



## Application for Works Approval

### Part V Division 3 of the *Environmental Protection Act 1986*

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**Works Approval Number** W3015/2025/1

**Applicant** Boab Metals Limited

**ACN** 107 159 713

**File number** APP-0027616

**Premises** Sorby Hills Project  
Part Mining Leases M80/286, M80/197 and M80/196  
KUNUNURRA WA 6743  
  
As defined by the coordinates in Schedule 1 of the works approval  
  
As defined by the premises maps attached to the issued works approval

**Date of report** 06 February 2026

**Decision** Works approval granted

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## 1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W3015/2025/1 has been granted.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

### 2.2 Application summary and overview of premises

On 24 February 2025, Boab Metals Limited (the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works relating to Category 5 Ore Processing Facility (OPF) and Tailings Storage Facility (TSF), Category 6 Mine Dewatering, Category 63 Class I Inert Landfill Site, Category 85 Wastewater Treatment Plant (WWTP) and Category 89 Putrescible Landfill at the premises.

The premises is approximately 50 km north east of Kununurra, with the Sorby Hills Project seeking to produce a single concentrate that primarily contains lead and silver. Although zinc is present in the ore, the concentrate product is not designed to recover zinc separately. Instead, zinc is considered a minor by-product and may be present in small amounts within the lead-silver concentrate, but not as a standalone zinc concentrate.

The premises relates to the categories and assessed production / design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W3015/2025/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W3015/2025/1.

Refer to Figure 1 for locations of infrastructure and proposed site layout.

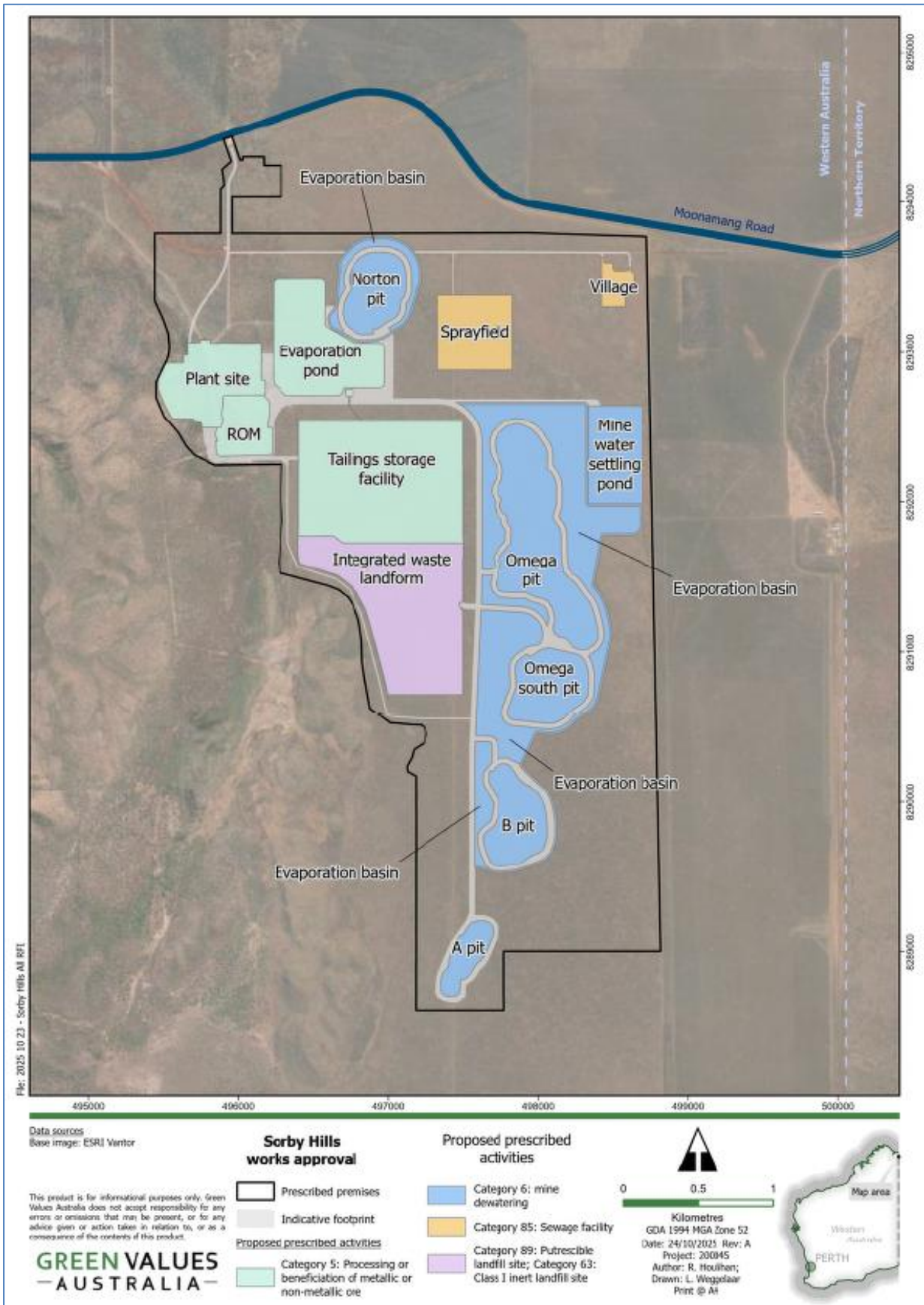


Figure 1: Proposed Locations of Prescribed Activities

### 2.2.1 Category 5 – Ore Processing Facility (OPF)

Ore will be transported by truck and stockpiled at a Run of Mine (ROM) pad to the west of the OPF. The stockpile will have a nominal capacity of 1.6 MT and will occupy an area of approximately 15.47 ha.

Ore will be processed by flotation to produce a lead and silver concentrate, which will be exported through the Port of Wyndham. The OPF is designed to treat both oxidised and fresh ores. The design allows for either batch processing of oxide and fresh ores separately or combined (blended) processing. Lead and silver are recovered into a single concentrate, with small amounts of zinc byproduct.

Material stored at the ROM will be fed into a primary crusher hopper ROM bin using a front-end loader. If required, the material stored at the ROM will be blended either by creating secondary stockpiles or during crusher loading operations. The ROM bin will be fitted with a screen to exclude oversize material. Oversize ROM material will be removed from the grizzly by the loader and stockpiled on the ROM pad for breakage using a mobile rock breaker.

The ROM feed material will be crushed using a primary jaw crusher and then conveyed to a coarse ore stockpile. From the coarse ore stockpile, ore will be conveyed to a semi-autogenous grinding (SAG) mill, which will be mixed with water for coarse grinding and then pumped to a ball mill for fine grinding.

Ore will be milled to a particle size P80 of 90µm in the ball mill before passing to the flotation circuit. The ore-water slurry will be mixed with a range of reagents.

The slurry and reagent mixture will be passed through a series of flotation cells. Sulphide materials float to the surface and are skimmed off to form a concentrate. Following skimming, the concentrate will be de-watered in a conventional thickener circuit and then dried to a specified moisture in a ceramic filter press. Filter cake will discharge from the filter into a live bottom hopper underneath the filter. Filter cake will be withdrawn from the live bottom hopper by a screw feeder arrangement and transferred to the concentrate handling plant. The tails from the flotation circuit will be thickened to reclaim process water. Flotation tailings slurry will be pumped from the flotation tailings hopper to the high-rate tailings thickener.

Other process streams reporting to the tailings thickener feed box will include various sump pump slurry streams. The tailings slurry will be dosed with flocculant to enhance the settling of the solids material. The tailings thickener underflow will target a tailings slurry density of 52% to 60% solids (w/w). Thickened tailings will be pumped to the TSF.

No concentrate stockpiles will be required on-site. The concentrate will be packaged directly into fully sealed and lockable containers for short-term on-site storage and subsequent transport off-site.

Refer to Table 1 for Chemical Use.

Refer to Figure 2 for Process Flow Diagram.

**Table 1: Chemical Use**

Chemical/Reagent	Function	Oxide Ore		Fresh Ore		Packaging
		Dose (g/t)	Annual (t)	Dose (g/t)	Annual (t)	
Sodium silicate	Dispersant	100	33.75	N/A	N/A	25kg polyethylene bags
Sodium hydrosulphide	Flotation activator	850	286.9	N/A	N/A	25kg polyethylene

Chemical/Reagent	Function	Oxide Ore		Fresh Ore		Packaging
		Dose (g/t)	Annual (t)	Dose (g/t)	Annual (t)	
						bags
Sodium metabisulphite	Weak depressant	N/A	N/A	1,000	1,912.5	1 tonne polyethylene bags
Aerophine 3418A	Flotation collector	8	2.7	8	30.6	200kg blue plastic drums
Sodium isobutyl xanthate	Flotation collector	85	28.65	N/A	N/A	25kg polyethylene bags
Frother W22	Frother	90	30.37	60	114.75	Open top steel drums
Flocculant	Flocculant	30	10.125	30	57.38	25kg polyethylene bags
SAG Grinding media	Grinding media	0.25	0.08	0.25	0.48	Steel drums
Ball mill Grinding Media	Grinding media	0.16	0.54	0.16	0.31	Steel drums

### Surface Water Monitoring

The OPF is designed to direct rainfall to sumps for collection and reuse within the processing plant water system. Sumps are located within the design footprint at low points within the bunded areas; where water is required to be discharged out of the OPF area (either to the evaporation basin, disused pit or evaporation pond), water will be sampled for the parameters in Table 2, consistent with WQPN 68: Mechanical equipment wash-down (Department of Water, 2013).

**Table 2: Proposed surface water monitoring parameters**

Measured Component	Discharge Limits
pH	Between 5.5 to 8.5
TDS	<15,000 mg/l
Turbidity	446 NTU
Surfactants (detergents)	5 mg/L (maximum)
Petroleum hydrocarbons	15 mg/L (maximum)
Benzene, toluene, ethyl benzene, xylene (BTEX)	10 ug/L (cumulative maximum)
Lead (dissolved)	10 ug/L

Measured Component	Discharge Limits
Nickel (dissolved)	80 ug/L
Zinc (dissolved)	24 ug/L
Silver (dissolved)	0.2 ug/L
Major cations and anions	No limits: for interpretation purposes only

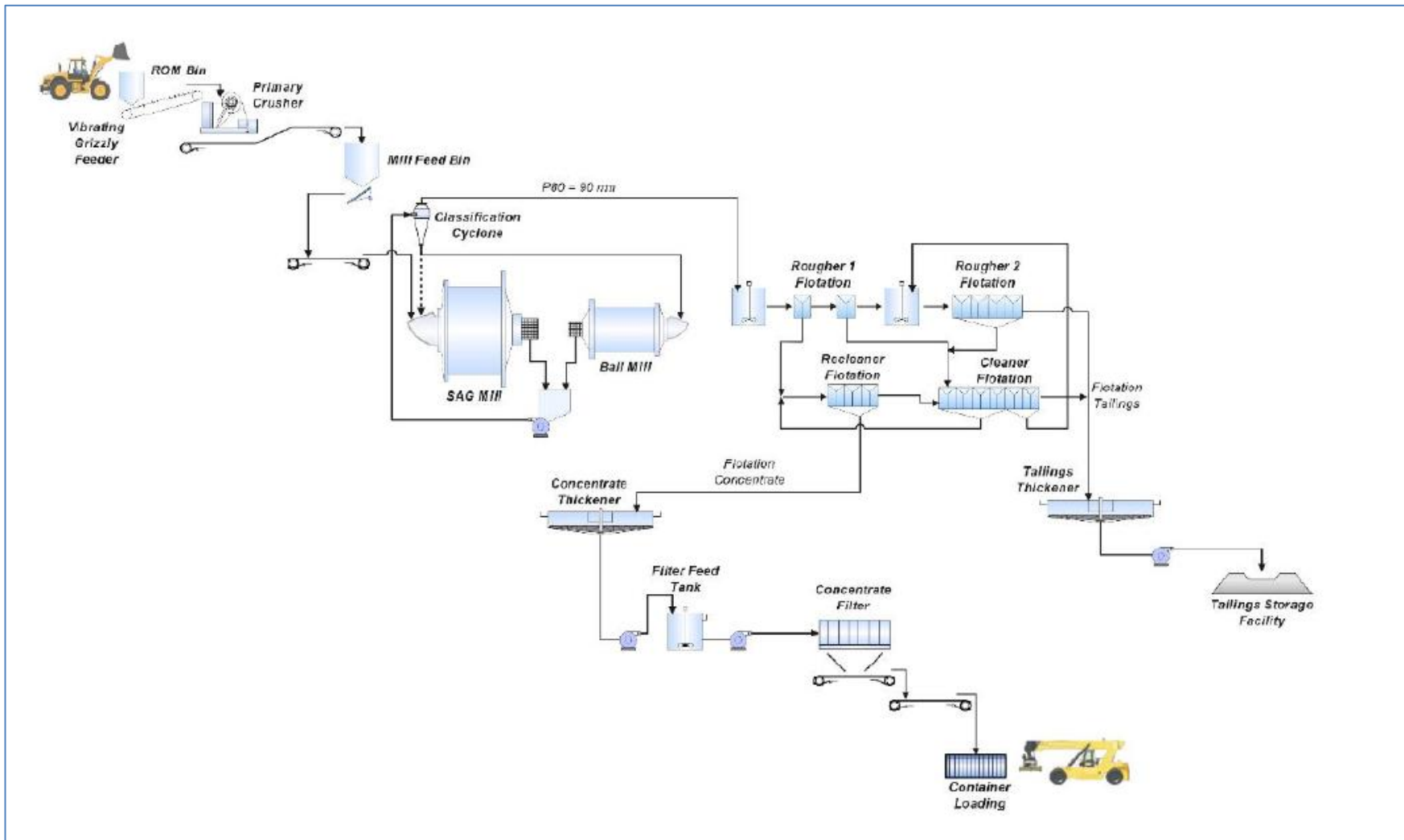


Figure 2: Process Flow Diagram

### Concentrate Storage & Loading Enclosed Shed

No concentrate stockpiles will be stored onsite. The concentrate will be packaged directly into fully sealed and lockable containers within a Concentrate Handling Shed that is fitted with dust collectors. Concentrate will be placed directly within containers as loose material.

Containers will be filled in the following process within the shed.

Direct-feed into containers:

- A container will be placed within the shed onto a trailer system mounted on rails outside of the shed;
- An automatic door system will open the shed for the trailer to enter. Once the trailer is inside, the door will close;
- The lid of the container will be removed, and the concentrate will be fed into the container by a bottom-dumping hopper;
- Once the required volume of concentrate has been placed within the container, the lid will be replaced and locked and the outside of the container washed to remove any fugitive material;
- Washdown water will be collected in a sump within the shed, and pumped to the concentrate thickener feed box;
- The trailer and locked container will then be transported to the outside of the shed and either stockpiled, or placed directly onto the truck for transport off-site; and
- The shed will be fitted with a dust collector to manage any fugitive emissions. Dust collected will feed into a hopper and transfer pump and report to the concentrate thickener feed box.

Refer to Table 3 for a summary of the design specifications for the dust collector.

**Table 3: Concentrate Shed Dust Collector Design Specifications**

Duty Specification	Units	Data
Duty Description	-	Extraction of dust generated from lead concentrate inside the concentrate shed
Maximum Permissible Dust Emissions	mg/Nm <sup>3</sup>	50 mg/ Nm <sup>3</sup> of minus 3 µm particles passing
Air Temperature Normal / Max	°C	Ambient
Solids Description	-	Lead/Zinc ore
Material Bulk Density	t/m <sup>3</sup>	1.63
Moisture Content (nominal)	%w/w	4
Type	-	Ducted system to reverse pulse dust collector with collection points at the filter dump hopper
Dust Collector Mounting Type		Baghouse with self-supporting structure
Design Air Flow	Am <sup>3</sup> /h	5,000

Duty Specification	Units	Data
Baghouse & Duct Losses to ID Fan	Kpa	Approx 5
Method of Dust Disposal	-	Rotary valve discharging to dust slurry hopper

Externally, there will be a designated drive-through wash bay for trucks, with wastewater directed back into the concentrate thickener. Each truck will be washed prior to leaving site. Wastewater will be returned to the OPF circuit.

Air Quality Monitoring

Dust deposition monitoring locations (Dust 1 to Dust 5) are shown in Figure 3. The network consists of 5 dust deposition gauges and two real-time dust monitors.

Each location is proposed to have a dust deposition gauge installed, with samples monitored monthly for: Ash Content, Combustible Matter, Total Soluble Matter, Total Insoluble Matter, Total Solids, and Lead. Samples will be archived and can, if required, be analysed for additional metals if high levels of deposited dust are recorded (including, but not limited to, copper and zinc).

Dust 1 and Dust 5 were chosen for the additional monitoring due to its location between sensitive receptors, being the accommodation village and the agriculture area:

- Dust 1 is located on the eastern boundary of the Project, adjacent to the boundary of Keep Farming operations.
- Dust 2 is located on the eastern site of the proposed development footprint.
- Dust 3 is located in between the plant site and the evaporation basin.
- Dust 4 is located on the western side of the plant and ROM area
- Dust 5 provides a suitable location between the OPF, camp and Moonamang Road, being the main access road through the area.

Real time dust monitors (particle monitor / dust track or similar) will be installed at the ‘Dust 1’ and ‘Dust 5’ monitoring locations for continuous monitoring of PM<sub>2.5</sub> and PM<sub>10</sub> in ambient air. A high-volume air sampler will be installed at the village to measure total suspended particulates (TSP). Lead will then be measured as total metal content in TSP.

The applicant devised the monitoring locations based on the Dust Emissions’ Impact Assessment which was carried out by Environmental & Air Quality Consulting Pty Ltd (EAQ, 2022). In this assessment wind speeds and wind direction were considered over the 3-year period (2019-2021); Sorby Hills wind direction characteristics show:

- Prevailing trends from the south-east and north-west, with the resultant vector (average) prevailing from the east (900).
- Kununurra’s wind direction trends prevail from the south-east and the north, with its resultant vector from the east, north-east (790).

Refer to for Table 5 for the proposed air quality monitoring parameters for the dust deposition monitoring network. Refer to Table 5 for the proposed ambient air quality monitoring for the real time dust monitoring network.

**Table 4: Proposed deposited dust parameters and triggers**

Parameter	Trigger	Threshold
Total insoluble matter <sup>Note 1</sup>	5 g/m <sup>2</sup> /mth	10 g/m <sup>2</sup> /mth
Lead and its compounds as lead	100 µg/m <sup>2</sup> /day annual average <sup>Note 2</sup>	250 µg/m <sup>2</sup> /day annual average <sup>Note 3</sup>
Other metals (Copper and Zinc)	No trigger or threshold proposed.	
Ash content	No trigger or threshold proposed.	
Combustible Matter		
Total Soluble Matter		
Total insoluble Matter		
Total Solids		

*Note 1: Based on historical baseline values*

*Note 2: Limits based on First General Administrative Regulation Pertaining to the Federal Emission Control Act (Technical Instructions on Air Quality Control – TA Luft)*

*Note 3: World Health Organisation – Air Quality Guidelines for Europe Second Edition, 2000 (Chapter 6 page 152).*

**Table 5: Proposed ambient air quality monitoring parameters**

Parameter	Location	Trigger	Threshold	Averaging Period	Reference
PM <sub>10</sub>	Dust 1 Dust 5	30 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	24 hours	NEPM – Ambient Air Quality (NEPC, 1998) DWER Guideline – Dust Emissions (2021) <sup>3</sup>
PM <sub>2.5</sub>	Dust 1 Dust 5	15 µg/m <sup>3</sup>	25 µg/m <sup>3</sup>	24 hours	NEPM – Ambient Air Quality (NEPC, 1998) DWER Guideline – Dust Emissions (2021) <sup>3</sup>
TSP	Dust 1 Dust 5 Village	60 µg/m <sup>3</sup>	90 µg/m <sup>3</sup>	24 hours	Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992
Lead <sup>1</sup>	Village	0.10 µg/m <sup>3</sup>	0.15 µg/m <sup>3</sup>	3-month rolling	USEPA, National Ambient Air

Parameter	Location	Trigger	Threshold	Averaging Period	Reference
				average <sup>2</sup>	Quality Standards - <a href="#">NAAQS Table   US EPA</a>
Copper dusts	Village	0.6 µg/m <sup>3</sup>	1 µg/m <sup>3</sup>	24 hours	DWER Guideline – Dust Emissions (2021) <sup>3</sup>
Zinc	Village	30 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>	24 hours	DWER Guideline – Dust Emissions (2021) <sup>3</sup>

Note1: Adapted from the USEPA, National Ambient Air Quality Standards.

Note 2: Maximum arithmetic monthly mean over 3 consecutive months

Note 3: DWER 2021, *Guideline: Dust emissions*, Perth Western Australia (DRAFT – for external consultation purposes).

**Key findings:**

1) The department has determined to set requirements in the works approval for the applicant to develop and implement a Dust and Air Quality Monitoring Plan. This will ensure that the proposed monitoring regime is document/outlined in a standalone plan that can be reviewed and revised as operations progress and based on the continual review of monitoring data. The plan is to be submitted to department by 31 May 2026. Refer to Section 3 and the works approval for additional details on imposed conditions.

2) Based on the dust impact assessment commissioning by the applicant the prevailing trends for the Sorby Hills site is from the south-east and north-west, with the resultant vector (average) prevailing from the east (900). Consideration should be given to expanding the spatial layout of dust monitoring locations to potentially include an additional dust deposition monitoring location in the south of the overall site, within tenement M 80/197. The need and location of any additional monitoring location can be considered when preparing the Dust and Air Quality Monitoring Plan outlined in point 1 above.

3) The department acknowledges that a 3-month rolling average for lead has been adopted for the site to ensure timely review of site operations and potential impacts to onsite and offsite receptors. In addition to this an annual average will also be set in works approval conditions, consistent with the criteria published in the NEPM – Ambient Air Quality (NEPC, 1998) and DWER Guideline – Air Emissions (2019) – see below table.

Parameter	Location	Trigger	Threshold	Averaging Period
Lead <sup>1</sup>	Village	0.25 µg/m <sup>3</sup>	0.50 µg/m <sup>3</sup>	Annual average

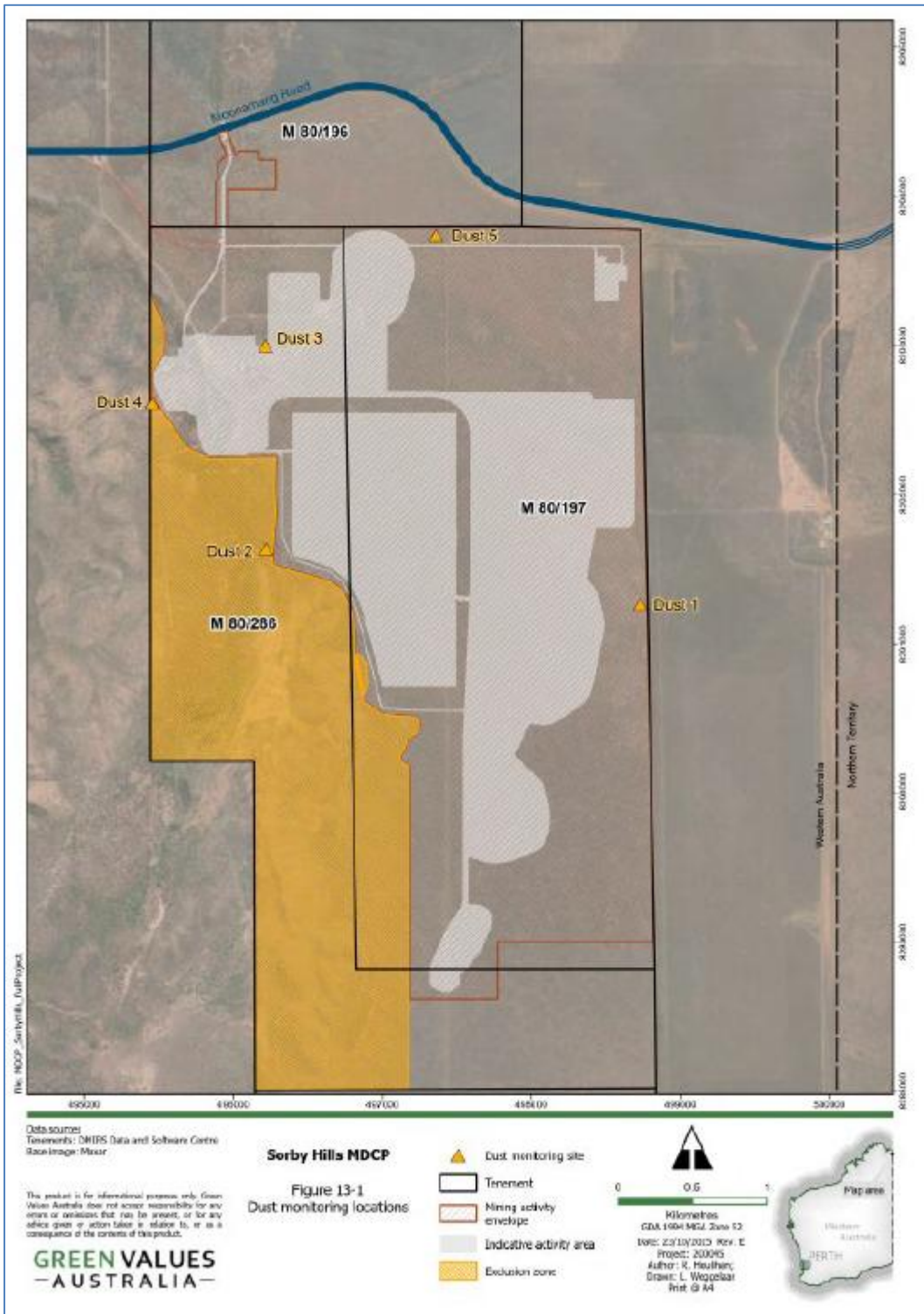


Figure 3: Dust Monitoring Locations

### 2.2.2 Category 5 – Tailings Storage Facility (TSF)

The TSF will be developed as an Integrated Waste Landform (IWL), located within the waste rock dump. Mine waste is placed around the outer edge of the alignment selected for the inner engineered containment embankment so that a void is formed inside the waste dump.

Refer to Table 6 for Engineering Properties and Design Parameters.

**Table 6: Engineering Properties and Design Parameters**

Property	Value
Tailings Production Rate (year 1-2)	0.89-1.89 Mtpa
Tailings Production Rate (years 3-8)	2.123-2.17 Mtpa
Tailings Production Rate (year 9)	1.77 Mtpa
Total tailings storage capacity at completion of Stage 8 lift	17.4 Mt
Maximum TSF height	31.5 m (to crest elevation of RL 52 m AHD)
Downstream embankment slope	14 degrees (1:4 (V:H))
Final footprint area	Approximately 55 ha
Number of raises	Eight
Construction method for raises	Downstream
Slurry density	60% solids (years 1 and 2); 52% solids (year 3-9)
Settled dry density	1.4 t/m <sup>3</sup>
Particle specific gravity	2.79
Particle size distribution	P80 ~ 100 µm; 70% passing 75 µm
Retained moisture content	35%
Angle of internal friction ( $\phi'$ ) and cohesion ( $c'$ )	$\phi' = 30^\circ$ and $c' = 0$ kPa (lower bound values adopted for conservative design purposes)
Vertical hydraulic conductivity (Kz)	Upper deposited tailings: $10^{-7}$ m/s Middle deposited tailings: $5 \times 10^{-8}$ m/s Lower deposited tailings: $10^{-8}$ m/s
Tailings beach slope	1:100 (V:H) (1%)
Lining and seepage collection system	A nominally 0.5 m thick basin clay liner with a hydraulic conductivity of $1 \times 10^{-9}$ m/s will be constructed over the prepared basin area. The upstream embankment liner will comprise a roller-compacted zone of inactive clayey mine waste,

Property	Value
	<p>forming a lower permeability zone.</p> <p>A gravity-driven under-drainage system (comprising central composite drains near the decant area and perimeter composite drains at nominally 10 m from the embankment upstream toe) was placed over the compacted clay liner.</p> <p>A cut-off trench with a 4 m wide base will be constructed beneath the Stage 1 perimeter embankment (Zone A) and backfilled with compacted clayey mine waste to capture horizontal seepage through the TSF. The trench will be excavated to a nominal depth of 2 m below the stripped ground level, with side cut batters of 1:1.5 (V:H).</p>

Permeability / hydraulic conductivity values adopted in the seepage analyses are summarised in Table 7. Permeability value for the foundation weathered rock was derived from in situ falling head tests, while permeability values for foundation soils and embankment clayey fill material / clayey mine waste were based on laboratory triaxial permeability tests. Permeability values for embankment mine waste and tailings were assumed based on findings from site investigations, material characterisation from laboratory classification tests and experience with similar materials.

**Table 7: Summary of Permeability Values**

Material	Permeability Kz (m/s)
Foundation Weathered Rock (Dolomite)	$1 \times 10^{-6}$
Lower Foundation Soil (Gravelly Sandy Clay / Clayey Sand)	$1 \times 10^{-8}$
Upper Foundation Soil (Sandy / Silty Clay)	$1 \times 10^{-8}$
Embankment (Compacted Clayey Mine Waste)	$1 \times 10^{-9}$
Embankment (Traffic Compacted Mine Waste)	$5 \times 10^{-6}$
Deposited Tailings (Lower Layer)	$1 \times 10^{-7}$
Deposited Tailings (Middle Layer)	$5 \times 10^{-8}$
Deposited Tailings (Upper Layer)	$1 \times 10^{-8}$
Compacted Clay Liner (0.5 m thick)	$1 \times 10^{-9}$

Tailings Characterisation

Geochemical testing of tailings material has been undertaken through two major studies: Soil Water Consultants (2011) and O’Kane Consultants (2021–2022). Both studies confirm that tailings from the Sorby Hills Project are predominantly Non-Acid Forming (NAF) due to their high acid-neutralising capacity and alkaline pH.

The tailings samples tested had neutral to alkaline paste pH values, with low electrical conductivity and sulfur contents ranging from 0.16% to 1.01%, primarily as sulfide sulfur. Acid-base accounting results indicate a strong capacity to neutralise acid, with negative net acid production potential values, meaning the material is unlikely to generate acidic drainage.

However, while the risk of acid generation is low, testing identified elevated concentrations of metals such as lead (Pb), zinc (Zn), silver (Ag), and others within the tailings. Leaching tests (ASLP) and kinetic trials show that under neutral drainage conditions, some metals—particularly Pb, Cd, Co, Sb, and Zn—can mobilise into solution. This means that even without acidic conditions, there is potential for metalliferous drainage from tailings and associated supernatant water.

The hardness of site drainage water will influence this risk. Higher hardness levels reduce metal bioavailability and therefore ecological risk, but hardness at the site varies significantly. This variability means that while some exceedances of ANZECC freshwater trigger values were recorded in laboratory tests, actual environmental impact will depend on site-specific water chemistry.

In summary, tailings from the Sorby Hills Project are not expected to produce acid mine drainage due to their strong neutralising capacity. The key environmental consideration is the potential for metal mobilisation under neutral conditions, which will require ongoing monitoring and management, particularly for lead and other enriched metals.

### Decant System

Water (comprising supernatant water from tailings deposition and surface runoff stormwater) from within the TSF will be removed via a dedicated pumping system located at the central decant area and pumped into the Evaporation Pond for reuse in the Process Plant or disposal by evaporation. The pump will be deployed at the end of the decant accessway.

### Underdrainage System

A gravity driven underdrainage system, placed over the compacted clay liner, has been incorporated into the design to maximise water (seepage) return to the plant, lower the phreatic surface through the embankment and improve embankment stability.

The proposed underdrainage system for the TSF comprises:

- An internal composite subsurface drainage system (covered with filter sand/fine aggregate and stabilised coarse aggregate/crushed rock) which will be placed over the basin compacted clay liner:
  - Central composite drains (near the decant area) (Prodrain composite strip filter drains (cuspatated core) with thermally bonded geotextile wrap: PD40-SD500 and PD40-SD150 for the central drains or approved equivalent);
  - Perimeter composite drains (located nominally 10 m from the embankment upstream toe) (Prodrain composite strip filter drains (cuspatated core) with thermally bonded geotextile wrap: PD40-SD300 or approved equivalent); and
- External solid outfall pipes (DN225 PE100 PN12.5).

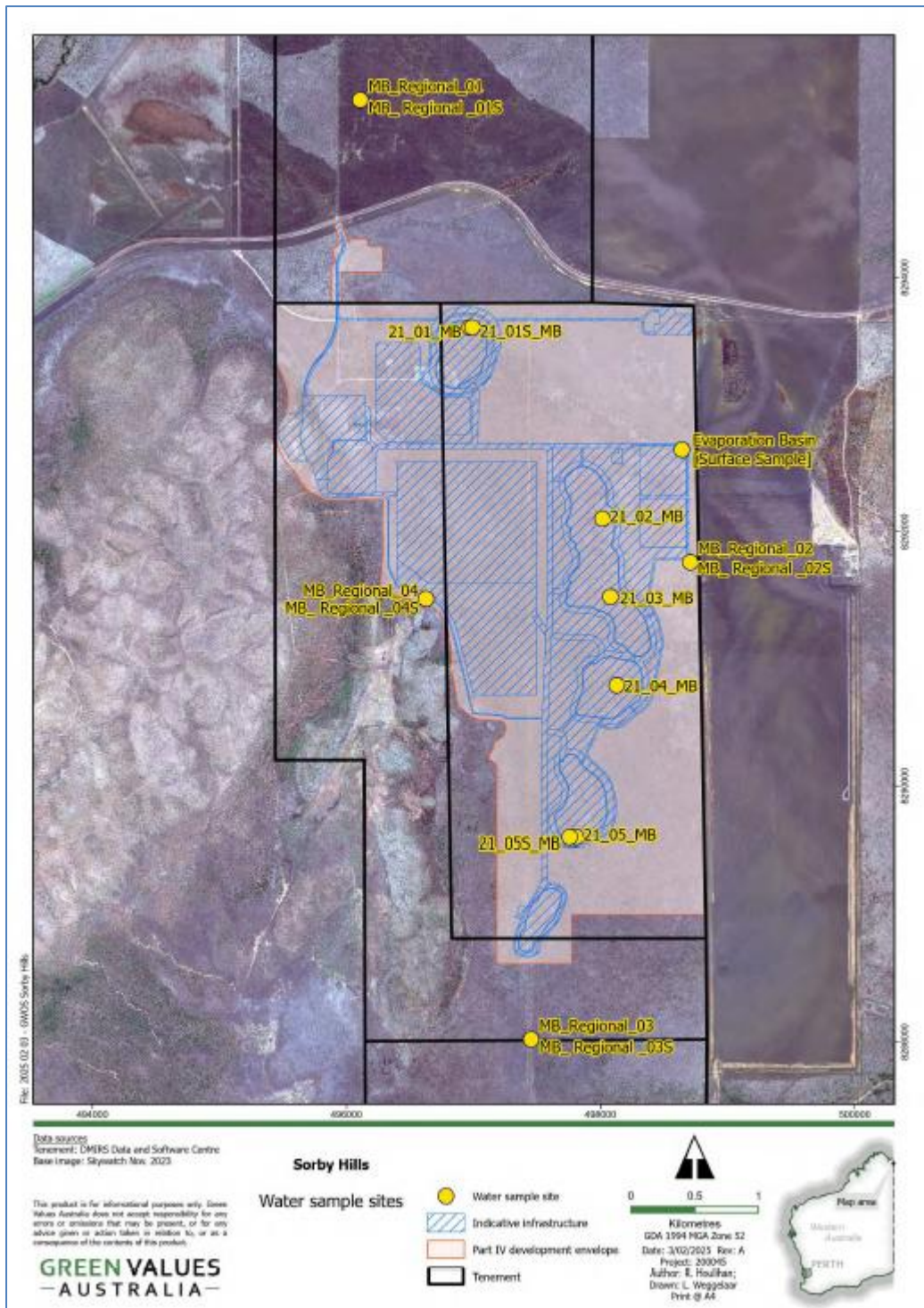
The underdrainage system has a minimum design flow capacity of 150 m<sup>3</sup>/day.

The recovered underdrainage (seepage) water will then gravity drain via three solid outfall pipes to a fully lined return water pond, from where it is proposed to be pumped into the Evaporation Pond for reuse in the OPF or disposal by evaporation. The pond will be located adjacent to the Evaporation Pond and has been sized to have a storage capacity of 900 m<sup>3</sup> with a total freeboard of 0.8 m (including a 0.5 m storm freeboard from a 1:100-year AEP, 72 hrs).

Raw water quality in Table 10 shows low iron levels in the water, with no iron-rich materials or pH adjustment occurring within the tailings process flow. As such, the Applicant has stated that it is unlikely that clogging could occur over time. In the scenario where seepage flow noticeably reduces over time, mechanical or chemical clearing will be implemented, accessing from the underdrainage outlet system.

### Groundwater Monitoring Regime

Regional groundwater monitoring bores will be installed and monitored in accordance with the Groundwater Operating Strategy approved under the *Rights in Water and Irrigation Act 1917*. Refer to Figure 4.



**Figure 4: Regional groundwater monitoring bore locations**

Five pairs (10 in total) of vibrating wire piezometers (VWP) be installed around the west, north and east sides of the TSF and at the perimeter embankment sections (i.e., near the plant site and offices, open pits and main local access / haul roads) to monitor the phreatic surfaces within

the perimeter embankments. The vibrating wire piezometers wires will be located in a conduit running along the basin clay liner and up against the embankment face, and then connected to data loggers located at the designated locations. VWP's shall be monitored continuously with a data logger.

The monitoring system will comprise a network of seven groundwater monitoring bores located around the TSF for the purposes of monitoring groundwater levels and groundwater quality. Bores will be measured monthly for groundwater level, and sampled annually for groundwater quality for metals, pH, TDS.

The monitoring program of the evaporation pond can utilise the proposed TSF monitoring bores and other regional monitoring bores in close proximity. Baseline monitoring of these bores will be conducted prior to any construction activities occurring.

Refer to Figure 5, Figure 6 and Figure 7 which depicts details of the proposed groundwater monitoring network.

**Key findings:**

Refer to Section 2.5 which provides a summary of DWER's Hydrogeological Review of the proposal.

1) The proposed bore network around the TSF (MB01-MB07), are acceptable for general monitoring purposes around the TSF only. As they exhibit long screened intervals, they will not provide an accurate representation of discrete seepage due to potential dilution along the screened interval.

2) In addition to the monitoring bores proposed by the applicant, separate short-screened bores (~ <4m) downgradient of the TSF should be installed. Nested monitoring bore arrangements have therefore been set in conditions of the works approval for monitoring locations MB01 to MB07.

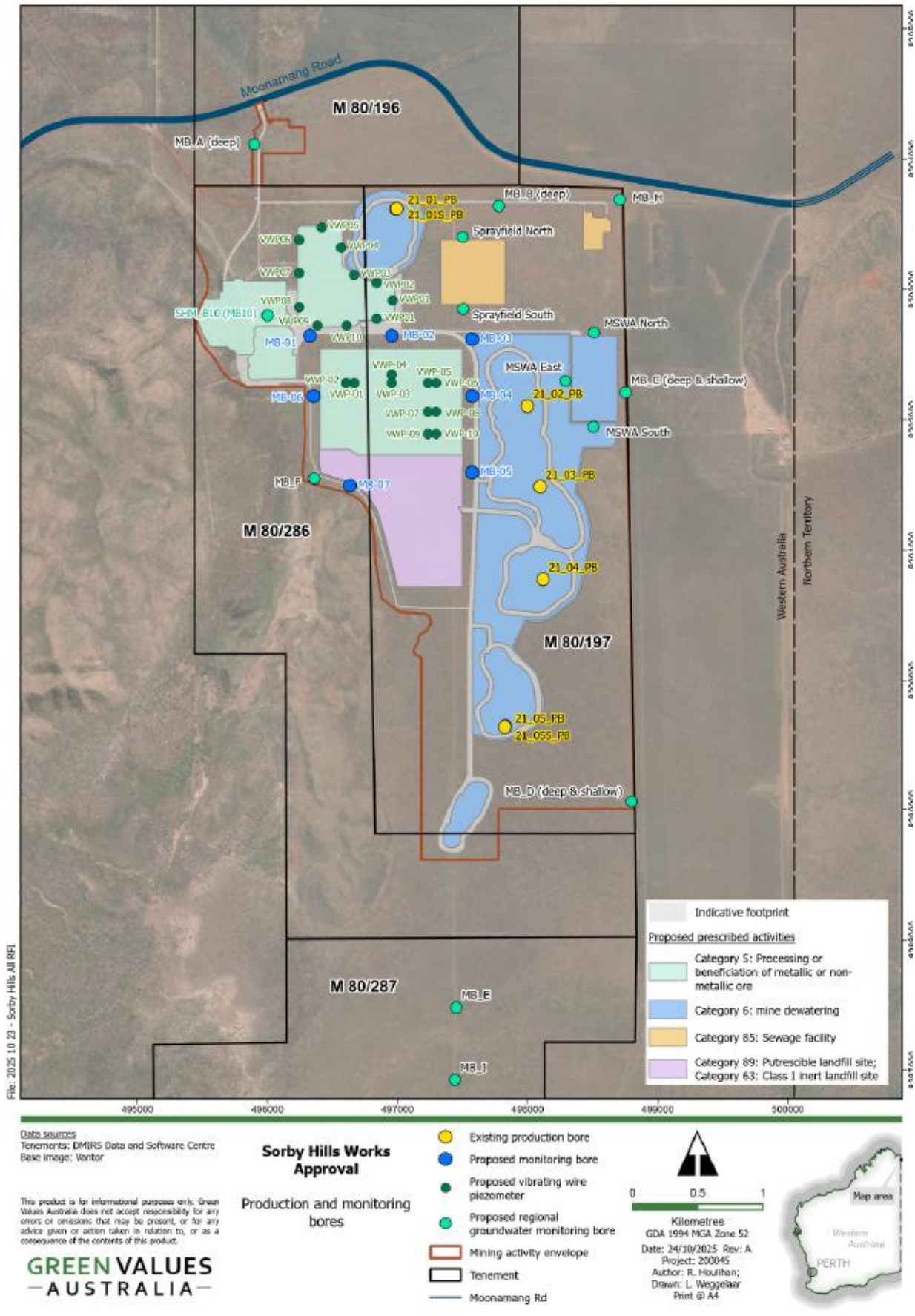


Figure 5: Water Monitoring Locations

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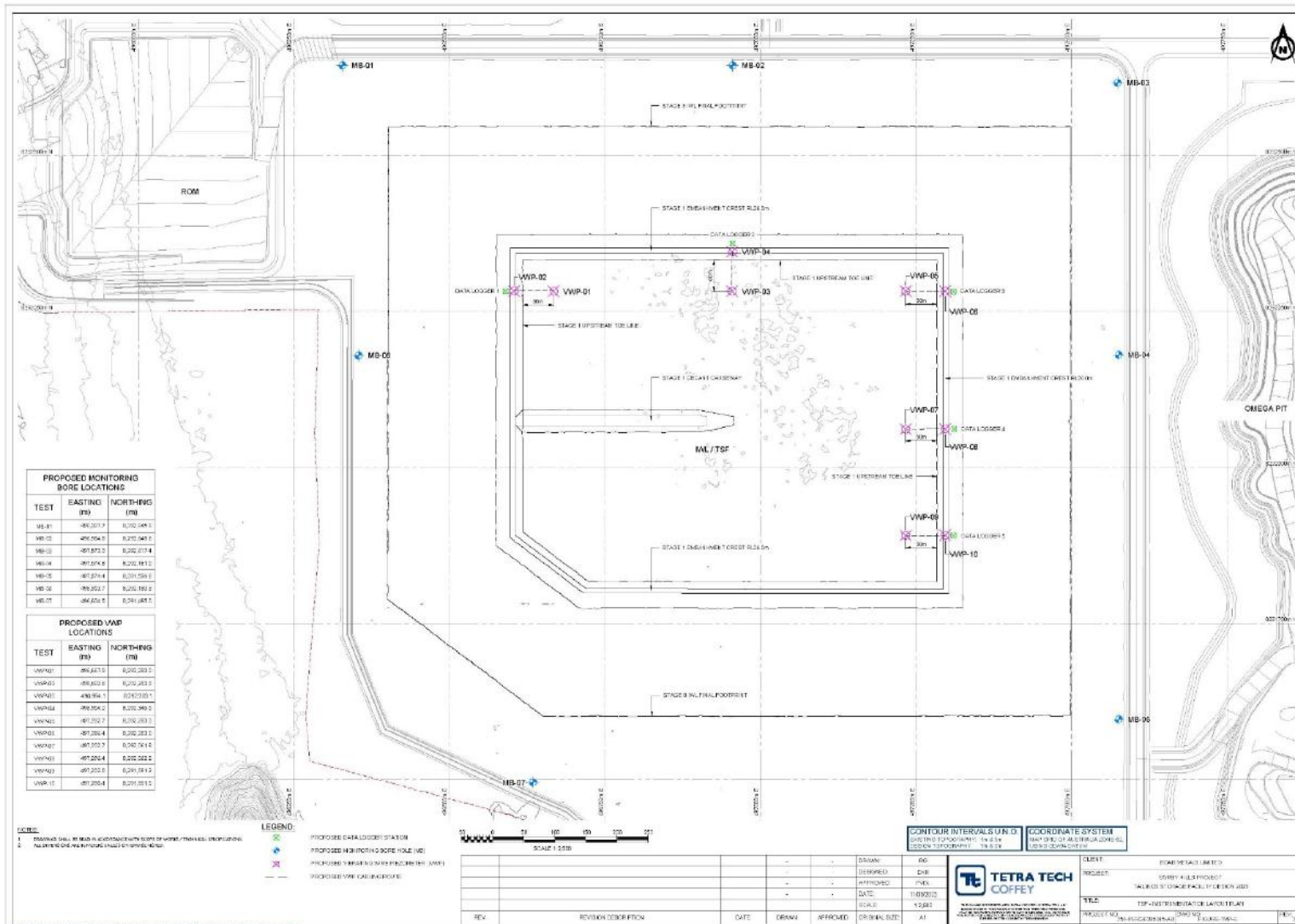


Figure 6: TSF Instrumentation Plan

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IR-T13 Decision report template (short) v3.0 (May 2021)

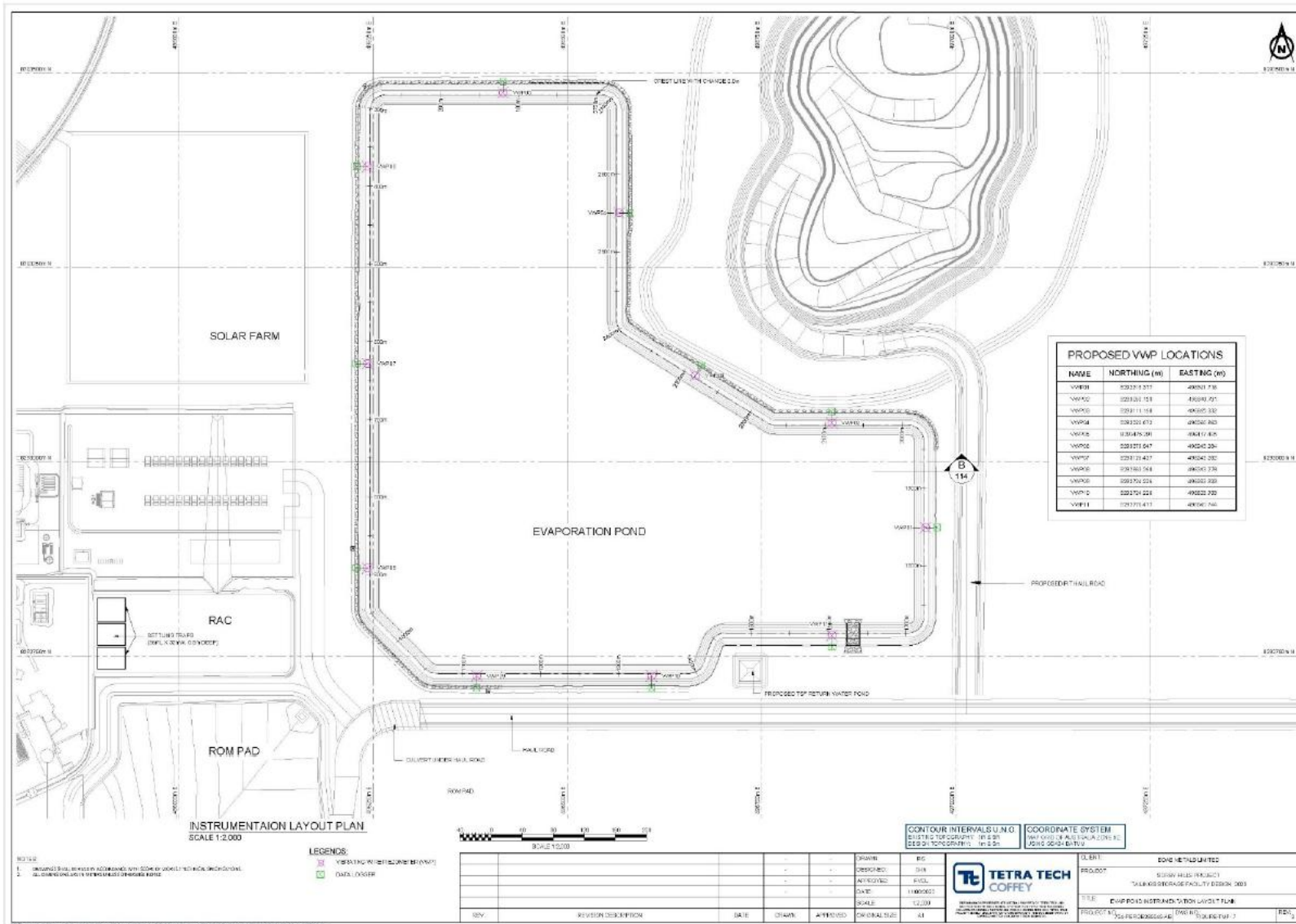


Figure 7: Evaporation Pond Instrumentation Plan

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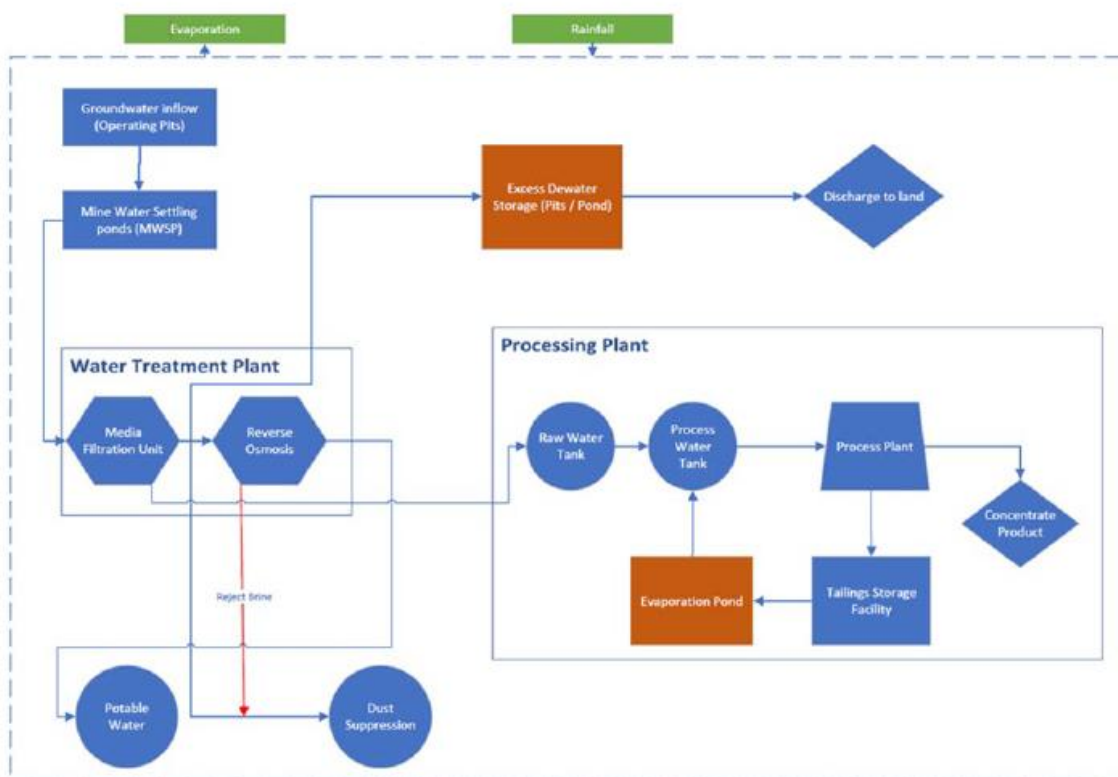
### 2.2.3 Category 6 Mine Dewatering

Although a water licence for 6.5 GLpa has been sought, the maximum water predicted for annual groundwater abstraction is likely to be in the order of 3.9 GLpa.

Approximately 52% of the groundwater for mine dewatering will be used for mining operations, including ore processing, dust suppression and to water treatment plants for potable water supplies. This consideration is conservative. It is anticipated that additional water will be required for mining operations. At peak operations (being years 3-6), modelled water use is consistent at approximately 1.8 GLpa.

The average surplus water for mine dewatering (water not required for use in mining operations) is estimated at 1.4 GLpa, with a range of 0.9-2 GLpa.

Refer to Figure 8 for the Project Water Schematic.



**Figure 8: Project Water Schematic**

Water Management for the Project will adhere to the following management strategy:

- Water within the pits will be collected within sumps on the lowest floor level of the mining operation;
- Water will then be pumped to the Mine Water Settling Pond (MWSP) for the removal of sediment material and passed through the media filtration unit; and
- The treated water will then be pumped either to:
  - Directly into the processing water circuit (Raw Water Tank);
  - For dust suppression use on haul roads, integrated waste landform and in-pit dust suppression. A standpipe and tank will be located at a suitable location;

- To the Reverse Osmosis (RO) plant for potable water supplies;
- Is surplus to operations and therefore disposed in accordance with Ministerial Statement 964.

### Mine Water Settling Pond

All mine dewatering will be discharged directly to the MWSP, where solids will be removed, prior to discharging either into the processing water circuit, or for disposal (Evaporation Basin, disused pits or Evaporators). Dewatering will be in-sumps, which will move as required. be constructed from compacted clays sourced on-site.

The MWSP will be an above-ground facility with a total footprint of approximately 9.2 hectares, designed to store benign groundwater from open-pit dewatering. It will consist of three cells:

- Cells 1 & 2: Constructed for Year 1 operations (Months 1–11), combined footprint ~5.35 ha, each with a storage capacity of ~29,500 m<sup>3</sup>.
- Cell 3: Constructed by Month 11, footprint ~3.85 ha, storage capacity ~55,000 m<sup>3</sup>.

### Design Features:

- Embankments: Crest RL 24.5 m, max height 3.5 m, slopes 1V:2H, crest width 14 m with 2% crossfall, safety windrows (1.5 m high), and 100 mm gravel sheeting for an 8 m running surface.
- Freeboard: 1.2 m (0.7 m rainfall + 0.5 m wave run-up) for a 1:1000 AEP, 72-hour event; MOL at RL 23.3 m.
- Foundation & Liner: The basin will be reworked to a depth of 0.3 m (ripped, moisture conditioned, and compacted) and lined with a 0.3 m thick clay layer. Laboratory testing of remoulded compacted samples indicates very low permeability, with saturated hydraulic conductivity in the range of  $1 \times 10^{-11}$  to  $1 \times 10^{-10}$  m/s, consistent with triaxial test results (typically  $1.9 \times 10^{-11}$  to  $8.1 \times 10^{-11}$  m/s).
- Cut-off trench: 3 m wide, 1 m deep beneath embankments, backfilled with compacted clayey mine waste.
- Drainage: Horizontal finger drains (3–6 m base, 1 m depth) with rockfill and geotextile to control seepage and maintain stability.
- A cut-off trench with a 4m wide base will be constructed beneath the Stage 1 perimeter embankment (Zone A) and backfilled with compacted clayey mine waste to capture horizontal seepage through the TSF. The trench will be excavated to a nominal depth of 2m below the stripped ground level with side-cut batters of 1:1.5 (V:H).
- Erosion Protection: Riprap layer ( $\geq 0.3$  m thick) over geotextile on upstream embankment faces.
- Access Ramp: Internal ramp for sediment removal, crest width 14 m, gradient 1V:8H, safety bunds 1.5 m high.
- Monitoring: Four groundwater monitoring bores around MWSP; levels measured monthly, water quality sampled annually (metals, pH, TDS). As shown in Figure 5.

### Operational Considerations:

- MWSP provides capacity for at least five days of pumping flow under revised rates.
- Water will settle solids before discharge to the process water circuit or disposal (evaporation basin, disused pits, evaporators).

### Water Balance

At peak operations (being years 3 – 6), modelled water use is consistent at approximately 1.8 GLpa. The average surplus water from mine dewatering (that is, water that is not required for use in mining operations) is estimated at 1.4 GLpa, however this fluctuates between 0.9 GLpa and 2 GLpa. Based on this, the options of the disused pits or the evaporators are ancillary and

back-up solutions. A summary of the project water balance is shown in Table 15.

**Table 8: Summary of Project Water Balance (kLpa)**

Period	Pit Dewatering	Site Operational Water Needs	Excess Water (Discharge)
1	1,897,802	897,249	1,000,553
2	2,758,842	1,139,685	1,619,157
3	2,722,123	1,774,926	947,197
4	3,887,879	1,843,817	2,044,062
5	3,375,518	1,906,243	1,469,275
6	3,701,681	1,891,221	1,810,460
7	2,243,515	1,305,920	937,595
<b>TOTAL</b>	<b>20,587,358</b>	<b>10,759,059</b>	<b>9,828,299</b>
<b>Average</b>	2,941,051	1,537,008	1,404,043
<b>Maximum</b>	3,887,879	1,906,243	2,044,062

Evaporation Basin

The preferential disposal pathway for surplus water is via the evaporation basins. Up to 250ML/month (annualised to 3GLpa) will be directed to the evaporation basin. Surplus water greater than this value will be directed to disused mine pits, or evaporators. Evaporators are considered as an alternative solution in periods where excess water cannot be managed under other measures.

The Evaporation Basin will be an uncleared area of 90 ha between the it crests and perimeter embankment.

The Evaporation Basin will be formed by constructing perimeter embankments to a nominal height of 1 m. The basin area will be grubbed of vegetation, but no topsoil will be removed. The basin area will not be lined, allowing for point source infiltration of discharged water within the basin footprint.

Water will discharge into the basin area via open pipe. A magnetic magflow will be installed at the discharge point to meter volumes into the basin. Water will pass over rip-rap (rocky) material to reduce velocity and allow sediment to fall out of suspension. Water will then flow overland through the basin area and will remain in situ where it will evaporate over time.

The basin discharge area is sufficiently large and self-contained to allow all water to evaporate or infiltrate in situ without producing run-off.

Natural Soil Conditions: Data indicates the site soils are of low permeability, with the upper 1 m of greyish-brown cracking clays having a permeability of approximately  $2.66 \times 10^{-8}$  m/s, and deeper brown clays (>1.1 m) around  $3.82 \times 10^{-8}$  m/s. Saturated hydraulic conductivity for these layers is estimated at  $2 \times 10^{-8}$  to  $4 \times 10^{-8}$  m/s, suggesting very slow drainage. Some infiltration may occur along preferential pathways formed by surface cracks, particularly during dry periods and initial inflows.

Engineered Liner: The basin will include a 0.3 m thick compacted clay liner, with laboratory testing of remoulded clays indicating very low permeability, in the range of  $1.9 \times 10^{-11}$  to  $8.1 \times 10^{-11}$  m/s, ensuring seepage control.

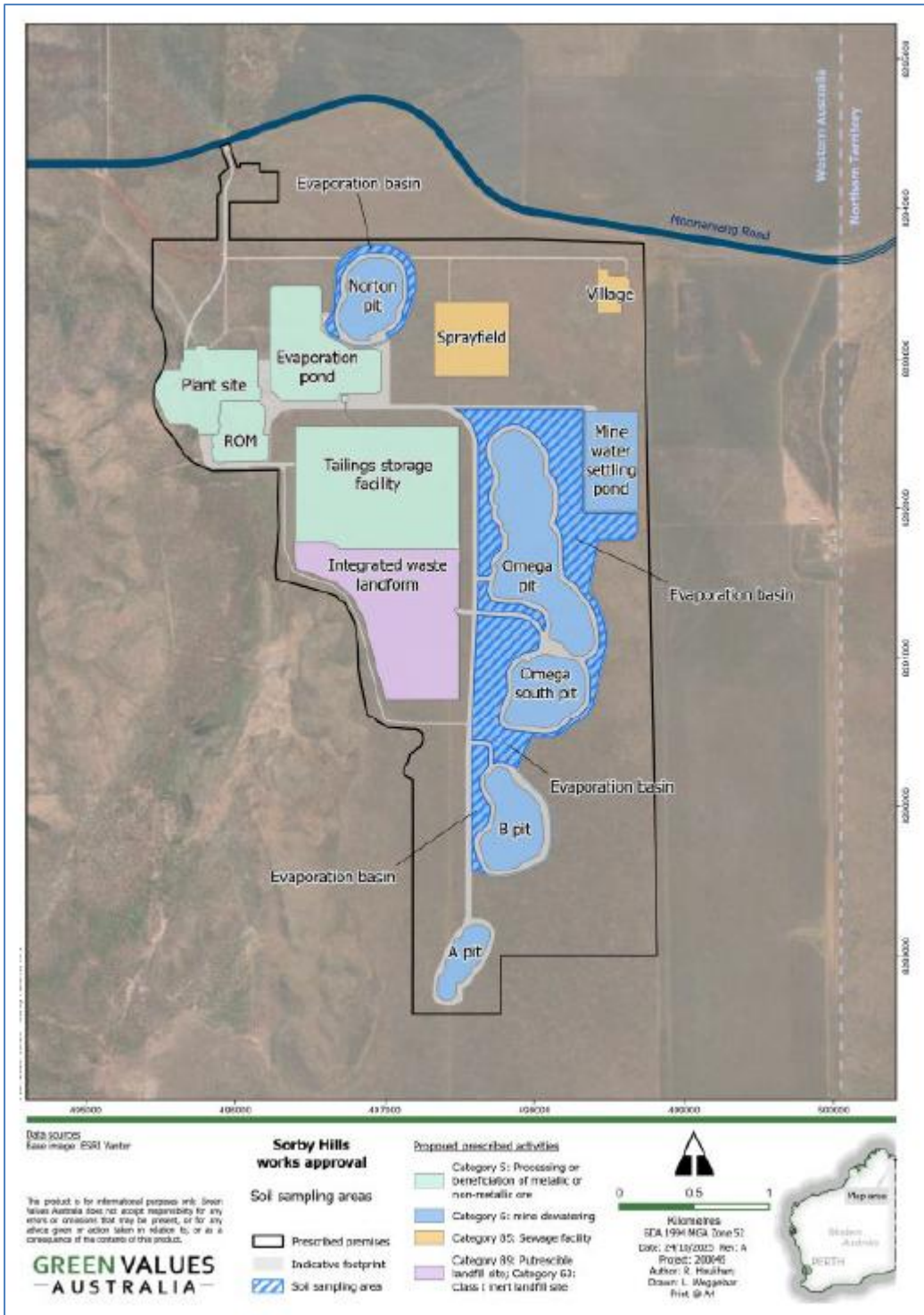
Water will infiltrate the heavy clays associated with the top 2 m of soils. The static water level for the Project area sits within the range of 8-13 mbgl, which is predicted to decrease during operations as a result of dewatering activities for mining. As such, a minor change may occur to the hydrology in the surface soils; however, it will be unlikely to result in any adverse impact on the receiving environment and will be contained in the evaporation basin footprint.

The low soil permeability, in conjunction with the high evaporation rates typical of the Project area suggest that it is highly unlikely that a substantial volume of the water discharged to the evaporation basin will have the capacity to infiltrate to groundwater in the surficial aquifer. It is expected that the majority of discharged water will evaporate and that potential impacts to the underlying hydrology will be negligible. Regular soil and groundwater monitoring will be undertaken throughout operations to confirm ongoing negligible impacts to the environment.

Soil sampling will be undertaken within the evaporation basin, as per Table 9 and shown in Figure 9. Samples will be taken at 6 locations quarterly to measure soil/sediment quality and health. The locations will be determined randomly and will be dependent on the discharge locations.

**Table 9: Evaporation Basin Planned Soil Quality Sampling**

Location	Parameters	Monitoring Frequency
Soil/sediment monitoring – 6 x random locations, in close proximity to water discharge.	pH, TDS, Total Soluble Salts, Moisture Content, filtered metals	Quarterly



**Figure 9: Soil monitoring locations**

Disused Pits

Water will discharge into the basin area via open pipe. A magnetic magflow will be installed at the discharge point to meter volumes into the basin.

Evaporators

The evaporators are proposed to be located along the embankment crest of the Evaporation Pond. In the scenario where evaporators are required, excess water will be pumped into the evaporation pond from the dewatering circuit. This excess water will then be pumped through

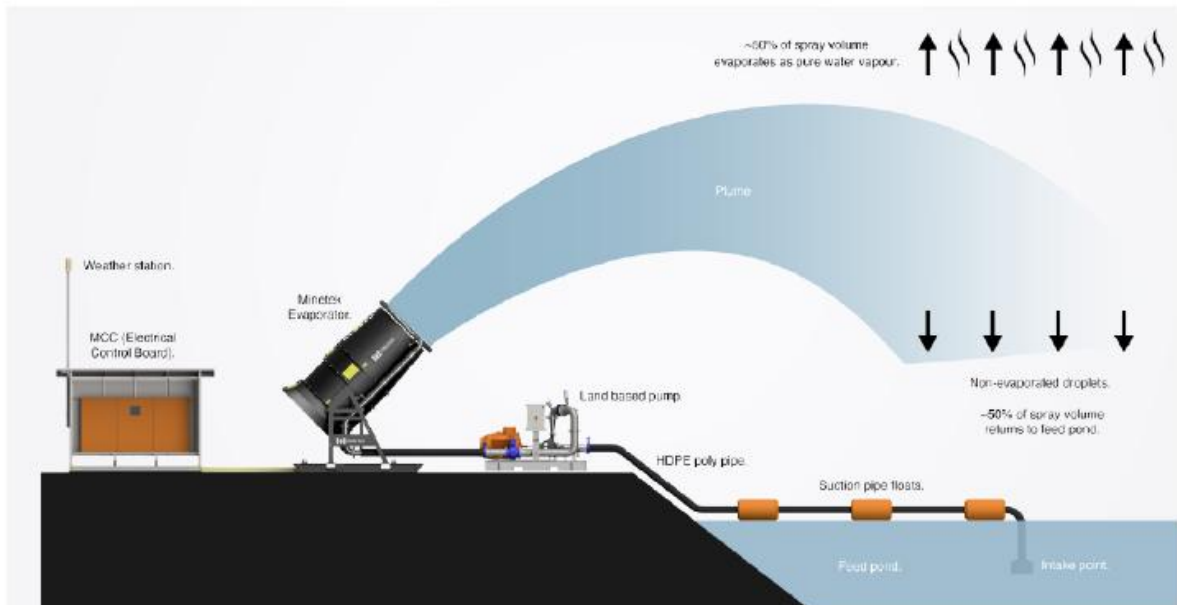
the evaporators.

This excess water will then be pumped through the evaporators. The evaporators work at 50% efficiency, being for every 10L pumped through the evaporators, 5L will be evaporated and the remaining will return to the pond

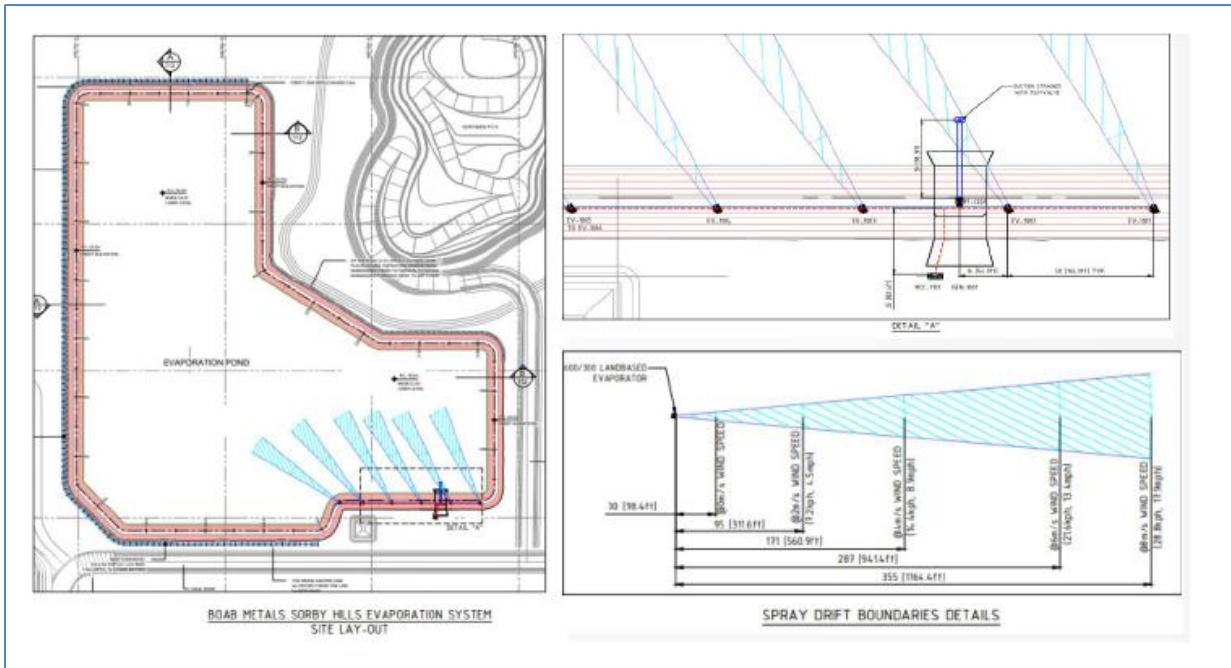
It is intended to install Nine (9) x 600/300 evaporators (or equivalent), rated at 37.5 L/s per unit at 10 bar. This installation is sufficient to evaporate up to 5.3G/a.

With the discharge to the evaporation basin and disused pits, the use of the evaporators will serve more as a contingency measure should weather conditions or volume constraints affect the utilisation of the water storage structures.

Refer to Figure 10 for Diagrammatic representation of evaporator system and Figure 11 for Evaporator system layout.



**Figure 10: Diagrammatic representation of evaporator system**



**Figure 11: Evaporator system layout**

### Mine Dewatering Water Quality

Water quality is in the TDS range of 500 – 1,500 mg/L and parameters arsenic, lead and zinc exceed the Interim Local Trigger Values (ILTV) guidance values used by the Ord River Irrigation Scheme (ORIA).

Groundwater water quality was assessed against both the Draft Water Quality for Irrigation and General Water Uses guidelines, as well as the Interim Local Trigger Values (ILTV) developed for the Lower Keep River. The ILTV are the guidance values used by the ORIA, managed by DPIRD, for environmental discharge to the creek line system. None of the groundwater results exceeded default long-term guideline values for metals or metalloids published by ANZECC in January 2024. Groundwater data are shown in Table 10 and indicate potential exceedances against the ILTV guideline criteria for arsenic, lead and zinc. It should be noted that ILTV considers direct discharge to a watercourse, whereas the Project proposes discharge to an engineered Evapotranspiration Basin.

### Water Treatment – Multimedia Filtration Units

Water is proposed to be treated through a water treatment plant, designed specifically to remove metals, via a Multimedia Filtration Units (MFU). Although the water samples completed to date show that water quality is below the ANZECC long-term irrigation values, a treatment system is considered appropriate as a safeguard mechanism to ensure that water quality is maintained below a suitable threshold. MFUs are designed to remove suspended solids and metal ions present in the feed water. The treatment system has a layer of oxidative media, that promotes stronger oxidation than molecular oxidation and ordinary oxidants.

In essence, the oxidants and the media work together to oxidize a dissolved solid into a suspended solid that is then filtered out in the media bed. If an element can't be oxidized and precipitated the media can't remove it. The media "helps" chemical reactions to occur by interacting with the oxidation reaction without being permanently altered (Aquasol, 2023).

Backwash water (which has the potential to have elevated levels of metals, sediments, and salts) will be returned to the Process Plant tailings hopper for discharge with the tailings. Where water is to be used for potable purposes, Reverse Osmosis (RO) will also be used to ensure suitable Total Dissolved Solids (TDS) levels are achieved.

Water will be treated through two stages: firstly, water collected from in-pit sumps will be pumped to a sedimentation basin to remove suspended solids; and secondly through a Metal Filtration Media (MFM) unit. The intention of the MFM unit is to further reduce metals via adsorption within a filtration system, further removing any pollutants from impact on the environment. This is considered a safeguard mechanism to ensure that water quality is maintained below a suitable threshold.

No treatment of TDS is proposed. Although the discharge water is likely to be above the ILTV values as outlined in Table 2-6, the salinity of surplus dewatering water is not expected to exceed recent draft ANZECC guideline values for long term irrigation of sensitive to moderately sensitive crops.

Water treatment - Reverse Osmosis (RO) Plant

A small RO plant for the potable water purposes has been proposed. The RO plant design throughput is 0.15GL/a (below the threshold for Category 85B). This will result in approximately 0.03GL/a of brine per year (or 8kL/d). Brine is to be reused as dust suppression. As very minimal brine will be produced each day, it will be diluted with dewatering water and used for dust suppression purposes.

Dilution of RO plant outflow will likely occur within tanks whereby RO water will be diluted with raw dewatering effluent (raw water tanks), reducing water quality constituents before any reuse for dust suppression.

Water feed and outflow values for the proposed MFU and RO plant are shown in Figure 9 below (source: Water Treatment Assessment (Aquasol, 2024, as provided in the additional information from Boab Metals, 26 November 2025 – RFI response).

Parameter	Units	Feed Water Values		MFU Outflow	Reverse Osmosis Outflow
		Design	Average	Design	Design
TDS	mg/L	1,200	860	<1,000	<250
Pb	mg/L	0.099	0.019	<0.0001	<0.0001
Zn	mg/L	1.6	0.6	<0.005	<0.0005
Fe (tot)	mg/L	0.3	0.09	<0.005	<0.001
Mn	mg/L	0.31	0.079	<0.010	<0.005
Mo	mg/L	0.019	0.004	<0.010	<0.005
Cl	mg/L	327	115	<300	<130

**Figure 12: Feed water and outflow water values for the proposed MFU and RO Plants**

**Key findings:**

- 1) As the MFU and RO plants have linkages to proposed emissions and discharges at the premises they will be included in conditions of the works approvals for the construction and operational aspects (directly related activity).
- 2) Limited information has been provided on the management of the proposed RO Plant brine waste stream. The following information has been provided:
  - The project will have a small RO system of 0.15 GL/a onsite for the treatment of the water supply to meet drinking water requirements.
  - As the water is slightly brackish (800 – 1600mg/L TDS) minor treatment will be required to meet aesthetic guidelines under Australian Drinking Water Guidelines

(ADWG) (being less than 500 mg/L, target is 240mg/L).

- Commonly, RO systems have a 20% brine (reject) amount, and therefore based on the input water quality parameters, reject TDS would likely be in the range of 8,000mg/L TDS.
- The proposal will likely need approx. 45kL/d for drinking water, which would equal approx.. 9kL/d of brine water being produced; project dust suppression needs are approx. 1,000 kL/d. As such the brine water will be diluted to be approx. 1% of the total dust suppression needs
- Brine will be directed to the dust suppression water tank for operational reuse. Both dewatering water and brine will be metered prior to use. TDS concentrations within the dust suppression tank will be routinely monitored. An operational TDS trigger level of 5,000 mg/L will be applied. Where TDS concentrations exceed this level, water within the tank will be further diluted (shandied) prior to use for dust suppression to ensure suitability for application.

Table 10: Mine dewatering water quality

Parameter	Unit	EQL	Long term irrigation	ANZECC 99 <sup>th</sup> %tile freshwater ecosystem	IVLT K4 Pool Dry	IVLT K4 Pool Wet	21_01_PB	21_01S_PB	21_02_PB	21_03_PB	21_04_PB	21_05_PB	21_05S_PB
Ammonia as N	mg/L	0.01	-	-	3200	3200	<0.01	0.05	<0.01	<0.01	0.03	<0.01	<0.01
Chloride	mg/L	1	-	-			138	118	105	295	163	89	180
Electrical Conductivity	µS/cm	1	-	-	850	290	1180	1040	1220	2050	16710	1440	1730
Mercury	mg/L	0.0001	0.002	-	0.00006	0.00006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium	mg/L	0.01	5	0.027	0.068	0.544	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/L	0.001	0.1	0.001	0.001	0.001	0.004	0.001	0.008	0.012	0.003	0.003	0.003
Cadmium	mg/L	0.0001	0.01	0.00006	0.0003	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0003	<0.0001
Chromium (III+VI)	mg/L	0.001	0.1	0.033	0.00004	0.00002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.001	2	0.001	0.0098	0.0019	0.020	0.005	0.099	0.004	<0.001	<0.001	<0.001
Manganese	mg/L	0.001	0.02	1.2	1.2	1.20.005	0.124	0.256	0.023	0.043	0.020	0.060	0.028
Selenium	mg/L	0.01	2	0.005	0.005	0.035	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	-	0.0024	0.035	0.00002	0.071	1.600	0.164	0.889	0.887	0.008	0.580
Silver	mg/L	0.001	-	-	0.00002	0.746	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ferrous Iron	mg/L	0.05	-	-	0.130		<0.05	0.28	0.16	0.06	<0.05	0.07	<0.05

Parameter	Unit	EQL	Long term irrigation	ANZECC 99 <sup>th</sup> %tile freshwater ecosystem	IVLT K4 Pool Dry	IVLT K4 Pool Wet	21_01_PB	21_01S_PB	21_02_PB	21_03_PB	21_04_PB	21_05_PB	21_05S_PB
Cations Total	mg/L	0.01	-	-	-	-	13.3	12.0	14.5	22.4	19.6	17.0	20.3
Anions Total	mg/L	0.01	-	-	-	-	12.6	11.8	13.4	22.7	18.9	16.6	19.7
Ionic Balance	%	0.01	-	-	-	-	2.50	0.67	3.90	0.47	1.90	1.36	1.57
Silicon as SiO <sub>2</sub>	mg/L	0.01	-	-	-	-	22.1	22.3	20.1	21.2	20.4	18.6	39.4
Silicon	mg/L	0.1	-	-	-	-	10.30	10.40	9.39	9.90	9.54	8.68	18.40
Calcium	mg/L	0.05	-	-	-	-	96	94	95	106	108	113	124
Magnesium	mg/L	1	-	-	-	-	52	49	58	71	82	72	86
Potassium	mg/L	1	-	-	-	-	4	4	4	4	4	6	4
Sodium	mg/L	1	-	-	-	-	95	73	112	258	170	122	160
Hardness as CaCO <sub>3</sub>	mg/L	1	-	-	-	-	454	436	476	557	607	579	664
Nitrate as N	mg/L	0.01	-	-	-	-	<0.01	0.07	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrogen	mg/L	0.01	-	-	-	-	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate as N	mg/L	0.01	-	-	-	-	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pH	pH units	0.01	-	-	-	-	7.77	7.78	7.78	7.73	7.59	7.76	7.76
Sulfate	mg/L	1	-	-	-	-	86	72	130	336	214	226	211

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Parameter	Unit	EQL	Long term irrigation	ANZECC 99 <sup>th</sup> %tile freshwater ecosystem	IVLT K4 Pool Dry	IVLT K4 Pool Wet	21_01_PB	21_01S_PB	21_02_PB	21_03_PB	21_04_PB	21_05_PB	21_05S_PB
Total Dissolved Solids	mg/L	10	-	-	-	-	654	573	697	1250	981	854	1040
Phosphate	mg/L	0.1	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

### 2.2.4 Category 63 Class I Inert Landfill Site

The Class I Inert Landfill Site will be located within the footprint of the Integrated Waste Landform for the purposes of disposing of used tyres (inert waste type 2). Used tyres will be placed within the waste rock landform footprint so that they can be disposed of as part of the progressive development of the landform.

Burial of used tyres will be in accordance with the *Environmental Protection Regulations 1987* where used tyres must be buried under a final soil cover of minimum 500 mm:

- In batches separated from each other by at least 100 mm of soil and each consisting of no more than 1,000 whole tyres; or
- In batches separated from each other by at least 100 mm of soil and each consisting of no more than 40 m<sup>3</sup> of tyres reduced to pieces.

Total amount of tyres disposed of annually is approximately 1,500.

Stormwater measures will be implemented so that any potentially contaminated stormwater is contained within the landfilling area and/or redirected to a containment sump. The landfilling area will be a minimum of 3 m above the highest level of the water table.

### 2.2.5 Category 85 WWTP

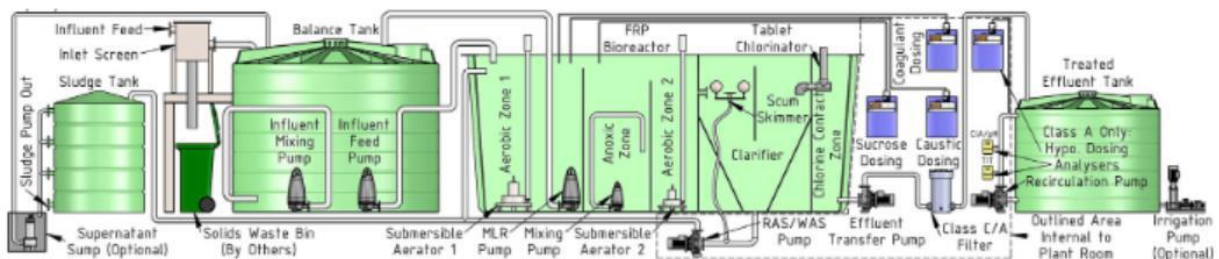
The Wastewater Treatment Plant (WWTP) has a capacity of up to 40 m<sup>3</sup>/day and is designed to treat sewage to achieve Class C treated effluent. It is modular and containerised consisting of the following components:

- Raw wastewater / balance tank;
- Sequencing Batch Reactor (SBR) within a sea container;
- Treated wastewater tanks;
- Sludge tanks; and
- A series of pumps, screens, diffusers, blowers and mixers to transfer and process the wastewater.

The key treatment process steps are:

- Influent screening;
- Balance tank mixing;
- Anoxic and aerobic treatment for nitrification and denitrification;
- Clarification;
- Effluent disinfection (chloring tablets); and
- Bag filtration.

Refer to Figure 13 for WWTP Schematic.



**Figure 13: WWTP Schematic**

Refer to Table 11 for WWTP characteristics.

**Table 11: WWTP Inputs and Outputs**

Parameter	Input range	Effluent output specification
Biological oxygen demand (BOD), mg/L	300 - 500	<5
Escherichia coli / thermotolerant coliforms, cfu / 100 mL	10 <sup>6</sup> - 10 <sup>8</sup>	<1000
Total nitrogen, mg/L	50 - 80	<15
Total phosphorus, mg/L	15 - 30	<8
Total Suspended Solids, mg/L	300 - 500	<5
pH, pH units	6.5 – 8.5	6.5 – 8.5
Electrical conductivity, dS	-	<1500
Sodium adsorption ratio	-	<15
Residual chlorine, mg/L	-	0.2 – 1

The WWTP will produce treated effluent, which will be disposed of to a 1.5 hectare Irrigation Area. The Irrigation Area will have signage, cattle fencing, be constructed above 10 % AEP rainfall event; as such, the sprayfield will be constructed 1.1m above ground level using uncrushed rock from the site quarry.

Water Quality Protection Note 22 loading rates for TN and TP will be met with 1.5 ha Irrigation Area.

Due to the construction works, the area will be re-seeded using species of local provenance, prior to the spray field being operational. The Applicant has stated that any remnant vegetation within the area is suitable for use within the sprayfield, in particular *Bauhinia cunninghamii*, *Terminalia volucris*, *Excoecaria parvifolia* and *Atalaya hemiglauca*, *Themeda triandra*, *Ophiuros exaltatus* or *Panicum*, *Flemingia pauciflora*, *Commelina* spp., and *Cyperus bifax* shrubs and sedges.

Other species that could be used include groundcovers and grasses such as *Imperata cylindrica* (Blady Grass), *Lomandra longifolia* (Spiny-headed Mat-rush), *Pennisetum alopecuroides* (Swamp Foxtail Grass) and *Carex appressa* (Tall Sedge).

Shrubs and Small Trees that are suitable are *Melaleuca viridiflora* (Broad-leaved Tea-tree), *Leptospermum liversidgei* (Olive Tea-tree) and *Melaleuca quinquenervia* (Broad-leaved Paperbark).

Two groundwater monitoring bores will be located adjacent to sprayfield.

### 2.2.6 Category 89 Putrescible Landfill

The landfill will be located within the footprint of the Integrated Waste Landform (IWL) and constructed and operated in accordance with the *Environmental Protection (Rural Landfill) Regulations 2002*. It will have a capacity of 1,000 tonnes per annum.

The waste types to be accepted include:

- Clean Fill;

- Putrescible Wastes;
- Inert Waste Type 1; and
- Uncontaminated Fill.

The total annual volume of waste to be accepted is 1,000 tonnes. Records of the type and volume of waste to be disposed of in the landfill will be kept to ensure the annual cumulative waste volume is compliant with the Prescribed Premises Category limit, and no unauthorised waste is disposed of in the landfill.

Trenches will be no greater than 30 m in length, 2 m width and 2 m depth and signposted to indicate what waste types can be disposed of within the trenches. The trench base will be a minimum of 3 m above the groundwater table, which naturally sits at an average of 8-13 mbgl across the Project. Fauna and stock access to the facility will be restricted via the installation of barricades, such as windrows or fencing.

Waste will be covered with dense, inert and incombustible material fortnightly, at a minimum. Monthly pick-ups of waste that may have potentially been washed or blown away from the tipping area will be conducted, with all waste collected returned to the tipping area.

The location of the landfill within the IWL will ensure that the facility sits above the natural topography, outside of the path of surface water flows and flood risk areas within the Prescribed Premises. Landfill trenches will be constructed within each subsequent lift of the IWL.

Stormwater management for the landfill will capitalise on the drainage features installed for the IWL, whereby surface water on the IWL is directed into a seepage pond.

### 2.2.7 Bioremediation facility

A small bioremediation facility will also be situated in the landfill area situated within the IWL footprint.

#### Key findings:

1) Limited details have been provided on the proposed bioremediation facility. As the proposed activity relates to treating impact soils recovered from within the premises (i.e. not received from off-site) a separate prescribed premises category does not apply (i.e. Category 61A). Notwithstanding this, the activity will be subject to regulation under Part V of the EP Act as a 'directly related activity'.

2) Bioremediation facilities should incorporate contemporary emission and control systems and as such the following controls will be imposed in conditions of the works approval:

- Signage; site to be appropriately marked with signage to prevent unauthorised access and include contacts in the event of an incident or emergency.
- Control of leachate: lined with 0.5 m thick clay liner with a hydraulic conductivity of  $1 \times 10^{-9}$  m/s.
- Control of leachate and stormwater: bunds to contain stormwater within the facility and intercept and divert the flow of stormwater away from the material being treated.
- Treatment footprint should be graded to allow surface water and leachate to drain to a low-point (sump) for collection/evaporation.

## 2.3 Part IV of the EP Act

The Sorby Hills Silver Lead Zinc Mine and Wyndham Port (mine and port referred to as the Project) were referred to the EPA in March 2011 (CMS17578). On 13 February 2012, the EPA determined that the Project should be assessed under Part IV of the *Environmental Protection*

Act 1986. The assessment process recommended by EPA was a Public Environmental Review. The project was approved subject to Ministerial conditions, [Ministerial Statement 964](#), on the 02 April 2014. A subsequent [Ministerial Statement 1097](#) was granted on 27 May 2019. Ministerial Statement 1097 extends the time limit for substantial commencement of the project to 02 April 2024.

The following Environmental Factors were considered under Part IV of the EP Act:

- (a) Flora and vegetation;
- (b) Human health;
- (c) Marine environmental quality; and
- (d) Closure and rehabilitation.

## 2.4 Water Services

The Applicant currently holds GWL202494(1) for the take of 70,000kL from the Canning-Kimberley Bonaparte-Alluvial Resource, GWL213014(1) for the take of 800,000kL from the Canning-Kimberley Bonaparte – Alluvial Resource and GWL213015(1) for the take of 5,700,000kL from the Canning-Kimberley Bonaparte – Limestone Resource.

To support this application, the Applicant was issued CAW205857 to allow for the construction of five production bores, this licence to construct a well expired in 2023.

If the Applicant needs to drill further production bores, they will require a new licence, however, a licence is not required for drilling of monitoring bores.

The Applicant does not hold a bed and banks permit. Generally, on mining tenure a bed and banks permit is only required by a mining company if it is associated with the take of water (i.e. a surface water licence).

The application is within the Ord Irrigation Area. Impacts to water quality and changes in land uses should not be significant, provided the Applicant implements the management measures proposed to mitigate contaminated surface water and groundwater.

## 2.5 Hydrogeological Technical Review

The TSF design was provided to DWER's Senior Hydrogeologist for technical review, with the following recommendations:

- The proposed locations of monitoring bores near the TSF are considered to be reasonable. However, due to the risks that some shallow seepage from the TSF could bypass lateral seepage controls, and that significant groundwater mounding would take place near the facility, it is recommended that additional shallow monitoring bores with short screened-intervals are installed at the water table at each of these monitoring sites
- Shallow monitoring bores should be installed at various locations downgradient of the TSF to assess the risk of seepage from the facility could bypass the cut-off trench and could be transported in shallow groundwater flow towards environmental receptors. If this monitoring were to indicate that excessive seepage was bypassing seepage controls, additional recovery bores or interception trenches may need to be constructed near the TSF; and
- Implement measures to discourage birds from visiting the TSF and TSF Evaporation Pond due to the tailings seepage from the TSF likely to contain a suite of metals and metalloids at levels that will potentially be of environmental concern. The environmental receptors of most immediate concern for contaminants from this seepage will be birdlife. This is because some birds would be likely to periodically visit the proposed seepage storage and evaporation ponds to feed on mosquito larvae and other aquatic insects that would probably inhabit the ponds due to the relatively low salinity of the seepage water. Suitable suite of geotechnical and geochemical tests has been undertaken on tailings materials..

## 3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

### 3.1 Source-pathways and receptors

#### 3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction / operation which have been considered in this decision report are detailed in Table 12 below. Table 12 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

**Table 12: Proposed applicant controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Construction</b>			
Dust	Movement of machinery / vehicles on roadways and construction and installation of infrastructure	Air / windborne pathway	<ul style="list-style-type: none"> <li>• Minimise clearing of vegetation as far as practicable;</li> <li>• Only clear areas as required to reduce areas susceptible to dust lift-off;</li> <li>• All vehicles on site are to be confined to designated routes with speed limits enforced;</li> <li>• Dust suppression during construction activities;</li> <li>• Dust suppression will be actively employed during the reclaiming and transfer of historical tailings; and</li> <li>• Implementation of a dust monitoring program using installed dust monitors on site as per Figure 3.</li> </ul>
Noise	Machinery and vehicles constructing and installing equipment	Air / windborne pathway	<ul style="list-style-type: none"> <li>• Ensure construction activities are carried out in accordance with AS 2436-2017 (Guide to Noise Control on Construction, Maintenance and Demolition Sites);</li> <li>• Ensure machinery and mobile equipment is appropriately operated by competent and trained operators to minimise excess noise and vibration;</li> <li>• Ensure internal combustion engines are fitted with a suitable muffler in good repair;</li> <li>• Use new generators with modern noise suppression devices attached;</li> <li>• Regularly service and maintain vehicles, plant, equipment and generators to maintain an appropriate sound power level; and</li> <li>• Ensure internal combustion engines are fitted with a suitable muffler in good repair.</li> </ul>
Hydrocarbons / Chemicals	From use onsite during construction	Direct discharges	<ul style="list-style-type: none"> <li>• Storage is to be in accordance with AS/NZS 1940:2017 (as amended, 2019 and 2021) and AS3833:2024 The storage and handling of mixed classes of dangerous goods;</li> <li>• All hydrocarbons and chemicals will be stored within bunds;</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<ul style="list-style-type: none"> <li>• Transfer points will be secondarily contained;</li> <li>• Conduct weekly inspections of storage areas to identify any leaks or issues;</li> <li>• Maintain an up-to-date inventory of hydrocarbons and other dangerous goods in storage and their quantities;</li> <li>• Provide a suitable level of training to staff and contractors identified to be involved in hydrocarbon or dangerous goods use, storage and disposal;</li> <li>• Implement and communicate spill management and reporting procedures;</li> <li>• Spill kits will be placed in proximity to areas of high hydrocarbon usage and within service vehicles;</li> <li>• Implement a spill response procedure; and</li> <li>• Surface water quality monitoring following rainfall events, including pH, TDS, turbidity, surfactants (detergents), petroleum hydrocarbons, benzene, toluene, ethyl benzene, xylene (BTEX), dissolved metals (Pb, Ni, Zn, Ag) and major cations and anions, with discharge limits set.</li> </ul>
<b>Category 5 Ore Processing Facility</b>			
<b>Commissioning and Operations</b>			
Dust	Crushing of material, vehicle movements, lift-off from stockpiles and/or stored product, earthworks etc.	Air/windborne pathway	<p>Dust controls:</p> <ul style="list-style-type: none"> <li>• Dust control will be achieved using high-pressure water fogging sprays installed over the ROM bin to form a mist and capture the fugitive dust particles. The ROM bin water sprays will operate automatically: water sprays will activate when a front-end loader tips into a bin and cease when the front-end loader departs beside the bin;</li> <li>• Four dust collectors: <ul style="list-style-type: none"> <li>➢ Primary Crusher Dust Collector (Ducted system to reverse pulse dust collector);</li> <li>➢ Crushed Ore Bin Dust Collector 1 (Horizontal Insertable Dust Collector);</li> </ul> </li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<ul style="list-style-type: none"> <li>➤ Crushed Ore Bin Dust Collector 2 (Ducted system to reverse pulse dust collector); and</li> <li>➤ Concentrate Shed Dust Collector (Ducted system to reverse pulse dust collector);</li> <li>• Baghouse Dust Collection systems include the following key elements:               <ul style="list-style-type: none"> <li>➤ Interchangeable filter bags suitable for fine ore dust particles;</li> <li>➤ Air pulsation system with timer, compressed air piping, filter regulator and isolation valve;</li> <li>➤ ID fan, discharge dampers, motors and drive components;</li> <li>➤ Interconnecting ducting between dust collector, fan and up to including discharge stack including all supports and expansion joints as required;</li> <li>➤ Discharge stack complete with screen, rain guard, condensation drain and air quality test points; and</li> <li>➤ Dust collector hopper with interconnecting pipe chutework, automatic rotary valve and manually operated knifegate isolation valve;</li> </ul> </li> <li>• Insertable Dust Collection System has the following key elements:               <ul style="list-style-type: none"> <li>➤ Horizontal insert filter elements suitable for fine ore dust particles;</li> <li>➤ Air pulsation system with timer, compressed air piping; and</li> <li>➤ Filter regulator and isolation valve;</li> </ul> </li> <li>• Dust control at the primary crusher will be achieved using a dust collector unit drawing air from ore impact points and skirting along the conveyor. The collected dust will be mixed with process water as it discharges into the primary dust collector hopper;</li> <li>• Dust collector maintenance schedule with daily, weekly, monthly, quarterly, biannual and annual tasks;</li> <li>• Dust collector fans installed throughout OPF circuit;</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<ul style="list-style-type: none"> <li>• All drop points, conveyors and transfer points enclosed;</li> <li>• Foggers to prevent dusting at transfer points;</li> <li>• Well maintained conveyor scrapers to prevent carryback and consequent spillage beneath conveyors;</li> <li>• Dust control at the primary crusher will be achieved using a dust collector unit drawing air from ore impact points and skirting along the conveyor;</li> <li>• Product drying to shipping moisture specification will be achieved by means of a ceramic filter press (not by drying in an oven or kiln);</li> <li>• No lead concentrate will be stored in open stockpiles: concentrate storage/handling will be managed within a fully enclosed shed equipped with suitable ventilation and dust management measures;</li> <li>• Enclosed Rotabox or equivalent for transport and storage (at site and port);</li> <li>• Fugitive dust emissions will be minimised through the use of water sprays and misters on processing equipment and use of a water sprays on stockpiles as required;</li> <li>• Water cart on standby to assist with additional dust suppression if required;</li> <li>• Implementation of a dust monitoring program using installed dust monitors on site as per Figure 3; and</li> <li>• Soil monitoring in vicinity of OPF for evidence of contamination from lead laden dust.</li> </ul>
Noise	Running of machinery / equipment in processing of ores	Air/windborne pathway	<ul style="list-style-type: none"> <li>• Operational activities are to comply with the relevant provisions of the <i>Environmental Protection (Noise) Regulations (1997)</i>;</li> <li>• Use new generators with modern noise suppression devices attached;</li> <li>• Regularly service and maintain vehicles, plant, equipment and generators to maintain an appropriate sound power level;</li> <li>• Ensure machinery and mobile</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>equipment is appropriately operated by competent and trained operators to minimise excess noise and vibration; and</p> <ul style="list-style-type: none"> <li>• Ensure internal combustion engines are fitted with a suitable muffler and are in good repair.</li> </ul>
Contaminated water	<p>Stormwater that has the potential to flow through the site and become contaminated</p> <p>Process water within bunded areas</p>	Direct discharges	<ul style="list-style-type: none"> <li>• The OPF will be established on a constructed fill platform to reduce the risk of entrainment of materials in the event of a flood;</li> <li>• The processing plant will be bunded to minimise potentially contaminated runoff;</li> <li>• All other areas associated with the OPF and ROM pad will be directed to the stormwater retention sump within the Processing Plant area;</li> <li>• Diversion drains will be installed around the plant site to direct surface water around the hardstand areas;</li> <li>• Potentially contaminated stormwater will be directed to sumps where it will be pumped;</li> <li>• Post-storm event, water within the stormwater retention sump will be pumped back into the process water circuit via the process water tank, the pumps associated with the stormwater retention sump will be sufficiently sized to transfer the volume of the sump to the process water tanks within a 24-hour period;</li> <li>• Pumps will include an automatic shut-down system should variances be detected between the inflow and outflow of the pipeline that indicate a potential leak;</li> <li>• Any faults and alarms will be automatically sent to the control room for immediate investigation;</li> <li>• ROM run-off or seepage from the stockpiled materials will be intercepted by a lined drainage channel and pumped to the process circuit;</li> <li>• A sump pump will be located within the concentrate thickener bunded area to assist with spillage clean-up. Any slurry spillage will be returned to the</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>concentrate thickener;</p> <ul style="list-style-type: none"> <li>• The flotation circuit and filter press will be contained within covered concrete bunded areas;</li> <li>• Any spillage from the grinding and classification circuit will be contained within a bunded concrete slab beneath the mills. Three centrifugal sump pumps will assist with clean up. All sump pump slurry will be returned to the mill discharge hopper;</li> <li>• Well maintained conveyor scrapers to prevent carryback and consequent spillage beneath conveyors;</li> <li>• Wheel wash to prevent concentrate being tracked onto roads;</li> <li>• Facilities managed in accordance with the Department of Water's (DoW) Water Quality Protection Note: Stormwater Management at Industrial Sites (DoW, 2002); and</li> <li>• Surface water quality monitoring following rainfall events, including pH, TDS, turbidity, surfactants (detergents), petroleum hydrocarbons, benzene, toluene, ethyl benzene, xylene (BTEX), dissolved metals (Pb, Ni, Zn, Ag) and major cations and anions, with discharge limits set.</li> </ul>
Hydrocarbons / Chemicals	Refer to Table 1	Direct discharge from transfer or overtopping	<ul style="list-style-type: none"> <li>• Storage is to be in accordance with AS/NZS 1940:2017 (as amended, 2019 and 2021) and AS3833:2024 The storage and handling of mixed classes of dangerous goods;</li> <li>• Hydrocarbon and chemical storage areas will be bunded;</li> <li>• Hazardous chemicals, fuel and other hydrocarbons shall be bunded as per the requirements of AS1940-2017 Storage and Handling of Flammable and Combustible Liquids;</li> <li>• Conduct weekly inspections of storage areas to identify any leaks or issues;</li> <li>• Maintain an up-to-date inventory of hydrocarbons and other dangerous goods in storage and their quantities;</li> <li>• Implement and communicate spill management and reporting procedures;</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<ul style="list-style-type: none"> <li>• Provide a suitable level of training to staff and contractors identified to be involved in hydrocarbon or dangerous goods use, storage and disposal;</li> <li>• Fuel to be stored in self bunded tanks;</li> <li>• Fuel transfer points to be secondarily contained;</li> <li>• Spills will be cleaned up immediately once detected. Spill response kits will be readily available at each work area within the OPF; the OPF will be bunded to minimise runoff and contain spills. Where hydrocarbon spills occur outside of the OPF bunded area (e.g. failed hydraulic hose on haul truck) resulting in hydrocarbon-impacted soils, this material shall be excavated and removed to the bioremediation area;</li> <li>• Service vehicles to be fitted with spill kits;</li> <li>• Spill kits will be located in all chemical and fuel storage areas;</li> <li>• MSDS registers;</li> <li>• Approved chemical handling procedure;</li> <li>• Spill response training/procedure;</li> <li>• Inductions/toolbox training;</li> <li>• All chemicals are to be approved prior to dispatch to site;</li> <li>• Scheduled Inspections and Audits;</li> <li>• Incident reporting and investigations;</li> <li>• Contaminated soil will be disposed of at the bioremediation facility; and</li> <li>• Surface water quality monitoring following rainfall events, including pH, TDS, turbidity, surfactants (detergents), petroleum hydrocarbons, benzene, toluene, ethyl benzene, xylene (BTEX), dissolved metals (Pb, Ni, Zn, Ag) and major cations and anions, with discharge limits set.</li> </ul>
<p>Tailings containing elevations in Ag, As, Cd, Cr, Mn, Pb and Zn</p>	<p>Tailings thickener underflow</p>	<p>Direct discharge (and tailings reports to the TSF)</p>	<ul style="list-style-type: none"> <li>• Tailings characterisation test work completed.</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
<b>Pipeline and services corridor (Processing Plant to TSF and TSF Evaporation Pond)</b>			
<b>Commissioning and Operations</b>			
Tailings and decant water	Pipeline spills and leaks	Direct discharge from ruptures	<ul style="list-style-type: none"> <li>• Tailings characterisation test work completed;</li> <li>• Use of appropriate standard pipe and fittings;</li> <li>• Visual (routine) inspections are proposed every 12 hours when in operation to check integrity of the pipelines and bunding;</li> <li>• Pipelines fitted with leak detection and telemetry;</li> <li>• Provide automatic cutoffs in the event of a pressure drop in the pipeline;</li> <li>• Drop in pressure in delivery line will send hazard alert to the control room instrumentation;</li> <li>• Located inside bunded open trench to contain any spillage of materials resulting from pipes that develop leaks or burst during operation;</li> <li>• The trenches have been sized with sufficient capacity to completely contain any spills from pipeline leakage or breach for a period equal to the time between routine inspections;</li> <li>• Designated release valves with erosion controls in situ; and</li> <li>• Regular inspections of pipeline for damage.</li> </ul>
<b>Tailings Storage Facility</b>			
<b>Commissioning and Operations</b>			
Dust	Dried tailings from the surface of the TSF	Air/windborne pathway	<ul style="list-style-type: none"> <li>• Pipelines are commissioned using fresh water where possible;</li> <li>• Dedicated discharge points (sumps) established for test water; and</li> <li>• TSF is designed to remain wet during operations to minimise dust.</li> <li>• Daily inspections of the TSF will include an assessment of dust generated from the tailings;</li> <li>• Implementation of a dust monitoring program using installed dust monitors</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>on site as per Figure 3; and</p> <ul style="list-style-type: none"> <li>• Dust suppression of tailings using water carts, as required.</li> </ul>
<p>Tailings containing elevations in Ag, As, Cd, Cr, Mn, Pb and Zn</p>	<p>Overtopping of embankments</p>	<p>Direct discharges</p>	<ul style="list-style-type: none"> <li>• Dam is commissioned at reduced capacity (i.e. &lt;50%);</li> <li>• Continuous, in situ telemetry monitoring pond level; and</li> <li>• TSF will be capable of temporarily storing rainfall from a 1:1,000-year AEP, 72-hour storm event plus the wave run-up due to a 1:50-year AEP wind event with the provision made for an additional freeboard of 0.5 m;</li> <li>• TSF is operated with a designed freeboard of 0.5 m; and</li> <li>• Daily inspections of the facility to monitor for evidence of geotechnical instability and check freeboard level.</li> </ul>
	<p>Seepage</p>	<p>Infiltration through base and embankments</p>	<ul style="list-style-type: none"> <li>• TSF will be constructed with compacted clay base;</li> <li>• A nominally 0.5 m thick basin clay liner with a hydraulic conductivity of <math>1 \times 10^{-9} \text{m/s}</math> will be constructed over the prepared basin area;</li> <li>• The upstream embankment liner will comprise a roller-compacted zone of inactive clayey mine waste, forming a lower permeability zone (lined with 0.5 m thick clay liner with a hydraulic conductivity of <math>1 \times 10^{-9} \text{m/s}</math>);</li> <li>• Underdrainage water recovery system installed;</li> <li>• Gravity-driven under-drainage system (comprising central composite drains near the decant area and perimeter composite drains at nominally 10 m from the embankment upstream toe) was placed over the compacted clay liner;</li> <li>• A cut-off trench with a 4 m wide base will be constructed beneath the Stage 1 perimeter embankment (Zone A) and backfilled with compacted clayey mine waste to capture horizontal seepage through the TSF. The trench will be excavated to a nominal depth of 2 m below the stripped ground level, with side cut batters of 1:1.5 (V:H);</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
	Open and accessible TSF and TSF Evaporation Pond	Access via fauna ingestion	<ul style="list-style-type: none"> <li>Implement groundwater monitoring program; and</li> <li>Monthly water balance conducted on TSF.</li> <li>Commission dam at reduced capacity;</li> <li>Quarterly monitoring of TSF and decant water quality;</li> <li>Regular monitoring of process water;</li> <li>Twice daily inspections of the facility include assessment of fauna present and any evidence of fauna deaths; and</li> <li>Implement the use of deterrents such as bird cannons and barricades as required.</li> </ul>
<b>TSF Evaporation Pond</b>			
<b>Commissioning and Operations</b>			
Tailings underdrainage, rainfall	Overtopping	Direct discharges	<ul style="list-style-type: none"> <li>Designed to be capable of temporarily storing rainfall from a 1:10,000-year AEP, 72-hour storm event;</li> <li>Operational freeboard is maintained at 2.0 m; and</li> <li>Monitor water quality in TSF Evaporation Pond.</li> </ul>
	Seepage	Infiltration through base and embankments	<ul style="list-style-type: none"> <li>Constructed with compacted clay base</li> <li>Use of evaporators to minimise volume of standing water in water storage structures; and</li> <li>Monitor water quality in TSF Evaporation Pond.</li> </ul>
	Open and accessible TSF and TSF Evaporation Pond	Access via fauna ingestion	<ul style="list-style-type: none"> <li>Maintained fencing around TSF Evaporation Pond;</li> <li>Placement of predatory bird decoys, cannon blasts and other tactics to discourage species;</li> <li>Collection of bird feathers around tailings dams quarterly for metals analysis;</li> <li>Monitor water quality in TSF Evaporation Pond;</li> <li>Establish fauna egress points at ponds;</li> <li>Conduct daily inspections for fauna</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			within the TSF and TSF Evaporation Pond; <ul style="list-style-type: none"> <li>Monitor fauna occurrences at TSF and water storages (including quarterly and opportunistic bird counts (species and numbers)); and</li> <li>Use Bug Yellow fluorescent lighting (or similar) to limit the attraction of flying insects to permanently lit areas.</li> </ul>
<b>Raw Water Tank</b>			
Dewatered water	Pit voids	Direct discharges from spills / leaks	<ul style="list-style-type: none"> <li>Water dewatered from the pits shall pass through the MWSP and media filtration unit, where it will then be pumped directly into the Raw Water Tank. Raw water will then be fed into the process water circuit.</li> <li>Tank is within the OPF footprint and is bunded. If the tank overflowed or leaked, it would be directed into the surface water controls within the OPF area.</li> </ul>
<b>Process Water Tank</b>			
Water from Evaporation Pond and Raw Water Tank	The Process Water Tank provides the balance of water for the processing circuit. The primary water feed into the Process Water Tank will be from the evaporation pond, with top-up occurring from the Raw Water Tank.	Direct discharges from spills / leaks	<ul style="list-style-type: none"> <li>Tank is within the OPF footprint and is bunded. If the tank overflowed or leaked, it would be directed into the surface water controls within the OPF area.</li> </ul>
<b>Concentrate Storage &amp; Loading Enclosed Shed</b>			
<b>Operations</b>			
Dust	Stockpiled concentrate	Air / windborne pathway	<ul style="list-style-type: none"> <li>Product drying to shipping moisture specification will be achieved by means of a ceramic filter press (not by drying in an oven or kiln);</li> <li>No concentrate stockpiles will be required on-site. The concentrate will be packaged directly into fully sealed and lockable containers within a concentrate handling shed;</li> <li>Enclosed Rotabox or equivalent for</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>transport and storage (at site and port);</p> <ul style="list-style-type: none"> <li>• Concentrate handling shed with automatic doors, dust collectors and sump collection system directed towards concentrate thickener;</li> <li>• A container will be placed on a rail-mounted trailer outside of the shed;</li> <li>• An automatic door system will open the shed for the trailer to enter. Once the trailer is inside, the door will close;</li> <li>• The lid of the container will be removed, and the concentrate will be fed into the container by a bottom-dumping hopper;</li> <li>• Once the required volume of concentrate has been placed within the container, the lid will be replaced and locked and the outside of the container washed to remove any fugitive material;</li> <li>• Washdown water will be collected in a sump within the shed and pumped to the concentrate thickener feed box;</li> <li>• The trailer and locked container will then be moved to the outside of the shed and either stockpiled, or placed directly onto a truck for transport off-site;</li> <li>• The shed will remain closed whilst handling material;</li> <li>• Cleanup material will be fed back into the concentrate hopper for re-packaging;</li> <li>• Rotoboxes will be inspected regularly for any breakages or cracks that could allow fugitive emissions;</li> <li>• The shed will be fitted with a dust collector to manage any fugitive emissions. Dust collected will feed into a hopper and transfer pump and report to the concentrate thickener feed box;</li> <li>• Dust collector comprises baghouse with ducted dust extract systems or bin-mounted insertable type dust collectors. The objective is to prevent ore dust emissions through extraction of dust laden air at various points via an ID fan. The fine dust discharged from the baghouses will be safely</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>recycled back into the process by mixing with water and pumping the dust slurry back into the process. No discharge to the outside environment will occur;</p> <ul style="list-style-type: none"> <li>• Baghouse Dust Collection systems include the following key elements: <ul style="list-style-type: none"> <li>➢ Interchangeable filter bags suitable for fine ore dust particles;</li> <li>➢ Air pulsation system with timer, compressed air piping, filter regulator and isolation valve;</li> <li>➢ ID fan, discharge dampers, motors and drive components;</li> <li>➢ Interconnecting ducting between dust collector, fan and up to including discharge stack including all supports and expansion joints as required;</li> <li>➢ Discharge stack complete with screen, rain guard, condensation drain and air quality test points; and</li> <li>➢ Dust collector hopper with interconnecting pipe chutework, automatic rotary valve and manually operated knifegate isolation valve;</li> </ul> </li> <li>• Daily inspections of dust collectors;</li> <li>• The concentrate loading area will be an enclosed shed and fitted with dust collectors. Concentrate will be placed directly within containers as loose material;</li> <li>• Direct-feed into containers: <ul style="list-style-type: none"> <li>➢ A container will be placed within the shed onto a trailer system mounted on rails outside of the shed;</li> <li>➢ An automatic door system will open the shed for the trailer to enter. Once the trailer is inside, the door will close;</li> <li>➢ The lid of the container will be removed, and the concentrate will be fed into the container by a bottom-dumping hopper;</li> <li>➢ Once the required volume of concentrate has been placed</li> </ul> </li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>within the container, the lid will be replaced and locked and the outside of the container washed to remove any fugitive material;</p> <ul style="list-style-type: none"> <li>➤ Washdown water will be collected in a sump within the shed, and pumped to the concentrate thickener feed box; and</li> <li>➤ The trailer and locked container will then be transported to the outside of the shed and either stockpiled, or placed directly onto the truck for transport off-site; and</li> </ul> <ul style="list-style-type: none"> <li>• Implementation of a dust monitoring program using installed dust monitors on site as per Figure 3.</li> </ul>
Concentrate	Stockpiled concentrate	Direct discharges via spillage	<ul style="list-style-type: none"> <li>• Enclosed Rotabox or equivalent for transport and storage (at site and port); and</li> <li>• No lead concentrate will be stored in open stockpiles: concentrate storage/handling will be managed within a fully enclosed shed equipped with suitable ventilation and dust management measures.</li> </ul>
Stormwater	Rainfall ingress to concentrate storage area	Direct discharges	<ul style="list-style-type: none"> <li>• The flotation circuit and filter press will be contained within covered concrete bunded areas. A sump pump will be located within the concentrate thickener bunded area to assist with spillage clean-up. Any slurry spillage will be returned to the concentrate thickener;</li> <li>• Externally, there will be a designated drive-through wash bay for trucks, with wastewater directed back into the concentrate thickener. Each truck will be washed prior to leaving site. Wastewater will be returned to the process plant circuit; and</li> <li>• Surface water quality monitoring following rainfall events, including pH, TDS, turbidity, surfactants (detergents), petroleum hydrocarbons, benzene, toluene, ethyl benzene, xylene (BTEX), dissolved metals (Pb, Ni, Zn, Ag) and major cations and anions, with discharge limits set.</li> </ul>
<b>Category 6 Mine Dewatering</b>			

Emission	Sources	Potential pathways	Proposed controls
<b>Operations</b>			
Mine dewatering and discharge management (potential elevations in arsenic, lead and zinc)	Pipeline leaks / spills	Direct discharge from ruptures	<ul style="list-style-type: none"> <li>• The pipelines shall be placed within a bund sufficient to retain the volume between inspections. This will be a 5-m wide trench with 1m high berms;</li> <li>• Any faults and alarms will be automatically sent to the control room for immediate investigation;</li> <li>• Where water is discharged into the evaporation basin or pits, pipes will be underlain with HDPE liner or disused conveyor, to allow for dissipation of velocity and minimise erosion scour;</li> <li>• Pipelines will likely be moved based on mine operations and active pits;</li> <li>• Pipelines will be within bunded pipeline corridors, or inside the abandonment bund. This will minimize any potential discharge outside of the project footprint;</li> <li>• the dewatering pipeline and discharge locations shall be visually inspection once per shift (every 12 hours);</li> <li>• The pipelines shall be placed within a bund sufficient to retain the volume between inspections;</li> <li>• This will be a 5-m wide trench with 1m high berms;</li> <li>• All discharge points shall be metered. Meters will be reported on monthly;</li> <li>• Any faults and alarms will be automatically sent to the control room for immediate investigation; and</li> <li>• Where water is discharged into the evaporation basin or pits, pipes will be underlain with HDPE liner or disused conveyor, to allow for dissipation of velocity and minimise erosion scour.</li> </ul>
	Overtopping of MWSP		<ul style="list-style-type: none"> <li>• The maximum embankment height will be 3.5 m, this includes a 1.2 m freeboard to allow for a 1:1000 year Annual Exceedance Period (AEP), 72-hour rainfall event (0.7m), and dry-freeboard of 0.5m for wave run-up.</li> <li>• Freeboard to be inspected daily.</li> </ul>
	Overtopping of Pit	Direct discharges	<ul style="list-style-type: none"> <li>• Water to be filled to the historical water</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
	voids		<p>table level (being 12m below pit crest), except in major (1% AEP) storm events.</p> <ul style="list-style-type: none"> <li>• Daily inspection of pit water levels.</li> </ul>
	Overtopping of Evaporation Basin	Direct discharges	<ul style="list-style-type: none"> <li>• Magnetic magflow will be maintained at the discharge point to meter volumes into the basin;</li> <li>• Water will pass over rip-rap (rocky) material to reduce velocity and allow sediment to fall out of suspension. Water will then flow overland through the basin area;</li> <li>• The basin discharge area is sufficiently large and self-contained to allow all water to evaporate or infiltrate in situ without producing run-off;</li> <li>• Operational freeboard is maintained at 0.5m; and</li> <li>• Daily inspection of pit water level.</li> </ul>
	Infiltration through base and embankments of Evaporation Basin	Planned discharges to the Evaporation Basin	<ul style="list-style-type: none"> <li>• The low soil permeability, in conjunction with the high evaporation rates typical of the Project area suggest that it is highly unlikely that a substantial volume of the water discharged to the evaporation basin will have the capacity to infiltrate to groundwater in the surficial aquifer;</li> <li>• It is expected that the majority of discharged water will evaporate and that potential impacts to the underlying hydrology will be negligible; and</li> <li>• Regular soil and groundwater monitoring will be undertaken throughout operations to confirm ongoing negligible impacts to the environment.</li> <li>• Preferential disposal pathway for surplus water (up to 250 ML/month, annualised to 3 GL/a);</li> <li>• Basin footprint: 90 ha (uncleared area between crests and perimeter embankment);</li> <li>• Perimeter embankments constructed to nominal height of 1 m;</li> <li>• Basin grubbed of vegetation (topsoil retained);</li> <li>• Basin not lined, allowing point source</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			infiltration within footprint; <ul style="list-style-type: none"> <li>Discharge via open pipe fitted with magnetic magflow meter;</li> <li>Rip-rap installed at discharge point to reduce velocity and allow sediment settlement; and</li> <li>Basin designed to contain water for evaporation/infiltration without runoff - Soils: heavy clays with low permeability (top 100 cm: <math>\sim 2.66 \times 10^{-8}</math> m/s; &gt;110 cm: <math>\sim 3.82 \times 10^{-8}</math> m/s)</li> </ul>
	Weed proliferation due to increased soil moisture levels at the Evaporation Basin	Planned discharges to the Evaporation Basin	<ul style="list-style-type: none"> <li>Effectively managed through distributing the water over the landscape, rather than at a singular location; and</li> <li>Regular weed management.</li> </ul>
	Overspray from mechanical evaporation	Spray-drift (air), and subsequent deposition to land	<ul style="list-style-type: none"> <li>With the discharge to the evaporation basin and disused pits, the use of the evaporators will serve more as a contingency measure should weather conditions or volume constraints affect the utilisation of the water storage structures; and</li> <li>Evaporators to be situated such that the spray is directed over the basin to reduce any overspray and discharge outside of the evaporation basin footprint (Refer to Figure 11).</li> </ul>
<b>Category 63 Class I Inert Landfill Site</b>			
<b>Operations</b>			
Dust	Movement around landfilling area	Air / windborne pathway	<ul style="list-style-type: none"> <li>Utilisation of water carts for dust suppression as required; and</li> <li>Implementation of a dust monitoring program using installed dust monitors on site as per Figure 3.</li> </ul>
Fire creating dark smoke	Large fires if tyres are not stored correctly	Air / windborne pathway	<ul style="list-style-type: none"> <li>Disposal of used tyres will be in accordance with the <i>Environmental Protection Regulations 1987</i> where used tyres must be buried under a final soil cover of minimum 500mm:                             <ul style="list-style-type: none"> <li>In batches separated from each other by at least 100mm of soil and each consisting of no more than 1,000 whole tyres; or</li> <li>In batches separated from each</li> </ul> </li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>other by at least 100mm of soil and each consisting of no more than 40m<sup>3</sup> of tyres reduced to pieces;</p> <ul style="list-style-type: none"> <li>• Establish and maintain firebreak around landfill site;</li> <li>• All vegetation is regularly removed from within the landfill facility; and</li> <li>• Implementation of waste segregation (hazardous waste materials are taken offsite for disposal).</li> </ul>
Contaminated stormwater	Rainfall ingress to tyre disposal areas	Direct discharges, infiltration	<ul style="list-style-type: none"> <li>• Surface water management measures will be implemented at tyre burial sites such that any potentially contaminated storm water is contained within the proposed burial area and/or redirected to a containment sump;</li> <li>• Waste tracking records maintained;</li> <li>• Base of landfill trenches will be a minimum of 3m above the groundwater level and locations will be surveyed and GPS coordinates recorded;</li> <li>• Segregation of waste (all hazardous materials taken offsite for disposal).</li> <li>• Landfill is designed to contain surface water within the landfill footprint and direct it into designated sumps;</li> <li>• Post-rainfall inspections of landfill facility; and</li> <li>• Surface water quality monitoring following rainfall events, including pH, TDS, turbidity, surfactants (detergents), petroleum hydrocarbons, benzene, toluene, ethyl benzene, xylene (BTEX), dissolved metals (Pb, Ni, Zn, Ag) and major cations and anions, with discharge limits set.</li> </ul>
<b>Category 85 Wastewater Treatment Plant</b>			
<b>Commissioning and Operations</b>			
Nutrient-rich wastewater	WWTP tanks and pipelines	Direct discharge via overtopping or ruptures of the WWTP tanks	<ul style="list-style-type: none"> <li>• The WWTP provides sufficient volume to store 4 days of wastewater, prior to requiring to dispose to the sprayfield. In a scenario where the sprayfield is not suitable for disposal (i.e. inclement weather, flooding), water would be transported to the Kununurra</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>wastewater treatment plant for disposal (in consultation with the Water Corporation);</p> <ul style="list-style-type: none"> <li>• The WWTP will be bunded to store a minimum the maximum tank volume within the area (being 48,000L); with an approximate 0.5m high berm;</li> <li>• The WWTP will be alarmed for any of the following potential failures:                             <ul style="list-style-type: none"> <li>➢ High-high, High, Low, and Low-low alarm levels in all tanks;</li> <li>➢ Chlorine failure (low/high); and</li> <li>➢ pH failure (low/high).</li> </ul> </li> </ul>
		Direct discharges from pipelines breaches	<ul style="list-style-type: none"> <li>• Sewage plant commissioned at reduced capacity;</li> <li>• Commissioning activities to utilise fresh water were practicable;</li> <li>• Environmental inspections of the WWTP and sprayfield will occur monthly; and</li> <li>• Pipelines fitted with leak detection and telemetry.</li> </ul>
		Run-off, ponding at Irrigation Area	<ul style="list-style-type: none"> <li>• The sprayfield is designed to meet the water requirements for the water disposal; however, in the scenario where ponding is noticeable, water will be stored within the WWTP until ponding has recessed. Where storage within the WWTP has the potential to be exceeded, treated effluent will be disposed of to the Kununurra WWTP in consultation with the Water Corporation; and</li> <li>• Sprayfield operation will be undertaken taking in consideration of the wet-season rainfall events; no disposal shall occur during and directly after any storm events.</li> </ul>
		Infiltration to groundwater	<ul style="list-style-type: none"> <li>• Two groundwater monitoring bores will be located adjacent to Irrigation Area.</li> </ul>
		Weeds	<ul style="list-style-type: none"> <li>• Environmental inspections of the WWTP and sprayfield will occur monthly. The inspection will include a visual assessment of weed coverage over the sprayfield area; and</li> <li>• During the dry season, weeds will be managed through spraying and hand</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			removal.
		Fauna ingress	<ul style="list-style-type: none"> <li>The WWTP will be fenced with simple cattle fencing to minimise access.</li> </ul>
Contaminated stormwater	Stormwater water that has the potential to flow through the site and become contaminated	Direct discharges	<ul style="list-style-type: none"> <li>The WWTP tanks and container will be constructed on a raised, compacted and stabilised earth pad; and</li> <li>Surface water quality monitoring following rainfall events, including pH, TDS, turbidity, surfactants (detergents), petroleum hydrocarbons, benzene, toluene, ethyl benzene, xylene (BTEX), dissolved metals (Pb, Ni, Zn, Ag) and major cations and anions, with discharge limits set.</li> </ul>
<b>Category 89 Putrescible Landfill</b>			
<b>Operations</b>			
Dust	Movement around landfilling area	Air / windborne pathway	<ul style="list-style-type: none"> <li>Utilisation of water carts for dust suppression as required; and</li> <li>Implementation of a dust monitoring program using installed dust monitors on site as per Figure 3.</li> </ul>
Waste egress and odour	Wastes disposed of into the landfill trenches	Windblown wastes	<ul style="list-style-type: none"> <li>Trenches will be no greater than 30 m in length, 2 m width and 2 m depth;</li> <li>Waste will be covered with dense, inert and incombustible material fortnightly, at a minimum;</li> <li>Regular waste pick up to return any windblown waste to landfill trench;</li> <li>Monthly pickups of waste that may have potentially been washed or blown away from the tipping area will be conducted, with all waste collected returned to the tipping area;</li> <li>Signposted to indicate what waste types can be disposed of within the trenches;</li> <li>All waste to be disposed of within landfill trenches and not stockpiled within the landfill facility;</li> <li>Regular cover applied to waste disposed of in trenches; and</li> <li>All waste bins fitted with lids and kept closed.</li> </ul>
		Fauna entering the	<ul style="list-style-type: none"> <li>Fauna and stock access to the facility</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
		landfill and carrying wastes	<p>will be restricted via the installation of barricades, such as windrows or fencing;</p> <ul style="list-style-type: none"> <li>• Installation of barricade (i.e. fencing) around landfill site to prevent access by stock and other fauna;</li> <li>• Regular cover applied to waste disposed of in landfill;</li> <li>• All waste bins fitted with lids and kept closed; and</li> <li>• Reporting of feral animal sightings.</li> </ul>
Contaminated leachate from wastes	Rainwater infiltration through the landfill	Through the base of the landfill to groundwater	<ul style="list-style-type: none"> <li>• The trench base will be a minimum of 3 m above the groundwater table, which naturally sits at an average of 8-13 mbgl across the Project;</li> <li>• The location of the landfill within the IWL will ensure that the facility sits above the natural topography, outside of the path of surface water flows and flood risk areas within the Prescribed Premises. Landfill trenches will be constructed within each subsequent lift of the IWL;</li> <li>• Stormwater management for the landfill will capitalise on the drainage features installed for the IWL, whereby surface water on the IWL is directed into a seepage pond;</li> <li>• Waste tracking records maintained;</li> <li>• Segregation of waste (all hazardous materials taken offsite for disposal);</li> <li>• Landfill is designed to contain surface water within the landfill footprint and direct it into designated sumps; and</li> <li>• Post-rainfall inspections of landfill facility.</li> </ul>
Contaminated stormwater	Stormwater water that has the potential to flow through the site and become contaminated	Direct discharges	<ul style="list-style-type: none"> <li>• The location of the landfill within the IWL will ensure that the facility sits above the natural topography, outside of the path of surface water flows and flood risk areas within the Prescribed Premises; and</li> <li>• Stormwater management for the landfill will capitalise on the drainage features installed for the IWL, whereby surface water on the IWL is directed into a seepage pond.</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
Hydrocarbons / Chemicals	Incorrect disposal due to lack of signage	Direct discharges	<ul style="list-style-type: none"> <li>• Signposted to indicate what waste types can be disposed of within the trenches; and</li> <li>• Records of the type and volume of waste to be disposed of in the landfill will be kept to ensure the annual cumulative waste volume is compliant with the Prescribed Premises Category limit, and no unauthorised waste is disposed of in the landfill.</li> </ul>
Air emissions / smoke	Tyre fires	Direct discharges	<ul style="list-style-type: none"> <li>• Establish and maintain firebreak around landfill site;</li> <li>• All vegetation is regularly removed from within the landfill facility; and</li> <li>• Implementation of waste segregation (hazardous waste materials are taken offsite for disposal).</li> </ul>

### 3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant’s employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 13 and 14 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

**Table 13: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Kununurra	50 km south west
Kumbrarumba community	Approximately 26 km south
Wawulm community	Approximately 29 km south-west
Environmental receptors	Distance from prescribed activity
Surrounding land forms part of the ORIA Stage 2 application area Agricultural activities to occur to the northeast and east of the Prescribed Premises area	The closest boundary of the ORIA to the Prescribed Premises under this proposal is approximately 1 km.
Goomig Range Conservation Park	Adjacent to Prescribed Premises
Darrmalanka Conservation Park	10 km north of premise boundary

Wiljim Nature Reserve	Approximately 7.5 km north-west
Priority Ecological Communities (PEC) Ivanhoe Land System P3(iii)	Within the prescribed premises boundary with the majority in the proposed laydown or hardstand areas.
PEC Oryza australiensis (wild rice) grasslands on alluvial flats of the Ord River P1	Approximately 3.9 km west of the prescribed premises boundary.
Threatened and/or priority flora <i>Typhonium</i> sp. Kununurra Priority species as identified under the Biodiversity Conservation Act	50 km north
Conservation Significant Flora Six priority flora species <i>Abildgaardia pachyptera</i> Croton arnhemicus <i>Fimbristylis</i> sp E Kimberley <i>Goodenia malvina</i> <i>Fimbristylis laxiglumis</i> <i>Minuria macrorhiza</i>  The area has high potential for Groundwater Dependent Vegetation	Within Prescribed Premises footprint
Native Fauna Eastern Curlew ( <i>Numenius madagascariensis</i> ) – Critically endangered; Curlew Sandpiper ( <i>Calidris ferruginea</i> ) - Critically endangered, migratory; Gouldian Finch ( <i>Erythrura gouldiae</i> ) – Endangered; Red Goshawk ( <i>Erythrotriorchis radiatus</i> ) – Endangered; Australian Painted Snipe ( <i>Rostratula australis</i> ) – Endangered; Northern Quoll ( <i>Dasyurus hallucatus</i> ) – Endangered; Northern Crested Shrike-tit ( <i>Falcunculus frontatus whitei</i> ) – Vulnerable; Grey Falcon ( <i>Falco hypoleucos</i> ) – Vulnerable; Ghost Bat ( <i>Macroderma gigas</i> ) – Vulnerable; Bare-Rumped Sheath-Tailed Bat ( <i>Saccolaimus saccolaimus nudicluniatatus</i> ) – Vulnerable;	A fauna habitat buffer (or exclusion zone) was developed and implemented as part of State Ministerial Statement 964. The buffer can be considered a transition habitat associated with the lower ranges of the Pincombe Ranges. The buffer is located along the western edge of the DE and provides a separation between the mining footprint and Pincombe Ranges. The buffer is aligned to the Buffer Footprint, as defined under the Ord River Irrigation Area (ORIA) Stage 2 agreement, State Ministerial Statement 585.

Fork-tailed Swift ( <i>Apus pacificus</i> ) – Migratory; and Yellow Wagtail ( <i>Motacilla flava</i> ) – Migratory.	
Rivers, lakes, oceans, and other bodies of surface water, etc. Knox Creek Border Creek Keep River	Knox Creek 3.5 south (downstream) Border Creek 3.5 km north (upstream) Keep River 2.8 km southeast
Ord River Irrigation Area (ORIA) The ORIA currently spans 28,000 hectares of farmland, producing crops such as sandalwood, maize, cotton, melon, pumpkin, mango, and other fruit and vegetables.	The relevant project tenement lies to the south and east of the ORIA – Weaber Plains Project. The southeastern corner of the ORIA – Weaber Plains Project overlaps the northwestern corner of mining leases associated with this proposal. The nearest developed agricultural land and the closest residence to the project site lie 21 km and 25 km to the southwest, respectively.
<b>Cultural receptors</b>	<b>Distance from prescribed activity</b>
Aboriginal and other heritage sites Jungil complex	1 km North

## 3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 14.

Works approval W3015/2025/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 14 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises i.e. Category 5, 6, 63, 85 and 89 activities. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

**Table 14: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation**

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
<b>Construction</b>								
Movement of machinery / vehicles on roadways and construction and installation of infrastructure  Machinery and vehicles constructing and installing equipment	Dust	<b>Pathway:</b> Air/windborne pathway	No nearby residences  Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Slight L = Possible <b>Low</b>	Y	Condition 2 – dust mitigation measures.	The general provisions of the EP Act also apply.
	Noise	<b>Impact:</b> Health and amenity Vegetation deposition		Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	N/A	The <i>Environmental Protection (Noise) Regulations 1997</i> apply.
	Hydrocarbons / Chemicals	<b>Pathway:</b> Direct discharges via leaks / spills  <b>Impact:</b> Contamination of soils, vegetation, groundwater	Groundwater for beneficial use  Groundwater Dependent Vegetation	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	N/A	Australian Standard AS 1940:2017 – The storage and handling of flammable and combustible liquids applies' and  The <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> also apply.
<b>Category 5 Processing Plant</b>								
<b>Commissioning and Operations</b>								
Crushing of material, vehicle movements, lift-off from stockpiles and/or stored product, earthworks etc.	Dust	<b>Pathway:</b> Air/windborne pathway	No nearby residences  Threatened and/or priority	Refer to Section 3.1	C = Minor L = Possible <b>Medium</b>	Y	Condition 1 – Design and construction / installation requirements specifies dust management systems in certain plant and equipment.	The general provisions of the EP Act also apply.

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
		<b>Impact:</b> Health and amenity Vegetation	flora and Conservation significant flora					
		<b>Pathway:</b> Air/windborne pathway <b>Impact:</b> ORIA agriculture deposition	ORIA agriculture	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium</b>	N	Condition 1 – Design and construction / installation requirements requires depositional dust monitors and real-time monitors.  Condition 10 – Dust and Air Quality Monitoring Plan Requirements requires a Plan to monitor air quality impacting on deposition to crops within the ORIA.	Ambient Air Quality Monitoring Plan – see Section 2.2.1 above.
Running of machinery / equipment in processing of ores	Noise	<b>Pathway:</b> Air/windborne pathway <b>Impact:</b> Health and amenity	Native fauna Livestock	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	N/A	The <i>Environmental Protection (Noise) Regulations 1997</i> apply.
Stormwater that has the potential to flow through the site and become contaminated  Process water within bunded areas	Contaminated water	<b>Pathway:</b> Direct discharges <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires stormwater management  Condition 13 - Environmental commissioning requirements requires stormwater management  Condition 14 – Limits set for parameters in stormwater contained and collected in the OPF.  Condition 15 – monitoring for surface water (sumps in OPF)  Condition 22 - Infrastructure and equipment requirements during time limited operations requires stormwater management (including surface water	The <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> also apply.

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							monitoring requirements following rainfall events)	
Processing Plant	Hydrocarbons / Chemicals	<b>Pathway:</b> Direct discharge from transfer or overtopping <b>Impact:</b> Soils, vegetation, groundwater	Threatened and/or priority flora and Conservation significant flora  Groundwater for beneficial use	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires hydrocarbons/chemicals management  Condition 13 - Environmental commissioning requirements requires hydrocarbons/chemicals management  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations require hydrocarbons/chemicals management	Australian Standard AS 1940:2017 – The storage and handling of flammable and combustible liquids  <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
Tailings thickener underflow	Tailings containing elevations in the Ag, As, Cd, Cr, Mn, Pb and Zn	<b>Pathway:</b> Direct discharge (and tailings reports to the TSF) <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 15 – Monitoring of tailings hopper, TSF decant return pump and TSF Evaporation Pond  Condition 24 – Monitoring of tailings hopper, TSF decant return pump and TSF Evaporation Pond	The general provisions of the EP Act also apply
<b>Pipeline and services corridor (Processing Plant to TSF)</b>								
<b>Commissioning and Operations</b>								
Pipeline spills and leaks	Tailings and decant water	<b>Pathway:</b> Direct discharge from ruptures <b>Impact:</b>	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires pipeline controls  Condition 13 - Environmental commissioning requirements requires	The general provisions of the EP Act also apply

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
		Soils, vegetation					pipelines management  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires pipelines management	
<b>Tailings Storage Facility</b>								
Commissioning and Operations								
Dried tailings from the surface of the TSF	Dust	<b>Pathway:</b> Air/windborne pathway  <b>Impact:</b> Health and amenity	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Rare  <b>Low Risk</b>	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires tailings thickened to >65% w/w solids	The general provisions of the EP Act also apply
Overtopping of embankments	Tailings containing elevations in the Ag, As, Cd, Cr, Mn, Pb and Zn	<b>Pathway:</b> Direct discharges  <b>Impacts:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Moderate L = Unlikely  <b>Medium Risk</b>	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires AEP storm event and freeboard  Condition 13 - Environmental commissioning requirements requires freeboard management  Condition 22 - Infrastructure and equipment requirements during time limited operations requires freeboard management	The general provisions of the EP Act also apply
Seepage		<b>Pathway:</b> Infiltration through	Threatened and/or priority flora and	Refer to Section 3.1	C = Moderate L = Possible	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires base	Construction of groundwater monitoring wells and

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
		base and embankments  <b>Impact:</b> Soils, vegetation, groundwater mounding and contamination	Conservation significant flora  Groundwater for beneficial use  Groundwater Dependent Vegetation		<b>Medium Risk</b>		permeability  Condition 13 - Environmental commissioning requirements requires tailings thickened and decant pond minimum size management  Condition 16 and 26 - Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires tailings thickened and decant pond minimum size management	Baseline environmental monitoring requirements
Open and accessible TSF		<b>Pathway:</b> Access via fauna ingestion  <b>Impact:</b> Deterioration of fauna health	Native Fauna  Livestock	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 13 - Environmental commissioning requirements requires twice daily fauna observations, implementing fauna deterrents  Condition 22 - Infrastructure and equipment requirements during time limited operations requires twice daily fauna observations, implementing fauna deterrents, fencing, collect feathers, lighting controls	The general provisions of the EP Act also apply
<b>TSF Evaporation Pond</b>								
<b>Commissioning and Operations</b>								
Overtopping	Tailings underdrainage, rainfall	<b>Pathway:</b> Direct discharges  <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires AEP storm event and freeboard  Condition 13 - Environmental commissioning requirements requires	The general provisions of the EP Act also apply

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							freeboard management Condition 22 - Infrastructure and equipment requirements during time limited operations requires freeboard management	
Seepage		<b>Pathway:</b> Infiltration through base and embankments  <b>Impact:</b> Soils, vegetation, groundwater mounding and contamination	Threatened and/or priority flora and Conservation significant flora  Groundwater for beneficial use  Groundwater Dependent Vegetation	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires compacted clay base  Condition 13 - Environmental commissioning requirements requires testing of underdrainage system  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires daily inspections	Construction of groundwater monitoring wells and Baseline environmental monitoring requirements
Open and accessible TSF Evaporation Pond		<b>Pathway:</b> Access via fauna ingestion  <b>Impact:</b> Deterioration of fauna health	Native Fauna  Livestock	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 3 - Critical containment infrastructure design and construction requirements requires fencing around pond  Condition 13 - Environmental commissioning requirements requires fencing maintained  Condition 22 - Infrastructure and equipment requirements during time limited operations requires fencing maintained	The general provisions of the EP Act also apply
<b>Concentrate Storage &amp; Loading Enclosed Shed</b>								

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
<b>Operations</b>								
Stockpiled concentrate	Dust	<b>Pathway:</b> Air/windborne pathway <b>Impact:</b> Health and amenity Vegetation deposition	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires shed design Condition 13 - Environmental commissioning requirements requires shed commissioning conditions Condition 22 - Infrastructure and equipment requirements during time limited operations requires shed operating conditions	Ambient Air Quality Monitoring Plan
Stockpiled concentrate	Concentrate	<b>Pathway:</b> Direct discharges via spillage <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements no open stockpiles with direct packing to sealed containers	The general provisions of the EP Act also apply
Rainfall ingress to concentrate storage area	Stormwater	<b>Pathway:</b> Direct discharges <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires concrete bunding Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
<b>Category 6 Mine Dewatering</b>								
Operation								
Pipeline leaks / spills	Mine dewatering with potential elevations in	<b>Pathway:</b> Direct discharge from	Threatened and/or priority flora and Conservation	Refer to Section 3.1	C = Moderate L = Unlikely	Y	Condition 1 - Design and construction / installation requirements requires bunding, HDPE, flow meters	The general provisions of the EP Act also apply

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
	arsenic, lead and zinc	ruptures <b>Impact:</b> Soils, vegetation	significant flora		<b>Medium Risk</b>		Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires twice daily visual inspections, flow meters and alarms	
MWSP		<b>Pathway:</b> Overtopping direct discharges <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora Groundwater Dependent Vegetation	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires freeboard  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires freeboard, record water levels, visual inspections	The general provisions of the EP Act also apply
		<b>Pathway:</b> Seepage <b>Impact:</b> Mounding and contamination of groundwater	Groundwater for beneficial use Groundwater Dependent Vegetation	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires low permeability  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires visual inspections for seepage	The general provisions of the EP Act also apply
Pit voids		<b>Pathway:</b> Overtopping direct	Threatened and/or priority flora and Conservation	Refer to Section 3.1	C = Moderate L = Unlikely	Y	Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited	The general provisions of the EP Act also

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
		discharges <b>Impact:</b> Soils, vegetation	significant flora Groundwater Dependent Vegetation		<b>Medium Risk</b>		operations Condition 22 - Infrastructure and equipment requirements during time limited operations requires monitoring water levels	apply
		<b>Pathway:</b> Seepage <b>Impact:</b> Mounding and contamination of groundwater	Groundwater for beneficial use Groundwater Dependent Vegetation	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations Condition 22 - Infrastructure and equipment requirements during time limited operations requires inspections for seepage and erosion	The general provisions of the EP Act also apply
		<b>Pathway:</b> Overtopping discharges direct <b>Impact:</b> Soils, vegetation	Threatened and/or priority and Conservation significant flora	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires perimeter embankments to 1m Condition 22 - Infrastructure and equipment requirements during time limited operations requires freeboard	The general provisions of the EP Act also apply
Evaporation Basins		<b>Pathway:</b> Seepage <b>Impact:</b> Mounding and contamination of groundwater	Groundwater for beneficial use Groundwater Dependent Vegetation	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires low permeability Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations Condition 22 - Infrastructure and equipment requirements during time limited operations requires visual inspections for seepage Condition 25 – Sediment monitoring in evaporation basin	Construction of groundwater monitoring wells and Baseline environmental monitoring requirements

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Dust suppression		<b>Pathway:</b> Direct discharges  <b>Impact:</b> Contamination of areas sprayed, soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 22 - Infrastructure and equipment requirements during time limited operations requires avoiding oversaturation and runoff	The general provisions of the EP Act also apply
Overspray from mechanical evaporation		<b>Pathway:</b> Air/windborne pathway  <b>Impact:</b> Soils, vegetation from overspray	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires use only during low wind conditions and buffer zones	The general provisions of the EP Act also apply
<b>Category 63 Inert Landfill Site</b>								
<b>Operations</b>								
Fires	Dark smoke	<b>Pathway:</b> Air/windborne pathway  <b>Impact:</b> Health and amenity Vegetation, Fauna	Threatened and/or priority flora and Conservation significant flora  Native Fauna Livestock	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 22 - Infrastructure and equipment requirements during time limited operations requires firebreak maintenance and vegetation removal	Part 6 — Tyres of the <i>Environmental Protection Regulations 1987</i>  Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)
<b>Category 85 Wastewater Treatment Plant</b>								
Commissioning and Operations								

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
WWTP tanks and pipelines	Nutrient-rich wastewater	<b>Pathway:</b> Direct discharges from pipelines breaches  <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires pipelines fitted with leak detection and telemetry	The general provisions of the EP Act also apply
		<b>Pathway:</b> Direct discharge via overtopping or ruptures of the WWTP tanks  <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires contingency storage volume, alarms  Condition 13 - Environmental commissioning requirements requires validation of parameters  Condition 22 - Infrastructure and equipment requirements during time limited operations requires maintain contingency storage	The general provisions of the EP Act also apply
		<b>Pathway:</b> Direct discharges to the irrigation area  <b>Impact:</b> Soils, vegetation and ponding / pooling of water, weeds, fauna attraction	Threatened and/or priority flora and Conservation significant flora  Native fauna  Livestock	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	N	Condition 1 - Design and construction / installation requirements requires output specifications  Condition 13 - Environmental commissioning requirements requires validation of parameters  Condition 15 and 24 Emissions and discharges monitoring during environmental commissioning and time limited operations requires treated effluent monitoring  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time	Loading rates in supporting documentation provided do not meet Water Quality Protection Note 22 Irrigation with nutrient-rich wastewater guidelines, so condition included that TN and TP loading rates must comply

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							limited operations requires loading rates met	
Stormwater water that has the potential to flow through the site and become contaminated	Contaminated stormwater	<b>Pathway:</b> Direct discharges <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires WWTP on raised pad and Irrigation Area above natural ground level Condition 22 - Infrastructure and equipment requirements during time limited operations requires no irrigation or effluent disposal during or immediately after storm events	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
<b>Category 89 Putrescible Landfill</b>								
<b>Operations</b>								
Wastes disposed of into the landfill trenches	Waste egress and odour	<b>Pathway:</b> Windblown wastes <b>Impact:</b> Littering	Conservation significant flora Native Fauna Livestock	Refer to Section 3.1	C = Slight L = Possible <b>Low Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires fencing Condition 22 - Infrastructure and equipment requirements during time limited operations requires monthly waste collection	Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)
		<b>Pathway:</b> Fauna entering the landfill and carrying wastes <b>Impact:</b> Detriment to fauna health	Native Fauna Livestock	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires fencing	Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)
Rainwater infiltration through the landfill	Contaminated leachate from	<b>Pathway:</b> Through the base of	Groundwater for beneficial use	Refer to Section 3.1	C = Slight L = Unlikely	Y	Condition 1 - Design and construction / installation requirements requires	Landfill Waste Classification and Waste Definitions

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
	wastes	the landfill to groundwater <b>Impact:</b> Groundwater contamination	Groundwater Dependent Vegetation		<b>Low Risk</b>		stormwater management  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations  Condition 22 - Infrastructure and equipment requirements during time limited operations requires post-rainfall inspections and surface water contained within landfill area  Table 13 Monitoring of ambient groundwater concentrations during commissioning and time limited operations	1996 (as amended 2019)
Stormwater water that has the potential to flow through the site and become contaminated	Contaminated stormwater	<b>Pathway:</b> Direct discharges <b>Impact:</b> Soils, vegetation	Threatened and/or priority flora and Conservation significant flora	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1 - Design and construction / installation requirements requires stormwater management  Condition 22 - Infrastructure and equipment requirements during time limited operations requires post-rainfall inspections and surface water contained within landfill area	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
Incorrect disposal due to lack of signage	Hydrocarbons / Chemicals	<b>Pathway:</b> Direct discharges <b>Impact:</b> vegetation, groundwater Soils,	Groundwater for beneficial use  Groundwater Dependent Vegetation	Refer to Section 3.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1 - 1 Design and construction / installation requirements requires signposting  Condition 16 and 26- Monitoring of ambient groundwater concentrations during commissioning and time limited operations	Australian Standard AS 1940:2017 – The storage and handling of flammable and combustible liquids  <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
Tyre fires	Air emissions /	<b>Pathway:</b>	Conservation significant flora	Refer to	C = Slight	Y	Condition 22 - Infrastructure and equipment requirements during time	Part 6 — Tyres of the <i>Environmental</i>

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for additional regulatory controls / DWER comments
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
	smoke	Air/windborne pathway  <b>Impact:</b> Health and amenity  Vegetation, fauna	Native Fauna  Livestock	Section 3.1	L = Unlikely  <b>Low Risk</b>		limited operations requires firebreak maintenance and vegetation removal	<i>Protection Regulations 1987</i>  Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

## 4. Consultation

Table 15 provides a summary of the consultation undertaken by the department.

**Table 15: Consultation**

Consultation method	Comments received	Department response
Application advertised on the department's website on 21 July 2025	None received	N/A
Local Government Authority advised of proposal on 21 July 2025	None received	N/A
Department of Mines, Petroleum and Exploration (DMPE) advised of proposal 21 July 2025	<p>DMPE replied on 07 August 2025 stating / advising that:</p> <p>The Applicant has submitted the “Sorby Hills Silver-Lead-Zinc Project Mining Proposal (Years 1 to 7) (Reg ID 500282) to DMPE that is currently under assessment. The Mining Proposal is consistent with the works approval application pertaining to:</p> <ul style="list-style-type: none"> <li>• Category 5 - Processing or beneficiation of metallic or non-metallic ore; and</li> <li>• Category 6 – Mine dewatering.</li> </ul> <p>That is, the Mining Proposal considers:</p> <ul style="list-style-type: none"> <li>• A processing plant designed to treat 1.5 Mtpa of ore in the first year of operation, increasing to 2.25 Mtpa from the beginning of year 2, and maintained at this level for a 10 year life of mine.</li> <li>• Mine dewatering via in-pit sumps varying depending on the mine plan; from 1.9 GLpa to 3.89 GLpa (with an average of 2.9 GLpa for the life of mine). When the plant is in steady-state operation water requirements are approximately 1.8 GLpa. Surplus water disposal requirements will vary based on water usage, and dewatering requirements, with an average of approximately 1.4 GLpa.</li> </ul> <p>In respect to:</p> <ul style="list-style-type: none"> <li>• Category 85 – Sewage facility;</li> <li>• Category 89 – Putrescible landfill site; and</li> </ul>	Noted.

	<ul style="list-style-type: none"> <li>• Category 57 – Used tyre storage</li> </ul> <p>the Mining Proposal application provides little detail.</p> <p>The sewage facility (wastewater treatment plant) is associated with a proposed camp site referenced in the Mining Proposal. The location of the Category 85 Sewage facility in the works approval supporting documentation is consistent with the camp location in the Mining Proposal.</p> <p>No approvals for a landfill have been sought in the current Mining Proposal application (Reg ID 500282) under assessment.</p> <p>No reference to used tyre storage has been made in the current Mining Proposal application (Reg ID 500282) under assessment.</p> <p>Mining Proposal application (Reg ID 500282) is currently in assessment. A request for further information has been sent to the applicant seeking further information and clarification in respect to these aspects, with DMPE awaiting a reply.</p> <p>DWER has requested that the geotechnical review for the Tailings Storage Facility, and any other advice as applicable is provided to assist with the assessment of this Works Approval application.</p> <p>A geotechnical review of the Project has been undertaken by the Department of Local Government, Industry Regulation and Safety (LGIRS). In particular, the proposed construction of an Integrated Waste Landform (IWL) that incorporates a Tailings Storage Facility (Class 1) constructed within waste rock dump, using non-mineralised waste from mining activities. The facility is consistent with that presented in the works approval supporting documentation.</p> <p>The LGIRS review concluded that: Overall, it is considered conceptually feasible that the intended Project could be completed within acceptable standards, with the relevant applicable DMPE tenement conditions applied.</p>	
<p>Department of Biodiversity, Conservation and Attractions (DBCA) advised of proposal 21 July 2025</p>	<p>DBCA replied on 12 August 2025 stating / advising that:</p> <p>DBCA understands that the Sorby Hills Project is the subject of an existing approval under Part IV of the EP Act, with environmental conditions under Ministerial Statement 964. However, this approval did not consider impacts on the threatened flora <i>Typhonium sp.</i> Kununurra (A.N. Start ANS 1467) (ranked endangered) listed under the <i>Biodiversity Conservation Act 2016</i> (BC Act).</p> <p><i>Typhonium sp.</i> Kununurra (A.N. Start ANS 1467) has been identified within and adjacent to the Sorby Hills Project and will be impacted by project implementation. There are requirements under Section 40 of the BC Act for Ministerial authorisation if activities will result or are likely to result in the take of a threatened species. On 20 December 2021, Boab Metals Limited was granted section 40 authorisation (TFL 084-2122) to take up to 553 hectares of habitat for <i>Typhonium sp.</i> Kununurra (A.N. Start ANS 1467), with condition requirements including the submission and</p>	<p>Noted.</p>

	approval of an offset strategy. Under this authorisation, the proponent is not permitted to clear more than 50 per cent of the approved limit (i.e. 276.5 hectares) until the offset strategy is submitted and approved. The final offset strategy has not been submitted to DBCA for approval.	
Department of Primary Industries and Regional Development (DPIRD) advised of proposal 21 July 2025	None received	N/A
Department of Planning, Lands and Heritage (DPLH) advised of proposal 21 July 2025	None received	N/A
Kimberley Development Commission advised of proposal 21 July 2025	None received	N/A
Kimberley Agricultural Investment Pty Ltd advised of proposal 21 July 2025	None received	N/A
Ord River District Cooperative advised of proposal 21 July 2025	None received	N/A
Yawoorroong Miriuwung Gajerrong Yirrgab Noong Dawang MG Corporation advised of proposal 21 July 2025	None received	N/A

<p>Applicant was provided with first draft package on 23 December 2025</p>	<p>Applicant responded on 12 and 13 January 2026 commenting on items highlighted by DWER in the draft Decision Report and Works Approval. Additional comments were also provided to clarify other documented information.</p>	<p>Feedback and clarified items considered in preparing second draft package for applicant consultation.</p>
<p>Applicant was provided with second draft package on 21 January 2026</p>	<p>Applicant responded on 28 January 2026 commenting on items highlighted by DWER in the draft Decision Report and Works Approval. Additional comments were also provided to clarify other documented information.</p>	<p>Updates made and documents finalised for issuing.</p>

## 5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

## References

1. Boab Metals Limited, Sorby Hills Project - Works Approval Application 24 February 2025 (Application Form and Supporting Documentation).
2. Boab Metals Limited, APP-0027616 - Application for a works approval - Request for further information 14 April 2025 (RFI reply).
3. Boab Metals Limited, APP-0027616 - Application for a works approval - Request for further information 16 June 2025 (RFI reply).
4. Boab Metals Limited, APP-0027616 - Application for a works approval (W3015/2025/1) – Request for further information 26 October 2025 (RFI reply).
5. Boab Metals Limited, APP-0027616 - Application for a works approval (W3015/2025/1) – Request for further information 26 November 2025 (RFI reply).
6. Boab Metals Limited, APP-0027616 – Response to 1st Draft Approval Package 12 and 13 January 2026.
7. Boab Metals Limited, APP-0027616 – Response to 2nd Draft Approval Package 28 January 2026 and 04 February 2026.
8. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
9. Department of Water (DOW) 2013, *Water quality protection note 68 - Mechanical equipment wash down*, Perth, Western Australia.
10. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
11. DWER 2019, *Guideline: Air emissions*, Perth Western Australia (DRAFT – for external consultation purposes).
12. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
13. DWER 2021, *Guideline: Dust emissions*, Perth Western Australia (DRAFT – for external consultation purposes).
14. EAQ Consulting, 2022, *Dust Impact Assessment of Proposed Mining Operations BOAB Metals Ltd – Sorby Hills Project*.
15. National Environmental Protection Council (NEPC) 1998, *National Environment Protection (Ambient Air Quality) Measure*.