Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 7

Licence Number	L8621/2011/1
Licence Holder	Roy Hill Iron Ore Pty Ltd
ACN	123 722 038
File Number:	2011/009784
Premises	Roy Hill Iron Ore Mine M46/518 and M46/519 NEWMAN WA 6753
Date of Amendment	**13/06/2019**

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Alana Kidd

Manager, Resource Industries

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

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Amendment Notice	refers to this document
ANCOLD	Australian National Committee on Large Dams
BWRO	Brackish Water Reverse Osmosis
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 10 JOONDALUP DC WA 6919 info@dwer.wa.gov.au
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
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)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
GL	gigalitre

IPTSF	In-Pit Tailings Storage Facility
Licence Holder	Roy Hill Iron Ore Pty Ltd
Licensee	Roy Hill Iron Ore Pty Ltd
MAR	Managed Aquifer Recharge
m^3	cubic metres
mg/L	milligram per litre
mbgl	metres below ground level
Minister	the Minister responsible for the EP Act and associated regulations
MP	Mining Proposal
MPP	Mine Process Plant
MS	Ministerial Statement
Mtpa	million tonnes per annum
MW	megawatt
NEPM	National Environmental Protection Measure
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.
PMP	Probable Maximum Precipitation
RHIO	Roy Hill Iron Ore Pty Ltd
RIWI Act	*Rights in Water and Irrigation Act 1914*
RO	Reverse Osmosis
SCADA	Supervisory Control and Data Acquisition
TPS	Tailings Pump Station
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
WBP	Water Blending Plant
Z5 IPTSF	Zulu 5 In-Pit Tailings Storage Facility

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

This notice is limited only to an amendment for Categories 5, 52 and 64 and addition of category 85B.

The following guidance statements have informed the decision made on this amendment*:*

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

Roy Hill Iron Ore Pty Ltd (RHIO) (Licensee) (Licence Holder) submitted an Application on 25 January 2019 to amend Licence L8621/2011/1. RHIO proposes to:

- construct and operate the Zulu 5 In-Pit Tailings Storage Facility (Z5 IPTSF);
- construct and operate a 15 GL/annum Water Blending Plant (WBP) which incorporates a 14.6 GL/annum Brackish Water Reverse Osmosis (BWRO) Plant (Category 85B);
- increase the approved capacity of the Mine Power Station to 80MW;
- increase the tyre disposal area; and
- remove TSF groundwater monitoring bore TSFMW08.

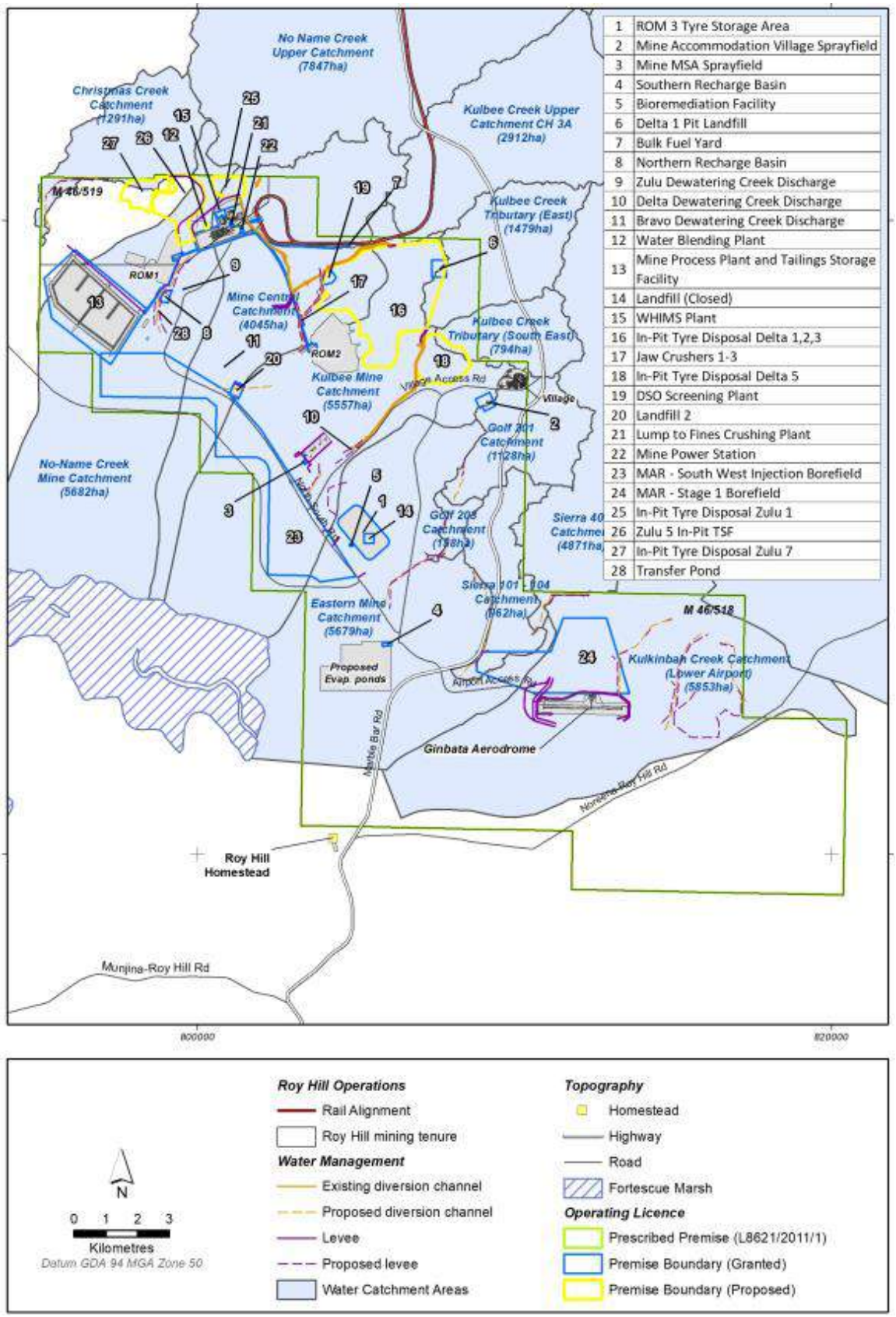
Table 2 below outlines the proposed changes to the Licence categories.

Table 2: Proposed design and throughput capacity changes

Category	Current approved throughput capacity	Proposed design/ throughput capacity	Description of proposed amendment
52: Electric power generation	45 MW	80 MW	Maximum number of 1.6 MW generators operating at any one time to be increased from 30 to 50 for total power output of 80 MW, with additional 6 generators used for maintenance/redundancy.
85B: Water desalination Plant: premises at which salt is extracted from water if waste water is discharged onto land or into waters (other than marine waters)	N/A	15 G/L per year	Addition of a 15 GL per year Water Blending Plant which incorporates a 14.6 GL/annum Reverse Osmosis Plant

Location of the proposed Z5 IPTSF, WBP, Power Station and In-Pit Tyre Disposal areas are shown in Figure 1 below.

Figure 1: Premises infrastructure map and



Zulu 5 In-Pit Tailings Storage Facility

RHIO currently operates an above ground Tailings Storage Facility (TSF) which was designed to accommodate the expected life of mine tailings production. After an assessment of future tailings management for the site, RHIO is now proposing to implement in-pit deposition as part of a long-term strategy for tailings management, commencing with the Z5 IPTSF. The overall capacity of the Z5 IPTSF for input assumptions, is estimated at 26.5 Mm^3. The existing above ground facility will remain an option for future disposal should the need arise.

The RHIO tailings are generated as part of the iron ore beneficiation process in cyclones, up-current classifiers and spirals. Three tailings streams are mixed in a conventional thickener to increase the solids concentration to 55% (by weight) before being pumped to the TSF. RHIO is currently designing a Magnetic Separation (Wet High Intensity Magnetic Separation [WHIMS]) plant to extract more recoverable iron from the tailings. The WHIMS is scheduled to be operational prior to the commissioning of the Z5 IPTSF. There may be times however, when the process plant is operational, but WHIMS is offline and tailings will revert to the current product. Consideration for both current and WHIMS tailings products has been undertaken in the design and, where required, adopted conservative parameters so that all scenarios are accounted for (Application, page 39).

Tailings characterisation

SRK Consulting undertook geochemical characterisation of the RHIO tailings (*SRK Report ROY006 Tailings Geochem Rev2, 30 August 2018).*

A total of 20 tailings slurry samples were collected by RHIO for the geochemical test work. The samples were collected from pipe infrastructure located at the processing plant between 23 September 2016 and 29 November 2016 (SRK, 2018).

The test program was designed to assess the potential for the tailings to generate acidic mine drainage and/or neutral mine drainage. The samples were classified as non-acid forming (NAF) based on the low total sulfur content (<0.09%) and, albeit low, acid neutralising capacity (3 kgH2SO4/t to 8 kgH2SO4/t). Trace elements that were found to be enriched in the samples were Arsenic, Bismuth, Chromium, Antimony and Selenium (SRK, 2018).

Leach tests undertaken were: Conventional static deionised water leach tests (6 samples), Mild acid leach (3 samples leached at a pH of 4 to 4.1), Saline leach (3 samples at leached at salinities between 2 g NaCl/L and 10 g NaCl/L), Low contact ratio leach (3 samples leached at L: S between 0.5:1), Multi-step DI water leach (1 sample leached 5 times in succession) (SRK, 2018).

The SRK Report concluded that the tailings are not likely to be acid generating, but that the supernatant may be subject to evapo-concentration and that some elements (i.e. Aluminum, Barium, Chromium, Fluorine, Iron, Molybdenum, Manganese, Selenium, Thorium and Sulfate) may leach at concentrations higher than the background water quality (GHD, 2018).

DWER notes that the leaching tests undertaken by SRK may not have adequately characterised the extent to which elevated nitrate concentrations may influence the leaching of adsorbed selenium from mine wastes.

Zulu 5 IPTSF – key aspects

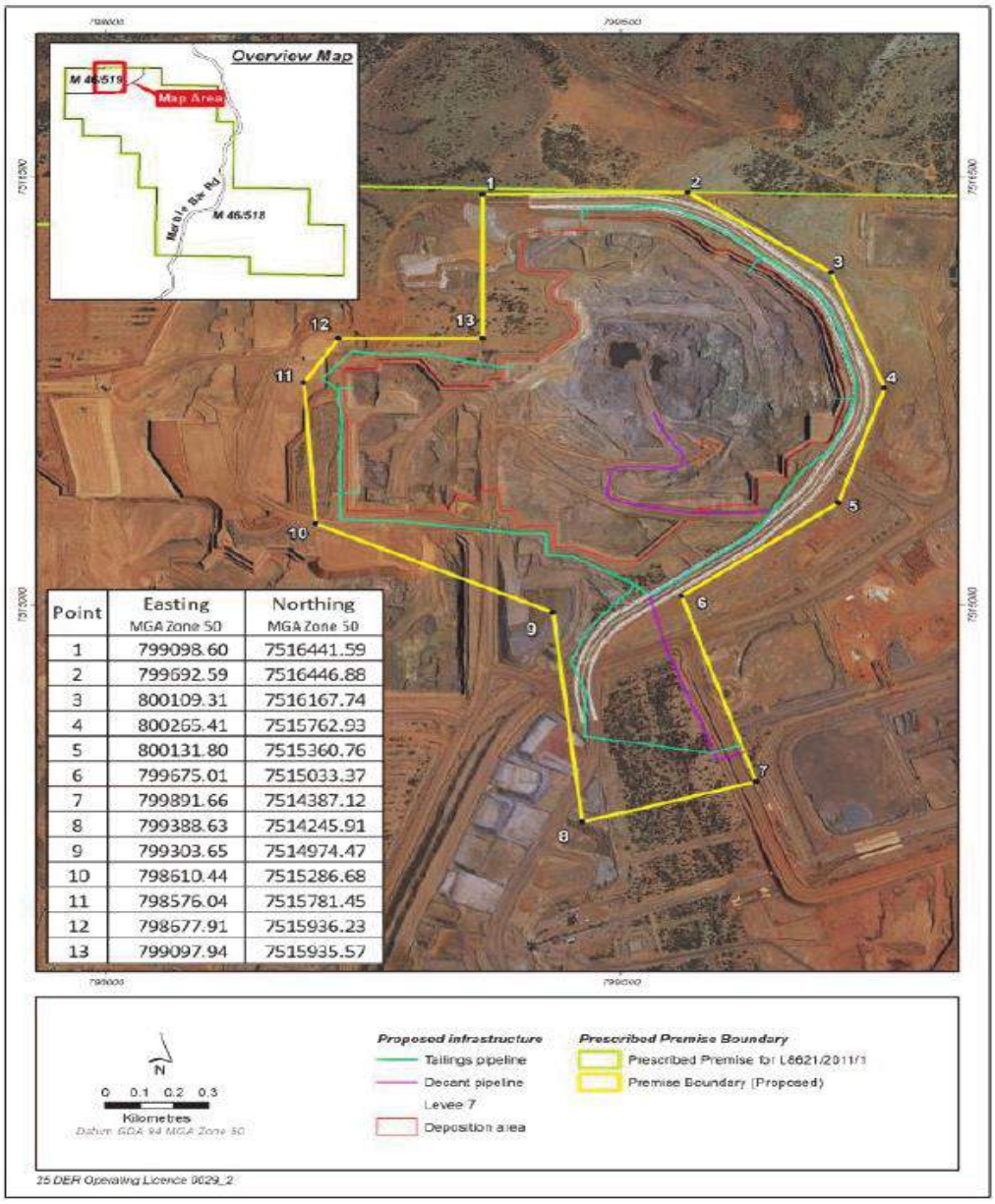
The Z5 IPTSF is located to the northwest of the existing Mine Process Plant (MPP). The deposition area is shown in Figure 2 below.

The key design aspects of the Zulu 5 IPTSF include:

- Construction of two containment embankments to complete the perimeter and to isolate the TSF from the ongoing mining activities.

- Construction of decant access ramp to facilitate water return and emergency discharge channel.
- Installation of dual tailings delivery lines from a tie-in location downstream of the existing process plant to the pit perimeter.
- Installation of 6 discharge spigots on the pit perimeter.
- Installation of skid mounted pumps and dual return water lines to transfer decant to a designated above ground transfer pond and/or a tie-in to the existing return water pipelines to the plant.
- Installation of electrical and control infrastructure for both the tailings delivery and return water systems.
- Associated civil and structural works for access roads, pipeline corridors, road crossings, pipe plinths, anchor blocks etc.
- Installation of survey and monitoring instrumentation.

Figure 2: Zulu 5 IPTSF deposition area and tailing delivery and decant lines



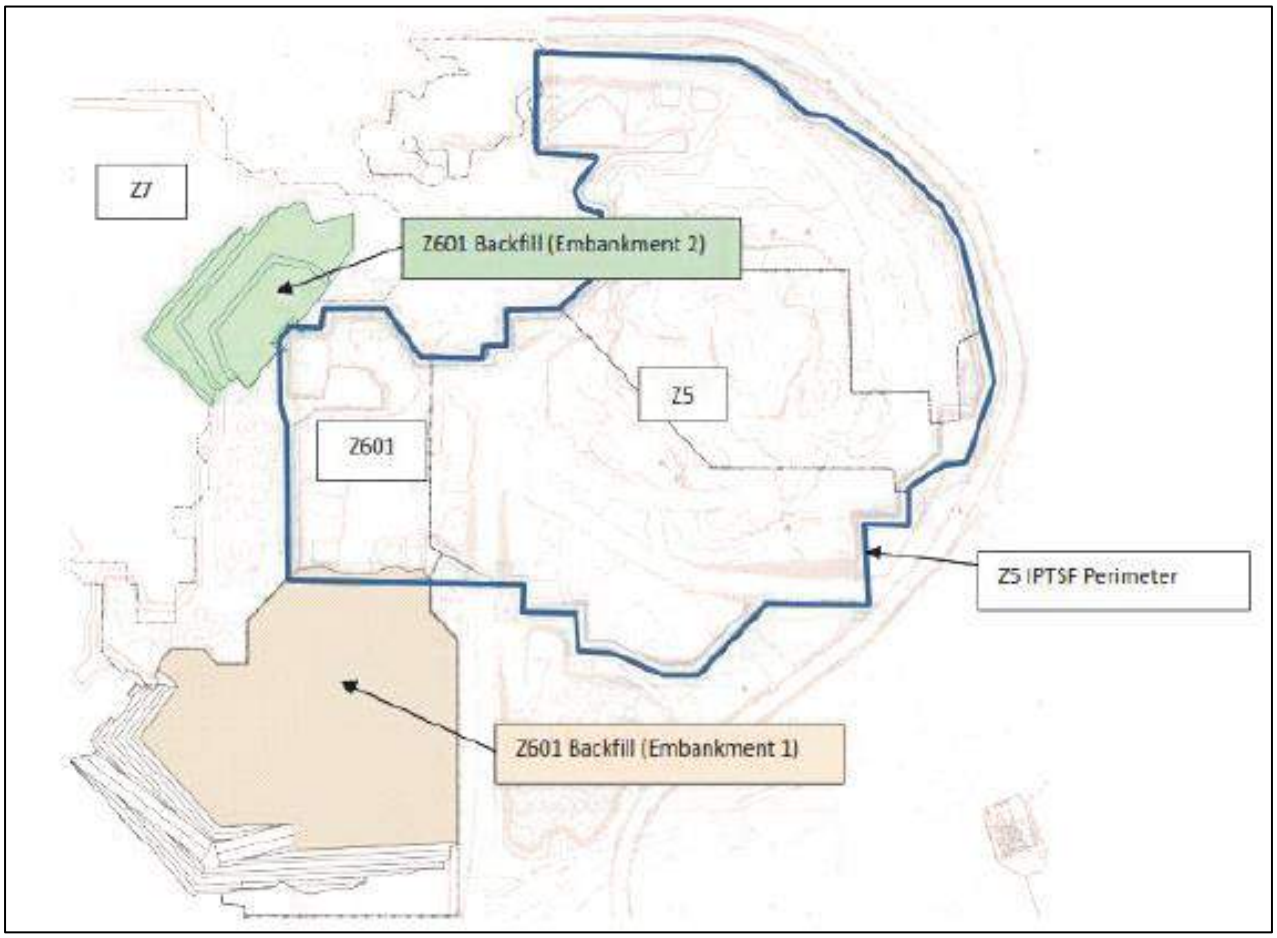
Embankment design

Two containment embankments will be constructed to complete the perimeter and to isolate Zulu 5 IPTSF from the ongoing mining activities. The location of these two embankments is illustrated in Figures 3 and 4.

Embankment 1 will be constructed by the backfilling with mine waste of pit Z601 with mine waste and Embankment 2 will be constructed by mining and partial backfilling of pit Z7 (also with mine waste). Backfilling will be completed prior to deposition/commissioning.

Permeability of the backfill for seepage modelling assessment was assumed by GHD consultants as 1 x 10^{-6} m/second and by lab test result as 4 x 10^{-8} m/second.

Figure 3: Zulu 5 IPTSF embankment locations



It is anticipated that the front face of the Embankment 1 backfill may comprise relatively fine material and a minimum 2 m wide layer of select coarser waste will be placed on this face to limit erosion damage. A windrow will be constructed near the crest to prevent runoff down the slope.

Some sloughing or minor erosion of the front face is expected and a safety offset has been defined by the stability modeling for the positioning of the pipeline corridor and access road for the tailings delivery line. The same surface water management measures and safety offset for Embankment 1 will be applied to Embankment 2.

Surface Water Management

Flood protection is currently in place at the Zulu 5 pit by Levee 7 and will remain during the operation of the Z5 IPTSF. Levee 7 diverts runoff from the upstream catchment and has been designed for a 1% AEP flood.

Freeboard

The maximum anticipated pond elevation as determined from the deposition modeling is 442.2 mRL.

GHD (2018) reports that the 1 in 100 year 72 hr storm rainfall intensity as defined by Bureau of Meteorology (BOM) is 4.7 mm/hour which results in a storm volume of 385 Mm^3. GHD (2018) has calculated that this storm event volume as well as an allowance for wave run up freeboard can be accommodated below an emergency overflow invert level of 444.0mRL.

Contingency overflow

In accordance with Australian National Committee on Large Dams (ANCOLD) guidelines, a 20m wide, 1m deep emergency channel has been designed to safely discharge flow and prevent an embankment overtopping failure in the event of a Probable Maximum Precipitation (PMP) event at the site. The PMP was estimated using Generalised Short Duration Method (BOM, 2003) assuming a closed catchment for durations between 1 and 6 hours.

A 20m wide channel will be constructed at an inlet level of 444.0mRL and contingency flow will discharge into No Name Creek downstream.

Tailings delivery pipeline

The tailings delivery system will utilise the existing Tailings Pump Station (TPS) at the Mine Process Plant. Downstream of the existing magflow and density meters, a new tie-in will be installed to connect to the new tailings delivery pipelines.

The new pipelines will utilise the same materials, sizes and pressure classes as the existing lines where feasible. The tie-in will occur in the DN450 High Density Polyethylene (HDPE) lined carbon steel portion of the lines. The new lines will continue with this material until the design pipeline pressure reduces sufficiently to safely allow the use of HDPE piping.

The transition from steel to HDPE will occur approximately at the base of Levee 7. A silt trap will be constructed at this location to contain any potential leaks from the change in pressure rating. Each line will have a burst disc installed near this location and be installed such that pipes will discharge into the Z5 IPTSF directly, negating the need for additional capture.

Pipe alignment will be parallel to roads where practicable and will be protected from vehicle interactions by windrows and culverts at road intersections.

Automatic shutoff

The new tailings delivery pipelines will have magflow meters installed at Levee 7. The readings from these magflows will be automatically compared with that from the PS1 magflows, and in the event of significant differences in reading, PS1 will start the automated fast shutdown sequence to prevent any leak from propagating. Additionally, a pressure switch directly downstream of the burst disc will automatically detect rupture of the burst disc and will start the PS1 fast shutdown sequence.

Tailings deposition ring main and spigots

The deposition ring mains will be installed in two branches around the perimeter of the Z5 IPTSF, with 3 deposition spigots on each branch. The burst disc installed at the dam location will protect against overpressure of the HDPE piping. The ring mains will be installed with a 30m setback from the edge of the pit or mine waste backfill, due to the erodible nature of the ground, protected by a windrow and with the access track on the outside of the ring

The deposition spigots will be DN450 PN16 HDPE pipe. The pipe will not be slotted for approximately the first 2 m after the turn-down elbow, to prevent any early release of tailings from the top of the spigot. The spigots will extend down between 20 to 40m to ensure discharge is beyond the erodible zones.

Tailings deposition strategy

Tailings will be delivered to the IPTSF via dual delivery pipeline that will split into an Eastern and Western leg at the pit perimeter (Figures 4 and 5).

The deposition strategy comprises rotation deposition through six discharge locations to allow for air drying and ensure that the pool is located around the decant access ramp. The length of the spigots at each location has been selected to ensure that discharge occurs below the easy erodible materials along the pit walls.

The operational strategy assumes that decant will be maximised to enhance air drying and increase the average density of the placed tailings.

Water balance

GHD developed a water and chloride balance model using GoldSim 12.0 (Build #379) to inform the life of mine tailings disposal strategy for the mine. The model simulates the various system components and processes of a TSF, including the deposition and accumulation of tailings solids, as well as changes in chloride concentration. This water balance model has been used to estimate the volume of water available at the Z5 IPTSF for return to the process plant under various climatic conditions.

Evaluating the worst case scenario (46% solids concentration), the proposed reclaim infrastructure comprising 3 x 10 ML/day pumps in a duty, duty standby configuration will have sufficient capacity to meet the daily reclaim requirements up to and including the 95th percentile.

Decant Return water system

Decant reclaim will be achieved using three identical skid mounted pumps and dual return water lines located on an access ramp (Figure 4).

Decant will discharge to the process plant and a new Transfer Pond. Each return water pump skid will be monitored and controlled remotely via telemetry.

The operating philosophy for the decant return water system considers the process plant supply as process critical (preferential constant flow rate), while the flows to the new transfer pond have been considered disposal (stop/start operation to keep the decant pond level at a manageable level that promotes consolidation).

The new Zulu 5 return water line will tie into the existing return water line via manually operated valves. There will be a flow meter required at the tie in location to monitor flow rates.

Decant return water piping will be HDPE. Where vehicular crossings are required, the pipeline will be direct buried. Light Vehicle crossings will have a minimum of 1000mm cover, and Heavy Vehicle crossings will have a minimum of 1500mm cover. All buried pipe will be a minimum pressure rating of PN10.

The remaining decant water, expected to be between 10 and 20ML/d, will be disposed of to a 60 ML HDPE lined Transfer Pond via two pumps operating in duty/assist configuration.

Figure 4 – Z5 IPTSF general layout

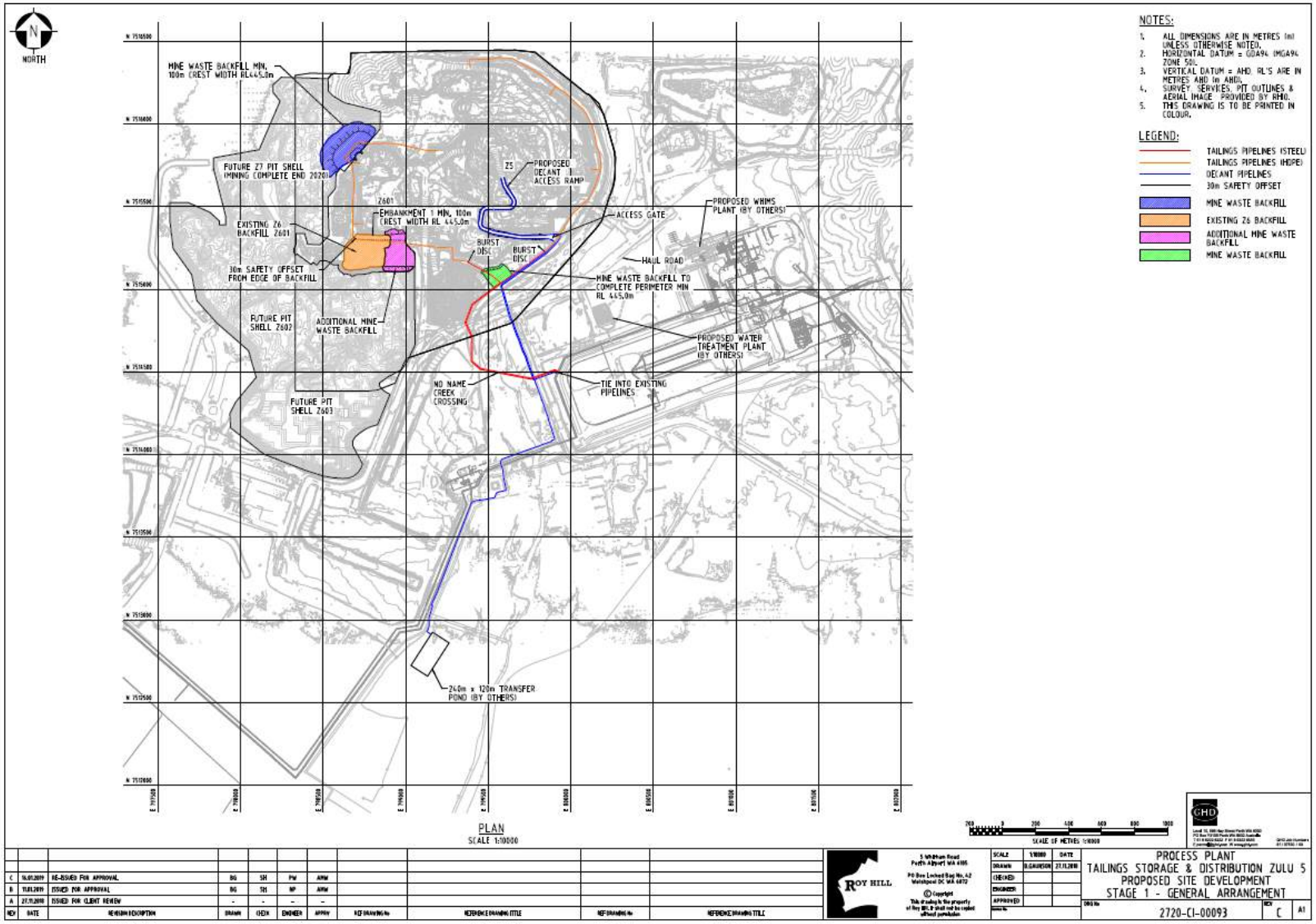
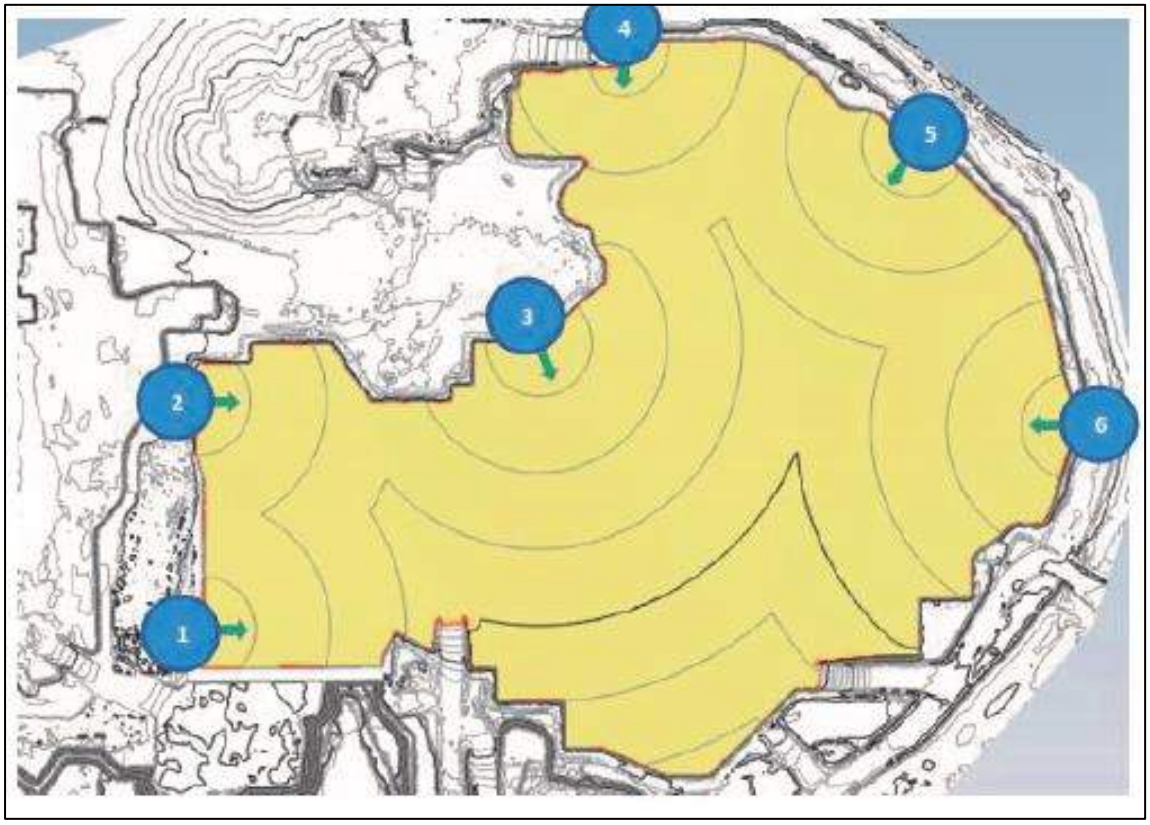


Figure 5: Spigot location



Z5 IPTSF - impacts to groundwater level and quality (GHD, 2019)

GHD (2019) carried out an assessment of the potential impacts to groundwater from construction, operation and closure of the Z5 IPTSF, as summarised below.

Mounding

GHD (2019) modelling predicts that groundwater mounding will be small and limited to the immediate vicinity of the IPTSF footprint due to the dewatering at an adjacent pit for the duration of tailings deposition. This mound is expected to slowly dissipate once Z5 IPTSF ceases to be operational.

Groundwater quality

The Z5 IPTSF will be a source of elevated trace metals, such as Se and Cr, and nitrate. Seepage from the IPTSF to groundwater will introduce these solutes into the groundwater system.

GHD (2019) concluded that due to a low rate of seepage (driven by low permeability of tailings) the mass loadings of these solutes will be limited. They are predicted to develop groundwater plumes during the later stage of mining which will continue to evolve after closure. The plumes (primary plume extending south of the IPTSF and the residual plume to the south-east of the IPTSF) are predicted to evolve post closure at a slow rate given the hydrodynamic setting of the area.

The predicted concentration changes were relatively small for Se and Cr, i.e. up to 0.002 to 0.005mg/L Se, up to 0.01mg/L for chromium, and up to 20mg/L of nitrate in peak parts of the plume. The modelling suggested that there will be low-rate gradual depletion of mass from the IPTSF but at quantities too small to sustain an observable groundwater plume around the IPTSF.

Predicted nitrate concentrations suggested redistribution of the nitrate plume predominantly after closure resulting in larger area with lower concentrations. The predicted long-term concentration range is 2 to 5mg/L in the Bravo area and between 10 and 20mg/L in the Zulu area and was not considered likely to migrate to the Fortescue Marsh.

Riparian vegetation

Riparian vegetation is located potentially within parts of contaminant plumes. Eucalyptus species that are present within riparian zone within the mining tenement have long root systems. However, the modelling indicates that depth to groundwater is expected to be more than 20 mbgl after rebound of the dewatering drawdown, and GHD (2018) concluded that access to groundwater by the root system would be opportunistic.

In areas where the selenium and chromium plumes temporarily intersect the riparian zone to the east of Zulu 5, the predicted concentration change was 0.01 and 0.02mg/L respectively. In a small riparian section to the west of the IPTSF the concentration changes were predicted as up to 0.005 and 0.01mg/L of Se and Cr, respectively. GHD (2018) concluded that it was unlikely that deep groundwater in these areas would be accessed by root systems.

The summary conclusion by GHD was that residual plumes associated with Z5 IPTSF would not impact the riparian vegetation.

Fortescue Marsh

Given the distance of approximately 12km from Zulu 5, GHD concluded the groundwater concentration changes associated with IPTSF as non-material to the Marsh. The plumes developed due to the seepage from the IPTSF were predicted to remain within the mining tenement. The contaminant transport modelling results indicated that these plumes are not likely to reach the Fortescue Marsh.

The adverse risks to the Fortescue Marsh from Zulu 5 IPTSF were assessed to be negligible

with respect to Cr, Se, and N concentrations, both during mining and post closure.

Stock watering

The Ten Mile Well stock bore, is situated downslope approximately 4 to 5 km south of Z5 pit within the riparian zone. Based on the contaminant transport modelling results GHD concluded that the bore will not be affected by trace metal or nitrate plumes due to the seepage from the in-pit TSF.

Operating Manual

An Operations Manual will be developed for the Z5 IPTSF prior to the facility being commissioned and will document the procedures required to operate, monitor the performance of, and maintain the TSF and associated water management facilities.

Groundwater monitoring

GHD recommended that a monitoring network be established. Bores should monitor likely plume directions to the south and the southeast and at least four bores to target the Marra Mamba Formation and the overlying unconsolidated sediments. The Application did not include proposed locations or details for groundwater monitoring bores.

Decant disposal by dust suppression and MAR

The use of decant water for dust suppression was identified as a Proposal Characteristic in the *Roy Hill 1 Iron Ore Project Stage 1, Report and recommendations of the Environmental Protection Authority , Report 1342, November 2009* (EPA Report 1342).

In May 2018, RHIO requested DWER (Industry Regulation) to confirm RHIO's understanding of the approval requirements for disposing TSF decant water via dust suppression.

DWER (Industry Regulation) response was by letter dated 26 September 2018 that reuse of water for dust suppression is not usually considered by DWER to be a discharge to environment that is regulated as part of the primary activity under Schedule 1 of the *Environmental Protection Regulations 1987.* Where the activity of dust suppression is undertaken in such a manner that it is clearly a *de facto* discharge of excess water beyond the amount required for genuine dust suppression requirements, this activity would constitute an offence unless it was done in accordance with a licence condition. Where the reuse is associated with a primary activity on a prescribed premises it may be subject to licence conditions where a source, pathway and receptor is identified. Regardless of the licence conditions that may apply, the activity may not result in environmental harm. The general provisions of the EP Act and the *Environmental Protection (Unauthorised Discharges) Regulations 2004 apply.*

Concerns were noted with regard to localised environmental impacts, and DWER (Industry Regulation) recommended that the TSF decant water is not used on a long term basis for dust suppression on mine roads, but short term use may be acceptable.

It was also noted that the existing Licence allows tailings return water to be stored within the process water dam prior to use in the MPP or evaporated using mechanical evaporators.

The Application includes Appendix 6, *Roy Hill Iron Ore Pty Ltd, TSF Decant Water Disposal Risk Assessment*, GHD, January 2019, for impacts from TSF decant water for use of dust suppression and also for disposal into the MAR system for the life of the mine.

The disposal of decant water into the MAR system for the life of the mine is not included as a Key Characteristic of MS 824. Attachment 7 to MS 824 specifies "*Dewatered Saline Groundwater (up to 30,000 mg/L TDS) and RO Plant reject water to be disposed to recharge basins and/or reinjection bores: Up to 55 GL per annum for a period of up to 2 years".*

RHIO has submitted a *Revised Proposal of the Roy Hill Iron Ore Mine* under EP Act s38 for *a significant increase in ground disturbance to that previously approved, a revised materials*

management strategy, a Life of Mine water management strategy including Managed Aquifer Reinjection, a significant increase in dewatering volumes and establishment of permanent surface water diversion structures. The Revised Proposal includes the *Roy Hill Iron Ore Pty Ltd, TSF Decant Water Disposal Risk Assessment*, GHD, January 2019.

RHIO may apply to amend the Part V Licence to include long term disposal of decant by dust suppression and MAR, after determination of the s38 application.

Water Blending Plant

RHIO is proposing to construct and operate a 15 GL/annum Water Blending Plant (WBP) incorporating a 14.6 GL/annum Brackish Water Reverse Osmosis (BWRO) Plant to allow for blended water to meet Mine Process Plant (MPP) water quality requirements. RHIO plan to initially construct and operate a 20.5 ML/day (7.5 GL/annum) WBP (Stage 1) and later upscaling by replicating Stage 1 for total capacity of 41 ML/day (15 GL/annum) (Stage 2).

The WBP will be located on the western end of the MPP. Stage 1 will consist of the following plant and equipment (layout shown in Figure 6 below):

- Feed water Tank (2 ML).
- 7 Multimedia filtration (MMF) units and MMF backwash system.
- 5 µm cartridge filtration.
- RO - 4 x 5ML/day units.
- Permeate water blending tank (1 ML).
- Blended Water Tank (2 ML).
- Waste Water Storage Tank (1 ML).
- Transfer and pumping systems.
- Chemical dosing system.
- Chemical storage consisting of:
    - Biocide (100%) to prevent growth in the source water tank estimated consumption 75 kg/day.
    - Antiscalant A&B (100%) additive to pre-filtration system to liberate barium sulphate salts estimated consumption 1,200 L/month.
    - Citric Acid (50%) additive to chemical neutralising estimated consumption 1,550 L/month.
    - Hydrochloric Acid (30%) additive to membrane cleaning and chemical neutralising estimated consumption 130 L/month.
    - Sodium Hydroxide (30%) additive to chemical neutralising tank estimated consumption 1,200 L/month.

Chemicals will be delivered in 1 kL Intermediate Bulk Containers (IBC) and stored in double skin chemical containers. The IBC bulk containers drain to a containment tank in the chemical storage unit. Pipework from the chemical storage unit directly connects the chemical to the dosing pumps. Pipework is run within the confines of the bunded concrete floor of the WBP building. Dosing pumps are automated to provide programmed dosing blend for the pre-treatment, backwash or neutralisation.

Appropriate chemical spill kits will be located within the facility in the event of a chemical spill.

The Stage 2 WBP will result from the addition of a second WBP (20.5 ML/day) at the same location.

Reject water

Saline reject water will be collected in the waste water tank and will be either pumped to a lined 60 ML capacity Dust Suppression Pond/Transfer Pond, or pumped direct to the Managed Aquifer Recharge (MAR) system. Disposal of RO plant reject to the MAR system has approval under Part IV of the EP Act.

The quality of the reject will slowly trend towards a more saline nature as the borefield water quality increases in salinity.

The expected ranges in quality are detailed in Table 3 (from the Application).

Table 3: Saline reject water quality

Parameter High Concentration (mg/L)	Low Concentration (mg/L)	High Concentration (mg/L)
TDS	8,000	19,000
Chloride	2,000	7,500
pH	7	8
Sodium	1,500	4,700
Magnesium	400	700
Calcium	500	700
Sulphate	3,000	5,000

Note: the above figures ultimately depend upon real feedwater chemistry and changes.

The indicative route of the pipeline is shown below in Figure 7.

Figure 6: Layout of WBP

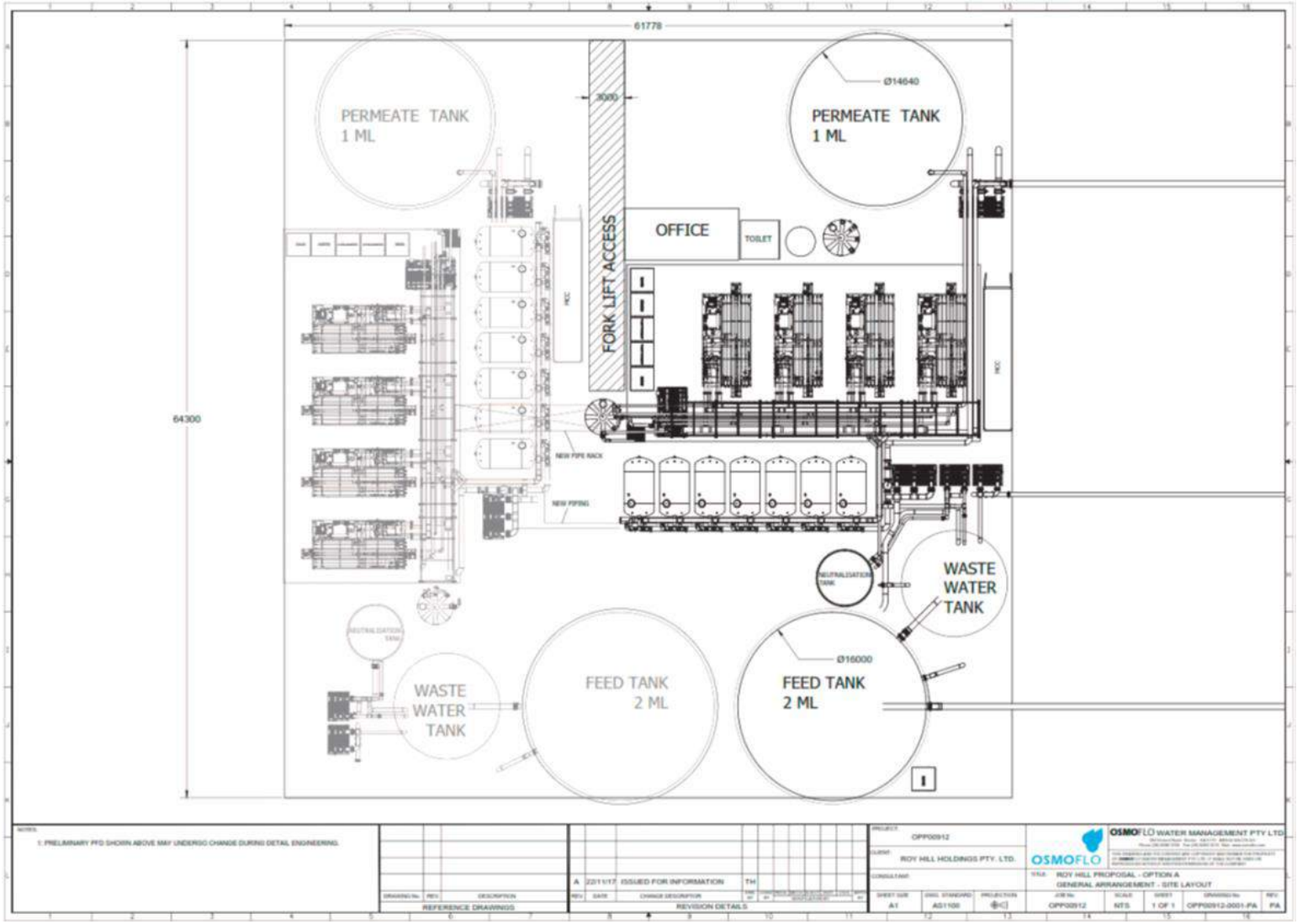
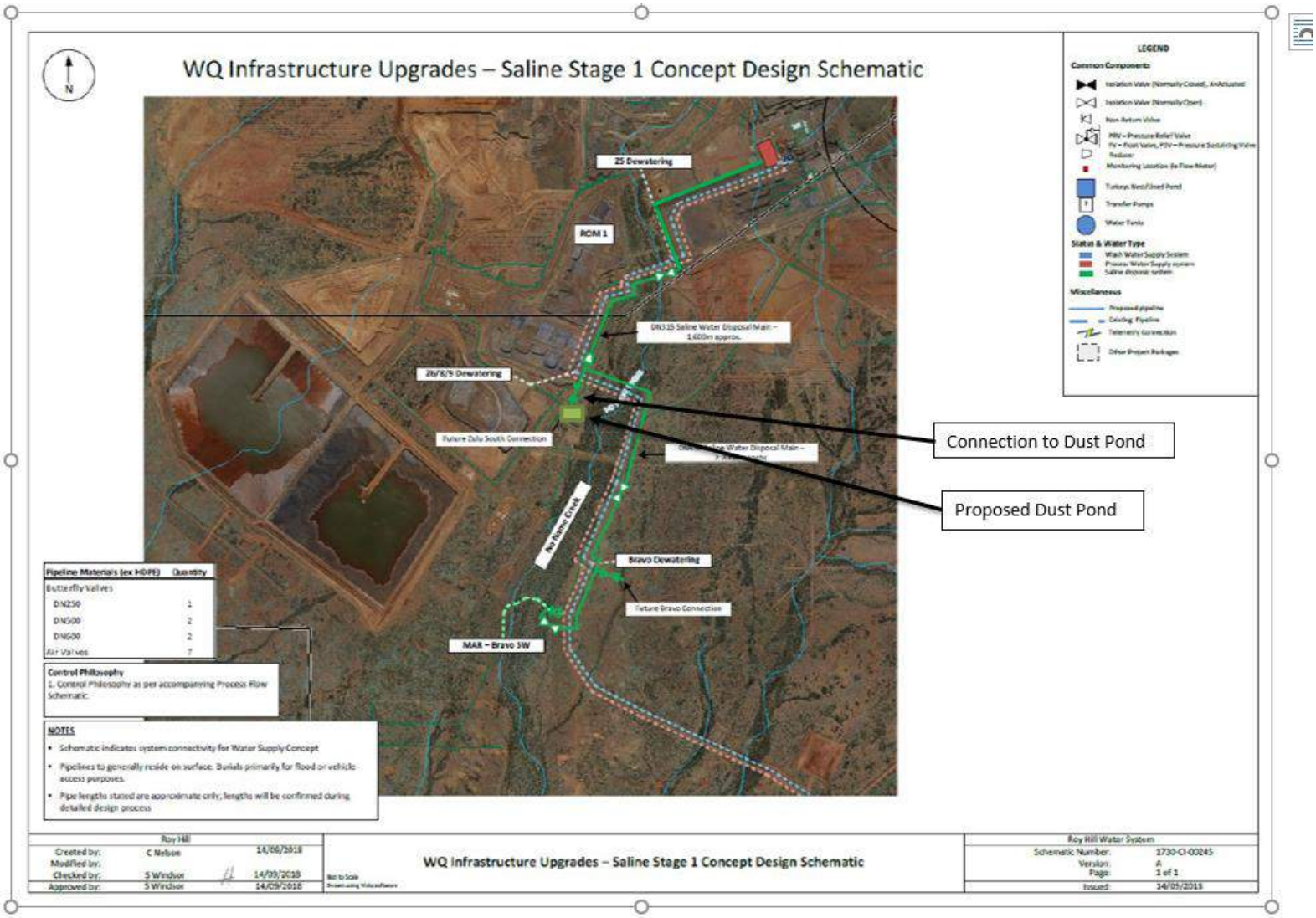


Figure 7: Indicative distribution layout of WBP reject water



Mine Power Station

Licence Amendment Notice 3 approved construction and operation of a power plant by the installation of 56 Caterpillar 3516B diesel generators, each with a continuous gross rated output of 1.6.MW, and with a maximum of 30 generators operating at any one time for peak power demand of 45 MW.

RHIO has applied to increase the maximum number of generators operating at any one time from 30 to 50 generators, for a revised peak power output of 80 MW. The remaining 6 generators will be used for redundancy and maintenance rotation only.

There are no changes to the power plant construction as approved by Amendment Notice 3. Location, stack numbers, height, and stack exhaust velocity and manufacturer's nominal air emissions for each generator remain the same.

There are also no changes to diesel fuel supply by underground pipeline from the Bulk Fuel Facility as assessed by Amendment Notice 3.

The Village is the only human receptor in the likely area of impact for air emissions and noise, but is located within the premises boundary and is therefore not considered as a sensitive receptor for purposes of the Licence in accordance with *Guidance Statement: Risk Assessment*.

The Application included an air emissions assessment report by Environmental Technologies and Analytics (2018). Ground level concentrations of PM^{10} and NO_2 air emissions for 50 diesel units operating continuously were modelled. Results indicated that under both normal and peak operating conditions, the predicted PM^{10} are insignificant compared to background concentrations, and compliance with the assessment criteria (NEPM 2015) for NO^2 is predicted to occur under the vast majority of meteorological conditions at the onsite Accommodation Village.

The Application also included a noise report by Pacific Environmental (2017). Modelling was conducted to predict adverse noise impacts from revised power plant output at the site Accommodation Village. The noise assessment indicated noise levels from the proposed power station operations are expected to be below 10 dB(A) at the Accommodation Village under neutral and worse case operating conditions.

Tyre disposal

Licence Amendment Notice 3 approved disposal of tyres into the Delta mine pit within defined locations D101 and D301. RHIO propose additional tyre disposal areas located within the Delta pit (Delta 1, 2, 3 & 5) and also within defined areas of the Zulu mine pit (Zulu 1 and 7). The tyre disposal areas are located as shown below on Figures 8, 9and 10.

Management of the expanded and additional tyre landfilling areas will be the same as for the disposal of tyres in the Delta pit approved by Amendment Notice 3:

- Base of in-pit tyre disposal area will be at least 3 m from original groundwater level;
- A minimum of 5 m of inert waste backfill cover will be placed on top of the tyres, if the overlying surface is to be flat. A minimum of 8 m of inert waste backfill cover will be placed on top of the tyres, if the overlying surface is to be sloping.
- Tyres will be landfilled in batches separated from each other by at least 1,000 mm of soil and each consisting of not more than 1,000 whole tyres; and
- No tyres will be placed underdrainage lines or major proposed mine infrastructure.

Apart from burial within different pits and expansion of burial area, placement and management of disposal of tyres remains the same. Risk and controls remain unchanged and do not require reassessment. The Delegated Officer has determined that the proposed tyre burial locations can be added to the licence.

Figure 8: Delta 1, 2, 3 & 5 In-Pit Tyre Disposal Location

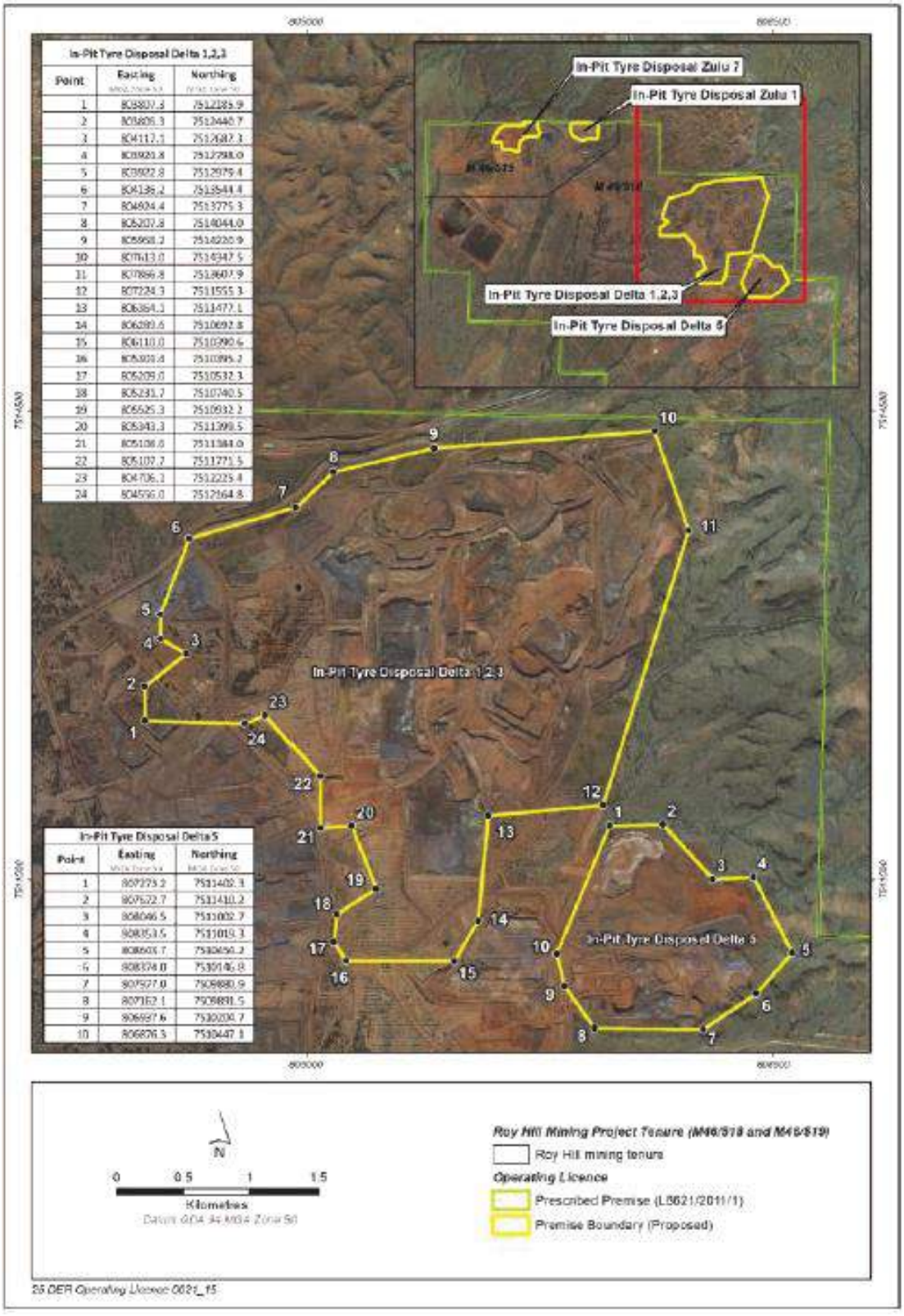
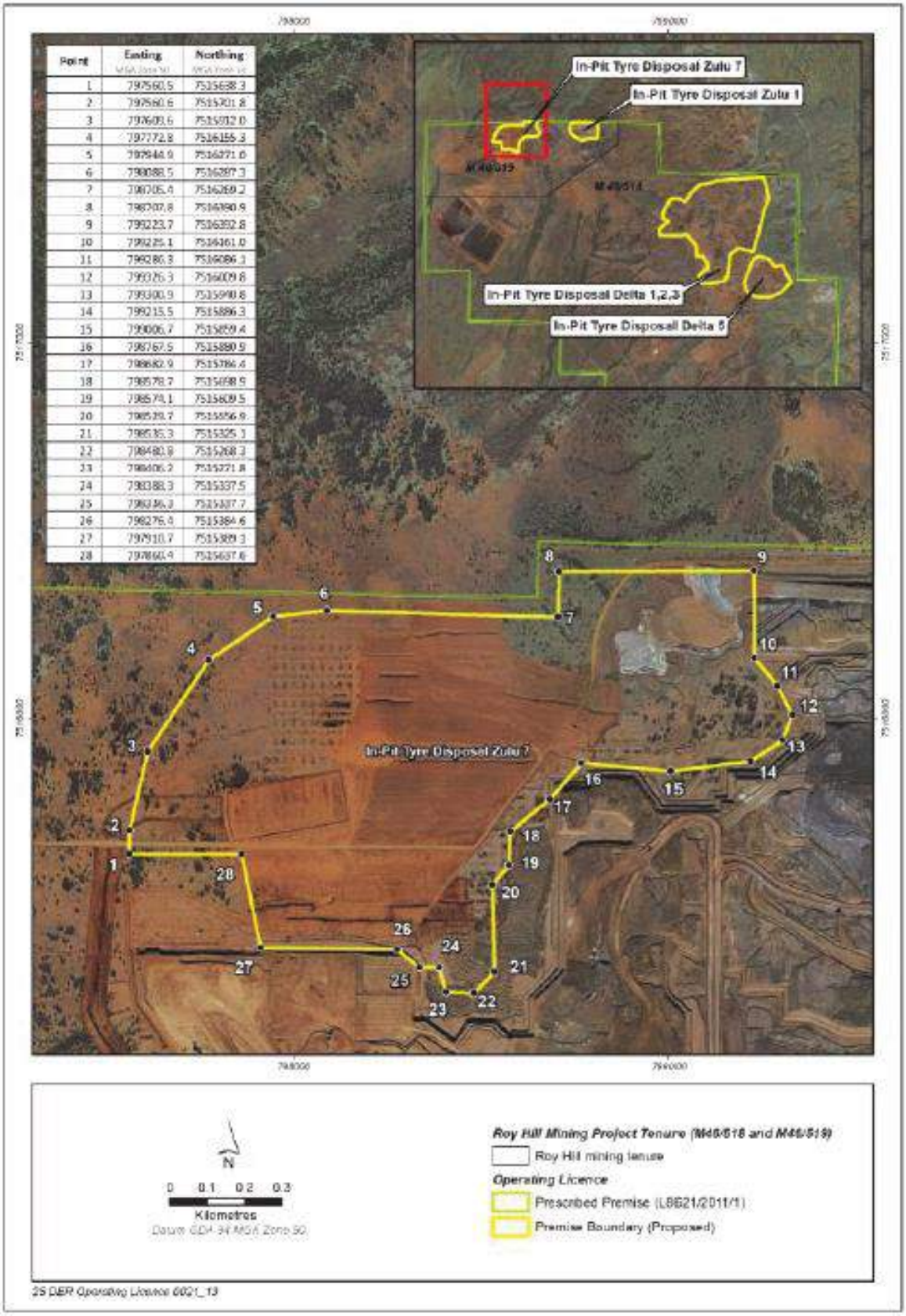


Figure 9: Zulu 1 In-Pit Tyre Disposal location

Figure 10: Zulu 7 In-Pit Tyre Disposal location



Point	Easting	Northing
1	797560.5	7515638.3
2	797560.6	7515701.8
3	797609.6	7515702.0
4	797772.8	7516155.3
5	797944.9	7516271.0
6	798088.5	7516287.3
7	798705.4	7516269.2
8	798707.8	7516280.9
9	799223.7	7516262.8
10	799225.1	7516161.0
11	799286.3	7516086.3
12	799376.3	7516009.8
13	799300.9	7515990.8
14	799215.5	7515886.3
15	799006.7	7515859.4
16	798767.5	7515880.9
17	798682.9	7515786.4
18	798578.7	7515698.9
19	798579.1	7515609.5
20	798539.7	7515556.9
21	798535.3	7515525.1
22	798480.8	7515268.3
23	798406.2	7515271.8
24	798388.3	7515337.5
25	798336.3	7515337.7
26	798276.4	7515384.6
27	797910.7	7515389.3
28	797860.4	7515637.6

Removal of TSF monitoring bore TSFMW08

RHIO is proposing to incorporate an adjacent Waste Rock Landform (WRL) into the embankment structure of the above ground TSF, which will result in covering TSF groundwater monitoring bore TSFMW08. The bore is currently used to determine groundwater quality and level downstream of the TSF. Relocation would require it to be located approximately 300 metres away from its current position to avoid the waste dump and natural drainage line to the west of the TSF.

The TSF monitoring bores initially demonstrated a rise in groundwater levels following the commissioning of the TSF however water levels have since been declining as the tailings in the TSF have formed a low permeability layer. Deposition of tailings into the TSF is expected to cease in the next 12 months.

Given the above, the Delegated Officer considers the remaining 7 bores are sufficient to monitor groundwater at the TSF and has determined that TSFMW08 will be removed from the Licence as requested by RHIO.

Other approvals

The Licence Holder has provided the following information relating to other approvals as outlined in Table 3.

Table 4: Relevant approvals

Legislation	Number	Approval
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)	EPBC No: 2008/4624	Notification of Referral Decision – Not a Controlled Action
EP Act Part IV	Ministerial Statement (MS) 824 (Stage 1)	Approved 23 December 2009
	MS 829 (Stage 2)	Approved 31 March 2010
Mining Act 1978	Mining Proposal (MP) Reg ID 76733	Determined 07/12/2018
	MP Reg ID 78415	Submitted 22 February 2019 and under assessment at the time of this Amendment.
Dangerous Goods Safety Act 2004	Dangerous Goods Site Licence	DGS021489
Rights in Water and Irrigation Act 1914 (RIWI Act)	GWL172642(3)	17,000,000 kilolitres per annum approved allocation, 'Licence to Take Groundwater (s5C)' in accordance with the RIWI Act provides authorisation for the ability to: • abstract for the purpose of dewatering; • dust suppression for earthworks and construction purposes; • earthwork and construction purposes; and • mineral ore processing and other mining purposes.

	Amendment to GWL172642 (still under assessment at the time of this amendment)	Online Application submitted 20 June 2018 by Licensee for '*Additional 53 GL/a (total 70 GL/a) annual allocation to meet dewatering demands.'* Updated Groundwater Operating Strategy provided in support of the increased allocation application. Not yet determined at the time of this amendment.

EP Act Part IV – further detail

The Environmental Protection Authority (EPA) assessed the Roy Hill Iron Ore Mining Project (Stages 1 and 2).The Proposal was approved by MS 824 for Stage 1 on 23 December 2009 and MS 829 for Stage 2 on 31 March 2010.

MS 824 for Stage 1 is to mine iron ore from the Stage 1 project area on the southern slopes of the Chichester Range and develop associated mining infrastructure.

MS 829 for Stage 2 is to mine iron ore from the Stage 2 project area on the southern slopes of the Chichester Range and develop a remote borefield.

MS 824 and MS 829 provide conditions for the management of groundwater drawdown, and groundwater dependent vegetation (from groundwater abstraction).

Condition 8 of MS 824 and Condition 10 of MS 829 pertain to the protection and management of surface water and groundwater quality in the context of run-off and seepage from waste facilities, evaporation ponds and locations where salt is encapsulated. Monitoring of the surface water and groundwater around the waste fines and evaporation pond storage facilities and locations where the salt is encapsulated is required.

Several changes to the Key Characteristics Tables of both MS 824 and MS 829 have been approved under section 45C of the EP Act. The most recent change was approved on 25 March 2019, to MS 824 by Attachment 7 with the addition of "*Zulu 5 pit to be utilised for in-pit disposal of tailings, with tailings to be disposed of to a TSF".*

The authorised Key Characteristics of MS 824 and MS 829 as listed in Attachment 7 relevant to this amendment are:

Element	Authorised Extent
Mine Life	20 years (Stage 1 and Stage 2).
Processing Rate	Removed as regulated under Part V of the *Environmental Protection Act 1986.*
In-pit tailings disposal	Zulu 5 pit to be utilised for in-pit disposal of tailings, with tailings to be disposed of to a TSF.
Mine Dewatering	Up to 396 GL total for Stage 1 and Stage 2.
Dewatered Saline Groundwater to be disposed of to Evaporation Ponds	36 GL total for Stage 1 and 2.
Dewatered Saline Groundwater to be used for dust suppression	Up to 3.7 GL/a for Stage 1and Stage 2.
Dewatered Saline Groundwater (up to 30,000 mg/L TDS) and RO Plant reject water to be disposed to recharge basins and/or reinjection bores	Up to 55 GL per annum for a period of up to 2 years.

Approval for an increase in dewater discharge volumes to 55 GL per annum is known as the Managed Aquifer Recharge (MAR) Trial.

Amendment history

Table 4 provides the amendment history for L8621/2011/1.

Table 5: Licence amendments

Instrument	Issued	Amendment
L8621/2011/1	22/03/2012	New Licence issued approving operation of category 85 (WWTP).
L8621/2011/1	30/05/2013	Amendment to include category 89 (putrescible landfill).
L8621/2011/1	19/09/2013	Amendment to include category 12 (screening of material) and upgrade from category 85 to category 54 (WWTP).
L8621/2011/1	8/5/2014	Amendment to incorporate expansion to the landfill (category 89).
L8621/2011/1	5/2/2015	Amendment to add category 57 (used tyre storage), increase category 64 landfill design capacity and excise land for a small WWTP.
L8621/2011/1	9/4/2015	Administrative amendment
L8621/2011/1	5/11/2015	Amendment to include the Mine Services Area WWTP and update licence template.
L8621/2011/1	7/4/2016	Amendment to include category 6 (dewatering) and 73 (bulk storage of chemicals), construction of northern recharge basin and southern and northern discharge locations to No-name Creek. Removal of Mankarlyikkakurra Exploration Camp.
L8621/2011/1	29/04/2016	Amendment by Notice to extend Licence expiry date to 25/03/2034.
L8621/2011/1	24/11/2016	Amendment to include category 5 operations including ore processing plant (Process Plant) and TSF, the operation of the Mine Process Plant WWTP constructed under W5732/2014/1 (as amended) including an increased WWTP irrigation area of 15,000 m^2, operation and construction of Class II landfill and operation dewatering recharge basins. Removal of conditions related to the discharge of dewatering effluent to the southern and northern discharge locations to No Name Creek, and the monitoring of those emissions, due to expiry of the Office of the EPA temporary authorisation to discharge.
L8621/2011/1	13/1/2017	Amendment Notice 1 - approved operation of TSF evaporators to enhance water evaporation within TSF.
L8621/2011/1	16/11/2017	Amendment Notice 2 –approved changes to the design and construction of the stage 2 raise of the TSF; addition of groundwater monitoring conditions around TSF, administrative changes.
L8621/2011/1	17/11/2017	Amendment Notice 3 – approved construction and operation of a new diesel fired power station, in-pit tyre disposal areas and

Instrument	Issued	Amendment
		additional crushing/screening facilities.
L8621/2011/1	29/05/2018	Amendment Notice 4– addition of three creek discharge points for the purpose of scheduled and unscheduled water dewatering water and Process Dam discharge. Addition of category 52 to the front page of this Amendment Notice (administrative only as previously assessed under Amendment Notice 3).
L8621/2011/1	31/05/2018	Amendment Notice 5 – addition of 7 new 90 kilowatt (kW) TSF evaporators to increase water evaporation volumes within the TSF.
L8621/2011/1	05/10/2018	Amendment Notice 6 – increase of (category 5) ore processing throughput to 86 Mtpa (wet); construction and operation of 4 Mtpa MSP; increase of (category 6) dewatering disposal volume to 55 GL/a for a period of two years following submission of the construction compliance report for the MAR System; and movement of the (category 54) Mine Process Plant Irrigation Area immediately north of where it currently exists.
L8621/2011/1	13/06/2019	Amendment Notice 7 – Addition of the Zulu 5 In-Pit Tailings Storage Facility; removal of TSF groundwater monitoring bore TSFMW08; addition of Category 85B by a 15 GL/annum Water Blending Plant which incorporates a 14.6 GL/annum Brackish Water Reverse Osmosis Plant; increase the proposed capacity of the approved Mine Power Station; and increase the tyre disposal area.

Location and receptors

Table 5 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment. The RHIO Accommodation Village is located within the premises and operated by the License Holder and is therefore not considered by DWER to be a sensitive land use or receptor for the purposes of assessing the risks of emissions and discharges associated with the operation of the prescribed activities.

Table 6: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from prescribed activities
Roy Hill Homestead	20 km from the Zulu 5 IPTSF, water blending plant, and the Zulu 7 and Zulu 1 In-Pit Tyre Disposal Areas. 18 km from the Mine Power Station 17 km Delta 1,2,3 In-Pit Tyre Disposal Area
Chichester Metals Pty Ltd's Christmas Creek mining operation accommodation village	Approximately 30 km to the west
Noreena Downs Station	Approximately 30 km to the north east
Town of Nullagine	More than 60 km to the north.

Table 6 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment. Specified Ecosystems are defined in the Guidance Statement Environmental Siting (DER 2016).

Table 7: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Fortescue River and Marsh is listed as a Priority 1 Ecological Community (PEC), a wetland of national significance and proposed Ramsar Area.	The Fortescue River and Marsh are located 12 km from Zulu 5 pit and infrastructure (as shown in Figure 1).
Ephemeral Creeks	The Mine area is drained by several ephemeral creeks that generally flow in a south westerly direction towards the Fortescue River and Marsh. Kulbee Creek passes through the centre of the Mine project area. The Zulu 5 IPTSF falls within the No Name Creek catchment. These ephemeral creeks flow in a southwest direction towards the Fortescue River and Marsh. The Kulbee, Kulkinbah and No-Name Creek catchments combined represent less than 0.5% of the Fortescue catchment. There are no permanent creeks, surface water pools or wetlands within the mine area.
Vegetation	Groundwater dependent and surface water vegetation communities have been identified within the boundaries of the Premises. Riparian vegetation is located adjacent to the Zulu 5 pit area. Five priority flora species have been recorded on the premises.
Groundwater	There are no Public Drinking Water Supply Areas within or adjacent to the RHIO prescribed premises. Salinity of groundwater beneath the project site ranges from 600 to 100,000 mg/L Total Dissolved Solids (TDS). Depth to natural groundwater at the site of Zulu 5 area is 40 – 50 mbgl. Under natural conditions, groundwater flows in the south westerly direction towards the Fortescue Marsh, at relatively flat flow gradients with depth decreasing in the direction of the Marsh. Dewatering from the open mine pits will create a large area of depressed groundwater levels with reversed flow gradients. The water levels will be depressed by up to 50 – 70 m below the natural groundwater level. Depth to groundwater at the power station and the WBP is approximately 34 mbgl and at the Delta In-Pit tyre disposal areas approximately 38 mbgl. Reinjection of dewater currently approved for two years is proposed for Life of Mine duration. The proposal is currently subject to a EP Act s38 application. Sustained re-injection of is expected to result in formation of a localised groundwater mound predicted to rise by up to 10 m above natural groundwater level. After dewatering and re-injection ceases, groundwater levels will slowly recover. The recovery of drawdown created by dewatering is predicted to be relatively long-term.

Risk assessment

Tables 8 and 9 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 8: Risk assessment for proposed amendments during construction

Risk event								
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**	**Consequence rating**	**Likelihood rating**	**Risk**	**Reasoning**
Construction of: • Zulu 5 IPTSF and associated infrastructure; • Water blending plant and associated infrastructure; and • Expansion of tyre disposal areas.	Dust associated with construction activities	Closest sensitive land user is Roy Hill Homestead more than 15 km away.	Air	Health and/or amenity impacts	N/A	N/A	N/A	Distance to closest sensitive receptor is sufficient to inform the risk of dust emissions as not foreseeable. The general provisions of the EP Act are applicable.
	Noise associated with construction activities							Distance to closest sensitive receptor is sufficient to inform the risk of noise emissions as not foreseeable. The *Environmental Protection (Noise) Regulations 1997* are applicable.

Table 9: Risk assessment for proposed amendments during operation

Risk event								
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**	**Consequence rating**	**Likelihood rating**	**Risk**	**Reasoning**
Category 5: Zulu 5 IPTSF -storage of tailings.	Stormwater/flood waters intercepting the in-pit TSF causing instability/ failure of walls and overflow of the pit with tailings and decant water	Soils, vegetation, surface water and riparian vegetation in the path of overflow - Zulu 5 pit is located within the No Name Creek catchment Fortescue Marsh (12 km away)	Direct discharge to ground and along flow path.	Inundation and smothering of vegetation. Soil contamination inhibiting vegetation growth and accumulation of salts and metals.	N/A	N/A	N/A	Stormwater/Flood protection is currently in place at the Zulu 5 pit by Levee 7 and will remain during the operation of the Z5 IPTSF. This levee diverts runoff from the upstream catchment and has been designed for a 1% AEP flood. Levee 7 has been assessed and is managed under the *Mining Act 1978* by DMIRS through the Mining Proposal and long term closure planning.
Category 5: Zulu 5 IPTSF -storage of tailings.	Embankment failure release of tailings and decant water.	Soils, vegetation, surface water and riparian vegetation in the path of overflow - Zulu 5 pit is located within the No Name Creek catchment Fortescue Marsh	Direct discharge to ground and along flow path.	Inundation and smothering of vegetation. Soil contamination inhibiting vegetation growth and accumulation of salts and	N/A	N/A	N/A	Embankment failure is assessed and managed under the *Mining Act 1978* by DMIRS through Mining Proposal and long term closure planning.

		(12 km away).		metals.				
Category 5: Zulu 5 IPTSF - storage of tailings.	Pit overflow - tailings and/or decant water/stormwater	Soils, vegetation, surface water and riparian vegetation in the path of overflow. Zulu 5 pit is located within the No Name Creek catchment Fortescue Marsh (12 km away)	Direct discharge to ground and along flow path.	Inundation and smothering of vegetation. Soil contamination inhibiting vegetation growth and accumulation of salts and metals.	Moderate Mid-level on site impacts	Unlikely The risk event will probably no occur	Medium	Overflow due to overtopping of tailings would be in the vicinity of the pit. Overflow due to a major stormwater event would be more widespread, with dilution of potential contaminants. <u>Applicant controls</u> • Flood protection is currently in place by Levee 7 and will remain during the operation of the Z5 IPTSF. Levee 7 diverts runoff from the upstream catchment and has been designed for a 1% AEP flood. • Construction of Embankments 1 and 2 to complete the perimeter of the TSF. • Maximum pond elevation will be to 442.2mRL below an emergency spill overflow level of 444.0 mRL which will flow into No Name Creek. • Pond elevation monitored daily. <u>Regulatory controls</u> Applicant controls which reduce risk will be added to the Licence: • Construction of Embankments 1 and 2, and Spill way will be added as infrastructure requirements of the Licence. • Deposition and emergency spill RL levels will be conditioned. • Pond freeboard and visual monitoring will be required. Levee 7 has been assessed and is managed under the *Mining Act 1978* by DMIRS through the Mining Proposal and long term closure planning. The spill way is also assessed and managed under the *Mining Act 1978*.
Category 5: Zulu 5 IPTSF - storage of tailings.	Tailings leachate	Soils, vegetation, and riparian vegetation in the vicinity of the IPTSF. Zulu 5 pit is located within the No Name Creek catchment.	Seepage through the sides and base of the Zulu 5 IPTSF	Groundwater mounding causing inundation of vegetation root zones resulting in poor vegetation health or death.	Moderate Mid-level on site impacts	Unlikely The risk event will probably not occur	Medium	Modelling by GHD (2018) predicts that mounding will be small and localised to within 200 m of the perimeter of the pit. Modelling by GHD (2018) also predicts that groundwater contamination plumes will form, but the modelling indicates that the plumes will not reach Fortescue Marsh. <u>Applicant controls</u> • Tailings will be distributed for maximum dispersion and to reduce erosion by two branches around the perimeter of the pit, with 3 deposition spigots on each branch. • Supernatant will be removed as possible, to reduce seepage. <u>Regulatory controls</u> Licence will be amended to require the supernatant pond on the TSF to be minimised as far as possible. Monitoring and recording of volumes of water recovered and water balance will also be required.
		Ground water Fortescue Marsh is 12 km away.		Contamination of groundwater with metals and metalloids, and salts	Moderate Mid -level on site impacts	Unlikely The risk event will probably not occur	Medium	

				impacting beneficial use of stock watering, and groundwater dependent vegetation.				Condition 8 of MS 824 and Condition 10 of MS 829 require monitoring of groundwater quality around waste fines storage facilities and therefore will not be required by the Licence. Groundwater monitoring bores will be required to be installed for monitoring standing water levels to confirm mounding is not potentially impacting root zones.
Category 5: Transport of tailings and decant by pumps, slurry pipelines	Tailings slurry or decant water by leaks or pipeline failure.	Soils, vegetation, surface water and riparian vegetation in the path of spills. Zulu 5 pit is located within the No Name Creek catchment.	Direct discharge to ground and along flow path	Inundation and smothering of vegetation and riparian vegetation. Soil contamination inhibiting vegetation growth and accumulation of salts and metals.	Moderate Mid-level on site impacts Uncontained pipeline rupture has potential for large area and volume of uncontained spill.	Unlikely The risk event will probably no occur	Medium	<u>Applicant controls – Tailings pipes</u> • Tailings pipe to be same materials and will tie in to the current system. • Tailings pipe alignment will be parallel to roads where practicable and will be protected from vehicle interactions by windrows and culverts at road intersections. • Tailings lines fitted with automatic cut-out in the event of a pipeline failure or spill. • Twice daily inspections of pipelines to assess integrity and identify any issues. <u>Applicant controls – return pipes</u> • Three skid mounted pumps and dual HDPE return water lines located on an access ramp. • Each return water pump skid controlled remotely via telemetry. • A flow meter to be installed at the tie in location to monitor flow rates. • Where vehicular crossings are required, the pipeline will be direct buried. Light Vehicle crossings will have a minimum of 1000mm cover, and Heavy Vehicle crossings will have a minimum of 1500mm cover. • All buried pipe will be a minimum pressure rating of PN10. • Decant will be returned to the process plant or to the Transfer Pond. <u>Regulatory controls</u> Applicant controls have reduced likelihood of the risk event and will be included in the licence as construction and operational requirements.
Category 5 - Transfer Pond	Transfer Pond overflow and seepage The transfer Pond also accepts reject water from the WBP.	Soils, vegetation, surface water and riparian vegetation in the path of overflow. Groundwater	Direct discharge to ground Infiltration through ground	Inundation and soil contamination inhibiting vegetation growth and accumulation of salts (TDS up to 5,000 mg/L) and some elevated metals.	Minor Low level on site impacts limited to the vicinity of the pond.	Unlikely The risk event will probably no occur	Medium	<u>Applicant controls</u> • The Transfer Pond (also referred to in the Application as Dust Suppression Pond) will have a capacity of 60 ML and be lined with 1.5 mm HDPE. • A 500 mm freeboard will be maintained with level trips connected to the SCADA system. • The pond will be inspected weekly. <u>Regulatory controls</u> Applicant controls have reduced likelihood of the risk event and will be included in the licence as construction requirements for the pond.

Category 85B – Water Blending Plant incorporating a RO plant	Spills and leaks of chemicals and saline waste water at the WBP.	Soils, vegetation, surface water and riparian vegetation in the path of the spills and leaks.	Direct discharge to ground	Soil contamination inhibiting vegetation growth and accumulation of salts in the vicinity of the WBP	Minor Low level on site impacts	Unlikely The risk event will probably no occur	Medium	<u>Applicant controls</u> • The WBP will be located at the Mine Process Plant area. • Capacity limited to: Stage 1 capacity will be 20.5 ML/day (7.5 GL/annum) incorporating a 7.3 GL/annum Brackish Water Reverse Osmosis (BWRO) Plant, then upscaling by replicating Stage 1 for total capacity of 41 ML/day (15 GL/annum) (Stage 2). • The WBP will have a bunded concrete floor with drains - to contain and collect spills. • Chemicals will be delivered in 1kL Intermediate Bulk Containers (IBC) and stored in double skin chemical containers. • IBC bulk containers will drain to a containment tank in the chemical storage unit. • Pipework is run within the confines of the bunded concrete floor of the WBP. • Saline reject water collected in the waste water tank will be pumped to the Dust Suppression Pond, or pumped direct to the Managed Aquifer Recharge (MAR) system (no other discharge). <u>Regulatory controls</u> Applicant controls have reduced likelihood of the risk event and will be added to the licence as construction and operational requirements.
Category 85B – Water Blending Plant incorporating a RO plant – transport of reject water	Reject water pipelines – spill and rupture.	Soils, vegetation, surface water and riparian vegetation in the path of overflow. The pipeline will cross No Name Creek.	Direct discharge to ground	Inundation of saline water - soil contamination inhibiting vegetation growth and accumulation of salts	Moderate Mid level on site impacts	Unlikely The risk event will probably no occur		Pipelines are several km long and cross No Name Creek. Pipeline rupture has potential for large area and volume of uncontained spill of saline water. <u>Applicant controls</u> • Pipelines constructed of HDPE. • Pipelines constructed above ground in cleared areas, but will be buried through creek crossings to maintain surface water flow and manage spills. • Pipelines will be connected to the SCADA system (for detection of flow or pressure anomalies. • Pipelines will be visually inspected weekly as per existing licence conditions for mine dewater pipelines. <u>Regulatory controls</u> Applicant controls have reduced likelihood of the risk event and will be included in the licence as construction and operational requirements.
Category 85B – Water Blending Plant incorporating a RO plant – storage of	Saline Dust Suppression Pond overflow and seepage May also accept decant water.	Soils, vegetation, surface water and riparian vegetation in the path of overflow.	Direct discharge to ground Infiltration through ground	Inundation and soil contamination inhibiting vegetation growth and accumulation	Minor Low level on site impacts limited to the vicinity	Unlikely The risk event will probably no occur	Medium	<u>Applicant controls</u> • The Saline Dust Suppression Pond is the same pond referred to in the Application as the Transfer Pond (capacity of 60 ML, lined with 1.5 mm HDPE, 500 mm freeboard maintained with level trips connected to the SCADA system and inspected weekly.

reject water				of salts (TDS up to 5,000 mg/L)	of the pond.			Regulatory controls Applicant controls have reduced likelihood of the risk event and will be included in the licence as construction and operational requirements.
Category 52: Power Station - increase the maximum number of generators operating at any one time to 50 for output of 80 MW.	Noise and Air emissions	Closest sensitive land user is Roy Hill Homestead more than 15 km away.	Air	Health and/or amenity impacts	N/A	N/A	N/A	Distance to closest sensitive receptor is sufficient to inform the risk of air emissions and noise as not foreseeable. Regulatory controls The licence will be amended to increase power output limit to 80 MW. The *Environmental Protection (Noise) Regulations 1997* are applicable.

Decision

The Delegated Officer has determined to amend the licence for construction and operation of the Zulu 5 IPTSF and Water Blending Plant, increased capacity of the Mine Power Station to 80MW, increase of tyre disposal area, and removal of groundwater monitoring bore TSFMW8.

Approval includes construction and operation conditions for the Transfer Pond for storage of decant for dust suppression for two years, to allow RHIO to demonstrate there is no environmental impact and/or determine appropriate management actions for long term use.

Amended conditions are determined in accordance with *Guidance Statement: Risk Assessment*, as detailed above and in Tables 8 and 9.

Summary of Amendments

The Licence is amended by the following:

- Prescribed premises category table on the front cover updated to include increased Category 52 capacity and addition of Category 85B.
- Definitions updated.
- Condition 1.2.4, Table 1.2.2 amended to include additional tyre disposal areas.
- Condition 1.2.11, Table 1.2.4 for containment infrastructure requirements, amended to include Zulu 5 IPTSF and associated infrastructure and the WBP and associated infrastructure.
- Condition 1.2.12, Table 1.2.5 inspection of infrastructure amended to include RO pipelines.
- Condition 1.2.14, Table 1.2.6 amended to include works specifications of the Z5IPTSF infrastructure and groundwater monitoring bores, and the WBP.
- Condition 1.2.18, Table 1.2.7 production limits amended for the power station and addition of limit for the water desalination plant.
- Condition 1.2.19 amended to increase the number or maximum power generators operating.
- Conditions 3.5.1 and 3.5.2 amended to add Z5IPTSF for water balance monitoring and requirements.
- Condition 3.6.1, Table 3.6.1 amended to include monitoring of Z5TSF groundwater monitoring bores for groundwater surface level.
- Condition 4.2.1 amended to include annual reporting of water balance of Z5TSF and monitoring of Z5TSF groundwater monitoring bores for groundwater surface levels.
- Schedule 1 Maps are updated where required.

Other amendments

During this amendment the following changes have also been made to the Licence:

- The works specifications for the Stage 2 TSF raise and Mine Process Plant (MPP) Sprayfield (relocated) in Table 1.2.6 has been removed. The Licence Holder provided compliance documentation (*TSF Cell 2 Stage 2 Raise Compliance*) and (*MPP Sprayfield Relocation Compliance*) to DWER on 7 November 2018 and 17 October 2018 respectively.
- Compliance documentation for 37 of the MAR System reinjection bores was received

by DWER on 15 November 2018, 7 December 2018, 12 December 2018, 20 December 2018, 7 February 2019 and 21 May 2019 (*MAR reinjection bore compliance*). Tables 2.2.1, 2.2.2 and 3.2.1 have been updated so that the bores where compliance has been received are under 'installed' and those (13) that haven't been constructed and/or compliance hasn't been received are under 'proposed' for both the SWIB Injection Bores and the Stage 1 Borefield Injection Bores.

- Bore logs for the proposed groundwater monitoring bores regional; and groundwater monitoring bores adjacent to injection bores in Table 3.6.1 were provided to DWER on 15 November 2018, 7 December 2018, 12 December 2018, 19 December 2018, 7 February 2019, 6 March 2018, 28 March 2019, 9 April 2019 and 12 April 2019 (*Bore Logs*). Table 3.6.1 has been updated so that the bores where the bore logs have been received are under 'installed' and those that haven't been constructed are under 'proposed'.
- The Licence Holder advised DWER on 20 December 2018 (MAR reinjection bore compliance) that monitoring bore RHPZ0225 had been drilled, however it had to be abandoned and will be replaced by bore RHPZ0315SD. A bore log for RHPZ0315SD will be submitted once the drilling has been completed. Table 3.6.1 has been updated to include RHPZ0315 under "proposed" for groundwater monitoring bores adjacent to injection bores.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 31 May 2019. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

Amendment

1. The Prescribed premises category table on the front cover the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the text shown in bold and underline below.

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	86,000,000 (wet) tonnes per annual period (to produce 65,000,000 [wet] tonnes of ore per annual period for export)
6	Mine dewatering	50,000 tonnes or more per year	55,000,000 tonnes per annual period discharged for a period of up to two years following submission of the construction compliance document required under condition 1.2.16. Thereafter, the discharge throughput will revert back to 843,000 (scheduled) tonnes per annual period
12	Screening, etc. of material	50,000 tonnes or more year	6,570,000 tonnes per annual period
52	Electric power generation	10 MW or more in aggregate (using a fuel other than natural gas)	~~45~~ **80** MW
54	Sewage facility	100 cubic metres or more per day	593 cubic metres per day
57	Used tyre storage (general)	100 tyres or more	No more than 5,000 tyres
64	Class II putrescible landfill site	20 tonnes or more per year	8,000 tonnes per annual period

73	Bulk storage of chemicals, etc	1,000 cubic metres in aggregate	5,530 cubic metres in aggregate
85B	**Water desalination plant**	**0.5 GL or more per year**	**15 GL per year**

2. Definitions of the Licence is amended by the insertion of the text shown in bold and underline below:

'GL' means gigalitre

'ML' means million litres or megalitres

'SCADA' means Supervisory Control and Data Acquisition

'WBP' means Water Blending Plant

'Z5 IPTSF' means the Zulu 5 in-pit tailings storage facility

3. Condition 1.2.4, Table 1.2.2 is amended by the deletion of the text shown in strikethrough below and the insertion of the text shown in bold and underline below.

1.2.4 The Licensee shall ensure that wastes accepted onto the Premises are only subjected to the process(es) set out in Table 1.2.2 and in accordance with any process limits described in that Table.

Table 1.2.2: Waste processing

Waste type	Process(es)	Process limits[1,2]
Inert Waste Type 1	Receipt, handling and disposal of waste by landfilling	Disposal of waste by landfilling shall only take place within the Landfill 2 and Delta 1 Pit Landfill shown on the Premises map in Schedule 1. The separation distance between the base of the landfill and the highest groundwater level shall be greater than 3 m. Disposal of waste shall not exceed 3,000 tonnes per annual period. The size of the tipping face is kept to a minimum and not larger than 30 m in length. Must meet the acceptance criteria for a Class II landfill[3].
Putrescible Waste		
Clean Fill		
Inert Waste Type 2[1]	Receipt, handling and disposal of waste by landfilling	Disposal of Inert Waste Type 2 shall not exceed 5,000 tonnes per annual period and shall only include tyres, conveyors and HDPE pipe. Tyre disposal shall only occur at the In-pit Tyre Disposal areas ~~(D101, D301),~~ **within the Delta pit (Delta 1, 2, 3 & 5) and areas of the Zulu mine pit (Zulu 1 and 7)**, and ROM 3 Tyre Storage Area, identified on the Premises map in Schedule 1. Base of In-pit Tyre Disposal areas ~~(D101, D301)~~ shall be greater than 3 m above original groundwater level. Not more than 5,000 used tyres shall be stored at the Premises at any one time. Storage of used tyres in the ROM 3 Tyre Storage Area shown on the Premises map in Schedule 1 shall only occur in units

Table 1.2.2: Waste processing		
Waste type	**Process(es)**	**Process limits[1,2]**
		not more than 100 tyres. Used tyres must be stacked on their side walls or if stored on treads, the area shall be baled with a securing device made of non-combustible material. A separation distance of 6 m must be maintained between units.
Sewage	Biological, physical and chemical treatment	Treatment of sewage waste at the MSA WWTP and Mine Process Plant WWTP shall be at or below the treatment capacity of 48 m^3/day and 35 m^3/day respectively.
Sewage	Biological, physical and chemical treatment.	Treatment of sewage waste at the Accommodation Village WWTP shall be at or below the treatment capacity of 510 m^3/day.

Note 1: Requirements for landfilling tyres are set out in Part 6 of the *Environmental Protection Regulations 1987*.
Note 2: Additional requirements for the acceptance and landfilling of controlled waste (including asbestos and tyres) are set out in the *Environmental Protection (Controlled Waste) Regulations 2004*.
Note 3: Defined in the Landfill Definitions.

4. Condition 1.2.11 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the text shown in bold and underline below:

1.2.11 The Licensee shall ensure that tailings material, dewatering water, **blended water** and hydrocarbons are only stored and/or treated within vessels or compounds provided with the infrastructure requirements specified in Table 1.2.4 and identified in Schedule 1.

Table 1.2.4: Containment infrastructure		
Containment cell or dam number(s) as depicted in Schedule 1	**Material**	**Infrastructure requirements**
TSF	Tailings	A minimum top of embankment freeboard of 1,200 mm[1] is maintained. Methods of operation minimise the likelihood of erosion of the embankments by wave action. The supernatant pond on the TSF is minimised as far as possible. Final perimeter embankment height of 456 mRL.
Z5 IPTSF	**Tailings**	**Maximum pond elevation of 442.2 mRL with emergency overflow invert level of 444.0 mRL.** **The supernatant pond on the TSF is minimised as far as possible.**
Process Water Dam	Mine dewatering water, tailings return water and water from the Stage 1 Borefield	HDPE lined (1.5 mm thickness) dam, which stores water prior to use in the mine process plant.
Transfer Pond	**Reject water from the Water Blending Plant** **Tailings decant water**	**60 ML capacity** **HDPE lined (1.5 mm thickness)**

	for use for dust suppression for up to two years from date of issue of Amendment Notice 7.	**Freeboard of 500 mm maintained**
Bulk Fuel Yard	C1 Combustible Liquid (diesel)	Two 2,765,000 litre storage tanks situated inside a HDPE lined bund, with bund permeability no less than 10^{-9} metres per second. Bund height sufficient to prevent surface water ingress up to 500 mm deep. Bund floor with both mechanical and fire protection in the form of clean fill and sloped and graded to allow drainage to sump. Ring beam has floor leak detection indicators.
Southern Recharge Basin	Mine dewatering water	Discharge controlled over a rock lined surface to the base of the basin to reduce erosion. Diversion drains installed to divert stormwater around the basins. Basins are fenced.
Northern Recharge Basin		
Stage 1 Recharge Basin		Minimum 2.25 m deep. Spoil material to be stockpiled on the upslope side to prevent surface water runoff entering the basins. Minimum operational freeboard of 0.25 m. Basins are fenced.
Stage 2 Recharge Basin		
Stage 2 Recharge Basin		

Note 1: Determined by the total sum of operational freeboard of 300 mm, beach freeboard of 200 mm and 10,000 year storm requirement of 700 mm.

5. Condition 1.2.12 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

1.2.12 The Licensee shall:

(a) undertake inspections as detailed in Table 1.2.5;

(b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and

(c) maintain a record of all inspections undertaken.

Table 1.2.5: Inspection of infrastructure		
Scope of inspection	**Type of inspection**	**Frequency of inspection**
Tailings delivery pipelines	Visual integrity	Daily
Tailings return pipelines	Visual integrity	Daily
Z5 IPTSF and TSF Embankment freeboard	Visual to confirm required freeboard capacity is available	Daily
Transfer Pond	**Visual to confirm required freeboard capacity is available**	**Weekly**
WBP reject water pipelines	**Visual integrity**	**Weekly**
Mine dewater pipelines	Visual integrity	Weekly
Tailings facility evaporators	Visual integrity	Daily
Weather station	Functionality and calibration	Annual
Automated PLC system	Calibration	Annual

6. Condition 1.2.14 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the text shown in bold and underline below:

1.2.14 The Licensee must not depart from the specifications in Table 1.2.6 except:
(a) where such departure is minor in nature and does not materially change or affect the infrastructure; or
(b) where such departure improves the functionality of the infrastructure and does not increase risks to public health, public amenity or the environment; and
(c) all other Conditions in this Licence are still satisfied.

Table 1.2.6: Works specifications	
Column 1	**Column 2**
Bravo Dewatering Creek Discharge location	1. Construction and placement of rock rip-rap in the defined creek bed/channel (at 'Bravo Dewatering Creek Discharge' as shown on the Map of dewatering bore areas and creek discharge points in Schedule 1) to minimise erosion and vegetation disturbance. 2. Spreader pipe to disperse flow across the rip-rap area. 3. Flow meter near the discharge point to record discharge volumes. 4. Pipelines are/will be buried beneath road and creek lines. 5. The length (to nearest bore of the pipeline to the discharge point) will be approximately 7.5 km.
Mine Power Station	1. Comprised of: • 56 x Caterpillar 3516B (XQ2000) diesel generators; • 2 x 110,000 L double skinned diesel storage tanks; • 28 x transformers in self-bunded modules; • 1 x 27,000 L self-bunded lube storage tank; and • 1 x OWS system, designed to treat stormwater to less than 15 mg/L total petroleum hydrocarbons; 2. Constructed as per the map of the Mine Power Station shown in Schedule 1; and 3. Exhaust emissions from each generator via two 0.45 m diameter stacks at a height of 2.9 m above ground level at a velocity of 34.6 metres per second.
~~Stage 2 TSF raise~~	~~1. Phased removal of relevant Cell (1 or 2) tailings delivery pipelines, decant pipework and associated infrastructure;~~ ~~2. Phased bulk earthworks construction of embankment lifts of relevant Cell (1 or 2) including raising of decant structure, to a design level of 442 mRL;~~ ~~3. Re-installation of tailings delivery pipelines, decant pipework and associated infrastructure at relevant Cell prior to commencement of raise on subsequent Cell; and~~ ~~4. Pipelines located around the top of the dam wall are to be constructed of P12 DN450 HDPE and pipelines constructed from the Booster Station to the inflow area on the dam wall, constructed of C12 DN450 Carbon Steel Pipe.~~
Cell 2 TSF evaporators	1. Installation of seven Minetek 90 kilowatt evaporators on Cell 2 decant causeway. 2. Automated PLC System. 3. Diesel generators that: • have 110% tank capacity spill protection, including a double-bunded base; • have hydrocarbon fill-points with adequate spill-collection installed to prevent spills on the decant causeway and into the TSF; • are safely accessible for refuelling; and • spill kits available at each (generator) location.
MSP	1. Switchrooms. 2. Scrubber. 3. Reagent Storage Area. 4. Concentrate Thickener. 5. Tailings Thickener. 6. Water Services Area (Water Storage tanks for MSP operation). 7. De-slime cyclone.

Table 1.2.6: Works specifications	
Column 1	**Column 2**
	8. Hydro-separators. 9. Concentrate Storage Tank. 10. Return water pipeline (directed to Process Water Dam). 11. Earthen bunding to separate MSP area from Mine Process Plant Irrigation Area, functional to retain surface water flow.
~~Mine Process Plant Sprayfield (relocated)~~	~~1. Reinstatement of 1.53 hectare Mine Process Plant Irrigation Area (to the location shown on the map in Schedule 1) including:~~ ~~• 3 strand fencing.~~ ~~• Above ground PVC pipework with functioning sprinklers.~~ ~~• Exclusion / warning signage.~~ ~~• Construction of a levee and a diversion channel which protect the sprayfield from flood waters / limit overland flow to No Name Creek/ un-named minor creek lines.~~
MAR System – reinjection bores	1. Install monitoring equipment on up to 50 reinjection bores (located within SWIB and Stage 1 Borefield as shown on the MAR Trial areas map in Schedule 1). 2. Each reinjection bore to be equipped with flow meter, Electrical Conductivity sensor, water level sensor and sample tap.
MAR System – recharge basins	1. Install two unlined recharge basins (Stage 1 and Stage 2 recharge basins as depicted on the maps in Schedule 1) to be located outside flood channels to dispose of excess dewatering water, to the following dimensions and characteristics: • Each basin is to be a minimum 2.25 m deep; • Spoil material from the basin construction to be stockpiled on the upslope side of the construction to prevent surface water runoff entering the basin; • Basins to be located outside of flood channels and surface water runoff areas to prevent groundwater egress or surface water ingress; and • Constructed for minimum operational freeboard of 0.25 m. 2. Pipework to the basins to be connected to the higher quality dewatering network only via direct feed HDPE pipelines. 3. Feed lines to contain: • Isolation valves; • Magnetic flow meter; and • Electrical conductivity sensor. 4. Float valves to be installed: • One solenoid control, (acting as the primary control); and • One mechanical control (acting as the secondary control) to allow for maintenance of freeboard. 5. Level transmitter to manage water level and primary solenoid control. 6. All instrumentation connected to a telemetry panel which will transfer data back to a centralised Supervisory Control and Data Acquisition screen. 7. Ability for manual shutdown of feed water delivery. 8. Stock exclusion fencing and human exclusion signage erected.
Z5 IPTSF	**1. Construction of Embankments 1 and 2 to complete the perimeter of the TSF and to isolate the TSF from the ongoing mining activities.** **2. Embankment 1 constructed by the backfilling of pit Z601 with mine waste and Embankment 2 constructed by mining and partial backfilling of pit Z7 with mine waste.** **3. A 20m wide channel constructed at an inlet level of 444.0mRL to direct flood contingency discharge into No Name Creek downstream.** **4. Located and constructed as shown on the maps in Schedule 1, titled *Premises map* and *Map of Zulu 5 IPTSF - general arrangement*.**

Table 1.2.6: Works specifications	
Column 1	**Column 2**
Z5 IPTSF tailing delivery system	**1. The tailings delivery system to utilise the existing Tailings Pump Station (TPS) at the Process Plant. Downstream of the existing magflow and density meters, a new tie-in to be installed to connect to the new tailings delivery pipelines.** **2. The new pipelines will utilise the same materials, sizes and pressure classes as the existing lines where feasible. The tie-in will occur in the DN450 High Density Polyethylene (HDPE) lined carbon steel portion of the lines. The new lines will continue with this material until the design pipeline pressure reduces sufficiently to safely allow the use of HDPE piping.** **3. The transition from steel to HDPE to occur approximately at the base of Levee 7. A silt trap constructed at this location to contain any potential leaks from the change in pressure rating. Each line to have a burst disc installed near this location and be installed such that pipes will discharge into the Z5 IPTSF directly.** **4. Magflow meters to be installed at Levee 7 to enable automated fast shutdown sequence.** **5. A pressure switch directly downstream of the burst disc to automatically detect rupture of a burst disc to start fast shutdown sequence.** **6. Pipe alignment will be parallel to roads where practicable and will be protected from vehicle interactions by windrows and culverts at road intersections** **7. Located as shown on the map in Schedule 1, titled *Map of Zulu 5 IPTSF general arrangement***
Z5 IPTSF Tailings deposition ring main and spigots	**1. The deposition ring mains to be installed in two branches around the perimeter of the Z5 IPTSF, with 3 deposition spigots on each branch.** **2. The ring mains to be installed with a 30m setback from the edge of the pit or mine waste backfill.** **3. The deposition spigots to be DN450 PN16 HDPE pipe. The pipe will not be slotted for approximately the first 2 m after the turn-down elbow, to prevent any early release of tailings from the top of the spigot.** **4. The spigots will extend down between 20 to 40m to ensure discharge is beyond the erodible zones.** **5. Located as shown on the map in Schedule 1, titled Map of Zulu 5 IPTSF - general arrangement**
Z5 IPTSF Return water system	**1. Three skid mounted pumps and dual HDPE return water lines located on an access ramp.** **2. Return water line to tie into the existing return water line via manually operated valves.** **3. Each return water pump skid controlled remotely via telemetry.** **4. A flow meter to be installed at the tie in location to monitor flow rates.** **5. Where vehicular crossings are required, the pipeline will be direct buried. Light Vehicle crossings will have a minimum of 1000mm cover, and Heavy Vehicle crossings will have a minimum of 1500mm cover.** **6. All buried pipe will be a minimum pressure rating of PN10.** **7. Decant to discharge to the Mine Process Plant and Transfer Pond.** **8. Located as shown on the map in Schedule 1, titled *Map of Zulu 5 IPTSF - general arrangement***

Table 1.2.6: Works specifications	
Column 1	**Column 2**
Water Blending Plant (WBP)	1. Stage 1 - capacity of 20.5ML/day (7.5 GL/annum) incorporating a 7.3 GL/annum Brackish Water Reverse Osmosis (BWRO) Plant. 2. Stage 2 - upscaling by replicating Stage 1 for total capacity of 41 ML/day (15 GL/annum) (Stage 2). 3. Located on the western end of the Mine Process Plant area as shown on the Premises map in Schedule 1. 4. Constructed with a bunded concrete floor with drains - to contain and collect spills. 5. The Stage 1 WBP will consist of the following plant and equipment: • Feed water Tank (2ML); • 7 Multimedia filtration (MMF) units and MMF backwash system; • 5µm cartridge filtration; • RO - 4 x 5ML/day units; • Permeate water blending tank (1ML); • Blended Water Tank (2ML); • Waste Water Storage Tank (1ML); • Transfer and pumping systems; • Chemical dosing system; and • Chemical storage. 6. Chemicals delivered in 1kL Intermediate Bulk Containers (IBC) and stored in double skin chemical containers. 7. IBC bulk containers drain to a containment tank in the chemical storage unit. 8. Pipework is run within the confines of the bunded concrete floor of the WBP. 9. Saline reject water collected in the waste water tank pumped to the Dust Suppression Pond, or pumped direct to the Managed Aquifer Recharge (MAR) system.
WBP reject water pipelines	1. Reject water pipelines constructed of HDPE (diameter between D314 and D630). 2. Constructed in cleared areas, and buried beneath road crossings and buried through creek crossings to maintain surface water flow. 3. Reject water pipelines connected to the SCADA system (for detection of flow or pressure anomalies, and alarms).
Transfer Pond	1. Capacity of 60 ML and lined with 1.5 mm HDPE. 2. Freeboard and water levels managed with level trips connected to the SCADA system. 3. Located as shown on the as shown on the Premises map in Schedule 1.
Z5IPTSF Groundwater monitoring bores	1. Monitoring network established, designed to enable mounding from the TSF to be detected by standing water level. 2. Installed prior to deposition of tailings. 3. Final siting of monitoring wells determined under advice by an experienced hydrogeologist. 4. Bore logs submitted to the CEO.

7. Condition 1.2.18 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

1.2.18 The Licensee shall ensure the limits specified in Table 1.2.7 are not exceeded.

Table 1.2.7: Production or design capacity limits		
Category[1]	**Category description[1]**	**Premises production or design capacity limit**
5	Processing or beneficiation of metallic or non-metallic ore	86, 000,000 (wet) tonnes per annual period (to produce 65,000,000 [wet] tonnes of ore per annual period for export)
6	Mine dewatering	55,000,000 tonnes per annual period discharged for a period of up to two years[2] (following submission of the construction compliance report required under condition 1.2.16 for the MAR System) comprising: • 54,535,000 into reinjection bores and recharge basins. • 5, 000 tonnes per day over 31 days per annum with a maximum of 7 days per scheduled event, discharged at Zulu Creek Discharge location. (Maximum discharge volume to Zulu Creek Discharge of 155,000 tonnes per annum); • 5, 000 tonnes per day over 31 days per annum with a maximum of 7 days per scheduled event, discharged at Bravo Creek Discharge location. Maximum discharge volume to Bravo Creek Discharge of 155,000 tonnes per annum); and • 5, 000 tonnes per day over 31 days per annum with a maximum of 7 days per scheduled event, discharged at Delta Creek Discharge location. Maximum discharge volume to Delta Creek Discharge of 155,000 tonnes per annum). Thereafter the discharge throughput will revert back to 843,000 (scheduled) tonnes per annual period[2]. In addition to the abovementioned 843,000 (scheduled) tonnes, once every 5 years Comprising: • 100,000 tonnes per annual period; with no more than a maximum of 25,000 tonnes per day to the Zulu Creek discharge location.
12	Screening, etc. of material	6,570,000 tonnes per annual period
52	Electric power generation	~~45~~ **80** MW
73	Bulk storage of chemicals, etc	5,530 cubic metres in aggregate as per Bulk Fuel Facility specifications in Table 1.2.4
85B	**Water desalination Plant: premises at which salt is extracted from water if waste water is discharged onto land or into waters (other than marine waters)**	**15 G/L per year**

Note 1: *Environmental Protection Regulations 1987,* Schedule 1.
Note 2: For a period of up to two years as authorised by s45C dated 11 May 2018 for MS 824 and MS 829, thereafter reverting back to 843,000 (scheduled) tonnes per annual period discharged (unless amended earlier)

8. Condition 1.2.19 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

1.2.19 The Licensee shall operate the Power Station such that the maximum number of generators operating at any time will be no more than ~~30~~ **50** generators.

9. Condition 2.2.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

2.2.1 The Licensee shall ensure that where waste is emitted to groundwater from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emission points to groundwater		
Emission point reference and location on Map of emission points	**Description**	**Source including abatement**
Southern Recharge Basin	Disposal of excess water where dewatering production exceeds other mine site demands for dust suppression and construction and when the mine process plant is shutdown for maintenance	Water from mine dewatering
Northern Recharge Basin		
Stage 1 Recharge Basin	Disposal of excess mine pit dewatering water	
Stage 2 Recharge Basin		
SWIB Injection Bores *Installed* RHIB0128**, RHIB0129, RHIB0130,** ~~to~~ RHIB0131, RHIB0230, **RHIB0231A,** RHIB0232, RHIB0233, **RHIB0236, RHIB0238, RHIB0239, RHIB0249, RHIB0250, RHIB0251,** ~~RHIB0235,~~ RHIB0252, **RHIB0254, RHIB0255, RHIB0258, RHIB0260, RHIB0261, RHIB0262, RHIB0263, RHIB0264, RHIB0266,** ~~RHIB0253,~~ ~~RHIB0265,~~ RHIB0267, RHIB0268, *Proposed* ~~RHIB0231A,~~ ~~RHIB0233,~~**RHIB0235,** ~~RHIB0236,~~ RHIB0237, **RHIB0253, RHIB0265,** ~~RHIB0238, RHIB0239, RHIB0249, RHIB0250, RHIB0251, RHIB0254, RHIB0255,~~ RHIB0257, ~~RHIB0258~~, **RHIB0259** ~~to RHIB0264, RHIB0266~~		
Stage 1 Borefield Injection Bores *Installed* RHIB0188**, RHIB0189, RHIB0190,** ~~to~~ RHIB0191, RHIB0193, RHIB0194, RHIB0196, RHIB**0**009, ~~RHIB0023, RHIB0024, RHIB0027,~~		

Table 2.2.1: Emission points to groundwater		
Emission point reference and location on Map of emission points	**Description**	**Source including abatement**
~~RHIB0030, RHIB0036, RHIB0039,~~ RHIB0275, **RHIB0276,** ~~to RHIB0277,~~ RHIB0279 ***Proposed*** **RHIB0023, RHIB0024, RHIB0027, RHIB0030, RHIB0036, RHIB0039, RHIB0277**		

10. Condition 2.2.2 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

2.2.2 The Licensee shall not cause or allow point source emissions to groundwater greater than the limit listed in Table 2.2.2.

Table 2.2.2: Point source emission limits to groundwater			
Emission point reference	**Parameter**	**Limit (including units)**	**Averaging period**
Southern Recharge Basin Northern Recharge Basin	Total Dissolved Solids	6,000 mg/L	Spot sample
Stage 1 Recharge Basin Stage 2 Recharge Basin	Total Dissolved Solids (Electrical Conductivity)	5,000 mg/L (less than 7,300 µS/cm)	Continuous during discharge
SWIB Injection Bores *Installed* RHIB0128**, RHIB0129, RHIB0130,** ~~to~~ RHIB0131, RHIB0230, **RHIB0231A,** RHIB0232, RHIB0233, **RHIB0236, RHIB0238, RHIB0239, RHIB0249, RHIB0250, RHIB0251,** ~~RHIB0235,~~ RHIB0252, **RHIB0254, RHIB0255, RHIB0258, RHIB0260, RHIB0261, RHIB0262, RHIB0263, RHIB0264, RHIB0266,** ~~RHIB0253, RHIB0265,~~ RHIB0267, RHIB0268, *Proposed* ~~RHIB0231A, RHIB0233,~~**RHIB0235,** ~~RHIB0236,~~ RHIB0237, **RHIB0253, RHIB0265,** ~~RHIB0238, RHIB0239, RHIB0249, RHIB0250, RHIB0251, RHIB0254, RHIB0255,~~ RHIB0257, ~~RHIB0258~~, **RHIB0259** ~~to RHIB0264, RHIB0266~~		30,000 mg/L (less than 40,000 µS/cm)	
Stage 1 Borefield		5,000 mg/L	

Table 2.2.2: Point source emission limits to groundwater			
Emission point reference	**Parameter**	**Limit (including units)**	**Averaging period**
Injection Bores *Installed* RHIB0188**, RHIB0189, RHIB0190,** ~~to~~ RHIB0191, RHIB0193, RHIB0194, RHIB0196, RHIB**0**009, ~~RHIB0023, RHIB0024, RHIB0027, RHIB0030, RHIB0036, RHIB0039,~~ RHIB0275, **RHIB0276,** ~~to RHIB0277,~~ RHIB0279 ***Proposed*** **RHIB0023, RHIB0024, RHIB0027, RHIB0030, RHIB0036, RHIB0039, RHIB0277**		(less than 7,300 µS/cm)	

11. Condition 3.2.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

3.2.1 The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of point source emissions to groundwater			
Emission point reference as depicted in Schedule 1	**Parameter**	**Units**	**Frequency**
Southern Recharge Basin and Northern Recharge Basin	Volumetric flow rate[1]	m^3/day	Continuous
	Duration of discharge	Dates/days	Quarterly
	Electrical Conductivity[1]	µS/cm	
	Total Dissolved Solids[1]	mg/L	
Stage 1 Recharge Basin Stage 2 Recharge Basin	Volumetric flow rate[1]	Litres	Continuous (cumulative)
	Duration of discharge	Dates/days	Daily
	Electrical Conductivity[1]	µS/cm	Continuous during discharge
	Total Dissolved Solids[1, 2]	mg/L	
	Total Dissolved Solids	mg/L	Quarterly
SWIB Injection Bores *Installed* RHIB0128**, RHIB0129, RHIB0130,** ~~to~~ RHIB0131,RHIB0230, **RHIB0231A,** RHIB0232, RHIB0233, **RHIB0236, RHIB0238, RHIB0239, RHIB0249, RHIB0250, RHIB0251,** ~~RHIB0235,~~ RHIB0252, **RHIB0254, RHIB0255, RHIB0258, RHIB0260, RHIB0261, RHIB0262, RHIB0263, RHIB0264, RHIB0266,** ~~RHIB0253, RHIB0265,~~ RHIB0267,	Volumetric flow rate[1]	Litres	Continuous (cumulative)
	Duration of discharge	Dates/days	Daily
	Electrical Conductivity[1]	µS/cm	Continuous during discharge
	Total Dissolved Solids[1, 2]	mg/L	
	Total Dissolved Solids	mg/L	Quarterly

Table 3.2.1: Monitoring of point source emissions to groundwater			
Emission point reference as depicted in Schedule 1	**Parameter**	**Units**	**Frequency**
RHIB0268 *Proposed* ~~RHIB0231A,~~ ~~RHIB0233,~~**RHIB0235,** ~~RHIB0236,~~ RHIB0237, **RHIB0253, RHIB0265,** ~~RHIB0238, RHIB0239,~~ ~~RHIB0249, RHIB0250,~~ ~~RHIB0251, RHIB0254,~~ ~~RHIB0255,~~ RHIB0257, ~~RHIB0258~~, **RHIB0259** ~~to~~ ~~RHIB0264, RHIB0266~~			
Stage 1 Borefield Injection Bores *Installed* RHIB0188**, RHIB0189, RHIB0190,** ~~to~~ RHIB0191, RHIB0193, RHIB0194, RHIB0196, RHIB**0**009, ~~RHIB0023, RHIB0024, RHIB0027, RHIB0030, RHIB0036, RHIB0039,~~ RHIB0275, **RHIB0276,** ~~to~~ ~~RHIB0277,~~ RHIB0279 ***Proposed*** **RHIB0023, RHIB0024, RHIB0027, RHIB0030, RHIB0036, RHIB0039, RHIB0277**	Volumetric flow rate[1]	Litres	Continuous (cumulative)
	Duration of discharge	Dates/days	Daily
	Electrical Conductivity[1]	µS/cm	Continuous during discharge
	Total Dissolved Solids[1, 2]	mg/L	
	Total Dissolved Solids	mg/L	Quarterly

Note 1: In field non-NATA accredited analysis permitted.
Note 2: Calculation from Electrical Conductivity.

12. Condition 3.5.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

3.5.1 The Licensee shall undertake the monitoring specified in Table 3.5.1.

Table 3.5.1: Process monitoring					
Monitoring point reference	**Process description**	**Parameter**	**Units**	**Frequency**	**Method**
TSF **and Z5 IPTSF**	-	Volumes of tailings deposited	m^3	Continuous	None specified
	-	Volumes of water recovered	m^3	Continuous	None specified
	-	Volume of seepage recovered	m^3	Continuous	None specified

13. Condition 3.5.2 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

3.5.2 The Licensee shall undertake an annual water balance for the TSF and **Z5 IPTSF**. The water balance shall as a minimum consider the following:

(a) site rainfall;
(b) evaporation;
(c) tailings return water recovery volumes;
(d) seepage recovery volumes; and
(e) volumes of tailings deposited.

14. Condition 3.6.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

3.6.1 The Licensee shall undertake the monitoring in Tables 3.6.1 and 3.6.2 according to the specifications in that table.

Table 3.6.1: Monitoring of ambient groundwater quality

Monitoring point reference as depicted in Schedule 1	Parameter	Units	Averaging period	Frequency
RHPZ0092 and RHPZ0091	Standing Water Level[1]	m(AHD)	Spot sample	Quarterly
	pH[1]	pH units		
	Electrical Conductivity	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Hardness			
	Aluminium (Al), Arsenic (As), Barium (Ba), Boron (B), Cadmium (Cd), Chloride (Cl), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Silver (Ag), Sodium (Na) and Zinc (Zn)			
RHPZ0092, RHPZ0091 and RHPZ0035	Total Recoverable Hydrocarbons	mg/L		
TSFMW01, TSFMW02, TSFMW03, TSFMW04, TSFMW05, TSFMW06, TSFMW07, and ~~TSFMW08~~	Standing Water Level[1]	m(AHD)	Spot sample	Monthly
Z5 IPTSF monitoring bores located as required by condition 1.2.14	**Standing Water Level[1]**	**m(AHD)** **metres below ground level**	**Spot sample**	**Monthly**
Bores providing water to the creek discharge points from the Zulu, Bravo and Delta Dewatering Bore Areas	Electrical Conductivity[1]	µS/cm	Daily	Continuous during discharge
	Volumetric flow rate[1]	m^3/day		
	Total Dissolved Solids Other parameters: Alkalinity ($CaCO_3$), Total Hardness ($mgCaCO_3$), Calcium (Ca), Chloride (Cl), Sulfate (SO_4), Bicarbonate (HCO_3), Carbonate (CO_3), Aluminium	mg/L	Spot sample	Once, at the commencement of each discharge event

Table 3.6.1: Monitoring of ambient groundwater quality				
Monitoring point reference as depicted in Schedule 1	**Parameter**	**Units**	**Averaging period**	**Frequency**
	(Al), Silver (Ag), Arsenic (As), Boron (B), Barium (Ba), Beryllium (Be), Cadmium (Cd), Cobalt (Co), Chromium (Cr), Copper (Cu), Iron (Fe), Mercury (Hg), Potassium (K), Magnesium (Mg), Manganese (Mn), Molybdenum (Mo), Sodium (Na), Nickel (Ni), Lead (Pb), Sulfur (S), Selenium (Se), Silicon (Si), Tin (Sn), Strontium (Sr), Titanium (Ti), Thallium (Tl), Uranium (U), V (Vanadium), Zinc (Zn), Nitrite as NO_2, Nitrate as NO_3, Ammonium (NH_4), Total Nitrogen, Total Phosphorus and Total Suspended Solids.			
Groundwater monitoring bores regional *Installed* RHPZ0186S, RHPZ0083, RHPZ0088, RHPZ0075, RHPZ0184, RHPZ0185, **RHPZ0281S, RHPZ0283S, RHPZ0285S, RHPZ0286S, RHPZ0287S, RHPZ0288S, RHPZ0289S, RHPZ0293S**, **RHPZ0292S, RHPZ0299S, RHPZ0300S, RHPZ0301S** *Proposed* ~~RHPZ0285,~~ ~~RHPZ0288,~~ ~~RHPZ0289,~~ ~~RHPZ0287[2],~~ ~~RHPZ0283,~~ ~~RHPZ0293[2],~~ ~~RHPZ0292[2],~~ ~~RHPZ0286[2],~~ RHPZ0294, ~~RHPZ0281[2],~~ ~~RHPZ0299,~~ ~~RHPZ0300,~~ ~~RHPZ0301,~~	Standing Water Level[1]	m(AHD)	Spot sample	Monthly for the first twelve months, then Quarterly
	pH[1]	pH units		
	Electrical Conductivity	µS/cm		
	Oxidation-reduction potential (calibrated using Zobell's solution)	millivolts (mV)		
	Total Dissolved Solids	mg/L		Quarterly
	Total Hardness			
	Nitrite as NO_2			
	Nitrate as NO_3			
	Aluminium (Al), Arsenic (As), Barium (Ba), Bicarbonate (HCO_3^-), Boron (B), Cadmium (Cd), Calcium (Ca), Chloride (Cl), Chromium (Cr), Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Magnesium (M), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Potassium (K), Selenium (Se), Silver (Ag), Silica, (SiO_2) Sodium (Na), Sulfate (SO_4^{2-}), Thallium (Tl), Uranium (U), Vanadium(V) and Zinc (Zn)			

Table 3.6.1: Monitoring of ambient groundwater quality				
Monitoring point reference as depicted in Schedule 1	**Parameter**	**Units**	**Averaging period**	**Frequency**
RHPZ0312 **Groundwater monitoring bores adjacent to ~~production~~ injection bores** *Installed* RHPZ0139S, RHPZ0140S, RHPZ0141S, RHPZ0142S, RHPZ0216, RHPZ0128, RHPZ0222, RHPZ0223, RHPZ0240, RHPZ0238, RHPZ0239, RHPZ0217, RHPZ0032, RHPZ0255, RHPZ0256, RHPZ0262, RHPZ0259, RHPZ0264, RHPZ0263, RHPZ0260, RHPZ0277, RHPZ0278, RHPZ0280A, **RHPZ0226S, RHPZ0229S, RHPZ0241S, RPHZ0265S, RHPZ0266S, RHPZ0276S, RHPZ0267S, RHPZ0268S, RHPZ0269S, RHPZ0270S, RHPZ0271S, RHPZ0272S, RHPZ0273S, RHPZ0219S, RHPZ0221S, RHPZ0274S**, **RHPZ0218S, RHPZ0275S, RHPZ0279** *Proposed* ~~RHPZ0225,~~ ~~RHPZ0226,~~				

Table 3.6.1: Monitoring of ambient groundwater quality				
Monitoring point reference as depicted in Schedule 1	**Parameter**	**Units**	**Averaging period**	**Frequency**
~~RHPZ0229,~~ ~~RHPZ0241,~~ ~~RPHZ0265,~~ ~~RHPZ0266,~~ ~~RHPZ0276,~~ ~~RHPZ0267,~~ ~~RHPZ0268,~~ ~~RHPZ0269,~~ ~~RHPZ0270,~~ ~~RHPZ0271,~~ ~~RHPZ0272,~~ ~~RHPZ0273,~~ ~~RHPZ0219,~~ ~~RHPZ0221,~~ ~~RHPZ0274,~~ ~~RHPZ0218,~~ RHPZ0288, ~~RHPZ0275,~~ RHPZ0306, RHPZ0307, RHPZ0308, RHPZ0309, RHPZ0310, **RHPZ0315,** ~~RHPZ0279~~				

Note 1: In field non-NATA accredited analysis permitted.
Note 2: Sampling and analysis of ~~RHPZ0281,~~ ~~RHPZ0286, RHPZ0287,~~ ~~RHPZ0292 and RHPZ0293~~ **Zulu5 IPTSF monitoring bores** to commence immediately following installation.

15. Condition 4.2.1 is amended by the addition of the insertion of the bold text in underline below:

4.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 90 calendar days after the end of the anniversary date. The report shall contain the information listed in Table 4.2.1 in the format or form specified in that table.

Table 4.2.1: Annual Environmental Report		
Condition or Table (if relevant)	**Parameter**	**Format or Form[1]**
-	Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken	None specified
-	Summary of results from the TSF evaporator vegetation health/soil monitoring program for that annual period, including any exceedance of triggers and management responses, as described within RHIO's Saline Water Disposal Vegetation Management Plan (OP-PLN-00072).	None specified
Tables 1.2.1 and 1.2.7	Actual throughput for the reporting period for approved categories under Schedule 1 of the *Environmental Protection Regulations 1987,* including individual throughput values for the	None specified

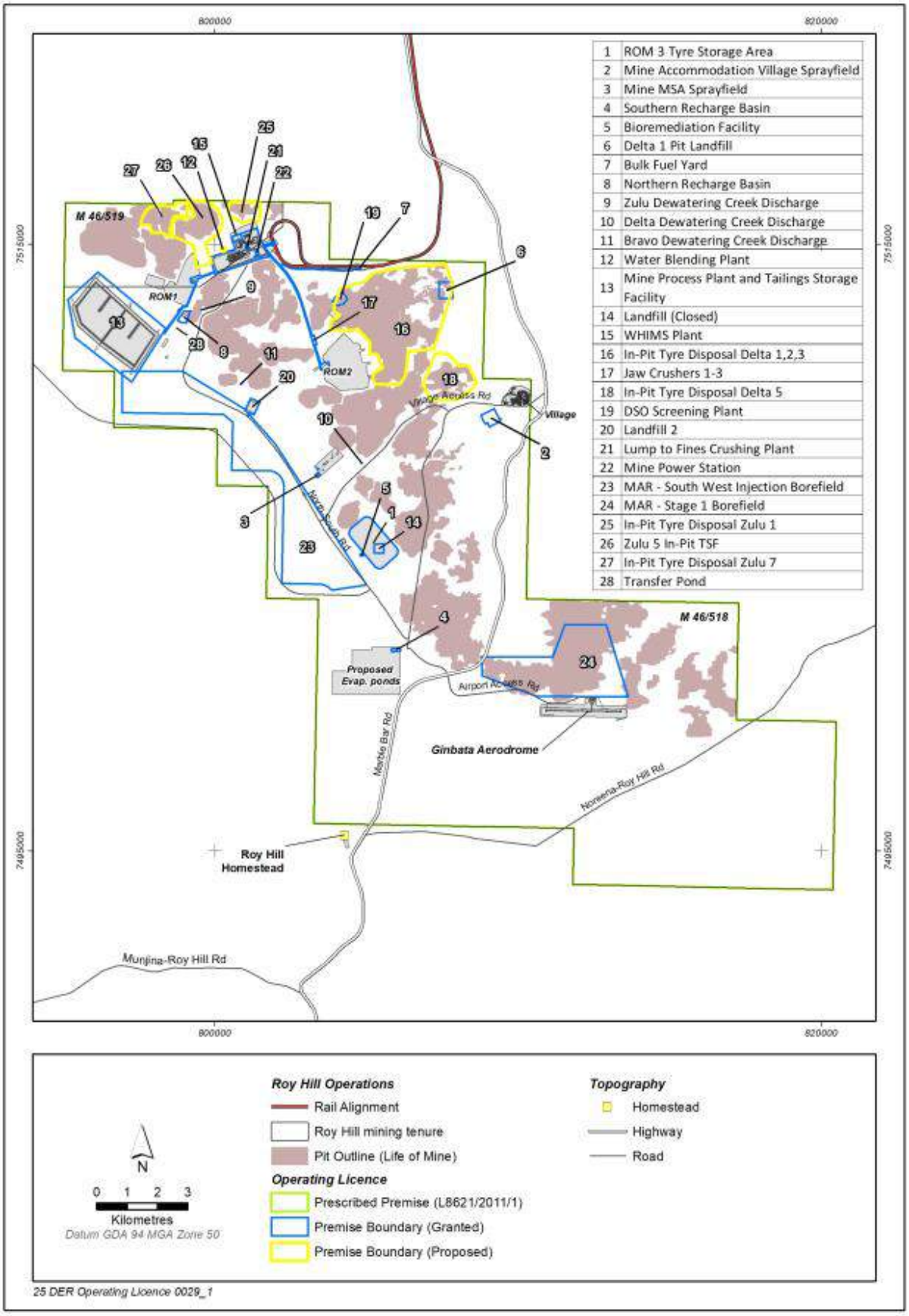
Table 4.2.1: Annual Environmental Report		
Condition or Table (if relevant)	**Parameter**	**Format or Form[1]**
	MSP	
Condition 1.2.12	Summary of any failure or malfunction of any infrastructure listed in Table 1.2.5 and any action taken post inspection.	None specified
Table 2.3.1	An updated description of the irrigation area(s) reporting any decline in health, against previous years, and corrective actions	None specified
Condition 2.4.1	Compliance	TSF evaporator hours of use
Condition 2.5.3	Summary of reports detailing the reason for discharge – timing of discharge, volume discharged, water quality and comparison to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* with discussion on elevated results	None specified
Table 2.5.2	Compliance	Table demonstrating daily averaged TDS values (using the hourly data) as recorded during creek discharge events
Table 3.2.1	Volumetric flow rate and Duration of discharge	GR1
	Electrical Conductivity (24 hour average) and Total Dissolved Solids	Tabular format with graphs, including when injection in that area is occurring
Table 3.3.1	Monthly records and cumulative volume for each WWTP	None specified
	Biochemical Oxygen Demand, Total Suspended Solids, pH, Total Nitrogen, Total Phosphorus, *E.coli*, Total Dissolved Solids, Total Recoverable Hydrocarbons-	LR1
Table 3.5.1	Process monitoring	None specified
Condition 3.5.2	Annual water balance of TSF **and Z5 IPTSF**	None specified
Table 3.6.1	RHPZ0092, RHPZ0091 for the following parameters: Standing Water Level, pH, Electrical Conductivity, Total Dissolved Solids, Aluminium (Al), Arsenic (As), Barium (Ba), Boron (B), Cadmium (Cd, Chromium (Cr), Chloride (Cl), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Silver (Ag), Sodium (Na), Zinc (Zn)	AGW1
	Total Recoverable Hydrocarbons for RHPZ0092, RHPZ0091 and RHPZ0035	
	TSFMW01, TSFMW02, TSFMW03, TSFMW04, TSFMW05, TSFMW06, TSFMW07 and TSFMW08 Standing Water Level data	Table format providing: monthly Standing Water Level data
	Z5 IPTSF standing water level data	
Tables 3.6.1	Monitoring associated with the Bores providing	Report providing:

Table 4.2.1: Annual Environmental Report		
Condition or Table (if relevant)	**Parameter**	**Format or Form[1]**
and 3.7.1	water to the creek discharge points from the Zulu, Bravo and Delta Dewatering Bore Areas; and Monitoring of point source emissions to surface water-	Dates of creek discharge duration, results and comparison of results between groundwater samples from Bores providing water to the discharge points from the Zulu, Bravo and Delta Dewatering Bore Areas (data required in Table 3.6.1) and results from Table 3.7.1.
Table 3.6.1	Monitoring of the groundwater monitoring bores regional and groundwater monitoring bores adjacent to the production injection wells	All data provided in a tabular format within a report
Table 3.6.2	Demonstration of vegetation and stream ecosystem condition	Report providing: • GPS location, photographic information and comparison of vegetation and stream ecosystem condition between established photographic points; • Information on annual assessment of vegetation health as per the Roy Hill Vegetation Health Monitoring Program. Specifically: - General site condition - Soil surface states - Projected Foliar Cover (PFC), stratum cover dominance and weeds - Recruitment - Sample plants - Quantitative parameters. • Discussion on the findings of the vegetation assessment in comparison with the Management objectives and strategies found in EPA, 2013 (for 'Zone 3a – Kulbee Alluvial Flank – Natural water regimes)
Table 3.6.2 and Table 3.7.1	Record of flow distance	Table providing comparison of flow volumes and maximum distance flow has travelled down each creek line for each discharge event
Condition 4.1.2	Compliance	None Specified
Condition 4.1.3	Complaints summary	None specified
Condition 4.1.4	Records of waste types and quantities received at the site and disposed of at the site	None specified

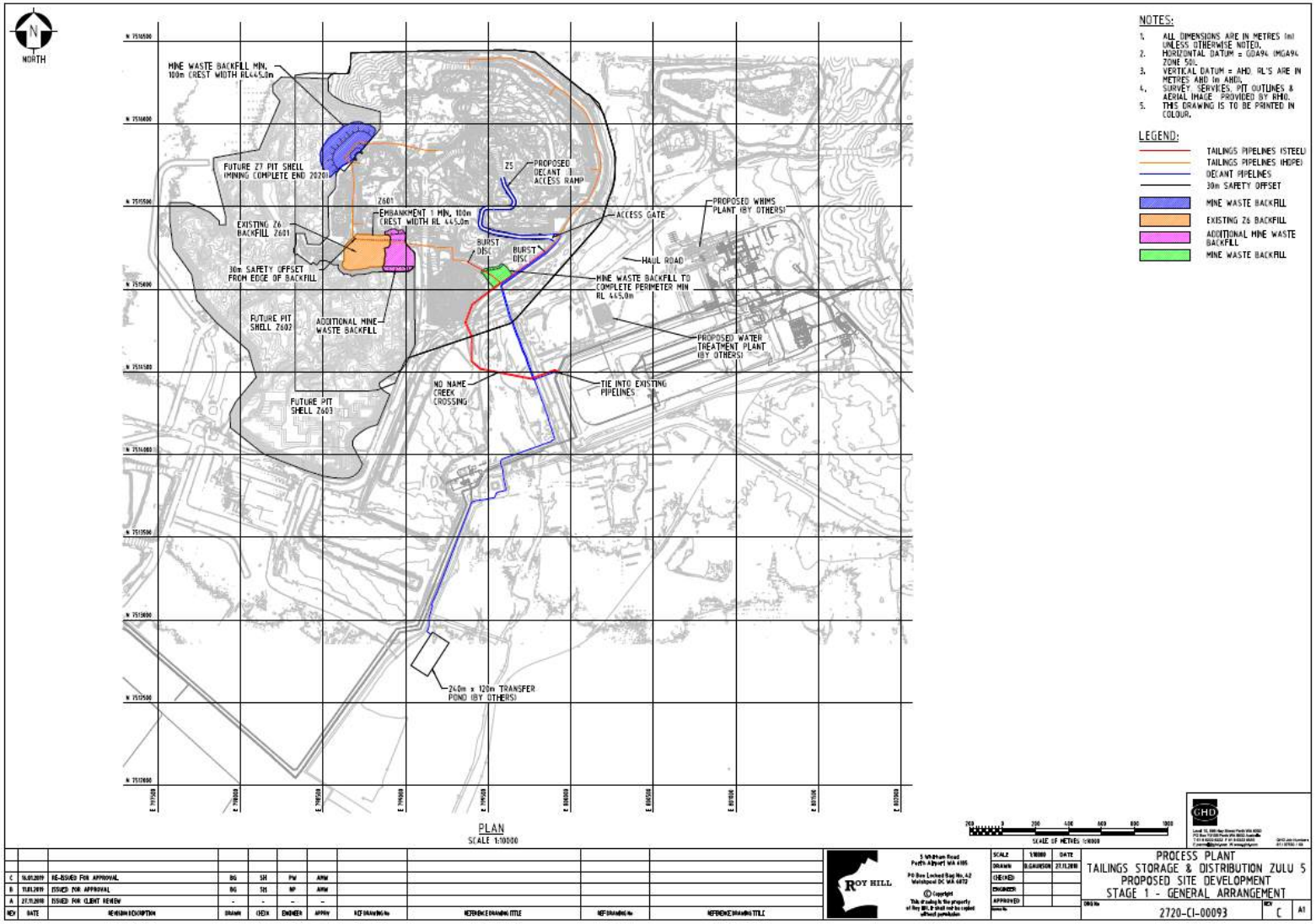
16. Schedule 1: Maps is amended by the removal of the existing Premises Map and insertion of the Premises map below.

17. Schedule 1: Maps is amended by the insertion of the Map of Zulu 5 IPTSF - general arrangement map below.

Premises map including waste processing locations, containment infrastructure, emission and monitoring points



Map of Zulu 5 IPTSF - general arrangement



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Application form and Supporting document (including Appendices) *Mine Operating Licence Amendment – Increased In-Pit Tyre Disposal Areas, Water Blending Plant, Increased Power Station Capacity and Zulu 5 In-Pit Tailings Storage Facility*. Roy Hill, 22/01/2019	Application	DWER records (A1757986)
2	Email Vlad Rios Vera *Subject RE: L8621 Roy Hill Iron Ore Mine AN7 request clarification WBP & pipeline, removal of TSF bore*. 18/04/2019 11:28 AM.		DWER records (A1783658)
3	Email Vlad Rios Vera *Subject: FW: L8621 Roy Hill Iron Ore Mine AN7 request clarification for decant lines and transfer pond* 1/05/2019 3:36 PM		DWER records (A1785912)
4	Letter from RHIO to DWER *Re Roy Hill Iron Ore Pty Ltd – Application For Amendment To Licence (L8621/2011/1) – Response To Request For Further Information For Water Blending Plant*, dated 19 February 2018	Letter dated 19/02/2018	DWER records (A1620236)
5	Guidance Statement: Regulatory principles, Department of Environment Regulation, July 2015	Guidance Statement: Regulatory principles	accessed at www.dwer.wa.gov.au
5	Guidance Statement: Setting conditions, Department of Environment Regulation, October 2015	Guidance Statement: Setting conditions	
6	Guidance Statement: Licence duration, Department of Environment Regulation, August 2016	Guidance Statement: Licence duration	
7	Guidance Statement: Risk Assessments, Department of Environment Regulation, February 2017	Guidance Statement: Risk Assessments	
8	Guidance Statement: Decision Making, Department of Environment Regulation, February 2017	Guidance Statement: Decision Making	
9	GHD, 2018. *Zulu 5 In-Pit Tailings Facility Detailed Design* Report	GHD, 2018	Application (Appendix 5)
10	GHD, 2019. *Zulu 5 In-Pit TSF Detailed Design Groundwater Change Assessment*	GHD, 2019	Application (Appendix 5)
11	L8621/2011/1 Construction Compliance Documentation, Roy Hill Iron Ore Pty Ltd, received 15 November 2018, 7 December 2018, 12 December 2018, 20 December 2018, 7 February 2019 and 21 May 2019	MAR reinjection bore compliance	DWER records (A1739901, A1746478, A1748272, A1751400, DWERDT132339 and DWERDT161209)
12	L8621/2011/1 – Construction Compliance documentation – MPP Sprayfield Relocation, Roy Hill Iron Ore Pty Ltd, 17	MPP Sprayfield Relocation Compliance	DWER records (A1736107)

	October 2018		
13	L8621/2011/1 Submission of Bore Logs, Roy Hill Iron Ore Pty Ltd, received 15 November 2018, 7 December 2018, 12 December 2018, 19 December 2018, 7 February 2019, 6 March 2019, 28 March 2019,9 April 2019 and 12 April 2019	Bore Logs	DWER records (A1739901, A1746478, A1748272, A1750496, DWERDT132339, DWERDT140207, A1776671, DWERDT151203 and A1781325)
14	L8621/2011/1 – TSF Cell 2 Stage 2 Raise Compliance Document, Roy Hill Iron Ore Pty Ltd, 7 November 2018	TSF Cell 2 Stage 2 Raise Compliance	DWER records (A1736993)
15	Ministerial Statement 824	MS 824	accessed at www.epa.wa.gov.au/
	Ministerial Statement 829	MS 829	
16	SRK Consulting (Australasia) Pty Ltd, September 2018. *Roy Hill – Geochemical Characterisation of Iron Ore Tailings*	SRK, 2018	DWER records (A1794434)

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 31 May 2019 for review and comment. The Licence Holder responded on 6 June 2019. The following comments were received on the draft Amendment Notice.

Comment Line	Condition	Summary of Licence Holder comment	DWER response
1	Tailings Characterisation – SRK Report requested.	Provided	Additional information included in Background section.
2	Decant disposal by dust suppression and MAR – 3rd paragraph (pg 14)	Roy Hill uses decant water for dust suppression as a genuine dust suppressive source. It is unclear what this paragraph is attempting to state.	3rd paragraph (pg 14) is a summary of DWER Regulatory Services (Industry Regulation)'s advice previously provided to RHIO, as background information to a reader who may not be aware of DWER's approach to the regulation of re-use of water for dust suppression. Paragraph is edited to include the date of the advice letter and additional information for further explanation to any reader.
3	Decant disposal by dust suppression and MAR – 4th paragraph (pg 14)	DWER indicate that they recommended that the TSF decant water is not used on a long term basis for dust suppression on mine roads, but short term use may be acceptable. This statement is inconsistent with statement on page 34 (noted below)	As per Comment line 6 below.
4	Decant disposal by dust suppression and MAR – RHIO may apply to amend the Licence to include long term disposal of decant by dust suppression and MAR, after approval and determination of the s38 application. (pg 15)	Roy Hill requests that this sentence be removed following discussion with Lindy Twycross and email from Peter Tapsell (EPA Services). Alternatively, it should be reworded to not refer to s38, but rather Part IV approval if deemed that Part IV approval is required.	Reworded that RHIO may apply to amend the Licence to include long term disposal of decant by dust suppression and MAR, *after determination of the s38 application.*
5	Operations Risk Assessment (pg 31) – states groundwater is regulated under Part IV however then states	Roy Hill notes that these two statements appear to contradict each other.	Reworded to better clarify that MS requires monitoring of groundwater quality around waste fines and storage facilities, and the Licence to monitor standing water levels.

Comment Line	Condition	Summary of Licence Holder comment	DWER response
	additional monitoring bores will be required.		The Risk Assessment does not specify that additional monitoring bores will be required.
6	Decision – 2nd paragraph (pg 34)	Roy Hill notes that this paragraph appears inconsistent by stating that decant for dust suppression is not approved however on page 14 it notes that reuse of water for dust suppression is not usually considered by DWER to be a discharge to the environment.	The Application included a risk assessment for long term re-use of decant for dust suppression. 3rd paragraph (pg 14) is a summary of DWER Regulatory Services (Industry Regulation)'s approach to the regulation of re-use of water for dust suppression, and as advised by letter to RHIO dated 26 September 2018. The comment is missing the end words of the actual sentence in the text, which is that reuse of water for dust suppression is not usually considered by DWER to be a discharge to environment that is regulated as part of the primary activity under Schedule 1 of the Environmental Protection Regulations 1987). Where the reuse is associated with a primary activity on a prescribed premises it may be subject to licence conditions. Regardless of the licence conditions that may apply, the activity may not result in environmental harm. The general provisions of the EP Act and the Environmental Protection (Unauthorised Discharges) Regulations 2004 apply. As summarised in this Section, DWER (Industry Regulation) has previously recommended to RHIO that the TSF decant water is not used on a long term basis for dust suppression on mine roads, but short term use may be acceptable. To provide for short term use, the Delegated Officer has determined that storage of decant in

Comment Line	Condition	Summary of Licence Holder comment	DWER response
			the Transfer Pond for purposes of dust suppression is conditioned for up two years, to enable RHIO to confirm/demonstrate there is no environmental impact or determine appropriate management options, for longer term purposes, or prior to possible determination by the s38 application.
7	Other Amendments (pg 34 and 35) - Roy	Roy Hill notes that a construction compliance report for injection bores was submitted on 21 May however this is not included in this document.	Edited to include the submission in 'Other Amendments'.
8	Condition 1.2.11 (Table 1.2.4) (pg 38)	Condition states that the transfer pond may only be used for tailings decant water when use for dust suppression is approved and conditioned however as noted on page 14 DWER indicate that short term use of decant water to dust suppression may be acceptable.	As per Comment line 6 above.
9	Condition 1.2.12 (Table 1.2.5) - Daily inspections for the transfer pond and WBP reject water pipelines	In the risk assessment (pg 32) it states for the transfer pond and WBP reject water pipelines that Roy Hill has committed to weekly inspections and that the applicant controls have reduced the likelihood of the risk event. Can this condition please reflect the risk assessment?	Agreed. Transfer Pond and Pipelines will be connected to the SCADA system, and weekly inspection requirement is considered sufficient to manage risk, and is consistent with weekly inspection regime required for mine dewater pipelines.
10	1.2.14 (Table 1.2.6) – Z5IPTSF Groundwater Water Bores	There is a 1 next to this line item however it is unclear what this is currently referring to. Item 1 also notes "detected by groundwater surface water level". This should refer to standing water level. Items 4 and 5 are very specific and given that the Z5IPTSF is within a dewatering area and may experience large fluctuations in groundwater level over time, these may not be the most appropriate guidelines. Roy Hill suggests that this is removed and instead well design is determined by the experienced	Typo edited to remove Typo edited. Agreed to remove items 4 and 5 with requirement for submission of bore logs.

Comment Line	Condition	Summary of Licence Holder comment	DWER response
		hydrogeologist. Roy Hill will provide the bore logs if requested. Item 6 is also not clearly worded. It is unclear of the intention here.	The intention of Item 6 is primarily to ensure depth below ground level is able to be determined. This is removed, and requirement for reporting standing water level by metres below ground level included in Condition 3.6.1 Table 3.6.1.
11	3.6.1 (Table 3.6.1) – groundwater monitoring regional bores	Roy Hill notes that the groundwater monitoring regional bores list has been changed to include both shallow (bores ending in S) and deep monitoring bores (bores ending in D). Roy Hill monitors groundwater levels only in the shallow aquifer to monitor change from injecting into the deep aquifer. Roy Hill requests this list is updated to only include shallow bores (bores ending in S).	Table 3.6.1 has been updated to reference only "S" shallow bores for the groundwater monitoring bores.
12	3.6.1 (Table 3.6.1) – groundwater monitoring regional bores	Roy Hill thanks DWER for including the change of adding RHPZ0315 into the licence. Can this change please be referenced in the text somewhere?	A paragraph has been included under Other Amendments to outline the inclusion of RHPZ0315.
-	Condition 4.2.1	-	Z5 TSF monitoring is added to the requirements for the Annual Environmental Report.