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	L6145/1983/11
Licence Holder	GMA Garnet Pty Ltd
ACN	009 344 227
File Number	APP-0027440
Premises	GMA Garnet Narngulu 122 Goulds Road NARNGULU WA 6532 As defined by the Premises map in Schedule 1
Date of Report	16 October 2025
Decision	Revised licence granted

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1. Decision summary

Licence L6145/1983/11 is held by GMA Garnet Pty Ltd (Licence Holder) for GMA Garnet Narngalu (the premises), located at 122 Goulds Road, Narngulu.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during operation of the Premises. As a result of this assessment, Revised Licence L6145/1983/11 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 Premises overview

The premises is located within the Narngulu Industrial Area within the City of Greater Geraldton. The premises has been operational since 1983, treating garnet sand concentrate sourced from the Licence Holder's open cut alluvial garnet mine in Port Gregory, located approximately 75 km north of the premises (regulated under licence L8561/2011/1).

The premises receives and treats more than 300,000 tonnes of garnet sand annually. At the mine site, the garnet sand would undergo wet processing to remove fine particulates. At the premises, the garnet sand concentrate is dried using large dryers, and separated through screens and magnetic equipment to extract graded garnet product and small quantities of ilmenite by-product. Since 2007, tailings from the process have undergone additional screening to recover zircon-rutile concentrate. Finished products are stored either in bulk or packaged at the premises, prior to transport offsite for export.

Waste generated by the processing plant primarily consists of quartz and shell (calcium) carbonate sands, which is transported back to the mine site for incorporation into the wet plant tailings, which are eventually used to progressively backfill mine pits.

2.2.1 Drill sample analysis and waste management

At the premises, the Licence Holder analyses drill samples to better understand ore deposits. Currently, the samples are analysed at an external laboratory. However, the Licence Holder has planned to undertake the analysis works at the premises, within a retrofitted laboratory in Shed E. The drill samples will undergo wet screening using a Sweco Shaker to separate coarse materials from sand, generating tailings that include fine particles and water.

In 2023, the Licence Holder applied to amend licence L6145/1983/11 to construct and operate a solar drying pond to store tailings waste from the drill samples. Licence L6145/1983/11 was subsequently amended on 4 August 2023. The Licence Holder estimated that up to 200 m^3 of tailings would be produced at 1.1% solids and deposited into the solar drying pond annually.

Since then, the Licence Holder has decided not to proceed with the solar drying pond, and instead, seeks to manage tailings using soak wells instead.

2.3 Amendment summary

On 11 February 2025, the Licence Holder submitted an application to the department to amend licence L6145/1983/11 (Licence) under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act), for the following changes:

- Authorisation to construct concrete soak wells to accept filtered wastewater from drill sample tailings; and
- Removal of construction and operational requirements related to solar drying pond and associated infrastructure (e.g., groundwater monitoring bores).

On 18 September 2025, the Licence Holder informed the department that a recent shift in operational planning will result in a more intensive processing schedule over a period of approximately six months. Consequently, the Licence Holder proposed to increase discharge of filtered wastewater from 200 m^3/annum to 500 m^3/annum.

This amendment is limited only to changes to Category 8 activities from the existing licence. The current assessed production capacity of 3,000,000 tonnes per annual period will remain unchanged.

2.3.1 Dewatering filter bags and soak wells

To replace the proposed solar drying pond, the Licence Holder proposed to transport tailings from Shed E to the soak well area via a belowground PVC pipeline (Figure 1). The tailings will be discharged via an outlet pipe directly into a dewatering filter bag positioned on a pallet. The dewatering filter bag will separate the solid tailings material from the filtered water. The filtered water will drain into the underlying soak well.

The proposed soak wells will be constructed within the footprint of the proposed solar drying pond. Two soak wells were proposed, with the pipeline outlet discharging into soak well 1, which is covered with a trafficable spill grate. Soak well 2 will be installed adjacent to and is connect to soak well 1, where overflow from the first soak well will enter the second soak well. Soak well 2 will be fitted with a concrete lid to prevent runoff and debris ingress.

Each soak well will be made of pre-cast concrete with thickness of approximately 50 mm to 75 mm, reinforced with rebar for additional structural integrity. The wells will a nominal height and width of 1.5 m, resulting in a storage capacity of 2,500 L (i.e., 2.5 m^3) each. The base of each well will consist of 300 mm of compacted gravel to facilitate infiltration. Filtered water will be allowed to infiltrate into the ground.

The soak wells have been designed to handle an annual tailings throughput of 500 m^3. The maximum proposed daily discharge is 2.5 m^3, which are based on operational data collected to date. The estimate reflects peak discharge activity during the Licence Holder's current intensive drill sample washing program.

Once full, the dewatering filter bags will be replaced by a forklift. Tailings in the bag will be placed in a designated hardstand area next to the soak wells. Once sufficiently dried, the bags will be removed, the collected tailings emptied into the tailings bunker for subsequent removal offsite.

Due to the filtering process introduced by the dewatering filter bags, only wastewater is produced, eliminating the requirement for a solar drying pond to store the tailings. The Licence Holder also indicated that groundwater monitoring bores are no longer required as the tailings will be removed through the filtration process prior to water entering the soak well, ensuring only filtered water that is free of potential contaminants, from entering the environment.

The geochemical characteristics of the tailings have been previously considered by the department under the assessment for the solar drying ponds (DWER 2023).

Figure 1: Premises layout

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 2020b).

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 construction and operation which have been considered in this Amendment Report are detailed in Table 1 below. Table 1 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 1: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Dust	Construction of tailings pipeline, concrete soak wells, and hardstand area.	Air/windborne pathway	None.
Noise			None.

Emission	Sources	Potential pathways	Proposed controls
Tailings slurry	Operation of tailings pipeline.	Pipeline failure	• Pipeline will be installed below roadway to protect it from surface loads and environmental exposure. • Soak wells will be inspected daily. • Any spills will be immediately cleaned up and reported internally.
Tailings slurry and tailings supernatant	Discharge of tailings into dewatering filter bags and wastewater.	Overtopping	• Soak well 2 will be connected to soak well 1 to receive overflow and excess water from soak well 1. • Soak well 2 will be covered with a concrete lid to prevent runoff and sediment ingress, while soak well 1 will be open (for positioning of dewatering filter bags) with a trafficable spill grate. • Soak wells will have sufficient capacity to handle up to 200 m^3 of tailings annually. • Soak wells will only be used for purpose of discharging wastewater (after filtering via dewatering bags). • Soak wells will be inspected daily. • Minimum freeboard of 300 mm will be maintained within the soak wells.
Tailings supernatant		Infiltration	• Soak wells will be made of precast concrete reinforced with rebar for added structural integrity. • The base of soak well will consist of 300 mm thick compacted gravel to facilitate infiltration. • Tailings/sediment fraction will be removed by discharging into a dewatering filter bag to remove sediment/particulate fraction. • Soak wells will only be used for purpose of discharging wastewater (after filtering via dewatering bags). • During a continuous filtering event, spot sample will be collected for analysis of pH and total dissolved solids.
Tailings dust	Drying and storage of tailings.	Air/windborne pathway	None.
Tailings		Loss of containment	• Once drained, filter bags will be placed in a designated hardstand area. Once dried, dried tailings will be stored at tailings bunker, awaiting offsite disposal.

3.1.2 Receptors

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

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

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

Human receptors	**Distance from prescribed activity**
Residential premises	Semi-rural residential premises are present around the premises, with the nearest premises being approximately 1 km to the north-east of the premises. Urban residential premises are present further to the north-west and west of the premises, as part of the Geraldton township.
Industrial and commercial premises	The premises is located within the Narngulu Industrial Area, surrounded by a number of industrial, commercial, and agricultural premises that are manned, including asphalt manufacturing, fertiliser handling, liquid and solid waste facility, tyre storage, landfilling, mineral sand processing, and wastewater treatment.
Environmental receptors	**Distance from prescribed activity**
Remnant native vegetation	Due to the premises' location within the Nargulu Industrial Area, surrounding native vegetation is sparse, mostly isolated to road verges. Based on aerial imagery, significant vegetation appears present directly east of the premises, though they are associated with the neighbouring mineral sand mine.
Groundwater aquifer	Groundwater at the premises is approximately 17.5 metres below ground level (mbgl) and is considered saline, with total dissolved solids ranging from 3,000 mg/L to 7,000 mg/L. Regional groundwater flow direction is to the west and south-west, towards the Indian Ocean. The premises is located within the Arrowsmith Groundwater Area, proclaimed under the *Rights in Water and Irrigation Act 1914*. The nearest registered abstraction bore (targeting the superficial aquifer) is located approximately 800 m north-west of the premises, at the Meru Waste Facility adjacent to the premises. The superficial aquifer is underlain by the Cadda Formation, which comprises shale, siltstone, sandstone, and shelly sandy limestone, with the presence of limestone and siltstone in the upper portions of the formation suggesting that the aquifer is hydrologically separated from the superficial aquifer.

3.2 Risk ratings

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

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

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

The Revised Licence L6145/1983/11 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. category 8 activities.

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

Table 3. Risk assessment of potential emissions and discharges from the premises during construction and 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**				
Construction								
Construction of tailings pipeline, concrete soak wells, and hardstand area.	Dust	***Pathway:*** Air/windborne pathway ***Impact:*** Impact to amenity.	Industrial and commercial premises.	None.	C = Slight L = Unlikely **Low Risk**	N/A	None.	N/A
	Noise	***Pathway:*** Air/windborne pathway ***Impact:*** Impact to amenity.		None.	C = Slight L = Rare **Low Risk**	N/A	None.	N/A
Operation								
Operation of tailings pipeline.	Tailings slurry	***Pathway:*** Pipeline failure, resulting in direct discharge to land ***Impact:*** Impact to ecological health.	Surrounding soils; Groundwater aquifer.	Refer to Section 3.1.	C = Slight L = Unlikely **Low Risk**	Y	Condition 1 – Installation requirements; Condition 4 – Operational requirements; Condition 5 – Inspection requirements.	N/A
Discharge of up to 500 m^3 of tailings into dewatering filter bags and wastewater.	Tailings slurry	***Pathway:*** Overtopping of filter bags or soak well, resulting in direct discharge to land ***Impact:*** Impact to ecological health.		Refer to Section 3.1.	C = Slight L = Unlikely **Low Risk**	Y	Condition 1 – Construction requirements; Condition 4 – Operational requirements; Condition 5 – Inspection requirements; Condition 6 – Authorised discharge point.	N/A
	Tailings supernatant			Refer to Section 3.1.	C = Slight L = Unlikely **Low Risk**	Y		N/A
		Pathway:	Groundwater	Refer to	C = Minor	N	Condition 1 – Construction	Seepage modelling undertaken previously

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				
		Infiltration of supernatant through base of soak well ***Impact:*** Potential mounding of water table and degradation of groundwater quality, resulting in impacts to ecological health	aquifer; Remnant native vegetation.	Section 3.1.	L = Possible **Medium Risk**		requirements; Condition 5 – Inspection requirements; Condition 6 – Authorised discharge point; **Condition 7 – Ambient groundwater monitoring;** **Condition 8 – Emission and discharge monitoring**.	by REC (2021) for the discharge of up to 200 m^3/annum of tailings into the proposed solar drying pond was unlikely to result in groundwater mounding. Due to the proposed increase in proposed tailings wastewater discharge to 500 m^3/annum, the likelihood of the risk event has likely increased. Furthermore, the discharge of wastewater into a soak well instead of a solar drying pond will likely result in a greater proportion of discharged water being lost as seepage, rather than evaporative losses. In the absence of updated seepage and groundwater modelling, the likelihood of this risk event is not well understood. Due to this, the department determined the requirement to undertake groundwater monitoring at the premises to be necessary to observe and better understand potential impacts to groundwater and surrounding receptors during the proposed activities. Consequently, the department has not removed condition 7 from existing licence L6145/1983/11. (as an additional regulatory requirement). Furthermore, the proposed tailings wastewater discharge monitoring proposed by the Licence Holder has been included under new condition 8 of the amended licence. However, the department has determined that the proposed monitoring of pH and total dissolved solids only in the tailings wastewater within the soak well is not adequate. Although filtered, the wastewater infiltrated through the soak well is still considered a

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**				
								supernatant of the parent tailings material and warrants similar monitoring, until such time when sufficient monitoring data on the wastewater quality is available to better inform potential risk. Consequently, the department has applied the same monitoring parameters for the previously proposed groundwater monitoring program to the monitoring of tailings wastewater within the concrete soak well, as an additional regulatory requirement.
Drying and storage of tailings	Tailings dust	***Pathway:*** Air/windborne pathway ***Impact:*** Impact to human health, ecological health, and amenity	Residential premises; Industrial and commercial premises.	None.	C = Slight L = Unlikely **Low Risk**	N/A	Condition 1 – Construction requirements; Condition 4- Operational requirements; Condition 5 – Inspection requirements.	N/A
	Tailings	***Pathway:*** Loss of containment, resulting in direct discharge to land ***Impact:*** Impact to ecological receptors	Groundwater aquifer	Refer to Section 3.1.	C = Slight L = Rare **Low Risk**	Y	Condition 1 – Construction requirements; Condition 4- Operational requirements; Condition 5 – Inspection requirements.	N/A

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

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

4. Consultation

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

Table 4: Consultation

Consultation method	Comments received	Department response
City of Greater Geraldton advised of proposal on 31 March 2025.	The City of Greater Geraldton responded on 4 April 2025, with no objection to the proposed activities. Further, it was advised that the soak well should be at least 10 metres from any property boundary.	The department has noted the comment.
Licence Holder was provided with draft amendment on 10 September 2025.	Refer to Appendix 1.	Refer to Appendix 1.
Licence Holder was provided with draft amendment on 15 October 2025.	No comments provided. Comment period waived.	Noted.

5. Conclusion

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

5.1 Summary of amendments

Table 5 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 5: Summary of licence amendments

Amended condition no.	Proposed amendments
Condition 1	Updated Table 1 to: • Include construction requirements for concrete soak wells and associated tailings pipeline; and • Remove authorisation to construct solar drying pond and tailings pipeline.
Condition 2	Updated condition to align with current standard licensing format.
Condition 3	
Condition 4	Updated Table 2 to: • Specify operational requirements for concrete soak wells and associated tailings pipeline; and • Remove operational requirements for the solar drying pond.

Amended condition no.	Proposed amendments
Condition 5	Updated Table 3 to: • Specify inspection requirements for concrete soak wells and associated tailings pipeline; and • Remove inspection requirements for the solar drying pond.
Condition 6	Updated Table 4 to: • Specify the discharge of tailings from drill sample processing to the concrete soak wells; • Increase authorised discharge volume from 200 m^3/annum to 500 m^3/annum, and • Remove authorisation to discharge tailings to solar drying pond.
Condition 7	Updated Table 5 to: • Specify monitoring points MB01 and MB02; and • Specify quarterly monitoring frequency for all parameters.
Condition 8	Updated Table 6 to: • Specify emission and discharge monitoring requirements at the concrete soak well
----	Condition 10 on the existing licence, relating to water balance monitoring for the solar drying pond, was removed.
Condition 13	Updated Table 7 to: • Update reporting requirements for ambient groundwater monitoring; and • Specify reporting requirements for emission and discharge monitoring of concrete soak well.
----	Updated Table 7 to: • Include definition for: AS/NZS 5667.10; and • Remove definition for solar drying pond.
----	In Schedule 1: Maps: • Updated Figure 1 and Figure 2 to remove reference to solar drying pond and include reference to concrete soak wells; and • Removed Figure 3, Figure 4, and Figure 5, which related to the construction of the solar drying pond and associated groundwater monitoring bores.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020a, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020b, *Guideline: Risk Assessments*, Perth, Western Australia.
4. DWER 2023, *Licence L6451/1983/11 – Amendment Report* (granted 4 August 2023), Perth, Western Australia.
5. Resource Engineering Consultants Pty Ltd (REC) 2021, *Tailings Storage Facility Design Report Narngulu Operations, Western Australia, Rev A (10 November 2021)*, Carine, Western Australia.

Appendix 1: Summary of Licence Holder's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder's comment	Department's response
Licence Holder was provided with draft licence amendment on 10 September 2025. Licence Holder provided comments for the draft licence amendment on 16 September 2025 and 18 September 2025.		
Condition 1 – Design and construction/ installation requirements	For the construction of the concrete soak well, the Licence Holder proposed replacing the term 'sealed' with 'covered', such that '*all soak wells must be covered, except for primary soak well…*'. The rationale for this was to add clarity to the construction requirement and allow the Licence Holder to install a removable lid, allowing for the soak well to be reviewed and inspected, while preventing surface water ingress.	The department has amended the construction requirement accordingly in the amended licence, as the intent of the requirement remain unchanged.
Condition 6 – Authorised discharge point	The Licence Holder proposed to increase the authorised discharge volume for tailings waste to concrete soak well from 200 m^3 per annum to 500 m^3 per annum. The proposed increase came as a result of a recent shift in operational direction that will require more intensive drill processing schedule over the next six months or so. Following this six-month intensive drill processing period, drill processing (and subsequently, tailings production and discharge) will likely occur on an ad-hoc basis.	As the proposed discharge volume of tailings waste has increased, the department has undertaken an updated risk assessment. The updated risk assessment can be found in Table 3. While the relevant risk rating remains primarily unchanged, the department considers the likelihood of impact to have become elevated as a result of the proposed increase in discharge volume. In regard to the proposed monitoring frequency, the department agrees that wording of the condition may unintentionally result in excessive sampling effort, with minimal environmental benefit. At the time of the initial assessment, specific aspects around the duration and interval between each continuous discharge event was not adequately considered. Consequently, the department has updated the draft amended licence in the following way:
Condition 7 – Emissions and discharge monitoring	The Licence Holder proposed that the emission monitoring frequency (i.e., *at least one sample for each continuous tailings discharge event*) be modified such that discharge events occurring within 72 hours of each other are considered continuous. As detailed above, intensive drill processing will result in tailings production and discharge on a daily basis (during morning and afternoon shifts from Monday to Friday). Discharge only occurs during the washing of drill samples, which is a manual process. Therefore, tailings production	

Condition	Summary of Licence Holder's comment	Department's response
	and discharge will only occur when personnel are present at the premises. As the term 'continuous' was not well-defined, the Licence Holder may be required to take up to 180 samples over a six-month period. The Licence Holder argued that the monitoring frequency would result in over-sampling with minimal additional environmental benefits. Consequently, the Licence Holder proposed (i) the term 'continuous tailings discharge event' be clarified and defined, (ii) the condition be amended to prevent unnecessary oversampling due to minor pauses in discharges (e.g., shift change, weekends, brief operational delays), while still ensuring that the monitoring program is risk-based and proportionate to the actual environmental impact.	• Installation and monitoring of groundwater bores (proposed for the solar drying pond) have not been removed from the amended licence. Ambient groundwater monitoring is determined to be required where discharge of tailings waste is estimated to be up to 500 m^3 per annum. • Modified emission monitoring frequency such that monthly monitoring should be undertaken as a minimum (i.e., in months where at least one discharge event has taken place).
Licence Holder was provided with a second draft licence amendment on 7/10/2025. Licence Holder waived the comment period and provided no further comments on 15/10/2025.		