# **Amendment Report**

## **Application for Licence Amendment**

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

Licence Number L8621/2011/1

**Licence Holder** Roy Hill Iron Ore Pty Ltd

**ACN** 123 722 038

**File Number** 2011/009784-1

**Premises** Roy Hill Iron Ore Mine

M46/518 and M46/519

**NEWMAN WA 6753** 

As defined by the Premises maps attached to the Revised

Licence

Date of Report 23 September 2022

**Decision** Revised licence granted

# A/MANAGER, RESOURCE INDUSTRIES REGULATORY SERVICES

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

## **Table of Contents**

1.	1. Decision summary1							
2.	Sco	pe of as	ssessment	1				
	2.1	Regul	latory framework	1				
	2.2	Applic	cation summary	1				
		2.2.1	Category 6 Assessed design capacity	3				
		2.2.2	Remote MAR Borefield	4				
		2.2.3	MAR Transfer Pond	6				
	2.3	Part I	V of the EP Act	8				
3.	Risk	asses	sment	8				
	3.1	Sourc	ce-pathways and receptors	8				
		3.1.1	Emissions and controls	8				
		3.1.2	Receptors	12				
	3.2	Risk r	atings	14				
4.	Con	sultatio	on	20				
5.	Con	clusion	1	20				
	5.1	Sumn	nary of amendments	21				
Ref	erenc	es		22				
App	endix	1: Sur	mmary of Licence Holder's comments on risk asso	essment and				
			olication validation summary					
			design or throughput capacity changes					
Tabl	e 2: E	cess W	ater Disposal to 2032	3				
Tabl	e 3: Li	cence H	older controls	g				
			human and environmental receptors and distance from pre					
			ssment of potential emissions and discharges from the Preparation					
		•	ion					
			of licence amendments					
Figu	re 1: R	lemote N	MAR Indicative Bore Locations	5				
Figu	re 2: F	low diag	gram of the Remote MAR Transfer Pond Area	6				
Figu	re 3· P	roposec	Remote MAR Transfer Pond Location	7				

## 1. Decision summary

Licence L8621/2011/1 is held by Roy Hill Iron Ore Pty Ltd (Licence Holder) for the Roy Hill Iron Ore Mine (the Premises), located at M46/518 and M46/519, NEWMAN WA 6753.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the construction and operation of the Premises. As a result of this assessment, Revised Licence L8621/2011/1 has been granted.

## 2. Scope of assessment

## 2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <a href="https://dwer.wa.gov.au/regulatory-documents">https://dwer.wa.gov.au/regulatory-documents</a>.

#### 2.2 Application summary

On 12 February 2021, the Licence Holder submitted an application to the department to amend Licence L8621/2011/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are sought:

- Modifications to Category 6 Assessed design capacity in line with Revised Proposal Ministerial Statement 1189;
- Installation of up to 65 reinjection bores within the Remote Managed Aquifer Recharge (MAR) Borefield;
- Build a Remote MAR Transfer Pond;
- Change to a monthly flow weighted average to Total Dissolved Solids (TDS) limit in Condition 20, Table 9;
- Increase injection limit in Condition 20, Table 9 up to 50,000 mg/L TDS in the South West Injection Borefield to align with the Revised Proposal;
- Update Condition 4, Table 2 to clarify the locations that Inert Waste Type 2 can be disposed of;
- Update freeboard in Condition 10, Table 4 of the Zulu 5 In-Pit Tailings Storage Facility (TSF) to match the TSF Operating Manual ANCOLD (2019) Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure;
- Ability to change monitoring bore to similar suitable bore for monitoring if bores are blocked or damaged;
- Request for sampling of mine dewatering water to occur from trunkline as opposed at each individual injection bore in the South West Injection Borefield (SWIB) and Stage 1 Borefield as per Appendix 1; and
- Clarify what frequency continuous data from flow meters from injection bores and recharge basins for volumetric flow rate and electoral conductivity should be provided in Annual Environmental Report (AER).

This amendment is limited only to changes to Categories 5, 6 and 64 activities from the Existing Licence. No changes to the aspects of the existing Licence relating to Categories 12, 52, 54, 57, 73 and 85B have been requested by the Licence Holder.

Table 1 below outlines the proposed changes to the existing Licence.

Table 1: Proposed design or throughput capacity changes

Category		Current design throughput capacity	Proposed design throughput capacity	Description of proposed amendment
Category Processing beneficiation metallic or metallic ore	5: or of non-	86,000,000 (wet) tonnes per annual period (to produce 65,000,000 [wet] tonnes of ore per annual period for export)	No change	Update freeboard in Condition 10, Table 4 of the Zulu 5 In-Pit Tailings Storage Facility (TSF) to match the TSF Operating Manual ANCOLD (2019) Guidelines on Tailings Dams – Planning, Design, Construction, Operation and Closure.
Category 6: dewatering	Mine	55,000,000 tonnes per annual period for a trial period to 25/03/2023.  Thereafter, the discharge throughput will revert back to 843,000 (scheduled) tonnes per annual period for recharge basins.	67,000,000 tonnes per annual period  Note maximum excess water disposal by aquifer injection and recharge basins on Ministerial Statement 1189 is 508 GL until 2032  Groundwater modelled values range from 16 GL/annum (2022) to 67 GL/annum (2027) over the 10 years  Refer to Table 2 to see excess water disposal per annum	<ul> <li>Modifications to Category 6         Assessed design capacity in         line with Revised Proposal         Ministerial Statement 1189;</li> <li>Installation of up to 65         reinjection bores within the         Remote Managed Aquifer         Recharge (MAR) Borefild;</li> <li>Build a Remote MAR Transfer         Pond;</li> <li>Change to a monthly flow         weighted average to Total         Dissolved Solids (TDS) limit in         Condition 20, Table 9;</li> <li>Increase injection limit in         Condition 20, Table 9 up to         50,000 mg/L TDS in the South         West Injection Borefield to         align with the Revised         Proposal;</li> <li>Ability to change monitoring         bore to similar suitable bore for         monitoring if bores are blocked         or damaged;</li> <li>Request for sampling of mine         dewatering water to occur from         trunkline as opposed at each</li> </ul>
				<ul> <li>individual injection bore in SWIB and Stage 1 Borefield as per Appendix 1; and</li> <li>Clarify what frequency continuous data from flow</li> </ul>

			meters from injection bores and recharge basins for volumetric flow rate and electoral conductivity should be provided in Annual Environmental Report (AER).
Category 12: Screening, etc. of material	6,570,000 tonnes per annual period	No change	N/A
Category 52: Electric power generation	80 MW	No change	N/A
Category 54: Sewage facility	593 cubic metres per day	No change	N/A
Category 57: Used tyre storage (general)	No more than 5,000 tyres	No change	N/A
Category 64: Class Il putrescible landfill site	8,000 tonnes per annual period	No change	Update Condition 4, Table 2 to clarify the locations that Inert Waste Type 2 can be disposed of.
Category 73: Bulk storage of chemicals, etc	5,530 cubic metres in aggregate	No change	N/A
Category 85B: Water Desalination Plant	15 GL per year	No change	N/A

## 2.2.1 Category 6 Assessed design capacity

The Revised Proposal Ministerial Statement 1189 allows maximum excess water disposal by aquifer injection and recharge basins as 508 GL until 2032. The peak value of 67 GL/annum occurs in 2027 and this is what has been incorporated onto the licence with the stipulation that the Ministerial Statement 1189 limit of 508 GL over 10 years is adhered to. Refer to Table 2.

Table 2: Excess Water Disposal to 2032

Year	Excess Water Disposal (GL)	Excess Water Disposal (tonnes)
2022	16	16,000,000
2023	41	41,000,000
2024	45	45,000,000
2025	63	63,000,000
2026	61	61,000,000

2027	67	67,000,000
2028	63	63,000,000
2029	20	20,000,000
2030	49	49,000,000
2031	64	64,000,000
2032	19	19,000,000
Total	508	508,000,000

#### 2.2.2 Remote MAR Borefield

The Licence Holder is proposing to install up to 65 reinjection bores within the Remote MAR Borefield. These bores will be designed to restrict the injection of surplus dewatering water to the deep hypersaline aquifer. Injection bores will be connected to the water distribution network via direct feed, above-ground, high density polyethylene (HDPE) pipelines.

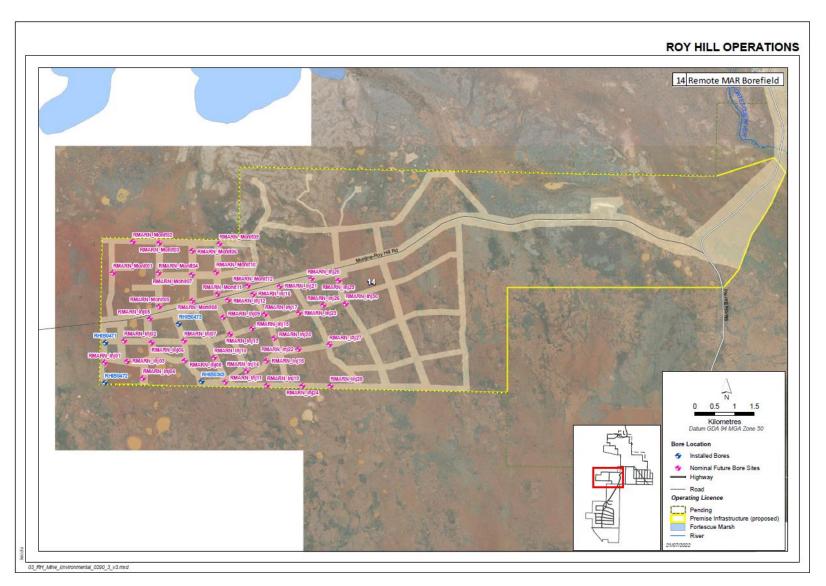
The main pipeline will be constructed to ensure surface water flows are maintained through Fortescue River. The borefield pipelines will be buried through drainage lines to maintain surface water flows.

For each reinjection bore, a multipiezometer bore will be installed at a distance up to 100m from the reinjection bore. These bores provide data on the responses to reinjection in both the shallow and deep aquifers and are used to control and regulate the operation of the reinjection bores in terms of water flows and groundwater levels. Monitoring bores will communicate data via radio and or telecom network to the site central data historian.

In addition to monitoring bores installed adjacent to reinjection bores, a regional network of monitoring bores will be installed to monitor the overall effect of the MAR operation on water levels and quality. The MAR Borefield indicative bore locations are shown in Figure 1.

#### Groundwater

Samples recovered from the production and monitoring bores at the Mine area confirm the groundwater quality to be alkaline, and generally brackish to hypersaline. Water quality reinjected into the Remote MAR Borefield will be similar to the reinjection aquifer (up to 50,000 mg/L Total Dissolved Solids (TDS)). The groundwater salinity in the Remote MAR Borefield is higher than that in the Southern Borefield to the south, with EC between 26,600  $\mu$ S/cm and 36,600  $\mu$ S/cm, increasing with depth.



**Figure 1: Remote MAR Indicative Bore Locations** 

#### 2.2.3 MAR Transfer Pond

The proposed MAR Transfer Pond will have a capacity of up to 100,000 kL with a HDPE liner or alternative liner that achieves the same or better permeability. Freeboard of 500mm will be maintained and water levels will be managed with level trips connected to the SCADA system and the pond will be inspected weekly.

Water entering the pond will come from the grater water network and is abstracted from numerous upstream dewatering borefields. The water out of the pond will be pumped to the Remote MAR North injection borefield approximately 20km south of the current mine.

A flow diagram is shown in Figure 2.

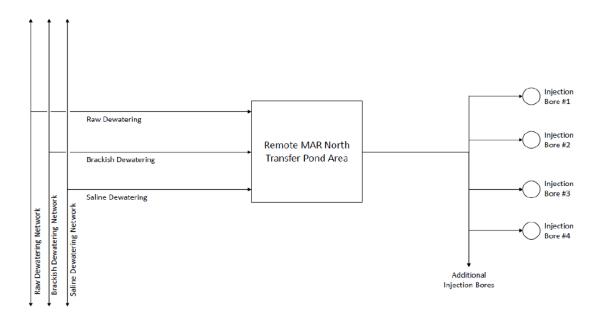


Figure 2: Flow diagram of the Remote MAR Transfer Pond Area

The proposed MAR Transfer Pond is shown in Figure 3.

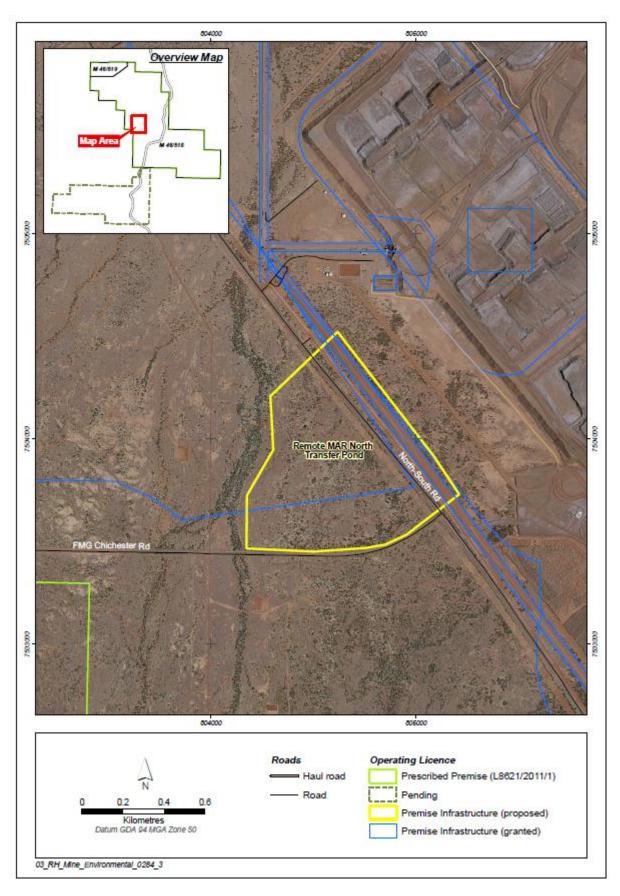


Figure 3: Proposed Remote MAR Transfer Pond Location

#### 2.3 Part IV of the EP Act

The original proposal was referred to the EPA and approved as two separate proposals, Stages 1 and 2. The respective implementation agreements are set out in Ministerial Statements 824 and 829 (as amended) and changes to conditions recorded in Ministerial Statements 979 and 980.

The proposed changes to the original proposal are required to achieve an ore blend that satisfies customer demand. This involves multiple pits operating at once to produce a consistent quality of ore. In turn, there is a requirement to increase dewatering to maintain dry mining conditions. Mining multiple pits at once also creates the need for additional above ground waste rock dumps due to reduced availability of pit voids for waste rock disposal during mine operation. Additional ground disturbance is required to accommodate the above ground waste rock dumps, aquifer injection infrastructure to dispose of mine dewater and pit abandonment bunds for mine closure.

The EPA released the Revised Proposal for the Roy Hill iron Ore Mine Report on 20 October 2021. Ministerial Statement 1189 was issued on 19 May 2022. Ministerial Statements 824, 829, 979 and 980 are repealed on the issuing of Ministerial Statement 1189. A summary of the conditions relevant to Part V of the EP Act assessment is included below:

- Excess water disposal by aquifer injection and recharge basins on Ministerial Statement 1189 is 508 GL until 2032;
- Prior to aquifer injection and mine pit dewatering exceeding the extent of the original authorised proposal, the proponent shall revise the Water Management Plan – Mine OP-PLN-00300 Rev 1 and Roy Hill iron Ore Vegetation Management Plan OP-PLN-00344 Rev 1, and this shall be confirmed by EPAS;
- Increase the injection limit up to 50,000 mg/L TDS in the SWIB;
- The Management Plans shall specify trigger criteria to ensure that inland waters and subterranean fauna impacts are avoided. This includes water quality and standing water levels triggers; and
- Evaporation Pond Design and Management Plan for the storage of mine dewatering water overtopping, seepage, construction materials characteristics and total capacity/freeboards requirements.

#### 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 Amendment Report are detailed in Table 3 below. Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

**Table 3: Licence Holder controls** 

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction of borefields (and connection to existing network) and Remote MAR Transfer Pond	Air/windborne pathway causing impacts to health and amenity	Construction activities will involve mainly minor earthworks for a short period of time. Dust from earthworks is unlikely to significantly impact vegetation or fauna species. There is no threatened flora in the vicinity of the proposed prescribed premises. Dust will be managed in accordance with Roy Hill Dust Management Procedure (OP-PRO-00180), The procedure outlines the following key points relevant to this facility:
			Limited duration for construction period;
			<ul> <li>Implement dust suppression measures where dust generation is visible, except during topsoil clearing;</li> </ul>
			Use dust suppression measures (e.g. water trucks) on unsealed roads and access tracks, cleared areas and at locations of high dust risk (e.g. where dust lift off is likely or there is evidence of dust during low wind conditions);
			Use of water sprays or alternative dust suppression measures to manage dust generation from ore processing, transport and stockpiles;
			Adhere to all vehicle speed limits, use existing tracks and reduce vehicle speeds on haul roads, work sites and camp sites where necessary to minimise dust emissions; and
			Avoid the use of scrapers during high winds (>50 km/hr) where possible
Noise		Air/windborne pathway	Limited duration for construction period; and
		causing impacts to health and amenity	Compliance with the Environmental Protection (Noise Regulations) 1997.
Remote MAR	Borefield		
Saline mine dewatering water	Reinjection into the groundwater aquifer	Direct discharge	The Licence Holder manages the activities within the prescribed premises in accordance with the management strategies recommended by EPA Report 1484 - Environmental and Water Assessments Relating to Mining and Mining-related Activities in the

Emission	Sources	Potential pathways	Proposed controls
			Fortescue Marsh Management Area;
			Groundwater quality is monitored in accordance with the Roy Hill Water Management Plan (OP-PLN-00300) and Mine Operating Licence;
			Vegetation health is monitored across the Mine in accordance with Roy Hill Vegetation Environmental Monitoring Plan (OP-PLN-00344);
			Groundwater quality is monitored in accordance with the Roy Hill Water Management Plan (OP-PLN-00300) and Mine Operating Licence;
			<ul> <li>Water quality reinjected into the Remote MAR Borefield will be similar to the reinjection aquifer (up to 50,000 mg/L TDS); and</li> </ul>
			Water quality reinjected into the SWIB MAR Borefield will be up to 50,000 mg/L TDS.
	Pipeline leaks/spills	Direct discharge	Pipelines will be constructed from HDPE and sized to suit the required peak flows (to be determined during the detailed design). Pipelines will be fitted with instruments monitoring flow, pressure and conductivity which will be monitored via SCADA. Alarms associated with high pressure or low flow will trigger operator investigation and automatic pumps shut off;
			Pipelines will be monitored continuously for leak detection and spills via SCADA. The ability to continuously monitor the pipeline and shut off pumps immediately following detection of an issue significantly reduces the risk of spills. In the unlikely event of a spill, clean-up measures will be undertaken in accordance with Roy Hill Spill Response Procedure (OP-PRO-00275);
			Pumps and pipelines are fitted with flow and pressure monitoring instruments which are visible via SCADA; these identify potential blockages by indicating high pressure or low flow. Alarms associated with high pressure or low flow trigger operator investigation and automatic pumps shut off;
			Injection sites have small earth bunds installed around the bore to contain potential spills. The ability to

Emission	Sources	Potential pathways	Proposed controls
			continuously monitor the pipeline and shut off pumps immediately following detection of an issue significantly reduces the risk of spills. Remediation of spills is conducted as per Roy Hill Spill Response Procedure (OP-PRO-00275);
			Weekly inspections of reinjection pipelines and Remote MAR Transfer Pond;
			Freeboard and water levels will be managed with level trips connected to the SCADA system;
			Pipelines will be buried through drainage lines to maintain surface water flows; and
			The main pipeline will be constructed to ensure surface water flows are maintained through Fortescue River.
Remote MAR	Transfer Pond		
Saline mine	Overtopping	Direct discharge	Freeboard of 500mm maintained;
dewatering water			Pond inspected weekly;
			EC will be monitored continuously by conductivity probes linked to network SCADA at the pond;
			The pond level will be continually monitored via SCADA with alarms indicating pond high level. The pond itself will have an overflow channel constructed to protect the pond should system protections fail. This overflow will discharge to a cleared area adjacent to the pond. In the unlikely case of an overflow, this will be managed in accordance with Roy Hill Spill Response Procedure (OP-PRO-00275) as per the below:
			<ul> <li>Control the spill at source if safe to do so;</li> </ul>
			Test the spill water for salinity (EC) if possible, using a handheld field pH/EC meter, to determine the appropriate response;
			Control the extent of the spill using earthen bunds;
			Prevent brine or saline water from entering native vegetation, drains and waterways as a priority;
			➤ Consult with the Roy Hill

Emission	Sources	Potential pathways	Proposed controls
			Environment Team about the appropriate clean up method. This may include one or more of the following management techniques:
			<ul> <li>Flush the area with fresh water to dilute the salt;</li> </ul>
			- Rip to allow infiltration; or
			<ul> <li>Add specific products or chemicals.</li> </ul>
			Report all non-compliances (including all sized spills) with this procedure, all regulatory exceedances and all community complaints as an incident in the Roy Hill Incident Management System.
	Seepage	Infiltration	High Density Polyethylene (HDPE) liner or alternative liner that achieves the same or better permeability.
	Wildlife / stock access	Wildlife / stock access	The pond complex will be fenced with a wire mesh fence.

#### 3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's 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 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 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Roy Hill Station Homestead	4km north of the proposed Remote MAR Borefield 8.5km (ponds)/20km (borefield)
Roy Hill Accommodation Village	7.4km (ponds)/11.7km (borefield) Within tenement M46/518 and adjacent to eastern boundary
Fortescue Metals Christmas Creek mine	4km (borefield)/6.1km (pond) northwest of the Roy Hill mining lease
Environmental receptors	Distance from prescribed activity
<ul> <li>Vegetation/Flora</li> <li>Fortescue Marsh PEC (P1);</li> <li>Narbung Land system PEC;</li> <li>Priority Flora x 8 spp</li> </ul>	Adjacent to the premises boundary (PEC); and Within the revised development envelope and local surrounds (priority flora and Narbung PEC).
Groundwater dependent and surface water vegetation	Within premises boundary
Ephemeral creeks  The premises is drained by several ephemeral creeks, including No Name Creek, which generally flow in a south westerly direction towards the Fortescue River and Marsh.	Within premises boundary
<ul> <li>Leggadina lakedownensis (Northern Shorttailed Mouse)(P4);</li> <li>Macrotis lagotis (Bilby)(Vulnerable);</li> <li>Falco hypoleucos (Grey Falcon (Vulnerable);</li> <li>Macroderma gigas (Ghost Bat)(Vulnerable);</li> <li>Pseudomys champani (Western Pebble mouse)(P4);</li> <li>Liasis olivaceus barroni (Pilbara Olive Python (Vulnerable); and</li> <li>Dasycercus blythi (Brush-tailed Mulgara)(P4).</li> </ul>	Within premises boundary
Groundwater	Salinity of groundwater beneath the project site ranges from 600 to 100,000 mg/L Total Dissolved Solids (TDS). There are no Public Drinking Water Supply Areas within or adjacent to the prescribed premises. Depth to groundwater within the MAR is 5-10mbgl, with depth decreasing near the Marsh.

### 3.2 Risk ratings

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

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

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 5.

The Revised Licence L8621/2011/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Categories 5, 6 and 64.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 5. Risk assessment of potential emissions and discharges from the Premises during construction and operation

Risk Event	Risk Event					Licence Holder's		Justification for
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	controls sufficient?	Conditions <sup>2</sup> of licence	additional regulatory controls
Construction								
Construction of borefields (and connection to existing	Dust	Air/windborne pathway causing	Closest residence is the Roy Hill Homestead approx. 4km away	Refer to Section 3.1	C = Slight L = Unlikely Low Risk	Y	N/A	N/A
network) and Remote MAR Transfer Pond	Noise	impacts to health and amenity		Refer to Section 3.1	C = Slight L = Unlikely Low Risk	Y	N/A	N/A
Operation								
Category 6 Assessed design capacity modifications	Excess water disposal	Direct discharge by aquifer injection and recharge basins	Groundwater aquifer Fortescue Marsh vegetation community	Refer to Section 3.1	C = Moderate L = Possible Medium Risk	Υ	Cover Page Assessed design capacity stipulates the maximum mine dewatering discharge as per Table 2, with a clause that 508 GL is the maximum to be discharged until 2032, as per MS 1189.  Condition 16, Table 7 Production or design capacity limits stipulates the maximum mine dewatering discharge as per Table 2, with a clause that 508 GL is the maximum to be discharged until 2032, as per MS 1189.	N/A
Remote MAR Borefield operation and pipeline	Surplus dewatering water,	Direct discharge to saline groundwater aquifer causing	Groundwater aquifer Fortescue	Refer to Section 3.1	C = Moderate L = Possible	Y	Condition 13, Table 6 Works Specifications Requires the Remote MAR Borefield to be	N/A

Risk Event	Risk Event					Licence Holder's		Justification for
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	controls sufficient?	Conditions <sup>2</sup> of licence	additional regulatory controls
route	reverse osmosis plant reject water and tailings storage facility decant	mounding and potential to increase salinity	Marsh vegetation community		Medium Risk		equipped with sensors and multipiezometer bores.  Condition 14 requires Environmental Compliance Report be submitted for the Remote MAR Borefield.  Condition 16, Table 7 Production or design capacity limits Requires category 6 limit.  Condition 19, Table 8 Emission points to groundwater Requires the Remote MAR Borefield as an emission point.  Condition 20, Table 9 Point source emission limits to groundwater Requires TDS and EC limits.  Condition 31, Table 14 Monitoring of point source emissions to groundwater Requires monitoring of mine dewatering water discharged into injection bores.  Condition 32, Table 15 Management actions Requires trigger levels for TSS to injection bores.  Condition 36, Table 18 Monitoring of ambient groundwater quality	

Risk Event					Risk rating <sup>1</sup>	Licence Holder's		Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	controls sufficient?	Conditions <sup>2</sup> of licence	
							Requires monitoring of ambient groundwater quality.  Condition 44, Table 21 Annual Environmental Report Requires monitoring results to be provided.	
		Discharge to land from pipeline leaks causing localized vegetation death and decline	Threatened Flora and overall vegetation health Surface Water creek lines	Refer to Section 3.1	C = Moderate L = Possible <b>Medium Risk</b>	Y	Condition 12, Table 5 Inspection of infrastructure Requires weekly inspections of mine dewatering pipelines. Condition 20, Table 9 Point source emission limits to groundwater Requires TDS and EC limits. Condition 31, Table 14 Monitoring of point source emissions to groundwater Requires monitoring of mine dewatering water discharged into injection bores.	N/A
Operation of the MAR Transfer Pond	Saline water	Direct discharge to land during overtopping of pond causing direct vegetation death or decline	Fortescue Marsh vegetation Threatened Flora	Refer to Section 3.1	C = Moderate L = Possible Medium Risk	Y	Condition 10, Table 4 Containment infrastructure Requires the Remote MAR Transfer Pond to be lined and freeboard maintained.  Condition 13, Table 6 Works Specifications Requires the Remote	N/A

Risk Event					Risk rating <sup>1</sup>	Licence Holder's		Justification for
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	controls sufficient?	Conditions <sup>2</sup> of licence	additional regulatory controls
							MAR Transfer Pond to be lined and freeboard maintained.	
							Condition 14 requires Environmental Compliance Report be submitted for the Remote MAR Transfer Pond.	
							Condition 16, Table 7 Production or design capacity limits Requires category 6 limit.	
							Condition 20, Table 9 Point source emission limits to groundwater Requires TDS and EC limits.	
							Condition 31, Table 14 Monitoring of point source emissions to groundwater Requires monitoring of mine dewatering water discharged into injection bores.	
							Condition 44, Table 21 Annual Environmental Report Requires monitoring results to be provided.	
	Saline water	Infiltration	Groundwater	Refer to Section 3.1	C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 10, Table 4 Containment infrastructure Requires the Remote MAR Transfer Pond to be lined and freeboard maintained.	N/A

Risk Event	Risk Event				Risk rating <sup>1</sup> Licence Holder's		Justification for	
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood	controls sufficient?	Conditions <sup>2</sup> of licence	additional regulatory controls
	Saline water	Discharges to land from pipeline leaks/blockages/spills	Vegetation	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 12, Table 5 Inspection of infrastructure Requires weekly inspections of mine dewatering pipelines.	N/A

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

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

## 4. Consultation

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

**Table 6: Consultation** 

Consultation method	Comments received	Department response
Local Government Authority advised of proposal (09/09/2021)	No comments received.	N/A.
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal (09/09/2021)	No comments received.	N/A.
Department of Biodiversity, Conservation and Attractions (DBCA) advised of proposal (09/09/2021)	"Of primary interest to DBCA in relation to this proposal is the potential for direct and indirect impacts to conservation significant values, in particular Priority flora species and ecological communities identified as occurring within or adjacent to the licence area. However, DBCA notes the proponent's commitment to undertake targeted pre-clearance surveys for conservation significant flora and fauna and their habitat, minimise direct impacts through pipeline route and bore location design and undertake ongoing vegetation monitoring in relation to potential indirect impacts, and is supportive of this approach in combination with an adaptive management approach in response to monitoring results."	N/A.
Licence Holder was provided with draft amendment on (16/06/2022)	Licence Holder provided comments on 04 July 2022 Refer to Appendix 1	Licence Holder provided comments on 04 July 2022 Refer to Appendix 1
Licence Holder was provided with draft amendment on (23/08/2022)	Licence Holder provided comments on 09/09/2022 Refer to Appendix 1	Licence Holder provided comments on 09/09/2022 Refer to Appendix 1

## 5. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

## 5.1 Summary of amendments

Table 7 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

**Table 7: Summary of licence amendments** 

Condition no.	Proposed amendments			
-	General updating to format.			
Cover Page	Update Category 6 Assessed design capacity			
4, Table 2	Tyre disposal replaced by Inert Waste Type 2.			
10, Table 4	Updated Z5 IPTSF maximum pond elevations. Inclusion of MAR Transfer Pond.			
13, Table 6	Inclusion of Remote MAR Borefield and Remote MAR Transfer Pond.			
16, Table 7	Update Category 6 Premises production or design capacity limit			
19, Table 8	Inclusion of Remote MAR Borefield.			
20, Table 9	Limit modified from 30,000 mg/L up to 50,000 mg/L as per Revised Proposal.  Averaging period modified from Continuous during discharge to monthly.			
31, Table 14	Inclusion of Remote MAR Borefield.			
32, Table 15	Inclusion of Remote MAR Borefield.			
44, Table 21	For Condition 31, Table 14 inclusion of daily average volumetric flow rate and electrical conductivity to be provided.			
Schedules 1 and 2	Updated maps.			
Schedule 3	Removed LR1 form as Licence Holder can provide this data in their own forms.  Updated N1 Notification Form.			
Appendix 1	Inclusion of Remote MAR Borefield.			
Appendix 2	Inclusion of Remote MAR Borefield.			

#### References

- 1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
- 2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
- 3. DWER 2020, Guideline: Risk Assessments, Perth, Western Australia.
- 4. Roy Hill Iron Ore Pty Ltd, Application to Amend RHIO Operating Licence L8621/2011/1 Remote MAR Borefield 12/02/2021, Welshpool, Western Australia.
- 5. Roy Hill Iron Ore Pty Ltd, RE: APPLICATION FOR AN AMENDMENT TO LICENCE (L8621/2011/1) REQUEST FOR FURTHER INFORMATION 20/05/2021, Welshpool, Western Australia.
- 6. Roy Hill Iron Ore Pty Ltd, RE: L8621 Roy Hill Licence Amendment 15/03/2022, Welshpool, Western Australia.
- 7. Roy Hill Iron Ore Pty Ltd, RE: L8621 Roy Hill Licence Amendment updates 15/03/2022, Welshpool, Western Australia.
- 8. Roy Hill Iron Ore Pty Ltd, RE: L8621 Roy Hill Licence Amendment updates 30/03/2022, Welshpool, Western Australia.
- 9. Roy Hill Iron Ore Pty Ltd, RE: NOTIFICATION: NOTICE OF PROPOSED AMENDMENT TO LICENCE L8621/2011/1 04/07/2022, Welshpool, Western Australia.
- 10. Roy Hill Iron Ore Pty Ltd, RE: L8621 Roy Hill Licence Amendment updates 21/07/2022, Welshpool, Western Australia.
- 11. Roy Hill Iron Ore Pty Ltd, RE: L8621 Roy Hill Category 6 02 August 2022, Welshpool, Western Australia.
- 12. Roy Hill Iron Ore Pty Ltd, RE: L8621 Roy Hill Category 6 03/08/2022, Welshpool, Western Australia.
- 13. Roy Hill Iron Ore Pty Ltd, Proposed Amendment to Licence L8621/2011/1 09 September 2022, Welshpool, Western Australia.
- 14. Roy Hill Iron Ore Pty Ltd, HPE CM: RE: HPE CM: Proposed Amendment to Licence L8621/2011/1 13 September 2022, Welshpool, Western Australia.
- 15. Roy Hill Iron Ore Pty Ltd, HPE CM: RE: HPE CM: Proposed Amendment to Licence L8621/2011/1 20 September 2022, Welshpool, Western Australia.

# Appendix 1: Summary of Licence Holder's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder's comment	Department's response
First 21 days consultation per	iod	
Licence		
Condition 13, Table 6	Roy Hill notes that Figure 18 includes the Remote MAR (RAMR) borefield area. Roy Hill requires flexibility in the final location of the reinjection and monitoring bores at the RMAR borefield. The flexibility is required so that optimum reinjection locations can be identified and developed.	Noted. Figure 18 is titled as "indicative" locations.
Condition 20, Table 9	Roy Hill confirms that 50,000 mg/L TDS is equivalent to 80,000uS/cm.	Updated as requested.
Condition 32, Table 15	Roy Hill confirms that TDS is managed through the Water Management Plan (WMP) (OP-PLN-00300) required under Condition 2-2 of Ministerial Statement 1189.  The WMP includes the following management action where TDS exceeds the threshold trigger level of 75 mg/L: In the event a threshold trigger is exceeded at a SWIB or RMARN RHIB, the following will be undertaken:  Investigate equipment error and sampling error.  Immediate (within 24 hours) cessation of aquifer injection at the individual injection bore(s) of the exceedance being identified.	Updated as requested.
	And where practicable:  Reduce reinjection within the SWIB/RMARN. Redistribute and/or mix surplus water for reinjection at and/or between SWIB/RMARN to improve water quality below criteria.  Then:	

Condition	Summary of Licence Holder's comment	Department's response
	<ul> <li>Report the threshold exceedance to the CEO within seven (7) days of the exceedance being identified.</li> <li>Investigate to establish causal factors such as climatic influences, dewatering characteristics, sampling injection water streams and undertake actions to reduce injection water TDS and/or TSS.</li> <li>Determine if any potential environmental harm or alteration of the environment occurred due to the threshold criteria being exceeded.</li> <li>Continue implementation of threshold contingency actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and implementation of thethreshold contingency actions is no longer required.</li> </ul>	
Condition 36, Table 18	Roy Hill refers to its comments above regarding the location of bores in RMAR.  Given the monitoring bores are still required to be installed, Roy Hill requests that the monitoring bore locations are consistent with the approach accepted by DWER for the SWIB. Therefore, Roy Hill will provide confirmation of bore logs for completed reinjection and monitoring bores.  Appendix 1 does not have the coordinates for RHIB0502-RHIB0506, these were provided to DWER in April 2022.  Also, reference is made to MS824, these needs to be updated to MS1189.	Coordinates updated.
Condition 44, Table 21	Roy notes that Table 21 refers to Form LR1, however this appears to be removed in the Schedule 1	Updated as requested.
Appendix 1  RMAR Bore location coordinates	Roy Hill advises that the details of the bore locations are yet to be confirmed. Roy Hill will provide bore logs which will also include coordinates and bore ID for the RMAR North reinjection bores and monitoring bores.	Coordinates updated.
Appendix 1  RMAR Monitoring bore coordinates	Roy Hill also advises that provided coordinates for RHIB0502-RHIB0506, to DWER in April 2022.  Roy Hill notes that reference is made to MS824, which is now replaced by MS1189.	Coordinates updated.

Condition	Summary of Licence Holder's comment	Department's response			
Decision Report					
Appendix 2: Application validation Summary	Roy Hill notes that the Part IV Ministerial Statement was issued on 19 May 2022. As such the table will need to be updated to replace the wording	Updated as requested.			
Table 1 - Legislative context and other approvals.	under assessment with EPA.				
Second 21 days consultation pe	eriod				
Licence					
Prescribed premises category description	This is an important addition to the Licence Amendment and reflects MS1189 and information submitted to DWER (snip below)	Noted.			
Condition 16, Table 7	As above.	Noted.			
Condition 32, Table 15	Roy Hill requests to amend the highlighted Management Action for "Remote MAR" but also "SWIB Injection Bores".	Updated as requested.			
	See discussion below:				
	Currently as part of operations there are two types of capacity assessments, and these are conducted every 4 months.				
	1. Infrastructure capacity				
	2. Aquifer capacity				
	These are further described below:				
	Infrastructure capacity assessment – individual bores are assessed, and injection capacity optimised on a quarterly basis.				
	To increase the infrastructure capacity, injection bores can be refurbished, or alternatively additional injection bores can be added to spread the injection load.				
	2. Aquifer capacity assessment - this capacity is modelled using hydrogeological data from monitoring and injection bores.				
	To increase aquifer capacity, it would require additional injection bores over a larger injection borefield area."				

Condition	Summary of Licence Holder's comment	Department's response
	Roy Hill requests that the management actions be amended in line with the actions in the approved Water Management Plan (OP-PLN-00300, Rev 5):	
	Investigate to establish causal factors such as equipment error, sampling error, climatic influences, individual bore characteristics i.e., infrastructure capacity.	
	Immediate cessation (within 24 hours) of aquifer injection at individual RMAR North or South injection bore(s).	
	Reduce reinjection at the RMAR North or South injection borefield.	
	And where practicable:	
	Redirect surplus water to alternate injection borefield within 24 hours.	
	If infrastructure capacity is identified as an issue the potential for additional bores to spread the injection load of a borefield(s) within the approved limits will be assessed.	
Schedule 1 maps	Figure 1 – premises infrastructure has been updated to approved as opposed to proposed, and pending premises boundary amended to the tenure boundary. See Figure 1.	Updated as requested.
	Figure 3 – the previous Z5IPTSF figure has been replaced and the previous figure should be used (also see below regarding the inserted Figure).	
	Figure 18 – current Figure 18 should be replaced with the inserted Figure 3 discussed above.	
Appendix 1	Note that new bores may still need to be confirmed, Roy Hill requests the progressive development and submission of new bores are treated the same as the latest Amendment for SWIB.	Updated as requested.
	See Attachment 1 for a revised Appendix 1 - list of bores and their coordinates	
	WMP Threshold Criteria	
	RHPZ0292S - 3 mbgl	
	RHPZ0293S - 3 mbgl	
	Removal of monitoring bore RHPZ0294S as it is not included in the Water Management Plan and now located within a restricted area for clearing and	

Condition	Summary of Licence Holder's comment	Department's response
	cannot be installed. There is no requirement for a replacement.	
Amendment Report		
Throughput	Roy Hill confirms all additions regarding Category 6 design capacity are correct.	Noted.
Figure 1	Roy Hill requests:	Updated as requested.
	Figure 1 is updated with Figure 18 from the Licence (once updated as discussed in Table 1)	
Table 3: Licence Holder Controls	Roy Hill queries whether this should reference EPA Report 1716?	This is direct from the Licence Holder's supporting documentation and is referring to the EPA Report 1484 - Environmental and Water Assessments Relating to Mining and Mining-related Activities in the Fortescue Marsh Management Area.
Appendix 1	Roy Hill notes that the snipped information should have cited the following thresholds against TDS and TSS:	Noted.
	WMP Threshold Criteria	
	TDS is managed under the injection limit of 50,000 mg/L	
	TSS is managed under the injection limit of 75 mg/L	

## **Appendix 2: Application validation summary**

SECTION 1: APPLICATION SUMMARY					
Application type					
Works approval					
		Relevant works approval number:		None	
		Has the works appr with?	oval been complied	Yes □	No □
Licence		Has time limited operations under the works approval demonstrated acceptable operations?		Yes □	No □ N/A □
		Environmental Compliance Report / submitted?		Yes □	No □
		Date Report received:			
Renewal		Current licence number:			
Amendment to works approval		Current works approval number:			
Amendment to licence	M	Current licence number:	L8621/2011/1		
Amendment to licence	$\boxtimes$	Relevant works approval number:		N/A	
Registration		Current works approval number:		None	
Date application received	12/02/2021				

Applicant and Premises details	
Applicant name/s (full legal name/s)	Roy Hill Iron Ore Pty Ltd
Premises name	Roy Hill Iron Ore Mine
Premises location	M46/518, M46/519, L47/346, L47/772, L47/851 (new mining tenements)
Local Government Authority	Shire of East Pilbara
Application documents	
HPCM file reference number:	2011/009784-1~14
Key application documents (additional to application form):	Application Form DWERDT413898 Supporting Information A1991914
Scope of application/assessment	
Summary of proposed activities or changes to existing operations.	<ul> <li>The amendment to the Licence is sought to:</li> <li>Establish the Remote Managed Aquifer Recharge (MAR) transfer pond in the mining tenements;</li> <li>Establish a reinjection borefield in the Remote MAR Borefield. A change to the premises boundary is required to undertake these amendments;</li> <li>Install regional network of monitoring bores to monitor the effect of the MAR operation on water levels and quality;</li> <li>Request a change to a monthly flow weighted average for the TDS limit in Condition 2.2.2;</li> <li>Increase the injection limit up to 50,000 mg/L TDS in the SWIB;</li> <li>Revise Table 1.2.2 to clarify where Inert Waste Type 2 can be disposed of and include conveyor waste and HDPE;</li> <li>Amend the Zulu 5 in-put tailings storage facility freeboard;</li> <li>Provide flexibility to replace blocked or damaged monitoring bores;</li> <li>Provide for pipeline sampling in the trunk line, instead of current individual injection bores (4); and</li> <li>Clarify Condition 4.2.1 re the frequency for continuous flow meter data required in the AER.</li> </ul>

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity
Category 5: Processing or beneficiation of metallic or non-metallic ore	86,000,000 (wet) tpa to produce 65,000,000 (wet) tpa ore for export	No change
Category 6: Mine dewatering	55,000,000 (trial period to 2023)	No change to premises' assessed throughput. 20,000,000 tpa injection proposed.
Category 12: Screening etc of material	6,570,000 tpa	No change
Category 52: Electric Power Generation	80MW	No change
Category 54: Sewage facility	593 m³/day	No change
Category 57: Used tyre storage (general)	No more than 5,000 tyres	No change
Category 64: Class II putrescible landfill	8,000 tpa	No change
Category 73: Bulk storage of chemicals etc	5,530m³ aggregate	No change
Category 85B: Water desalination plant	15GL/yr	No change

Legislative context and other approvals		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ⊠ No □	Referral decision No: Ref 2214, PER Status: Ministerial Statement 1189 was issued on 19 May 2022
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ⊠ No □	Ministerial statement No:  Ministerial Statement 1189 was issued on 19 May 2022. Ministerial Statements 824, 829, 979 and 980 are repealed on the issuing of Ministerial Statement 1189.
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ⊠ No □	Reference No: EPBC 2008/4624. Revised proposal currently being assessed.
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ⊠ No □	Mining lease / tenement ⊠ Expiry:  M46/518 – 31/10/2031  M46/519 – 31/10/2031  L47/346 – 28/03/2033  L47/772 – 02/11/2038  L47/851 – 29/10/2039
Has the applicant obtained all relevant planning approvals?	Yes □ No □ N/A ⊠	Approval: Expiry date: If N/A explain why?
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes □ No ⊠	Clearing to be confirmed through Part IV assessment
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes □ No ⊠	Licence/permit No: N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes □ No ⊠	Licence/permit No: GWL172642(4)
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ⊠ No □	Name: Pilbara Surface Water Area Pilbara Groundwater Area Type: Proclaimed Groundwater Area/Surface Water Area Has Regulatory Services (Water) been consulted? Yes □ No ☒ N/A □ Regional office: North West

Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes □ No ⊠	
Is the Premises subject to any other Acts or subsidiary regulations (e.g. Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx)	Yes⊠ No □	Dangerous Goods Safety Act 2004 Mining Act 1978
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes □ No ⊠	
Is the Premises subject to any EPP requirements?	Yes □ No ⊠	
Is the Premises a known or suspected contaminated site under the Contaminated Sites Act 2003?	Yes □ No ⊠	Roy Hill have reported DWER of a potentially contaminated site on 11/11/2020 following a fuel spill. This was largely cleaned up but part of the area can't be accessed.