Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6524/2021/1
Applicant	Mardie Minerals Pty Ltd
ACN	152 574 457
File Number	DER2021/000126
Premises	Mardie Project Wastewater Treatment Plant Legal description - Part of the Exploration Tenement E08/1849 and E09/2740 As defined by the coordinates in Schedule 1 of the Works Approval
Date of Report	05/07/2021
Status of Report	Final

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Abbie Crawford
Senior Environmental Officer, Industry Regulation

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the Public Sector Management Act 1994 and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the Public Sector Management Act 1994 and is responsible for the administration of the Environmental Protection Act 1986 along with other legislation.
EPA	Environmental Protection Authority
EP Act	Environmental Protection Act 1986 (WA)
EP Regulations	Environmental Protection Regulations 1987 (WA)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
m^3	cubic metres
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Risk Event	As described in Guidance Statement: Risk Assessment
WQPN 22	Water Quality Protection Note 22, Irrigation with Nutrient Rich Wastewater

2. Purpose and scope of assessment

Mardie Minerals Pty Ltd (Applicant) has applied for a works approval to construct a wastewater treatment plant and an irrigation area within exploration tenement E08/1849 and E08/2740.

The application specifically requests approval for:

- the installation of two additional 20 m^3/ day package wastewater treatment plants (WWTP) to supplement the existing 20 m^3/ day wastewater treatment plant; and
- expansion of the existing irrigation area to accommodate the additional loading.

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Application form including following supporting information; 1. Attachment 1A – Proof of occupier status 2. Attachment 1B – ASIC company extract 3. Attachment 2 – Prescribed premises map 4. Attachment 3A – Commissioning plan 5. Attachment 3B – Overview of proposed activities 6. Attachment 5 – Other approvals and consultation 7. Attachment 6A – Emissions and discharges 8. Attachment 7 – Siting and location 9. Cost of Project 10. Attachment 9 – Fee calculation	3 March 2021
Email: Response from applicant to request for further information (Location Map)	28 April 2021
Email: Response from applicant to request for further information (Commissioning plan confirmation)	28 April 2021
Email: Response from applicant to request for further information (nutrient discharge calculation)	4 May 2021

3. Background

The application details that Mardie Minerals Pty Ltd (Mardie Minerals) (Applicant) is currently developing the Mardie Project (Project) located in the western Pilbara region of Western Australia (WA), approximately 80 kilometres (km) south west of Karratha in the City of Karratha. In its entirety, the Project will include solar concentration ponds, crystallisation ponds, processing plants and a marine export facility, capable of producing and exporting up to 4.4 million tonnes per annum of industrial-grade salt (NaCl) and up to 110,000 tonnes per annum of sulphate of potash (SOP), all being derived from seawater.

The Project currently operates an approved 80-man temporary exploration camp (20 x 4 room accommodation blocks) that will be expanded to temporarily accommodate up to 200 persons in the coming months.

The temporary camp which currently operates a small package wastewater treatment plant (WWTP) for the treatment of wastewater, has a design capacity of less than 20 m^3/day, which

is less than the threshold for a prescribed premises. The site requires two additional 20 m^3/day package treatment plants to supplement the existing WWTP. The proposed expansion in capacity of the sewage treatment facility to 60 m^3/day will therefore require a Works Approval (Category 85) under the *Environmental Protection Act 1986* (EP Act).

On 3 March 2021, the applicant submitted an application for a Works Approval under the EP Act for the installation of these two additional 20 m^3/day package WWTP; and expansion of the existing irrigation area to service the exploration camp within tenements E08/1849 and E08/2740.

Table 3 lists the prescribed premises categories that have been applied for.

Table 3: Prescribed Premises Categories

Classification of Premises	**Description**	***Approved Premises production or design capacity or throughput***
Category 85	Sewage facility: premises on which — (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	60 m^3/day

4. Overview of Premises

4.1 Operational aspects

The operational aspects as outlined within the works approval application supporting document are detailed below:

Sewage facility

The temporary camp currently operates a small package plant for the treatment of wastewater from the ablutions and other facilities at the exploration camp. It currently has a design capacity of less than 20 m^3/day. Effluent is collected and pumped from the exploration camp to the WWTP. This application relates to the installation of two additional 20 m^3/day package treatment plants to supplement the existing WWTP.

The proposed Mardie Project WWTP will be located adjacent to the exploration camp as shown on Figure 1 below. The WWTP will be a self-contained system. At the peak, the exploration camp will cater for up to 200 people.

Wastewater will be treated using the Activated Sludge Bioreactor (ASBR) WWTP with an average daily capacity of 50 m^3/day with a capacity to treat up 60 m^3/day peak flow. The Class D standard treated effluent water will be suitable for reuse in low risk category applications or for discharge to the environment. Treated effluent will be discharged via an above ground sprinkler arrangement spray field.

The additional two treatment trains will be manufactured off-site and trucked to the Premises. It will then be assembled and positioned alongside the existing WWTP on the same levelled pad, increasing the physical footprint from approximately 100 m^2 to approximately 250 m^2. There is no additional clearing requirement. Some areas will be concreted for support/stability, as required. Basic components and operation of the ASBR system is shown in Figure 2 below and will include:

- Influent screening and balance tank;
- Anoxic and aerobic treatment;

- Clarification;
- Effluent sterilization (chlorination);
- Bag filtration (100 micron);
- Sludge tank;
- Irrigation / treated effluent tank; and
- A series of pumps, screens, diffusers, blowers and mixers to transfer and process the wastewater.

The balance tanks will be fitted with low level and high level alarms to commence and cease pumping and a 'high level' alarm which activates a visual and sound alarm for abnormally high levels in the tank for immediate action. A small amount of chemicals will be stored in a bunded area for operation of the WWTP.

An appropriately sized fence will be erected around the boundary of the spray field to ensure an effective safety barrier to prevent humans and animals from easily accessing the area. An appropriately signposted entrance/exit gate will be incorporated into the fence and gates will always be kept closed.

The WWTP will be constructed, operated and maintained in accordance with the 'Operations and Maintenance Manual' for the plant, DWER's Works Approval and other stakeholder approvals.

The applicant has indicated that a separate registration to Mardie Mineral's existing licence (L9253/2020/1) will be applied for because the WWTP (premises boundary) is not connected and is located a significant distance (approximately 8 km) from the current licensed premises as shown in Figure 3 below.

Spray irrigation area

The spray field will be utilised for the irrigation of effluent wastewater during commissioning with testing undertaken to prove the WWTP is producing water to the Low Risk standard in accordance with the '*Guidelines for the Non-Potable Uses of Recycled Water in Western Australia*' (DOH 2011).

The irrigation area will be sized in accordance with the Department of Water (DoW) *'Water Quality Protection Note (WQPN 22) Irrigation with Nutrient Rich Wastewater'.* The spray field area is not permanently or seasonally inundated or waterlogged, needs no artificial drainage or requires natural watercourses to be diverted. There are creek systems that provide a conduit for seawater to migrate inwards and outwards in response to tidal variations. There are no Sensitive Water Resources within 500 m of the spray field. The location of the facility is not within a Public Drinking Water Source Area, a wetland with defined conservation value, Environmental Protection Policy Lakes, Waterways Management Areas or other wetland.

A review of the available soil data from the Mardie Project (saline loams with shelly sands) indicated that the maximum allowable nitrogen (N) and phosphorus (P) loads are likely to be based on Risk category B within the WQPN 22 and therefore require a minimum irrigation area of 10.9 ha. The Applicant has subsequently commissioned a soil scientist to characterise the specific soil physicochemical properties of the sprayfield site to confirm this, or to determine if Risk category D is more appropriate, and therefore a smaller irrigation area may be suitable. The final irrigation area will be determined by the Applicant in accordance with WQPN 22 and data supporting the appropriate Risk category will be required upon completion of construction and prior to any application for a licence at the premises. Table 4 below outlines the effluent specifications for each risk type.

Table 4: Effluent specifications

Item	Units	Value
Nitrogen load		
Daily flow rate	m^3/ day	60
TN in effluent	mg/L	<40
Total TN allowed per ha (risk category B)	kg TN/ha/year	180
Total TN allowed per ha (risk category D)	kg TN/ha/year	480
Phosphorous load		
Daily Flow rate	m^3/ day	60
TP in effluent	mg/L	<10
Total TP allowed per ha (risk category B)	kg TP/ha/year	20
Total TP allowed per ha (risk category D)	kg TP/ha/year	120

Commissioning

The commissioning process for the WWTP will have the following phases:

- Pre-commissioning- comprising static checks on un-powered equipment to confirm that the infrastructure has been built according to specification. Operators of the WWTP will be trained in testing and maintenance procedures to ensure the plant is operated in accordance with the manufacturer's specifications. This phase is to be conducted without the addition of chemicals, water or wastewater.
- Wet commissioning- comprising test operation of equipment and facilities with water; and
- Wastewater commissioning- comprising test operation of equipment and facilities with chemicals and wastewater and will comprise the following:
    - Material feeds to the WWTP will be gradually increased until they reach the steady-state design volumes;
    - Treated effluent will be collected in a storage tank and recycled to the WWTP as required to meet effluent irrigation quality specifications;
    - Treated effluent water quality will be established according to a sampling and validation program. Treated effluent will not be disposed of unless the measured parameters comply with the wastewater quality as shown in Table 5 below.

Table 5: Effluent quality

Discharge point	Parameter	Limit
Discharge point to the sprayfied	pH	6.5 - 8.5[1]
	Biochemical Oxygen Demand	<20 mg/L[1]

Discharge point	Parameter	Limit
	Total suspended solid	<30 mg/L[1]
	Total Nitrogen	<40 mg/L
	Total Phosphorus	<10 mg/L
	Total Chlorine	0.2 - 2.0 mg/L[1]
	E. coli	<1000 cfu/100ml[1]

Note 1: Guidelines for Non-potable uses of recycled Water in Western Australia 2011, Department of Health

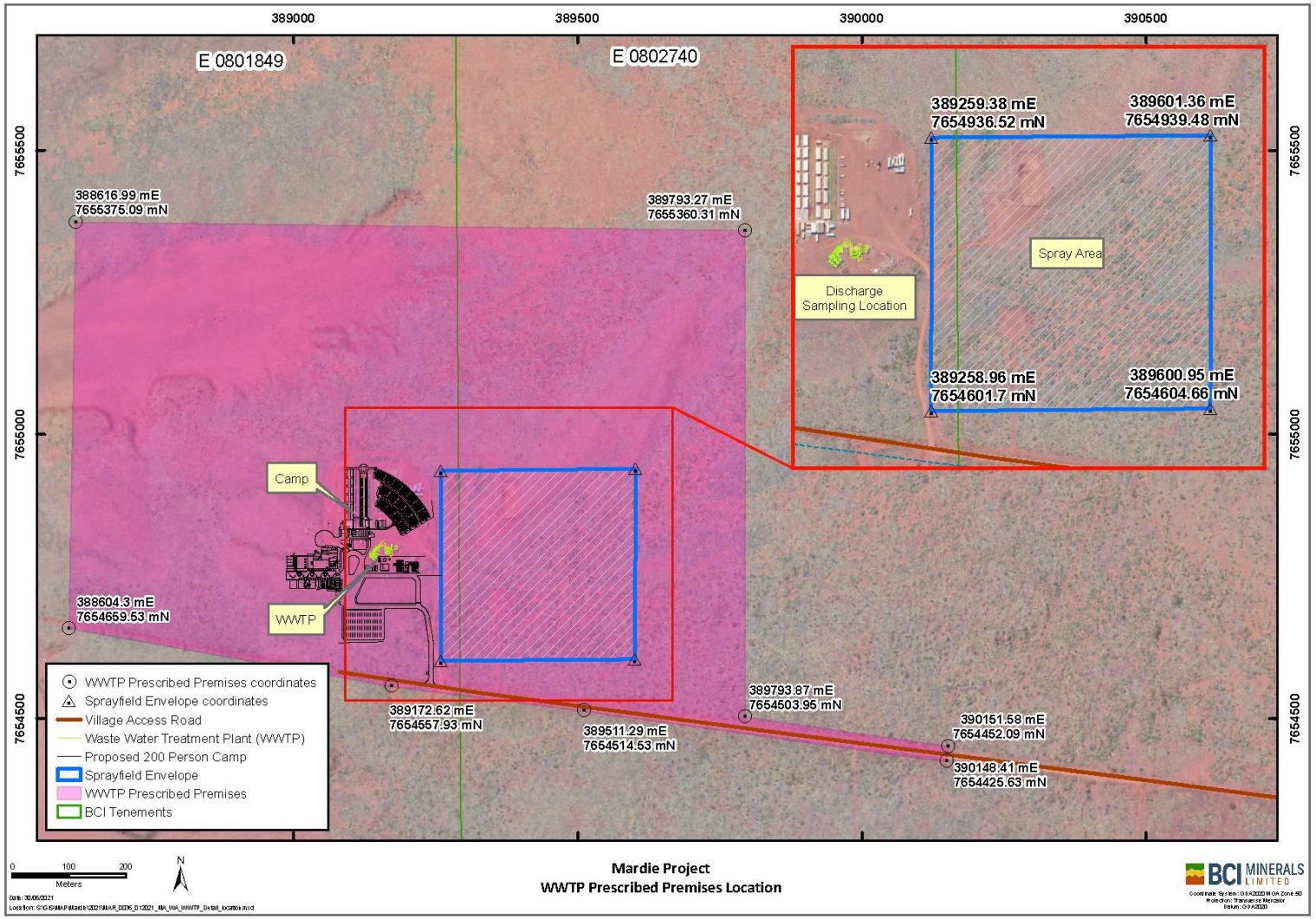

Figure 1: Site and infrastructure layout, showing the largest possible area of the sprayfield.

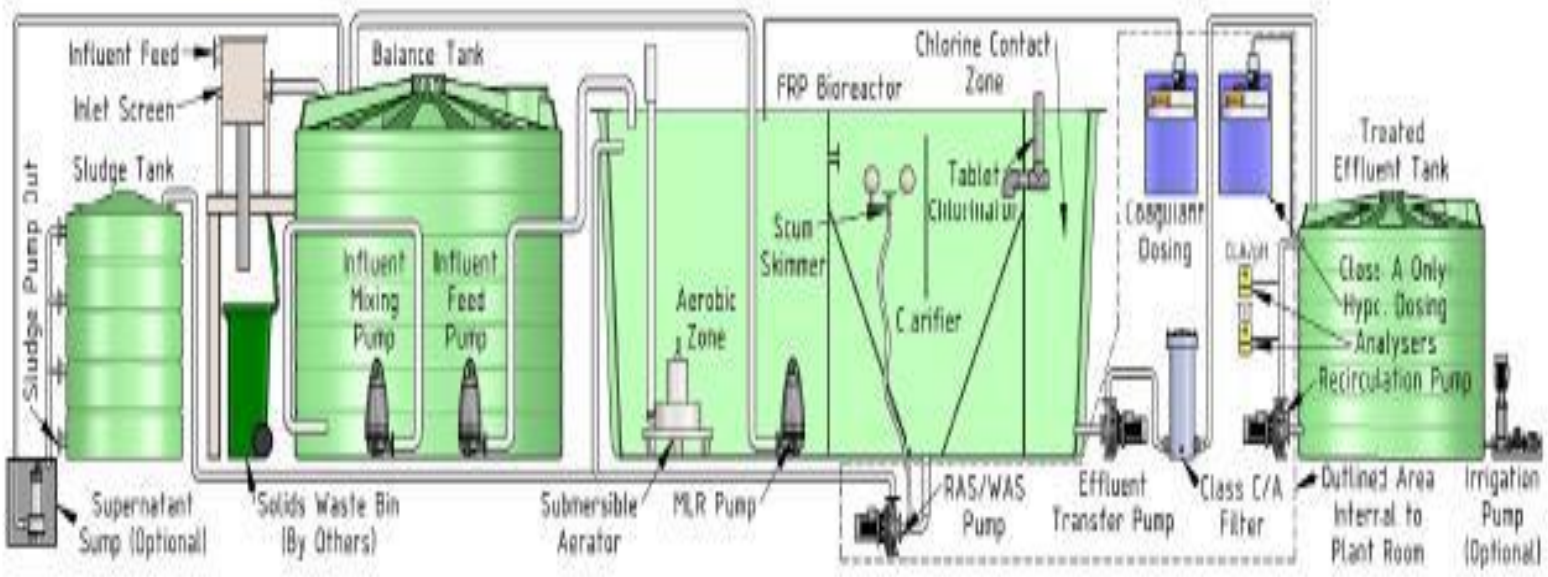

Figure 2: Process layout

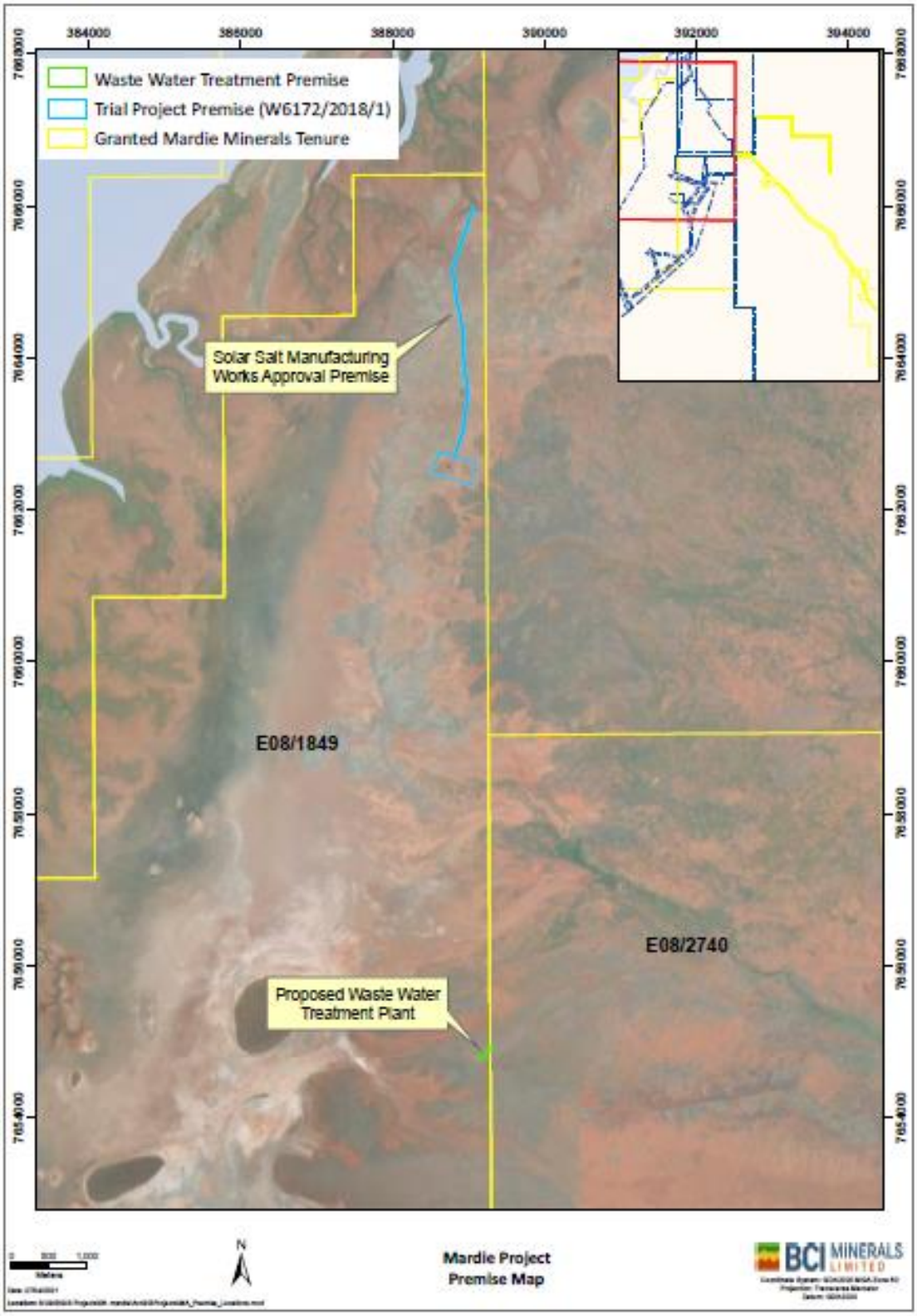

Figure 3: Proposed location of the wastewater treatment plant

4.2 Infrastructure

The Mardie Project Wastewater Treatment Plant facility infrastructure, as it relates to Category 85 activities, is detailed in Table 6 and with reference to the Site Plan (attached in the Issued Works Approval).

Table 6 lists infrastructure associated with each prescribed premises category.

Table 6: Mardie Project WWTP facility Category 85 infrastructure

	Infrastructure	**Site Plan Reference**
	Prescribed Activity Category 85	
A containerized ASBR WWTP to accept sewage and grey water from the on-site exploration camp. After treatment, the chlorinated effluent water will be discharged via an above ground sprinkler arrangement fenced irrigation area.		
1	The basic components of the ASBR system will include: • WWTP installed inside sealed shipping containers; • Impermeable concrete pads for the storage of tanks; • Influent screening and balance tank; • Anoxic and aerobic treatment; • Clarification; • Effluent sterilization (chlorination); • Bag filtration (100 micron); • Sludge tank; • Irrigation / treated effluent tank; and • A series of pumps, screens, diffusers, blowers and mixers to transfer and process the wastewater.	Figure 1: WWTP and sprayfield
2	The irrigation area will be sized in accordance with the Department of Water (DoW) *'Water Quality Protection Note (WQPN 22) Irrigation with Nutrient Rich Wastewater'* • Designed to receive up to 60 m^3 per day of treated wastewater. • Flow meter to record the volume of treated water discharged to the irrigation area; • High Density Polyethelene (HDPE) pipelines with welded joints; • Above ground sprinklers; • Safety/warning signage; and • Fully fenced spray field with a minimum of five metres from any sprinkler spray drift.	

5. Legislative context

Table 7 summarises approvals relevant to the assessment.

Table 7: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
Environment Protection and Biodiversity Conservation Act 1999	EPBC 2018/8236	Mardie Mineral Pty Ltd	The entire Project is currently being formally assessed under the EPBC Act. The proposed WWTP is for investigative/trial works and as such is not constrained by this process.
Mining Act 1978	Programme of Works (PoW) No. 75407 for the Mardie Project	Mardie Mineral Pty Ltd	The current exploration camp and associated infrastructure (including the WWTP) has been approved under PoW Reg ID 79508.
Health Act 1911 Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974	Application 93.21	Mardie Mineral Pty Ltd	Department of Health granted approval on 10 May 2021.
Part IV of the EP Act (WA)	Statement Number 2167	Mardie Mineral Pty Ltd	The entire Project is currently being formally assessed by the EPA under Part IV of the EP Act at the level of Public Environmental Review. The proposed WWTP is for investigative/trial works and as such is not constrained by the Part IV EP Act process.

5.1 Other relevant approvals

5.1.1 Planning approvals

The proposal does not require Development Approval from the City of Karratha in accordance with City's Local Planning Scheme No.8.

5.1.2 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory principles (December 2020)*
- *Guidance Statement: Setting conditions (October 2015)*
- *Guidance Statement: Environmental Standards (September 2016)*
- *Guidance Statement: Environmental Siting (December 2020)*
- *Guidance Statement: Risk Assessments (December 2020)*

- *Guideline: Decision Making (December 2020)*
- *Guideline: Industry Regulation Guide to Licensing (June 2019)*

5.1.3 Works approval and licence history

Table 8 summarises the works approval and licence history for the premises.

Table 8: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
W6524/2021/1	05/07/2021	Works Approval granted for installation of the installation, commissioning of two additional 20 m^3/ day package wastewater treatment plants (WWTP) to supplement the existing 20 m^3/ day wastewater treatment plant; and expansion of the existing irrigation area to accommodate the additional loading.

5.1.4 Clearing

The applicant has indicated that there is no additional clearing required.

6. Consultation

The application was advertised on the DWER website on 12 May 2021 and in the West Australian on 12 May 2021 for a public consultation period. No submissions from the public were received.

Letters requesting comment were also sent to the City of Karratha, Department of Health and Department of Mines and Petroleum on 12 May 2021.

The City of Karratha advised that the proposed works, should they remain within a granted Mining Tenement, will not require Development Approval. The City supports the purpose of the works, being for the Mardie Trial Project, on the understanding all relevant environmental approvals and conditions issued for this project are adhered to by Mardie Minerals Pty Ltd.

Department of Health provided comment indicating that they gave approval for the WWTP on 10 May 2021 and had no further comment.

Department of Mines and Petroleum did not provide comment.

7. Location and siting

7.1 Siting context

The Premises is located approximately 100 km south-west of Karratha on the Pilbara coastline (Figure 2). The Premises overlies the Mardie Pastoral lease (Crown Lease CL453-1984), which is owned by CITIC Pacific Limited. The solar salt evaporators and concentrators are located approximately 5 km inland of the Indian Ocean.

7.2 Residential and sensitive receptors

There are no residential receptors located within a 5 km radius of the Premises boundary.

7.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 9. Table 9 also identifies the distances

to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting.*

Table 9: Environmental values

Specified ecosystems	Distance from the Premises
Threatened/Priority Fauna	Phoenix (2018) reported that the following were not identified in the survey but may exist in the Mardie Trial Project area: • Lakeland Down Mouse (*Leggadina lakedownensis*) - Priority 4; • Fork-tailed Swift (*Apus pacificus*) - Migratory bird; • Grey Falcon (*Falco hypoleucos)* – Vulnerable; and • Peregrine Falcon (*Falco peregrinus)* - Specially Protected Fauna.

7.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 10.

Table 10: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
Groundwater	The Applicant reports that the depth to groundwater varies between 0.3 – 0.8 m below ground level (mbgl), with salinity up to three times the level of seawater and ranging from 130,000 – 210,000 microsiemens per centimetre (µS/cm). The nearest bore lies approximately 2 km south-east of the Mardie Trial Project area based on DWER's data.	Water is not used for potable or industrial use. Marine water inundation occurs on the Premises.
Major watercourses or waterbodies	The Indian Ocean lies approximately 5 km from the Mardie Trial Project ponds. The inlet from which seawater is to be drawn is 4.5 km north of the Mardie Trial Project ponds. The Mardie Trial Project area lies within the Saline Coastal Flat.	Marine and mangrove ecosystems.

7.5 Soil type

DWER's dataset identifies the soil type across the Mardie Trial Project area as salt flats, tidal

swamps, and coastal dune sands: chief soils are saline loams with shelly sands. Small areas of calcareous earths and shallow loams are associated with marls (Northcote, 1960-68).

7.6 Meteorology

7.6.1 Wind direction and strength

Prevailing wind patterns can provide a direct pathway for transmission of dust by air, so the prevailing wind patterns that may carry these emissions to sensitive receptors have been considered. The closest Bureau of Meteorology (BoM) weather station which records wind frequency data is Mardie weather station (BoM site 005008). Prevailing winds are from the east to south west in the mornings, and from the west and the north in the afternoons (Figure 4). It is important to note that these wind roses show historical wind speed and wind direction data for Mardie weather station and should not be used to predict future data.

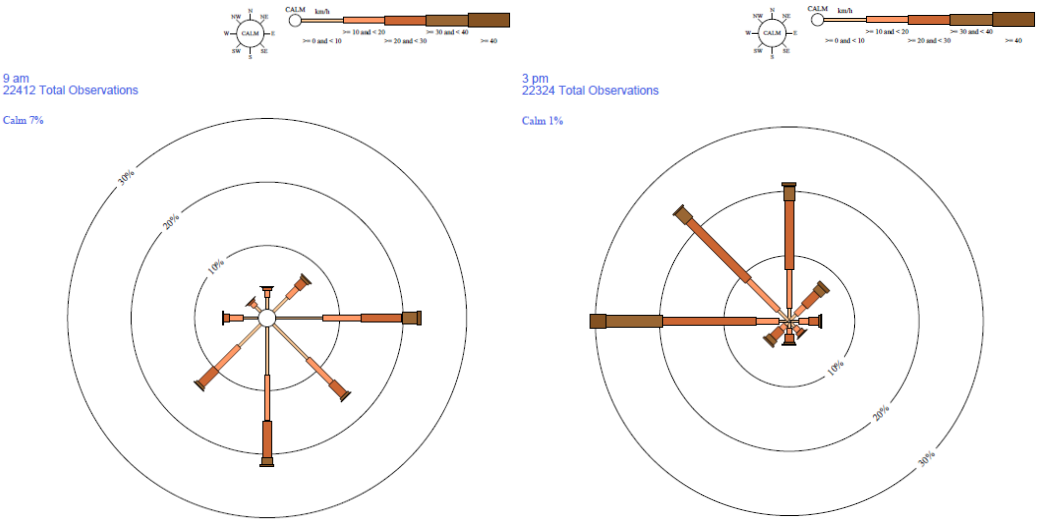

Figure 4: Annual wind rose for 9am and 3 pm at Mardie weather station

7.6.2 Rainfall and temperature

Rainfall as stormwater can contribute to emissions where it becomes contaminated after coming into contact with treated effluent water, then exits the Premises via overland flow, potentially contaminating receptors in close proximity to the Premises, or exits via leachate to groundwater potentially contaminating groundwater. Rainfall events that may carry these emissions to sensitive receptors have been considered. The closest Bureau of Meteorology (BoM) weather station which records rainfall data is Mardie weather station (BoM site 005008). Maximum average rainfall is received from January to June annually. Minimum average rainfall is received from September to November annually (Figure 4). The hottest month is January with an average maximum temperature of 39°C; however, temperatures above 30.0°C occur frequently. Winters tend to be cool and July is the coldest month with average maximum temperature of 28°C.

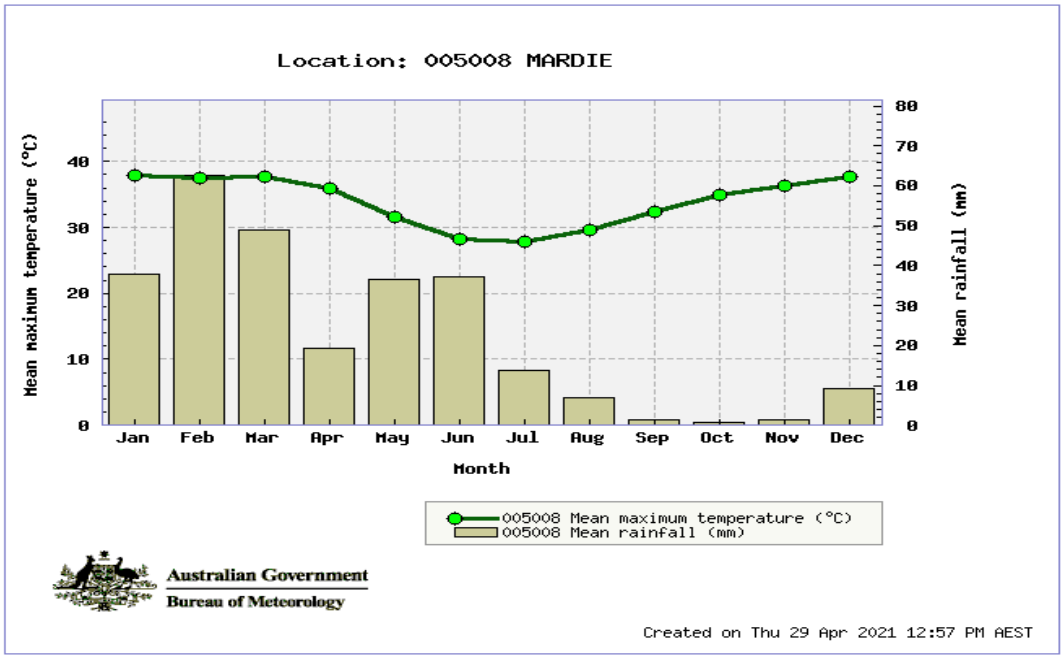

Figure 5: Mean maximum temperature and mean rainfall for Mardie weather station

8. Risk assessment

8.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

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. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 12.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 11 and 12 below.

Table 11. Identification of emissions, pathway and receptors *during construction*

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Construction, mobilisation and positioning of infrastructure	Vehicle movements on unsealed access roads, Installation of 2 new treatment plants and associated infrastructure	Noise	Residential receptors	Air / wind dispersion	Amenity impacts	No	No receptor present
		Dust			Amenity impacts	No	No receptor present
	Storage and use of hydrocarbons and chemicals	Spills and breach of containment	Soil and vegetation adjacent to the area of spill or breach Groundwater (0.3 – 0.8 mbgl)	Direct discharges to land	Soil contamination inhibiting vegetation growth and survival. Deterioration of groundwater quality and health impacts to fauna	No	Self-bunded fuel tanks used for fuel storage stored on impermeable concrete pads. Storage of dangerous goods in accordance with the *Dangerous Good Safety Act 2004*, and associated Regulations, administered by DMIRS. The general provisions of the EP Act and *Environmental Protection (Unauthorised Discharges) Regulations 2004* apply.

Table 12: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Waste Water Treatment Plants	Treatment of sewage	Odour	Residential receptors	Air / wind dispersion	Amenity impacts	No	No receptor present. The WWTP has been designed as a containerised system with enclosed balance tank and treated effluent/ irrigation tank to ensure odour levels are kept to a minimum.
	Sewage pipes and holding tanks	Rupture of pipes / overtopping of holding tanks /storage tank failure resulting in sewage discharge to land	Residential receptors Nearby flora and fauna which may include Threatened/Priority Fauna Indian Ocean	Direct discharge	Health and amenity impacts Contaminated stormwater runoff with elevated nutrients can result in eutrophication of waterways and ecosystem disruption Soil contamination inhibiting vegetation growth and survival	Yes - Refer to section 8.4	
	Storage of chemicals and hydrocarbons	Breach of containment causing chlorine discharge to land	Residential receptors Nearby flora and fauna which may include Threatened/Priority Fauna Indian Ocean	Inhalation, Ingestion and dermal contact	Health impacts	No	No residential receptors present. Self-bunded tanks used for fuel and chemical storage. Storage of dangerous goods in accordance with the *Dangerous Good Safety Act 2004*, and associated Regulations, administered by DMIRS. The general provisions of *the EP Act and Environmental Protection (Unauthorised Discharges) Regulations 2004* apply.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Treated effluent water re-use	Irrigation of treated effluent	Treated effluent discharged to spray field for irrigation containing excessive Nitrogen and Phosphorous levels	Nearby flora and fauna which may include Threatened/Priority Fauna Groundwater (0.3 – 0.8 mbgl) Indian Ocean	Direct discharge and overland flow	Facilitated growth of weeds; Increase in nutrient levels in soil; Change in soil chemistry; Ponding in the irrigation area; Impacts to surrounding vegetation; and Ground water recharge	Yes – Refer to section 8.5	

8.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 13 below.

Table 13: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 14 below.

Table 14: Risk criteria table

Likelihood		**Consequence**		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		**The following criteria has been used to determine the consequences of a Risk Event occurring:**		
			Environment	**Public health* and amenity (such as air and water quality, noise, and odour)**
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*

"onsite" means within the Prescribed Premises boundary.

8.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment table 15 below:

Table 15: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

8.4 Risk Assessment – Risk Event 1 - WWTP rupture of pipes, overtopping and storage tank failure during operation

8.4.1 Description of Risk Event

Sewage from ablutions and other facilities at the accommodation villages will be treated through the WWTP. If the WWTP has a breakdown of pumps, rupture of pipes, overtopping and/or tank failure, there is the potential for untreated, partially untreated or treated wastewater (depending on component of plant breakdown) to be released to the environment. During such an event, stormwater at the Premises also has the potential to become contaminated. During normal operations, only treated wastewater will be discharged to the irrigation area.

8.4.2 Identification and general characterisation of emission

Wastewater may contain high levels of pathogens and nutrients; concentrations dependant on level of treatment reached when discharge occurs.

8.4.3 Description of potential adverse impact from the emission

Wastewater accidently discharged to the environment during the treatment process may cause localised soil contamination off-site impacts on vegetation.

8.4.4 Criteria for assessment

The Applicant has provided a commitment that the WWTP will comply with a Low Exposure Risk Level (human contact) in accordance with DoH, 2011 and Water Quality Protection Note (WQPN) 22(refer to Table 5 for the effluent specifications).

General provisions of the *EP Act* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* apply as well

8.4.5 Applicant controls

This assessment has reviewed the controls set out in Table 16 below.

Table 16: Applicant's proposed controls for Risk Event 1 – Rupture of pipes, overtopping and storage tank failure

Site infrastructure	Description	Operation details	Reference to issued plan
Controls for dIscharge			
WWTP	Rupture	All pipelines will be HDPE with welded joints; Pipelines will be inspected daily to identify leaks, spills or failures; Remote monitoring and control capabilities; Standby pumps, during emergencies; The WWTP will be installed as per manufacturer specifications and filled with fresh water prior to filling with wastewater to test for leaks; WWTP tanks will be installed on an impermeable concrete pad; The WWTP includes process alarms and volumetric meters to notify the operator of system upsets; Any incident involving a spill of untreated sewage will be responded to immediately with contaminated soil removed and taken by a licensed transporter to a licensed facility. Remediation actions will be taken to minimise the risk of reoccurrence;	Figure 1
	Overtopping	Sufficient freeboard will be maintained within each tank to ensure overspill does not occur; Any incident involving a spill of untreated sewage will be responded to immediately with contaminated soil removed and taken by a licensed transporter to a licensed facility. Remediation actions will be taken to minimise the risk of reoccurrence. The WWTP includes process alarms and volumetric meters to notify the operator of system upsets; Remote monitoring and control	Figure 1

Site infrastructure	Description	Operation details	Reference to issued plan
		capabilities; and Standby pumps, during emergencies.	
	Storage tank failure	Remote monitoring and control capabilities; All wastewater storage components of the WWTP will be impermeable (i.e. fiberglass, concrete or lined with HDPE); and Standby pumps, during emergencies.	Figure 1

8.4.6 Consequence

Based on the applicant controls and distance to the nearest sensitive receptors and that the entire WWTP will be installed inside sealed shipping containers the impact of WWTP pipe rupture, overtopping and tank failure will result in low level on-site impacts. Therefore, the consequence is **minor**.

8.4.7 Likelihood of Risk Event

Based on the information detailed above and applicant controls to be put in place, an environmental impact from WWTP pipe ruptures, tank failure and the irrigation of treated wastewater will not occur in most circumstances. Therefore, the Delegated Officer has determined that, the likelihood of the consequence is **unlikely**.

8.4.8 Overall rating of Risk Event

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 13) and determined that the overall rating for the risk of discharges to land from the rapture of pipes, overtopping and storage tank failure is **medium.**

8.4.9 Acceptability and control measures

In accordance with DWERs Guideline Risk Assessments, medium risk events are acceptable and may be subject to regulatory controls.

The Delegated Officer has determined that the works approval will contain construction and commissioning conditions which specify requirements to be met for both construction and operation phases of the WWTP infrastructure. These requirements will replicate the applicant's control measures.

8.5 Risk Assessment – Risk Event 2 – Irrigation of excessive nutrient or pathogen levels

8.5.1 Description of risk from reuse of treated wastewater

In the event that sewage is not properly treated, or a large enough irrigation area is not utilised, there may be excessive nutrients or pathogens applied to soil. There is also potential for ponding in the irrigation area, increase in nutrient levels, seepage or overland flow, where the loading rate for the irrigation area is exceeded.

8.5.2 Identification and general characterisation of emission

The inefficient irrigation from the WWTP would results in the deposition of large amounts of organic matter and nutrients which may impact nearby flora and fauna, groundwater and surface waters.

8.5.3 Description of potential adverse impact from the emission

If wastewater is discharged to the irrigation area prior to meeting emission standards, this could lead to the facilitated growth of weeds, increase in nutrient and pathogenic levels in soil within the irrigation area. The groundwater in the area is not used for potable or industrial use.

8.5.4 Criteria for assessment

The following criteria have been used to evaluate the risk associated to irrigation of treated wastewater is the *Water Quality Protection Note 22.*

8.5.1 Applicant controls

Effluent from the WWTP will be treated to a secondary level of treatment in accordance with Water Quality Protection Note 22 (WQPN 22) and to comply with a Low Exposure Risk Level (level of human contact) in accordance with DoH, 2011, with effluent achieving the specifications detailed in Table 5.

The required irrigation area will be variable and calculated based on the WWTP throughput as necessary.

8.5.2 Consequence

Based on the applicant controls and distance to the nearest sensitive receptors, this Risk Event may result in low level on-site impacts. Therefore, the consequence is **minor**.

8.5.3 Likelihood of Risk Event

Based on the information detailed above and applicant controls to be put in place, this Risk Event will not happen in most circumstances. Therefore, the Delegated Officer has determined that, the likelihood of the consequence is **unlikely**.

8.5.4 Overall rating of Risk Event

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 13) and determined that the overall rating for the Risk Event is **medium.**

8.5.5 Acceptability and control measures

In accordance with DWERs Guideline Risk Assessments, medium risk events are acceptable and may be subject to regulatory controls.

The Delegated Officer has determined that the works approval will contain construction requirements that specify the treatment standards that the infrastructure and irrigation area must be able to meet. The works approval will also contain commissioning conditions relating to authorised emissions and monitoring to ensure irrigation is maintained within appropriate levels, including specifying that treated effluent may not be disposed of unless it complies with the expected parameters.

9. Applicant's comments

DWER referred the draft Works Approval and Decision Report to the Applicant on 16 June 2021.

The Applicant responded 24 June 2021 requesting flexibility to determine risk category B or D based on forthcoming soil sample results. Given the final irrigation area is determined solely in line with the specifications in the WQPN 22 the Delegated Officer considered this acceptable. The Works Approval was updated to require confirmation of soil sample results for verification.

10. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report.

Based on this assessment, it has been determined that the Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.