Amendment Report

Application for Licence Amendment

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

Licence Number	L5529/1988/12
Licence Holder	Mt Magnet Gold Pty Ltd
ACN	008 669 556
File Number	DER2016/001228-1
Premises	Mt Magnet Gold MOUNT MAGNET WA 6623 M58/30, M58/121, M58/136, M58/172, M58/181, M58/185, M58/187, M58/191, M58/193, M58/202, M58/205 and M58/234
Date of Report	22 December 2021
Decision	Revised licence granted

Lauren Edmands

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Lauren Edmands
MANAGER RESOURCE INDUSTRIES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

Licence L5529/1988/12 is held by Mt Magnet Gold Pty Ltd (Licence Holder) for Mt Magnet Gold (the Premises), located within multiple mining tenements. This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the Premises. As a result of this assessment, Revised Licence L5529/1988/12 has been granted.

The Revised Licence issued as a result of this amendment consolidates and supersedes the existing Licence previously granted in relation to the Premises.

2. Scope of assessment

2.1 Regulatory framework

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

2.2 Application summary

On 27 October 2021, the Licence Holder submitted an application to the department to amend Licence L5529/1988/12 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Operation of Checkers Tailings Storage Facilities 1 and 2 (CTSF1 and CTSF2) to allow deposition of tailings. This request follows embankment raises to CTSF1 and CTSF2 completed under works approval W6342/2020/1, issued 17 July 2020 (see section 2.2.1).
- Addition of CTSF1 and CTSF2 to process monitoring conditions; and
- Addition of groundwater monitoring bores and seepage recovery bores to the licence.

This amendment is limited only to changes to Category 5 activities from the Existing Licence. No changes to the aspects of the existing Licence relating to Categories 6 or 64 have been requested by the Licence Holder.

2.2.1 Works Approval W6342/2020/1

Works approval W6342/2020/1 found the risk for seepage impacts to nearby public drinking water source areas (PDWSA's) (see section 3.1.2) to be 'High'. Seepage from further deposition of tailings into CTSF1 and CTSF2 could impact the water reserve quality (i.e. drinking water) with potentially severe consequences to human receptors. The original proposed controls by the applicant were not considered sufficient to mitigate risks to the PDWSA's. It was therefore concluded that:

- The applicant would be granted approval for embankment raises but not deposition of tailings;
- Installation of an appropriate groundwater monitoring network was required including additional monitoring bores near CTSF1 and CTSF2 and on the west side of the Galaxy pits (to detect any potential seepage not captured by the presumed geological barrier to the PDWSAs). An adequate quantity of monitoring bores with representative depth and location were found to be necessary to identify potential seepage impacts.
- After reviewing the data provided, the department's Principal Hydrogeologist suggested the contaminant/seepage plume is moving at the base of the regolith, along the surface

of fresh bedrock. Therefore, this would be a more appropriate depth interval to monitor. It was recommended that the applicant consider this in further detail before the installation of any additional monitoring bores so that any new bores are appropriately placed and installed.

- Further investigations were needed to assess impacts of the additional seepage from CTSF1 and CTSF2 to the current CTSF3 seepage and to confirm that there are no pathways to the PDWSA's.
- Regulatory controls were placed on the works approval requiring appropriate seepage management measures to reduce adverse impacts, and confirmation of the permanent containment by the Galaxy pits.

To respond to the requirements of the works approval, Mt Magnet Gold:

- Installed eight groundwater monitoring bores, T2MB02 – TDMB09 in August 2020 (MWES, 2020), including a bore on the western side of the galaxy pits (Figure 1);
- Conducted monthly groundwater monitoring from September 2020 to November 2021 of the newly installed monitoring bore network. Results were submitted and compared to drinking water guidelines (MWES, 2021; see section 3.3.2 for a discussion of results);
- Installed five seepage recovery bores T2RB08 – T2RB12 in July 2021 (Figure 1) and attempted seepage recovery over a 90 day period (MWES, 2021; see section 3.3.2 for a discussion of seepage recovery).

As part of this licence amendment, to allow deposition of tailings into CTSF1 and CTSF2, the applicant proposes to add these monitoring bores and seepage recovery bores to the licence for ambient monitoring and seepage management.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in

Table 1 below.

Table 1 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 1: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Seepage (contaminated water)	Tailings deposition into CTSF1 and CTSF2	Seepage through base and embankments to groundwater Migration through groundwater to PDWSA's	<u>Existing licence conditions</u> 1.3.8 – seepage interceptor drain immediately downstream of the external toe of the tailings dam 3.3.1 – process monitoring tailings for CTSF3 <u>Applicant proposed controls</u> • Addition and operation of five seepage recovery bores installed in July 2021 under works approval W6342/2020/1 (Figure 1) • Addition and monitoring of eight groundwater monitoring bores installed in 2020 under works approval W6342/2020/1 to the licence (Figure 1) • Include CTSF1 and CTSF2 for process monitoring (condition 3.3.1) • Monthly monitoring of abstraction from seepage recovery bores
Tailings and contaminated water		Overtopping of TSF and direct discharge to land	<u>Existing licence conditions</u> 1.3.8 – 300mm freeboard for CTSF3 1.3.9 – daily visual inspections to confirm freeboard No additional applicant controls proposed.
		Fauna interaction with decant pond (ingestion)	No controls proposed.
Dust	TSF embankment erosion, erosion of deposited tailings	Air/windborne pathway	<u>Existing licence conditions</u> 1.3.8 – "Measures to prevent or minimise dust generated from surface of the tailings storage facility installed" No additional applicant controls proposed

Figure 1 Groundwater monitoring bores and seepage recovery bores proposed for addition to licence

L5529/1988/12

3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 2 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental siting* (DWER 2020)).

Table 2: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	**Distance from prescribed activity**
Town of Mount Magnet	Approximately 2.4km south-east of premises boundary. Prevailing winds are from the east and north-east.
Environmental receptors	**Distance from prescribed activity**
Public Drinking Water Source Area (PDWSA) P1 and P2 The Mount Magnet Water Reserve consisting of Genga and Lennonville Water Reserve (Figure 2)	The Lennonville Water Reserve (P1) borders on the northern side of the premises boundary. The northern part of the Genga Water reserve (P2) lies within the premises boundary, while the P1 area of this reserve lies approximately 5km south of the premises boundary.
Groundwater East Murchison Groundwater Area Rights in Water and Irrigation Act *(RIWI Act 1914)*	Groundwater flow in the borefield area is generally southward (DER, 2005). Groundwater levels are typically 5 - 15 mbgl, but can be substantially deeper in areas affected by pumping (DER, 2005). CTSF1 & CTSF2 depth to original Groundwater estimated to be 30 mbgl. Depth to groundwater at Ruby Queen Pit estimated to be 30 mbgl.
Surrounding vegetation	Surrounding vegetation of CTSF3 may be impacted by seepage and raising groundwater levels.

3.1.3 Public Drinking Water Source Protected Area

The Mount Magnet Water Reserve is a PDWSA, proclaimed under the Country Areas Water Supply Act 1947 (*CAWS Act)* and consists of the Genga and Lennonville water reserves. The premises partially lies within the Genga water reserve to the west, and borders on the Lennonville water reserve on the northern boundary (Figure 2)

The southern part of Genga, and the Lennonville water reserve are classified as priority 1 areas (P1) by the department. As set out in the department's Water Quality Protection Note No. 25, *Land use compatibility tables for public drinking water source areas* (DOW, 2016), P1 areas are managed to ensure there is no degradation of the drinking water quality source, with the objective of risk avoidance, consistent with the preventative risk-based framework of Western Australian Government.

The northern part of Genga water reserve is classified as a priority 2 area (P2), which are managed to maintain or improve the quality of the drinking water source with the objective of

risk minimisation.

The Drinking Water Source Protection Plan (DWSPP) (DWER, 2019) for the Mount Magnet water reserve reports on activities and risks to water quality within the Mount Magnet water reserve and discusses management strategies to minimise identified risks. The DWSPP does not specifically refer to groundwater impacts through seepages from mining activities.

The original application documentation for works approval W6342/2020/1 refers to seepage being 'permanently contained by the Galaxy complex pits', no confirmation or assessments to investigate these assumptions were provided. The applicant continues to maintain that these pits act as a sink for seepage.

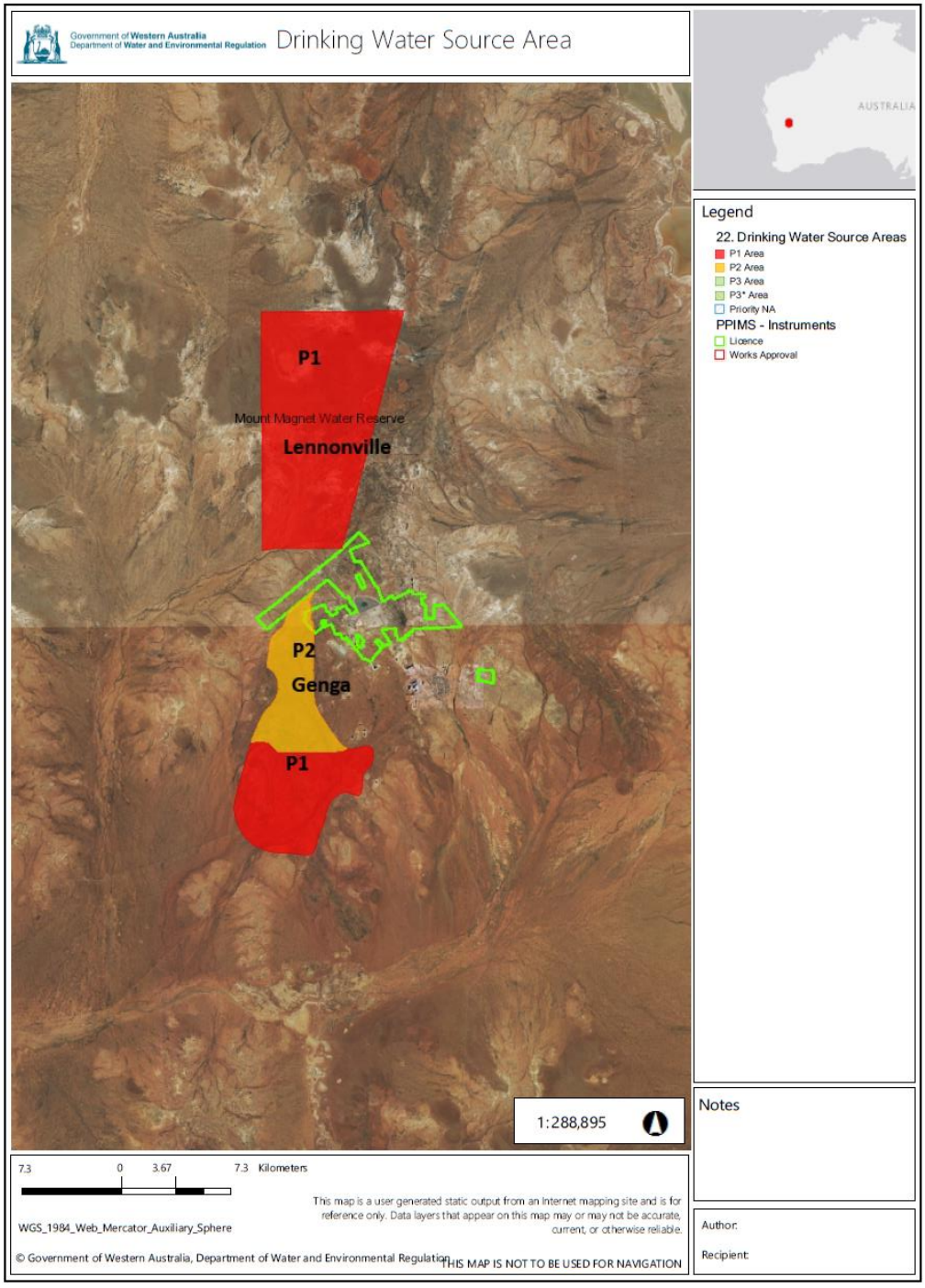

Figure 2: Distance to sensitive receptors

3.2 Risk ratings

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

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

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 3.

The Revised Licence L5529/1988/12 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. category 5 activities.

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

Table 3. Risk assessment of potential emissions and discharges from the Premises during operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**			
Tailings deposition into CTSF1 and CTSF2	Seepage (contaminated water)	Seepage through base and embankments to groundwater Migration through groundwater causing contamination of PDWSA's (drinking water)	Human health receptors: drinking water	Refer to Section 3.1	C = Severe L = Unlikely **High Risk**	<u>Modifications to existing conditions</u> 1.3.8 – containment infrastructure 3.3.1 - tailings process monitoring 3.3.1 – addition of CTSF1 and CTSF2 to tailings process monitoring 3.4.1 – addition of new monitoring wells 4.2.1 – seepage management reporting <u>New conditions</u> 3.5.1 - Water balance monitoring	Condition 1.3.8 has been modified to include CTSF1 and CTSF2 containment infrastructure and operational requirements. See section 3.3 for a discussion regarding seepage management.
		Seepage through base and embankments to groundwater causing groundwater mounding and poor vegetation health	Adjacent native vegetation	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	<u>Modifications to existing conditions</u> 3.4.1 – addition of SWL limit of 4m bgl	
	Tailings and contaminated water	Overtopping of TSF and direct discharge to land causing poor vegetation health	Adjacent native vegetation	Refer to Section 5.1	C = Moderate L = Unlikely **Medium Risk**	<u>Modifications to existing conditions</u> 1.3.8 tailings storage facility freeboard requirement of 500mm	The freeboard requirement for all tailings storage facilities on-site has been conditioned as 500mm, a standard requirement to prevent the risk of overtopping.
		Fauna interaction with decant pond (ingestion) causing poor health/death	Fauna (birds and wildlife)	Refer to Section 5.1	C = Moderate L = Unlikely **Medium Risk**	N/A – no additional changes proposed	N/A

Risk Event					Risk rating[1] C = consequence L = likelihood	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**			
TSF embankment erosion, erosion of deposited tailings	Dust	Air/windborne pathway causing poor vegetation health by dust accumulation on vegetation	Adjacent native vegetation	Refer to Section 5.1	C = Minor L = Unlikely **Medium Risk**	Modifications to existing conditions 1.3.8 – containment infrastructure	A requirement for measures to prevent or minimise dust generated from the tailings storage facility has been placed as a regulatory control for CTSF1 and CTSF2 (already in place for CTSF3).

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

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

3.3 CTSF1 and CTSF2 seepage

3.3.1 Seepage chemistry

Previous analysis of tailings water from CTSF3 (2001-2016) from the decant underdrain and toe trenches have identified the seepage chemistry as set out in Table 4 (MWES, 2019). Cyanide concentrations (WAD and total) were reported as higher in CTSF1 and CTSF2 than in the currently operating CTSF3 (Coffey, 2019).

Table 4 Seepage source chemistry, impact criteria and tailings characterisation

	TDS [g/L]	SO_4/TDS	WAD cyanide [mg/L]	Total cyanide [mg/L]	pH	Iron [mg/L]
Seepage	14-23	0.16	0.01-6.4		7.9	2.8
Property of tailings						
CTSF1	20	-	72	100	9	-
CTSF2	20	-	72	100	9	-
CTSF3	15	-	2.3	20	7.8	-

3.3.2 Historical operations – CTSF1 and CTSF2

No tailings have been deposited into CTSF1 and CTSF2 since 2000 and 2001, respectively[1]. Previous operations of CTSF1 and CTSF2 have resulted in high rates of seepage. Baseline water levels prior to development were recorded between 34 and 62 metres below ground level. The water level below CTSF1 and CTSF2 rose to the natural surface within 12 months of commencing operations (MWES, 2019). Historical data indicated multiple bores were detecting seepage from CTSF1 and CTSF2 during operations. CTDP1D, CTDP2D and HCB058 showed increased salinity and detectable cyanide, directly linked to tailings seepage impacts. Salinity levels of selected monitoring bores recorded are shown in Figure 3. For context, the local baseline groundwater salinity is approximately 4000 mg/L TDS.

A summary of 421 water samples from CTSF1 and CTSF2 monitoring bores (1990-2019), identified WAD cyanide detected in 61% of the samples, with a mean average of 0.05 mg/L.

[1] CTSF1 operated between 1989 and 2000. CTSF2 operated between 1993 and 2001.

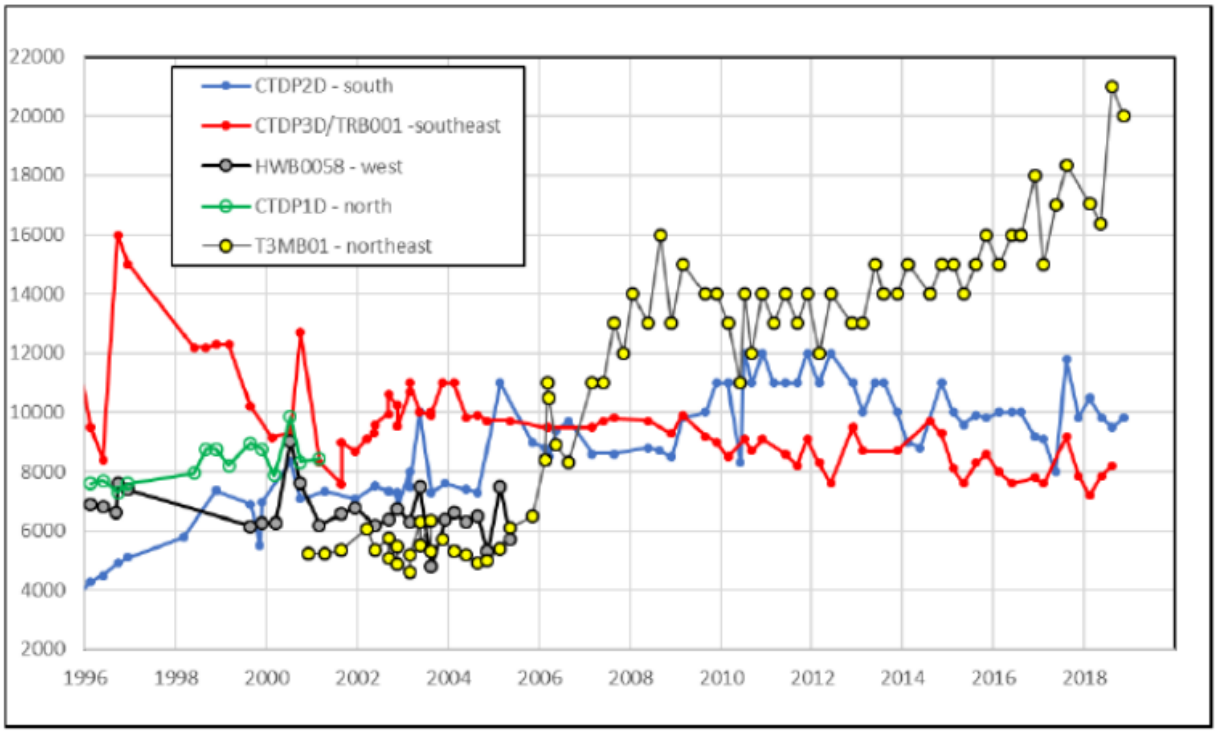

Figure 3 Salinity (mg/L) recorded as TDS in selected monitoring bores

3.3.3 Pathway and Receptor

Seepage has the potential to infiltrate and contaminate the groundwater and the Mount Magnet Water Reserve. Data from previous deposition into CTSF1 and CTSF2 and predictions for the recommencement of the containment structures have identified the following (MWES, 2019):

- In the CTSF1 and CTSF2 area, low bedrock permeability in the unmineralised mafic rock type is present;
- Initial seepage to the water table will be low until old tailings have re-saturated;
- Seepage rates are predicted to be lower than previously observed due to ~20 m dry tailings pile;
- Seepage is controlled by operations including deposition cycle and rate of rise.

The applicant states that no seepage is expected to impact the Mount Magnet Water Reserve (Genga) due to discharge being captured and retained by the Morning Star and Galaxy pits. A previous study found that only minor and localised impacts on the groundwater environment from groundwater pit outflows would occur, and the Genga Water Reserve is unlikely to be impacted (MWES, 2017).

Advice from the department's regional hydrogeologists suggests a low risk of seepage impacting the P1 and P2 PDWSA. It was concluded in the assessment for W6342/2020/1 that these claims needed to be confirmed by further assessments and required additional seepage management measures to ensure no contaminants are reaching the PDWSAs. Additional groundwater monitoring and seepage recovery undertaken by the applicant in response to the works approval are discussed in section 3.3.4 below.

3.3.4 W6342/2020/1 groundwater monitoring and seepage recovery

To respond to the requirements of W6342/2020/1, Mt Magnet installed eight new groundwater monitoring wells. The works approval assessment concluded that monitoring wells were required to be appropriately located and screened to detect seepage, where the department's

Principal Hydrogeologist suggested the contaminant/seepage plume may be moving at the base of the regolith, along the surface of fresh bedrock. Seven monitoring bores, T2MB02 – T2MB08, were drilled along seepage paths assumed from an electromagnetic (EM) survey (Figure 4). T2MB09 was installed on the western side of the Galaxy pits, to monitor for potential impacts to the nearby PDSWA (Figure 1).

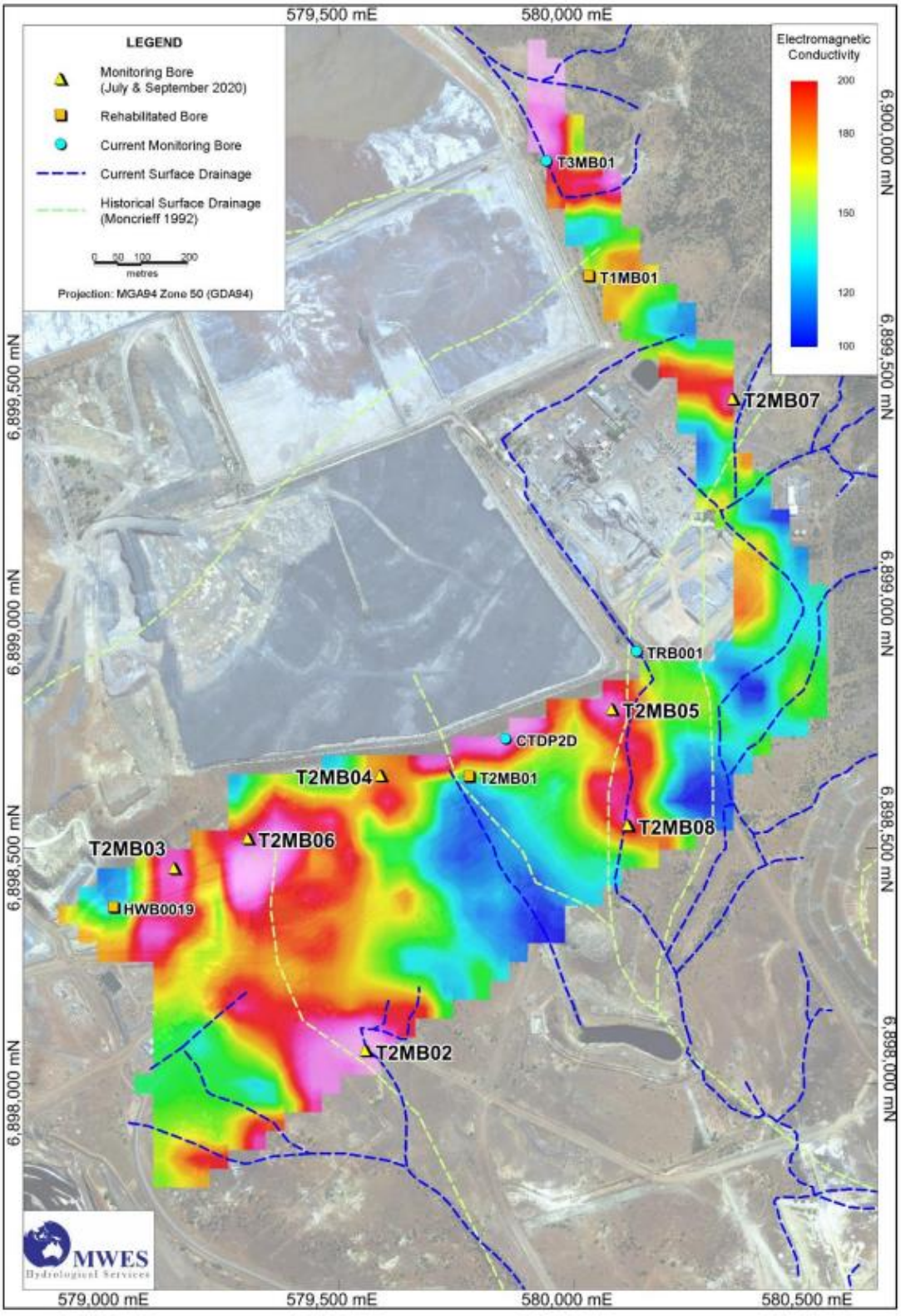

Figure 4 Well locations in relation to electromagnetic survey

MWES (2020) states that “well screens were placed against target aquifers… no perched aquifers, requiring separate shallow monitoring bores were encountered at any location” and that the new bores were screened at intervals from the base of the clay zone (part of the weathered regolith) to several metres into fresh rock (Table 5).

Table 5 New groundwater monitoring bores and screened depth (MWES, 2020)

Bore ID	Hole Depth (mbgl)	Screen Depths (mbtoc)	Depth of Clay Zone (mbgl)	Fracture Rock Depths (mbgl)	Development Airlift Yields (L/min)
T2MB02	42.3	24.3 to 42.3	21	Minor at 36 & 41	1.0
T2MB03	48.5	24.5 to 48.5	25	Minor at 40	1.1
T2MB04	48.35	24.35 to 48.35	24	45	1.4
T2MB05	54.4	42.4 to 54.4	48	Minor at 50	0.7
T2MB06	48.3	36.3 to 48.3	39	Minor at 45	1.1
T2MB07	58	45 to 58	33	54 to 58	11.4
T2MB08	46	28 to 46	36	36 to 44	1.8
T2MB09	100	82 to 100	22	Very minor at EoH	Not airlifted

It is noted in borelogs for T2MB02 – T2MB08 that the monitoring wells have been screened across the weathered regolith/fresh rock interface. T2MB09 (on the western side of the Galaxy Pits, closest to the PDSWA) encountered water at 84.89m bgl and is screened from 82 – 100mbgl rather than at the clay/fresh rock interface (22m bgl - Table 5). There is consequently some uncertainty regarding whether T2MB09 has been appropriately screened. DWER will investigate this further and if required, a DWER initiated amendment will be undertaken.

Mt Magnet conducted monthly monitoring of eight newly installed groundwater monitoring wells (Figure 1) from August 2020 to November 2021. All results for T2MB09 (closest to the PDSWA) were compared with 2021 Australian Drinking Water Guidelines (ADWG) and were within acceptable criteria except for iron, manganese and total dissolved solids which exceeded the aesthetic limit but were within the health limit (see Appendix 1).

The second closest well to the PDSWA from the tailings storage facility is T2MB03 (on the eastern side of the galaxy pits, see Figure 1). It is noted that T2MB03 is within close proximity of CTSF2, only being 200m south-west of CTSF2 and screened across the weathered regolith/fresh rock interface. Results exceeded the ADWG 2021 health guidelines for total cyanide, boron, chromium VI, nitrate and selenium. Results exceeded the aesthetic limit for total dissolved solids, iron and manganese. A summary of exceedances for T2MB03, compared to seepage, are presented in Table 6 below.

Table 6 Exceedance Summary T2MB03 and T2MB09

	TDS [g/L]	WAD CN [mg/L]	Tot CN [mg/L]	Boron [mg/L]	Cr VI [mg/L]	NO3 [mg/L]	Se [mg/L]	pH	Iron [mg/L]
ADWG 2021 aesthetic	0.6	-	-	-	-	-	-	8.5	0.3
ADWG 2021 health	-	-	0.08	4	0.05	50	0.012	-	-

	TDS [g/L]	WAD CN [mg/L]	Tot CN [mg/L]	Boron [mg/L]	Cr VI [mg/L]	NO3 [mg/L]	Se [mg/L]	pH	Iron [mg/L]
Seepage (decant underdrain, toe trenches)	14-23	0.01-6.4	-	-	-	-	-	7.9	2.8
T2MB03	12 - 14	<0.004 – 0.006	0.051 – 0.21	3.6 – 5.8	<0.005 – 0.13	27 – 110	0.011 – 0.013	7.1-7.2	0.04 – 0.37
T2MB09	0.69 – 1.1	<0.004	<0.004	0.56 – 1.1	<0.005	<0.5 - 33	<0.001 – 0.001	7.6 – 8.1	<0.01 – 0.35

Seepage recovery bores, installed in response to the works approval, were reported to recover only 116 kL over 90 days of operation. It was suggested that the low recovery was due to low hydraulic conductivity of fractured bedrock (unmineralised mafic rock) and the overlying regolith in the affected area (MWES, 2021). It was also indicated the seepage recovery would continue when CTSF1 and CTSF2 become operational, and that recovery rates may increase once tailings deposition recommences.

DWER outcome

Advice from the department's regional hydrogeologists suggests a low risk of seepage impacting the P1 and P2 PDWSA. It was concluded in the assessment for W6342/2020/1 that these claims needed to be confirmed by further assessments and required additional seepage management measures to ensure no contaminants are reaching the PDWSAs.

Eight additional groundwater monitoring bores were consequently installed and more appropriately screened and located to detect seepage from CTSF1 and CTSF2. Monitoring was conducted monthly for 15 months, and concentrations for analytes of concern were found to be low, and within conservatively adopted 2021 Australian Drinking Water Guidelines for monitoring bore T2MB09 closest to the PDWSAs. Whilst some uncertainty exists regarding the appropriate screening of the T2MB09, borelogs indicated that a perched aquifer was not encountered.

The Delegated Officer considers the consequence of seepage impacting the PDWSAs to be "Severe", with a likelihood of "Unlikely", giving an overall risk rating of "High". Consequently, the following controls will be placed on the licence:

- Applicant proposed on-going monitoring of newly installed monitoring wells. The applicant has proposed annual monitoring for major component analysis and quarterly monitoring for field water quality. These will be implemented with the exception of T2MB09, being key for monitoring risk to the PDSWA, which will require quarterly monitoring for analytes of concern;
- Seepage rates may increase as CTSF1 and CTSF2 become operational. Applicant proposed on-going seepage monitoring and recovery, using the newly installed seepage recovery bores, will be conditioned.
- Quarterly water balance monitoring, with a requirement for annual reporting on seepage management, for CTSF1, CTSF2 and CTSF3.

Historical operation of CTSF1 and CTSF2 resulted in water level mounding to the natural surface within 12 months of operation (originally ~30m below ground level). As current site groundwater level ranges between 5 and 15m bgl, the consequence of seepage impacting adjacent native vegetation is 'Moderate' with a likelihood of 'Possible', giving an overall risk

rating of “Medium”. Consequently, a 4 metre standing water level limit will be conditioned to protect the rootzones of adjacent native vegetation.

4. Consultation

Table 7 provides a summary of the consultation undertaken by the department.

Table 7: Consultation

Consultation method	Comments received	Department response
Local Government Authority – Shire of Mt Magnet advised of proposal 6 December 2021	No comments received	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal 6 December 2021	No comments received	N/A
Licence Holder was provided with draft amendment on 21 December 2021	The Licence Holder provided comments on 21 December 2021. The summarised Licence Holder provided comments are provided in Appendix 1.	DWER responses to Licence Holder comments are provided in Appendix 1.

5. Conclusion

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

5.1 Summary of amendments

Table 8 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 8: Summary of licence amendments

Condition no.	Proposed amendments
N/A – Introduction in licence	• Removal of text describing DWER initiated licence amendment in 2020. This information is captured within the Instrument Log table. • Inclusion of CTSF1 and CTSF2 as tailings disposal locations.
1.3.8 Table 1.3.4	• Modification to include operational requirements for CSTF1 and CTSF2. • CTSF3 freeboard regulatory requirement updated to align with the new CTSF1 and CTSF2 requirements.
1.3.13 and 1.3.14	Removal of groundwater monitoring bore installation and compliance reporting. These conditions were specific to the previous licence amendment (September 2020) and new monitoring bores have since been installed at the premises.

Condition no.	Proposed amendments
3.3.1	Modified to include CTSF1 and CTSF2; process description table removed as there were no details specified within this column.
3.4.1 Table 3.4.1	• Modified to include monitoring requirements for eight new monitoring bores installed around CTSF1 and CTSF2. • Table updated to include monitoring bore T3MB07.
3.5.1	New condition added for water balance monitoring
4.2.1	Reporting requirements modified to include a seepage management summary, water balance summary and reporting requirements for the before-stated amendments

References

1. Coffey 2019, Design Report – Checker Tailings Storage Facility 1, 2 and 3 Embankment Raise Design Report (DWER reference A1836308)
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
4. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
5. MWES, 2017 Mt Magnet Gold Multi Pit Mining Project Hydrology & Hydrogeology Assessment (DWER reference A1508316)
6. MWES , 2019 Mt Magnet Gold Project Checker TSF1 and 2 Reinstatement Groundwater Impacts Assessment (DWER reference A183609)
7. MWES, 2020. Mt Magnet Gold Pty Ltd – Monitoring Bore Installation Checkers Tailings Storage Facilities 1 and 2, July & September 2020 (DWER reference A2058094)
8. MWES, August 2021 Mt Magnet Gold Pty Ltd – Recovery Bore Installation Checkers Tailings Storage Facilities 1 and 2 (DWER reference A2074317)
9. MWES, November 2021 Mt Magnet Gold Pty Ltd – Seepage Monitoring Report Checkers Tailings Storage Facilities 1 and 2, November 2021 (DWER reference A2074316)
10. Works Approval W6342/2020/1 (DWER reference A1915238)

Appendix 1: Groundwater Monitoring Results T2MB03 and T2MB09

2021 < Health Limit		No limit				0.08		0.1	0.01	4	0.06		0.002	No limit		0.05		2	1.5		0.001	0.5	0.05	50	0.02	0.01	0.003	0.01	
2021 < Aesthetic Limit		8.5		600	No Limit		0.2	No limit										1		0.3		0.1	No limit						3
Bore ID	Date	pH	EC	TDS	CN WAD	CN (tot)	Al	Ag	As	B	Be	Bi	Cd	Co	Cr (diss)	Cr (6)	Cr (3)	Cu	F	Fe	Hg	Mn	Mo	NO_3	Ni	Pb	Sb	Se	Zn
T2MB03	6/08/20	7.2	18000	12000	<0.004	0.15	<0.01	<0.001	0.001	4.6	<0.0005	<0.001	<0.0001	0.27	0.032	0.028	<0.005	0.003	<1	0.04	<0.00005	0.16	0.004	110	0.002	<0.001	<0.001	0.012	0.005
T2MB03	15/09/20	7.1	18000	14000	<0.004	0.14	<0.01	<0.001	0.002	5.1	<0.0005	<0.001	<0.0001	0.25	0.036	0.031	0.005	0.002	<1	0.04	<0.00005	0.062	0.002	57	0.001	<0.001	<0.001	0.012	0.007
T2MB03	14/10/20	7.1	18000	13000	<0.004	0.15	<0.01	<0.001	0.001	4.8	<0.0005	<0.001	<0.0001	0.29	0.006	0.005	<0.005	0.008	0.3	0.04	<0.00005	0.05	0.011	97	0.056	<0.001	<0.001	0.012	0.019
T2MB03	12/11/20	7.2	18000	13000	<0.004	0.21	<0.01	<0.001	0.002	5.3	<0.0005	<0.001	<0.0001	0.26	0.035	0.028	0.007	0.004	<1	0.04	0.00007	0.036	0.002	28	0.002	<0.001	<0.001	0.012	0.014
T2MB03	12/12/20	7.1	18000	13000	<0.004	0.14	<0.01	<0.001	0.002	5.8	<0.0005	<0.001	<0.0001	0.24	0.031	0.028	<0.005	0.002	0.3	0.1	0.00014	0.047	0.002	70	0.001	<0.001	<0.001	0.012	0.008
T2MB03	8/01/21	7.2	18000	12000	0.004	0.14	<0.01	<0.001	0.002	4.3	<0.0005	<0.001	<0.0001	0.26	0.03	0.024	0.006	0.002	0.3	0.08	<0.00005	0.03	0.002	27	<0.001	<0.001	<0.001	0.012	0.008
T2MB03	20/02/21	7.2	19000	13000	0.006	0.14	0.01	<0.001	0.002	4.4	<0.0005	<0.001	<0.0001	0.28	0.032	0.13	<0.005	0.006	<1	0.03	0.00022	0.024	0.002	110	<0.001	<0.001	<0.001	0.011	0.003
T2MB03	9/03/21	7.2	18000	13000	<0.004	0.089	<0.01	<0.001	0.002	5.2	<0.0005	<0.001	<0.0001	0.25	0.023	<0.005	0.023	0.003	<1	0.37	0.00017	0.031	0.002	160	0.001	<0.001	<0.001	0.012	0.015
T2MB03	6/04/21	7.2	17000	13000	<0.004	0.066	<0.01	<0.001	0.002	3.6	<0.0005	<0.001	<0.0001	0.26	0.032	0.025	0.007	0.005	<5	0.03	<0.00005	0.021	0.002	93	0.001	<0.001	<0.001	0.012	0.031
T2MB03	7/05/21	7.2	20000	13000	<0.004	0.069	<0.01	<0.001	0.002	4.5	<0.0005	<0.001	<0.0001	0.28	0.036	0.026	0.01	<0.001	<1	0.03	0.00023	0.012	0.002	87	0.002	<0.001	<0.001	0.012	0.005
T2MB03	25/06/21	7.1	18000	14000	<0.004	0.061	<0.01	<0.001	0.002	4.7	<0.0005	<0.001	<0.0001	0.27	0.034	0.03	<0.005	<0.001	<2	0.02	0.00018	0.014	0.002	100	<0.001	<0.001	<0.001	0.012	0.002
T2MB03	12/07/21	7.2	18000	13000	<0.004	0.051	<0.01	<0.001	0.002	4.8	<0.0005	<0.001	<0.0001	0.28	0.035	0.025	0.0099	0.001	<2	0.02	0.00028	0.008	0.002	100	<0.001	<0.001	<0.001	0.012	0.003
T2MB03	13/08/21	7.2	18000	14000	<0.004	0.054	<0.01	<0.001	0.002	4.4	<0.0005	<0.001	<0.0001	0.29	0.036	0.027	0.0098	0.001	0.3	0.03	0.00032	0.008	0.002	110	<0.001	<0.001	<0.001	0.013	0.001
T2MB03	12/09/21	7.2	18000	12000	<0.004	0.066	<0.01	<0.001	0.002	4.6	<0.0005	<0.001	<0.0001	0.27	0.035	0.022	0.012	0.003	0.3	0.05	0.00008	0.009	0.002	120	<0.001	<0.001	<0.001	0.012	0.018
T2MB03	7/10/21	7.2	18000	12000	<0.004	0.064	<0.01	<0.001	0.002	5.2	<0.0005	<0.001	<0.0001	0.28	0.036	0.026	0.0094	<0.001	0.4	0.02	0.00026	0.012	0.002	110	<0.001	<0.001	<0.001	0.012	0.011
T2MB03	5/11/21	7.2	19000	14000	<0.004	0.10	<0.01	<0.001	0.002	5.1	<0.0005	<0.001	<0.0001	0.3	0.034	0.025	0.009	0.002	0.3	0.03	0.00013	0.01	0.002	100	<0.001	<0.001	0.002	0.013	0.015
T2MB09	15/09/20	7.9	1200	730	<0.004	<0.004	<0.01	<0.001	0.002	0.65	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	0.003	0.4	0.02	<0.00005	0.015	0.025	33	0.003	<0.001	0.001	<0.001	0.007
T2MB09	27/10/20	7.7	1300	690	<0.004	<0.004	0.02	<0.001	0.006	0.65	<0.0005	<0.001	<0.0001	0.002	<0.001	<0.005	<0.005	0.003	0.2	<0.01	<0.00005	0.031	0.027	31	0.004	<0.001	<0.001	<0.001	0.006
T2MB09	11/11/20	7.7	1300	760	<0.004	<0.004	0.02	<0.001	0.005	0.65	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	0.002	0.4	0.03	<0.00005	0.034	0.024	7.2	0.003	<0.001	<0.001	<0.001	0.008
T2MB09	12/12/20	7.7	1300	780	<0.004	<0.004	0.03	<0.001	0.005	0.62	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	0.002	0.3	0.35	<0.00005	0.042	0.027	28	0.004	<0.001	<0.001	<0.001	0.011
T2MB09	8/01/21	7.8	1300	750	<0.004	<0.004	0.02	<0.001	0.005	0.67	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	<0.001	0.3	0.02	<0.00005	0.032	0.023	6.1	0.003	<0.001	<0.001	<0.001	0.004
T2MB09	20/02/21	7.6	1300	730	<0.004	<0.004	0.07	<0.001	0.004	0.59	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	0.003	0.6	<0.01	<0.00005	0.025	0.019	28	0.003	<0.001	<0.001	<0.001	0.003
T2MB09	9/03/21	7.7	1500	790	<0.004	<0.004	0.02	<0.001	0.005	0.92	<0.0005	<0.001	<0.0001	0.008	<0.001	<0.005	<0.005	0.004	0.5	0.02	<0.00005	0.031	0.026	30	0.002	<0.001	<0.001	<0.001	0.005
T2MB09	8/04/21	7.8	1500	1000	<0.004	<0.004	0.02	<0.001	0.004	1.1	<0.0005	<0.001	<0.0001	0.022	0.002	<0.005	<0.005	0.011	0.6	0.02	0.00005	0.014	0.024	21	0.004	<0.001	<0.001	0.001	0.014
T2MB09	7/05/21	7.7	1500	950	<0.004	<0.004	0.03	<0.001	0.005	1.1	<0.0005	<0.001	<0.0001	0.003	0.002	<0.005	<0.005	0.008	0.3	<0.01	<0.00005	0.005	0.028	17	0.002	<0.001	<0.001	<0.001	0.01
T2MB09	24/06/21	7.6	1500	960	<0.004	<0.004	0.03	<0.001	0.005	0.79	<0.0005	<0.001	<0.0001	<0.001	0.001	<0.005	<0.005	0.005	0.2	0.02	<0.00005	0.01	0.031	12	0.007	<0.001	<0.001	<0.001	0.012
T2MB09	12/07/21	7.8	1500	1000	<0.004	<0.004	0.02	<0.001	0.004	0.71	<0.0005	<0.001	<0.0001	0.005	<0.001	<0.005	<0.005	0.001	0.2	<0.01	<0.00005	0.12	0.03	4.5	0.003	<0.001	<0.001	<0.001	0.003
T2MB09	12/08/21	7.8	1500	940	<0.004	<0.004	0.02	<0.001	0.003	0.6	<0.0005	<0.001	<0.0001	<0.001	0.002	<0.005	<0.005	<0.001	0.3	0.01	<0.00005	0.12	0.034	0.06	0.008	<0.001	0.002	<0.001	0.004
T2MB09	12/09/21	7.8	1500	1100	<0.004	<0.004	0.02	<0.001	0.004	0.56	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	<0.001	0.3	0.05	<0.00005	0.17	0.033	<5	0.002	<0.001	<0.001	<0.001	0.002
T2MB09	6/10/21	8.1	1500	860	<0.004	<0.004	0.02	<0.001	0.004	0.63	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	<0.001	0.3	0.18	<0.00005	0.18	0.032	<0.5	0.003	<0.001	<0.001	<0.001	0.003
T2MB09	4/11/21	7.8	1500	900	<0.004	<0.004	0.02	<0.001	0.003	0.6	<0.0005	<0.001	<0.0001	<0.001	<0.001	<0.005	<0.005	<0.001	0.3	0.26	<0.00005	0.2	0.029	<0.5	0.001	<0.001	<0.001	<0.001	0.003

Appendix 2 -Summary of Licence Holder's comments on risk assessment and draft conditions

Relevant condition or section within corresponding document	Summary of Licence Holder's comment	Department's response
DRAFT amendment report (L5529/1988/12)		
Section 3.1.1 (Table 1)	The Licence Holder confirmed presence of the seepage interceptor drain immediately downstream of the external toe of the tailings dam.	No DWER response required.
DRAFT licence amendment (L5529/1988/12)		
Introduction (Premises description and Licence summary)	The Licence Holder confirmed that the premises description was correct at the time of application and that no changes are required. The Licence Holder noted that future revisions of the licence will include new emission points including CTSF1 and 2.	As the 'Premises description and Licence summary' provides and overview of the current operations, the Delegated Officer has updated this section to incorporate CTSF1 and CTSF2 as tailings disposal locations.
1.3.8 (Table 1.3.4)	Amend the CTSF3 freeboard regulatory requirement to align with the new CTSF1 and CTSF2 requirements. For example, update the CTSF3 line item to read "Maintain a minimum 500mm total freeboard (including an allowance for the 1% annual exceedance probability [AEP] 72-hour rain event) above the normal operating pond."	The Delegated Officer is satisfied with the applicant's proposed update. The CTSF3 line item in Table 1.3.4 has been updated accordingly.
1.3.8	The Licence Holder confirmed presence of the seepage interceptor drain immediately downstream of the external toe of the tailings dam.	No DWER response required.
3.4.1 (Table 3.4.1)	The Licence Holder confirmed the list of monitoring bores, noting that monitoring bore T3MB07 was missing from the list.	The Delegated Officer is satisfied with the applicant's proposed update and Table 3.4.1 has been updated accordingly with the inclusion of monitoring bore T3MB07.

Appendix 3: Application validation summary

SECTION 1: APPLICATION SUMMARY					
Application type					
Amendment to licence	☒	Current licence number:	L5529/1988/12		
		Relevant works approval number:	W6342/2020/1	N/A	☐
Date application received		27/10/2021			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Mt Magnet Gold Pty Ltd			
Premises name		Mt Magnet Gold Pty Ltd			
Premises location		M58/121, M58/193, M58/205			
Local Government Authority		Shire of Mount Magnet			
Application documents					
HPCM file reference number:		DER2016/001228-1			
Key application documents (additional to application form):		CTSF lift construction compliance reports Engineering audit Groundwater monitoring bores compliance report Seepage Management and Recovery Plan			
Scope of application/assessment					
Summary of proposed activities or changes to existing operations.		Licence amendment • CTSF1 and 2 have now been completed in accordance with the Works Approval W6342/2020/1. Mt Magnet Gold Pty Ltd (MMG) requests this Licence amendment to add these two existing tailings storage facilities to licence L5529/1888 for the purpose of storing mine tailings under the Category 5 Processing or beneficiation of metallic or non-metallic ore Prescribed Premise. MMG needs the CTSF1 and 2 to be operational and work in with the currently licensed CTSF3. • Addition of CTSF1 and CTSF2 to Table 1.3.4 containment infrastructure table and Table 3.3.1 Process monitoring • Addition of seepage recovery bores (not the new installed groundwater monitoring bores?) to Table 3.4.1 for monitoring of ambient groundwater quality surrounding the TSF • Addition of CTSF1 and CTSF2 to reporting requirements Table 4.2.1 • Addition of external ore source “Penny Ore Blend”			

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

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 5: Processing or beneficiation of metallic or non-metallic ore	2,400,000 tonnes per annual period	N/A
Category 6: Mine dewatering	1,500,000 tonnes	N/A
Category 64: Class II putrescible landfill site	10,000 tonnes per annual period	N/A

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☒ Expiry: 2030 Other evidence ☐ Expiry: Provided as part of works approval application
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why? Exempt under the *Mining Act*
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.

Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☒ No ☐	Application reference No: Licence/permit No: GWL151513(8) MMG are submitting an addendum to the Operating Strategy of the licence to include changes to operational requirements]
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☒	No, however there is a nearby Mount Magnet Water Reserve (Country Area Water Supply) Public Drinking Water Source Protected Area 2.8km west of TSF Name: The Mount Magnet Water Reserve consisting of Genga and Lennonville Water Reserve Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☐ Regional office: Mid-West Gascoyne
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☒ No ☐	The Lennonville Water Reserve (P1) borders on the northern side of the premises boundary. The northern part of the Genga Water Reserve (P2) lies within the premises boundary, while the P1 area of this reserve lies approximately 5 km south of the premises boundary. Priority: P2 Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☒ N/A ☐
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	*Mining Act* *Dangerous Goods Act*
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	Classification: Possibly contaminated – investigation required (PC–IR Date of classification: 29/3/2017