



## Application for Works Approval

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

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**Works Approval Number** W6659/2022/1

**Applicant** BHP Nickel West Pty Ltd

**ACN** 004 184 598

**File number** DER2022/000104

**Premises** Kalgoorlie Nickel Smelter  
Celebration Road  
KALGOORLIE WA 6430  
Legal description -  
Lot 100 on Deposited Plan 212288  
Certificate of Title Volume 1670 Folio 313

**Date of report** 5 December 2022

**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 a new Stabilised Residue Dam (SRD) at the premises. As a result of this assessment, works approval W6659/2022/1 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

On 10 March 2022, 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 44 – Melting smelting or refining at the premises.

The premises relates to the category and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6659/2022/1. 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 W6659/2022/1.

#### 2.2.1 Background

BHP Nickel West Pty Ltd (the Applicant, BHP) currently operate the Kalgoorlie Nickel Smelter (the premises) under Licence L8653/2012/2. Nickel concentrate, sourced from BHP owned operations as well as other third-party operations, is transferred to the premises for processing (smelting) to produce nickel matte. Nickel matte is transported to the Kwinana Nickel Refinery to produce high quality nickel metal.

The nickel smelting process at the premises produces waste gases containing sulphur dioxide, particulates (including heavy metals), combustion gases and waste heat. Waste gases are cleaned and passed through an acid plant to produce saleable sulphuric acid. The waste gas cleaning system produces a weak acid by-product (effluent) typically comprising 10-12% (wt/wt) acid strength and approximately 0.2% (wt/wt) solids. The effluent also contains a soluble arsenic material as a result of the chemical composition of the concentrate feed stocks.

Effluent is collected and transferred to the site effluent treatment plant where it undergoes the following processes:

- Neutralisation: The weak acid is mixed with lime slurry to produce calcium sulphate (gypsum); and
- Arsenic fixation: Gypsum slurry is pumped to the arsenic fixation process where, at a pH target of 7.0, ferric sulphate and sodium hypochlorite are added to convert soluble arsenic into a fixated, insoluble ferric arsenate within the gypsum.

The resulting stabilised gypsum slurry is transferred to the Residue Storage Facility (Figure 1) for storage and recovery of liquids. The existing Residue Storage Facility comprises of:

- Gypsum and Brine Ponds – initial lined ponds (currently at capacity);

- Residue Dam / Residue Holding Pond – double lined pond constructed in 2002 (currently at capacity);
- Stabilised Residue Dam 1 (SRD1) - double lined pond constructed in 2002 (currently at capacity); and
- Stabilised Residue Dam 2 (SRD2) - double lined pond constructed in 2011 (nearing capacity).

To ensure sufficient storage capacity and enable continued operations, the Applicant is proposing to construct a new residue storage dam (SRD3).



Figure 1: Kalgoorlie Nickel Smelter Residue Storage Facility and location of SRD3.

## 2.2.2 SRD3 design and operation

Gypsum slurry disposed of to SRD3 will have between 30% and 40% solids content and exhibit the same characteristics as those currently being deposited into SRD2.

The Applicant submitted a detailed design report for SRD3 (Tetra Tech Coffey, 2022a). The report confirms that SRD3 has been designed in accordance with the following guidelines:

- Department of Mines and Petroleum (DMP) *Code of Practice, Tailings Storage Facilities in Western Australia* (DMP, 2013);
- DMP *Guide to preparation of a design report for Tailings Storage Facilities* (DMP, 2015); and
- Australia and New Zealand Committee on Large Dams (ANCOLD) *Guidelines on Tailings Dams* (ANCOLD, 2019).

SRD3 was assessed as being a Category 2 – Medium facility in accordance with DMP guidelines and having a Low Dam Failure Consequence Category and Low Environmental Spill Consequence Category per ANCOLD guidelines. A stability analysis was undertaken for the proposed dam design which confirmed that the minimum Factor of Safety (FOS) values per ANCOLD 2019 stability requirements will be met for SRD3.

The proposed SRD3 will be constructed adjacent to the existing dams (Figure 1) using borrow material sourced from within the premises. Geotechnical investigations indicate that underlying soils comprise of stiff to hard clayey soils which are considered suitable for use as base material for the dam.

A summary of key design characteristics of SRD3 are shown in Table 1.

**Table 1: SRD3 design specifications**

Design Feature	Specifications
Dimensions of pond	Total footprint of 3.3 ha with an internal surface area of 2.9ha
Storage capacity	60,000m <sup>3</sup>
Crest of pond	8 m wide
Maximum embankment height	4.5m (RL 351m) – Similar to SRD2
Maximum operating level (MOL)	3.7m (RL 350.2m)
Spillway	Concrete spillway up to 1.2 m wide and 0.9 m deep located on southern embankment connecting to SRD1.
Spillway invert	4.0m (RL 350.5m)
Slope of batters	Upstream: 1(V):2.75(H) Downstream: 1(V):2(H)
Freeboard	300mm between the MOL and the spillway invert. 800mm total freeboard between MOL to the embankment crest

### **Liner system**

SRD3 will have a dual liner system to mitigate seepage comprising of a Geonet drainage layer encapsulated between two high density polyethylene (HDPE) geomembrane layers. Any leakage through the primary (top) HDPE layer will be contained by the secondary (bottom) liner.

Leakage collected in the Geonet layer will drain via gravity towards a fully lined leak detection sump located adjacent to the decant facility at the southern end of SRD3. An inclined riser pipe will be installed to allow monitoring of any leakage. Groundwater monitoring will also be undertaken using the existing monitoring network to monitor any seepage from the ponds.

### **Water recovery and overtopping**

At the expected solids deposition rate of 12,000m<sup>3</sup>/year, SRD3 is expected to provide storage capacity for up to five years. The deposition rate is based on the existing rate of slurry deposition into SRD2 which is currently about 900m<sup>3</sup> at 30% - 40% solids.

Slurry will be deposited subaerially via the north-eastern corner to provide the greatest path length to the water return and therefore greater opportunity for settling. During operations, deposition will be regularly circulated to different points along the northern embankment to maximise the storage capacity of the dam and manage beaching of sediments.

The Applicant undertook a water balance to determine the expected inflows and outflows from the SRD. Calculations were based on a slurry deposition rate of 120,000 tonnes per year (t/yr) and assume a solids content of 10%. The expected water input (excluding rainfall) was calculated to be about 2,958.9 m<sup>3</sup>/day (90,000 m<sup>3</sup>/month) and water losses due to evaporation, etc. estimated to be 2,738 m<sup>3</sup>/day (85,000 m<sup>3</sup>/month) in summer and 738.8m<sup>3</sup>/day (22,164m<sup>3</sup>/month) in winter. Results of the water balance indicate that water recovery is essential for maintaining pond capacity, especially during winter as input volumes exceed the storage capacity of the dam.

A decant system will be installed in the southern end of SRD3 to recover supernatant water which will be pumped back to the smelter for reuse. The water balance suggests that the volume of water available for recovery throughout the year is below the premises operating requirements and therefore there is sufficient water demand to ensure that pond levels can be appropriately managed. Water recovery rates will be higher in summer due to high evaporation rates (approximately 15% - 35% of the slurry water input recovered) and lower in winter (40% - 85% of the slurry water input recovered).

The Delegated Officer notes that the water balance assumes a solids content of 10% which is much less than the actual expected solids content of 30% - 40% (based on current slurry deposition). As such, water estimates derived from the water balance are considered conservative as the actual water availability will be lower with a higher solids content.

Despite this, the volume of water expected to be input into the SRD is significant and failure of the decant system will increase the risk of overtopping, and potentially compromise embankment stability. The Applicant has indicated that a pontoon mounted pump can be used as a redundancy/emergency pump to manage water levels in these situations. Furthermore, like SRD2, SRD3 is designed to incorporate a gravity-driven under drainage system placed over the double liner system. While the underdrainage system is installed primarily to support the system as it nears closure, it can also be used during operations as a water recovery contingency should issues arise with the primary decant system.

Overtopping risks are further mitigated through freeboard considerations. The dam is designed to contain stormwater from a 1 in 100-year AEP, 72 hour storm event (212mm) plus a minimum freeboard of 500mm per the *Guide to the preparation of a design report for tailings storage facilities (TSFs)* (DMP 2015). A spillway will be installed on the southern embankment to allow overflow into SRD1 during a rainfall event greater than the 1 in 100 year AEP allowance.

Wave run-up and the risk of overtopping during a PMP rainfall event were also considered in freeboard design. The wave run-up for 1:10 AEP wind is estimated to be 300mm with a significant wave height of 370mm. The 4-hour PMP rainfall event was calculated to be 590mm. With the above freeboard in place, overtopping due to wave run-up or a 4-hour PMP event was considered to be unlikely.

### 2.2.3 Stability assessment

The Applicant was referred to the Department of Mines, Industry Regulation and Safety (DMIRS) who normally regulate tailings storage structures under the Western Australia *Mining Act 1978*. Although the premises does not fall within the scope of this legislation, a request was made to DMIRS to review the embankment stability based on the design criteria contained within the application.

DMIRS did not provide any objections or raise any concerns regarding the proposed design and operation of SRD3. The following conditions were recommended:

- That a copy of the construction report is submitted to confirm that the facility is constructed as designed; and
- That the facility is audited by a third party at least biannually noting that Tetra Tech Coffey suggested in the design report that annual reviews are carried out to assess facility performance and conditions.

In addition to the above requirements, DMIRS also noted that standard conditions generally applied to facilities that fall under the *Mining Act 1978* include:

- Construction is to be supervised by an engineering or geotechnical specialist and documented;
- The dam is to be checked on a routine daily basis by site personnel to ensure the facility is functioning as per the design intent;
- An engineering or geotechnical specialist shall audit and review the active tailings storage facility on a biennial basis and outcomes reported.
- A further review report shall be submitted at the time of decommissioning and prior to rehabilitation.

The Delegated Officer has considered these comments in the assessment and applied conditions to the works approval accordingly. Where appropriate, conditions reflecting DMIRS comments may also be included on the licence to ensure ongoing operation of SRD3 is managed appropriately. Further verification of the embankment stability may be sought from DMIRS upon completion of the construction works and submission of construction reports.

### **SRD2 assessment**

On advice of DMIRS, a copy of the most recent third-party review report for SRD2 was requested to confirm this facility, which is similar to SRD3, is being operated as designed. The report was provided by the Applicant confirmed that the facility shows no signs of instability. No other operational issues were identified.

## 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 and

operation which have been considered in this decision report are detailed in Table 3. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

### 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 2 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 2: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Town of Kalgoorlie	7.5 km north of SRD3
Goldfields Highway	2.9km east of SRD3
Industrial premises	Department of Primary Industries and Regional Development (DPIRD) quarantine facility located 3.2km south-west of the proposed SRD.
Environmental receptors	Distance from prescribed activity
White Lake and Red Lake system	1.7 km south-west of the premises
Hannan Lake system	4.4 km east of the premises
Non-perennial creeks draining to lake systems	1.5 km north-west and 1.8 km south-east of the premises
Priority flora	Two Priority 2 and two Priority 3 flora species existing within 5km of the premises.
Underlying groundwater	<p>Average groundwater depth across the premises is approximately 9.5 metres below ground level (mbgl). Groundwater monitoring results measured in 2021 indicate that the depth to groundwater ranges from approximately 12.8 mbgl (KNSMB09) to 7.7mbgl (KNSMB60). Groundwater is generally saline to hypersaline.</p> <p>The premises is located in the Goldfield Groundwater Area.</p> <p>The site is registered under the <i>Contaminated Sites Act 2003</i> as “Awaiting Classification”. Data contained in the Annual Environmental Report indicates that Nickel concentrations recorded at groundwater monitoring bores on the premises exceed the non-potable domestic/industrial use guidelines per the <i>Assessment and management of contaminated sites</i> (DWER, 2021).</p>



**Table 3: Proposed applicant controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Construction</b>			
Dust	Construction of SRD3 – earthworks and movement of vehicles/ machinery	Air / windborne pathway	<p>Construction to occur over a relatively short period (six months).</p> <p>Dust will be managed through water suppression (water carts &amp; sprinklers) and application of suppressant products (e.g. Gluon) where required.</p> <p>Construction material will be conditioned with water to minimise dust generation.</p> <p>Limited clearing as located within existing cleared area. Active/working areas will be minimised.</p> <p>Wind speeds will be reviewed each day and visual inspections of dust undertaken throughout the day in accordance with the Construction Dust Management Plan. Response actions including stopping work, applying additional suppressants, etc. will be applied under high wind condition or if there is visual dust.</p>
Noise			<p>Construction during daylight hours only (i.e. no night time noise).</p> <p>Short term (6 months) construction timeframe.</p>
<b>Operation</b>			
Dust	Lift-off from SRD3	Air / windborne pathway	Material will be maintained in a wet state or below liquids limiting dust generation.
Noise	Operation of pumps		No noise specific controls proposed.
Contaminated water and slurry	Loss of containment from SRD3: Seepage	Seepage and infiltration to groundwater	<p>Dual liner system drains to lined seepage collection sump for leak detection with an inclinor riser pipe to allow manual monitoring of seepage.</p> <p>Seepage collection sump monitored quarterly and if seepage is detected a consultant will be engaged to design an investigation plan to further assess impact of seepage from SRD3.</p> <p>Liners selected to meet design principles of <i>Water Quality Protection Note 26: Liners for containing pollutants, using synthetic membranes</i> (DoW, 2013).</p> <p>HDPE liners will be separated by a HDPE biplanar geonet layer with high flow capacity.</p>

Emission	Sources	Potential pathways	Proposed controls
			<p>HDPE and geonet liners will be free of blisters, undispersed raw materials and any sign of contamination by foreign matter, and shall be protected at all time from mechanical and chemical damage.</p> <p>Liners and the drainage layer will be anchored in 1 m wide by 1 m deep anchor trenches backfilled with fill/soil compacted to 95% SMDD at a <math>\pm 2\%</math> optimal moisture content (OMC).</p> <p>Embankments will be constructed to a maximum embankment height of 4.5 m (RL 351 m) with an 8m embankment crest width and upstream batter slope of 1(V):2.75(H) for liner stability.</p> <p>HDPE liners will be rolled out into position before each sheet is welded together with all working welds to be tested by non-destructive means for integrity.</p> <p>Location of decant and spigot points designed to maximise solids consolidation and manage beaching.</p> <p>Decant system to be installed to remove supernatant water.</p> <p>The decant structure will be situated on a concrete base on the HDPE liner and comprise of pre-cast, concrete slotted rings surrounded by filter rock material with a low fines content. Construction of the decant will be carried out so as to not damage the HDPE liner.</p> <p>Pumping from the decant system is activated automatically with a low-level switch installed to prevent the pump running dry.</p> <p>The facility will be inspected in accordance with the <i>NKS Stabilised Residue Dam No. 3 Operations Manual</i> (Tetra Tech Coffey, 2022b) will be undertaken at least once per shift to identify seepage issues and verify operational functionality. Inspections of the pond include, but are not limited to, delivery/return pipelines, decant system, freeboard, embankments and leak detection system.</p> <p>Groundwater monitoring at existing monitoring bores will continue in accordance with Licence conditions.</p>
	Loss of containment from SRD3: Overtopping	Overland runoff and/or infiltration to groundwater	<p>SRD3 is designed in accordance with the <i>DMP Code of Practice, Tailings Storage Facilities in Western Australia</i> and the <i>ANCOLD 2019 Guidelines on Tailings Dams</i>.</p> <p>Embankment configuration (height, width, slope) designed for embankment stability.</p> <p>Designed to contain stormwater from a 1 in 100-year AEP, 72 hour storm event plus a minimum freeboard of 500mm above the maximum operating level.</p>
	Loss of containment from SRD3:		<p>Spillway provides emergency overflow to SRD1 in the event of extreme weather event (above a 1:100 year AEP, 72-hour event) to protect the integrity of the embankment. An additional spillway is available between SRD1 and SRD2 providing extra capacity if required.</p>

Emission	Sources	Potential pathways	Proposed controls
	Embankment failure		<p>Embankments will be constructed using in-situ materials compacted to 95% SMDD at a <math>\pm 2\%</math> OMC</p> <p>Toe drain to be installed along the eastern embankment to direct surface water away from the facility and draining to a collection sump.</p> <p>Decant recovery system will continually remove water from the pond for reuse in the nickel smelter. A pontoon mounted pump will be available for use as a redundancy / emergency pump to manage water levels.</p> <p>Per above, the facility will be inspected in accordance with the <i>NKS Stabilised Residue Dam No. 3 Operations Manual</i> to identify integrity issues and freeboard capacity.</p>
	Loss of containment from slurry & return pipelines		<p>Pipelines located on embankments with any leaks / spills draining into SRD3, elsewhere the pipelines will be bunded.</p> <p>A leak detection alarm and flow meter will be installed on the residue delivery pipeline at the pump station to assist in identifying leaks.</p> <p>Pipeline inspections will occur once per shift to check for integrity issues/leaks in accordance with the <i>NKS Stabilised Residue Dam No. 3 Operations Manual</i> (Tetra Tech Coffey, 2022b).</p>

## 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. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls, 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 4.

Works approval W6659/2022/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 4 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. deposition and storage of residue into the Residue Dam. 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 4: Risk assessment of potential emissions and discharges from the premises during construction and operation**

Risk events					Risk rating <sup>1</sup>	Applicant controls sufficient?	Conditions of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
<b>Construction</b>								
Construction of SRD3 – earthworks and movement of vehicles/machinery	Dust	Air / windborne pathway causing impacts to health and amenity	Nearest resident >7km away	Refer to section 3.1.1	C= Slight L = Unlikely <b>Low risk</b>	Yes	Condition 1 (siting)	The Delegated Officer considers that there is sufficient separation distance to receptors that, with Applicant controls applied, impact from noise and dust is not likely to occur. The general provisions of the EP Act apply to fugitive dust from the construction works and the applicant is required to comply with relevant provisions in the Environmental Protection (Noise) Regulations 1997 with respect to construction noise.
	Noise			Refer to section 3.1.1	C= Slight L = Unlikely <b>Low risk</b>	Yes	Condition 1 (siting)	
<b>Operations (including time limited operations)</b>								
Storage of slurry in SRD3	Dust lift-off from SRD3	Air / windborne pathway causing impacts to health and amenity	Nearest resident >7km away	Refer to section 3.1.1	C= Slight L = Unlikely <b>Low risk</b>	N/A	N/A	As above, the Delegated Officer considers that there is sufficient separation distance to human receptors. The existing licence requires that dust controls are maintained and operated on the premises to minimise the generation of dust.
	Loss of containment from SRD3: Seepage	Seepage/infiltration causing groundwater contamination	Lake systems 1.7km away Depth to groundwater 7.7mbgl	Refer to section 3.1.1	C = Moderate L = Unlikely <b>Medium risk</b>	Yes	Conditions 1 – 4, 7-9	Application controls conditioned. Groundwater monitoring will continue in accordance with existing licence conditions.
	Loss of containment from SRD3: Overtopping	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality and infiltrating groundwater		Refer to section 3.1.1	C = Moderate L = Unlikely <b>Medium risk</b>	Yes		Assessment of any future licence amendment application should consider implementation of similar operational controls (e.g. freeboard requirements, visual inspections, etc.) and the recommendation of DMIRS relating to biennial auditing and review of the facility.
	Loss of containment from SRD3: Embankment failure			Refer to section 3.1.1	C = Moderate L = Unlikely <b>Medium risk</b>	Yes		
	Loss of containment from slurry & return			Refer to section 3.1.1	C = Moderate L = Unlikely <b>Medium risk</b>	Yes		Application controls conditioned.

Risk events					Risk rating <sup>1</sup>	Applicant controls sufficient?	Conditions of works approval	Reasoning
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
	pipelines				<b>Medium risk</b>			
Operation of pumps	Nosie	Air / windborne pathway causing impacts to health and amenity	Nearest resident >7km away	Refer to section 3.1.1	C= Slight L = Unlikely <b>Low risk</b>	Y	N/A	The delegated officer considers that the proposal will not contribute significantly to operational noise from the premises and therefore noise from the premises is not expected to change as a result of the proposal. The premises is required to comply with the Environmental Protection (Noise) Regulations 1997.

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 5 provides a summary of the consultation undertaken by the department.

**Table 5: Consultation**

Consultation method	Comments received	Department response
Application advertised on the department's website on 30 March 2022	None received	N/A
Local Government Authority advised of proposal on 29 June 2022	Planning approval for the proposal was granted by the City of Kalgoorlie-Boulder in May 2022.  It was recommended that a dust management plan be submitted and approved for the construction phase of the proposal.	Applicant provided a copy of the proposed Construction Dust Management Plan.
Applicant was provided with draft documents on 18 October 2022	No changes to the draft conditions or Decision Report were requested. Further information was provided as requested by the department.	The Decision Report has been updated to consider additional information provided by the Applicant.

## 5. Decision

Based on the assessment in this decision report, the Delegated Officer as determined that the proposal to construct and operate SRD3 will not pose an unacceptable risk to public health or the environment. This determination is based on the following:

- SRD3 has capacity to store up to 60,000m<sup>3</sup> of slurry over its operational life which is contingent on the majority of supernatant water being evaporated or returned via decant to the smelter;
- SRD3 has been designed in accordance with relevant guidelines for the design and construction of tailings management facilities and will meet appropriate ANCOLD Factor of Safety requirements;
- SRD3 has been designed and will be operated with adequate freeboard to minimise the risk of overtopping;
- an emergency spillway has been incorporated into the design to allow overspill into SRD1 to minimise the risk of embankment failure; and
- SRD3 will have a dual HDPE liner system with a drainage layer and leak detection to minimise the risk of seepage.

In order to minimise the potential for environmental impacts to occur, applicant controls outlined in section 3.1.1 relating to design and operation have been conditioned on the works approval.

Groundwater monitoring will continue in accordance with the existing licence conditions. The Delegated Officers considers that the existing groundwater network is appropriate for determining groundwater impacts. Groundwater monitoring results are currently assessed for trends to determine if there are elevated concentrations indicating seepage. Results to date suggest exceedance of the non-potable domestic/industrial use guidelines per the Assessment and management of contaminated sites (DWER, 2021). Potential groundwater impact should be delineated and reported

to the department under the *Contaminated Sites Act 2003* (Form 1) if it is found to extend off-site. The Delegated Officer considers that further review of the groundwater monitoring results may be required under the Licence to better assess groundwater contamination and determine if site specific trigger levels are required.

The Delegated Officer is satisfied the works approval controls lower the overall risk profile of the proposed infrastructure, and adequately address the potential for unacceptable impacts to the environment to occur. As the works are considered to be associated with Critical Containment Infrastructure, in accordance with the *Guideline: Industry Regulation Guide to Licensing* (DWER, 2019), the Applicant is required to submit a Critical Containment Infrastructure Report (CCIR) following completion of the works, and prior to commencing time limited operation, certifying that works are carried out in accordance with the works approval conditions. The information required to be submitted in the Critical Containment Infrastructure Report aligns with the recommendations of DMIRS (refer to section 2.2.3).

A licence amendment will be required to authorise ongoing operation of the constructed infrastructure. Licence conditions will not be finalised until the department assesses the amendment application. The department will consider information reported in the CCIR and the Time Limited Operations report in assessing the application. Conditions will be imposed to ensure day-to-day operations do not pose an unacceptable risk of impacts to on and off-site receptors. Conditions of the Licence may be included to reflect commitments and controls assessed under this works approval relating to operating freeboard and monitoring.

The Licence assessment may also consider advice provided by DMIRS which recommends regular review of SRD3. The Applicant has indicated that as SRD3 will be subject to external audits on an annual basis. Adequacy of the auditing program will be considered in the Licence assessment.

Works Approval W6659/2022/1 that accompanies this report authorises construction and time limited operations only. The conditions in the issued works approval, as outlined in the above risk table have been determined in accordance with the Guidance Statement: Setting Conditions (DER 2015).

## **6. 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. Australian National Committee on Large Dams (ANCOLD) 2019. *Guidelines on Tailings Dams, Planning, Design, Construction, Operation and Closure, Revision 1*,
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Mines and Petroleum (DMP) 2013, *Tailings storage facilities in Western Australia – code of practice*, Perth, Western Australia
4. DMP 2015, *Guide to the preparation of a design report for tailings storage facilities (TSFs)*, Perth Western Australia.
5. Department of Water (DoW) 2013, *Water Quality Protection Note 26: Liners for containing pollutants, using synthetic membranes*, Perth Western Australia
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