



Licence Number	L5529/1988/12
Licensee	Mt Magnet Gold Pty Ltd
ACN	008 669 556
File Number:	DER2016/001228
Premises	Mt Magnet Gold M58/30, M58/121, M58/136, M58/172, M58/181, M58/185, M58/187, M58/191, M 58/193, M58/202, M 58/205 and M58/234. MOUNT MAGNET WA 6638
Date of Amendment	19 August 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 Licensing – Resources 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
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Amendment Notice	refers to this document
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 <i>Environmental Protection Act 1986</i> 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 <i>Public Sector Management Act 1994</i> 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	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
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
Licensee	Mt Magnet Gold Pty Ltd
m ³	cubic metres
Minister	the Minister responsible for the EP Act and associated regulations

mbgl	Metres below ground level
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Occupier	has the same meaning given to that term under the EP Act.
PDWSA	Public Drinking Water Source Area
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
TDS	total dissolved solids
tpa	Tonnes per annum

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 to an amendment for Category 6 and minor changes to groundwater monitoring requirements. No other changes to the aspects of the Licence relating to categories 5 or 64 have been requested by the Licensee.

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

- *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

The Licensee operates the Mt Magnet Gold Mine (Premises) which is located adjacent to the town of Mount Magnet in the Murchison Region of Western Australia. Both open pit and underground mining occurs at the Premises, with the mined ore processed onsite to produce gold.

The existing Licence authorises the dewatering of groundwater at the Premises so mining of ore can occur. The dewatered effluent is discharged to and transferred between various disused mined voids for storage. All water contained within the various pits is then later used for processing of ore, potable water use and dust suppression at the Premises. The Licence currently allows for 660,000 tpa of dewatering effluent to be discharged to mined pit voids which is considered a discharge to the environment.

The Licence allows for the dewatering of the:

- Titan pit with the dewatering effluent discharged to the Saturn and Ruby Queen pits;
- Stellar, Stella West, Milky Way and Shannon pits with the dewatering effluent discharged to the Franks Tower pit; and
- Franks Tower pit with the water then transferred to the Ruby Queen pit for storage before reuse at the Premises.

The Licensee is now proposing to include dewatering of the:

- Lone Pine pit lake and Eridanus underground with the dewatering effluent discharged to the O'Meara pit (Eridanus Project). The water will be stored in the O'Meara pit before being pumped to a Reverse Osmosis Plant (RO) to produce potable water;
- St George/Water Tank Hill & Hill 60 underground with the dewatering effluent discharged to the Blackcat South pit (St George/Water Tank Hill/Hill 60 Project). The Blackcat South pit will be used as a transfer node before the water is pumped to the Ruby Queen pit. Water from the Ruby Queen pit is then transferred to the existing Checker Dam for use in the process plant;
- Shannon underground with the dewatering effluent discharged to a header tank with any excess to mine use discharged to the Franks Tower pit (Cosmos Project). The Licensee is currently authorised through conditions in the Licence to dewater the Shannon pit with the discharge to Franks Tower pit; and
- Morning Star pit with the dewatering effluent discharged to the Ruby Queen pit (Morning Star Project). This is only likely to occur when the base of the pit is reached. Dewatering will occur from in-pit sump pumps.

The Franks Tower and Ruby Queens pits are already identified as emission points in the Licence with the O'Meara and Blackcat South pits to be included as new emission points.

Figures 1, 2 and 3 below provide an overview of the dewatering layout. The current throughput of 660,000 tpa will increase to 1,500,000 tpa with the addition of the new emission points.

The Licensee also originally applied for discharge to the Stella West pit, however the Licensee now no longer requires this emission point (MWES, June 2019).

The Licensee also proposes to:

- install an additional seepage recovery bore (T3RB4A) at the tailings storage facility (CTSF3) for the recovery of any seepage that may occur at this facility;
- replace the requirement of sampling groundwater monitoring bore T3MB07 as it has partially collapsed. The Licensee proposes to sample the nearby recovery bore T3RB01 as an alternative groundwater monitoring source; and
- remove the Saturn Pit as an emission point for receiving dewatering effluent as it is no longer required.

Table 2 below outlines the proposed changes to the Licence.

Table 2: Proposed throughput capacity changes

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
6	660,000 tpa	1,500,000 tpa	The increased throughput is a result of dewatering of additional pit lakes and underground workings at the Premises. All dewatered effluent is discharged to disused mine voids for temporary storage before being used at the Premises for potable water, processing water and dust suppression.

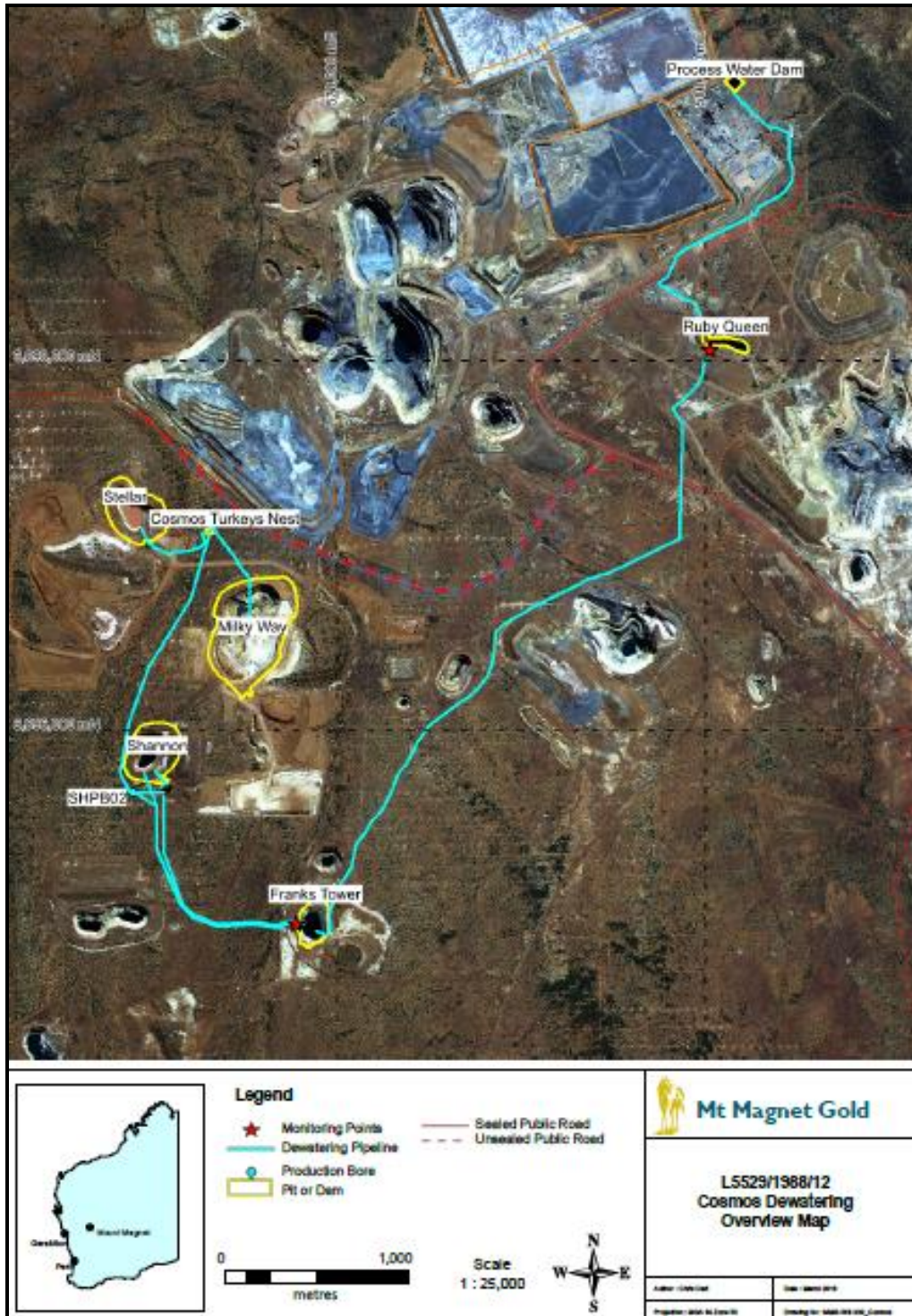


Figure 1: Cosmos Dewatering Overview Map

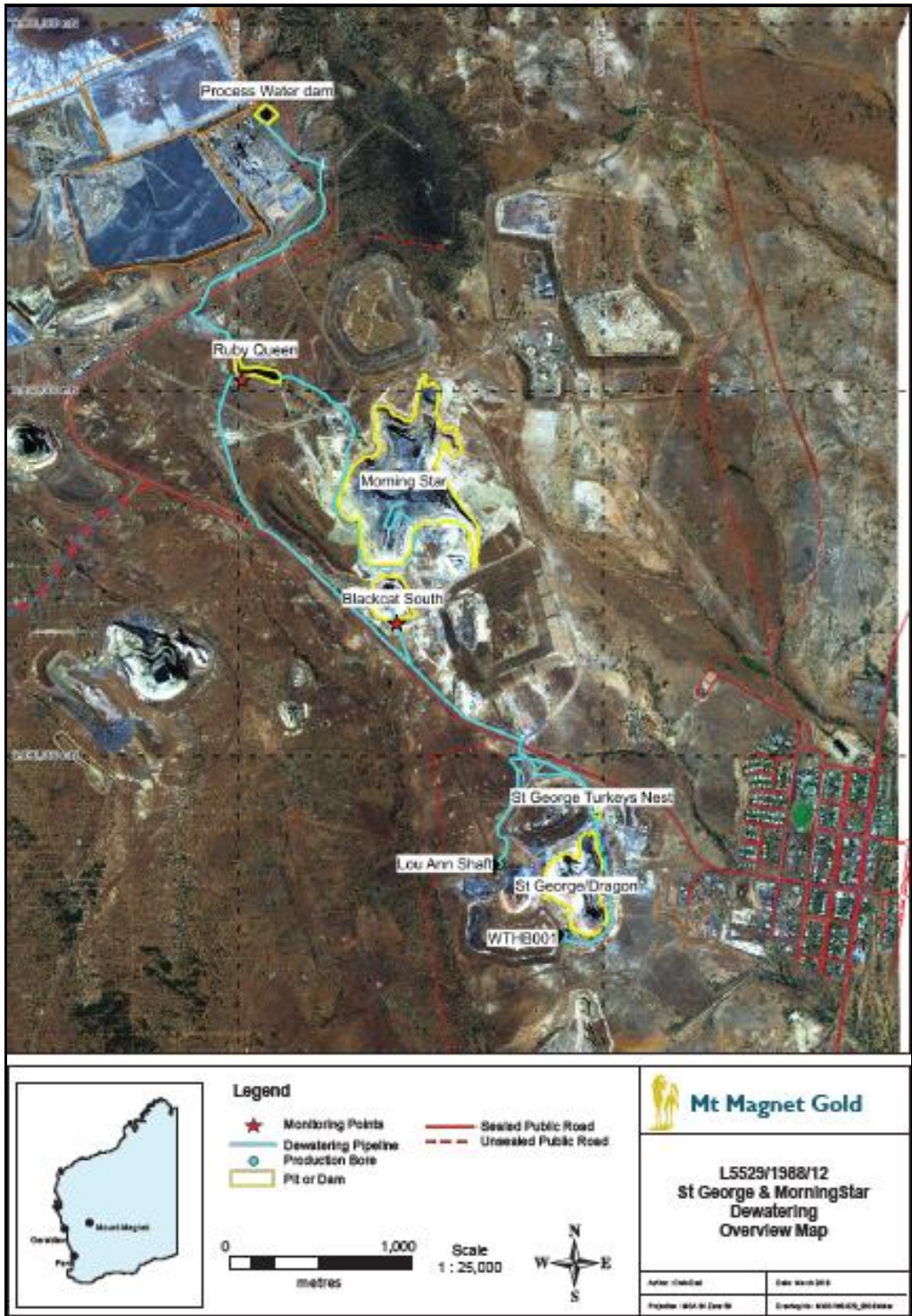


Figure 2: St George & Morning Star Dewatering Overview Map

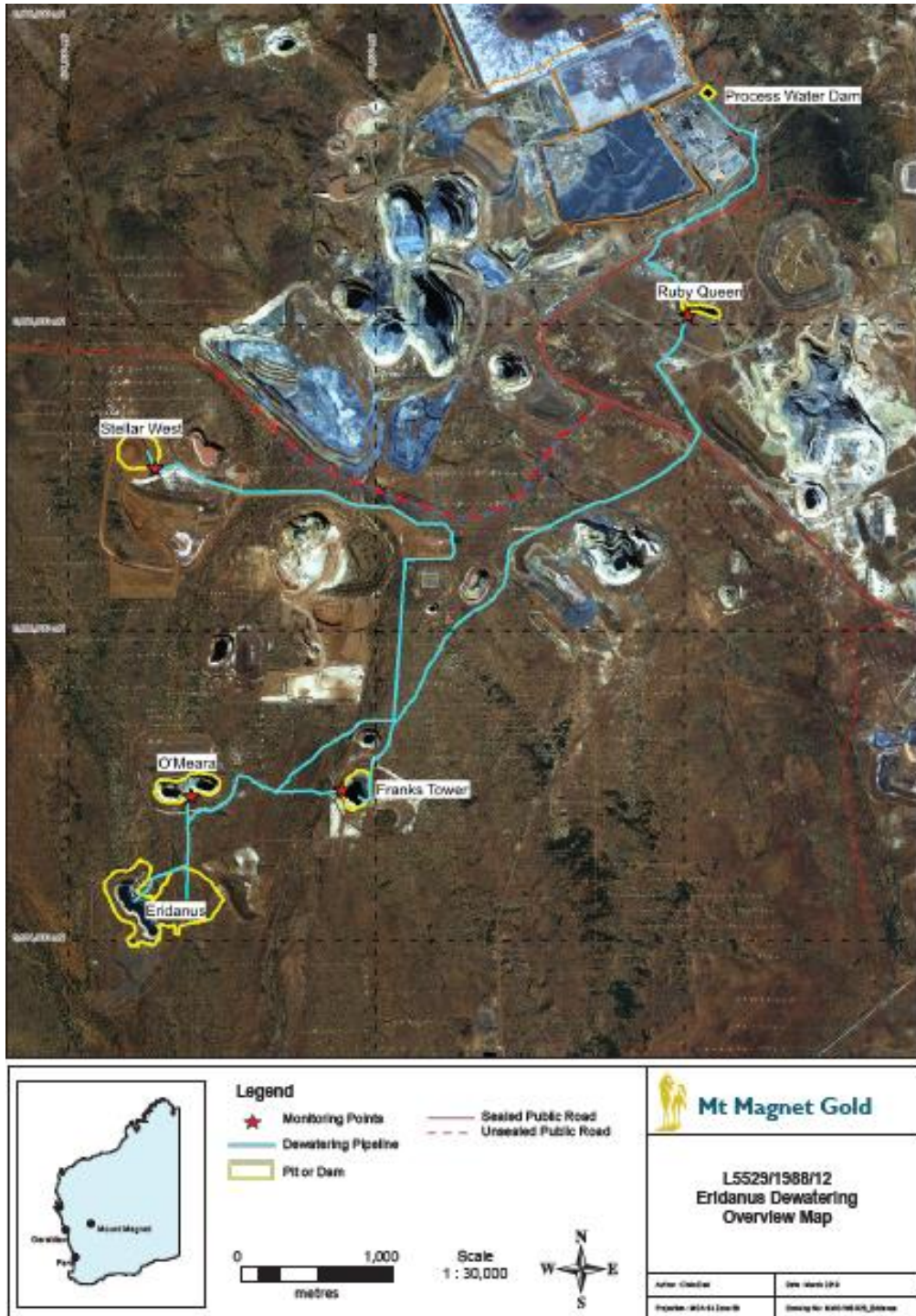


Figure 3: Eridanus Dewatering Overview Map

Note: The Stella West pit is no longer considered as an emission point

Other approvals

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

Table 3: Relevant approvals

Legislation	Number	Approval
<i>Mining Act 1978</i>	REG ID 75926 - 19/12/2018	Revised Galaxy-Cosmos Multi-Pit Project Mining Proposal (Shannon underground)
	REG ID 75820 – 4/12/2018	Revised Morning Star Mining Project Mining Proposal
	REG ID 75711 - 16/12/2018	Revised St George/Water Tank Hill UG Project Mining Proposal (V3) and Hill 60 underground
<i>Rights in Water and Irrigation Act 1914</i> (RIWI Act)	GWL151513(8)	Dewatering approval

Amendment history

Table 4 provides the amendment history for L5529/1988/12.

Table 4: Licence amendments

Instrument	Issued	Amendment
L5529/1988/12	30/06/2017	Amendment Notice 1: Include the discharge of mine dewatering to Ruby Queen and Saturn Pits.
L5529/1988/12	18/09/2017	Amendment Notice 2: Include the dewatering of Stellar, Stellar West, Milky Way and Shannon Pits, discharging via Frank Tower Pit and Ruby Queen Pit to Checker salt water dam. Premise boundary extended. AER submission dates aligned with the AACR.

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.

Table 5: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Town of Mt Magnet	The Blackcat South emission point, which is the closest to the Town of Mt Magnet, is located approximately 2.0 km away in a NW direction.

Table 6 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 6: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Minor tributary of the Salt River	A minor tributary runs through the Premises from the north to the south. A number of minor non-perennial watercourses run from the premises with a constructed diversion around the northern part of the tailings storage facility and bunds at pits. The Salt River is located 20 km away.
(RIWI Act) Groundwater Area	The premises is located on the East Murchison Groundwater Area.
Groundwater - Public Drinking Water Source Areas (PDWSA)	<p>The Mount Magnet Water Reserve (PDWSA) has two separate sections: Genga, which is south-west of the town of Mount Magnet; and Lennonville, which is north-west of the town (see Figure 4 below).</p> <p>Protection of the PDWSA is provided through the Department of Water and Environmental Regulation, Water resource protection series Report WRP 182, <i>The Mount Magnet Water Reserve drinking water source protection review</i>, March 2019 (WRP 182, 2019).</p> <p>The WRP 182, 2019 considers changes that have occurred in and around Mount Magnet Water Reserve since completion of the <i>Mount Magnet Water Reserve drinking water source protection plan (DoE 2005)</i>.</p> <p>The Water Corporation supply drinking water to Mount Magnet from five production bores located in the Genga water reserve which is located approximately 10 km south west of the Mount Magnet town. The bores draw water from an unconfined aquifer which makes the source vulnerable to contamination (WRP 182, 2019).</p> <p>The key recharge area is a P1 area, and the rest of the Genga water reserve, which represents the surface water catchment area of the borefield, is a priority 2 (P2) area. This is consistent with the decisions made in the 2005 plan (WRP 182, 2019).</p> <p>The Lennonville water reserve is maintained as a future water source.</p> <p>The O'Meara and Franks Tower pits are the closest emission points to the P1 Genga Water Reserve which is located over 3 km away in a southerly direction (see Figure 5). The other proposed emissions points are over 5 km away.</p> <p>The O'Meara pit is as close as 500 m from the boundary of the P2 Genga Water Reserve. The Franks Towers pit is approximately 1.7 km away with the Ruby Queen and Blackcat South pits both over 5 km away.</p> <p>Figure 5 below shows the location of proposed dewatering and activities in relation to the PDWSAs.</p>
Groundwater bores – privately owned	The nearest livestock watering groundwater bore is located 1.8 km away from Franks Tower pit (DWER GIS WIN groundwater sites).
Groundwater	<p>Depth to groundwater ranges considerably across the premises.</p> <p>Parameters of Nitrate, Nitrite, and turbidity have been found to be elevated within the Genga bore field with treatment required before water is supplied as a potable water source (WRP 182, 2019)</p> <p>The depth to groundwater at the Ruby Queen Pit is estimated at 30 mbgl. The Ruby Queen pit has a depth of 27 metres so there is an estimated separation distance of 3 metres between the base of the pit and groundwater. However this was based on monitoring conducted in 1989 and due to seasonal variations, the water table could possibly have risen allowing for pit water to interact with groundwater.</p>

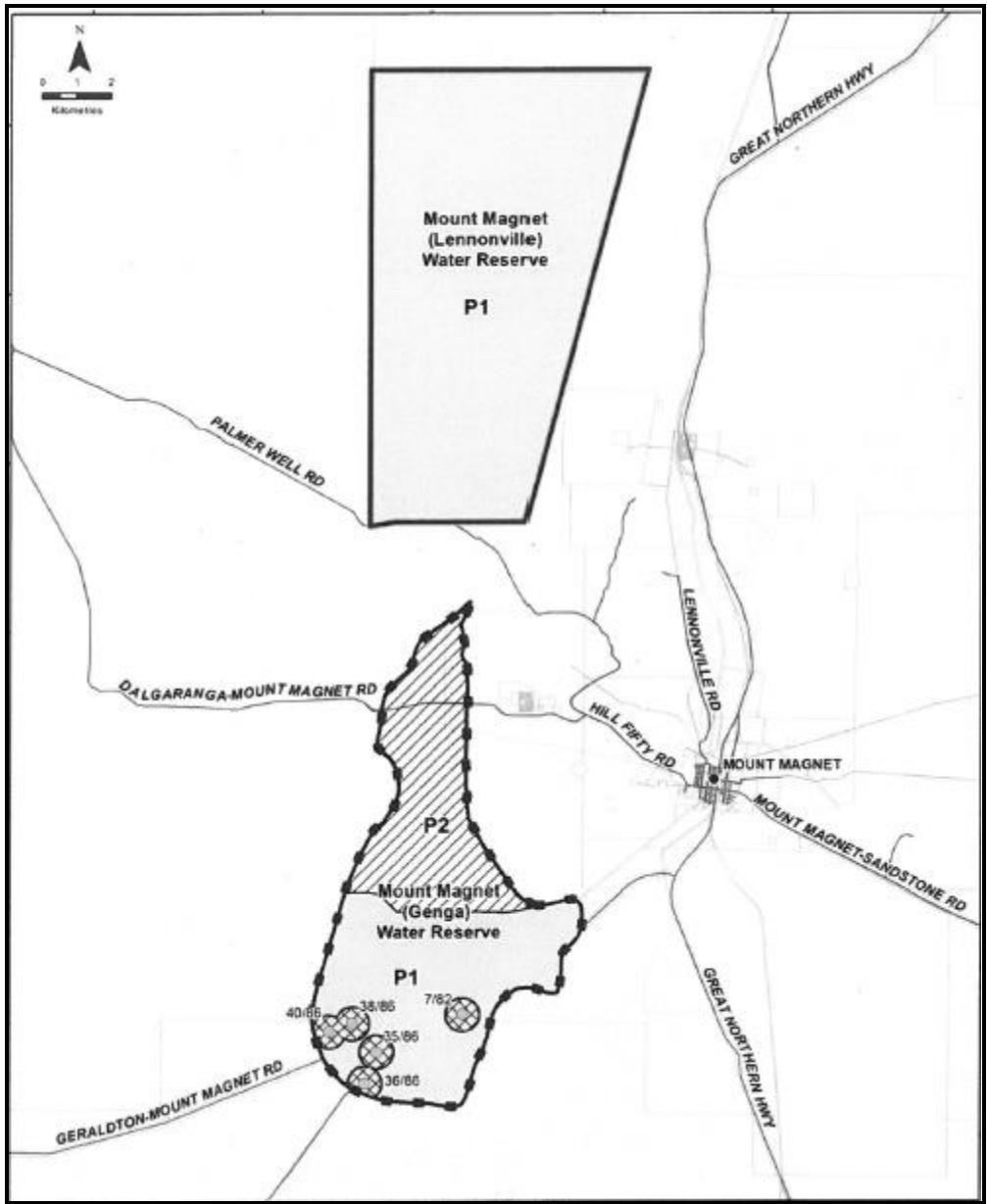


Figure 4 Mount Magnet Water Reserves

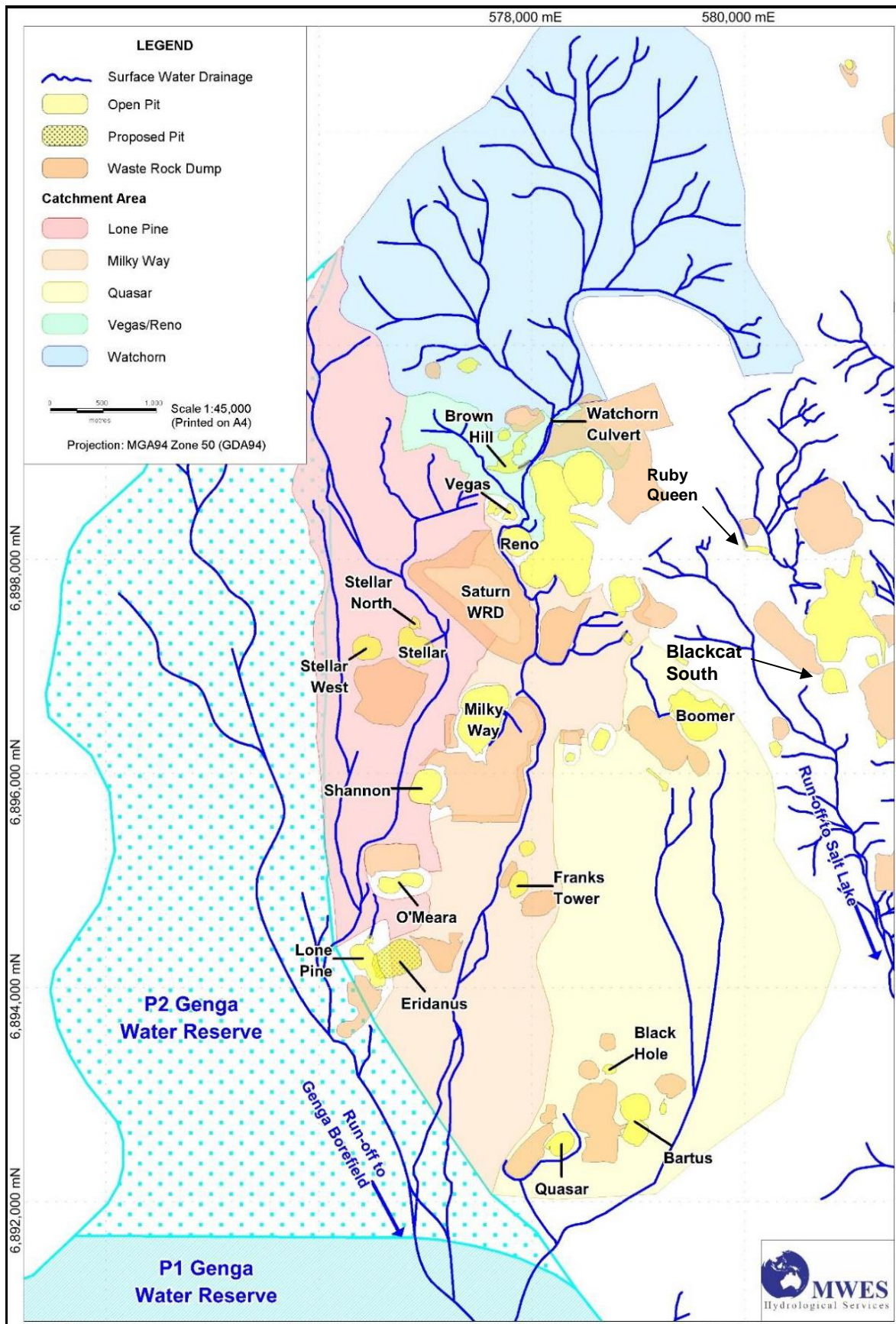


Figure 5: Genga Water Reserve and Licensee proposed dewatering emission points

Hydrogeology

The multi pit project is located in the Meekathara-Wyldgee Greenstone Belt comprising basalts, schists, amphibolite gabbro, serpentinite and several dipping chert and banded iron formations. Groundwater occurs mainly in fractures and joints. There are several main fault systems that exert a major control of movement of groundwater (MWES, 2017).

MWES (2017) states that groundwater aquifers in the area are known to be low permeability. An MWES water balance study in 2015 confirmed historical low groundwater inflow rates at all studied pits. MWES concluded that *“if any groundwater outflows from pits did occur they will have minor and only localized impact on the groundwater environment, and are very unlikely to impact the Genga Bore field”*. MWES concluded by a water balance study that after closure, all pits will remain groundwater sinks, due to the combination of high evaporation, low rainfall and low to moderate groundwater yield (MWES, 2017).

Groundwater Quality

The quality of the groundwater at the Premises is generally moderately saline, neutral pH, low in heavy metals, and elevated levels of nitrate. Table 7 below shows the quality of the water contained within pits that have been mined below the water table. These results provide a good representation of the groundwater quality expected at the Premises.

Water Balance Modelling

A comprehensive site-wide water balance using GoldSim software is maintained at the Premises and is updated as required. The model utilises data collected since 1996 with the following measured inputs included:

- Daily rainfall readings from Mount Magnet and calculated monthly evaporation from the Bureau of Meteorology;
- Pit shapes and water meter readings supplied by the Licensee;
- Measures catchment surface areas; and any historical data relevant to water flows.

The Licensee estimated future mine dewatering rates as maximum values in L/sec as they believe it is not possible to quantify how long the dewatering pumps will need to operate over a one year period. The Licensee set a maximum pumping capacity at each pit. The annual volume of water to be discharged at each pit was calculated using a higher L/sec value assuming it will be pumped continuously over a full one year period. Therefore the estimated dewatered volumes presented in the water balance are maximum values with true dewatering volumes expected to be considerably lower.

Groundwater inflows and outflows have been calculated as a range of daily rates as the rate will depend on the pit lake water level which will vary depending on the variable input rates and the need for water use onsite.

Rainfall inputs are also highly variable from year to year.

Table 7 below provides a water balance summary for the proposed dewatering to occur as part of this assessment. The water balance was prepared by Principal Hydrologist Gary Meyer from MWES Consulting.

Table 7: Water balance for receiving pits

Mode	Component	O'Meara Pit	Franks Tower Pit	Blackcat South Pit	Ruby Queen Pit
Inputs	Pumped Inputs	Flooded water from the Lone Pine Pit, estimated to be 320,000kL. Dewatering from the proposed Eridanus Pit, estimated to be 5-10L/sec (315,000kL/yr max). Total in first year will be 635,000kL, followed by a maximum of 315,000kL/yr.	All mining operations at the Shannon and Quasar pits and dewatering bore SHPB02 at the Shannon Pit produced 120,000-500,000kL/yr from 2015 to 2019. Note that mine water from the Milky Way, Stellar and Stellar West pits will now be directed to the Galaxy-Cosmos Turkeys Nest, not Franks Tower. This leaves about 0-350,000kL/yr discharge. With the addition of the Shannon Underground mine, this will increase by some 3-5L/sec (160,000kL/yr max).	Part of the discharge to the Ruby Queen Pit will be diverted to the Blackcat South Pit. The amount will vary widely depending on the need to keep water levels below 2m from the spill point at each pit. The capacity of the Blackcat South Pit is 1,500,000kL and much higher than Ruby Queen which is 106,000kL.	All mining operations at St George and Water Tank Hill, including historical Lou Ann and Hill60 mines, CPB1 Councillor Bore, Morning Star Shaft, Boomer Pit & Franks Tower Pit produced 700,000-1,200,000kL/yr from 2013 to 2019. With the addition of Hill60, this will increase by some 2-3.5L/sec (110,000kL/yr max). The Morning Star Mine is expected to continue dewatering at close to historical rates of 150,000 to 350,000kL/yr.
	Rainfall	Daily rainfall from the Mount Magnet weather station. Applied directly to the pit lake surface area and as runoff from the pit walls.			
	Catchment Runoff	Estimated to be 5.2kL/sec at a 1:10-year peak flow rate event.	None	None	Based on an initial rainfall loss of 40mm/day and a catchment runoff coefficient of 0.9, peaked at 75,500kL/day in 2006.
	Groundwater inflow	Calculated as 100 to 200kL/day depending on the level of the pit lake.	Calculated as 500 to 600kL/day depending on the level of the pit lake.	Estimated to be 100 to 500kL/day based on typical values in the area. No historical data is available to calibrate a water balance model.	Nil
Outputs	Pit Abstraction	All water in the O'Meara Pit will be used for sub-potable water supply to the MMG operation. The pump rate will be sufficient to maintain a 2m freeboard in the O'Meara Pit.	Water from the Franks Tower Pit was pumped to Ruby Queen Pit and amounted to 240,000-600,000kL/yr. With the addition of the Shannon Underground mine, this will increase by some 3-5L/sec (160,000kL/yr max).	The pit will be pumped at sufficient rate to keep the water level 2m below the spill point. All water will be pumped to the Ruby Queen Pit.	250,000kL/yr to the Checker Salt Water Dam for mill process supply. 120,000-180,000kL/yr to mining contractors water supply. 60,000-120,000kL/yr for dust suppression. More if there is a need to reduce the water level in the pit.
	Evaporation	Average monthly evaporation from gridded data supplied by Bureau of Metrology. Applied to the calculated pit lake surface area.			
	Groundwater outflow	Nil	Nil	Nil	Highly variable to maximum 300kL/day depending on the pit lake water level.

Pit Water Quality

The dewatered water quality and the receiving water quality within the receiving pits is presented in Table 8 below.

Table 8: Pit water quality

Project name	Eridanus Project		St George/Water Tank Hill/Hill 60 Project		Cosmos Project		Morning Star Project	
Parameter	Dewatered - Lone Pine/Eridanus underground Discharge to O'Meara	Emission point - O'Meara Pit Storage before being pumped to RO plant to produce potable water for use on-site	Dewatered - St George/Water Tank Hill & Hill 60 (WTHB001) Discharge to Blackcat South	Emission point - Blackcat South Transfer node before transfer to Ruby Queen	Dewatered – Shannon underground To header tank. Excess to Franks Tower	Franks Tower Transfer node before transfer to Ruby Queen	Dewatered - Morning Star Discharge to Ruby Queen	Emission point - Ruby Queen Pit Storage Node before transferred to Checker dam for use in process
Sample date	6/03/2019	6/03/2019	8/03/2019	10/04/2018	6/03/2019	6/03/2019	10/04/2018	11/03/2019
pH	8.7	8.9	8.1	8.4	8.0	7.9	7.9	8.1
Electrical conductivity µS/cm	1,200	3,300	7,000	14,000	5,300	9,500	11,000	8,600
Total Dissolved Solids (TDS) mg/L	640	2,100	4,400	9,000	3,100	5,900	7,900	5,800
Nitrate as NO3 mg/L	4.3	5.8	78	41	41	78	17	47
Aluminum mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
Silver mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic mg/L	<0.001	0.002	0.007	0.062	0.002	0.007	0.006	0.007

Boron mg/L	0.43	2.5	2.5	22	1.3	1.5	3.1	2.8
Cadmium mg/L	<0.001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0005	0.0001
Cobalt mg/L	<0.001	<0.001	0.003	0.008	<0.001	<0.001	0.032	0.005
Dissolved Chromium (VI) mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper mg/L	0.001	0.002	<0.001	0.006	<0.001	<0.001	0.005	0.001
Iron mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese mg/L	<0.005	<0.005	0.077	0.040	0.018	<0.005	0.35	0.013
Molybdenum mg/L	0.003	0.006	0.009	0.055	0.012	0.012	0.11	0.04
Nickel mg/L	<0.001	<0.001	0.015	0.021	0.001	<0.001	0.043	0.012
Lead mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium mg/L	<0.001	<0.001	0.004	0.023	0.002	0.004	0.007	0.006
Zinc mg/L	0.004	0.006	0.015	0.011	0.003	0.016	0.24	0.023

Risk assessment

Tables 9 and 10 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 9: Risk assessment for proposed amendments during construction

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Category 6 Dewatering	Construction of dewatering infrastructure	Dust	Surrounding native vegetation along the pipeline corridor	Air / wind dispersion	Decline in health of vegetation due to smoothing	Slight	Rare	Low	Minor fugitive dust is likely to be generated from light vehicle movements during installation of additional dewatering pipelines. Fugitive dust emissions generated during construction activities including traffic movements can impact on the health of vegetation. However, this risk is considered low due to the vegetation in this area being highly degraded as a result of mining and historical grazing activities, short construction period, and the use of a water cart when required. No additional regulatory controls are required to mitigate this risk. Any potential dust emissions can be regulated by section 49 of the EP Act.

		Noise	The town of Mount Magnet is located approximately 2 km away	Air / wind dispersion	Amenity	Slight	Rare	Low	Minor noise emissions are expected during the installation of the dewatering infrastructure. The noise emissions are not expected to have an impact on sensitive receptors due to the distance and the low noise levels expected to be generated from these types of construction activities. The provisions of the <i>Environmental Protection (Noise) Regulations 1997</i> are applicable.
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Table10: Risk assessment for proposed amendments during operation

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Category 6 Dewatering	Dewatering pipeline rupture	Discharge of mine dewatering effluent to land	Native vegetation. Nearby groundwater with beneficial use: P1 and P2 PDWSA Mount Magnet (Genga) Water Reserve. Surrounding soils	Direct discharge to land	Contamination of surrounding land and groundwater with mine dewater (brackish to moderately saline and slightly elevated nitrate levels). Decline in health of vegetation	Slight	Possible	Low	<p>The Licensee has committed to:</p> <ul style="list-style-type: none"> - installing new pipelines within previously cleared areas or utilising existing dewatering pipelines; - conducting 12 hourly inspections of the pipeline; and - installing flow metres. <p>A majority of the vegetation near existing pipelines and the route of new pipelines has previously been cleared or is highly degraded due to mining activities.</p> <p>The dewatering water is low in heavy metals and is brackish to moderately saline.</p> <p>Existing conditions within the Licence require all pipelines containing environmentally</p>
				Seepage through soils to groundwater					

									<p>hazardous substances (saline water is considered hazardous to vegetation), are fitted with:</p> <ul style="list-style-type: none"> - telemetry systems and pressure sensors along the pipeline to detect leaks and pipeline failures; - equipped with automatic cut-outs in the event of a pipe failure; or - provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections. <p>Existing conditions within the Licence also require daily monitoring of the pipeline.</p>
	Overtopping at the pit (emission point)	Discharge of mine dewatering effluent to land	<p>Native vegetation.</p> <p>Nearby groundwater with beneficial use: P1 and P2 PDWSA Mount Magnet (Genga) Water Reserve.</p> <p>Surrounding soils</p>	<p>Direct discharge to land</p> <p>Seepage through soils to groundwater</p>	<p>Contamination of surrounding land and groundwater with mine dewater (brackish to moderately saline and slightly elevated nitrate levels).</p> <p>Decline in health of vegetation</p>	Slight	Unlikely	Low	<p>Vegetation in the area is highly degraded and is therefore not considered a sensitive receptor.</p> <p>Natural drainage lines at the Premies may direct overtopping water from the pits (emission points) towards the Genga bore field. However, the dewatering water is reasonable quality, depth to groundwater is more than 15 mbgl, and the closest pits (Franks Tower and O'Meara) to the Genga P1 area boundary are over three km away.</p> <p>The Licensee has committed to maintaining a minimum freeboard of 2m below the pits' spill level by managing water between pits and pumping water to the Checker Salt Water Dam for use in the processing plant.</p> <p>Existing conditions within the Licence require daily visual inspections of the Franks Tower and Ruby Queen pits to confirm</p>

									the required freeboard is being maintained.
	Dewatering of the Lone Pine/Eridanus underground with discharge to the O'Meara pit.	Discharge of mine dewatering effluent to groundwater	Localised groundwater at the receiving pit The O'Meara pit is located approximately 3.4 km away from the boundary of the P1 Mount Magnet (Genga) Water Reserve.	Direct interaction with local groundwater through seepage (pits mined below ground water table)	Contamination of PDWSA with mine dewatering effluent (brackish to moderately saline and slightly elevated nitrate levels).	Moderate	Unlikely	Medium	<p>Water balance modelling indicates no groundwater outflows are expected from the O'Meara pit (MWES, 2019). If any groundwater outflows from pits were to occur they will have minor and only localized impact on the groundwater environment, and are very unlikely to impact the Genga Bore field (MWES, 2017).</p> <p>The quality of the dewatered effluent from the Lone Pine/Eridanus underground is considered fresh (see Table 8) and is of better quality than the water contained within the O'Meara pit.</p> <p>Water contained within the O'Meara pit will be pumped to a RO plant for potable water use at the Premises.</p> <p>Distance and local hydrogeology, including the presence of an iron banding barrier, are thought to limit the ability of open pit water infiltrating and reaching the bore field located in the P1 Mount Magnet (Genga) Water Reserve (DoE, 2005).</p> <p>The Licensee has committed to installing flow meters and sample points where dewater discharge will be to open pits.</p>
	Dewatering of St George/Water Tank Hill & Hill 60 (via		Localised groundwater at the receiving pit The Blackcat			Minor	Unlikely	Medium	Water balance modelling indicates no groundwater outflows are expected from the Blackcat South pit (MWES, 2019). If any groundwater outflows from pits did

	<p>WTHB001) with discharge to the Blackcat South pit.</p>		<p>South pit is located approximately 6.0 km away from the boundary of the P1 Mount Magnet (Genga) Water Reserve. This separation distance is considered too great for the Genga Water Reserve to be considered a sensitive receptor</p>					<p>occur they will have minor and only localised impact on the groundwater environment, and are very unlikely to impact the Genga Bore field (MWES, 2017).</p> <p>The quality of the dewatered effluent from St George/Water Tank Hill & Hill 60 is of similar or better quality than the water contained within the Blackcat South pit (see Table 8).</p> <p>The Blackcat South pit is only used as a transfer node before the water is then pumped to the Ruby Queen pit.</p> <p>The Licensee has committed to installing flow meters and sample points where dewater discharge will be to open pits.</p>
	<p>Dewatering of the Shannon underground with discharge to a header tank and any excess to the Franks Tower pit.</p>		<p>Localised groundwater at the receiving pit</p> <p>The Franks Tower pit is located approximately 3.4 km away from the boundary of the P1 Mount Magnet (Genga) Water Reserve.</p>		Moderate	Unlikely	Medium	<p>Water balance modelling indicates no groundwater outflows are expected from the Franks Tower pit (MWES, 2019). If any groundwater outflows from pits did occur they will have minor and only localized impact on the groundwater environment, and are very unlikely to impact the Genga Bore field (MWES, 2017).</p> <p>The quality of the dewatered effluent from Shannon underground is of similar or better quality than the water contained within the Franks Tower pit (see Table 8).</p> <p>The Franks Tower pit is only used as a transfer node before the water is then pumped to the Ruby Queen</p>

									<p>pit.</p> <p>The Franks Tower pit is already authorised through conditions in the Licence to receive dewatering effluent.</p> <p>The Licensee has committed to maintain existing flow meters and sample points where dewater discharge will be to open pits.</p>
	<p>Dewatering of the Morning Star pit with discharge to the Ruby Queen pit.</p>		<p>Localised groundwater at the receiving pit</p> <p>The Ruby Queen pit is located approximately over 7.0 km away from the boundary of the P1 Mount Magnet (Genga) Water Reserve. These separation distances are considered too great for the Genga Water Reserve to be considered a sensitive receptor.</p>			Minor	Unlikely	Medium	<p>Water balance modelling indicates groundwater outflows from the Ruby Queen pit are highly variable up to a maximum of 300 kL/day (MWES, 2019). Any outflows are expected to report back to the nearby large Morning Star pit.</p> <p>The Ruby Queen pit is located over 7.0 km away from the boundary of the P1 Mount Magnet (Genga) Water Reserve and therefore any outflows are not expected to have any impacts on this reserve.</p> <p>Previous studies on all pits at the Premises (MWES, 2017) indicate any impacts would be localised and very unlikely to impact the Genga Bore field.</p> <p>The water quality at the Morning Star pit is similar to the water contained within the Ruby Queen pit with the exception of Cobalt, Manganese, Molybdenum and Zinc concentrations. These elements are slightly elevated however the concentration levels will be diluted with other pit water being discharged into the Ruby Queen</p>

									<p>Pit.</p> <p>All water contained within the Ruby Queen pit is transferred to the Checker dam for use in the process plant at the Premises.</p> <p>The Ruby Queen pit is already authorised through conditions in the Licence to receive dewatering effluent.</p> <p>The Licensee has committed to maintain existing flow meters and sample points where dewater discharge will be to open pits.</p>
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Decision

The Delegated Officer has determined that the key emissions associated with this Amendment Notice are:

- the dewatering of the Lone Pine pit and Eridanus underground with the discharge to the O'Meara pit;
- the dewatering of the St George/Water Tank Hill & Hill 60 (via WTHB001) with discharge to the Blackcat South pit;
- the dewatering of the Shannon underground with discharge to the Franks Tower pit; and
- the dewatering of the Morning Star pit with discharge to the Ruby Queen pit.

These emissions are considered a discharge to groundwater.

Other potential emissions associated with this Amendment Notice are the accidental discharge of brackish to saline dewatering effluent to land from overtopping of the pits and pipeline failure.

The Delegated Officer considers the commitments made by the Licensee, and an amendment to the existing conditions within the Licence are sufficient to mitigate the risk.

The following existing conditions in the Licence are amended:

- Condition 1.3.8 is amended to include the O'Meara and Blackcat South pits as containment infrastructure;
- Condition 1.3.9 is amended to include the requirement for maintenance and inspection of a 2 m freeboard at the O'Meara and Blackcat South pits;
- Conditions 1.3.10 is amended to increase the approved category 6 production capacity to 1,500,000 tonnes per annum;
- Condition 2.2.1 is amended to include dewatering of the Lone Pine pit lake, Eridanus underground, St George/Water Tank Hill & Hill 60 underground, Shannon underground and Morning Star underground with discharge to the O'Meara and Blackcat South pits. The Franks Tower and Ruby Queen pits are existing emission points in the Licence;
- Condition 3.2.1 is amended to include the requirement to monitor emissions to the O'Meara and Blackcat South pits. The requirement to monitor emissions to the Franks Tower and Ruby Queen pits are already included in the Licence;
- The Map of emission points in Schedule 1: Maps is updated to include new maps showing the emission points and infrastructure; and
- The Map of monitoring locations in Schedule 1: Maps is updated to include new maps showing the monitoring points.

The Delegated Officer has also determined to amend the Licence by:

- including controls through new conditions 1.3.11, 1.3.12 and 1.3.13 for the construction of the dewatering infrastructure;
- replacing the requirement to sample groundwater monitoring bore T3MB07 as it has partially collapsed. The Licensee proposed to sample the nearby recovery bore T3RB01 as an alternative groundwater monitoring source, and this has now been included as a monitoring point in condition 3.4.1;
- including an additional seepage recovery bore (T3RB4A) at the tailings storage facility (CTSF3) for the recovery of any seepage that may occur at this facility; and
- removing the Saturn Pit as an emission point in condition 2.2.1 and the requirement to monitor emissions to the Saturn pit in condition 3.2.1. The Licensee advised this pit is no longer used as an emission point.

Licensee's comments

The Licensee was provided with the draft Amendment Notice on 13 August 2019. The Licensee responded on 15 August 2019 waiving the remaining comment period until 5 September 2019.

Amendment

- The Prescribed premises category table is amended by the deletion of the text shown in strikethrough below and the insertion of the text shown in bold and underline below:

Prescribed premises category

Schedule 1 of the *Environmental Protection Regulations 1987*

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	2,400,000 tonnes per annual period
6	Mine dewatering	50,000 tonnes or more per year	660,000 <u>1,500,000</u> tonnes per annual period
64	Class II putrescible landfill site	20 tonnes or more per year	10,000 tonnes per annual period

- Condition 1.3.8 is amended by the insertion of the text shown in underline and bold below:

- 1.3.8 The Licensee shall ensure that waste materials are discharged into dams and pits with the relevant infrastructure requirements and at the location specified in Table 1.3.4 and identified in Schedule 1.

Containment point reference	Material	Infrastructure requirements
CTSF3	Tailings	<p>Measures to prevent or minimise dust generated from surface of the tailings storage facility installed</p> <p>A seepage interceptor drain is maintained immediately downstream of the external toe of the tailings dam to recover any liquid matter resulting from seepage or breach of the embankment</p> <p>Any matter collected in interceptor drain(s) shall be returned to either the tailings dam, an evaporation dam or used in the processing plant</p> <p>Seepage recovery bores T3RB1, T3RB2A, T3RB3, T3RB4, <u>T3RB4A</u>, T3RB6 and T3RB7 are maintained to recover any liquid matter resulting from seepage</p> <p>A minimum top of embankment freeboard of 300mm is maintained in order to accommodate an extreme rainfall event</p>
Process Water Dam	Dewatering effluent water and seepage recovery water	<p>A minimum top of embankment freeboard of 300mm is maintained</p> <p>Lined to achieve a permeability of 10⁻⁹ m/s or less.</p>
Franks Tower pit	Dewatering effluent	A minimum freeboard of 2 m is maintained in order to accommodate an extreme rainfall event.
Ruby Hill Queen pit		
<u>O'Meara pit</u>		
<u>Blackcat South pit</u>		

3. Condition 1.3.9 is amended by the insertion of the text shown in underline and bold below:

1.3.9 The Licensee shall:

- (a) undertake inspections as detailed in Table 1.3.5;
- (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 1.3.5: Inspection of infrastructure		
Scope of inspection	Type of inspection	Frequency of inspection
Tailings delivery pipelines	Visual integrity	Daily
Return water lines		
Dewatering pipelines		Weekly
Chemical storage areas		
Processing plant		
TSF embankment freeboard	Visual to confirm required freeboard capacity is available	Daily
Franks Tower pit		
Ruby Queen pit		
O'Meara pit		
Blackcat South pit		

4. Condition 1.3.10 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 underlined below:

1.3.10 The Licensee shall ensure the limits specified in Table 1.3.6 are not exceeded.

Table 1.3.6: 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	2,400,000 tonnes per annual period
6	Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore	660,000 <u>1,500,000</u> tonnes per annual period

Note 1: *Environmental Protection Regulations 1987, Schedule 1.*

5. Conditions 1.3.11 and 1.3.12 have been included as new conditions in the Licence and are shown in bold and underline below:

1.3.11 The Licensee must install and undertake the Works for the infrastructure and equipment

- (a) specified in Column 1; and**
 - (b) to the requirements specified in Column 2**
- of Table 1.3.7 below.**

Table 1.3.7: Construction Requirements	
Column 1	Column 2
<u>Infrastructure/Equipment</u>	<u>Requirements (design and construction)</u>
<u>Dewatering pipelines</u>	<ul style="list-style-type: none"> • <u>All joints are butt welded;</u> • <u>Fitted with flow meters; and</u> • <u>Located within a V-notch drain or by other methods to minimise movement of the pipeline.</u>

1.3.12 The Licensee must submit a construction compliance report to the CEO, within one month following the construction of the Works and prior to operating the new Works at the premises, confirming that the Works have been completed in accordance with Condition 1.3.11.

6. Condition 2.2.1 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 underlined below:

2.2.1 The Licensee shall ensure that where waste is emitted to groundwater from the emission point 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	Description	Source including abatement
Saturn pit	Dewatering waste water discharge into disused mine pits.	Water from dewatering of the Titan pit.
Franks Tower pit		Water from dewatering of Stellar, Stellar West and Milky Way pits, and the Shannon underground pits (Cosmos pits project).
Ruby Queen pit		Water from dewatering of the St George open pits, St George/Water Tank Hill underground pits, Blackcat South, Morning Star and Franks Tower pits.
<u>O'Meara pit</u>		<u>Water from dewatering the Lone Pine pit and Eridanus underground</u>
<u>Blackcat South pit</u>		<u>Water from dewatering the St George/Water Tank Hill and Hill 60 underground pits</u>

7. Condition 3.2.1 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 underlined 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 located in Schedule 1	Parameter	Units	Averaging Period	Frequency
Dewatering discharge outlets into the Saturn, O'Meara, Blackcat South, Franks Tower and Ruby Queen pits	Volumetric flow rate	m ³ /day	Monthly	Continuous
	Aluminium	mg/L	Spot sample	Annually
	Arsenic			
	Cadmium			
	Chromium			
	Cobalt			
Copper				
Iron				
Lead				
Manganese				
Mercury				
Molybdenum				
Nickel				
Selenium				
Total recoverable hydrocarbons				
Zinc				
Standing water level in pits	mbgl			Quarterly
Total dissolved solids and Total Nitrogen	mg/L			
pH ¹	-			

8. Condition 3.4.1 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 underlined below:

3.4.1 The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table and record and investigate results that do not meet any limit specified.

Table 3.4.1: Monitoring of ambient groundwater quality					
Monitoring point reference and location	Parameter	Limit	Units	Averaging period	Frequency
CTDP2D, TRB001, T3MB1, T3MB2, T3MB4, T3MB5, T3MB6, T3MB7, T3RB01 , T3MB8, T3MB9 and T3MB10	Aluminium	5.0	mg/L	Spot sample	Annually
	Arsenic	0.5			
	Cadmium	0.08			
	Chromium (+6)	1.0			
	Cobalt	1.4			
	Copper	0.5			
	Lead	0.4			
	Mercury	0.11			
	Molybdenum	0.05			
	Nickel	1.0			
	Selenium	0.08			
	Zinc	20.0			
	Electrical conductivity	-			
	Standing water level (SWL) ¹				
	Total cyanide				
Total dissolved solids					
Weak acid dissociable cyanide (WAD cyanide)	0.5				
pH ¹	6.0 to 9.0	-			
PHMB3 and PHMB4	Total recoverable hydrocarbons	-	mg/L		

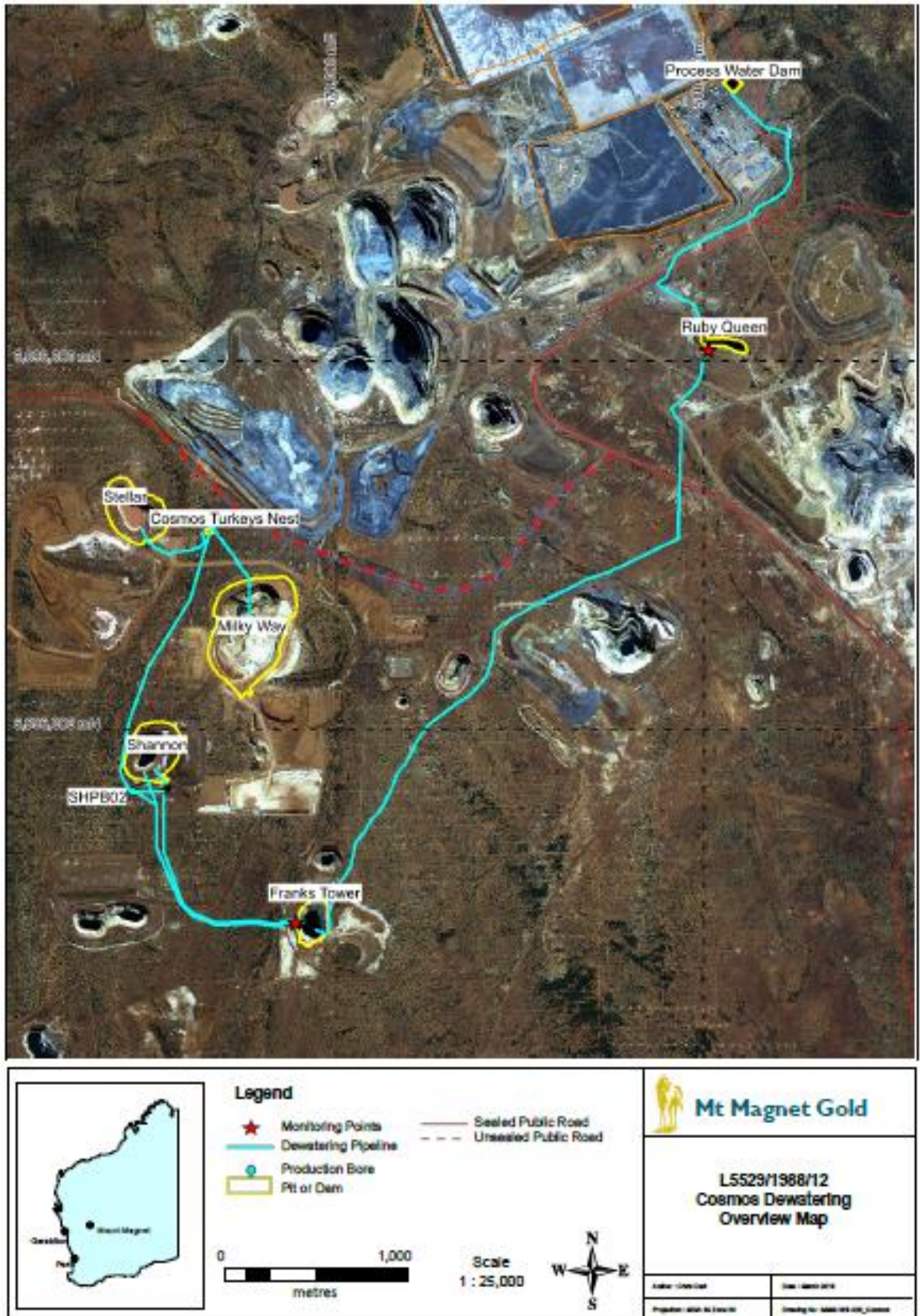
Note 1: In-field non-NATA accredited analysis permitted. SWL shall be determined prior to collection of other water samples.

9. Schedule 1 Map of emission points of the Licence is amended by the deletion of the maps labelled **Dewatering discharge to the Saturn pit**, **Dewatering discharge to the Ruby Queen pit**, and **Dewatering discharge to Frank Tower and Ruby Queen pits from the Cosmos pit**, and insertion of the text shown in bold and underline below and insertion of the new maps as shown below.

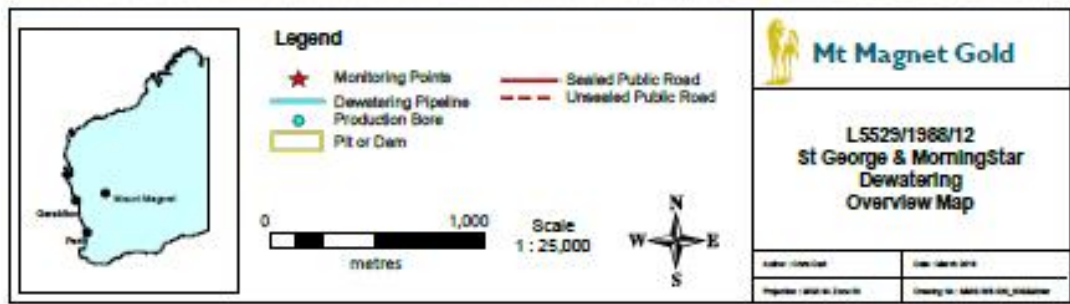
Map of emission points

The locations of the emission points defined in Table 2.2.1 is shown below.

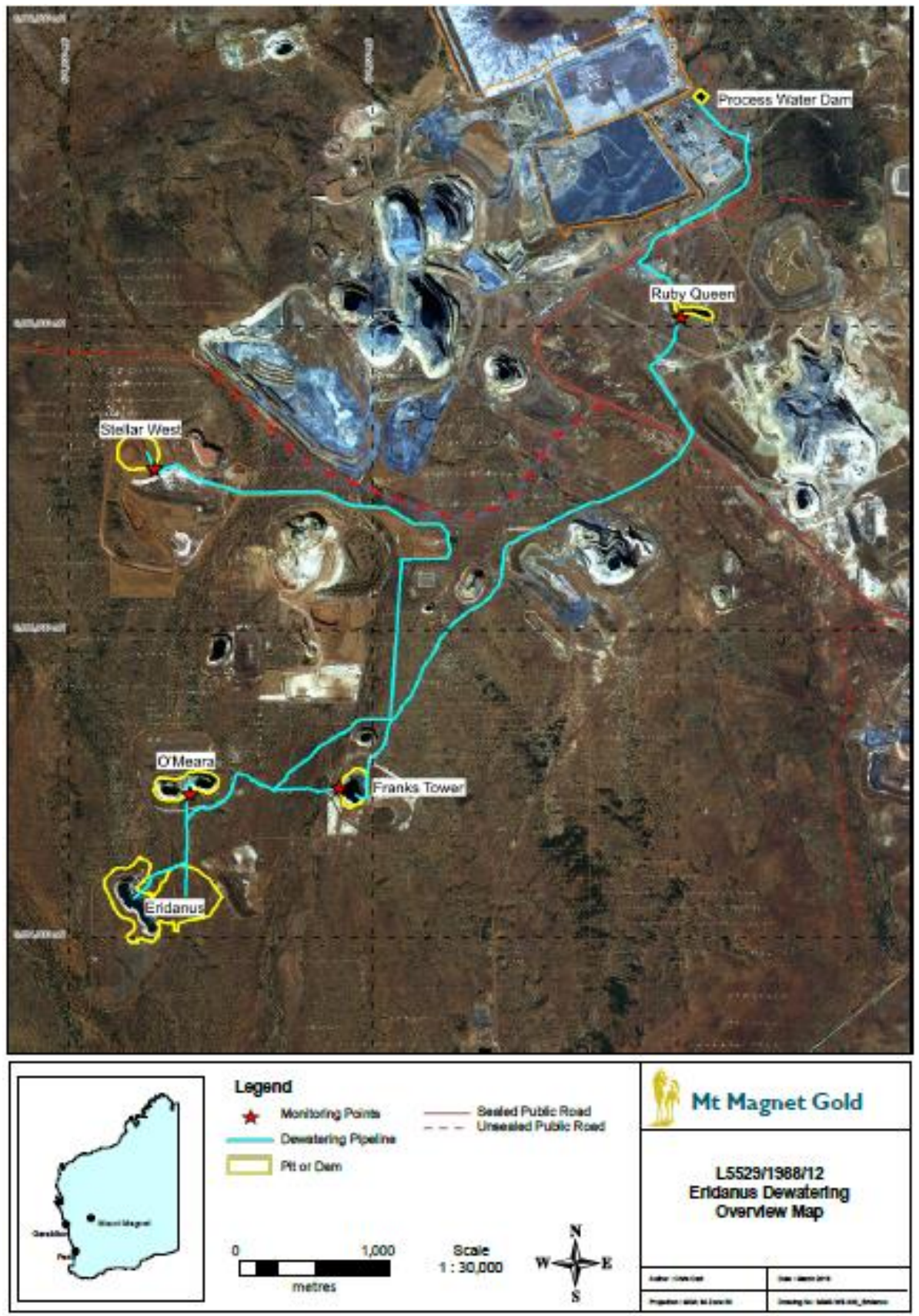
Franks Tower and Ruby Queen emission points



Blackcat South emission point



O'Meara emission point

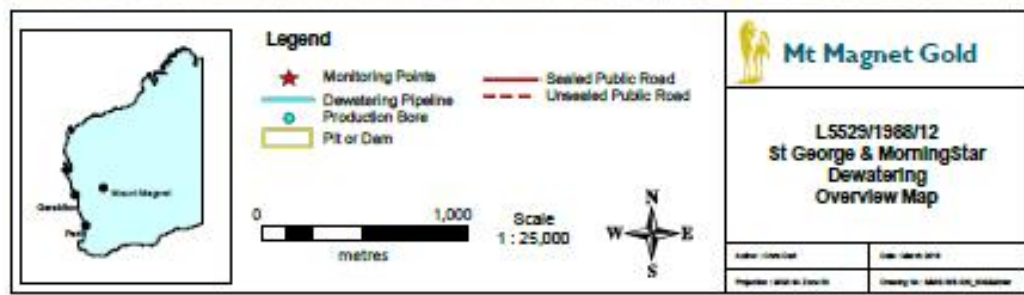


10. Schedule 1 Map of monitoring points of the Licence is amended by the deletion of the maps labelled **Saturn pit monitoring point**, **Ruby Queen monitoring point**, **Dewatering of cosmos pits – monitoring points**, and **CTSF3 Groundwater monitoring locations** and insertion of the text shown in bold and underline below and insertion of the new maps as shown below.

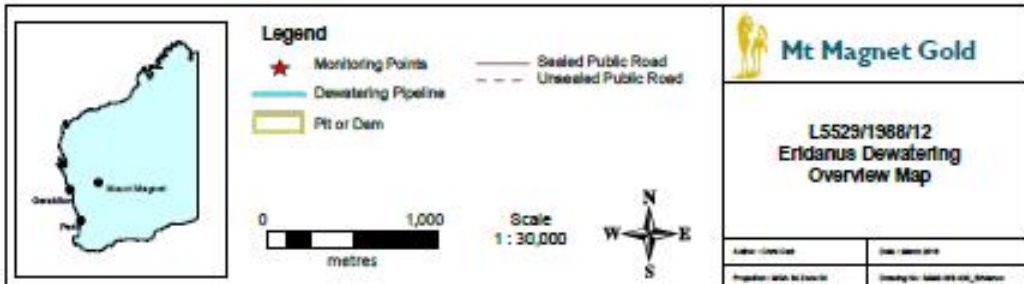
Map of monitoring locations

The locations of the monitoring points defined in Table 3.2.1 are shown below.

Ruby Queen and Blackcat South monitoring points

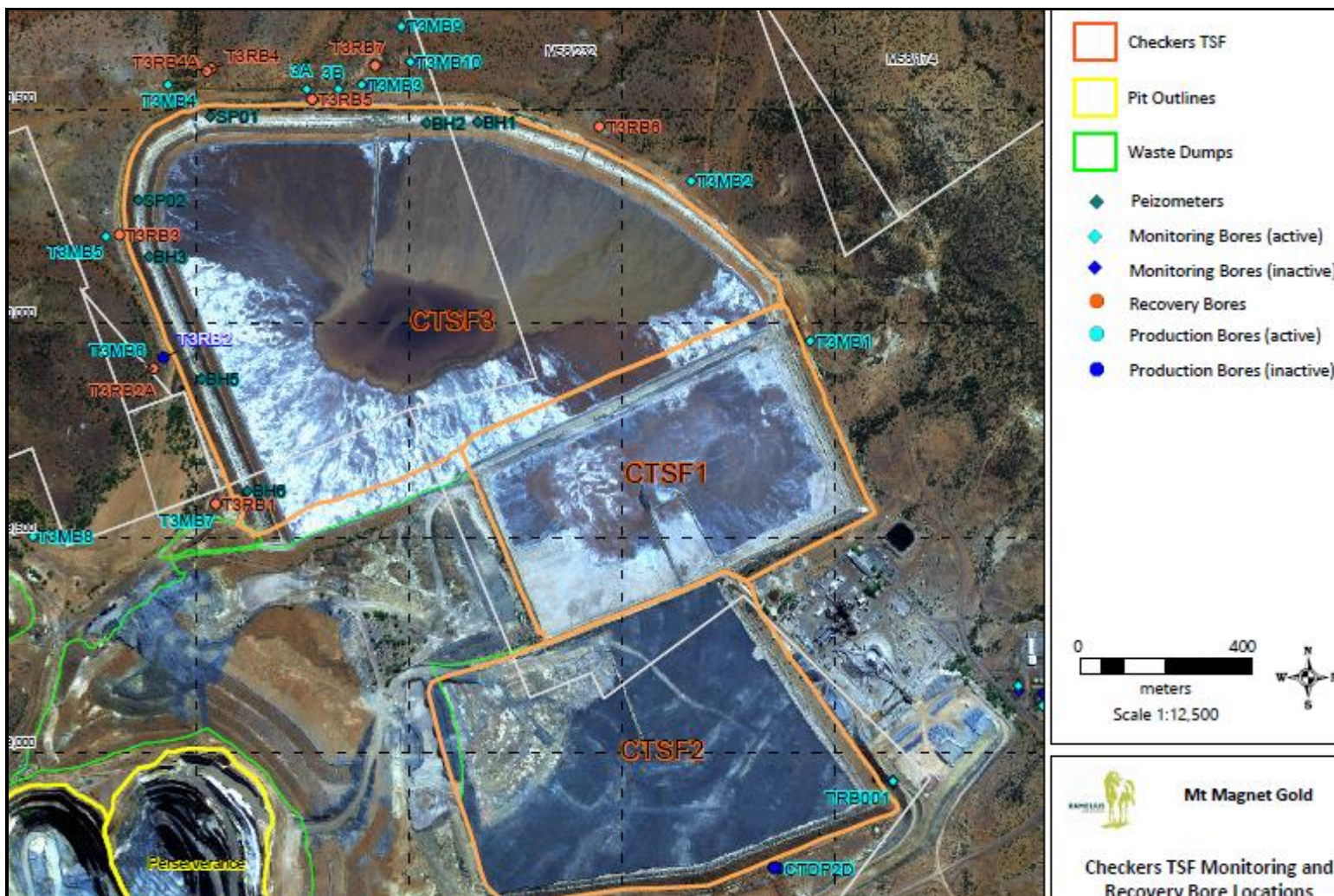


O'Meara and Franks Tower monitoring points



The location of the monitoring points defined in Table 3.4.1 are shown below.

CTS3 Groundwater monitoring locations



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Mt Magnet Gold Pty Ltd, Licence Amendment Application, received 10 April 2019	Application	accessed at www.dwer.wa.gov.au
2	Mt Magnet Gold Pty Ltd, Further information for amendment to Licence L5529/1988/12, dated 1 July 2019	Application	DWER record (DWERDT174608)
3	<i>Information requested by DWER, Application for Amendment to Licence L5529/1988/12 Environmental Protection Act 1986</i> , MWES consulting, 26 June 2019	MWES, 2019	
4	<i>Mt Magnet Gold Multi-Pit Project Hydrology and Hydrogeology Assessment</i> , MWES Consulting, 1 March 2017	MWES, 2017	DWER record (A1508316)
5	Department of Water and Environmental Regulation, <i>Mount Magnet Water Reserve drinking water source protection review</i> , WRP 182, March 2019	WRP 182	accessed at www.dwer.wa.gov.au
6	DWR, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	-	accessed at www.dwer.wa.gov.au
7	DWER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	-	
8	DER, August 2016. <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	-	
9	DER, November 2016. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	-	
10	DER, November 2016. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	-	