



## Application for Licence Amendment

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

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<b>Licence Number</b>	L7276/1996/12
<b>Licence Holder</b>	Murrin Murrin Operations Pty Ltd
<b>ACN</b>	076 717 505
<b>File Number</b>	2011/011705-1
<b>Premises</b>	Murrin Murrin Nickel Cobalt Project  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 in Schedule 1 of the licence
<b>Date of Report</b>	31 January 2023
<b>Decision</b>	Amendment Granted

#### **MANAGER, RESOURCE INDUSTRIES**

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

## Table of Contents

<b>1. Decision summary</b>	<b>1</b>
<b>2. Scope of assessment</b>	<b>1</b>
2.1 Regulatory framework	1
2.2 Application summary	1
2.3 Compliance with works approval W6526/2021/1	2
2.4 Part IV of the EP Act	5
2.5 Other relevant approvals	5
2.5.1 Department of Mines, Industry Regulation and Safety (DMIRS)	5
2.5.2 Aboriginal Heritage	5
2.6 Administrative correction	5
<b>3. Risk assessment</b>	<b>6</b>
3.1 Source-pathways and receptors	6
3.1.1 Emissions and controls	6
3.1.2 Receptors	8
3.2 Risk ratings	12
3.3 Detailed risk assessment for impacts of seepage on surrounding native vegetation	14
3.3.1 Source	14
3.3.2 Pathway	14
3.3.3 Proposed seepage management and monitoring	16
3.3.4 DWER assessment and controls	17
<b>4. Consultation</b>	<b>18</b>
<b>5. Conclusion</b>	<b>19</b>
5.1 Summary of amendments	19
<b>References</b>	<b>20</b>
<b>Appendix 1: Tailings characterisation</b>	<b>21</b>
<b>Appendix 2: Summary of Licence Holder's comments on risk assessment and draft conditions</b>	<b>22</b>
<b>Appendix 3: Application validation summary</b>	<b>23</b>
Table 1 Staged tailings deposition and decant pumping points	2
Table 2 Ministerial statements	5
Table 3: Licence Holder controls	6
Table 4: Sensitive environmental receptors and distance from prescribed activity	8
Table 5. Risk assessment of potential emissions and discharges from the Premises during operation	13

Table: 6 DWER regulatory controls (seepage) .....	17
Table 7: Consultation .....	18
Table 8: Summary of licence amendments .....	19
Table 9 Tailings liquor characterisation (Environ, 2010) .....	21
Figure 1. 17 series pit (green) and surrounding monitoring bores IP17-01 to IP17-12.....	2
Figure 2. Staged tailings deposition (red) and decant water (blue) pipeline and points – all stages .....	3
Figure 3. Stage one of 17-series in-pit TSF infrastructure (this amendment) .....	4
Figure 4. Distance to sensitive receptors – surface water .....	10
Figure 5. 17 series in-pit TSF location relative to existing in-pit tailings storage facilities.....	11
Figure 6. Groundwater levels recorded for monitoring bores surrounding 17 series in-pit TSF .....	15
Figure 7. Total dissolved solids recorded for groundwater monitoring bores surrounding 17 series in-pit TSF during time limited operations.....	16
Figure 8. Nickel recorded for groundwater monitoring bores surrounding 17 series in-pit TSF during time limited operations .....	16

# 1. Decision summary

Licence L7276/1996/12 is held by Murrin Murrin Operations Pty Ltd (MMO; the Licence Holder) for the Murrin Murrin Nickel Cobalt Project (the Premises), located within multiple mining tenements in Laverton and Leonora, WA. The activities proposed for this amendment will take place approximately 50km east from the town of Leonora and 56km west of the town of Laverton.

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.

The Revised Licence issued as a result of this amendment 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 1 November 2022, 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:

- On-going operation of the stage one 17 series in-pit tailings storage facility (TSF) and associated infrastructure originally approved under works approval W6526/2021/1. This includes:
  - Tailings deposition into 17 series pits from discharge points “T1” a “T2” (Figure 2 and Figure 3); and
  - Operation of tailings and decant water pipelines (D1) (Figure 2 and Figure 3).
- Addition of M39/553 to the prescribed premises boundary; and
- Update to Table 3.5.1 to include twelve monitoring bores IP17-01 to IP17-12 (Figure 1).

On-going operation of stage two and three infrastructure has not been applied for and will not be included as part of this amendment. See section 2.3 below for further detail regarding infrastructure staging.

This amendment is limited only to changes to Category 5 activities. No changes to the aspects of the existing Licence relating to Category 6, 12, 31, 44, 52, 54, 57, 63 or 64 have been requested by the Licence Holder. No amendments to prescribed category throughputs have been requested.

DWER has also undertaken an administrative correction as detailed in section 2.6.

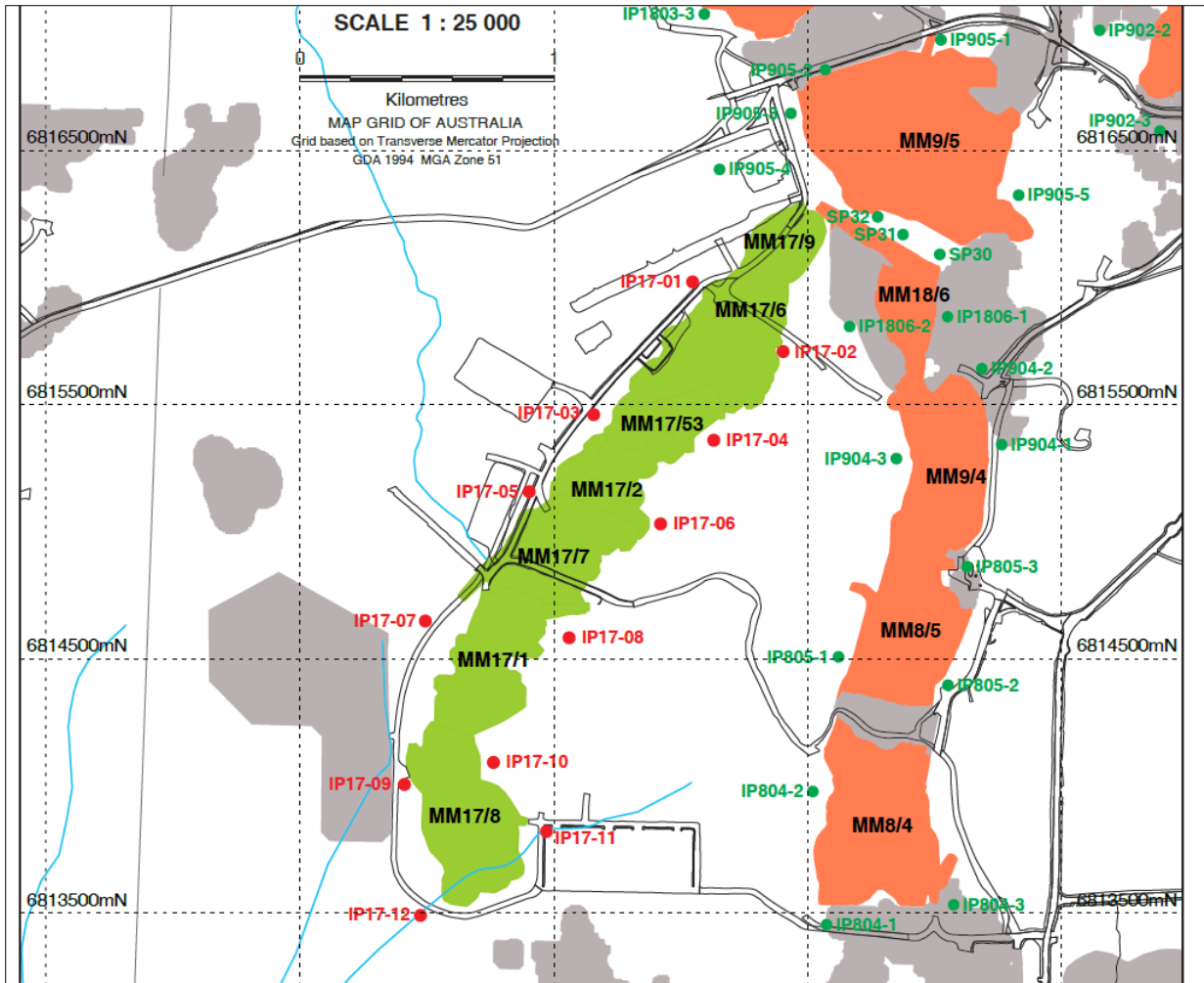


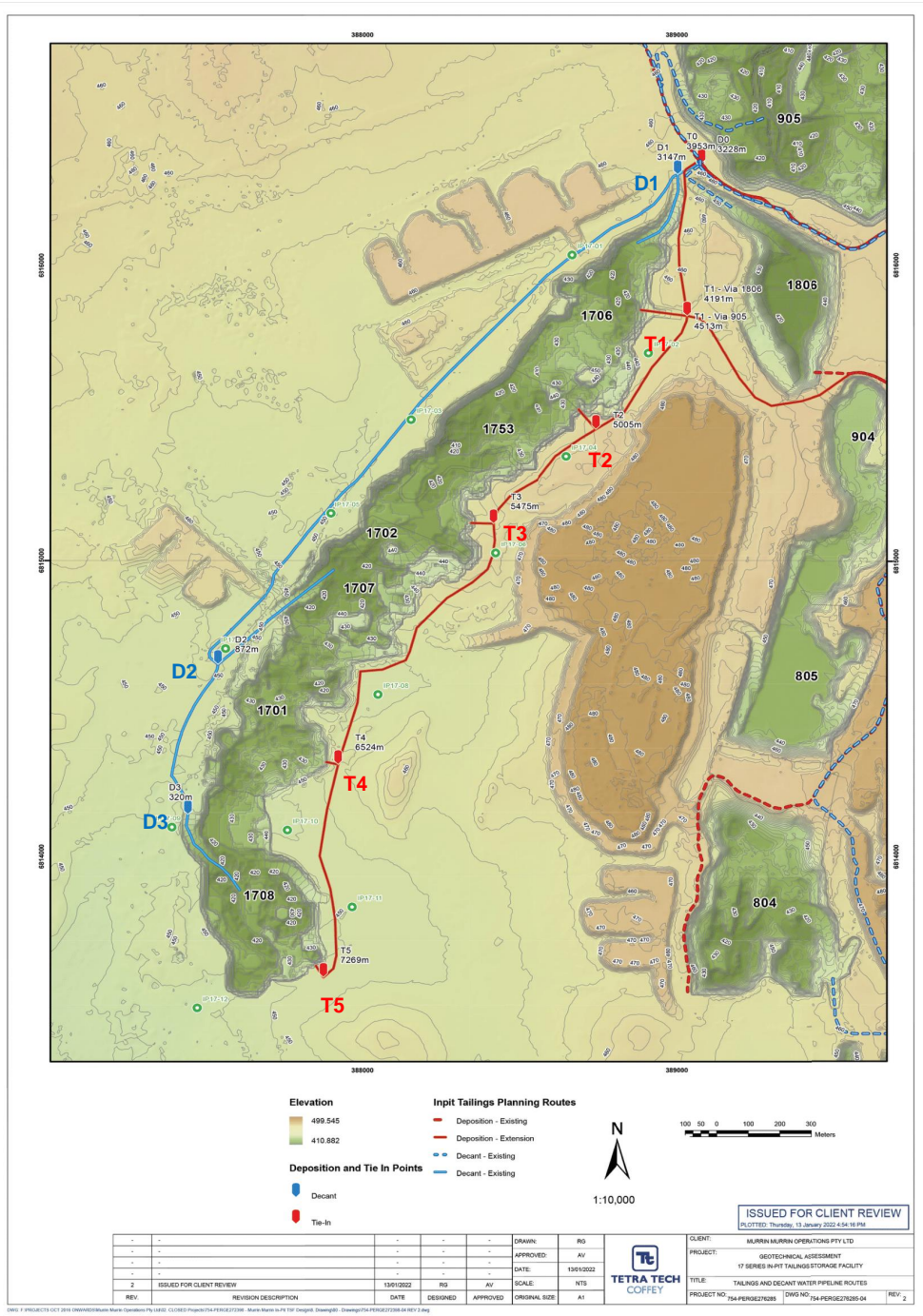
Figure 1. 17 series pit (green) and surrounding monitoring bores IP17-01 to IP17-12

### 2.3 Compliance with works approval W6526/2021/1

Works approval W6526/2021/1 was granted on 26 July 2021 and amended on 13 May 2022 to allow staged construction of infrastructure relevant to the 17 series in pit TSF (Table 1 and Figure 2 and Figure 3).

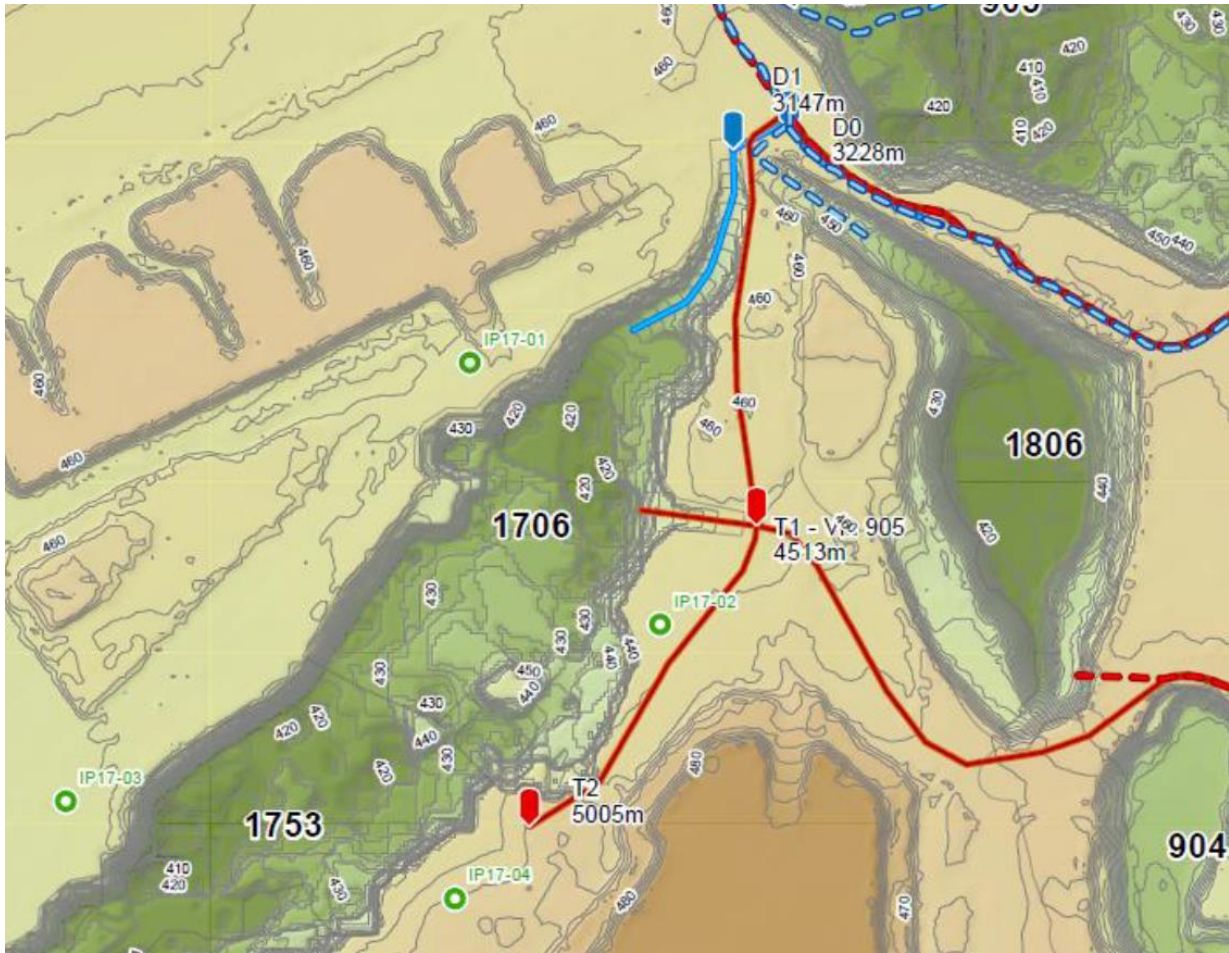
Table 1 Staged tailings deposition and decant pumping points

Stage	Authorised tailings deposition points <sup>1</sup>	Authorised decant water pumping points <sup>1</sup>
1	T1 and T2	D1
2	T3	D2
3	T4 and T5	D3



**Figure 2. Staged tailings deposition (red) and decant water (blue) pipeline and points – all stages**





**Figure 3. Stage one of 17-series in-pit TSF infrastructure (this amendment)**

Compliance documentation for stage one infrastructure was provided on 13 July 2022 and determined to meet requirements of conditions 1, 2 and 3 for:

- item 1: stage one tailings and decant pipelines, pipeline corridor, scour sump; and
- item 1: stage one 17 Series in-pit TSFs.

MMO was authorised to commence time-limited operations (TLO) under condition 7 of works approval W6526/2021/1 for the stage one infrastructure listed above on 18 July 2022. DWER notes that TLO for this infrastructure ended on 12 November 2022 and MMO has advised DWER that it has discontinued deposition (favouring deposition to other pits) until this amendment has been granted.

This amendment will not include on-going operation for stage two and three infrastructure. Environmental Compliance Reports and subsequent assessment by DWER are still required for stage 2 and 3 infrastructure (listed under item 2 and item 3 of condition 1), once they have been constructed and/or installed.

## 2.4 Part IV of the EP Act

Ministerial statements for the premises are summarised in Table 2 below.

**Table 2 Ministerial statements**

Date	Ministerial statement	Management of impact to receptors
6 June 1996	0418	Protection for rare flora: Requires development and implementation of a plan for conservation and management of <i>Hemigenia exilis</i> within the project area so that “no significant loss of the species occurs”.
5 May 1997	0444	
6 May 1997	0445	
31 May 1999	0506	Stage 2 expansion. For quarrying in calcrete deposits: includes a requirement for development and implementation of a subterranean fauna management plan (for quarrying activities).

## 2.5 Other relevant approvals

### 2.5.1 Department of Mines, Industry Regulation and Safety (DMIRS)

The Department of Mines, Industry Regulation and Safety (DMIRS) contacted DWER on 7 December 2022 indicating that the proposed activities are consistent with activities under Mining Proposal Registration ID 94424, approved 30 June 2021. The Mining Proposal approved the following activities:

- Conversion of the approved existing disturbed open pits 1701, 1702, 1706, 1707, 1708 and 1753 to in pit TSF 17; and
- Construction of tailings and decant water pipeline corridor including associated infrastructure (bunding and a scour sump).

### 2.5.2 Aboriginal Heritage

The supporting documentation submitted for the original works approval (W6526/2021/1) indicates that “Section 18 approvals under the AH Act [*Aboriginal Heritage Act 1972*] have been obtained for all sites which have been disturbed by mine development”.

DWER notes that the applicant is responsible for ensuring appropriate approvals and stakeholder engagement has taken place under the *Aboriginal Heritage Act 1972* and subsequently the *Aboriginal Cultural Heritage Act 2021* (following completion of the transitional period from the 1972 Act<sup>1</sup>).

## 2.6 Administrative correction

Amendment notice 3 (granted on 17 May 2018) included a requirement for baseline monitoring following one time disposal of spent vanadium catalyst waste into in-pit TSF 18/3 (previous conditions 3.1 and 5.2.4 and modification to condition 3.5.1). Baseline monitoring has since been submitted to DWER (18 July 2018, DWER ref 1702141) and showed the vanadium and

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<sup>1</sup> Before the *Aboriginal Cultural Heritage Act 2021* is implemented there will be a transitional period during which the regulations, statutory guidelines and operational policies will be developed to ensure the ACH Act will have its intended effects. During the transitional period the *Aboriginal Heritage Act 1972* will remain in force.



other metals at or below detection levels. Conditions 3.1 and 5.2.4 have subsequently been removed from the licence. However, by administrative error, text in condition 3.5.1 remains indicating that metal limits would be “determined based on baseline data”. No vanadium limits were placed when baseline monitoring data was received and conditions were removed.

This text will be removed from the condition as an administrative correction given the following:

- vanadium concentrations in bores surrounding the 18/3 in-pit TSF have remained either at or below detection levels (Murrin Murrin AER, 2022);
- the amendment was for one-time disposal of spent vanadium catalyst;
- no limits were placed at the time of baseline monitoring receipt and condition removal.

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

**Table 3: Licence Holder controls**

Emission	Sources	Potential pathways	Proposed controls
Tailings and contaminated water	Deposition of tailings into in-pit TSF	Tailings seepage through base and embankments to groundwater	<p><b>Proposed controls:</b></p> <ul style="list-style-type: none"> <li>• Standing water levels in proximity of the pit to be maintained at &gt;4m bgl;</li> <li>• Monitoring bores installed capable of being equipped with seepage recovery pumps. <b>The Delegated Officer notes that this is not acceptable practice, which is further discussed in section 3.3.4;</b></li> <li>• Rotational deposition of tailings;</li> <li>• The supernatant pond will be “kept as small as practicable to minimise seepage from the in-pit TSF”.</li> <li>• Decant recovery. The original works approval supporting documentation indicates that “water recovered by the decant pump will be pumped to the evaporation ponds”. MMO has confirmed the evaporation ponds have a current capacity of 5,100Mm<sup>3</sup> and that the average rate of decant recovery over the previous</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>five years has been 3,540Mm<sup>3</sup>/year. MMO is not increasing the throughput or changing the rate of tailings discharge – therefore the rate of decant discharge to the evaporation ponds will not change (Murrin Murrin 2023).</p> <ul style="list-style-type: none"> <li>• TSF to “allow tailings to desiccate to reduce seepage”: This will include vertical deposition cycles of 3 – 4 months with approximately 1 month drying time, however as other in-pit TSF’s are approaching capacity, drying times may be reduced during the operational life of the 17 series in-pit TSF as it becomes the primary tailings deposition facility.</li> </ul> <p><b>Monitoring:</b></p> <ul style="list-style-type: none"> <li>• On-going monitoring of twelve monitoring bores installed around the in-pit TSF</li> </ul>
		Overtopping and discharge to land	<p><b>Proposed controls:</b></p> <ul style="list-style-type: none"> <li>• Minimum operational freeboard of 300mm (note, total 500mm requirement placed on the works approval)</li> </ul> <p><b>Monitoring:</b></p> <ul style="list-style-type: none"> <li>• Monthly survey of decant ponds;</li> <li>• 12-hour inspections of in-pit TSF</li> </ul>
		Pipeline breaks or leakages	<p><b>Exiting conditions</b></p> <p>1.3.1 – all pipelines containing tailings, decant or hypersaline water are either:</p> <ol style="list-style-type: none"> <li>equipped with telemetry systems and pressure sensors along pipelines to allow the detection of leaks and failures;</li> <li>equipped with automatic cut-outs in the event of a pipe failure; or</li> <li>provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections.</li> </ol> <p>1.3.5 – 12 hour inspections (when operating) of tailings pipe lines and return water lines</p> <p><b>Proposed controls:</b></p> <ul style="list-style-type: none"> <li>• Tailings discharge and decant pipeline corridor bunded;</li> <li>• Leak detection via flow meters with telemetry reporting to the control room;</li> <li>• Scour sump (225m<sup>3</sup>) installed at the northern end of the in-pit TSF to capture</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			tailings from pipeline bund; <b>Monitoring:</b> <ul style="list-style-type: none"> <li>Daily inspections in accordance with existing licence conditions</li> </ul>

### 3.1.2 Receptors

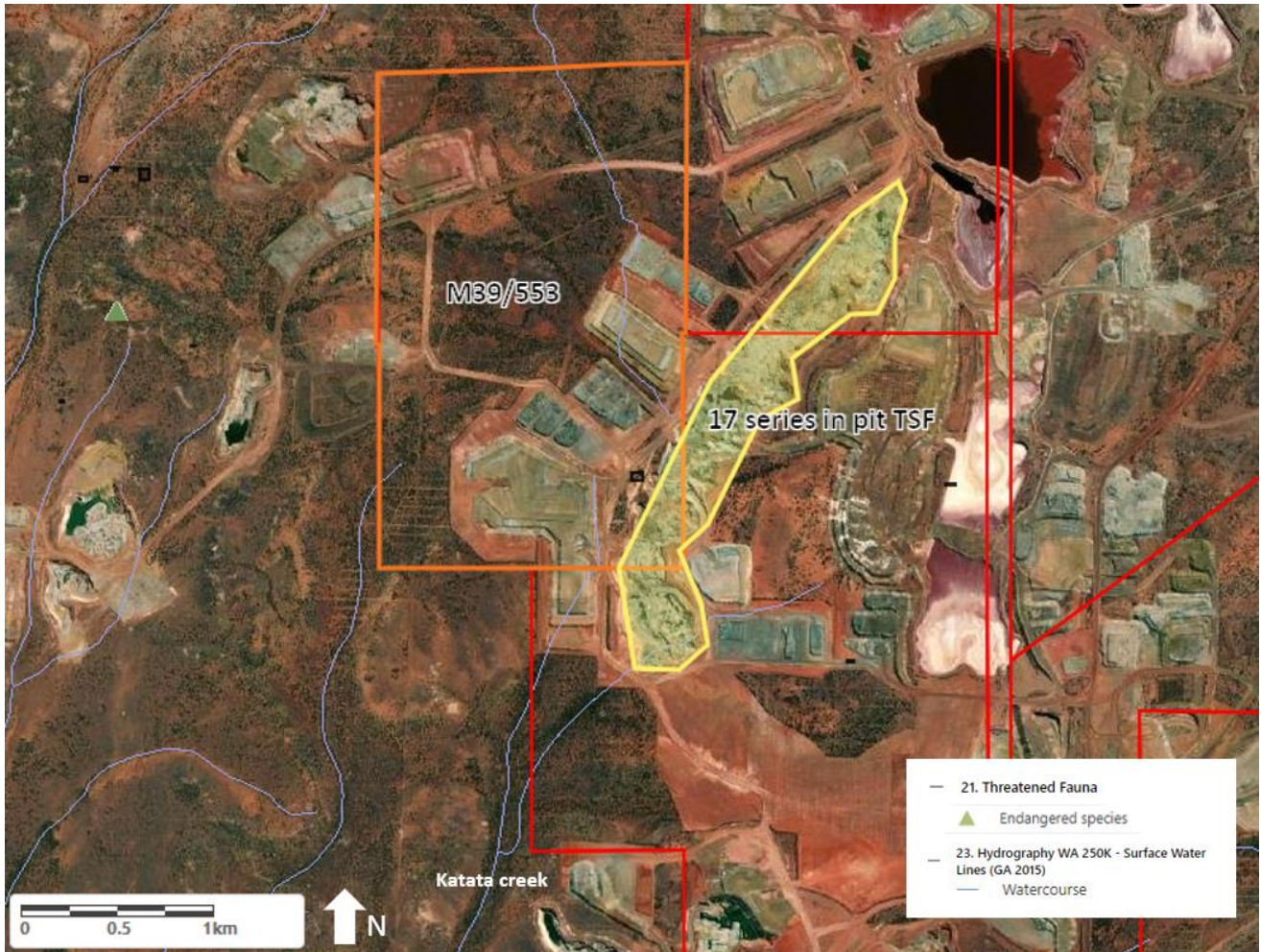
In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under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

Table 4 below provides a summary of potential 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)). As there are no human receptors within 50km of this site, human receptors have not been considered in this risk assessment.

**Table 4: Sensitive environmental receptors and distance from prescribed activity**

Environmental receptors	Distance from prescribed activity
<u>Ephemeral creek lines including Kata Creek</u> Hydrography – Inland Waters – Waterlines (named rivers) Hydrography WA 250K – surface water lines	<u>Unnamed ephemeral creekline:</u> 900m west of T2 discharge point (pit 1753) (Figure 4) <u>Katata creek:</u> Closest point ~180m south of southern-most section of in-pit TSF (pit 1708 – stage three discharge point) (Figure 4) and 2km south of the T2 discharge point.
<u>Groundwater</u> Goldfields Groundwater Area – <i>Rights in Water Irrigation Act 1914</i>	<u>Groundwater depth</u> Prior to commencing time limited operations, groundwater depths in the twelve bores surrounding the 17 in-pit series TSF ranged between 25 and 45m bgl. Groundwater levels rose in all monitoring bores following commencement of tailings deposition in May 2022. Levels rose between 3 and 10 metres over five months of tailings deposition. <u>Groundwater quality</u> Groundwater surrounding the 17 series pit is mostly brackish (1000-3000mg/L). However fresh groundwater (~400mg/L) has been recorded in the south-eastern portion of the in-pit TSF (monitoring bores IP17-08 and IP17-10). Groundwater salinity has been increasing as a result of deposition into the TSF during time limited operations, particularly for IP17-02 – which increased from TDS 2500mg/L in 2020 to 6400mg/L in October 2022 (see section 3.3.2 for further detail) The proposed 17-series in-pit TSF is adjacent to other in-pit TSFs (Figure 5) where Saproliite Environmental (2020) suggests that increases in

	<p>salinity are possible at discrete sites due to seepage migration through pathways of higher hydraulic conductivity.</p> <p><u>Nearby groundwater users</u></p> <p>It is unknown if there are other groundwater users within the immediate vicinity (2km) of the in-pit TSF. MMO have indicated they are not aware of any groundwater users within 2km of the 17 series in-pit TSF (Murrin Murrin, 2023)</p>
Native vegetation	Closest point ~170m west of pit 1753 (T2 discharge location)
<p><u>Priority flora</u></p> <ul style="list-style-type: none"> <li>• <i>Hybanthus floribundus</i> subsp. <i>Chloroxanthus</i> (Priority 3)</li> <li>• <i>Hemigenia exilis</i> (Priority 4)</li> <li>• <i>Acacia websteri</i> (Priority 1)</li> <li>• <i>Hibiscus krichauffianus</i> (Priority 3)</li> </ul>	Within the vicinity of the 17 series in-pit TSF
Subterranean fauna	<p>Subterranean fauna are considered under ministerial statement MS 0506 for calcrete quarry areas.</p> <p>From the geological profile given by Coffey (2020) the 17 series pit consists of a lateritic profile underlain by ultramafic rock (rather than calcrete).</p> <p>MMO has indicated subterranean fauna as assessed in MS 0506 are located in the Calcrete Quarry approximately 45km from the 17 series in-pit TSF. They have indicated that “there is no calcrete or highly karstic conditions within the geological profile surrounding the 17 series in-pit TSF and so no impact to subterranean fauna is expected” (Murrin Murrin, 2023).</p> <p>No further risk assessment with respect to subterranean fauna will therefore be included within this report.</p>



**Figure 4. Distance to sensitive receptors – surface water**



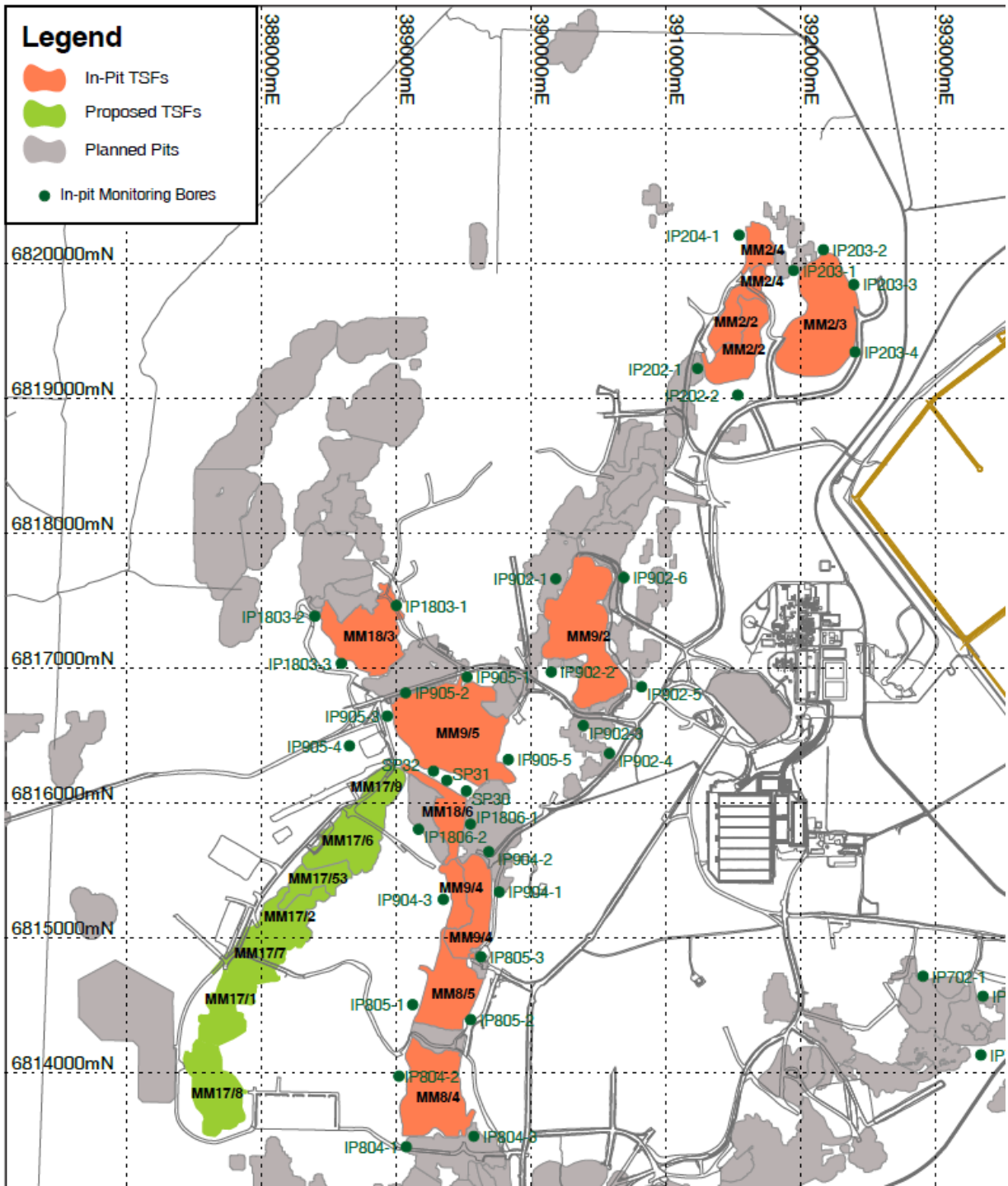


Figure 5. 17 series in-pit TSF location relative to existing in-pit tailings storage facilities

## 3.2 Risk ratings

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

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

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

The Revised Licence L7276/1996/12 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 5. Risk assessment of potential emissions and discharges from the Premises during operation**

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
<b>Operation</b>								
Deposition of tailings into in-pit TSF (17 series stage one)	Tailings and process water	Seepage through base and embankments to groundwater – causing impacts to groundwater quality, groundwater mounding and damage to surrounding vegetation	Native vegetation and priority flora  Groundwater (areas of fresh groundwater ~400mg/L TDS present)	Refer to Section 3.1.1	C = Major L = Possible <b>High Risk</b>	N	See section 3.3	See section 3.3
		Overtopping and discharge to land causing impacts to surrounding vegetation and ephemeral creeklines	Native vegetation and priority flora  Ephemeral creeklines including Katata Creek	Refer to Section 3.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	<u>Modification to existing conditions:</u> 1.3.3 – modified to include freeboard for in-pit 17 series TSF 1.3.5 –modified to specify for inspection of freeboard infrastructure as listed in condition 1.3.3 and 1.3.14 1.3.14 – modified to specify freeboard for all in-pit tailings storage facilities	The licence holder proposed controls are considered sufficient and have been placed on the licence as regulatory controls.
		Pipeline breaks or leakages resulting in direct discharge to surrounding vegetation and ephemeral creeklines	Native vegetation and priority flora  Ephemeral creeklines including Katata Creek	Refer to Section 3.1.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	<u>Existing conditions:</u> 1.3.1 – pipeline telemetry, bunding etc. 1.3.5 – 12 hourly inspections of pipelines when operating <u>Modification to existing conditions:</u> 1.3.2 – scour sump capacity maintained	The applicant's existing and proposed controls are considered sufficient to mitigate the risk. Condition 1.3.2 has been modified with a requirement to maintain the capacity stated by the applicant for the scour pit (225m <sup>3</sup> ).

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.

Licence: L7276/1996/12

IR-T15 Amendment report template v3.0 (May 2021)

## 3.3 Detailed risk assessment for impacts of seepage on surrounding native vegetation

### 3.3.1 Source

#### Tailings liquor

The tailings liquor is hypersaline with TDS of approximately 180,000 mg/L, a pH of 2.3 and is predominantly enriched in iron, magnesium, manganese and nickel (Appendix 1, Environ [2010]). The applicant states that “there is no sulphide material present in the tailings; therefore, the risk of acidic drainage from tailings disposal is considered to be nil” – however DWER notes that a pH of 2.3 is low and considered acidic.

#### Estimated seepage

The tailings slurry deposited has a large proportion of liquid, comprising only 27% solids. During time limited operations, Murrin Murrin calculated the seepage loss through the pit floor to be 2,160m<sup>3</sup>/day.

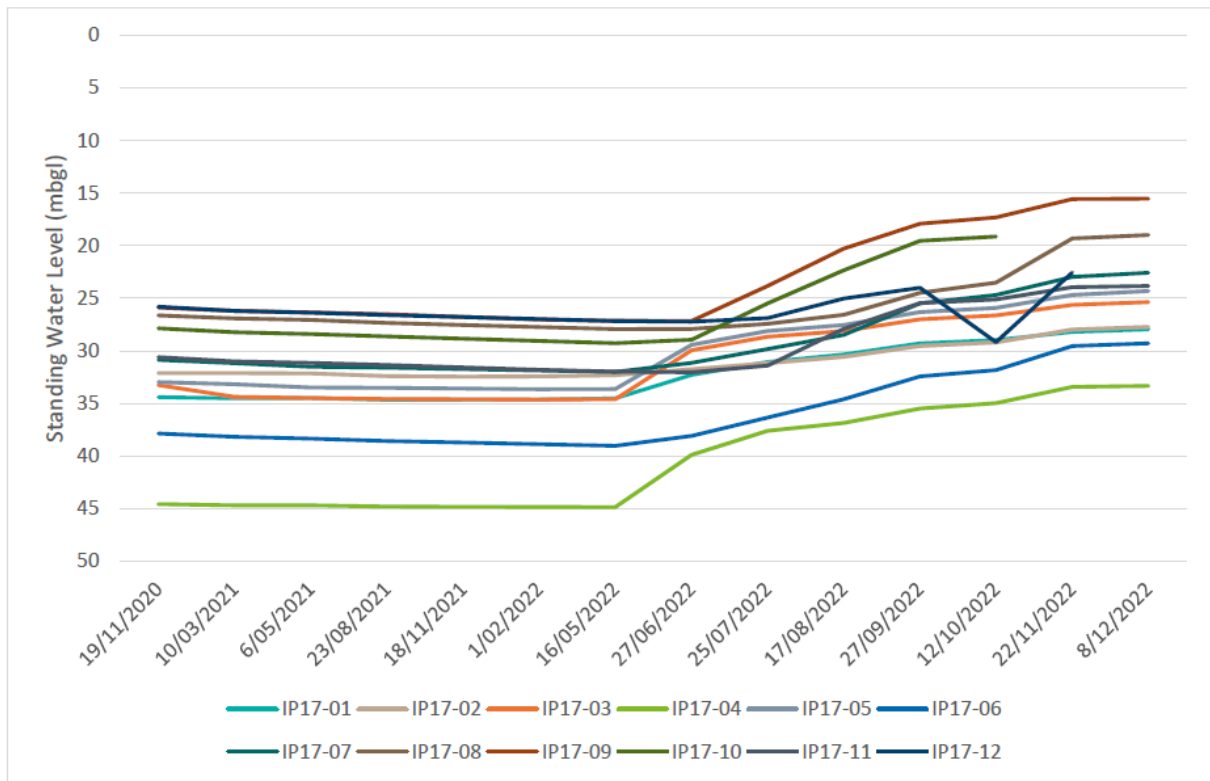
### 3.3.2 Pathway

#### Hydrogeology

Hydrogeological investigations for existing in-pit TSFs have indicated relatively low hydraulic conductivity across the project area (Saprolite, 2020), with potential for groundwater (and seepage) movement along discrete pathways associated with fault zones within the bedrock. Saprolite (2020) indicate that there is a major NW to SE striking fault zone that cuts across the southern end of the 1702 pit and that this fault zone is the most likely pathway for potential seepage migration and should be monitored during tailings deposition.

#### Groundwater depth

Groundwater depths in the twelve bores surrounding the 17 in-pit series TSF initially ranged between 25 and 45m bgl. Groundwater levels rose in all monitoring bores following commencement of tailings deposition in May 2022. Levels rose between 3 and 10 metres over five months of tailings deposition (Figure 6), where the shallowest groundwater level reported being 15.54 metres below ground level (m bgl).



**Figure 6. Groundwater levels recorded for monitoring bores surrounding 17 series in-pit TSF**

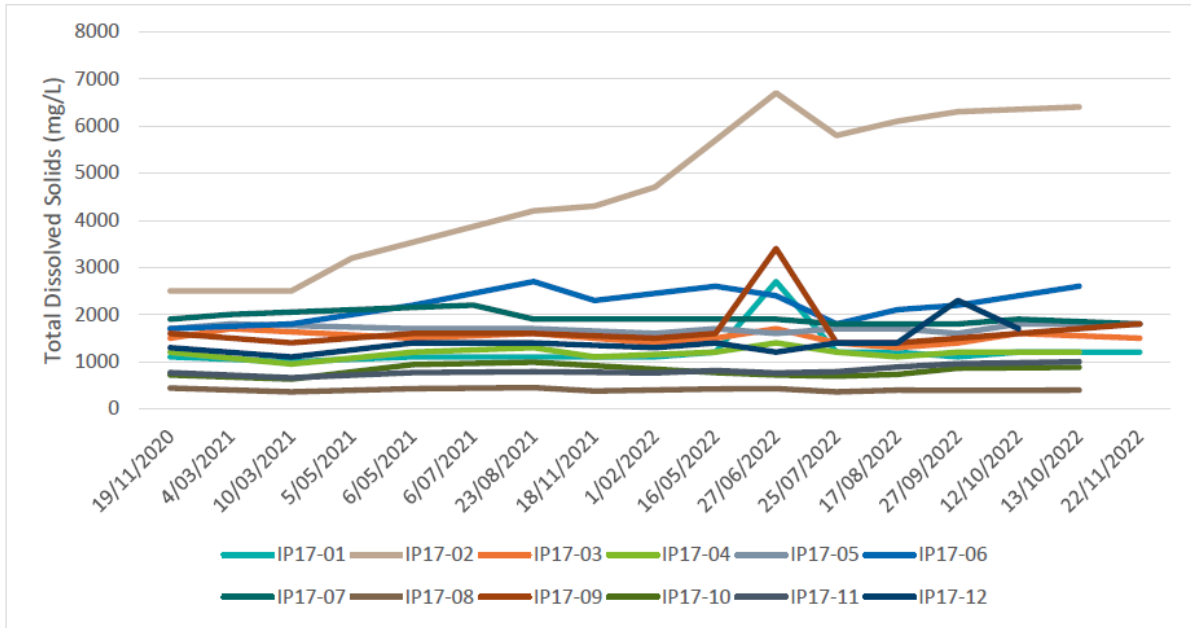
### Groundwater quality

Groundwater surrounding the 17 series pits is mostly brackish (TDS 1,000-3,000mg/L). However fresh groundwater (TDS ~400mg/L) has been recorded in the south-eastern portion of the in-pit TSF (IP17-08 and IP17-10).

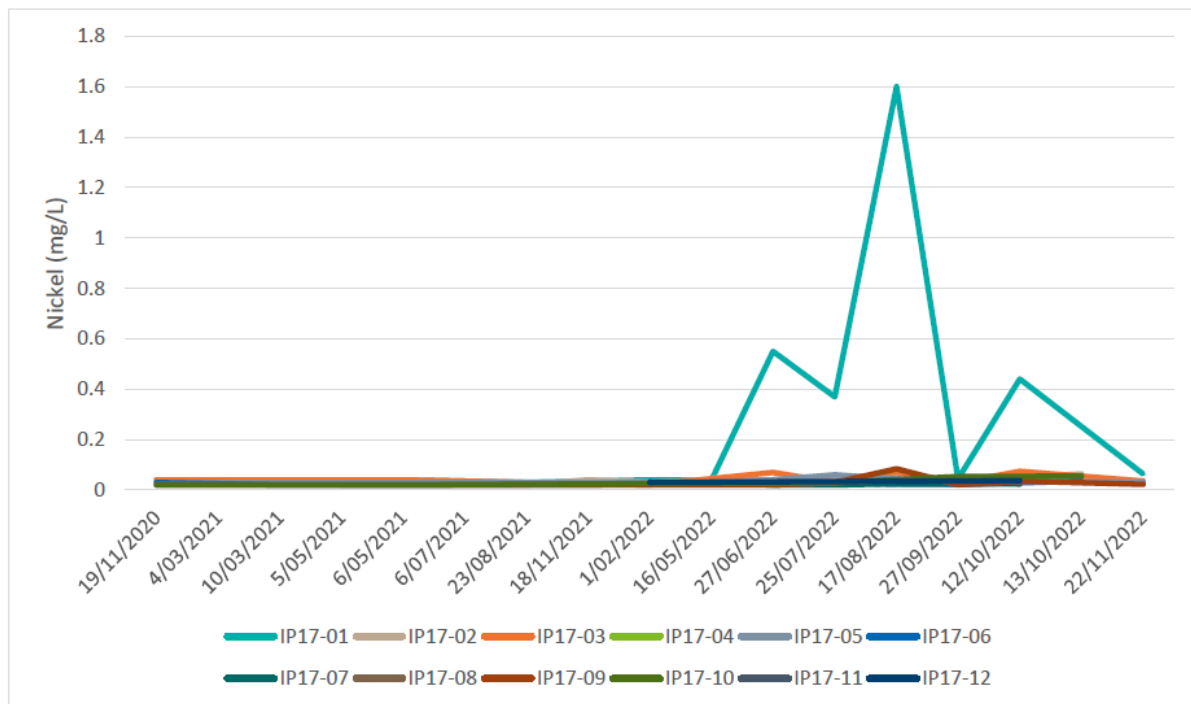
Groundwater salinity surrounding the 17 series pits has been increasing as a result of tailings deposition during time limited operations, particularly for IP17-02 – which increased from TDS 2,500mg/L in 2020 to 6,400mg/L in October 2022 (Figure 7).

Nickel concentrations for monitoring bore IP17-01 increased to 1.6mg/L in August 2022, followed by a declining trend closer to baseline levels in November 2022. Other parameters did not change significantly from baseline during time limited operations.





**Figure 7. Total dissolved solids recorded for groundwater monitoring bores surrounding 17 series in-pit TSF during time limited operations**



**Figure 8. Nickel recorded for groundwater monitoring bores surrounding 17 series in-pit TSF during time limited operations**

### 3.3.3 Proposed seepage management and monitoring

The applicant is proposing the following controls to manage seepage from the TSF:

- Standing water levels in proximity of the pit to be maintained at >4m bgl;
- Monitoring bores installed capable of being equipped with seepage recovery pumps. **DWER notes that this is not acceptable practice, which is further discussed in section 3.3.4;**

- Rotational deposition of tailings into in-pit;
- The supernatant pond will be “kept as small as practicable to minimise seepage from the in-pit TSF”.
- Decant recovery: the original works approval supporting documentation indicates that “water recovered by the decant pump will be pumped to the evaporation ponds”. MMO has confirmed the evaporation ponds have a current capacity of 5,100Mm<sup>3</sup> and that the average rate of decant recovery over the previous five years has been 3,540Mm<sup>3</sup>/year. MMO is not increasing the throughput or changing the rate of tailings discharge – therefore the rate of decant discharge to the evaporation ponds will not change (Murrin Murrin 2023).
- TSF to “allow tailings to desiccate to reduce seepage”: This will include vertical deposition cycles of 3 – 4 months with approximately 1 month drying time, however as other in-pit TSF’s are approaching capacity, drying times may be reduced during the operational life of the 17 series in-pit TSF as it becomes the primary tailings deposition facility.

The applicant also proposes on-going monitoring of twelve monitoring bores installed around the 17 series in-pit TSF.

### 3.3.4 DWER assessment and controls

The closest receptors which might be sensitive to impacts from seepage are adjacent native vegetation, priority flora and ephemeral creek lines. Given the high salinity (180,000mg/L) of the tailings liquor, consequence ratings associated with impacts from seepage are considered “Major”. Impacts to these receptors could occur if groundwater mounding were to continue and the seepage impacted groundwater were to become sufficiently shallow. Given the low percentage of solids (27%) in the tailings slurry and that groundwater levels have risen up to 10 metres in surrounding monitoring bores in five months of operation, the likelihood is considered “possible”. The Delegated Officer therefore considers the overall risk rating for impacts of seepage to adjacent receptors to be “High”.

Spatial coverage for monitoring bores installed under W6526/2021/1 is considered sufficient for on-going monitoring of seepage surrounding the 17-series in-pit TSF. Applicant proposed controls for 4m bgl standing water level limits and for on-going groundwater monitoring and have been placed on the licence. Monitoring will be included as part of a separate Table 3.5.2 under the same condition 3.5.1.

Given the risk ratings for seepage to nearby receptors, the following additional DWER regulatory controls will be placed on the licence.

**Table: 6 DWER regulatory controls (seepage)**

Condition/control	Justification
<p><u>Trigger for seepage management</u></p> <p>Modification to condition 3.5.1 – groundwater monitoring for 17 series in-pit TSF to include a management action trigger</p> <p>New condition 3.5.2 – submission of seepage management plan in event of trigger breach</p> <p>New condition 3.5.3 – implementation of seepage management plan in event of trigger breach</p>	<p>Should groundwater levels surrounding the in-pit TSF reach 6m bgl, DWER has implemented a requirement for the applicant to develop and implement a seepage management plan, including installation of seepage recovery bores.</p> <p>DWER notes that the applicant’s proposed control of converting groundwater monitoring bores into seepage recovery bores is inappropriate. Monitoring bores should be kept separate from seepage recovery to ensure continuity and reliability of monitoring data. The applicant would be required to install fit-for-purpose recovery bores, should they be required.</p> <p>Murrin Murrin will be required to notify DWER if groundwater levels reach 6m bgl.</p>

Modification to condition 4.3.1 – notification of trigger level breach	
<u>Water balance monitoring</u> New condition 3.6.1 – water balance	For on-going monitoring of seepage and to allow both Murrin Murrin and DWER to more adequately assess potential risk, a requirement for on-going water balance monitoring has been placed on the licence as a regulatory control.
<u>Tailings</u> Modification to condition 1.3.2 – authorised emissions	<p>Tailings from other ore sources may present additional risk associated with contaminants of concern which have not been considered or risk assessed within this approval. These may present additional contaminants of concern being present within facility seepage.</p> <p>Only tailings from the premises – the Murrin Murrin Nickel Cobalt Project - are therefore not permitted to be deposited into the 17 series in-pit TSF. To deposit tailings from other ore sources, a licence amendment would be required.</p>

## 4. Consultation

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

**Table 7: Consultation**

Consultation method	Comments received	Department response
Application advertised on the department's website (30/11/2022)	None received	N/A
Shire of Leonora advised of proposal (30/11/2022)	None received	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal (30/11/2022)	DMIRS replied on date stating that “It appears the proposal is consistent with the activities proposed in Mining Proposal REG ID 94424... Please note it is the tenement holder’s responsibility to ensure mining operations are conducted in accordance with Mining Act approvals and tenement conditions. If the licence amendments will result in any changes the mining activities outside of the scope of the Mining Act approvals, it is the tenement holder responsibility to seek further approval or amendments under the Mining Act as required.”	N/A
Department of Planning, Lands and Heritage advised of proposal (30/11/2022)	None received	<p>DWER made various attempts to follow up with DPLH however no comments were received.</p> <p>DWER notes that the applicant is responsible for ensuring appropriate approvals and</p>

		stakeholder engagement has taken place under the <i>Aboriginal Heritage Act 1972</i> .
Licence Holder was provided with draft amendment on 25/1/2023.	The licence holder provided comments on 27/1/2023. See Appendix 2 for detail.	See Appendix 2 for detail.

## 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.

It is recommended that further assessment regarding potential impacts to Katata creek be undertaken by DWER and Murrin Murrin when tailings deposition commences from the southern discharge points associated with stage 3 infrastructure (T4 and T5).

DWER notes that the applicant is responsible for ensuring appropriate approvals have been received and stakeholder engagement has taken place under the *Aboriginal Heritage Act 1972*.

### 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
1.3.2	Inclusion of 17 series in-pit TSF within containment infrastructure table Inclusion of scour sump within containment infrastructure table
1.3.3	Modification to include 17 series in-pit TSF within freeboard management condition
1.3.5	Modification of Table 1.3.2 to explicitly state inspection of embankment freeboard for infrastructure listed in conditions 1.3.3 and 1.3.14. A requirement for all TSFs to have visual markers has also been added to this Table to provide for accurate monitoring of freeboard.
1.3.14	Modified Table 1.3.14 to state freeboard requirement for all in-pit tailings storage facilities
3.5.1	Modification to include Table 3.5.2 for 17 series in-pit TSF monitoring bores and monitoring requirements Administrative correction to text as detailed in section 2.6 of report
3.5.2 (new) and 3.5.3 (new)	New conditions for development and implementation of a seepage management plan in the event of a licence trigger breach.
3.6.1 (new)	New condition for water balance monitoring of 17 series in-pit TSF
4.3.1	Modification of condition to include trigger breaches for notification requirements.
Schedule 1	Inclusion of Figures 24 and 25 relating to 17 series in-pit TSF stage one infrastructure and monitoring bores

## References

1. Coffey 2020, Geotechnical Assessment of 17 Series In-Pit TSF
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. Environ Australia Pty Ltd (Environ) 2010, '*Murrin Murrin North 8/5 and 9/4 Inpit Tailings Disposal: Mining Proposal and Works Approval Supporting Documentation*', unpublished report for Minara Resources Pty Ltd.
6. Murrin Murrin 2022, *Annual Environmental Report, 2021 – 2022*
7. Murrin Murrin 2023, *RE Proposed Amendment to Licence*, DWER ref A2152366
8. Saprolite 2020, *Murrin Murrin North Mining Area Proposed In-Pit Tailings Disposal into 17 Series Pit Voids*



## Appendix 1: Tailings characterisation

Table 9 Tailings liquor characterisation (Environ, 2010)

Parameter	Units	Tailings liquor (Sample 1)	Tailings liquor (Sample 2)
EC	µS/cm	64,000	64,000
TDS	mg/L	182,000	188,000
pH	-	3.5	3.56
Al	mg/L	480	500
B	mg/L	12	12
Ca	mg/L	400	400
Cd	mg/L	0.085	0.087
Co	mg/L	26	26
Cu	mg/L	2.4	2.4
Cr	mg/L	21	20
Fe	mg/L	4,300	4,300
K	mg/L	28	28
Mg	mg/L	21,000	22,000
Mn	mg/L	2,100	2,100
Mo	mg/L	<0.005	<0.005
Na	mg/L	540	540
Ni	mg/L	400	410
Si	mg/L	67	68
Zn	mg/L	61	62
As	mg/L	0.048	0.03
Pb	mg/L	<0.02	<0.02
Hg	mg/L	0.0001	0.0001

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

Condition	Summary of Licence Holder's comment	Department's response
1.3.2 (Table 1.3.1)	The 17 Series in-pit TSF is one single pit void and cannot be divided into individual pits for the purpose tailings deposition or management. The pit numbering on some maps may be misleading but reflects original mine pit sequencing. All 17 series pits have now been joined to form one single pit.	The licence has been revised to reflect authorised stage one discharge points T1 and T2 rather than to pit numbering.
1.3.5 (Table 1.3.2)	N/A	Following from the Licence Holder's response that visual markers are present in TSFs, this Table has been amended to include the requirement for these visual markers to be present in all TSFs. This will provide for accurate monitoring of freeboard.
1.3.14	Request update to in-pit facility names to reflect those in the provided table (and to also reflect that some of the in-pit voids are connected).	The licence has been updated to reflect the in-pit facility names provided.
3.5.2	The condition requires the licensee to install seepage recovery bores, however, it would be more accurate to replace the word 'bores' with 'pumps' within the condition, as there are a number of monitoring bores already in place which can be equipped with recovery pumps.	<p>The draft decision report provided to the applicant stated the applicant proposed conversion of monitoring bores into seepage recovery bores was considered inappropriate – as discussed in section 3.3.4 of this decision report.</p> <p>Monitoring bores should be kept separate from seepage recovery to ensure continuity and reliability of monitoring data. The applicant will be required to install separate fit-for-purpose recovery bores, should they be required (in the event of groundwater levels surrounding the in-pit TSF reaching 6 m bgl).</p> <p>Condition 3.5.2 has been amended with a note to make it clear that monitoring bore conversion to seepage recovery bores will not be accepted.</p>

## Appendix 3: Application validation summary

SECTION 1: APPLICATION SUMMARY				
Application type				
Works approval	<input type="checkbox"/>			
Licence	<input type="checkbox"/>	Relevant works approval number:		None <input type="checkbox"/>
		Has the works approval been complied with?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Has time limited operations under the works approval demonstrated acceptable operations?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Date Report received:		
Renewal	<input type="checkbox"/>	Current licence number:		
Amendment to works approval	<input type="checkbox"/>	Current works approval number:		
Amendment to licence	<input checked="" type="checkbox"/>	Current licence number:	L7276/1996/12	
		Relevant works approval number:	N/A	<input type="checkbox"/>
Registration	<input type="checkbox"/>	Current works approval number:	None	<input type="checkbox"/>
Date application received	1/11/2022			
Applicant and Premises details				
Applicant name/s (full legal name/s)	Murrin Murrin Operations Pty Ltd			
Premises name	Murrin Murrin Nickel Cobalt Project			
Premises location	M39/446, M39/820, L39/81, L39/62, L39/83, M39/299, M39/651, M39/300, M39/301, M39/435, M39/436, M39/421, M39/422, M39/423, M39/424, M39/342, M39/343, L39/136, L39/168, M39/314, M39/322, M39/562, M39/637, M39/686, M39/692, M39/714, M39/715, M39/716 and M39/737 Laverton WA 6440			
Local Government Authority	Shire of Leonora and Shire of Laverton			
Application documents				
HPCM file reference number:	2011/011705-1			
Key application documents (additional to application form):	Proof of Occupier Status Shapefile Mining proposal approval: reg ID 94424 Application supporting documentation			

Scope of application/assessment		
Summary of proposed activities or changes to existing operations.	<p><u>Licence amendment</u></p> <p>MMO are requesting an amendment to allow ongoing operation of the in-pit TSF and associated infrastructure (pipelines etc) originally approved via works approval W6526/2021/1.</p> <p>They are also seeking addition of mining tenement M39/553 to the premises.</p> <p>(would also involve additional of monitoring bore network associated with in-pit TSF to the licence)</p> <p><u>A list of the applicants requests as detailed in their application are:</u></p> <ul style="list-style-type: none"> <li>• “Update to premises details by including tenement M39/553 in the tenement list;</li> <li>• Update the prescribed premises boundary map (Figure 1 in Schedule 1) with Figure 2-2 of this document (also provided as Attachment 2A of the application package);</li> <li>• Insert Figure 2-3 of this document in Schedule 2 (attachment 2A of application package)</li> <li>• Update Table 1.3.1 to include In-pit 17 series as a containment point reference;</li> <li>• Update Table 3.5.1 to include monitoring bores”</li> </ul>	
Category number/s (activities that cause the premises to become prescribed premises)		
<b>Table 1: Prescribed premises categories</b>		
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	5,000,000 tonnes per annum	No changes to throughput proposed (works approval W6526 throughput is same as current licence throughput)
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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input type="checkbox"/>
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: MS 506 approved 31/5/1991 EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Reference No:

<p>Has the applicant demonstrated occupancy (proof of occupier status)?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Certificate of title <input type="checkbox"/>          General lease <input type="checkbox"/> Expiry:          Mining lease / tenement <input checked="" type="checkbox"/> Expiry: see extract for expiries – <b>new tenement lease M39/553 has been provided</b>          Other evidence <input type="checkbox"/> Expiry:</p>
<p>Has the applicant obtained all relevant planning approvals?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/></p>	<p>Approval:          Expiry date:          If N/A explain why?          Exempt under the <i>Mining Act</i></p>
<p>Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>CPS No: N/A          No clearing is proposed.</p>
<p>Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Application reference No: N/A          Licence/permit No: N/A          No clearing is proposed.</p>
<p>Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Application reference No:          Licence/permit No:          206312: exp 22/11/2026          61171: exp 22/11/2026          206313" exp 22/11/2026          154363 exp 22/11/2026          60768 (expired)          101297 (expired)          151974 (expired)</p>
<p>Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Name Goldfields Groundwater Area          Type: RIWI ACT          Has Regulatory Services (Water) been consulted?          Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>          Regional office: Goldfields</p>



<p>Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	<p>Name: N/A  Priority: N/A  Are the proposed activities/ landuse compatible with the PDWSA (refer to <a href="#">WQPN 25</a>)?  Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>.</p>
<p>Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx</i>)</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p><i>Mining Act 1978</i></p>
<p>Is the Premises within an Environmental Protection Policy (EPP) Area?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises subject to any EPP requirements?</p>	<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>	
<p>Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i>?</p>	<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>	<p>Classification: Awaiting classification  Site 2024</p>