Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

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

Licence Number	L7276/1996/12
Licence Holder	Murrin Murrin Operations Pty Ltd
ACN	076 717 505
File Number	APP-0026276
Premises	Murrin Murrin Nickel Cobalt Project Legal description – Mining tenements: L39/62, L39/81, L39/83, L39/136, L39/168, M39/299, M39/300, M39/301, M39/314, M39/322, M39/421, M39/422, M39/423, M39/435, M39/436, M39/424, M39/342, M39/343, M39/446, M39/553, M39/562, M39/637, M39/651, M39/686, M39/692, M39/714, M39/715, M39/716, M39/737, M39/820 LAVERTON WA 6440 As defined by the Premises maps attached to the Revised Licence
Date of Report	16 April 2025
Decision	Revised licence granted

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1. Decision summary

Licence L7276/1996/12 is held by Murrin Murrin Operations Pty Ltd (Licence Holder) for the Murrin Murrin Nickel Cobalt Project (the Premises), located on several Mining tenements[1] near Laverton, Western Australia.

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 L7276/1996/12 has been granted.

2. Scope of assessment

2.1 Regulatory framework

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

2.2 Application summary

On 4 November 2024, the Licence Holder submitted an application to the department to amend Licence L7276/1996/12 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Operation of the Stage 3 deposition points T4 and T5 at the 17 Series In-pit Tailings Storage Facility (TSF) on mining tenements M39/342, M39/343, M39/553, M39/424, M39/421 (refer to Figure 1).

This amendment is limited only to changes to Category 5 activities on the existing licence. No changes to the aspects of the existing licence relating to Category 6, 12, 31, 44, 52, 54, 57, 63, 64 5, 52 and 64 have been requested by the Licence Holder. No changes to the design/throughput capacity of Category 5 have been proposed.

2.2.1 Background

The works approval W6526/2021/1 was amended on 13 May 2022 to allow for a staged installation of the pipeline and spigot infrastructure which split the works into four stages. Stage 1 and Stage 2 infrastructure has been constructed and is in operation. Construction of Stage 3 was determined to be compliant by the department with a compliance letter dated 3 January 2025 issued to the applicant (works approval holder). As such, deposition points T4 and T5 (under Stage 3) have been operating under a period of time-limited operations (TLO) authorised in works approval W6526/2021/1.

[1] The premises comprises tenements L39/62, L39/81, L39/83, L39/136, L39/168, M39/299, M39/300, M39/301, M39/314, M39/322, M39/421, M39/422, M39/423, M39/435, M39/436, M39/424, M39/342, M39/343, M39/446, M39/553, M39/562, M39/637, M39/651, M39/686, M39/692, M39/714, M39/715, M39/716, M39/737 and M39/820

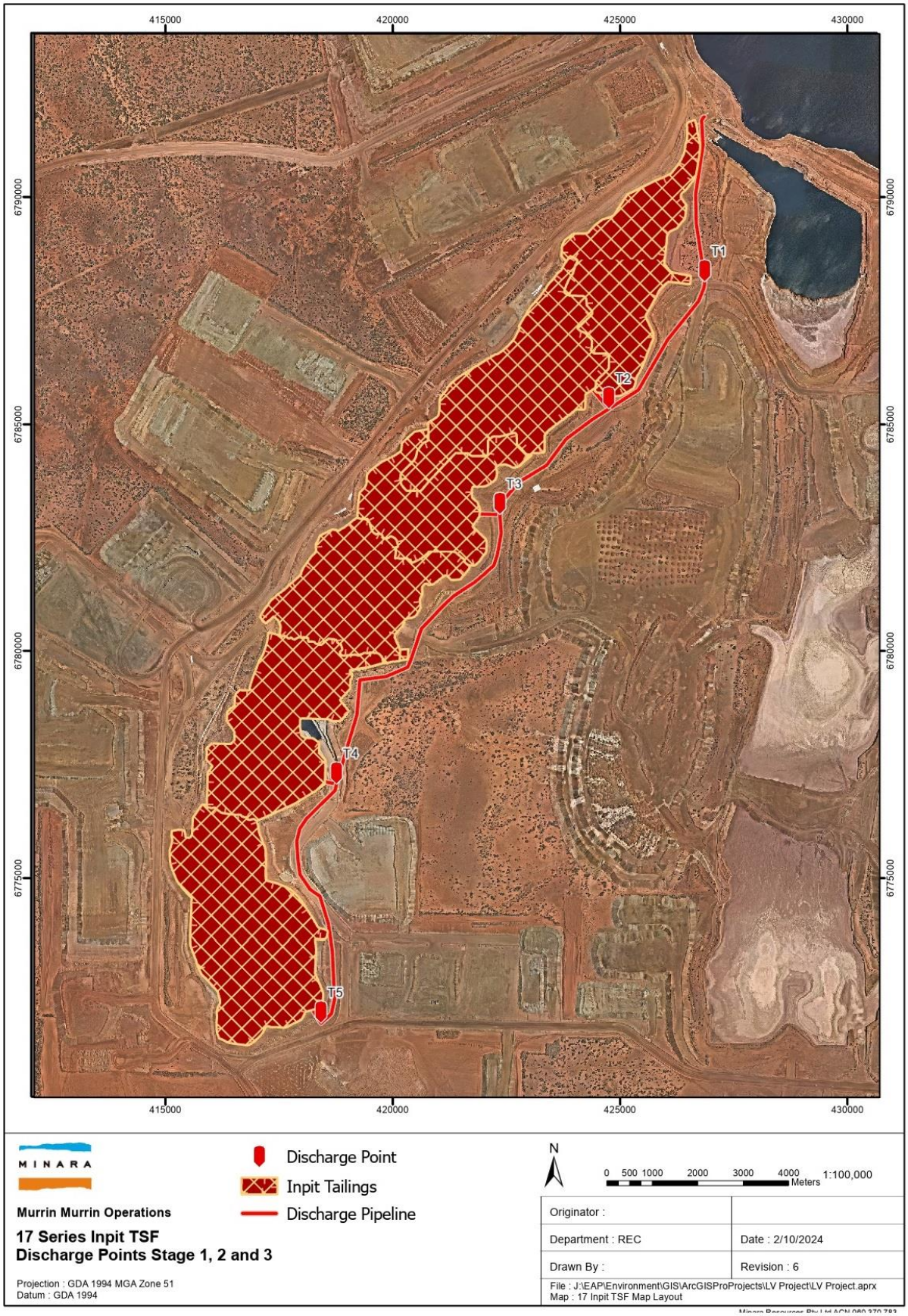

Figure 1: TSF deposition point locations T4 and T5

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
Decant water/tailings	Operation failure of decant pipeline and/or tailings delivery pipeline (spills/leaks)	Direct discharge/runoff	Existing licence controls: • 1.3.1 – pipelines equipped with telemetry, secondary containment (located in bunded corridor), leak detection • 1.3.2 - Scour sump installed at northern end of the in-pit TSF to capture tailings from pipeline bund • 1.3.5 – tailings and dewater pipelines 12 hourly frequency of inspection when operating
	Deposition of tailings at the 17 series in-pit TSF at points T4 and T5	Seepage through pit base and walls	• Nickel exceedance contingency: if continued exceedances of nickel occur between 1mg/L to 5mg/L, the in-pit Tailings Action Response Plan (TARP) will be in effect, involving installing recovery pumps on recovery bores in vicinity of affected piezometer. If Nickel is higher than 5 mg/L for three consecutive months, deposition ceases and installation of additional recovery bores[5] Existing licence controls: • 1.3.2 - Depositional cycle for tailings deposition to reduce seepage: approximately 3 – 4 months vertical deposition with approximately 1 month drying time • 3.4.1 Tailings deposition inputs and outputs monthly • 3.5.1 Quarterly monitoring of ambient groundwater quality with monitoring bores

Emission	Sources	Potential pathways	Proposed controls
			IP17-01 to IP17-12 • Standing water level trigger of 6 mbgl and limit of 4 mbgl in bores around 17 series in-pit TSF. • 3.5.3 - If standing water level is breached, contingency plan. • Nickel Limit of 1 mg/L in bores around 17 series in-pit TSF. • 3.6.1 – water balance required monthly review Works approval controls: • Supernatant water removed via decant pump, and transferred to existing evaporation pond
		Overtopping of in-pit, runoff	Existing licence controls: • 1.3.3 - minimum top of embankment freeboard of 300 mm or a 1 in 100 year/72-hour storm event (whichever is greater) is maintained. • 1.3.5 – inspection of freeboard every 12 hours • 1.3.14 – freeboard requirements maximum operating pond level 456.9mAHD. • 3.4.1 Tailings deposition inputs and outputs monthly • 3.6.1 – water balance required monthly review

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 environmental and cultural 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 receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Native vegetation	Directly adjacent to TSF and along creek lines
Underlying groundwater (non-potable purposes) Baseline quality: (levels following installation of	Premises located within *Rights in Water and Irrigation Act 1914* (RIWI) Goldfields Groundwater area. Baseline standing water levels (SWL): about 26 -

monitoring bores): • Total Dissolved Solids (TDS): 414 mg/L to 1,500 mg/L (9 out of 12 bores). Brackish quality 1,630 – 2,320 mg/L (in 3 out of 12 bores). • PH – 7.89 to 8.66 • Hydraulic conductivities typically lower on the eastern margin of the pit void due to geological characteristics. <u>Current groundwater:</u> • Groundwater relatively stable within most bores except 2, indicating saline water (TDS ranging 10,000 mg/L to 16,000mg/L). • PH range 6.60 to 8.60. • In June 2024 a slightly elevated nickel concentration was recorded at bore IP17-09 which is above the licence limit of 1 mg/L. During the subsequent monitoring (September 2024) nickel was reported with a concentration of 4.1mg/L.	45 mbgl. Current SWL: 11 - 27 mbgl Results measured in groundwater monitoring bores around TSF: IP17-01 to IP17-12 as displayed in Figure 3.
Surface water lines: Katata creek and unnamed non-perennial watercourses	Katata creek runs adjacent to the TSF to the west, and has been diverted along some sections due to premises infrastructure. Creek lines within 1 km south of the TSF.
Cultural receptors	**Distance from activity / prescribed premises**
Aboriginal heritage sites (Registered of Lodged)	Aboriginal heritage sites within a 500 m buffer of the 17 Series Inpit TSF: • ACH-00017108 - Abednego Site 20 - Quarry • ACH-00017102 - Abednego Site 05 - Artefacts / Scatter; Quarry • ACH-00017105 - Abednego Site 16 - Artefacts / Scatter • ACH-00015418 - UNITED WELL 07 - Artefacts / Scatter • ACH-00017188 - AB 17 - Artefacts / Scatter • ACH-00017191 - Stone Arrangements - Traditional Structure • ACH-00017107 - Abednego Site 21 - Quarry • ACH-00017113 - Abednego Site 18 - Artefacts / Scatter; Grinding areas / Grooves • ACH-00017190 - Marker Stone/Ceremonial Ritual / Ceremonial • ACH-00017106 - Abednego Site 19 - Artefacts / Scatter; Quarry

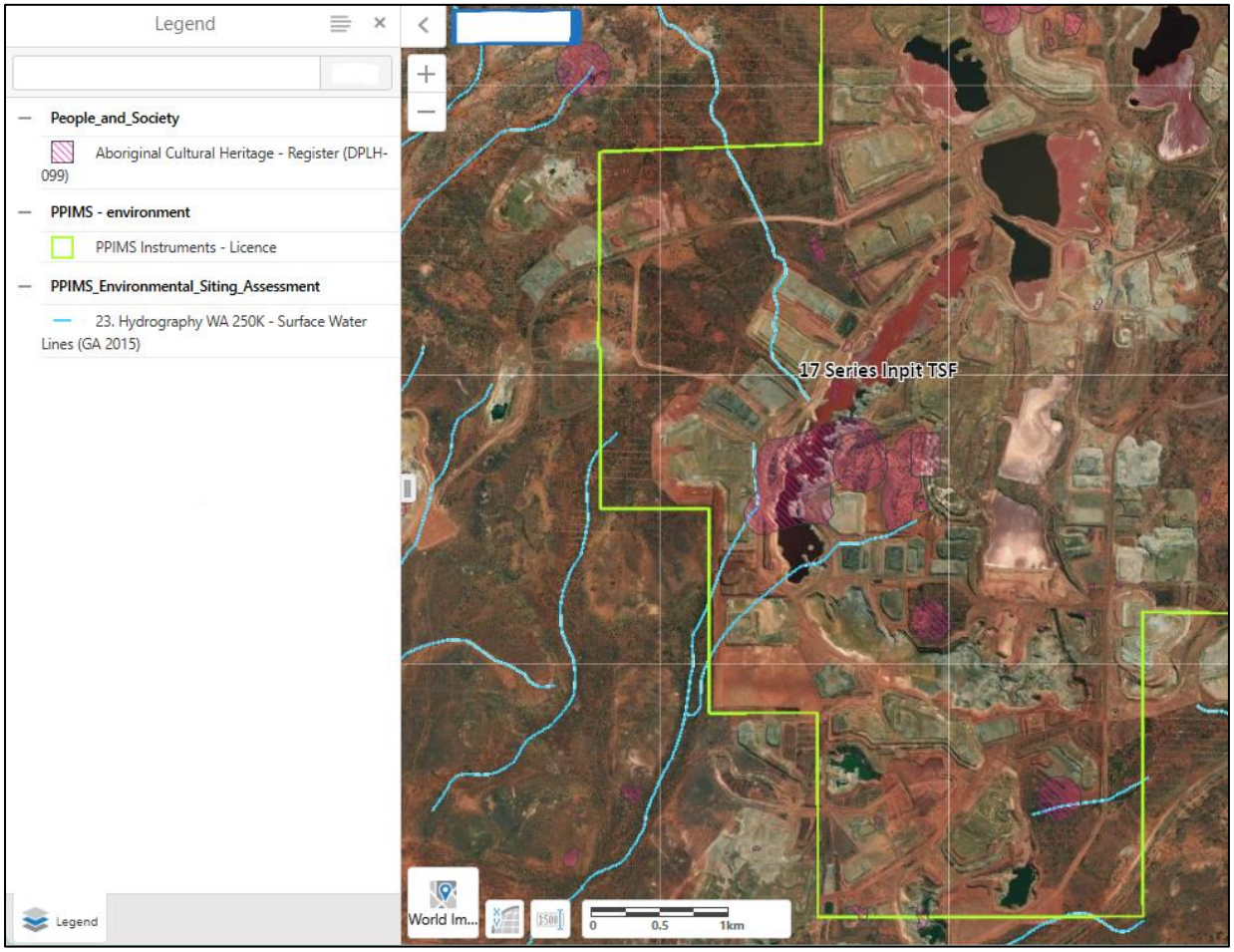

Figure 2 Distance to sensitive receptors

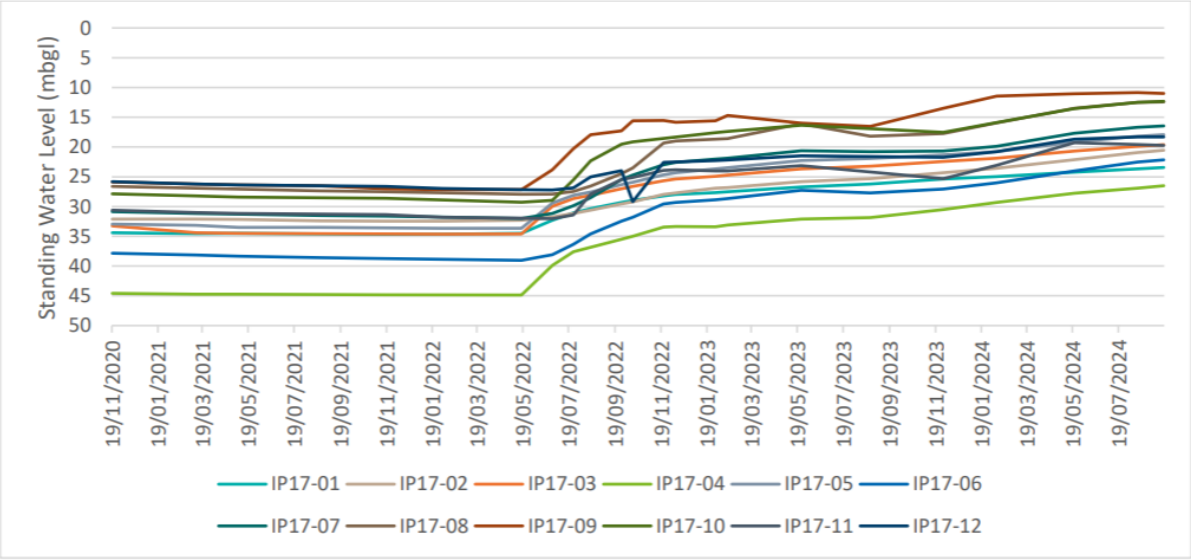

Figure 3 Standing water levels in the 17 series in-pit TSF groundwater monitoring bores

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 considers potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete 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 L7276/1996/12 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises. 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 operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
Operation failure of decant pipeline and/or tailings delivery pipeline (spills/leaks)	Decant water Tailings	**Pathway:** direct discharge, resulting in runoff and infiltration **Impact:** degradation to vegetation health/death, contamination and changes to water quality and erosion	Surface water lines – particularly Katata creek Native vegetation adjacent to TSF Aboriginal sites within 500m of TSF.	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	• 1.3.1 – Pipelines to be equipped with leak detection systems, automatic cut outs and secondary containment • 1.3.2 - Scour sump • 1.3.5 – Pipeline inspection	N/A
Deposition of tailings at the 17 Series Inpit TSF at deposition points T4 and T5	Tailings	**Pathway:** Seepage through pit base and walls to groundwater. Groundwater mounding and interaction with vegetation root zone (uptake). Abstraction of impacted groundwater for livestock drinking water resulting in ingestion of water with elevated nickel concentrations **Impact:** groundwater mounding and adverse impacts to groundwater dependent vegetation. Decline in health of livestock	Native vegetation Livestock (via drinking water)	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	• 1.3.2 - Depositional cycle and supernatant water removed via pump and discharged to evaporation pond • 3.4.1 - Deposition inputs and outputs • 3.5.1 – Monitoring including SWL trigger of 6 m bgl and limit of 4 mbgl, nickel concentration triggers commencing at 1 mg/L and a limit of 50 mg/L • 3.5.3 – Seepage management plan to be developed for breach in standing water level trigger • 3.5.5 – Nickel concentration trigger levels and response actions, including requirement for Nickel Management Plan and recovery bores should certain triggers be exceeded • 3.6.1 – Water balance	The Delegated Officer considers the addition of two depositional points unlikely to increase the existing risk given an increased overall discharge rate of tailings is not proposed. Multiple recent detections of elevated nickel concentrations exceeding the specified licence limit of 1 mg/L have been reported along with an increased SWL at monitoring bore IP17-09, indicating there is likely seepage in the vicinity of this bore. However, the SWL appears to have stabilised around 11 mbgl in the period Q1 – Q4 2024 (Figure 3) and is still significantly below the SWL limit of 4 m bgl (and trigger of 6 m bgl). The department therefore considers the most likely sensitive receptor to be livestock, via ingestion of drinking water sourced from groundwater post-mine closure. To address the potential for seepage with elevated nickel concentrations, the Delegated Officer has specified trigger levels and response actions should nickel concentrations exceed 1, 10 and 25 mg/L in groundwater monitoring bores surrounding the 17 Series Inpit TSF. Further, a revised limit of 50 mg/L has been specified. The triggers are based on licence holder comments on the draft instrument package (refer to Table 4). Response actions include requirement for a Nickel Management Plan and recovery bores should nickel triggers be exceeded. The licence holder proposed trigger of 25 mg/L for seepage recovery is 10% of the level of nickel salts (250mg/kg) demonstrated to cause impact on calve development (O'Dell et al., 1970). In determining the risk rating, the Delegated Officer also considered the deep, semi-confined nature of the aquifer, settling and drying of tailings and attenuation of nickel in groundwater post-closure, and that livestock would likely consume drinking water from multiple sources (not just from one or two impacts areas), reduced the likelihood of impact. The Delegated Officer therefore considers the specified conditions to be sufficient to mitigate potential impacts of TSF seepage on receptors.
	Decant water Tailings	**Pathway:** Overtopping of pit **Impact:** degradation to vegetation health/death, contamination and changes to water quality and erosion	Surface water lines – particularly Katata creek Native vegetation adjacent to TSF and 500m west Aboriginal sites within 500m of TSF	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	• 1.3.3 - Freeboard • 1.3.5 – Freeboard inspection • 1.3.14 – Freeboard • 3.4.1 - Deposition inputs and outputs • 3.6.1 – Water balance	N/A

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

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

4. Consultation

Table 4 provides a summary of the consultation undertaken by the department.

Table 4: Consultation

Consultation method	Comments received	Department response
Watarra Aboriginal Corporation advised of proposal 31/01/2025	No comment	N/A
NTS Goldfields Ltd advised of proposal 31/01/2025	No comment	N/A
Licence Holder was provided with draft amendment on 21/03/2025.	Comments received on the 27/03/2025: Requested the 1mg/L limit for nickel on groundwater monitoring bores become a trigger given this is in line with the use of the word 'trigger' in the ANZECC & ARMCANZ guidelines for livestock drinking water.	The Delegated Officer considers this change to trigger acceptable, noting revised trigger levels and response actions have been specified in the amended licence to protect against post-mine closure pastural use of the land (i.e. livestock drinking water).
	Suggestion to remove Condition 3.5.5 as there is no longer a limit for nickel. If removal is unacceptable, MMO suggests it is reworded to read "In the event that the trigger level for nickel specified in Table 3.5.2 is exceeded in any of the bores listed in Table 3.5.2, the Licence Holder shall submit a nickel exceedance management plan for the facility to the CEO within 3 months of the exceedance occurring. The management plan must detail actions outlined in MMO's Trigger Action Response Plan (TARP).	The Delegated Officer have revised this condition by adding a table with tiered trigger levels and response actions should nickel concentrations in groundwater rise in bores surrounding the 17 Series in-pit TSF. The revised condition includes a requirement to prepare and submit a Nickel Management Plan, as well as a specific condition to install recovery bores should the highest trigger level be exceeded (this control is specified in the TARP).
	Potentially contaminated groundwater resulting from seepage is highly unlikely to reach roots of vegetation as shown by historical groundwater data at the 17 Inpit TSF and historical groundwater monitoring at all other eight in-pit TSFs. SWL have also remained below the trigger value of 6 m as specified in L7276. During and after deposition it is expected that	The Delegated Officer agrees based on SWL that the relevant environmental value and therefore applicable ANZECC guideline criteria is livestock drinking water post-mining and has determined to adopt

	seepage may occur at depth, beyond the root zone. As such, MMO conclude that the nearest and only receptor to the risk of elevated nickel levels in groundwater would be pastoral livestock after closure and rehabilitation (the proposed and accepted post mining land use). Revision of TARP nickel levels to include: - below 0.75mg/L where no action occurs. - 0.75 – 1mg/L increase monitoring frequency to monthly. Review decant pond size and beaching. Inform Tailings and Water Coordinator. - 1-25mg/L review deposition strategy, continue monthly monitoring, inform general manager. - Higher than 25mg/L – continue monthly monitoring, install recovery pumps on recovery bores in vicinity of affected piezometer. The ANZECC guidelines detail how adding nickel salts to the diet of calves at concentration of 250mg/kg has been shown to reduce growth (O'Dell et al., 1970). MMO has used a conservative risk-based approach for the revised trigger value for recovery pumps, being 10% of this value. At a conservative level of 25 mg/L, the receptors to increased nickel concentration would be unaffected, especially considering the deep, semi-confined nature of the system and considerable time until closure (allowing for settling and drying of tailings and dilution of nickel) and subsequent potential exposure of nickel to cattle.	and tweak the proposed trigger levels and response actions (see revised condition 3.5.5). Regarding the installation of recovery bores, the licence holder clarified that no recovery bores have been installed to date and that recovery pumps will not be installed onto existing monitoring bores/piezometers, but rather between the adjacent monitoring bores and TSF to ensure compliance with condition 3.5.3 and maintain accuracy of SWL data.

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 5 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 5: Summary of licence amendments

Condition no.	Proposed amendments
Introduction	Removal of redundant information and updated to the most recent template including interpretation section
1.3.2	Addition of T4 and T5 deposition points for the 17 Series Inpit TSF and supernatant pumping to the evaporation pond.

	Addition of reference to scour sump's location in Figure 26.
3.5.1 Table 3.5.2	Changed nickel limit to 50 mg/L and first trigger to 1 mg/L.
3.5.5 Table 3.5.3	Revised to include triggers and corresponding response action for nickel concentrations in groundwater in the vicinity of 17 Series Inpit TSF.
4.2.1	Added requirement to report groundwater monitoring undertaken in compliance with Table 3.5.3
Figure 24	Replacement of figure to include T4 and T5 deposition points to the 17 Series Inpit TSF.
Figure 26	Added to display the location of the scour sump and dewatering and tailings pipelines.

References

1. ANZECC & ARMCANZ, 2000. *Australian and New Zealand guidelines for fresh and marine water quality. Volume 1: The guidelines*. Canberra: Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation 2020a, *Guideline: Environmental Siting*, Perth, Western Australia.
4. Department of Water and Environmental Regulation 2020b, *Guideline: Risk Assessments*, Perth, Western Australia.
5. Minara Resources 2023, *Inpit Tailings Piezometer Trigger Action Response Plan (TARP) – Murrin Murrin Nickel Cobalt Project*, Western Australia.
6. Minara Resources 2024, L7276/1996/12 Licence Amendment Supporting Document, Western Australia.
7. O'Dell GD, Miller WJ, King WA, Moor SL & Blackmon DJ 1970. *Nickel toxicity in the young bovine*. Journal of Nutrition 100, 1447–1454.