



## Application for Works Approval

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

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<b>Works Approval Number</b>	W6789/2023/1
<b>Applicant</b>	GMA Garnet Pty Ltd
<b>ACN</b>	009 344 227
<b>File number</b>	DER2023/000039
<b>Premises</b>	Port Gregory Garnet Mine 1420 George Grey Drive YALLABATHARRA WA 6535  Legal description - Mining Tenement M70/856 and General-Purpose Lease G70/171.
<b>Date of report</b>	7/7/2023
<b>Decision</b>	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 W6789/2023/1 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 20 January 2023 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 and time-limited operations relating to mineral sands processing infrastructure at the premises (detailed in Section 2.3). The premises is approximately 3 km north of the town of Gregory.

The premises relates to the category and assessed production capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6789/2023/1. 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 W6789/2023/1.

The proposed works fall within the prescribed premises boundary of Part V licence L8561/2011/1. The licence holder currently operates two open cut alluvial garnet mines. Lynton mine has been operational since 1981 and the Hose mine has been operational since 1997. The process plant at Lynton was decommissioned in 1997, with all processing now being conducted at the Hose plant located on General Purpose lease G70/171.

The applicant received authorisation under works approval W6584/2021/1 granted on 22 December 2021 to construct five additional solar drying ponds to the south of the mining tenement and a bioremediation facility. The applicant has since been granted an amendment to W6584/2021/1, which authorised minor changes to the bioremediation facility and the location of the proposed tailings transfer station. At the time of this works approval application, the applicant has not provided evidence of the construction of the bioremediation facility and five solar drying ponds.

### 2.3 Construction and operational aspects

This section provides further detail on the construction aspects of the works approval. Key infrastructure associated with the proposed works are displayed in Figure 1.

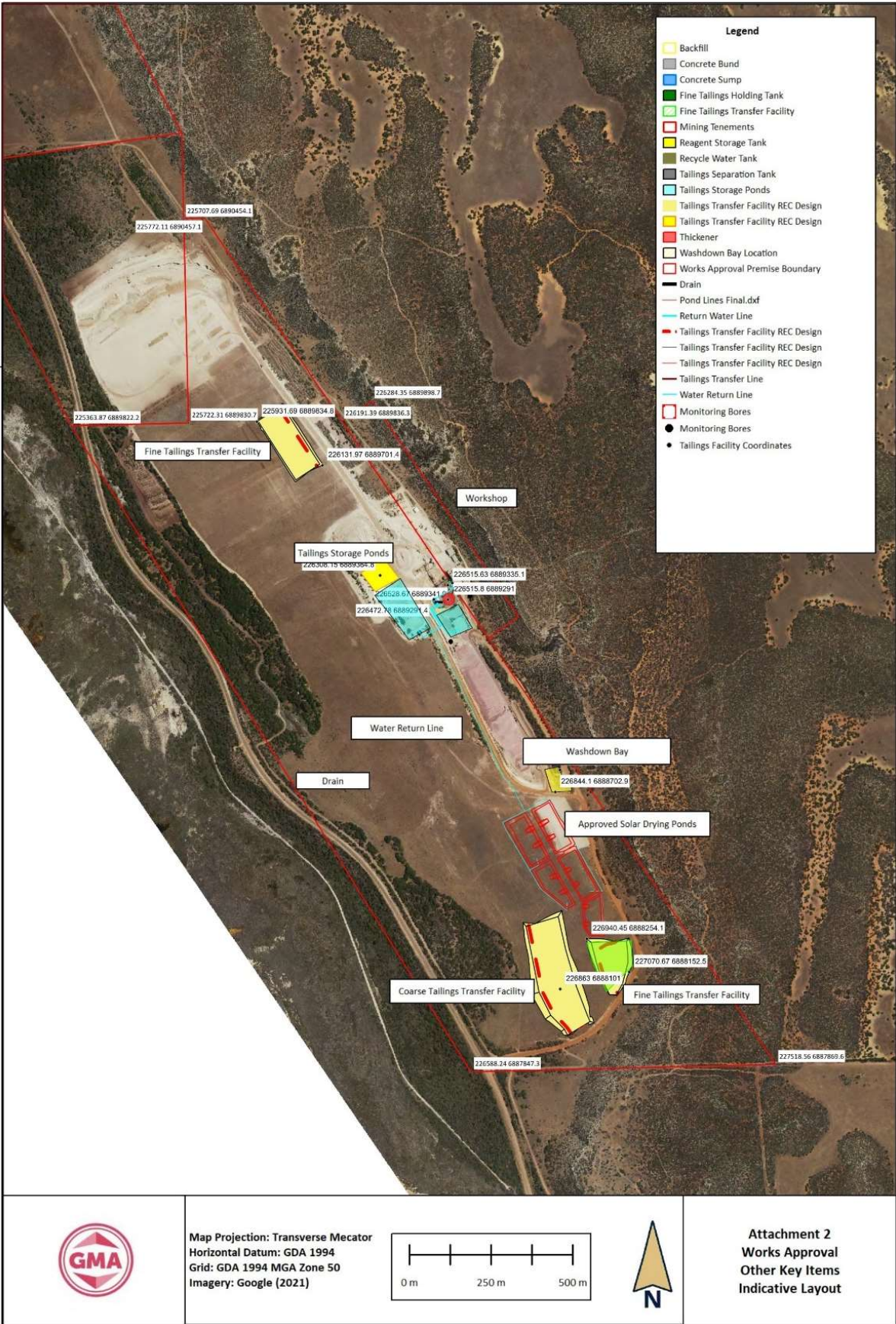


Figure 1: Proposed prescribed premises and location of proposed infrastructure



### 2.3.1 Plant optimisation infrastructure

The applicant is proposing to construct the following infrastructure as part of the processing cycle to optimize the Hose plant operation. The new infrastructure includes:

- Thickener tank with a capacity of 5,010 m<sup>3</sup>;
- Reagent storage tank with a capacity of 5,000 L to hold flocculant or coagulant;
- Tailings separation tank with a capacity of 88,000 L that will separate coarse and fine tailings;
- Installation of up to four new attritioners, up to a bank of eight cells to be located within existing wet plan processing facility; and
- Concrete sump with suitable capacity (100,000 L) and associated pump for managing plant run-off water and decant water for drying ponds.

These works will occur within the footprint of the existing process and raw ponds, which will be excavated and backfilled to enable the construction of the concrete pad on which the new thickener and reagent storage tank will be placed. This bunded pad will contain a drain that will direct all overflow to the new concrete sump. All proposed plant optimization infrastructure is shown in Figure 2 of Works Approval W6789/2023/1.

In addition, the applicant is proposing to convert two existing thickener tanks into recycling water tanks, both with a capacity of 300 m<sup>3</sup> to replace the existing process water pond which is being decommissioned.

### 2.3.2 Tailings transfer facilities

The applicant has proposed to construct four tailings transfer facilities to store fine and coarse tailings prior to backfill into mine voids. The construction of these facilities will involve earthworks to excavate and level the area, construct access ramps for front loader access and to construct earthen bunds around the perimeter of the facilities to divert water away and prevent run-off from the facility. It is likely that borrow material expected to comprise of mostly sandy soils will be used to construct the facilities. One of the facilities will be a re-profiled existing facility that will use existing dried tailings.

The facilities have been designed to be able to contain rainfall events (see Table 1). Incidental rainfall on the surface area of the facilities is expected to seep through the base due to the nature of the underlying soil. The applicant has proposed to line the fine transfer facilities with coarse material to prevent migration of fine tailings.

The design report suggests that if the construction material differs from sand then an assessment of the material will need to be undertaken by a suitably qualified geotechnical engineer to determine the suitability for construction. The tailings transfer facility design drawings are presented in Figures 8 – 11, Schedule 1 of the attached Works Approval W6789/2023/1.

**Table 1: Dimension of tailings transfer facilities (REC, 2023b)**

Parameter	Northern	Western	Eastern	Re-Profiled Existing
Type of tailings to be stored	Fine	Coarse	Fine	Coarse
Surface area (m <sup>3</sup> )	38,312	50,815	12,805	3,708
Required stormwater capacity (m <sup>3</sup> )	6,666	8,842	2,228	645

Stormwater capacity (m <sup>3</sup> )	13,188	27,033	2,969	743
Density (t/m <sup>3</sup> )	1.45	1.45	1.45	1.45
Batter slopes	1V:5H	1V:3H	1V:5H	1V:5H
Storage capacity (m <sup>3</sup> )	98,000	201,000	24,800	9,800
Storage capacity (t)	127,400	261,300	32,200	12,700

During operation, the tailings transfer facilities will receive coarse and fine tailings, which will be generated when the waste feed from the wet processing plant is pumped into the proposed tailings separation tank. The fine tailings forming at the top of the tank will be transferred into the existing fine tailings transfer tank before going through the new thickener tank. The drying ponds to be constructed under this works approval will support the drying of the fine tailings prior to their excavation and storage at the fine tailings transfer facilities. Coarse tailings from the separation tank will be returned to existing dewatering cyclones to remove excess water, before being stockpiled to the coarse tailings transfer facilities.

### 2.3.3 Washdown Bay

The construction of the washdown bay will involve clearing of native vegetation, earth moving and the installation of concrete pads, sumps and settlement pits and the installation of tanks. The washdown will involve:

- Heavy mobile equipment (HME) wash pad with dimensions of 7.9 m x 12 m and 75 mm perimeter bunding;
- Light vehicle (LV) wash pad about 4 m x 7.9m with a perimeter bunding of 75 mm;
- Drying pad about 7.9 m x 7.9 m with a perimeter bunding of 100 mm;
- 3 individual concrete settlement sumps with the total size of 16 m x 8 m;
- Oily water separator tank with the capacity to process 5,000 litres per hour; and
- 2 water storage tank with a capacity of 20,000 litres each.

The HME wash pad will be angled to direct water runoff into the concrete sumps. The LV wash pad will be connected to the sumps by a pipeline. The layout for the washdown bay can be found in Figure 13 of Schedule 1 of the Works Approval W6789/2023/1.

All washdown water will be directed towards sumps and settlement pits before undergoing oil-water separation. This water will be stored at the two proposed water tanks which will involve further water treatment. This recycled and treated water will be reused at the washdown facility.

### 2.3.4 Replacement of existing Tailings Evaporation Ponds

There are currently three drying ponds used for tailings deposition. The applicant proposes to decommission all three ponds, which will be excavated, backfilled and levelled. Two new drying ponds will be constructed with greater total capacity (Table 2) than the existing ponds and will have a water return system (lacking in the existing ponds). Earthworks will involve using coarse tailings and the natural material on site (sand) to construct the ramps and appropriate. The excavated material will be used to construct a 0.5 m high bund around the perimeter of the ponds (except where the ramp is). The Hazard rating for these ponds under Department of Mines, Industry Regulation and Safety (DMIRS) Code of Practice is Category 3 – Low, considering the maximum height of embankment is less than 5 m. The slope of the ponds will be 1V:3H for the internal batter slope and 1V:10H for the ramp used to reclaim the dried tailings. Figures 3 and 4 in Schedule 1 of the Works Approval W6789/2023/1 display the design

drawings.

**Table 2: Tailings Evaporation Pond capacities**

Parameter	Pond 1 (south-east)	Pond 2 (west)
Maximum crest height (m)	2.7	4
Storage capacity (m <sup>3</sup> )	5, 571	25,102
Storage capacity (t)	8,078	36,398
Life (days)	9	40

The applicant has stated that the environmental commissioning activities will be limited to testing the integrity of the tailings transfer pipes and pumps from the new thickener tank to the modified tailings drying ponds. During this testing the pipes will be visually inspected for leaks. After successful hydrotesting, the valves and spigots will be installed and the pipes will be ready for time-limited operations.

The fine tailings will be transferred via HDPE pipelines from the thickener tank underflow and deposited sub-aerially from two discharge points located on the north and east batter slopes of each pond. The expected rate of deposition of tailings into the ponds is 634 m<sup>3</sup>/day of 50% w/w slurry density.

A supernatant pond is expected to form in the southern area due to pond design where the decant water will be pumped out by a turret pump to the concrete sump, and then to the recycle water tanks. Under normal operating conditions, the decant pond is not expected to exceed a volume of 47 m<sup>3</sup> per day. To reduce seepage, the pond should be kept to as small as practicable. The ponds will be operated to provide a minimum 500 mm total freeboard, which will include a 300 mm operational freeboard and the allowance for 1% AEP 72-hour rain event, above the normal operating pond. It was recommended in design report prepared by REC (2023a) that the water recovery system have a minimum capacity of not less than 30 m<sup>3</sup>/day. The expected average daily water removal from these ponds is 468 m<sup>3</sup>/day. Water recovery must be around 70-75% slurry water in order to achieve the design in-situ density of 1.45 t/m<sup>3</sup> of the dried tailings.

When returned to the recycle water tanks, decant water will then be reused for wet plant processing or dust suppression on the premises. Once the deposited tailings are dried, they will be excavated and carted to the fine tailings transfer facility (constructed under this works approval).

#### Inspections and monitoring

Routine inspections during time-limited operations will involve inspections of batter slopes for signs of excessive erosion, ensuring the freeboard limit is maintained, the size and location of the supernatant ponds and the visual integrity of pipelines and bunding.

The applicant has also proposed to install two groundwater monitoring bores to detect potential impacts from seepage from the two ponds. They are located hydraulically downgradient and upgradient from the ponds. The monitoring program will be the same as that approved in monitoring bores for works approval W6584/2021/1 which involves the monthly monitoring of standing water level (SWL), pH and electrical conductivity and quarterly monitoring of total dissolved solids, total hardness, total alkalinity and a suite of metals for the duration of time-limited operations.

### **2.3.5 Decant water recovery system for approved solar drying ponds under W6584/2021/1**



The construction of five solar drying ponds in the southern area of mining tenement M70/856 were approved under works approval W6584/2021/1 granted on 22 December 2021. The applicant has advised that these ponds are not yet constructed. The approved location of the solar drying ponds can be seen in Figure 1.

The applicant proposed to build a water recovery system in the solar ponds. In design report, prepared by REC (2021) it is expected that the volume of water to be recovered via return pumping is 461 m<sup>3</sup>/day. The water from these ponds will be returned by a turret pump and banded HDPE pipelines to the concrete sump that will be constructed under this works approval. Based off the design report (REC, 2021) it was suggested that the water recovery system have a minimum capacity of no less than 20 tonnes per hour (tph). The water balance calculated that the expected seepage rate would be 154 m<sup>3</sup>/day, plus about 80 m<sup>3</sup>/day lost via evaporation and 287 m<sup>3</sup>/day retained in the tailings. The decant pond is to not exceed 1,400 m<sup>3</sup>.

### 2.3.6 Time-limited operations

Time-limited operations are proposed for a duration of 180 days for all infrastructure to be constructed on this works approval. Operations will involve ore being placed in the wet processing facility. The flocculant Magnafloc 1425 (approved for use under works approval W6584/2021/1) will be pumped into the processing facility to aid in extraction of minerals from the raw feed.

As discussed in Section 2.3.1, tailings from the wet processing facility will be pumped into the new tailings separation tank that will separate the coarse and fine tailings. Coarse tailings will be separated, dried and stockpiled while fine tailings will be placed in the Fine Tailings Holding tank before being sent to the tailings drying ponds via consolidation in the new thickener tank. Once the fine tailings have consolidated in the drying ponds, they will be excavated out and stored at the fine tailings transfer facilities prior to being backfilled in a mine void.

As discussed in 2.3.4, environmental commissioning activities will be limited to testing the integrity of the tailings transfer pipes and pumps from the new thickener tank to the modified tailings drying ponds.

## 3. Legislative context

### 3.1 Part V of the EP Act

The applicant has advised that a total of 0.58 hectares (ha) of native vegetation regrowth is proposed to be cleared using mechanical clearing methods for this project. About 0.46 ha of clearing will be covered by native vegetation clearing permit CPS9065/1 granted on 19 November 2020 for the construction of the washdown bay area and associated roads. The remaining 0.12 ha of vegetation located around the plant site for the construction of the new plant optimisation infrastructure will be covered by CPS8860/1 granted on 14 May 2020.

### 3.2 Mining Act 1978

The Department of Mines, Industry Regulation and Safety (DMIRS) advised that the Mining Proposal related to this project (Registration ID: 115648) has been submitted and is currently under assessment by DMIRS regarding the modifications to the existing Tailings Evaporation Ponds.

### 3.3 Contaminated Sites Act 2003

A fuel spill in the vicinity of the diesel fuel bund area on General Purpose lease G70/171 is classified as *possibly contaminated, with investigation required* (PC-IR) under the *Contaminated Sites Act 2003*. This classification was made on 25 August 2021 due to hydrocarbon contamination occurring from an oil spill surrounding the diesel fuel pad. Remediation works

were undertaken, however an area within the vicinity of the fuel bund could not be remediated due to active underground services. Investigative works are required at mine closure to confirm the extent of contamination before commencing remediation works.

## **4. Noise modelling**

The application included a noise modelling report (GHD 2022) for the proposed construction activities. Although the nearest human dwelling is over 5 km away from the proposed activity (see Table 4), the modelling was conservatively based on a 2 km separation distance from northern edge of the prescribed premises boundary defined in licence L8561/2011/1. The noise model predicted that even at a closer distance of 2 km, noise emissions will meet the assigned noise levels at the two nearest human receptors.

## **5. 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.

### **5.1 Source-pathways and receptors**

#### **5.1.1 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 below. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

**Table 3: Proposed applicant controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Construction</b>			
Dust	<ul style="list-style-type: none"> <li>• Topsoil stripping and stockpiling; and</li> <li>• Earthmoving works for:               <ul style="list-style-type: none"> <li>○ Modification to existing evaporation ponds;</li> <li>○ Backfilling and excavation of existing return water pond area;</li> <li>○ Levelling for tailings transfer facilities and washdown bay; and</li> <li>○ Earthen bunding around perimeter of transfer facilities.</li> </ul> </li> </ul>	Air / windborne pathway	<ul style="list-style-type: none"> <li>• Dust will be managed by watering unsealed roads with a water cart;</li> <li>• Dust management measures will be implemented around construction areas;</li> <li>• During high winds, where topsoil stripping is required, this will be restricted if dust cannot be adequately controlled; and</li> <li>• Vehicle traffic is confined to defined roads.</li> </ul> <p><u>Existing condition on Part V L8561/2011/1:</u></p> <ul style="list-style-type: none"> <li>• Dust monitoring; and</li> <li>• Dust suppression requirements.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• Installation of new thickener, cement sump, reagent tank;</li> <li>• Installation of new attritioners; and</li> <li>• Any earthworks as noted above.</li> </ul>		N/A
<b>Commissioning</b>			
Tailings discharge	<ul style="list-style-type: none"> <li>• Pipeline rupture - Testing tailing transfer pipelines.</li> </ul>	Direct discharge to land	<ul style="list-style-type: none"> <li>• Routine daily inspections of the pipeline by trained personnel; and</li> <li>• Pipeline constructed in containment bund (i.e. trench)</li> </ul>
<b>Operation</b>			
Process plant materials (including process water, tailings, reagents)	Thickener tank	Overtopping	<ul style="list-style-type: none"> <li>• Alarm and automatic cutoff supply pump;</li> <li>• Constructed on concrete pad with 75-100 mm bunding which drains to concrete sump; and</li> <li>• Daily inspections.</li> </ul>
	Reagent Tank		<ul style="list-style-type: none"> <li>• Constructed on concrete pad with 75-100mm bunding which drains to concrete sump;</li> <li>• Reagent storage in accordance with AS/NZS3833:2007; and</li> <li>• Daily inspections.</li> </ul>
	Concrete Sump		<ul style="list-style-type: none"> <li>• Adequate freeboard and capacity.</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
	Tailings separation tank	Overflow	<ul style="list-style-type: none"> <li>Fitted with a monitoring system for the tank level.</li> </ul>
	Recycled water tanks	Rupture of tank	N/A
	Pipeline rupture of return water system from existing solar ponds (approved under W6584/2021/1).	Direct discharge to land	<ul style="list-style-type: none"> <li>Routine daily inspections of the pipeline by trained personnel; and</li> <li>Pipeline constructed in containment bund (i.e. trench).</li> </ul>
Tailings	Tailings evaporation pond pipeline rupture		
	Tailings evaporation ponds	Overtopping of ponds and discharge to land	<ul style="list-style-type: none"> <li>Ponds constructed with an earthen bund around the perimeter of the ponds; and</li> <li>Operational freeboard of 300 mm maintained at all times.</li> </ul>
Tailings leachate		Seepage through base and walls of ponds	<ul style="list-style-type: none"> <li>Groundwater standing water level and quality monitoring</li> </ul>
Dust	Tailings transfer facilities	Air / windborne pathway	<ul style="list-style-type: none"> <li>No transfer during high winds</li> </ul> <p><i>“Dust management procedure” controls:</i></p> <ul style="list-style-type: none"> <li>Use of water trucks to dampen areas identified as being potentially dust generating; and</li> <li>Introducing dust suppression activities where required.</li> </ul> <p><u>Existing condition on Part V L8561/2011/1:</u></p> <ul style="list-style-type: none"> <li>Dust monitoring; and</li> <li>Dust suppression requirements.</li> </ul>
Contaminated stormwater		Direct discharge to land	<ul style="list-style-type: none"> <li>Earthen bunding constructed around perimeter of facility to divert surface water flows away and prevent surface water flow from the facility.</li> </ul>
Sediment/fines laden stormwater and leachate		Seepage through base of facility	<ul style="list-style-type: none"> <li>Proposed that the fine tailings transfer facilities will need to have a layer of coarse sand above the inward grade to prevent migration of fine tailings.</li> </ul>
Sediment laden runoff	Washdown bay facility	Direct discharge to land	<ul style="list-style-type: none"> <li>Construction of drainage sumps and three settlement pits to capture run-off water;</li> <li>Installation of oily water separator and two water storage tanks to treat the run-off before recycle back to processing; and</li> <li>A raised perimeter bund of minimum 75mm for the wash and drying pad.</li> </ul>
Hydrocarbon laden runoff			

## 5.1.2 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 4 and Figure 2 below provides a summary of potential human and environmental receptors that may be impacted because of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

**Table 4: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Nearest rural dwelling	Nearest human receptors are two residential properties over 5 km from the activities associated with this works approval: <ul style="list-style-type: none"> <li>• 2217 George Grey Dr</li> <li>• Lucky Bay Shacks</li> </ul>
Aboriginal Sites & Heritage Places – <i>Utcha Well</i> Native Title Holders: <i>Bundi Yamatji Aboriginal Corporation</i>	Located directly north-west from the prescribed premises. About 800 m from proposed activity. Documents sites of spiritual significance to local Aboriginal people.
Environmental receptors	Distance from prescribed activity
DBCAs Legislated Tenure - <i>Utcha Well Nature Reserve</i>	Located directly north-west from the prescribed premises and about 500 m from the nearest proposed activity (construction and operation of the northern fine tailings transfer facility).  Note: purpose of this reserve is for the conservation of flora and fauna.  Covers area of 400 ha – several small, connected perennials and ephemeral wetlands ( <i>Utcha Swamps</i> ). Hydrologically connected to Hutt Lagoon and provides important habitat for shorebirds and raptures.
Ecologically significant flora	Identified through desktop assessment of department's database: <ul style="list-style-type: none"> <li>• <i>Caladenia elegans</i> (Threatened) within 1 km south of the proposed prescribed premises;</li> <li>• <i>Lasiopetalum oldfieldii</i> (P3) within 2 km of the proposed prescribed premises; and</li> <li>• <i>Acacia litipes subsp. licina</i> (P3) within 2km of the proposed prescribed premises.</li> </ul>



<p>Surface water bodies / lines</p> <p>Hutt Lagoon:</p> <ul style="list-style-type: none"> <li>• Water supply to the lagoon only via direct precipitation, surface inflow from minor creeks and seepage of groundwater (from coastal dunes);</li> <li>• Coastal brine lake – (naturally high salinity (&gt;150,000 mg/L) and important stopover for migratory waders and provide a large area of habitat for native flora &amp; fauna;</li> <li>• Quite high aquatic invertebrate diversity compared to other sampling from similar salinity wetlands;</li> <li>• listed as a wetland of national importance on the Directory of Important Wetlands in Australia (DIWI).</li> </ul>	<p>Within 100 m to the west of tenement M70/856 and about 300 m west of the nearest proposed activity (construction and operation of the southern coarse tailings transfer facility).</p> <p>No surface water lines are located within the proposed prescribed premises (M70/856 and G70171).</p> <p>Topography of the area suggests that surface water from the premises drains westerly to the Hutt Lagoon.</p>
<p>Gascoyne Groundwater Area, proclaimed under RIWI Act 1914</p>	<p>Beneath premises - depth varies across the site, from 0.43 m along the edge of Hutt Lagoon to 40 m in bores adjacent to the scarp (east boundary of prescribed premises). Groundwater levels near Hose plant (located within M70/856) is approximately 30 metres below ground level (mbgl).</p> <p>Fresh / brackish groundwater in superficial aquifer discharges over saltwater wedge of hypersaline groundwater extending beneath eastern edge of Hutt Lagoon.</p> <p>At the base of aquifer, salinity ranges from 1,200 to 1,500 mg/L, with higher salinities (up to 30,000 mg/L) within 0.5 to 1.5 km of the Utcha Swamp and at the Hutt Lagoon perimeter (up to 150,000 mg/L).</p> <p>Salinity of groundwater at the Utcha Swamp borehole ranged from 400-1100 mg/L TDS between January 2020 to July 2021.</p>

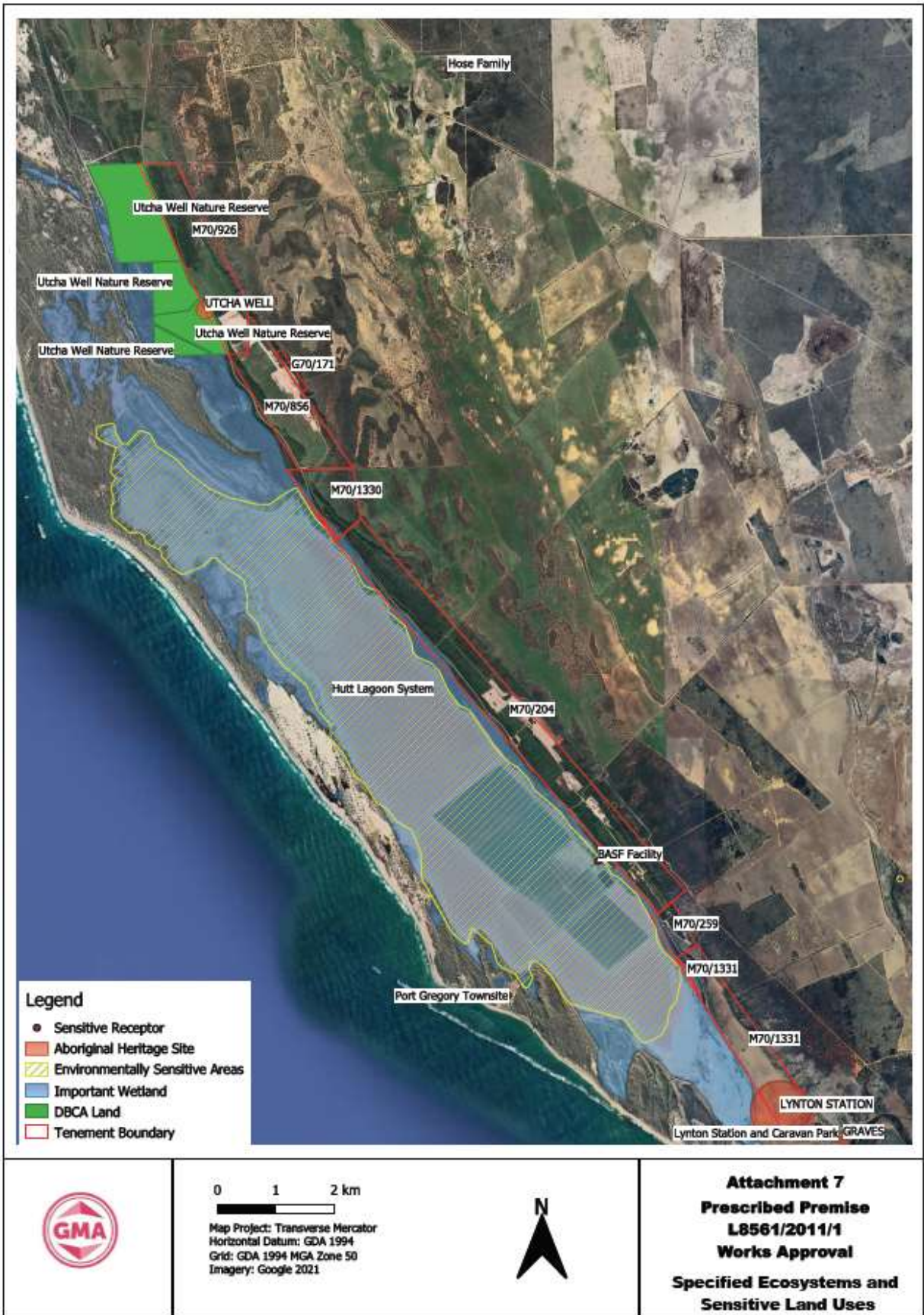


Figure 2: Distance to sensitive receptors

## 5.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and considers potential source-pathway and receptor linkages as identified in Section 5.1. 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 5.1), 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 5.

Works approval W6789/2023/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 5 have been determined in accordance with Guidance Statement: Setting Conditions (DER 2015).

A licence amendment 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. mineral sands processing 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 5: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation**

Risk events					Risk rating <sup>1</sup>	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
<b>Construction</b>								
<ul style="list-style-type: none"> <li>Earthworks and modifications to existing evaporation ponds;</li> <li>Earthworks to backfill and excavate return water pond area;</li> <li>Construction of tailings storage facility; and</li> <li>Construction of washdown bay.</li> <li>Installation of new thickener, cement sump, reagent tank; and</li> <li>Installation of new attritioners.</li> </ul>	Dust	<b>Pathway:</b> air / windborne <b>Impact:</b> disturbance to fauna & smothering of vegetation	Nearby native vegetation, including within Utcha Well Nature Reserve about 500 m from proposed construction activities	Refer to Section 5.1.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 4: construction requirements to undertake dust suppression with the use of water carts	Due to proximity of the receptor, including vegetation within Utcha Well Nature Reserve, the Delegated Officer has determined that applicant controls will be conditioned with the works approval to reduce the risk of dust impacts to an acceptable level.
	Noise	<b>Pathway:</b> air / windborne <b>Impact:</b> disturbance to amenity of human receptors	Residential receptors > 5 km from proposed construction activities		C = Slight L = Unlikely <b>Low Risk</b>	N/A	N/A	Due to this distance between the proposed activities to the nearest receptor and the results of the noise emissions modelling, the Delegated Officer has determined that the risk of noise emissions impacting off-site receptors is low and requires no regulatory control.
<b>Commissioning</b>								
Testing tailing transfer pipelines	Tailings discharge	<b>Pathway:</b> direct discharge to land via pipeline rupture <b>Impact:</b> contamination of soil & vegetation	Soils and nearby native vegetation	Refer to Section 5.1.1	C = Slight L = Possible <b>Low Risk</b>	Y	Condition 1: pipelines to be constructed in bunding Condition 13: testing of pipeline integrity with process water	The Delegated Officer has determined the proposed controls including construction of bunding along the pipeline to be sufficient to cover the risk of pipeline rupture during the commissioning phase.
<b>Operation (including time-limited-operations)</b>								
Tailings treatment infrastructure including <ul style="list-style-type: none"> <li>Tailings separation tank</li> <li>Thickener tank</li> <li>Reagent tank</li> <li>Concrete sump</li> </ul>	Process water Tailings Flocculant / coagulant	<b>Pathway:</b> direct discharge via overflow or failure of tank integrity or overflow of concrete sump <b>Impact:</b> contamination of soils & vegetation	Soils and nearby native vegetation	Refer to Section 5.1.1	C = Minor L = Unlikely <b>Medium Risk</b>	N	Condition 1: thickener tank to be fitted with monitoring level <b>Condition 1: tailings separation tank to be bunded</b> and fitted with a level alarm Condition 1: concrete sump constructed with sufficient holding capacity and freeboard requirements Condition 1: thickener tank constructed in bunded area (drainage into concrete sump) and with automatic pump cut-offs Condition 18: Automatic pump cut-out will be confirmed during TLO Condition 18: concrete sump freeboard Condition 19: inspection of thickener tank, reagent tank, concrete sump	To reduce the risk of a loss of containment, the Delegated Officer has specified the applicant's proposed infrastructure controls on the works approval, namely that the thickener tank be fitted with alarms and pump cut-offs and have secondary containment (be placed in concrete bunding). The concrete sump will be fitted with control valve and pump to direct inflow to the water tanks and be designed to have a minimum freeboard with a capacity to allow for a 1% AEP 72-hour rain event. In the design report, an estimated water balance was provided indicating a total volume of 947,000L/day may be pumped through the concrete sump. As an additional regulatory control, the Delegated Officer has determined that the tailings separation tank should be fitted with secondary containment in the event of a spill in addition to the level alarm.
Four new tailings transfer facilities (two coarse and two fine)	Dust	<b>Pathway:</b> air / windborne <b>Impact:</b> smothering of vegetation	Nearby native vegetation, including within Utcha Well Nature Reserve about 800 m from proposed construction activities	Refer to Section 5.1.1	C = Moderate L = Possible <b>Medium Risk</b>	N	<b>Condition 18: dust suppressant on stockpiles</b>	In consideration potential impacts of dust vegetation within the Utcha Well Nature Reserve (located about 600m north-west of the proposed fine tailings facility), the Delegated Officer has determined that an additional regulatory control is to be conditioned to wet down visible dust lift off from the facility stockpiles.
	Contaminated stormwater	<b>Pathway:</b> direct discharge to land via contamination of stormwater from the stored tailings <b>Impact:</b> contamination of soils, vegetation and surface water ecosystems	Nearby vegetation Hutt Lagoon (~300 m from coarse tailings facility) and Utcha Well Nature Reserve (~500 m from fine tailings facility)		C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1: construction requirements for perimeter bunding & storage to have capacity of stormwater	The applicant proposed control is to construct an earthen bund around the perimeter of the facility to prevent contaminated stormwater from causing surface impacts to vegetation and soil. The Delegated Officer has determined that the bund will be sufficient in preventing overflow of contaminated stormwater.



Risk events					Risk rating <sup>1</sup>	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
	Tailings leachate	<b>Pathway:</b> seepage from tailings stockpile <b>Impact:</b> contamination of soils, groundwater and migration to down-hydraulic gradient surface water receptors	Groundwater and Hutt Lagoon (~300 m from coarse tailings facility)		C = Slight L = Possible <b>Low Risk</b>	Y	N/A	The Delegated Officer has determined the inert nature of the dried tailings to be excavated from the ponds and temporarily stored at the facilities and the risk of leachate from the tailings are not considered a significant risk and therefore no additional regulatory controls will be conditioned.
Washdown facility	Sediment laden / hydrocarbon contaminated wash water and stormwater	<b>Pathway:</b> direct discharge to land via run off from facility and tank rupture <b>Impact:</b> contamination of local soil and vegetation	Soils and nearby native vegetation	Refer to Section 5.1.1	C = Minor L = Unlikely <b>Medium Risk</b>	N	Condition 1: construction requirements for bunding <b>Condition 1: water tanks and oily water separator to be placed within bunded areas</b> Condition 18: ensuring water is directed to settlement pits Condition 19: inspections of bunding and tank integrity	The applicant's proposed controls to bund the washdown area and construct drainage sumps to direct washdown water to pits to be recycled will be conditioned within the works approval. In addition, the oily-water separator and water tanks are to be installed within the bunded area.
Operation of two new tailings evaporation ponds	Tailings or return water	<b>Pathway:</b> direct discharge to land via pipeline rupture <b>Impact:</b> contamination of local soil and vegetation	Soils and nearby native vegetation	Refer to Section 5.1.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 1: constructed within bunds Condition 13: testing of pipeline integrity Condition 18: inspections of secondary containment	The Delegated Officer has determined that bunding and correctly conducted inspections of the pipeline are sufficient in mitigating the risk associated with pipeline rupture.
	Seepage of tailings leachate	<b>Pathway:</b> seepage to groundwater <b>Impact:</b> mounding and contamination of groundwater causing impacts to native vegetation	Soil, groundwater and vegetation (~300 m to west) Hutt Lagoon (~600 m to west)	Refer to Section 5.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	N	Condition 2: construction requirements for ponds Condition 3: monitoring bore construction Condition 5: baseline groundwater quality monitoring Condition 21: TLO groundwater monitoring for SWL and quality <b>Condition 3 and 21: additional groundwater monitoring locations</b>	The applicant has not proposed any controls to reduce seepage given it is a design feature of the ponds to allow for consolidation of dried tailings. The proposed controls to install monitoring bores that are subject to the groundwater monitoring of SWL and a limit of 4 mbgl will be conditioned. In addition, the Delegated Officer has specified the installation of an additional two bores around the ponds to provide improved spatial coverage for monitoring of potential mounding and impacts to water quality.
		<b>Pathway:</b> seepage to groundwater <b>Impact:</b> contamination of groundwater causing impacts to nearby surface water receptors						The overall risk of seepage causing groundwater contamination and migration of contaminants to nearby receptors is considered to be medium, given the wet processing of tailings involves mostly physical separation of the desired material, with the only chemical input being the addition of coagulant or flocculant. In works approval W6584/2021/1 the department determined the use of flocculant <i>FloPam T MAN610VH-15</i> and coagulant <i>Magnafloc 1425</i> in the processing as acceptable given it does not increase the risk of the inert nature of the tailings (primarily calcite group of fine carbonate sand and silt with smaller percentages of quartz). In recent Environmental Reports for the operating licence L8561/2011/1 the quality of the slimes deposited in the existing ponds had a neutral pH ranging from 7.6-8 and a TDS ranging from 1,100 to 6,900 mg/L. The applicant's proposed groundwater monitoring program aligns with existing monitoring of contaminants in the vicinity of existing solar ponds at the premises to observe the impacts of seepage on the groundwater quality. The Delegated Officer is satisfied that with the installation of two additional two bores around the ponds to capture potential impacts to the west and east of the ponds the risk is reduced to an acceptable level. The installation of bores will also confirm depth of groundwater in the local area and inform ongoing risk assessment.
	Processed tailings	<b>Pathway:</b> overtopping of ponds <b>Impact:</b> contamination of local soil and vegetation	Soils and nearby native vegetation	Refer to Section 5.1.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 2: construction requirements for ponds Condition 18: freeboard limit	The applicant's proposed controls for a freeboard limit and construction of a 0.5m safety bund around the perimeter to be sufficient in mitigating the risk of overtopping events impacting receptors.



Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification for regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
							Condition 19: pond inspections for freeboard and integrity of batter slopes	
Return water pipelines from approved solar drying ponds	Decant process water	<b>Pathway:</b> direct discharge to land via pipeline rupture <b>Impact:</b> contamination of soil & vegetation	Soils and nearby native vegetation	Refer to Section 5.1.1	C = Slight L = Unlikely <b>Low Risk</b>	Y	Condition 1: pipelines constructed in secondary containment Condition 19: inspections of secondary containment	The applicant's proposed control to maintain the pipeline in secondary containment is considered sufficient to capture spills or leaks to mitigate the risk.

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.

## 6. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

**Table 6: Consultation**

Consultation method	Comments received	Department response
Application advertised on the department's website on 24 March 2023	None received.	N/A.
Application advertised in the West Australia on 27 March 2023	None received.	N/A.
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal on 29 March 2023.	DMIRS replied on 12 April 2023 advising that the activities outlined in this application appear consistent with the Mining Proposal currently under assessment.	The applicant is required to obtain relevant approvals under the <i>Mining Act 1978</i> prior to the commencement of any proposed works under this works approval at the premises.
	DMIRS advised that although Port Gregory is considered a low-risk operation, the applicant is still required to have an approved Radiation Management Plan and do not yet have an exemption from Part 10.2 Division 3 of the <i>Work Health and Safety (Mines) Regulation 2022</i> . DMIRS will continue to liaise with the applicant regarding approvals under this legislation.	Noted. Radiation is not an aspect regulated under Part V of the EP Act.
Department of Biodiversity, Conservation and Attractions (DBCA) advised of proposal on 29 March 2023.	DBCA has advised that there have been observed declines in vegetation health and condition in areas adjacent to Utcha Well Nature Reserve, potentially linked to dust deposition from mining activities.  DBCA recommends a review of the proponent's dust and weed managements are undertaken to ensure any risk or impact from mining activities on sensitive receptors (Utcha Well Nature Reserve) beyond the proponents prescribed premises are avoided.	The department has considered potential impacts to Utcha Well Nature Reserve from dust emissions generated by the proposed activities in the risk assessment.  The department notes that weed management is not regulated as an emission under Part V of the EP Act.
Department of Planning, Lands and Heritage (DPLH) advised of proposal on 29 March 2023.	None received.	N/A.

Bundi Yamatji Aboriginal Corporation RNTBC advised of proposal on 29 March 2023.	None received.	N/A.
Applicant was provided with draft documents on 23 June 2023.	Applicant replied on 28 June 2023, addressing outstanding matters and requesting to waive consultation period.	Noted.

## 7. 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. Department of Environment (DOE) 2005, *Hutt River Foreshore Assessment*, Department of Environment, Water Resource Management Series No WRM 45.
2. Department of Environment and Conservation (DEC) 2009, *Resource Condition Report for a Significant Western Australian Wetland: Hutt Lagoon*. Department of Environment and Conservation, Perth, Western Australia.
3. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
5. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
6. GHD 2022, *Noise Assessment for Additional Plant Infrastructure Construction Works*, letter report dated 16 December 2022.
7. Resource Engineering Consultants (REC) Pty Ltd 2021, *Tailings Storage Facility Design Report, Port Gregory Operations, Western Australia. GMA Garnet Pty Ltd*, Revision 1.
8. Resource Engineering Consultants (REC) Pty Ltd 2023, *Tailings Storage Facility Design Report, Port Gregory Operations, Western Australia, GMA Garnet Pty Ltd*, Revision 2.
9. Resource Engineering Consultants (REC) Pty Ltd 2023, *Transfer Facilities Design – P21-35-PR-06/TM02*.