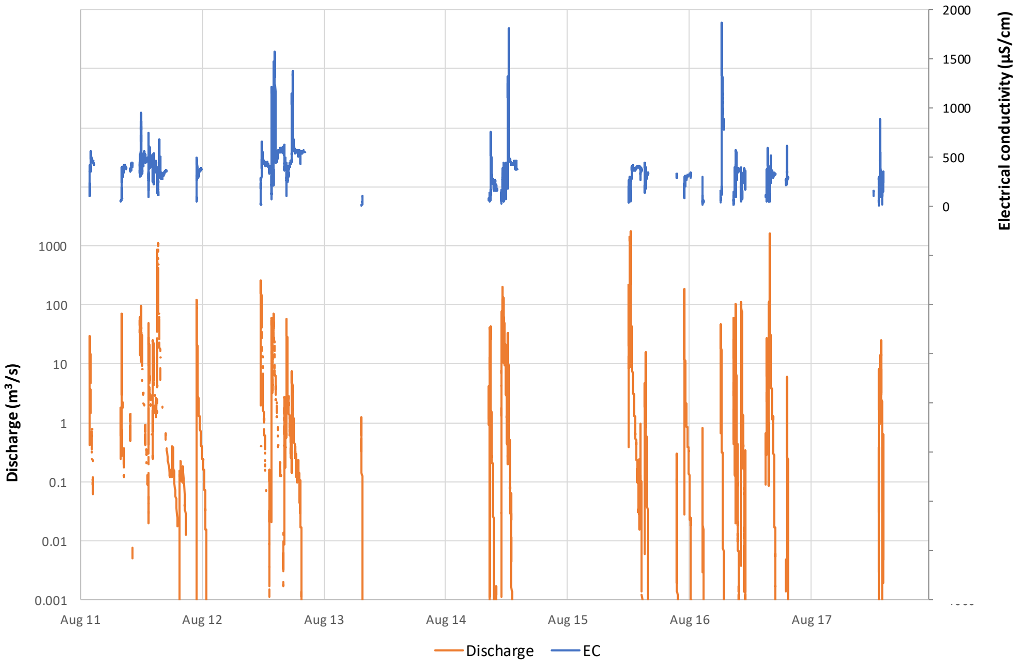


**Figure 2.7 Electrical Conductivity and Flow (Isaac River at Deverill Gauge)**

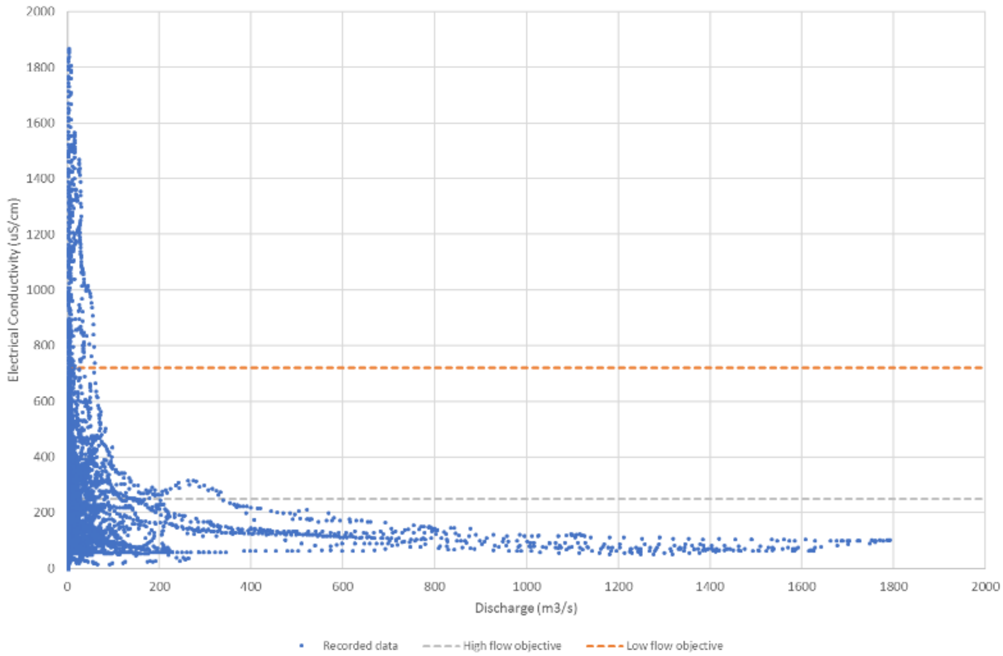


**Figure 2.8 Flow vs Electrical Conductivity (Isaac River at Deverill Gauge)**

## 2.9 WATER QUALITY OBJECTIVES

Release to receiving waters must comply with Condition F2 to Condition F5 of the Project EA:

- Condition F2: Contaminants that will/or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised activity, except as permitted under the conditions of this environmental authority;
- Condition F3: The environmental authority holder is not authorised to release mine affected water into receiving waters under a controlled release (pumped release);
- Condition F4: Releases to receiving waters must not cause erosion of the bed and banks of the receiving environment or cause a material build-up of sediment in such waters; and
- Condition F5: The release of water from sediment dams must be monitored at the release locations detailed in Table 4.3 and downstream monitoring point locations specified in Table 7.1 and shown in Figure 7.1, for each quality characteristic and at the frequencies specified in Table 2.1.

It is recommended that sediment dam which have ceased releasing should not require sampling to meet the requirements of the EA.

Table 2.1 Contaminant trigger investigation levels (Table F2 of the Project EA)

| Parameter | Dam release point trigger value | Downstream monitoring point trigger value | Source | Frequency |
|---|---|---|---|---|
| pH (pH units) | 6.5 - 8.5 | 6.5 - 8.5 | WQO (aquatic ecosystem) | Upon commencement (the first sample must be taken within 2 hours of commencement of release), daily during release, and within 2 hours after cessation of release. |
| Electrical Conductivity (µS/cm) | 873 | 727 | Locally derived | |
| Total suspended solids (mg/L)[1] | 102 | 85 | Locally derived | |
| Turbidity (NTU)[1] | 352.3 | 293.6 | Locally derived | |
| Dissolved oxygen | 64% - 132% saturation | 80% - 110% saturation | WQO (aquatic ecosystem) | |
| Sulfate (mg/L) | 139.2 | 116 | Locally derived | |
| Filtered metals and metalloids | | | | |
| Filtered Lead (µg/L) | 4.8 | 4 | MMC (aquatic ecosystem) | Upon commencement (the first sample must be taken within 2 hours of commencement of release), daily during release, and within 2 hours after cessation of release. |
| Filtered Mercury (µg/L) | 0.72 | 0.6 | WQO (aquatic ecosystem) | |
| Filtered Arsenic (µg/L) | 28.8 | 24 | WQO (aquatic ecosystem) | |
| Filtered Aluminium (µg/L) | 76.8 | 64 | Locally derived | |
| Filtered Molybdenum (µg/L) | 40.8 | 34 | WQO (aquatic ecosystem) | |
| Filtered Selenium (µg/L) | 13.2 | 11 | WQO (aquatic ecosystem) | |

Note:
1 = Dam release point trigger values for Total Suspended Solids and Turbidity can be exceeded for water discharged from the sediment dam during uncontrolled releases during a heavy rainfall event over and above the sediment dam's design storage capacity specified in Condition F19 of the Project EA

## 2.10 GEOLOGY AND SOILS

### 2.10.1 Geochemistry

RGS Environmental Pty Ltd (RGS) (2020) completed a geochemical assessment of the material at the site. A suite of representative samples were collected by RGS at the site and tested, and the findings are outlined in Section 6.

The Project is focussed on targets within the Moranbah Coal Measures, with the Alex and Dysart coal seams targeted as the main seams. The interburden material in the Project area generally comprises sandstone, siltstone, claystone and coal. The Alex seam is generally quite shallow and occurs just below the base of weathering in the stratigraphic profile. The Dysart Lower Seam comprises several plys with interburden in between.

### 2.10.2 Soils and land suitability

AARC Environmental Solutions Pty Ltd (2019) completed a Soil and Land Suitability Assessment (SLSA) for the Project and surrounds. To characterise the soils at the site, AARC collected 42 detailed soil profiles and analysed 12 laboratory samples from the site and surrounds.

The area surrounding the Project is dominated by clastic sedimentary rocks of marine and lacustrine origin, including sandstones, mudstones, siltstones and coal. Surface geology at the site includes Quaternary clay, silt, sand, gravel and soil with colluvial and residual deposits, as well as late Tertiary to Quaternary poorly consolidated sand, silt, clay, minor gravel and high-level alluvial deposits (AARC, 2019). AARC mapped the Soil Management Units (SMUs) across the site using the methodologies specified in the *Guidelines for Surveying Soil and Land Resources* (McKenzie et al, 2008) based on soil morphology, parent material and land attributes.

A description of each SMU found within the Project area is outlined in Table 2.2. The majority of the site consists of the Limpopo SMU, with a small southern portion of the Project site consisting of Crocodile and Zambezi SMUs.

**Table 2.2 Soil Management Units surveyed on site (AARC, 2019)**

| Soil Management Unit | Description |
|---|---|
| Crocodile | A shallow rocky soil unit associated with hill slopes and plateaus. Soil textures grade from loam at the surface, to loamy sands with depth; often containing rock material with little to no pedologic development throughout the solum. |
| Limpopo | The Limpopo unit is a brown texture-contrast soil. Soil textures predominantly grade from sands to clay sands in the surface soils to light clays in deeper horizons. |
| Zambezi | A predominantly grey coloured texture contrast soil with surface soils consisting of sands, increasing in clay content in deeper horizons. Lower horizons display diffuse orange to yellow mottles. |

Sodic soils contain large concentrations of Sodium relative to other cations. These soils have a degree of dispersivity and can accelerate erosion. AARC identified areas of high sodicity on site through the measurement of the Exchangeable sodium percentage and Emerson Class of surveyed soils. The Crocodile SMU was identified as having a low risk of dispersion and was not identified as being sodic.

For the remaining SMUs, AARC (2019) identified the depth horizons with sodic properties as follows:

- Limpopo SMU: Sodic below a depth of 0.5 m; and
- Zambezi SMU: Sodic below a depth of 0.5 m.

To control erosion from sodic dispersive soils, soils will be selectively handled and managed accordingly.

# 3 CONTAMINANT SOURCE STUDY

## 3.1 OVERVIEW

This section of the WMP describes the activities on the Project ML which, if not appropriately managed, could generate contaminants which impact on the EVs of the receiving waters.

## 3.2 SITE OPERATING ACTIVITIES

The major components of the VCM include:

- Jupiter open cut pit on the eastern edge of the Project ML (which will be completely backfilled and is therefore overlain by the in pit spoil dump in Figure 1.2);
- Matilda open cut pit on the western edge of the Project ML (which will be completely backfilled and is therefore overlain by the in pit spoil dump in Figure 1.2);
- two in pit spoil dumps at the open cut pit locations;
- a western out of pit spoil dump;
- a number of topsoil stockpiles which will be located adjacent to the in pit and out of pit spoil dumps;
- access and haul roads;
- a mine infrastructure area (MIA) and run-of-mine (ROM) stockpiles;
- a truck laydown area;
- a workshop area in the northwest of the site, including a vehicle washdown area;
- offices and car park in the northwest of the site;
- a creek crossing over the existing drainage diversion;
- a rail loop and train load out facility;
- a mine access road to the MIA area; and
- erosion and sediment control, and mine water management structures (described in Section 4).

Most of the activities have the potential to impact on the EVs and WQOs, if not appropriately managed. The management of the components of the VCM, including catchment delineation and staging of the mine are shown and discussed in Section 4.

## 3.3 SURFACE WATER TYPES

Land disturbance associated with mining has the potential to adversely affect the quality of surface runoff in downstream receiving waters through increased sediment loads. In addition, runoff from active mining areas (including coal stockpiles, etc.) may have increased concentrations of salts and other pollutants when compared to natural runoff. The proposed strategy for the management of surface water at the Project is based on the separation of water from different sources based on anticipated water quality.

Definitions of the types of water generated within the Project are outlined in Table 3.1.

**Table 3.1 Types of water managed within the Project**

| Water type | Definition |
|---|---|
| Mine affected water | In accordance with the Project EA, mine affected water means the following:<br>i. pit water, tailings dam water, processing plant water;<br>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;<br>iii. rainfall runoff which has been in contact with haul roads that have been constructed using coal and/or coal reject material;<br>iv. rainfall runoff which has been in contact with any areas disturbed by mining 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;<br>v. groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;<br>vi. groundwater from the mine dewatering activities; and<br>vii. a mix of mine affected water (under any of paragraphs i to vi) and other water. |
| Surface water | In accordance with the Project EA, surface water means runoff from areas that are disturbed by mining operations (including out of pit waste rock emplacements and rehabilitated areas). This runoff may contain high sediment loads but would not contain contaminated material or high total dissolved solids (TDS). |
| Diverted water | Surface runoff from areas unaffected by mining operations. Diverted catchment water includes runoff from undisturbed areas. |
| Raw water | Untreated water that has not been contaminated by mining activities. |
| Potable water | Treated water suitable for human consumption. |
| External water | Water supplied from a source that is external to the Project area to make up water shortfalls for onsite water demands when site water sources cannot meet demand. |

## 3.4 SURFACE WATER SOURCES

The sources of water types defined above are described in the following sub sections.

### 3.4.1 Mine-affected water

Mine-affected water is likely to be generated from the following activities/areas (Figure 1.2):

- water which collects in the pits, comprising surface runoff and/or groundwater;
- water which has been dewatered from the pits;
- runoff from the MIA and ROM stockpiles;
- runoff from the truck laydown area from vehicles handling carbonaceous material;
- runoff from the CHPP area;
- runoff from the internal haul road between the mining pit and the MIA which will accommodate trucks hauling coal between the pit and the ROM pad; and

- runoff from the workshop area.

This water will have the potential to come into contact with coal and hydrocarbons and therefore is mine-affected under the Project EA. Management of mine-affected water is outlined in Section 4.4.1.

### 3.4.2 Surface water

Surface water is likely to be generated from the following activities/areas (Figure 1.2 and Figure 1.3):

- runoff from the out of pit and in pit spoil dumps which does not runoff into the pits. The runoff from these dumps is not expected to come into contact with coal or other carbonaceous materials. The runoff may contain high sediment loads but is not expected to contain elevated levels of other water quality parameters (e.g. EC, pH, metals, metalloids, non-metals). The runoff will be managed to ensure adequate sediment removal prior to release to receiving waters (i.e. drainage to sediment dams) and will not be mixed with pit water, tailings water or workshop water;
- runoff from the topsoil stockpiles, which is expected to have a high sediment load but will not come into contact with coal or other carbonaceous material;
- runoff from the northern and southern haul roads, between the MIA and the northern infrastructure area, and the MIA and the out of pit emplacement. These roads are not expected to have trucks carrying ROM coal as the main internal haulage for the site will be undertaken on haul roads between the pit and southern infrastructure area (to transport coal from the pits to the stockpiles);
- runoff from the mine access road; and
- runoff from the site offices and carpark.

Runoff from these areas will be managed through erosion and sediment control structures as outlined in Section 4.4.2.

### 3.4.3 Diverted

Diverted water is water which drains to the Project from offsite, including (Figure 1.2 and Figure 1.3):

- water draining to the out of pit spoil dump from the southwest;
- water draining to the rail loop from the southwest; and
- to the northern edge of the site from adjacent operations to the north.

This water is managed through diverted water drains as outlined in Section 4.4.3.

# 4 SURFACE WATER MANAGEMENT

## 4.1 OVERVIEW

This section of the WMP describes the objectives and principles of the water management system (WMS), including a description of the infrastructure and systems that have been put in place to achieve the objectives and principles.

## 4.2 MANAGEMENT OBJECTIVES

The objective of the WMP is to manage all types of water onsite to meet operational, social and environmental objectives given in the Project EA.

The key WMS objectives are as follows:

- Have a strategy that ensures the Project does not release mine affected water into receiving waters under a controlled release (pumped release).
- Have a strategy that ensures releases to receiving waters does not cause erosion of the bed or banks of the receiving waters or causes a material build-up of sediment.
- The release of water is monitored and reported in line with the Project EA.
- Design and construct sediment dams and mine affected water dams in compliance with quality standards specified in the Project EA.
- Ensure the maintenance and cleaning of vehicles, plant and equipment is not carried out in areas from which contaminants can be released into receiving waters.
- Ensure spillage of wastes, contaminants or other materials is cleaned as quickly as practicable to minimise the release of contaminants to receiving waters.
- Manage and prevent saline and acid rock drainage from the site.

Specific objectives for each water type are as follows:

- External water: Ensure that external water allocation and associated infrastructure is sufficient to meet site demands under low rainfall conditions.
- Mine-affected water: Prevent uncontrolled discharges and ensure adequate water supplies are maintained for site demand during dry periods.
- Surface water: Maintain water quality leaving the Erosion and Sediment Control (ESC) structures to a quality as close to background levels as reasonably possible.
- Diverted water: Ensure that diverted water is separated from the mine-affected and surface water systems, and allowed to pass uninterrupted down the catchment.

## 4.3 SURFACE WATER MANAGEMENT PRINCIPLES

The general principles to manage surface water for the site are as follows:

- The fullest separation possible of diverted, surface and mine-affected water runoff.
- Minimise the area of surface disturbance, thereby minimising the volume of surface runoff.
- Collect and contain onsite all potential mine-affected water in dedicated mine water storages. The mine water storage will be used as the primary water source for dust suppression.

- Retain and reuse onsite any surface water runoff that has high sediment concentrations whenever possible. If not, release it in a controlled manner in compliance with an Erosion and Sediment Control Plan (ESCP).
- Minimise the potential for generation of mine-affected water by limiting the locations of chemical and fuel storage areas and manage the areas in accordance with relevant specifications of AS1940 *Storage and Handling of Flammable and Combustible Liquids* (AS1940). Implement spill response and management procedures in accordance with relevant TARPS (trigger action response plans) for any accidental spills.
- Maximise the use of onsite water and thereby minimise the need for importing external water.
- Prioritise the use of poor-quality water over superior quality water.

## 4.4 WATER MANAGEMENT SYSTEM

The site WMS is shown in Figure 1.2 and Figure 1.3. The WMS progresses over the mine life as the pit and dumps develop across the site:

- Figure 1.2 shows the WMS during the mining stage (2024-2025); and
- Figure 1.3 shows the WMS during the life-of-mine (post-mining) stage.

The mine-affected water management, surface water management and diverted water aspects of the WMS are described in Section 4.4.1, 4.4.2 and 4.4.3 respectively.

### 4.4.1 Mine-affected water management

Table 4.1 shows the mine affected dam details for the Project, including the full supply volume (FSV) of each dam and the operating rules for each dam which are applied if the operating volume (OV) is exceeded.

The following areas of the site have been defined as mine water catchments, consistent with the definitions provided in the Guideline Model Mining Conditions (DES, 2017) (see Figure 1.2 and Figure 1.3):

- the Jupiter Pit;
- the Matilda Pit (date commencement to be confirmed, after current mining stage/Jupiter pit);
- the southern mine infrastructure area – this area contains a number of coal stockpiles and the sorter/crusher and therefore will come into contact with coal (reporting to MWD1) and the proposed ROM pad area (reporting to MWD2);
- the TLO pad (operational once CHPP area is constructed) will contain the TLO dam and be considered mine affected water;
- the north-western section of the northern mine area (reporting to MWD3) – this area will contain a maintenance workshop, tyre fitting bay and wash bay; and
- the proposed CHPP product pad area (reporting to MWD5).

The above areas all drain to mine water dams (via overland flow and mine water drains) or to the pit itself. The dam sizes have been determined based on the water balance model (see Section 5) to ensure that the Jupiter and Matilda pits can be adequately dewatered and limit the spill risk to the receiving waters.

The TLO dam is intended to be a mine-affected water dam and will collect runoff from the train load out pad, direct rainfall and mine-affected water from the train loadout process. There is no external catchment runoff draining to the TLO dam. The TLO dam will only receive water as required for train loadout purposes.

The adopted full storage volumes (FSVs), surface areas and operating volumes (OVs) were refined using the water balance model and land availability identified in the mine plan. MWD1 has been designed to keep the Jupiter and Matilda pits dewatered for as long as practical. The remaining mine water dams have been sized to limit the risk of spills to the receiving waters.

To limit the risk of uncontrolled discharges from the mine water storages, OVs have been set for these water storages (as shown in Table 4.1) as follows:

- MWD1 has an operating volume (OV) of 73 ML. When the water inventory in MWD1 exceeds its OV, all transfers to MWD1 (i.e. pit dewatering and mine water transfers) cease;
- MWD2, MWD3 and MWD5 have OVs. When the water inventory in these dams exceeds their respective OVs, these storages commence dewatering to MWD1 or if MWD1 is at capacity, the disused mining pit; and
- In the event that transfer capacity is not available between the mine affected water storages, excess mine affected water will be pumped to the disused portions of the mining pit to prevent releases to the receiving environment.

**Table 4.1 Existing and proposed mine affected water dams**

| Storage | FSV (ML) | OV (ML) | FSV surface area (ha) | FSV water depth (m) | Adopted dewatering rate (ML/d) | Operating rules |
|---|---|---|---|---|---|---|
| MWD1* | 107.3 | 73.0 | 2.41 | 8.3 | 1.0 | Above the OV, pit dewatering, MWD2, MWD3 and MWD5 dewatering to MWD1 ceases. MWD1 commences dewatering to the other MWDs if they are below their OV. If near FSV it will pump to the Jupiter Pit. |
| MWD2^ | 58.0 | 36.7 | 1.95 | 5.0 | 1.0 | Above the OV, pit dewatering to MWD2 ceases. If near FSV it will pump to the Jupiter Pit. |
| MWD3 | 8.2^(4.7*) | 1.1# | 0.23 | 5.0^(3.5)* | 1.0 | Above the OV, MWD3 commences dewatering to MWD1 |
| MWD5^ | 66.0 | 44.8 | 1.60 | 5.0 | 1.0 | Above the OV, pit dewatering to MWD2 ceases. If near FSV it will pump to the Jupiter Pit |

^Proposed

*Existing

#Site indicates they operate MWD3 at 1.1 ML. It is proposed to increase the existing FSV (4.7 ML) by 3.5 ML (proposed FSV of 8.2 ML) to meet the minimum MAW 10% AEP 72-hour design rainfall capacity requirements.

### 4.4.2 Surface water management

Surface water generated from the Project is managed as follows:

- **the Jupiter in pit spoil dump:** generates runoff to surface water drains on its perimeter which drain to sediment dams SD5, SD6, SD7, SD8, SD9, SD10, SD11, SD12, SD17 and SD18.
- **the Matilda in pit spoil dump:** generates runoff to surface water drains on its perimeter which drain to sediment dams SD13, SD14, SD15 and SD16.
- **the out of pit dump:** generates runoff to surface water drains on its perimeter which drain to sediment dams SD1 and SD2.
- **topsoil stockpiles:** drain via either overland flow or via surface water drains to sediment dams SD4, SD7, SD8 or SD11.
- **northern mine infrastructure access road:** drains via overland flow and via surface water drains to SD3
- **southern haul road:** partially drains to MWD1 and via surface water drains to SD6 and SD7.
- **site offices and carpark:** drain via a surface water drain on its eastern side to a sediment trap (ST1).

The above areas all drain to sediment dams/traps (via overland flow and surface water drains). Table 4.2 provides details for the proposed sediment dams for the Project.

Water from parts of the mine access road and central topsoil stockpiles drain directly into the pit and become mine affected. This water is managed in the mine affected water system.

Sediment dams and traps will be installed and managed in accordance with the VCM ESCP (WRM, 2024). Consistent with the IECA guidelines (IECA, 2008), the sediment dams are not designed to provide 100% containment of captured runoff. Hence overflows will occur from the sediment dams when rainfall exceeds the design capacity. Releases from sediment dams to the environment will occur via passive releases across the spillway and active (pumped) releases to dewater treated water following rain events (to regain the settling zone storage capacity within 5 days). Water collected in sediment dams may be used to meet mine site water demands if required.

Table 4.3 shows the design storage volume requirements for sediment dams for the VCM based on IECA (2008). The sediment dam design volumes are based on the following:

- A “Type D” sediment basin.
- Total sediment basin volume = settling zone volume + sediment storage volume as shown in Figure 4.1. The sediment storage volume is the portion of the basin storage volume that progressively fills with sediment until the basin is de-silted. The settling zone is the minimum required free storage capacity that must be restored within 5 days after a runoff event.
- The settling volume is calculated based on the stormwater runoff from the catchment generated by an 85$^{th}$ percentile 5-day rainfall event.
- Sediment storage volume = 50% of settling zone volume.
- A depth of 2 m is adopted for the sediment dams.

Table 4.2  Existing and proposed sediment dam details

| Storage name | Release location latitude | Release location longitude | Water source | Downstream monitoring point | Receiving waters description |
|---|---|---|---|---|---|
| SD1 | -22.29314 | 148.18773 | Out of pit spoil dump | VSW2 | Drainage line 2 via the existing drainage diversion |
| SD2 | -22.28712 | 148.18329 | Out of pit spoil dump | VSW2 | |
| SD3 | -22.27813 | 148.17893 | Northern mine access road | VSW8 | Drainage line 1 |
| SD4 | -22.29449 | 148.18781 | Topsoil stockpile south of the out of pit spoil dump | VSW2 | Drainage line 2 via the existing drainage diversion |
| SD5 | -22.29493 | 148.19295 | Southern in pit spoil dump | VSW2 | Drainage line 2 |
| SD6* | -22.28537 | 148.18923 | Southern in pit spoil dump | VSW8 | Drainage line 1 via the proposed diversion drain |
| SD7 | -22.29197 | 148.18849 | Southern in pit spoil dump | VSW2 | |
| SD8 | -22.29452 | 148.18914 | Southern in pit spoil dump | VSW2 | Drainage line 2 via the existing drainage diversion |
| SD9 | -22.28529 | 148.19332 | Southern in pit spoil dump | VSW8 | Drainage line 1 |
| SD10 | -22.27911 | 148.18782 | Southern in pit spoil dump | VSW8 | Drainage line 1 |
| SD11* | -22.27850 | 148.18340 | Northern mine access road | VSW8 | Drainage line 1 via the proposed diversion drain |
| SD12* | -22.27721 | 148.18278 | Northern in pit spoil dump | VSW8 | |
| SD13 | -22.28572 | 148.17715 | Matilda in pit spoil dump | VSW2 | Drainage line 2 via the existing drainage diversion |
| SD14 | -22.28043 | 148.17748 | Matilda in pit spoil dump | VSW2 | |
| SD15 | -22.28432 | 148.17995 | Matilda in pit spoil dump | VSW2 | |
| SD16 | -22.28607 | 148.18011 | Matilda in pit spoil dump | VSW2 | |
| SD17* | -22.27835 | 148.18718 | Northern in pit spoil dump | VSW8 | Drainage line 1 |
| SD18* | -22.28046 | 148.18655 | Southern in pit spoil dump | VSW8 | Drainage line 1 via the proposed diversion drain |

Note:

* SD6, SD11, SD12, SD16, SD17, and SD18 are release points in the post mining stage and not during the mining stage. During the mining stage, SD6 releases report to the mining pit and will not require monitoring. SD11, SD12, SD16, SD17 and SD18 will be constructed when the in-pit dump begins to discharge off site within their respective catchments.

Locations may change slightly depending on finalisation of in pit spoil dump

Table 4.3 Existing and proposed sediment dam storage capacity requirements

| Storage name | Catchment area (ha) | Settling volume (ML) | Sediment storage volume (ML) | Total sediment dam volumes required (ML), based on the 85th percentile 5-day rainfall |
|---|---|---|---|---|
| SD1^ | 17.9 | 2.6 | 1.3 | 4.0 (5.9) |
| SD2^ | 12.1 | 1.8 | 0.9 | 2.7 (5.6) |
| SD3^ | 9.6 | 1.4 | 0.7 | 2.1 (3.8) |
| SD4^ | 2.1 | 0.3 | 0.2 | 0.5 (0.5) |
| SD5 | 12.6 | 1.9 | 0.9 | 2.8 |
| SD6 | 18.0 | 2.7 | 1.3 | 4.0 |
| SD7 | 13.9 | 2.1 | 1.0 | 3.1 |
| SD8 | 11.1 | 1.6 | 0.8 | 2.5 |
| SD9 | 8.2 | 1.2 | 0.6 | 1.8 |
| SD10 | 19.9 | 2.9 | 1.5 | 4.4 |
| SD11 | 14.9 | 2.2 | 1.1 | 3.3 |
| SD12 | 3.6 | 0.5 | 0.3 | 0.8 |
| SD13 | 8.9 | 1.3 | 0.7 | 2.0 |
| SD14 | 7.0 | 1.0 | 0.5 | 1.6 |
| SD15 | 10.7 | 1.6 | 0.8 | 2.4 |
| SD16 | 6.9 | 1.0 | 0.5 | 1.5 |
| SD17 | 10.1 | 1.5 | 0.7 | 2.2 |
| SD18 | 30.5 | 4.5 | 2.3 | 6.8 |

Note:

^ Existing Dam – Existing dam capacities based on Jan 2024 survey are provided in brackets

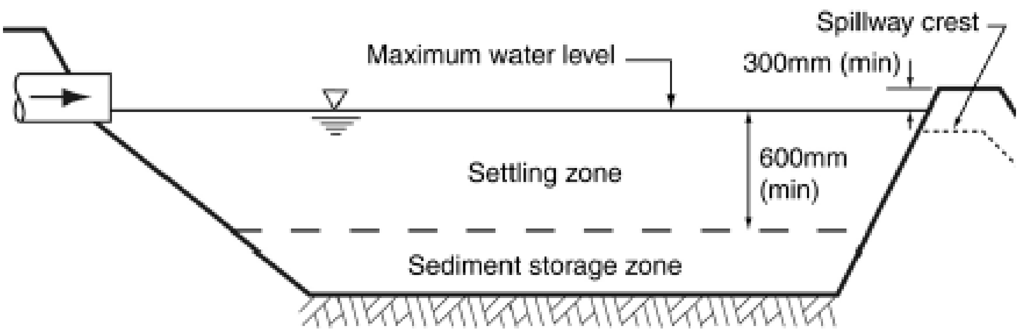


**Figure 4.1 Typical Type D sediment basin cross-section (Source: IECA, 2008)**

The settling zone volume was calculated using the following equation (IECA, 2008):

- $V_s = 10 * R_{(Y\%, 5\text{-day})} * C_v * A$
  - $V_s$ = volume of the settling zone ($m^3$)
  - $R_{(Y\%, 5\text{-day})}$ = Y%, 5-day rainfall depth (mm) ($85^{th}$ percentile adopted in Table 4.3)
  - $C_v$ = volumetric runoff coefficient
  - A = effective catchment surface area connected to the basin (ha)

The 5-day rainfall depths were calculated using the following equation (IECA, 2008):

- $R_{(Y\%, 5\text{-day})} = K_1 * I_{(1yr, 120hr)} + K_2$
  - $K_1$ = Constant
  - $K_2$ = Constant
  - $I_{(1yr, 120hr)}$ = Average rainfall intensity for a 1 in 1 year ARI, 120 hour storm (mm/hr)

### 4.4.3 Diverted water management

The water management system has been designed to divert undisturbed catchments around mining operations wherever practicable. The key features of the site diverted water management shown in Figure 4.2 are:

- Flood protection levees along the western and eastern edges of the proposed Matilda Pit to protect the proposed pit from potential floodwater ingress via the western upstream clean water catchment and overflows from the existing drainage diversion from the east. The proposed Matilda Pit western flood levee may be formed by the drainage diversion used to divert the western clean water catchment around the proposed pit;
- CWD1A and CWD1B (operational in mining stage) – two drains on the western side of the ex-pit emplacement and rail loop which will drain the undisturbed catchment to the west of the mining area around the ex-pit waste rock dump and toward the existing drainage diversion, which drains to the receiving waters; and
- CWD2 and MIA area diverted water bunds (operational in mining stage) located around the northern side of the northern workshop area and the southern side of the workshop area. The northern bund diverts runoff from the catchment area to the north of the workshop;
- CWD3 and diverted water bund (operational in mining stage) which is a clean water bund/diversion drain which has been designed to divert water around the northern side of the northern pit.

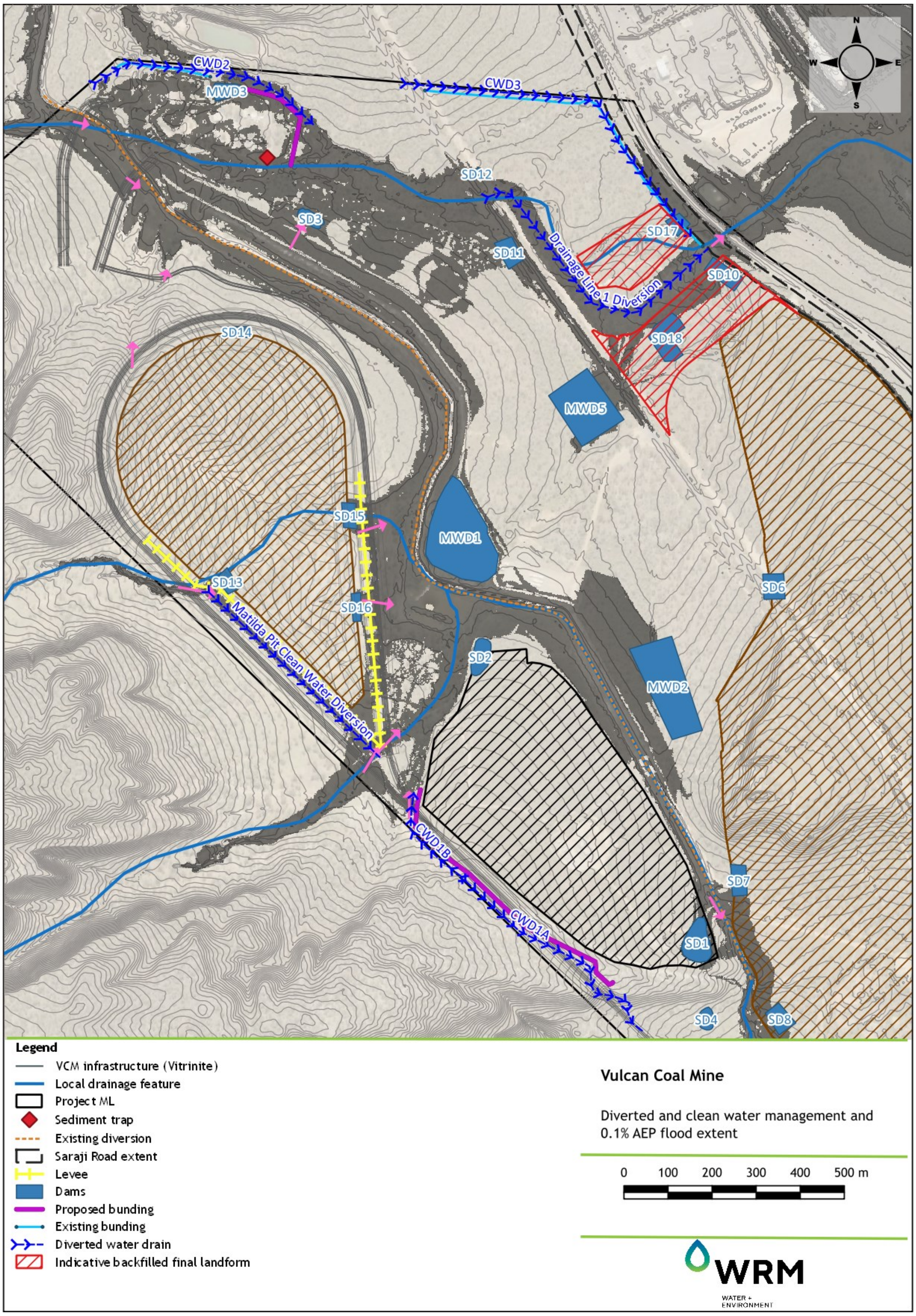


**Figure 4.2 Diverted and clean water management and 0.1% AEP flood extent**

- A flood protection levee may be required if the backfilled final landform on the western edge of the Drainage Line 1 diversion is delayed; and
- The rail loop (operational in mining stage) will be considered diverted runoff, diverting undisturbed catchments around the rail loop. Notwithstanding this, suitable construction erosion and sediment controls (ESCs) will be implemented in accordance with site's Erosion and Sediment Control Plan (ESCP) as part of the rail loop construction and will remain in place until disturbed soils have been suitably stabilised. This will ensure that the potential elevated risk of erosion and downstream sedimentation is minimised until the rail loop earthworks are complete.

### 4.4.4 External water management

External water at the Project is managed as follows:

- Mine affected water can be imported (assumed to be from Peak Downs) to supplement mine water demands.
- Vitrinite have a contract with Sunwater to receive water via the Bingegang pipeline.
- Raw water is imported via the Bingegang pipeline and treated at the mine in a potable water plant.

## 4.5 CHEMICAL MANAGEMENT

Any spillages of hazardous materials will be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or hazardous materials to the site WMS and into receiving waters.

### 4.5.1 Chemical storage

Primary chemical storage areas at the Project will be located in the MIA or in the workshop area. These storage facilities will be constructed and bunded generally in accordance with the relevant specifications of AS1940. Hazardous Substances Standard Operating procedures (SOPs) will be in place at these operations. A register will also be maintained onsite for all chemicals. Where appropriate, Safety Data Sheets (SDS) will be kept in storage areas or accessed online, as required.

### 4.5.2 Fuel storage

Fuel storage areas are a potential source of hydrocarbons. Primary fuel storage areas at the MIA and workshop area will be constructed and bunded in accordance with the relevant specifications of AS1940. Fuel storage areas will also be constructed at service and operational points across the mining lease.

Fuel storage areas associated with the Project operations will be inspected regularly, with repair and maintenance work completed on an as-needs basis. Bunded areas filled with stormwater are drained (i.e. diesel/oil storage bunding at warehouse drains to oil sump and onto oil separator system) or pumped out by a licensed contractor as soon as practicable to maintain the bunded volume.

### 4.5.3 Sewage

Sewage will be trucked offsite by registered waste transport contractors.

## 4.6 POST-MINING CONDITIONS WATER MANAGEMENT

Figure 1.3 shows the conceptual final landform water management plan for the Project during the post-mining stage. The final landform plan has been developed with an aim to use water infrastructure constructed during the mining stage. The post-mining layout shown in Figure 1.3 is conceptual only and may be updated should the mine plan and final landform plans change over the mine life.

The key features of the final landform include the following:

- No final voids are proposed as part of the final landform. Both open cut pits will be backfilled with overburden material;
- Final landform batter slopes will be no greater than 15%;
- Contour banks will be constructed on batters to limit topsoil erosion until vegetation has been suitably established;
- Drainage structures will be constructed to direct runoff from disturbed areas to sediment dams;
- The plateau will be drained to fall to the proposed drains and drop structures to drain the top of the landform to natural ground level;
- Mine water dams will be decommissioned following rehabilitation of infrastructure areas;
- A 10 m corridor between the Jupiter Pit shell crest and the toe of the final landform will be provided for drainage on the eastern side of the final landform;
- The drainage line 1 diversion channel will be constructed through backfilled spoil at the northern side of the final landform. SD10 and SD18 will capture runoff from the Jupiter in-pit final landform until the final landform is rehabilitated;
- The Matilda Pit diversion channel will remain part of the final landform;
- Sediment dams SD9, SD10 and SD11 will be implemented on the northern side of the Jupiter Pit in-pit waste rock dump, with specifications as outlined in Table 4.3;
- Sediment dams SD12 and SD17 will be implemented on the northern side of the drainage line 1 diversion channel, with specifications as outlined in Table 4.3;
- The diverted water drain upstream (west) of the rehabilitated landform at the former Matilda Pit will be a permanent landform feature to limit erosion of the landform toe until vegetation has been suitably established; and
- Sediment dams SD13, SD14, SD15 and SD16 will be implemented around the Matilda Pit in-pit waste rock dump, with specifications as outlined in Table 4.3.

When a sediment dam catchment is completely rehabilitated, and water quality monitoring of the runoff has established that it is consistent with EA release conditions, the sediment dam and associated drainage infrastructure will be decommissioned unless the areas are left to remain for habitat requirements. Surface runoff and seepage from the rehabilitated catchment will be allowed to shed directly to the receiving environment.

When the Jupiter Pit drainage corridor is rehabilitated, the catchment will be relinquished and would not require erosion and sediment control once in-stream vegetation has established.

# 5 MINE SITE WATER BALANCE

## 5.1 OVERVIEW

A water balance model was developed in the OPSIM water balance modelling software to assess the behaviour of the WMS at the Project for the expected infrastructure and pit extent for the 2024 mining stage. The mining stage was modelled as this was representative of the largest potential mine water runoff and sediment runoff catchments the Project would be required to manage.

The model was used to determine:

- the behaviour of the various onsite storages during the life of the Project;
- the ability and reliability of the various onsite storages to supply the mine site water requirements;
- the volume of potential 'surface' and/or 'mine-affected' water overflows from various onsite storages;
- the volume of 'external' (trucked water) water required to meet shortfalls in mine water demands; and
- the overall site water balance.

Details regarding the model setup (e.g. AWBM parameters, site water demands, groundwater inflows and catchment areas) are outlined in the report *Vulcan Coal Mine EA Amendment Surface water assessment* (WRM, 2022).

The key model inputs are outlined in Section 5.2 and the key results are outlined in Section 5.3.

## 5.2 MODELLING CONFIGURATION

The model has been configured to assess the operations of all major components of the WMS. The inflows and outflows included in the model are given in Table 5.1. The operating rules of the water balance model is outlined in Table 5.2.

**Table 5.1 Simulated inflows and outflows to the mine water management system**

| Inflows | Outflows |
|---|---|
| Direct rainfall on water surface of storages | Evaporation from water surface of storages |
| Catchment runoff | Haul road dust suppression demand |
| Groundwater inflows to the open cut pit | Potable water demand |
| External water supply | Dam overflows |
| ROM Coal Moisture | CHPP/Moisture stored within products and rejects coal |
| | Train loadout (TLO) demand |

**Table 5.2 Water balance model operational rules**

| Item | Node Name | Operating Rules |
|---|---|---|
| ***1*** | ***External water supply*** | |
| 1.1 | External water | • Mine affected water can be imported (assumed to be from Peak Downs) to supplement mine water demands;<br>• Supplies haul road dust suppression demands from MWD1 (3rd priority); and<br>• Supplies raw water which is filtered for drinking water purposes and vehicle washdown. |
| ***2*** | ***Supply to demands*** | |
| 2.1 | Haul road dust suppression | • Sourced from the following:<br>○ 1st priority: MWD system;<br>○ 2nd priority: Sediment dams; and<br>○ 3rd priority: External water.<br>• 100% loss assumed; and<br>• Demand values outlined in WRM (2022). |
| 2.2 | CHPP demands | • CHPP makeup demands are supplied by the MWD system (1st Priority);<br>• Supply from BMA pipeline if MWD system is low (2nd priority); and<br>• Demand values outlined in WRM (2022). |
| 2.3 | TLO demands | • TLO demands are supplied by the TLO dam/MWD system (1st Priority);<br>• Supply from BMA pipeline if MWD system is low (2nd priority); and<br>• Demand values outlined in WRM (2022). |
| 2.4 | Potable water demand | • Sourced from raw water via the external Bingebang pipeline and filtered at the onsite filtration plant;<br>• 100% loss assumed; and<br>• Assumed constant rate of 50 ML/yr (as outlined in WRM (2022). |
| ***3*** | ***Pit water*** | |
| 3.1 | Jupiter pit | • Proposed mining pit active during mining stage;<br>• Dewaters to MWD1, MWD2, MWD5 or a disused pit at 100 L/s (8.64 ML/d), provided there is capacity available in the receiving storage; and<br>• Receives groundwater inflows as outlined in WRM (2022). |
| 3.2 | Matilda Pit | • Proposed mining pit during the mining stage; and<br>• Dewaters to MWD1, MWD2, MWD5 or a disused pit at 100 L/s (8.64 ML/d), provided there is capacity available in the receiving storage. |

| Item | Node Name | Operating Rules |
|---|---|---|
| ***4*** | ***Operation of mine affected dams*** | |
| 4.1 | MWD1 | • Proposed primary mine affected water storage;<br>• Receives pump inflows from the Jupiter pit at 100 L/s (8.64 ML/d) until MWD1 reaches its OV, at which point dewatering ceases. Pumped inflows recommence once the MWD1 inventory drops below its maximum operating volume;<br>• Receives pumped inflows from MWD3 and MWD5 (refer to Table 4.1);<br>• Transfer water to MWD2, MWD5 or a disused pit at 11 l/s if the OV is exceeded.<br>• Supplies water to haul road dust suppression (1st priority).<br>• Overflows to the receiving environment. |
| 4.2 | MWD2 | • Receives pumped inflows from the Jupiter pit at 100 L/s (8.64 ML/d) until MWD2 reaches its OV, at which point dewatering ceases. Pumped inflows recommence once the inventory drops below its OV; and<br>• Supplies water to haul road dust suppression (1st priority).<br>• Overflows to the pit. |
| 4.3 | MWD3 | • Collect mine affected (potential) water from the mine workshop and laydown area; and<br>• Transfer water to MWD1 at 11 L/s (1 ML/d) if MWD3 exceeds the operating volumes outlined in Table 4.1.<br>• Overflows to the receiving environment. |
| 4.4 | MWD5 | • Mine affected water storages that capture runoff from the product pad/ROM pad/CHPP area;<br>• Supplies water to haul road dust suppression (1st priority);<br>• Transfer water to MWD1 at 5 day pump rate (outlined in Table 4.1) if the operating volumes are exceeded; and<br>• Overflows to the pit. |
| ***5*** | ***Operation of sediment dams*** | |
| 5.1 | Primary sediment dams (SD1, SD2, SD3, SD4, SD5, SD7, SD8, SD9, SD10, SD13, SD14, SD15, SD16) | • SD1 & SD2 collect water from the ex-pit waste rock dump;<br>• SD3 and SD4 collect runoff primarily from topsoil stockpiles and mine access roads;<br>• SD5, SD7, SD8, SD9 and SD10 collect runoff primarily from the Jupiter Pit in-pit waste rock dump;<br>• Supplies water to the haul road dust suppression as 2nd priority;<br>• Overflow to Boomerang Creek via Drainage Line 1/Drainage Line 2/existing drainage diversion; and<br>• SD13, SD14, SD15 and SD16 collect runoff from disturbed/in-pit waste rock dump areas of the Matilda Pit. |

| Item | Node Name | Operating Rules |
|---|---|---|
| 5.2 | SD6, SD11, SD12, SD17, SD18 | • Active in post-mining stage;<br>• Collects runoff from the Jupiter Pit in-pit waste rock dump and backfilled areas. |

## 5.3 MINE SITE WATER BALANCE RESULTS

### 5.3.1 Overall mine site water balance

Water balance results for all of the 125 model realisations are presented in Table 5.3. The results presented in Table 5.3 are the average of all realisations and will include wet and dry periods distributed throughout the mine life. Rainfall yield and evaporation at the Project is affected by the variation in climatic conditions within the adopted climate sequence.

Table 5.3 provides an indication of the long-term average annual inflows and outflows. The proposed water management system is in negative balance under 'average' climate conditions. This indicates that the Project will require significant volumes of external water to meet mine water demands.

It should be recognised that the following items are subject to climatic variability:

- Rainfall runoff;
- Evaporation;
- External water requirement;
- Dust suppression demand; and
- Dam overflows.

Whilst it provides an indication of the long-term average annual inflows and outflows, application of the nominated values for other purposes should only be undertaken with due consideration of the suitability of the nominated value and any potential implications.

In particular, the "average" sediment dam overflows do not necessarily mean that discharges occur under median climatic conditions. It means that there was a discharge in at least one of the 125 model realisations. A more detailed analysis of the performance of the various components of the water management system is provided in the following sections.

Table 5.3 Average annual water balance – all realisations

| Description | Mining stage |
|---|---|
| **Inflows (ML/year)** | **Average climatic conditions** |
| Rainfall Runoff | |
| *Mine affected water* | 164.8 |
| *Surface water* | 148.4 |
| *Diverted water* | 27.7 |
| Groundwater inflow | 9.6 |
| ROM coal moisture | 97.5 |
| External water | 334.5 |
| **Total Inflows** | **782.4** |
| **Outflows (ML/year)** | |
| Evaporation | 33.6 |
| Dam overflows | |
| *Mine affected water* | 0.0 |
| *Surface water* | 75.4 |
| *Diverted water* | 16.0 |
| CHPP | |
| *Product moisture* | 108.6 |
| *Coarse rejects moisture* | 69.2 |
| *Fine rejects moisture* | 138.8 |
| Haul road dust suppression | 216.1 |
| TLO demand | 73.1 |
| Potable water demand | 50.0 |
| **Total Outflows** | **780.7** |
| **Change in volume (ML/year)** | |
| **Change in stored volume** | **1.7** |

### 5.3.2 Jupiter pit inventory

Figure 5.1 shows the forecast inventory of the Jupiter pit and Figure 5.2 shows the forecast annual maximum Jupiter pit inventory for the 1%ile (wettest climatic conditions), 5%ile, 10%ile, 25%ile and 50%ile percentile traces during the 2024 mining stage. The pit is continuously dewatered into the mine water dams, as long as the mine water dams are maintained below their OV. The disused sections of the mining pit will be used only if the mine water system is above the maximum operating volumes.

The model results show the following:

- Under very wet (1%ile) conditions, the Jupiter pit will have a forecast inventory of up to 7 ML during the mining stage.
- Under wet (10%ile conditions) and 50%ile conditions, the Jupiter pit remains empty.

- The results suggest that generally, the pit can be dewatered under the majority of climatic conditions.

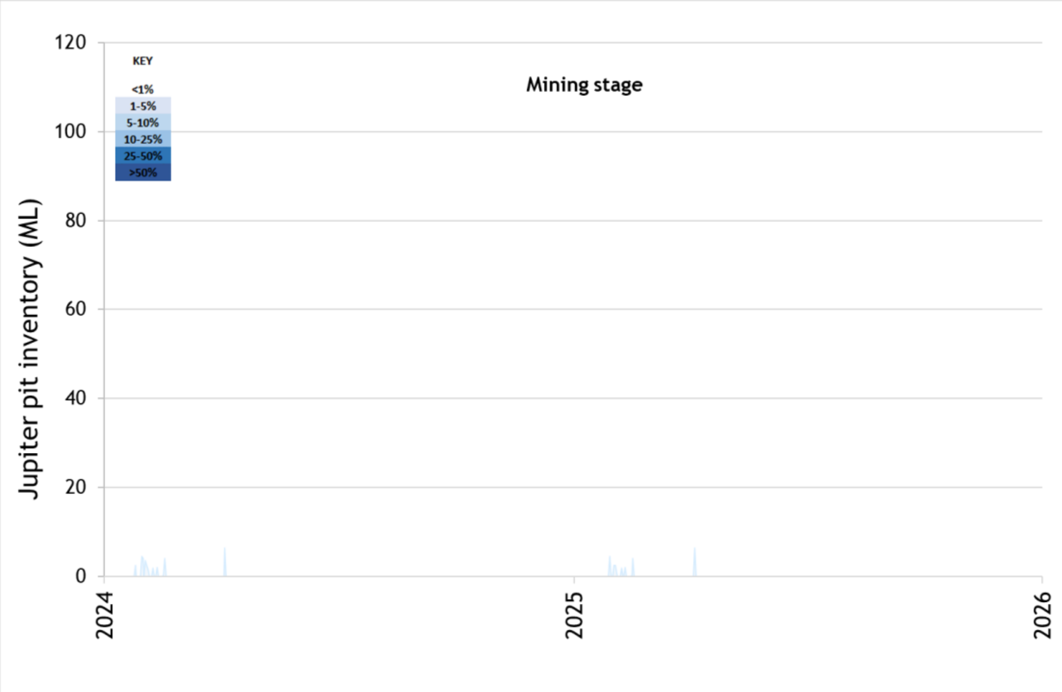


**Figure 5.1 Jupiter forecast mine pit inventory**

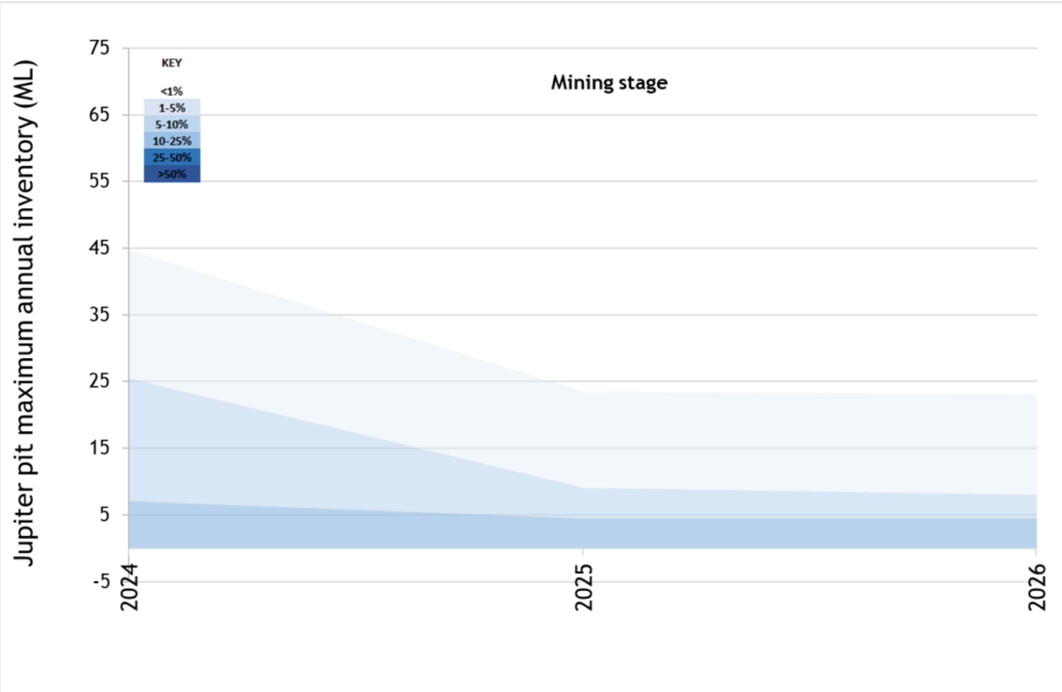


**Figure 5.2 Jupiter forecast annual maximum pit inventory**

### 5.3.3 Matilda pit inventory

The Matilda Pit will dewater to the mine water system during the mining stage. The results of the forecast water balance model show that the pit can be dewatered under the majority of climate conditions and would not accumulate water for long periods within the pit.

### 5.3.4 Mine water dam inventories

#### 5.3.4.1 MWD1 inventory

Figure 5.3 shows the forecast inventory for MWD1 which is the key out-of-pit mine affected water storage, controlling the dewatering of the pit. Figure 5.4 shows the annual maximum forecast inventory for MWD1 over the mining stage.

These results show the 1%ile (wettest climatic conditions), 5%ile, 10%ile, 25%ile and 50%ile traces.

As outlined in Section 4.4.1, to prevent uncontrolled discharges from MWD1 an OV is required. If the OV is exceeded, all transfers to the storage cease (i.e. pit dewatering and mine water dam dewatering). The MWD1 OV, in addition to the FSV are shown in Figure 5.3 and Figure 5.4.

The model results show the following:

- The MWD1 inventory is maintained below the FSV for all climatic conditions assessed and therefore is not predicted to spill under any modelled climate sequence;
- The MWD1 inventory is maintained below its OV for 10%ile and drier conditions. This means pit and mine dam dewatering is restricted under 5%ile in during mining;
- Under the 50%ile trace, the MWD1 inventory is maintained below 27 ML for the entire mine life;
- Under very wet (1%ile) conditions, MWD1 has an inventory of up to 105 ML; and
- Under wet (10%ile conditions), MWD1 has a maximum inventory of approximately 76 ML.

#### 5.3.4.2 Mine water dam inventories

MWD1, MWD2, MWD3, MWD5 and the TLO dam are the mine affected water dams on site. The excess capacity of the mine water system dewaters the pit following rainfall events. The OVs of these dams have been designed to keep the pit as dry as possible while also limiting the requirement to transfer water back to the pit. MWD3 collects runoff from the northern mine workshop area and dewaters to MWD1 when it rises above its OV. MWD2 and MWD5 collect runoff from the proposed CHPP/ROM area and dewaters to MWD1 when they accumulate water above their OV. The TLO dam collects runoff from the TLO pad (no external catchment), does not store water permanently and is used where required for the train loadout.

The mine affected water dams are not predicted to spill under any of the 125 modelled realisations.

Figure 5.5 shows the annual maximum forecast combined inventory for MWD2, MWD3 and MWD5. The model results show that:

- the combined water inventories are above the combined FSV under wet (10%ile) climatic conditions and excess water would be required to be stored in disused portions of the pit.
- Under 1%ile climatic conditions, no spills from the dams are predicted if the storage capacity of the disused pits is above approximately 120 ML;
- under 50%ile and drier conditions, the maximum mine water inventory is maintained below the combined OV for all years; and
- under 10%ile conditions, the maximum mine water inventory is generally below the combined OVs.

The results indicate that the mine water dams are predicted to store water, to some extent, under the majority of conditions. However, they are not at risk of surpassing their FSVs, even under extremely wet (<1%ile) conditions, as excess water can be stored in disused portions of the pit.

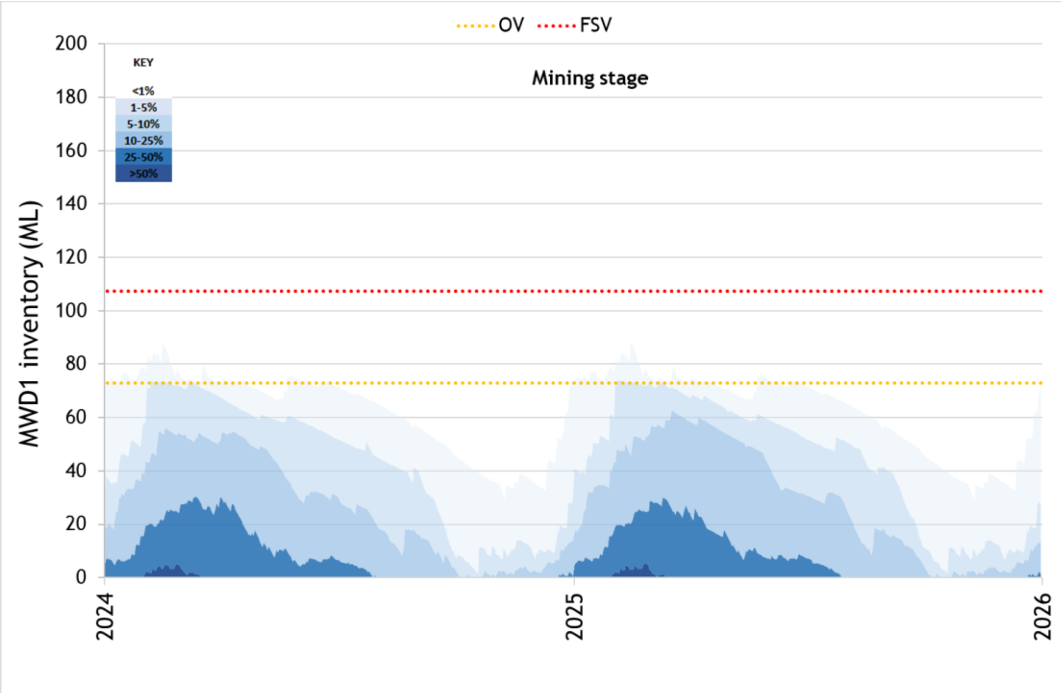


**Figure 5.3 Forecast MWD1 inventory**

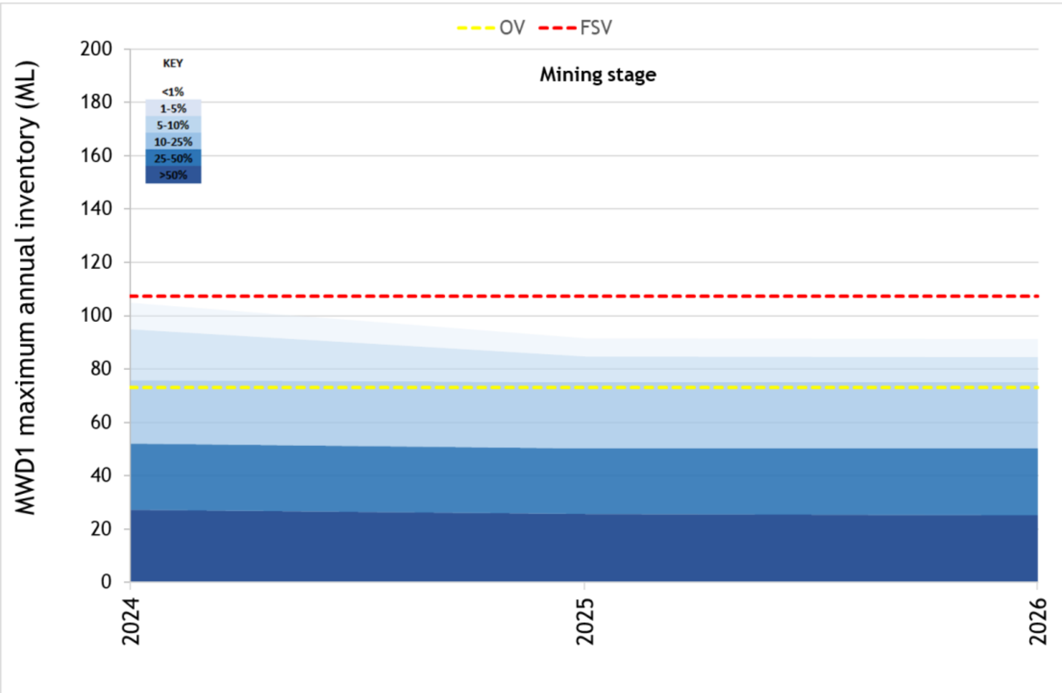


**Figure 5.4 Forecast annual maximum MWD1 inventory**

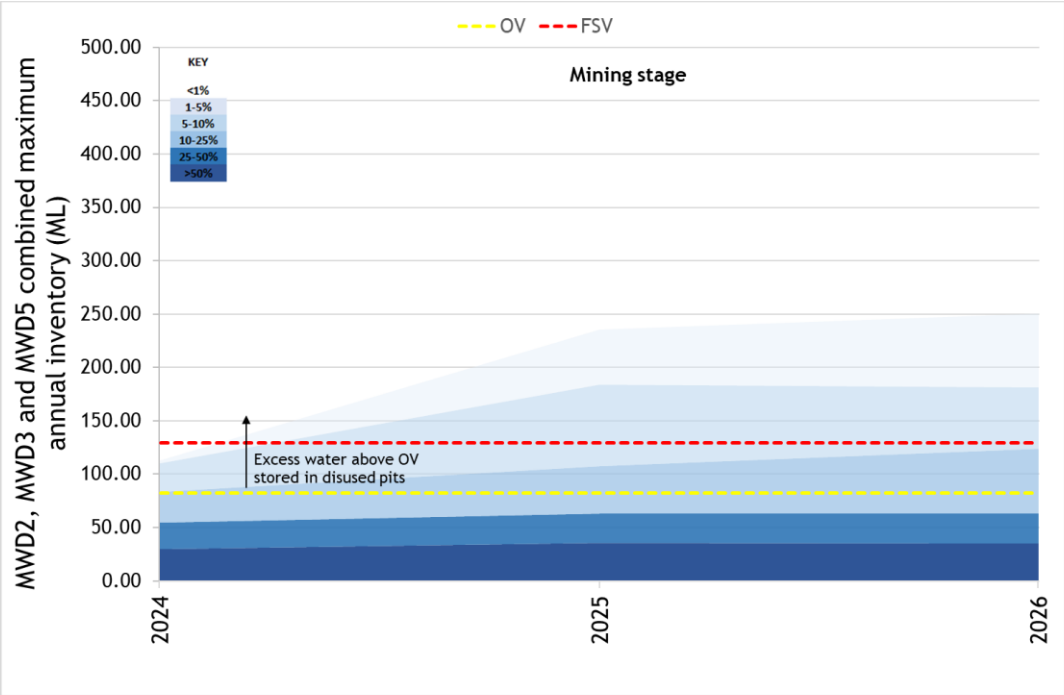


**Figure 5.5 Forecast annual combined maximum water inventory in MWD2, MWD3 and MWD5**

### 5.3.5 Spillway water discharges

#### 5.3.5.1 Mine Affected Water Dams

As outlined in Section 5.3.4.2, no spills are predicted from any of the mine affected water dams (i.e. MWD1, MWD2, MWD3, and MWD5) under any of the climate sequences modelled.

#### 5.3.5.2 Sediment Dams

Consistent with the IECA guidelines (2008), sediment dams do not provide 100% containment for captured runoff. Hence releases will occur from sediment dams when rainfall exceeds the design standard.

The potential for releases from the proposed sediment dam has been modelled using a passive overflow rather than active release (to regain storage capacity within 5 days).

Figure 5.6 shows the forecast annual sediment dam releases to the receiving waters which indicates that:

- Under wet (1%ile) conditions, the annual volume of sediment dam releases to the receiving waters are up to 442 ML/yr: and
- Under 50%ile conditions, the annual volume of sediment dam releases to the receiving waters are up to 29 ML/yr.

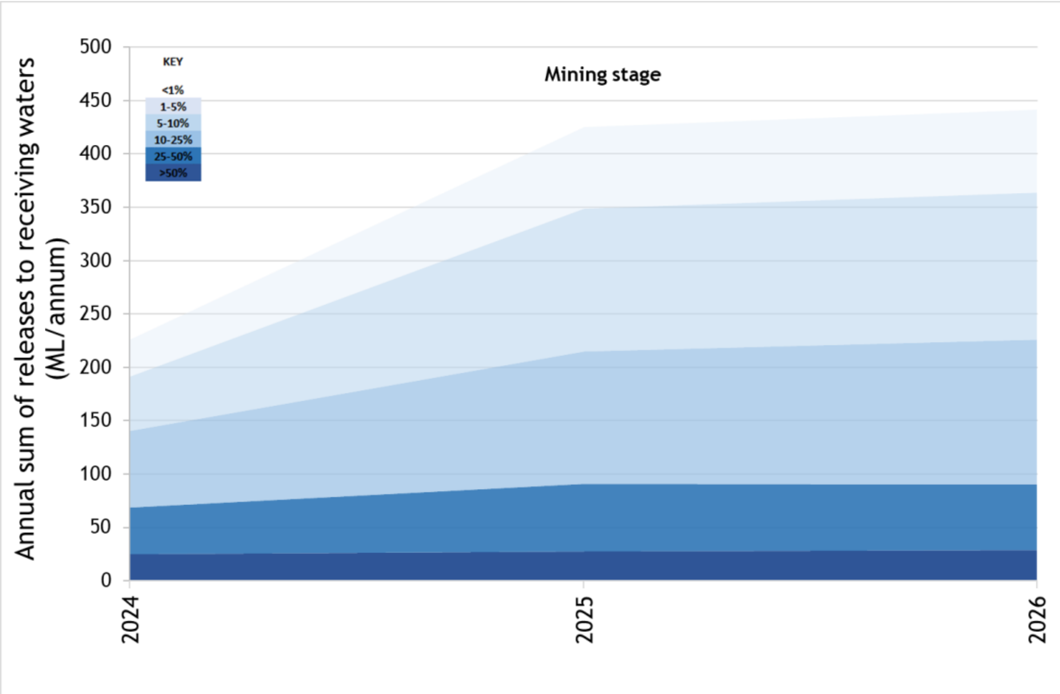


**Figure 5.6 Forecast annual sediment dam releases to the receiving waters**

# 6 SALINE AND ACID ROCK DRAINAGE

## 6.1 GEOCHEMICAL TESTING

RGS (2020) completed a geochemical assessment of the material at the site.

RGS obtained and tested 138 representative samples of waste rock (overburden and interburden; including roof, floor and parting materials) from 21 drill holes within the Project site and surrounds. Of these drill holes, 7 were located in the Jupiter target area and 14 were located in the surrounding area (specifically from the Vulcan proposed mining area to the south). RGS completed static and kinetic geochemical tests on the samples to determine their potential for acid mine drainage (AMD) and salinity.

RGS (2020) determined the following:

- The overwhelming majority (137 of 138) of the waste rock samples contained negligible sulfide content, had excess acid neutralising capacity (ANC), and were classified as non-acid forming (NAF). One of the samples was classified as uncertain. Overall, the waste rock samples were classified as having a very low risk of acid generation and a high factor of safety with respect to acid drainage.
- coal reject materials have relatively low sulfide content and excess ANC. As a bulk mixed material, it is expected that coal reject will be classified as NAF and have a relatively low risk of generating acidic drainage. Given that coal from the will be washed and processed offsite until the CHPP is constructed and operating as part of the Matilda pit EA amendment, there is a low likelihood of runoff from coal rejects causing contamination in the Project's receiving waters.
- Initial and ongoing surface runoff and seepage from mine waste materials was expected to be pH neutral to slightly alkaline and have a low level of salinity.

In consideration of the RGS (2020) results, material within the Jupiter pit is expected to be benign and the potential risk of saline and acid rock drainage is expected to be low.

RGS (2022) assessed materials from the Matilda Pit in September 2022 in response to higher sulfur content in the coal sampled.

RGS collected 38 individual samples from 2 drill holes within the Matilda Pit footprint as it was discovered that the total sulfur concentration results for coal quality samples taken from the Matilda Coal seam indicated higher total sulfur concentrations relative to similar materials likely to be generated from the Matilda pit. The Project will be required to contain any identified potentially acid forming (PAF) material within an ANC buffer.

## 6.2 MANAGEMENT MEASURES

Notwithstanding the low risk of acid rock or saline drainage outlined above, the following measures have been outlined to manage saline and acid rock drainage:

- The WMS has been designed to manage mine affected water separately from other water types at the Project, as outlined in Section 4.4.1. This includes designing specialised mine water storages inline with the Project EA and reusing mine affected water as a priority to avoid spills to receiving waters. Mine water drains ensure mine affected water is managed separately from other types of runoff in the Project area.
- Surface water will be managed in the surface water system (as outlined in Section 4.4.2), including drainage through surface water drains to sediment dams which will be managed in accordance with a site ESCP. In consideration of the RGS findings for the Jupiter pit, the runoff from the in pit and out of pit spoil dumps may contain high sediment loads but is not expected to contain elevated levels of electrical conductivity or pH. The runoff will be managed to ensure adequate

sediment removal prior to release to receiving waters (i.e. drainage to sediment dams) and will not be mixed with pit water, tailings water or workshop water.

- Surface water drains and sediment dams will be used to manage runoff from the Matilda pit in accordance with the site ESCP. In consideration of the RGS findings for the Matilda pit which identified PAF material, runoff from the in pit spoil dump should be monitored at the Matilda pit sediment dams (SD13 to SD16) against water quality objectives outlined in Table 2.1. The runoff will be managed to ensure adequate sediment removal prior to release to receiving waters and be managed within an ANC buffer.
- Water is monitored in the Project at the sediment dam release points and in the receiving waters for a number of water quality parameters, including pH and EC as outlined in Section 7. These parameters are measured against trigger levels, which, if exceeded will trigger the requirement to undertaken an investigation and may require the development of immediate and long-term measures to avoid environmental harm.

# 7 WATER MONITORING PLAN

## 7.1 OVERVIEW

Monitoring of surface water quality both within and external to the mine site will form a key component of the surface water management system. Monitoring of upstream, onsite and downstream water quality will assist in demonstrating that the site water management system is effective in meeting its objective of minimal impact on receiving water quality and will allow for early detection of any impacts and appropriate corrective action.

Further details regarding the monitoring program, including the sampling methodology and analysis process of the monitoring program, is described in the REMP (Vitrinite, 2021).

Details of the receiving water quality monitoring, mine affected water quality monitoring and sediment dam water monitoring program are outlined in Section 7.2, Section 7.3 and Section 7.4 respectively. Locations of the proposed surface water monitoring locations and mine affected dam monitoring locations are shown in Figure 7.1 and summarised in Table 7.1. Note that the mine water release points are the same as the mine water monitoring locations (i.e. at the spillway).

**Table 7.1 Receiving waters and mine water dam quality monitoring locations**

| Station ID | Latitude (GDA 2020) | Longitude (GDA 2020) | Description |
|---|---|---|---|
| **Receiving water monitoring sites** | | | |
| ***Upstream sites*** | | | |
| VSW1 | -22.27659 | 148.17451 | Diversion bund approximately 3.1 km upstream of Drainage line 2. Used as an upstream monitoring site for the Project. |
| VSW11 | -22.29794 | 148.18932 | Minor drainage line, upstream of confluence of Drainage line 2. |
| VSW12 | -22.275014 | 148.178265 | Minor drainage line, upstream of Drainage line 1. |
| ***Downstream sites*** | | | |
| VSW2 | -22.30104 | 148.19523 | Drainage Line 2 upstream of the railway. Used as a downstream monitoring site for SD1, SD2, SD4, SD5, SD7, SD8, SD13, SD14, SD15 and SD16. |
| VSW8 | -22.27859 | 148.18782 | Drainage Line 1 upstream of the railway. Used as a downstream site for MWD1, MWD2, MWD3 and MWD5 as well as SD3, SD6, SD9, SD10, SD11, SD12, SD17 and SD18. |
| ***Mine water dam monitoring locations / release points*** | | | |
| MWD1 | -22.28347 | 148.18218 | MWD1 spillway |
| MWD2 | -22.28670 | 148.18700 | MWD2 spillway |
| MWD3 | -22.27556 | 148.17703 | MWD3 spillway |
| MWD5 | -22.28160 | 148.18550 | MWD5 spillway |

## 7.2 RECEIVING WATERS MONITORING

In accordance with Condition F5 of the Project EA, Vitrinite will monitor the receiving water locations shown in Figure 7.1 and summarised in Table 7.1. These locations will be monitored during natural flow events and release events (i.e. releases from sediment or mine dams) to achieve at least 24 sampling events over a 2-year period. Vitrinite will submit the results of the receiving waters monitoring to DES no more than 2 years from the commencement of activities to evaluate whether the site-specific trigger values prescribed in the Project EA are suitable.

In addition, in accordance with Condition F7 of the Project EA, Vitrinite will ensure streamflow gauging stations are operated and maintained at the receiving water locations to determine and record streamflows. The receiving water monitoring points are required to be monitored for the parameters specified in Table 2.1.

Receiving waters monitoring locations are classified as upstream or downstream sites to assist with trigger investigations. The sites are classified as follows:

- VSW1, VSW11 and VSW12 are upstream monitoring points; and
- VSW2 and VSW8 are downstream monitoring points.

## 7.3 MINE AFFECTED WATER QUALITY MONITORING

The water quality monitoring program will also include monitoring at all dams which contain mine affected water with the potential to discharge to the receiving waters. This includes the following dams:

- MWD1;
- MWD2;
- MWD3; and
- MWD5.

Locations of the proposed mine water monitoring locations are shown in Figure 7.1 and summarised in Table 7.1.

In accordance with Condition F11 of the Project EA, in the event of an uncontrolled release from a mine affected water dam as a result of a rainfall event that exceeds design specifications, Vitrinite will:

a. notify the administering authority via WaTERS within 24 hours of the commencement of the release;
b. notify the administering authority via WaTERS within 24 hours of the cessation of the release; and
c. conduct an investigation within 20 business days of cessation of the release.

In accordance with Condition F12 of the Project EA, the investigation required under Condition F11(c) above must determine:

a. whether environmental harm has or may occur;
b. cause of the uncontrolled release;
c. where relevant, measures to address environmental harm; and
d. where relevant, measures to prevent recurrence of uncontrolled release(s).

Vitrinite will submit the results of the investigation to the administering authority within 28 days after completing the investigation. Water quality parameters which will be collected for the mine water dams are outlined in Table 2.1. Note that the metals listed in Table 2.1 will be analysed for both total and dissolved concentrations.

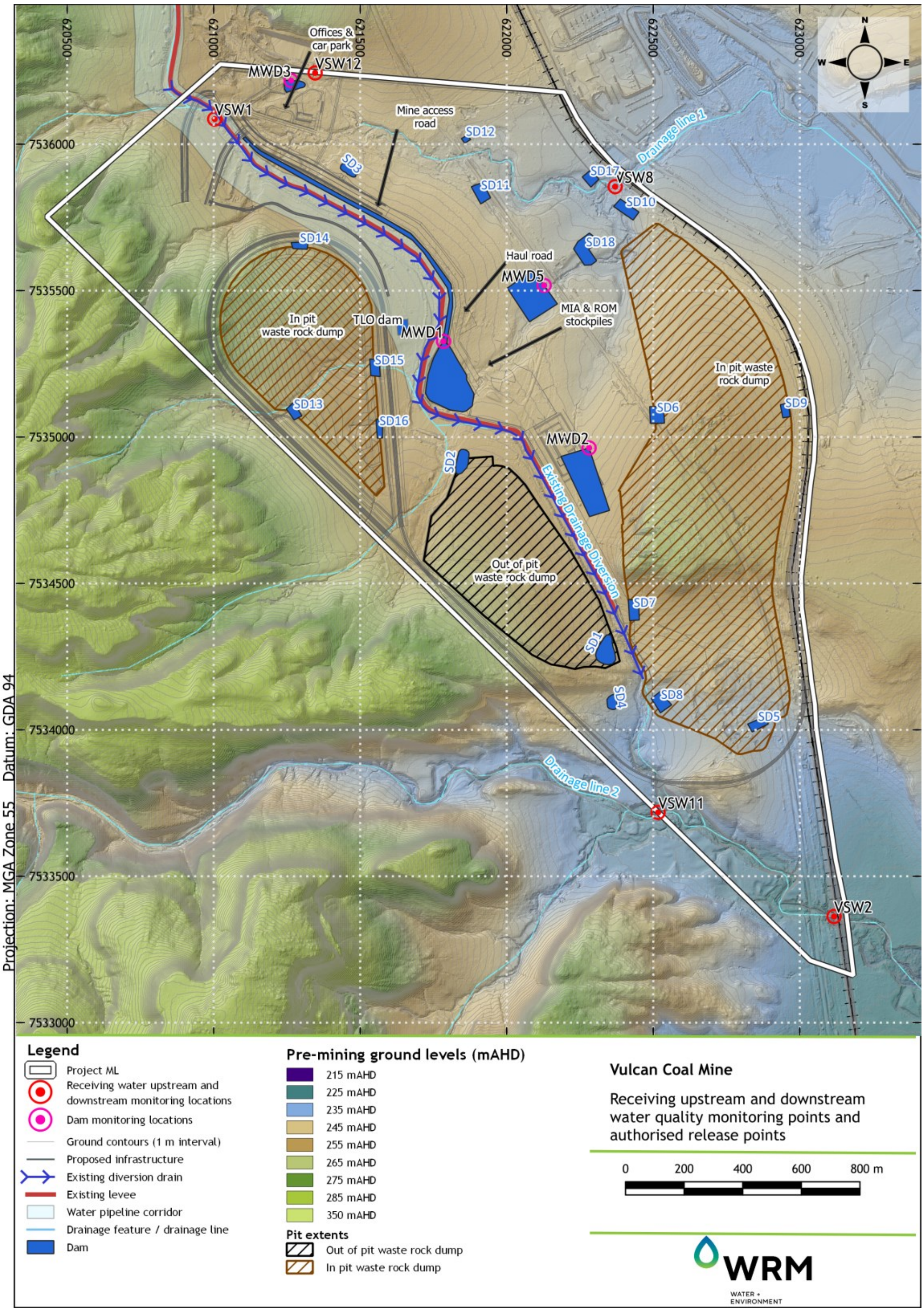


**Figure 7.1 Receiving waters and mine water quality monitoring locations**

## 7.4 SEDIMENT DAM WATER QUALITY MONITORING

In accordance with Condition F5 of the Project EA releases from sediment dams will be monitored at their release points for the water quality parameters specified in Table 2.1. The Project sediment dams are shown in Figure 7.1 and details regarding the sediment dams (including the location of release points) is outlined in Table 4.3.

## 7.5 MAINTENANCE AND INSPECTIONS

Water management structures should be inspected as follows:

- at least daily when rain is occurring;
- within 24 hours prior to expected rainfall; and
- as soon as practicable following a rainfall event of sufficient intensity and duration to cause on-site runoff.

Daily site inspections taking place during periods of runoff inducing rainfall must check:

- all drainage, erosion and sediment control measures;
- occurrences of excessive sediment deposition (whether on-site or off-site); and
- all site discharge points.

Site inspections immediately prior to anticipated runoff inducing events must check:

- all drainage, erosion and sediment control measures
- all mine affected water management measures; and
- all temporary (i.e. overnight) flow diversion and drainage works.

Site inspections as soon as practicable following runoff producing rainfall must check:

- treatment and dewatering requirements of sediment basins;
- sediment deposition within sediment basins and requirements for its removal;
- the integrity of all drainage, erosion and sediment control measures;
- occurrences of excessive sediment deposition (whether on-site or off-site);
- occurrences of construction materials, litter or sediment placed, deposited, washed or blown from the site, including deposition by vehicular movements;
- occurrences of excessive erosion, sedimentation, or mud generation around the site office, car park and/or material storage area;
- integrity of all mine affected water drains and dam embankments; and
- mine water dam operating volumes.

In addition to the above, monthly site inspections must check:

- surface coverage of finished surfaces (both area and percentage cover);
- health of recently established vegetation;
- proposed staging of future land clearing, earthworks, pre-strip activities and site/soil stabilisation; and
- mine water dam volumes.

The inspection and monitoring regime should collect and record the following key information:

- the previous condition of the infrastructure and any recommendations or works actioned since the last inspection;
- the current condition of the ESC infrastructure or mine water structure;
- the ESC controls currently in place, and their condition; and
- recommendations on remedial measures to ESC controls or mine water drains or additional ESC or mine water controls if required.

Any failure of effectiveness of structure will be reported to the Mine Site General Manager. The implementation plan should include the recommendations for the incident report. An example inspection template is provided in Appendix C of the ESCP.

## 7.6 DAM MONITORING

The embankments of all dams will be monitored annually before the wet season, and during and after flow events to ensure they are operating satisfactorily and have not been damaged through erosion.

Should a dam become damaged, the stored water will be pumped to a suitable water storage facility to minimise the risk of an uncontrolled release to the downstream waterway. The Mine Site General Manager will be responsible for communicating with regulators. A suitably qualified person shall be used to inspect the dam. Repair work will occur as soon as practicable after damage has occurred.

## 7.7 TRIGGER INVESTIGATION

In accordance with Condition F6 of the Project EA, Vitrinite will complete an investigation if water quality sampling identifies 3 consecutive exceedances of:

a. interim sediment dam release trigger values detailed in Table 2.1, at the sediment dams specified in Table 4.3; and
b. interim downstream monitoring point trigger values detailed in Table 2.1, at the receiving water locations specified in Section 7.1.

In accordance with Condition F8 of the Project EA, where the quality characteristics of the release exceed any of the trigger values specified in Table 2.1 on 3 consecutive occasions, the environmental authority holder must compare the downstream results to the upstream results and:

a. where the downstream result is the same or a lower value than the upstream value for the quality characteristic and the trigger values are not exceeded, then no action is to be taken; or
b. where the downstream result exceeds the values specified in Table 2.1:
    1. if the result is less than the upstream monitoring site data, then no action is to be taken, or
    2. if the result is greater than the upstream monitoring site data, complete an investigation and provide a written report to the administering authority via WaTERS within 90 days of receiving the result, outlining:
        i. details of the investigations carried out;
        ii. determine if the exceedance is a result of:
            a. activities authorised under the Project EA;
            b. natural variation; or
            c. neighbouring land uses;

3. if exceedances are a result of activities authorised under the Project EA, detail:
    i. level of environmental harm; and
    ii. actions taken to prevent environmental harm.

Where an exceedance of a trigger level has occurred and is being investigated, in accordance with a) and b) (1) above, no further reporting is required for subsequent trigger events for that quality characteristic.

In accordance with Condition F9 of the Project EA, if an investigation occurs in accordance with Condition F8(b)3 above, Vitrinite will determine whether environmental harm has or may occur, and detail:

a. strategies to implement immediate measures to reduce the potential for environmental harm; and
b. develop long-term mitigation measures to address any surface water contamination and prevent recurrence of surface water contamination.

Vitrinite must provide details of the measures implemented or to be implemented to reduce the potential for environmental harm as well as the long-term mitigation measures to the administering authority within 28 days after completing the investigation.

## 7.8 RECEIVING ENVIRONMENT MONITORING PROGRAM (REMP)

Further details regarding the monitoring program, including the sampling methodology and analysis process of the monitoring program, is described in the REMP (Vitrinite, 2021). The REMP will incorporate the historical and proposed monitoring as described in Section 7.1 and in the sections above.

The main objective of the REMP will be to report against WQOs for local waterways potentially affected by discharge from the Project and will assist in assessing general aquatic ecosystem health.

## 7.9 PRE WET SEASON CHECKLIST

A pre-wet season checklist should be undertaken for the Project at least annually, to prepare the site for potential rainfall events. A checklist provided by Vitrinite is in Appendix A.

# 8 EMERGENCY AND CONTINGENCY PLANNING

## 8.1 OVERVIEW

The WMS for the Project has been developed for both normal operation and during extreme wet weather events in order to:

- minimise the risk of uncontrolled releases from mine-affected water dams; and
- ensure compliance with the Project EA.

A summary of the emergency response, should a failure of the WMS occur, is given below.

## 8.2 EMERGENCY MANAGEMENT

In accordance with Condition A15 of the Project EA, all reasonable actions will be taken to minimise environmental harm, or potential environmental harm, resulting from any emergency, incident or circumstances not in accordance with the conditions of the Project EA.

In accordance with Condition A12 of the Project EA, Vitrinite will notify the administering authority by written notification within 24 hours, of becoming aware of any emergency or incident or action which:

a. results in the release of contaminants not in accordance; or
b. is reasonably expected to be not in accordance with the conditions of the Project EA.

The notification provided to the administering authority will include, but not be limited to, the following information:

a. the holder of the environmental authority;
b. the location of the emergency or incident;
c. the number of the environmental authority;
d. the name and telephone number of the designated contact person;
e. the time of the release;
f. the time the holder of the environmental authority became aware of the release;
g. the suspected cause of the release;
h. the environmental harm caused, threatened, or suspected to be caused by the release; and
i. actions taken to prevent any further release and mitigate any environmental harm caused by the release.

Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the later, written advice will be provided to the administering authority, including the following:

a. results and interpretation of any samples taken and analysed;
b. outcomes of actions taken at the time to prevent or minimise environmental harm; and
c. proposed actions to prevent a recurrence of the emergency or incident.

In the event of an uncontrolled release, Vitrinite will notify the administering authority and if required, undertake an investigation (including the implementation of appropriate management measures) as outlined in Section 7.

## 8.3 WET WEATHER ACCESS

During wet weather, site access may be restricted due to impassable unsealed roads, flooding and safety issues. It is proposed that waterways which have short duration flows and are inaccessible in wet conditions have a rising stage sampler which can be used to take water samples, minimising exposure of personnel to extreme weather events.

## 8.4 POST-EVENT MONITORING

Dams and drains onsite will be inspected after any significant rainfall event where overflows from sediment dams occur.

Drains and dam spillways will be checked for erosion damage and repaired when required.

# 9 REFERENCES


| | |
|---|---|
| AARC Environmental Solutions Pty Ltd, 2019 | *Vulcan Project Soil and Land Suitability Assessment.* October 2019. |
| DNRME, 2017 | Department of Natural Resources, Mines and Energy (DNRME) (2017). Water Information Portal (https://water-monitoring.information.qld.gov.au/). |
| IECA, 2008 | International Erosion Control Association (IECA) (2008). *Best Practice Erosion and Sediment Control Guideline.* |
| McKenzie NJ, Grundy MJ, Webster R and Ringrose-Voase, 2008 | *Guidelines for Surveying Soil and Land Resources*. Australian Soil and Land Survey Handbook Series. CSIRO Publishing, Melbourne. |
| RGS Environmental Pty Ltd, 2020 | *Geochemical Assessment of Waste Rock and Coal Reject Vulcan Complex Project.* Prepared for Vitrinite Pty Ltd. |
| Vitrinite Pty Ltd, 2021 | *Receiving Environment Monitoring Program Vulcan Coal Mine.* November 2021 |
| WRM, 2022 | *Vulcan Coal Mine EA Amendment Surface Water Assessment,* WRM Water & Environment Pty Ltd, September 2022, report prepared for MET Serve, Report Number 1571-22-B3. |
| WRM, 2024 | *Vulcan Coal Mine Erosion and Sediment Control Plan.* Prepared for Vitrinite Pty Ltd. 1571-31-C1. April 2024. |

# APPENDIX A PRE-WET SEASON AND STORM CHECKLIST

**PRE WET SEASON AND STORM CHECKLIST**

**INSPECTION OFFICER** . . . . . . . . . . . . . . . . . . . . . . . . . . **DATE** . . . . . . . . . . . . . . . . .

**SIGNATURE** . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

N/A – not applicable

✓ – acceptable controls adopted

× – measures are not acceptable, or a potential problem exists

**Vulcan Coal Mine**

| Item | Consideration | Assessment |
|---|---|---|
| 1 | Ensure adequate mine and sediment water storage capacity to cope with heavy rain and the wet season. | . . . . . . . . . . . |
| 2 | All structures are in place are sound and operational. | . . . . . . . . . . . |
| 3 | All monitoring equipment is installed and operational. | . . . . . . . . . . . |
| 4 | All pumps are in place, serviced and operational, pipes are attached and operators passed out. | . . . . . . . . . . . |
| 5 | All exposed areas report to a sediment dam prior to leaving site (not mine water catchments). | . . . . . . . . . . . |
| 6 | Seed and fertilizer in air conditioned storage, ready to seed when required. | . . . . . . . . . . . |
| 7 | Pipelines have been inspected. | . . . . . . . . . . . |
| 8 | All mine water dams are below operating volume to cope with wet weather runoff. | . . . . . . . . . . . |
| 9 | Markers are in place to allow observers to know water volumes in dams (Operating Volume vs Full Supply Volumes). | . . . . . . . . . . . |
| 10 | All ESC structures - rock check dams / silt fences / sediment traps / sediment dams are installed to IESC standards. All to have ID numbers, be checked on regular basis throughout wet season and be repaired / desilted where necessary. | . . . . . . . . . . . |
| 11 | All water quality testing equipment is calibrated, with spare sensors and monitoring equipment on hand. | . . . . . . . . . . . |

| | | |
|---|---|---|
| 12 | At least two sampling events worth of ALS testing kits for all monitoring sites is kept on hand. | ........... |
| 13 | All RSS sites are inspected, bottles cleaned and set at correct levels. Spare RSS bottles are ready to install if required. | ........... |
| 14 | All main drainage lines have been inspected, appropriate works are installed to ensure all areas are stable. | ........... |
| 15 | Ensure all topsoil stockpiles are bunded with either earthern bunds / silt fences to control runoff and sediment. Have an adequate vegetative cover where sites are longer term, will not overtop. | ........... |

**NOTES:**

Level 1, 369 Ann Street Brisbane
PO Box 10703 Brisbane Adelaide Street Qld 4000
**07 3225 0200**

Level 5, 93 Mitchell Street Darwin
GPO Box 43348 Casuarina NT 0811
**08 8911 0060**

wrm@wrmwater.com.au
wrmwater.com.au

ABN 96 107 404 544