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	L8148/2006/4
Licence Holder	Koolan Iron Ore Pty Ltd
ACN	099 455 277
File Number	APP-0026533
Premises	Koolan Iron Ore Mine and Port Facility Mining Tenements M04/416, M04/417, L04/29 and L04/68 KOOLAN ISLAND (BUCCANEER ARCHIPELAGO) WA 6733
Date of Report	03/06/2025
Decision	Revised licence granted

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1. Decision summary

Licence L8148/2006/4 is held by Koolan Iron Ore Pty Ltd (Licence Holder) for the Koolan Island Iron Ore Mine & Port Facility (the Premises), located within Mining Tenements M04/416, M04/417, L04/29 and L04/68, Koolan Island.

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 L8148/2006/4 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 28 November 2024, the Licence Holder submitted an application to the department to amend Licence L8148/2006/4 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Increase mine dewatering from 5,000,000 tonnes per year up to 10,000,000 tonnes per year;
- Allow routine dewatering discharge via the W3 emission point (this is the contingency discharge point under the current licence). Under the updated licence, contingency dewatering would continue to be undertaken via the W1a emission point, with emission point W1 being used to manage the risk of exceeding the 20 mg/L TSS limit for the W3 emission point.and
- Extend the duration of the licence beyond 17 June 2025 (20 years as per licence duration guidance statement).

Due to increased groundwater volumes as mining proceeds at greater depths within the eastern section of Main Pit, the annual routine dewatering volume for 2025 and 2026 is conservatively forecast to increase to 8,000,000 KL at an average rate of 21,917 KL/day. It is due to these expected increases in groundwater seepage that the current licence amendment is being sought.

This amendment is limited only to changes to Category 6 activities from the Existing Licence. No changes to the aspects of the existing Licence relating to Category 5, 12, 54, 58, 64 and 73 have been requested by the Licence Holder.

Table 1 below outlines the proposed changes to the existing Licence.

Table 1: Proposed design changes

Category	Current design capacity	Proposed design capacity	Description of proposed amendment
Category 6: Mine Dewatering	Existing Current mine dewatering 5,000,000 tonnes per annual period	Proposed The proposal is to increase the dewatering limit to 10,000,000 tonnes per annual period.	Proposed increase to annual mine dewatering limit and discharge points.

2.2.1 Overview of existing operations

Iron Ore is currently mined from the Main Pit, which is located at the south coast of Koolan Island. The Main Pit has been mined below sea level and is separated from Arbitration Cove (the marine environment to the south of Main Pit) by an engineered seawall. Water enters Main Pit via several pathways: seepage through the engineered seawall, seepage through the hanging wall and underlying rock, and surface flows from the Main Pit catchment in response to rainfall events.

As part of ongoing iron ore mining operations, the applicant undertakes dewatering operations from the Main Pit on Koolan Island and discharges this dewater to the ocean.

There are four relevant emission points that are currently listed in licence L8148 for the purpose of carrying out routine and contingency discharge of dewater from the Main Pit (Figure 1). Emission point W1 currently acts as the single routine discharge point, while emission points W1a, W2 and W3 provide contingency discharge options for mine dewater. These emission points are currently operated as follows:

- W1 – Mine dewater is routinely discharged from W1 via a settlement pond to the ocean through an engineered diffuser. The contingency discharge points are operated in circumstances where W1 is insufficient for the volume of water being discharged or where W1 is not operational (i.e. due to maintenance);
- W1a – Serves as the primary contingency emission point, where dewater is discharged directly into the ocean via a diffuser adjacent to the onshore settlement pond. Emission point W1a shares pipeline infrastructure with emission point W1, however it is able to bypass the settlement pond under contingency discharge protocols as described further below;
- W2 – This emission point is not currently installed; however, it is currently included as a contingency emission point under Licence L8148; and
- W3 – Contingency emission point where mine dewater is discharged over the Main Pit sea wall directly to the ocean via an open outlet.

Over the 2019-2023 period, the average annual dewatering volume was 4,224,751 KL at a rate of 11,574 KL/day. This average annual dewatering volume comprises of both routine and contingency dewatering events.

Routine dewatering occurs year-round as water enters the main pit via rainfall events, seepage through the hanging wall and underlying rock (groundwater), and seepage via the engineered seawall. Under routine dewatering protocols, water from the main pit is continually moved through the W1 emission point pipeline, into the settlement pond, and then discharged into the marine environment via the diffuser. Over the 2019-2023 period, routine dewatering occurred at an average annual volume of 3,737,202 KL per year (10,238 KL/day).

Contingency dewatering is carried out in direct response to rainfall events or where there are temporary periods of routine dewatering system maintenance. Under contingency dewatering protocols, water is moved from the main pit up to the settlement pond where it is then diverted to bypass the settlement pond to be directly discharged into the marine environment. Mine dewater that is discharged during contingency discharge events is comprised of both routine and contingency dewater which is discharged via the one ocean outfall (the W1/ W1a emission point). Contingency dewatering accounted for an annual average volume of 487,548 KL per year (nominally 1,335 KL/day) for the 2019-2023 period.

Monitoring of point source emissions of Total Recoverable Hydrocarbons (TRH) and Total Suspended Solids (TSS) is undertaken in accordance with conditions 14 and 15 of licence L8148 to ensure that TSS and THR limits of 20mg/L and 15mg/L respectively are not exceeded during routine dewatering events. It should be noted that no limit applies during contingency discharge periods, as contingency discharge is required to meet critical operational, safety and

geotechnical requirements in the Koolan Island Main Pit and is undertaken only when the Main Pit and the Settlement Pond both reach their maximum design capacity.

An in-pit sump situated within the Main Pit near emission point W3 acts as a settlement pond for the purpose of reducing TSS prior to dewater being discharged into the marine environment.

Figure 4 of Appendix 2 illustrates the potential flow pathways for routine and contingency discharge via the W1 and W1a pipelines. A number of scenarios that are illustrated in Figure 4 include the bypassing of the settlement pond, typically during storm events or where settlement pond and in-pit storage options are at capacity.

2.2.2 Proposed changes to main pit dewatering

In 2025 and 2026, the annual routine dewatering volume is conservatively forecast to increase to 8,000,000 KL at an average rate of 21,917 KL/day. This anticipated increase in dewatering can be attributed to increased groundwater volumes as mining proceeds at greater depths within the eastern section of Main Pit. This assumes that there is no change in the rate of seepage from the hanging wall.

In 2020 the contingency dewatering volume was estimated at 2,790,000 KL per year based on best estimates at that time and prior to increased seepage from the hanging wall. Under current conditions, and with the benefit of annual dewatering volumes available from 2019 onwards, the annual contingency dewatering volume is now conservatively estimated at 2,000,000 KL.

Considering the above, the revised total maximum annual dewatering volume (routine plus contingency) for the remaining life of mine is therefore estimated to be 10,000,000 KL which equates to an increase of 5,000,000 tonnes above the current licence limit. As flow rates are high, the increase in yearly discharge will ensure the applicant does not breach the limit on the licence.

To accommodate the proposed increase in dewater volumes, the following changes to the emission points are proposed:

- W1 – This emission point will be used to manage the risk of exceeding the 20 mg/L TSS limit for the W3 emission point. This risk will be managed by diverting mine dewater to the W1 emission point via the settlement pond, when TSS concentrations are approaching the limit and are forecast to continue rising.
- W1a – This will remain the contingency emission point for dewater discharge from the Main Pit.
- W2 – This emission point will be removed from the licence as it is not required and will not be constructed.
- W3 – This will function as the primary routine emission point in lieu of emission point W1.

The changes to routine emission points mean that there is a more direct and efficient route from the Main Pit to the discharge area via the in-pit sump, which acts as a settlement pond for the purpose of reducing TSS prior to discharge under routine dewater discharge protocols.

Under the amended licence, contingency discharge of mine dewater will remain unchanged, with water being extracted from the Main pit via the W1/ W1a pipeline where it will bypass the settlement pond through the W1a emission point.

No changes are proposed to the emissions limits to surface water quality for any of the emissions points (refer Table 7 in L8148), meaning that TSS and TRH limits at the W3 emission point would remain at 20 mg/L and 15 mg/L, respectively. This water quality is attainable within the in-pit sump, except during periods of rainfall when more turbid conditions prevail and through the inclusion of a volumetric daily flow limit to the emission points. In the scenario where TSS concentrations exceed 20 mg/L, contingency dewatering would be undertaken via the W1a outlet as per current arrangements, as emission point W1a is not

limited to the 20mg/L as specified in Table 7 of the licence.

3. Legislative context

3.1 Part IV of the EP Act

3.1.1 Background

Ministerial Statement 715 (MS 715) applies to the iron ore mine and associated infrastructure on Koolan Island. In accordance with MS 715 a Marine Management Plan (MMP) is required to be prepared and implemented by the Licence Holder.

The MMP sets out additional monitoring and management requirements of the marine environment in response to activities being undertaken in accordance with Licence L8148. More specifically, monitoring of the ambient marine environment in the vicinity of the existing emission points is a requirement of the MMP and includes annual marine monitoring surveys such as benthic habitat/coral cover surveys.

Additional controls are described in the MMP with respect to levels of ecological protection. Emission points W1 and W1a are located within a Low Ecological Protection Area (LEPA) while emission point W3 is located within a Moderate Ecological Protection Area (MEPA) (Figure 1). These areas of ecological protection prescribe the following limits:

- Water quality within the LEPA must remain within the 5th and/or 95th percentile of natural background for physicochemical stressors and within the 90% species protection limits for toxicants in water; and
- Within the MEPA there should be no detectable change in biodiversity, and only small changes in abundance and biomass and rates of ecosystem processes (e.g., 95th percentile of background).

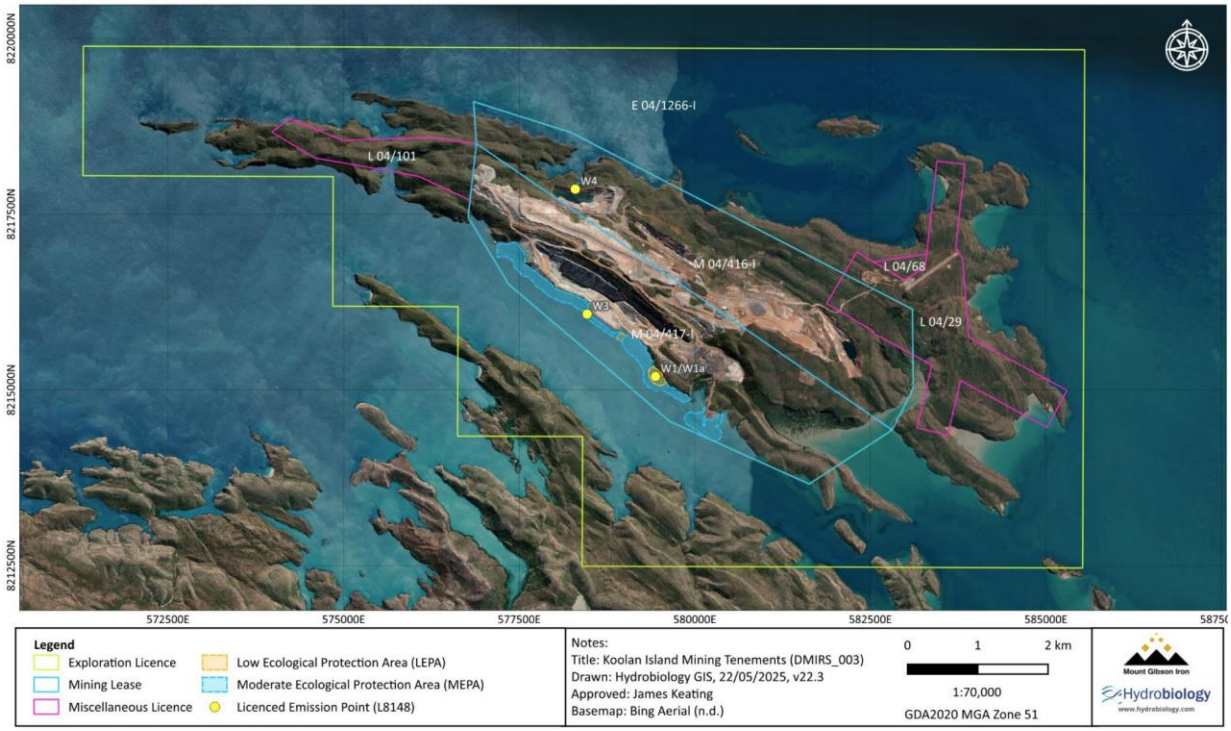
3.1.2 Environmental Protection Authority Services (EPAS) advice on Ministerial Statement 715 and Marine Management Plan

EPAS provided advice on 3 April 2025 relating to the proposed increase in mine dewater discharge. EPAS advised that the increase dewater discharge volume does not likely warrant EPA assessment under s.45c or s.46 of the *Environmental Protection Act 1986* (EP Act). This is based on existing condition 7 of MS 715 likely being able to manage potential impacts from the proposed licence amendment and ensure consistency with EPA objectives by requiring the following:

- Implementation of the Marine Management Plan (MMP, Version 22.5 was approved on 22 April 2024);
- Key management actions in MMP to minimstadise potential direct and indirect impacts;
- Maintain the ecological integrity and biodiversity of the marine environment;
- Water quality for dewatering discharge is required to meet relevant targets/criteria prior to release into the ocean; and
- Marine environmental quality monitoring to determine the level of sediments in the water, and changes in the physio-chemical properties of sediments and water in their natural state.

Considering the advice provided by EPAS and the nature of the proposed amendment, the Delegated Officer does not consider there to be any constraint to proceeding with the assessment of this amendment or making a decision on this application, and that no further assessment by EPAS is required.

Figure 1: Emission Points in relation to Ecological Protection Areas



EPAS has advised that it considers that the existing provisions in the MMP (as required by MS 715) can likely manage the potential impacts associated with the proposed license amendment and is consistent with EPA's objectives. The existing monitoring and management methods outlined in the MMP are likely sufficient to detect potential impacts on the marine environment. Furthermore, the EPA notes that the MMP underwent a comprehensive review in 2024. Considering this, any impacts to LEPAS and MEPAS, as well as implementation of the MMP can be managed under Part IV of the EP Act.

4. Modelling and monitoring

4.1 Dewater discharge dilution modelling study

4.1.1 Methodology

Dilution modelling was carried out in 2020 (Hydrobiology 2020) for the purpose of evaluating the dispersion of total suspended solids (TSS) into the marine environment from mine dewater discharge. This initial model was based on 5 million tonnes per annum (mtpa) discharge rates and informed the design of the diffuser present at the W1/ W1a emission point, and supported the ongoing discharge of mine dewater into the marine environment.

Modelling methodology for this project included a computational and analytical method used to simulate the near field mixing and dispersion of pollutants immediately after discharge into a water body. This method is used to predict the evolution of concentration gradients as a buoyant or momentum-driven jet interacts with the ambient water.

In this scenario, modelling has been used to predict concentrations of TSS during surface contact of the modelled discharge plume based on various discharge concentrations, including the current W1/W3 emission limit of 20 mg/L as well as the median, 80th percentile and 95th percentile of dewatering discharge monitoring results (TSS concentrations of 14.5, 67.0 and 173.3 mg/L respectively).

4.1.2 Results and findings

The model predicted the following results for the highest discharge rate and highest TSS value modelled (45,000 m3 /d at 150 mg/L TSS):

- The TSS trigger value for the surrounding MEPA (background @ 2.78 mg/L) would be met outside a 23.2 x 11.0 m mixing zone (i.e., well within the LEPA boundary) at flood tide; and
- The TSS concentration at the LEPA boundary would be 2.178 mg/L (background TSS concentration is 2.12 mg/L).

Modelling also showed that lower volumes and TSS concentrations produce smaller mixing fields. For example, for a discharge volume of 25,000 m3 /day:

- A TSS concentration of 20 mg/L produces a plume diameter of 10.6m on the flood tide and 48.4m on the ebb tide with corresponding TSS concentrations of 2.15 mg/L and 2.148 mg/L, respectively - the trigger value boundary for this scenario (where TSS = 2.78 mg/L) is 5.4m x 3.4m from the discharge point.
- A TSS concentration of 50 mg/L produces a plume diameter of 26.4m on the flood tide and 48.4m on the ebb tide with corresponding TSS concentrations of 2.15 mg/L for both tidal states – the trigger value boundary for this scenario (where TSS = 2.78 mg/L) is 9.6m x 7.6m from the discharge point.

The LEPA/ MEPA TSS boundary trigger value (2.78 mg/L) was not exceeded for any of the dilution modelling scenarios. Furthermore, the maximum modelled TSS concentration at the LEPA boundary is 2.178 mg/L, with a background concentration of 2.12 mg/L.

Initial dilution modelling concluded that substantial increases in both the volume of mine dewater and TSS concentration therein can be discharged such that TSS is adequately mixed within waters adjacent to the source.

4.1.3 Updated dilution modelling and results

Updated modelling was requested by the Delegated Officer for the proposed increase in mine dewater discharge of up to 10,000,000 tonnes per year. As with the initial modelling, the updated modelling predicts TSS concentrations at the surface contact of the modelled discharge plume based on the current W1/W3 emission limit of 20 mg/L as well as the median, 80th percentile and 95th percentile of dewatering discharge monitoring results.

The revised modelling predicts TSS at the surface contact of the plume to be significantly lower than the licenced emission limit of 20 mg/L. For the proposed W3 emission point, where the TSS concentration of mine dewater is 20mg/L, the predicted average plume TSS concentration at the surface is 0.04 mg/L on the ebb tide and 0.02 mg/L on the flood tide. This equates to average dilutions at surface contact of 1:447 (ebb tide) and 1:867 (flood tide). The average distances from the discharge point to where the plume contacts the surface are 19.5m (ebb tide) and 54.14m (flood tide).

Updated dilution modelling therefore indicates that the dilution rates are conducive to meeting the licensed discharge criteria of 20 mg/L for TSS for the proposed increased dewatering volume of 10,000,000 tonners per year. This is largely due to the density differences between the discharge waters and the receiving marine waters (buoyant plume) and, the current velocities naturally occurring at Koolan Island due to the high tidal range and constrained topography/bathymetry.

4.1.4 DWER technical review of dilution modelling

The Department has reviewed the initial and revised dilution modelling and has identified the following:

- The existing licensed discharge criterion of 20 mg/L is precautionary and agreed to in absence of in-situ monitoring. The intention is to limit the contribution to natural turbidity

from the discharge plume at the Low Ecological Protection Area (LEPA) boundary, particularly near the seabed where sensitive benthic communities are located.

- Modelling results suggest that regardless of the concentration of TSS in the pipe (up to 173 mg/L) the contribution to turbidity at the discharge point is <1 mg/L. Less than 1 mg/L is barely measurable and, hence, should not concern DWER, however,
- The modelling scenarios assume a constant discharge rate of 0.317 cubic metres per second, based on a total discharge of 10 million tonnes per year. This is unlikely to be representative of 'worst case' scenarios, such as during a significant rainfall event.
- The modelling results suggest adequate dilution of TSS is achieved between the diffuser and surface contact, particularly with the use of a multi-port diffuser, which improves dispersion in all scenarios. Parallel orientation of the diffuser under flood/ebb conditions optimises dilution and that a deeper diffuser depth would further enhance mixing by utilising the full water column, particularly during rising tides.
- The modelling results would ideally be validated through in situ monitoring at the LEPA boundary to ensure alignment with model predictions of TSS concentrations over time and under different tidal cycles. Monitoring of TSS at the LEPA boundary for a specified period should be incorporated into the Marine Management Plan (MMP) when possible.
- The modelling evaluates the impacts of discharging at concentrations greater than 20 mg/L and predicts that the contribution from the discharge to TSS of the receiving environment is less than1 mg/L approximately 20m from the diffuser. This contribution is negligible and is likely to be met within a newly proposed and spatially defined LEPA (where impacts on water quality and habitats are permitted). Provided the modelling is adequately validated by in situ monitoring and 90% species protection levels for all parameters of concern are met at the LEPA boundary, the risk of prolonged exposure effects is deemed to be low beyond the LEPA boundary.
- There is currently no point source limit to surface water for nitrates or nitrites. The use of explosives in the main pit has been identified as the likely source of nitrates and nitrites, and this should be monitored where possible.

Key Findings:

- The Delegated Officer acknowledges that the MMP was reviewed and updated in 2024, however the following recommendations are provided:
    - The next review should consider, in greater detail, defining a Low Ecological Protection Area (LEPA) around the W3 discharge point, unless it can be demonstrated that 90% species protection levels immediately adjacent to the diffuser for all parameters of concern, including nitrite/nitrate, can be met.
    - The Levels of Ecological Protection associated with the discharge points need to be designated in accordance with the Technical Guidance (EPA 2016). LEPA should be designated for W3 which extends to no more than 70m in radius from each discharge point. Currently the area surrounding discharge point W3 is designated as Moderate Ecological Protection Area (MEPA).
    - Modelling predictions should be verified in situ under different discharge and metocean conditions including the worst-case scenario (including 'routine' and 'contingency' discharge conditions).
    - Diffuser performance should be validated along a transect in the direction of the prevailing current which radiates from the discharge point to a distance of at least 70m, which will intersect the new (yet to be implemented) LEPA boundary associated with the discharge points. To verify the direction of currents the use of drogue is

recommended. Reference sites should be monitored concurrently.

  - The EPA Guidance (EPA 2016) recommends that for physico-chemical parameters such as TSS, the water quality should be equivalent to the 95th percentile of background TSS at the boundary of the MEPAs and 80th percentile of High Ecological Protection Area (HEPA).

- Settlement of mine dewater should be heavily incentivised, and contingency discharge should be prevented as much as possible through the inclusion of a 'contingency discharge' definition and limits to volumetric flow leaving the emission points.
- It is apparent that a definition for 'contingency discharge' would likely address some of the concerns associated with over reliance on contingency discharge and resulting high (but unmitigated) TSS during contingency discharge events.
- The absence of a volumetric flow limit could be seen to contribute to increased TSS during both routine and contingency discharge events. A volumetric flow limit of 317 mg/L aligns with the ideal rates of flow identified in the dilution modelling.
- It is noted that there is currently no point source limit to surface water for nitrates or nitrites. Exceedance of nitrates/nitrate remains a risk, with explosives in the main pit having been identified as the likely source of nitrates and nitrites. As there are no default guideline values for marine environments for these parameters, the Delegated Officer does not consider that there is sufficient support for further risk assessment concerning nitrates and nitrites entering the marine environment via dewater discharge.
- The modelling outputs should be compared to the EPA Guidelines (EPA 2016) at the boundary of the LEPA/MEPA to determine if there is a risk of impacts to the marine environment. If alignment with the guidelines is achieved with a discharge rate of 20 mg/L then the licence limits are aligned with the EPA Guidance. If alignment with the guidelines is not achieved, then the licence limit needs to be reduced, and alternatively if it is achieved, there may be scope to increase the licence limit.

4.2 Review of the MMP

As previously stated, the MMP was reviewed in 2024, however the review of licence L8148/2006/4 has identified further issues which could be addressed through a future review of the MMP. Key findings, listed above, from the review of licence L8148/2006/4 should be considered when the MMP is next reviewed in 2028.

5. 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 2020a).

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.

5.1 Source-pathways and receptors

5.1.1 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 2: Licence Holder controls below.

Table 2: Licence Holder controls also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 2: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Mine pit dewater	Routine dewatering of Main Pit dewater discharged through W3 emission point (ocean outfall), with the W1a emission point to be used as a contingency.	Direct discharge into marine environment	• Offtake from upper portion of in-pit sump. • Multi-port diffuser at offshore discharge point. • Pumping rate in accordance with diffuser specifications. • Discharge paused and re-routed to W1 discharge point via settlement pond if sampling indicates exceedance of a point source emission limit.

5.1.2 Receptors

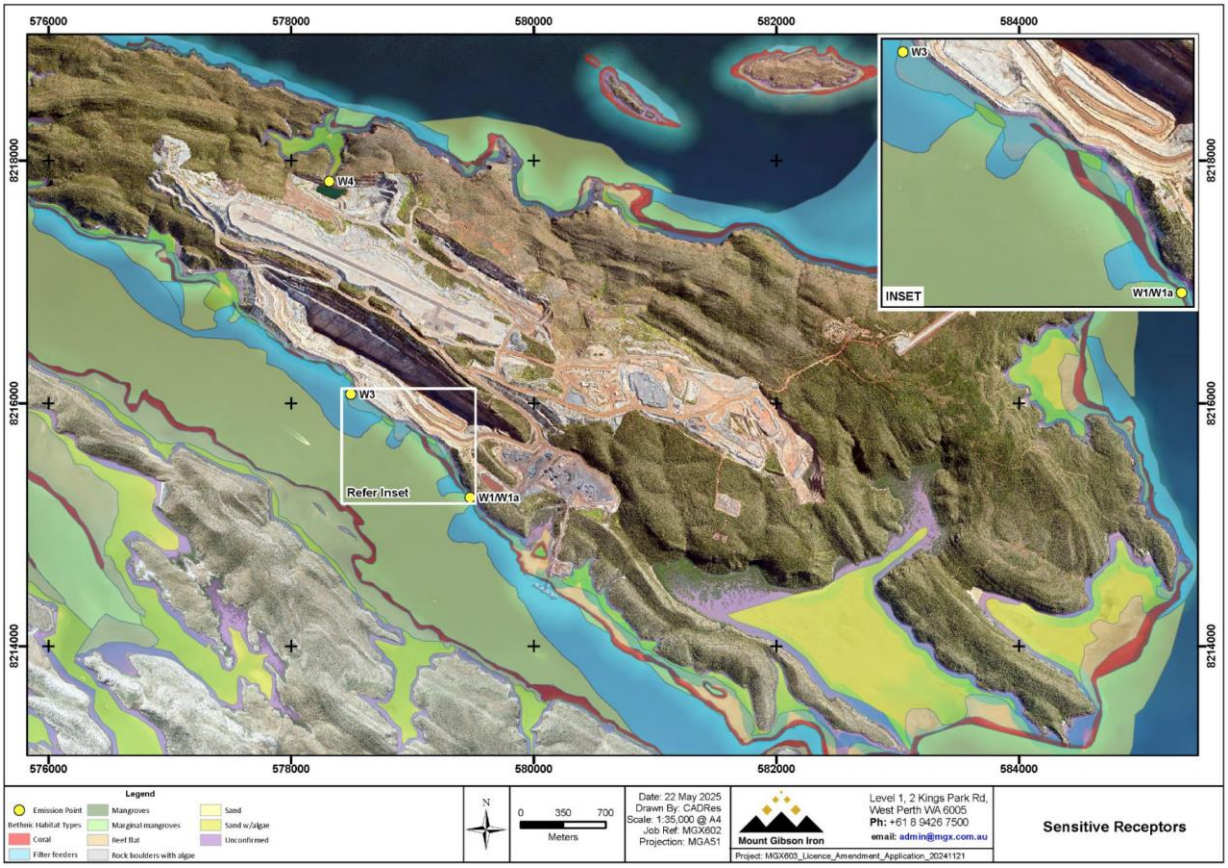
In accordance with the *Guideline: Risk assessments* (DWER 2020a), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under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

Table 3: Sensitive human and environmental receptors and distance from prescribed activity 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 3: Sensitive human and environmental receptors and distance from prescribed activity

Environmental receptors	Distance from prescribed activity
Marine waters and fauna, including benthic communities and coral reef habitat and species	The emission points discharge beyond the extent of the coral reef, which is located adjacent to the shoreline.

Figure 2: Distance to sensitive receptors



5.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020a) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 5.1. 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 5.1), 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 4: Risk assessment of potential emissions and discharges from the Premises during operation.

The Revised Licence L8148/2006/4 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Category 6 activities.

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

Table 4: Risk assessment of potential emissions and discharges from the Premises during 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**				
Routine dewatering of Main Pit dewater discharged through the W1 and W3 emission points (ocean outfall) and occasional discharges at W1a emission point. Increased volume of annual dewater discharge to ocean, up to 10 million m^3	Mine pit dewater with elevated TSS	**Pathway:** Direct discharge into marine environment **Impact:** Deterioration in health or death of marine ecosystems and species	Marine environment (waters and species in the vicinity of Arbitration Cove)	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	N	Condition 13 **Condition 14 and Table 16 – contingency discharge definition** **Condition 15 – volumetric flow limits**	Refer to section 5.3 – detailed risk assessment of mine dewater discharge

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

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

5.3 Detailed risk assessment – discharge of TSS to the marine environment

5.3.1 Overview of the risk assessment

This detailed risk assessment considers the potential for environmental harm associated with the proposed doubling of annual dewatering discharge volumes from 5,000,000 tonnes per annum to 10,000,000 tonnes per annum into the marine environment.

5.3.2 Characterisation of emission

Discharge water quality

Contingency discharge typically occurs following heavy rainfall events and/or when "reuse, in-pit disposal and temporary storage are not available or have been exhausted" as per condition 14 of licence L8148. During these contingency discharge events, TSS levels range between 6.4 mg/L to 6,420 mg/L with a mean of 213.4 mg/L and a median of 30 mg/L (Mount Gibson Iron 2025).

Annual Environmental Reports (AER) submitted by the licence holder from 2022 through to 2024 (Mount Gibson Iron 2023, Mount Gibson iron 2024, and Mount Gibson Iron 2025) provide the recorded TSS (mg/L) for each discharge event and are summarised in Table 5 below.

Table 5: Summary of AER TSS readings 2022-2024

AER Year	Total samples collected from routine emission point W1	Total samples collected from contingency emission points		Total samples collected from W1 where 20 mg/L limit was exceeded	Average TSS at emission point W1 over a 12 month period.
		W1a	W3		
2022	346	25	6	5	9.7 mg/L*
2023	347	24	11	10	12.2 mg/L
2024	311	38	26	8	11.7 mg/L

*denotes incomplete data – mean TSS was the only data available for 2022.

Volumetric flow rates

The volumetric flow rate for all discharge points is recorded daily and is reported monthly as per Table 10 of Licence L8148. Although there are limits in place for TSS, no such limits exist for volumetric flow rates within the licence. Maximum flow rates via W1 for the 2024 period reached 28367.1 mg/L while maximum flow rates via W1a were comparable with 26417.2 mg/L.

5.3.3 Characterisation of potential impact

The discharge of increased dewater volumes entering the marine environment with elevated TSS concentrations has the potential to reduce water quality and the health of marine species and habitats. There is an increased risk of impacts to the marine environment during contingency discharge events, given TSS concentrations are not currently restricted during these periodic events.

5.3.1 Licence holder controls

Controls are summarised in Section 5.1.1, with additional controls being implemented in accordance with Part IV approvals, such as the MMP and marine monitoring.

5.3.2 Criteria and assessment

TSS is currently monitored in accordance with conditions 13, 14, 15 and 22 of Licence L8148/2006/4. A limit of 20 mg/L for TSS is set for routine discharges, however the licence does not specify a limit for TSS during contingency discharge events. There are currently no standard limits set for TSS.

As discussed in section 5.3.2, TSS concentrations in routine discharges rarely exceed the licence limit of 20 mg/L. However, during contingency discharges, TSS concentrations are typically higher, with the maximum recorded TSS for 2024 being 6420 mg/L. Contingency discharges are also not clearly defined in the licence and there is no restriction on the rate of discharge, which is typically higher, during contingency discharge events. For these reasons, the Delegated Officer considers additional controls necessary, specifically a limit to volumetric flow rate, and providing a definition for contingency discharge.

TSS concentrations are currently lowered during routine discharge by allowing suspended solids to settle in a settlement pond before being discharged through the W1 emission point. During contingency discharge, mine dewater may be run directly through emission point W1a (Plates 2, 5, 6, 8 and 9 in Figure 4, Appendix 2), bypassing the settlement pond, with no further criteria required to be met for the reduction of TSS. This amendment includes the use of an in-pit sump to reduce TSS prior to discharge via emission point W3, with settlement being achieved by the existing settlement pond prior to dewater being discharged via emission point W1/ W1a.

5.3.3 Consequence

Based on monitoring data from the AER's and the sensitivity of receptors (the marine environment), the delegated officer has determined that the impact of discharging mine dewater to the marine environment (leading to excessive TSS loading) is low-level, off-site impacts. Therefore, the delegated officer considers the consequence to be moderate.

5.3.4 Likelihood

TSS is currently treated by allowing suspended solids to settle in a settlement pond before discharge via W1. The resulting TSS in the settlement pond (before discharge to the diffuser) is markedly lower than the in-pit sump TSS, which occasionally exceeds 20 mg/L (~5 times per year). Once exceeded, the discharge may be run in 'contingency mode', bypassing the settlement pond, with no further criteria required to be met.

The proposed discharge via the W3 emission point may decrease pre-treatment and allow the discharge to be run in 'contingency mode' much more frequently by bypassing the in-pit settlement pond. This could potentially increase turbidity in the pipe and the frequency of running the discharge in 'contingency mode'. This changes the function of the 20 mg/L licence condition from a precautionary measure, designed to incentivise the proponent to reduce TSS as much as possible prior to discharge, to a way to circumvent mitigation and discharge without the imposed 20 mg/L TSS limit. Without a commitment to mitigate TSS to achieve the 20 mg/L criterion prior to discharge, this criterion becomes ineffective for achieving optimal water quality outcomes and could be removed.

Based on monitoring data from the AER's and current licence holder controls, the delegated officer has determined that the likelihood of mid-level, on-site impacts or minimal off-site impacts from discharging mine dewater to the marine environment (leading to excessive TSS loading) is possible.

5.3.5 Overall rating of discharge of TSS to the marine environment

The delegated officer has applied the consequence and likelihood ratings described above to the Risk Criteria table in the *Guidance Statement: Risk Assessments* (DWER 2020a) and determined that the overall rating for the risk of emissions to the marine environment (from excessive TSS loading) on sensitive receptors is Medium.

A risk rating of 'Medium' is acceptable but generally subject to regulatory controls. Controls determined to be necessary to mitigate the risk to an acceptable level are detailed in Section 5.3.8.

5.3.6 Regulatory controls

Total Suspended Solids

The Delegated Officer has determined to define 'contingency discharge' in licence L8148/2006/4, which will clarify the circumstances under which contingency discharge may be undertaken. The intention is to limit contingency discharge to circumstances where it is necessary and TSS can be addressed and managed, despite no limits being imposed on the licence.

The proposed definition of contingency discharge is included in Table 16 and referenced in condition 14 of licence L8148/2006/4 and reads as follows:

"Dewatering that occurs when reuse, in-pit storage and temporary storage are at capacity."

In addition to the definition of contingency discharge, the contingency discharge form (CD1) has been updated to include a requirement for providing time-stamped, photographic evidence of maximum design capacity for dewater storage where this is stated as the reason for contingency discharge.

Volumetric flow limits

Volumetric flow limits are proposed to be added to Condition 15 (Table 7) to reduce the reliance on contingency discharge and to reduce TSS where settlement is not possible by limiting the flow of potential turbid water into the marine environment. It is expected that this will potentially reduce the risk inherent with bypassing the settlement pond by extending the discharge times through limiting flow rates to those provided in the dilution modelling (approximately 317 L/s). Flow rates would apply to both routine and contingency emission points, which would address concerns around exceedance of TSS limits via W3 and the in-pit sump.

It is the intention here that contingency discharge events are disincentivised and where they do occur, settlement is undertaken as much as possible. Figure 4 in Appendix 1 provides the flow pathway options for the W1 and W1a emission points. Limiting flow rates are expected to reduce the likelihood that options where the settlement pond is bypassed completely are limited to emergency situations or where no viable alternative is available.

The addition of the above controls will lower the risk rating by incentivising the Licence Holder to reduce TSS as much as possible prior to discharge during both routine and contingency discharge events, resulting in the further mitigation of impacts of excessive TSS entering the marine environment. The Delegated Officer also notes that the above controls are measurable and enforceable.

6. Consultation

Table 6: Consultation provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website (20/03/2025)	N/A	N/A
Local Government Authority - Shire of Derby/ West Kimberley advised of proposal (20/03/2025)	N/A	N/A
Licence Holder was provided with draft amendment on 26 May 2025.	Refer to Appendix 1	Refer to Appendix 1

7. 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.

7.1 Summary of amendments

Table 7: Summary of licence amendments 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 7: Summary of licence amendments

Condition no.	Proposed amendments
10 (Table 4)	Increased annual dewatering volume from 5,000,000 tonnes per Annual Period to 10,000,000 tonnes per Annual Period.
13 (Table 6)	Updated descriptions for Discharge Points 1, 2 and 3 in line with routine and contingency emission points. Discharge Point W3 changed to routine emission point by the removal of 'Contingency Dewatering Only' from the table. Emission Point W2 has been removed from the table. The source of mine dewater via Discharge Point W3 updated to include the in-pit sump.
15 (Table 7)	Added volumetric flow rate limit of 317 L/s for average quarterly flow rate.
Definitions (Table 16)	Added definition of 'contingency discharge' to Table 16.
Schedule 2: Reporting and notification forms	The Contingency Discharge (CD1) form has been updated ton include requirements for photographic evidence to be provided for reaching design capacity for dewater storage.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2016, *Guidance Statement: Licence Duration*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
4. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.
5. Department of Water and Environmental Regulation (DWER) 2024, *Environmental Protection Act 1986*, Perth, Western Australia.
6. Environmental Protection Agency (EPA) 2016, *Potecting the Quality of Western Australia's Marine Environment*, Perth, Western Australia.
7. Hydrobiology 2020, *Koolan Island Initial Dilution Modelling*, Perth, Western Australia.
8. Hydrobiology 2025, *Initial Dilution Modelling of Licenced Dewatering Discharge points W1/ W1a, W2 and W3*, Perth, Western Australia.
9. Mount Gibson Iron 2023, *Annual Environmental Report 2022 & Annual Audit Compliance Report*, West Perth, Western Australia.
10. Mount Gibson Iron 2024, *Annual Environmental Review & Annual Audit Compliance Report 2023*, West Perth, Western Australia.
11. Mount Gibson Iron 2024, *Dewatering Capacity and Emission Point W2/ W3 Upgrade Licence Amendment Application Attachments*, West Perth, Western Australia.
12. Mount Gibson Iron 2025, *Annual Environmental Report*, West Perth, Western Australia.

Appendix 1: Dewatering infrastructure and flow diagrams

Figure 3: Koolan Island dewatering infrastructure

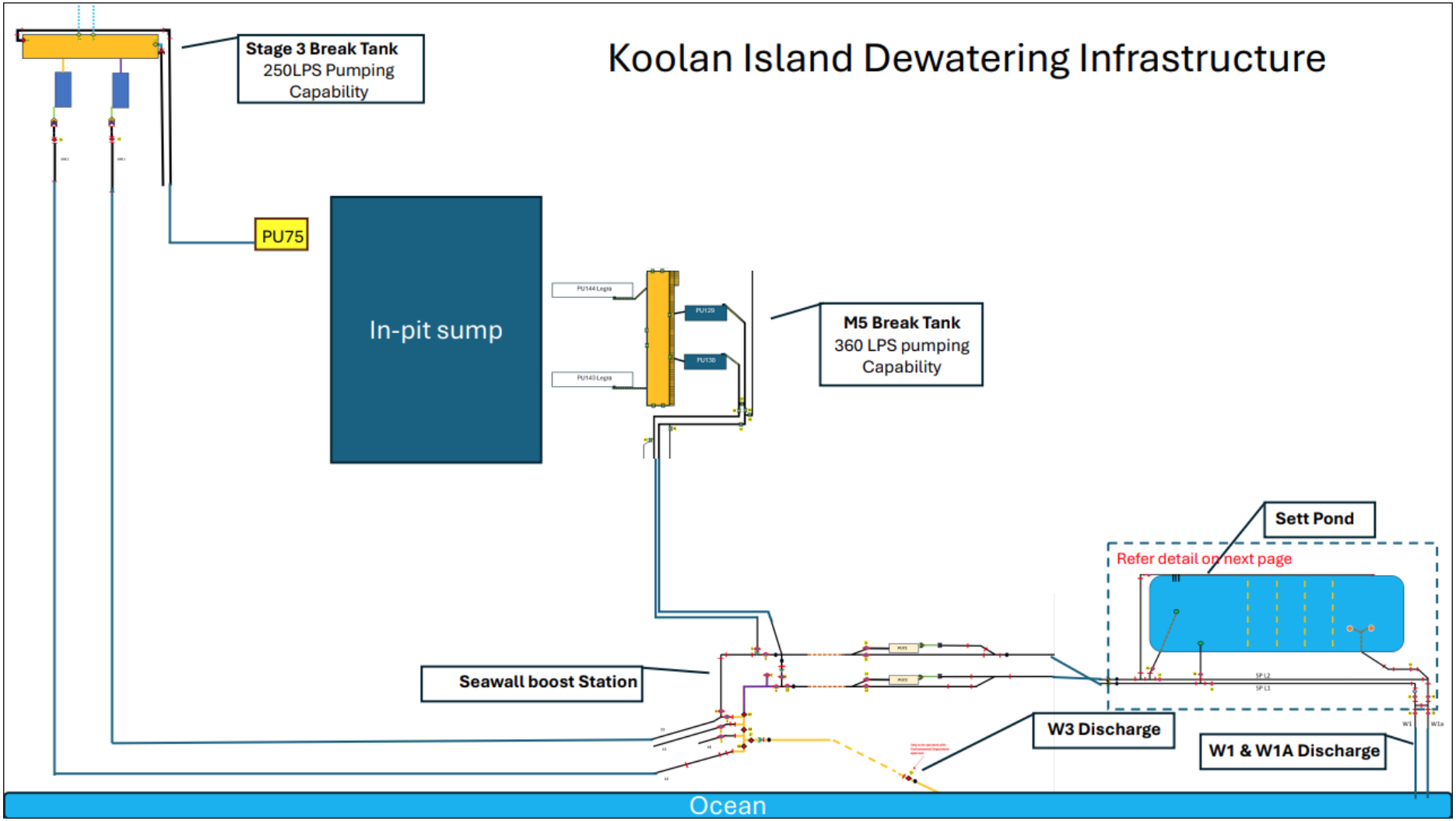
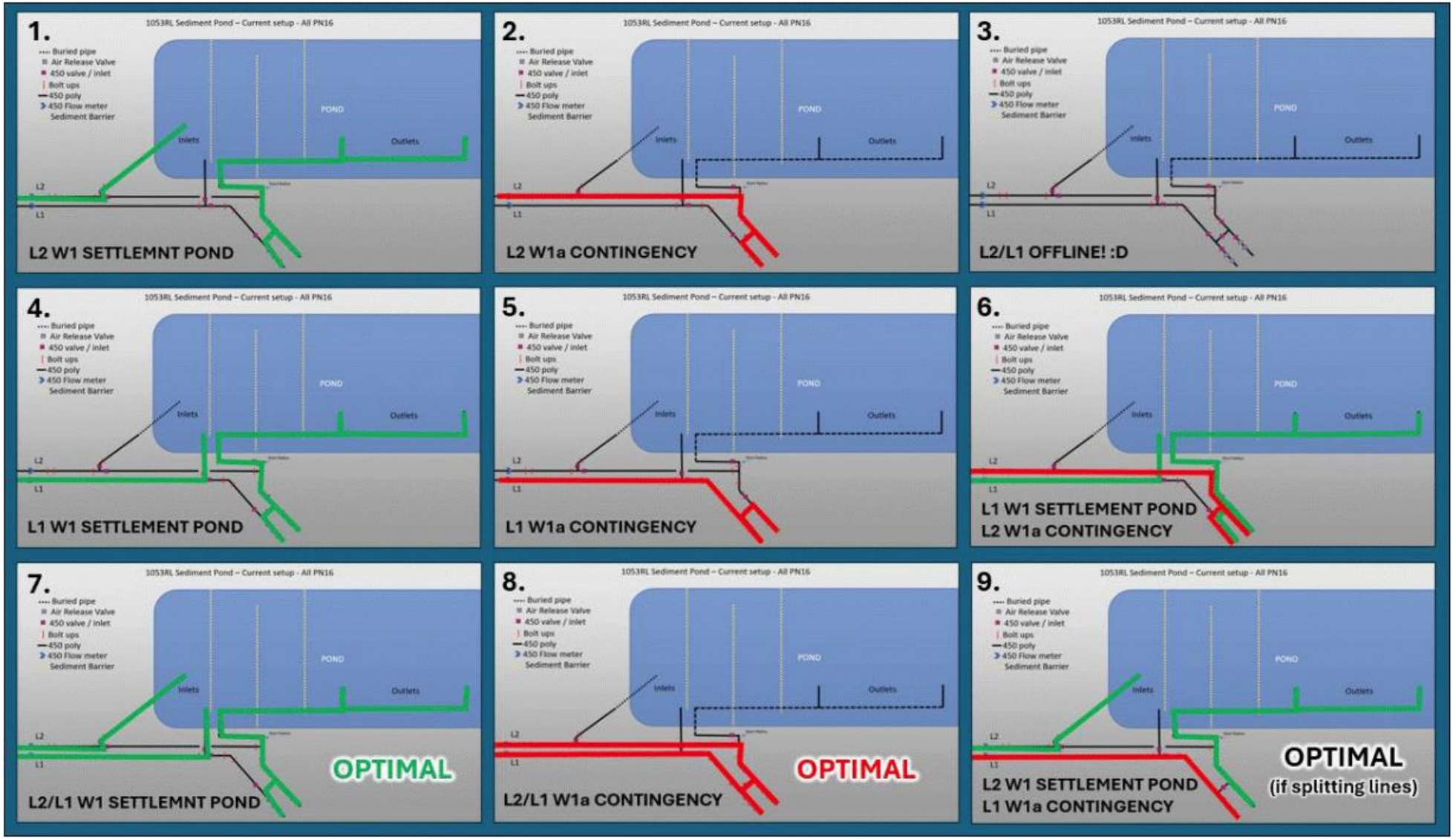


Figure 4: Flow pathways for routine and contingency discharge via W1 and W1a emission points



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

Condition	Summary of Licence Holder's comment	Department's response
Condition 13	Update table reference to Table 6.	Reference to Table 6 has been updated.
Table 6: Emission points to surface water	The term 'standby' may be misinterpreted as meaning this emission point will only be used occasionally. In practice it will be used, more frequently in the wet season, to manage the risk of exceeding the 20 mg/L TSS limit for the W3 emission point. This risk will be managed by diverting mine dewater to the W1 emission point via the settlement pond, when TSS concentrations are approaching the limit and are forecast to continue rising.	Noted. References to W1 being the 'standby' emission point have been removed and the function of W1 has been updated.
	The 'Source including abatement' column refers to mine dewater discharged from Mullet Pit settlement basin to the ocean. KIO advises that there is no settlement basin at Mullet Pit, other than the in-pit void, and suggests that the reference to the settlement basin is removed. The relevant point source and flow limits for the W4 emission point would still apply.	Noted, Table 6 has been updated.
Table 7: Point source emissions and flow limits to surface water	Volumetric flow of 310 l/s equals 9.78 mtpa. It would be more accurate to use 317 l/s, which is the figure provided in Table 1 of the dilution modelling report (Hydrobiology, 2025). Volumetric flow of 317 l/s equals 10 mtpa. The specified volumetric flow rate limit is practically difficult to achieve and likely to be exceeded at certain times, mainly during the wet season. KIO advises that although flow volumes are continuously recorded using flow metres, the flow metres are not continuously monitored (i.e., there is no telemetry). The flow metres are monitored daily via visual inspection to produce a daily flow volume (i.e., the volume of water moved in the preceding 24-hour period), from which an average daily flow rate can be extrapolated. KIO also advises that the volumetric flow associated with mine dewatering is variable throughout a 24-hour period, in response to changing pit conditions throughout the day (especially during the wet season) but also in response to the design limitations of the dewatering infrastructure. Mine dewater is pumped from the in-pit sump to break-tanks at higher elevation, where it is then pumped to the emission point (via the settlement pond in the case of the W1 outlet). Specifying a continuous volumetric flow limit of 317 l/s, based on the revised dilution modelling, is sound in theory but in practice it will be difficult to always remain in compliance. KIO	The volumetric flow proposed in Table 7 has been updated from 310 l/s to the recommended 317 l/s for average quarterly volumetric flow. 310 l/s was suggested as a conservative estimate, however the DO acknowledges that a volumetric flow that more accurately reflects the dilution modelling will ensure that the modelling realistically represents dewater discharge while allowing for fewer exceedances.

Condition	Summary of Licence Holder's comment	Department's response
	advises that the flow rate is likely to exceed 317 l/s at certain times but will be under this limit at other times. For the dilution modelling, the 317 l/s flow rate was applied simply as the average flow rate for 365 days that corresponds with a total yearly dewatering discharge of 10 million tonnes. KIO therefore requests that the volumetric flow limit of 310 l/s be changed to an average quarterly volumetric flow limit of 317 l/s (2,500,000 kilolitres per quarter). This allows flexibility for volumetric flow to exceed 317 l/s at certain times (e.g., in response to wet season rainfall but also operationally for maintenance as required) whilst remaining within the overall limit for the category (10 mtpa). This approach also allows for flow rates to be calculated based on current monitoring methods and eliminates the need for additional (expensive) equipment installation such as flow rate telemetry for continuous monitoring.	
Condition 17 (p11)	Remove Condition 17 and renumber conditions from that point forward.	Noted. Formatting issues have been updated.
Condition 26 (p14)	Remove Condition 26 and renumber conditions from that point forward.	As above.
Condition 31	Reword the condition to reference Condition 30 (AER).	Noted.
Condition 32	Update table reference to Table 14.	Noted.
Table 15: Notification requirements	Table 2.2.2 is from the version of the licence that preceded the last amendment, this table does not exist in either the current licence or the draft amended licence. Update table reference to Table 7, for which the reporting requirement is detailed in Table 14.	Noted.
Schedule 1 Maps Figure 2: Emission point locations	Refer to Schedule 1 of this response for an updated map with emission point W2 removed. The location of the W3 emission point is also identified.	Noted.
Schedule 1 Maps Figure 3: Monitoring points locations	Refer to Schedule 2 of this response for an updated map with monitoring point location M13 (Main Pit Sample Point) updated and monitoring point location M14 removed from Main Pit and relocated to Mullet Pit (formerly M15). This will require references to M15 throughout to be deleted (e.g. Table 10, Form WR1).	Noted.
Figure 1 Emissions Points in relation to Ecological Protection Areas	Refer to Schedule 3 of this response for an updated map with emission point W2 removed.	Noted.
Figure 2 Distance to sensitive	Refer to Schedule 4 of this response for an updated map with emission point W2 removed.	Noted.

Condition	Summary of Licence Holder's comment	Department's response
receptors		