Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval

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

Works Approval Number	W2852/2024/1
Applicant	Agnew Gold Mining Company Pty Ltd
ACN	098 385 883
File number	APP-0026142
Premises	Agnew Gold Mine M36/55 and M36/150
Date of report	6 March 2025
Decision	Works approval granted

Grace Heydon

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Grace Heydon

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

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, W2852/2024/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) 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 and overview of premises

On 30 October 2024, the Agnew Gold Mining Company Pty Ltd (the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works and time limited operations (180 days requested) relating to a Category 85 Wastewater Treatment Plant (WWTP) and associated Irrigation Spray Field (ISF) at the premises. The premises is approximately 18 km southwest of Leinster.

A 100-person WWTP is proposed to support the expansion of underground mining at Barren Lands and Redeemer. The proposed WWTP and ISF area will be 1 ha and will be located on previously disturbed areas within tenement M36/55, as shown in Figure 1 and 2.

After the submission of the works approval environmental compliance report (ECR), the applicant can apply to register the WWTP as Category 85 prescribed premises.

The premises currently has an existing licence L4611/1987/11 which includes an existing Category 85 WWTP (80 m^3/day). This Application is for an additional WWTP.

The premises relates to the category and assessed production and design capacity (P&DC) under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W2852/2024/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W2852/2024/1.

2.3 Proposed works

The Redeemer WWTP will comprise:

- A Sequencing Batch Reactor (SBR) modular system housed in a series of 12 m containers constructed of 6 mm steel.
- External tanks for balance and sludge storage.
- Fenced ISF.

Table 1 provides the WWTP overview.

Table 1: WWTP overview

Characteristic	Description
Production and Design Capacity (P&DC)	20 m^3/day
Planned Throughput	14.72 m^3/day
Type	Sequencing Batch Reactor
Peak Inflow	4.68 m^3/hr peak hourly for maximum 2 hours.
Footprint of WWTP	0.3 ha
Footprint of ISF	1 ha

The applicant proposes to construct an SBR WWTP as a 12m containerised system constructed of 6 mm steel and will have external tanks for balance and sludge storage. The SBR WWTP will require an inlet connection to the bar screen and electrical power connection to the control panel. The proposed system operates in a five-step mode including:

- Filling of the reactor basin
- A reaction phase
- A settling phase
- A decant phase
- An idle phase

The general arrangement of the WWTP has been designed and built to meet applicable Australian Standards, and the design details are as follows;

- 2.5 mm inlet bar screen.
- External 1 x 50 m^3 poly balance tank (external).
- Balance pump.
- SBR Tank with heavy duty submersible aerators and floating decant weir.
- Cyclic operation of the SBR tank includes:
  - 4 x 6 hr cycles per day;
  - 0.5 hr feed/1.25 hr anoxic period with mixing; and
  - 3.25 hr aeration, 0.75 hr settle and 0.75 hr decant.
- Decant pump.
- pH control with caustic dosing.
- Sludge pump.
- Recirculation pump with inline sodium hypochlorite dosing. Setpoint for residual chlorine in tank will be 0.2- 2.0 mg/L.
- Sodium hypochlorite dosing system.
- Polyaluminiumchloride dosing system.
- 1 x 50 kl sludge storage tank (external).
- Irrigation pump.

- Discharge flow meter.
- Control panel (Australian Standard) with PLC and remote monitoring capabilities.
- Audible and visual alarms.
- ISF will comprise:
    - Above ground plastic type sprinklers—these sprinklers will deliver large droplets over a radius of 15 m each with 5 mm nozzle reducing any element of clogging. Up to 100 m of rising main from WWTP irrigation pump to the irrigation field (laid above ground).
    - 1200 mm high, two strand steel wire fencing, with vehicle access gates and safety signage every 50 m to prevent inadvertent access by personnel and fauna.
    - Individual branch line flush valves.
    - Automated control from the WWTP irrigation pump.

A Reverse Osmosis (RO) plant designed to process 20 kL per day and discharge up to 6 kL of waste brine (RO Brine) daily will be situated alongside the WWTP. The RO Brine will be discharged into the WWTP and combined with Treated Wastewater (TWW) from the WWTP to create a blended effluent stream, which will be discharged at the ISF. The effluent discharge metering volumes will be affected (increased) by blending of the RO brine with WWTP effluent stream.

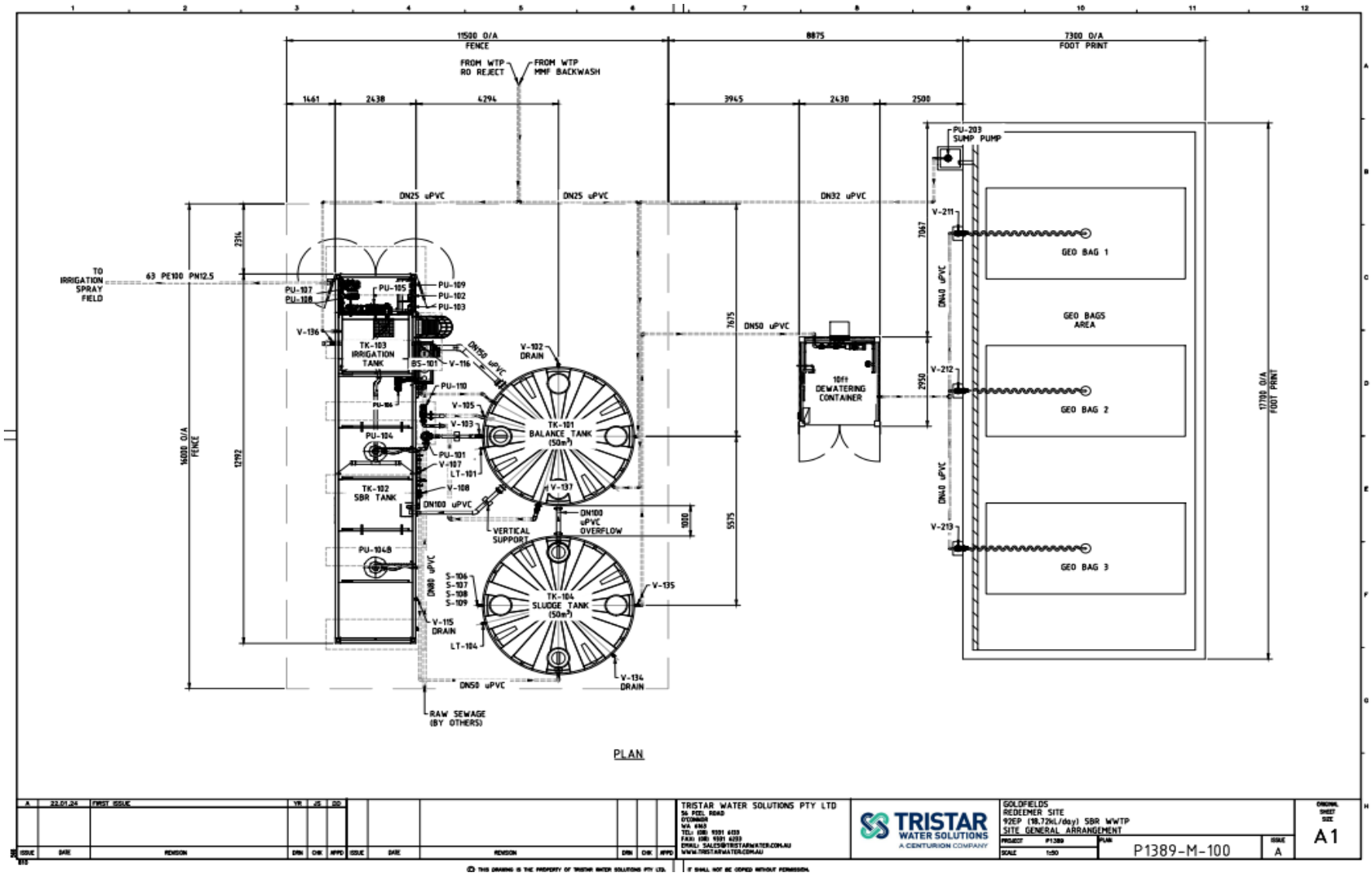

Figure 1: WWTP Overview

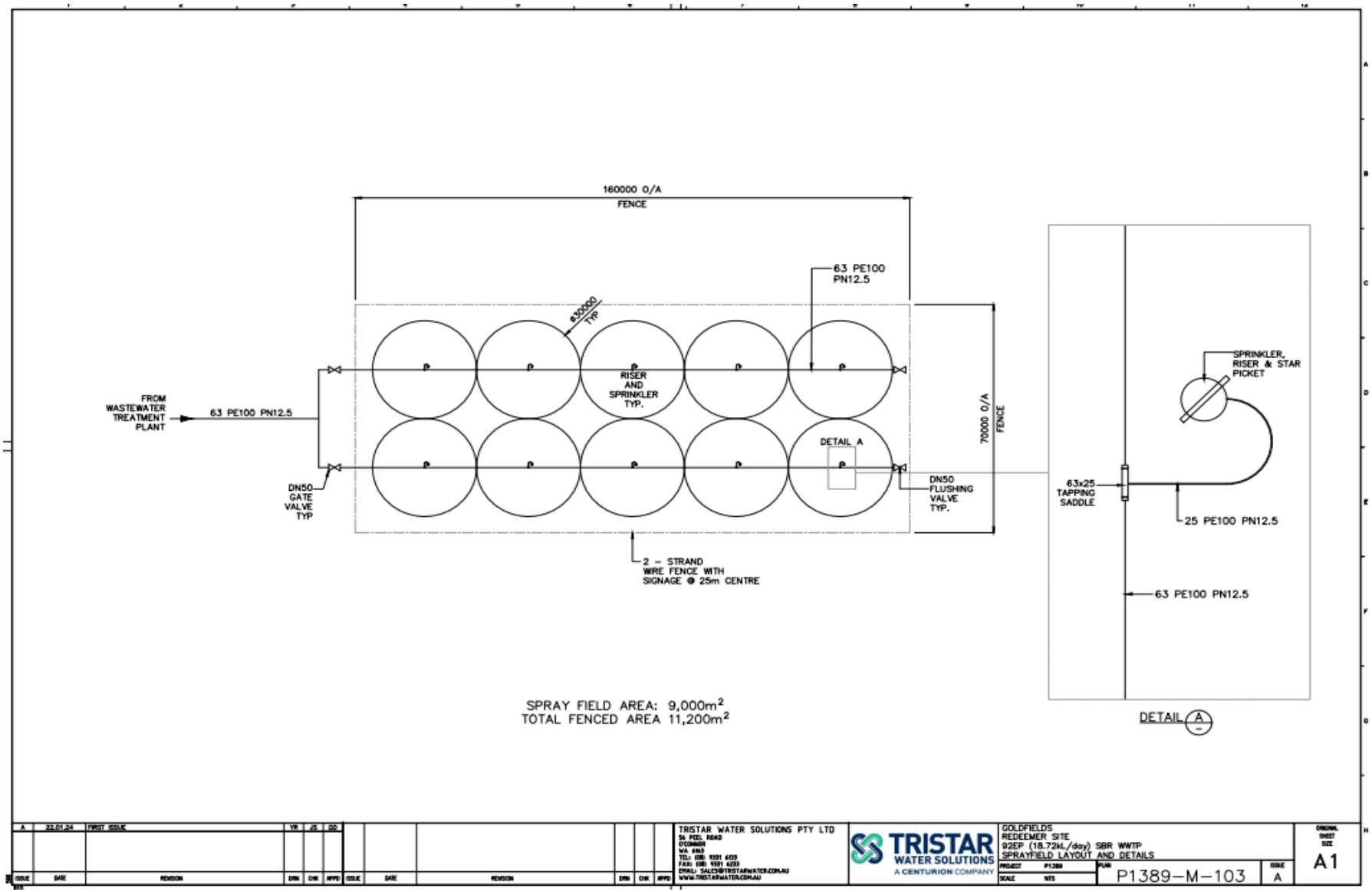

Figure 2: Irrigation Spray Field

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2.4 Targets for Treated Wastewater

The WWTP is proposed to treat effluent to the Target values provided in Table 2. These target values have been assessed against 'low exposure risk level' (ERL) as outlined in the Department of Health Guidelines for the Non-potable Uses of Recycled Water in Western Australia (DoH Guidelines) and to the Australian and New Zealand Environment and Conservation Council (ANZECC) 1997 *Australian Guidelines for Sewerage systems, Effluent Management*, National Water Quality Management Strategy (ANZECC (1997) (ANZECC (1997).

Table 2: WWTP Target discharge quality.

Parameter	Target	ERL[1]	ANZECC (1997)[2]
Biochemical Oxygen Demand (BOD)	<30 mg/L	<20 mg/L	20-30 mg/L
Total Suspended Solids (TSS)	<30 mg/L	<30 mg/L	25-40 mg/L
Total Nitrogen (TN)	30 mg/L	N/A	20-50 mg/L
Total Phosphorus (TP)	8 mg/L	N/A	6-12 mg/L
E. coli	<1000 cfu/100mL	<1000 cfu/100mL	10^5 – 10^6 org/100ml
pH	6.5 – 8.5 pH Units	6.5 – 8.5 pH Units	N/A
Residual Chlorine	0.2 – 2.0 mg/L	0.2 – 2.0 mg/L	N/A

Note 1: Table 7 of the DoH Guidelines.

Note 2: Appendix 6 ANZECC (1997).

The WWTP will undergo a 180-day Time-limited operations period, requiring TWW sampling, assessment, and reporting against the above discharge standards.

2.5 Irrigation of Treated Wastewater

The applicant intends to discharge TWW from the WWTP to the ISF. The volume of TWW discharged will be 14 m^3/day as per Table 1.

2.5.1 Description of potential adverse impact

Irrigation of nutrient rich TWW has the potential to cause contamination of soil and health impacts (degradation) to native vegetation in the ISF. TWW also has potential to infiltrate and cause adverse impacts to underlying groundwater.

2.5.2 Loading calculations

The applicant has referred to the document *Department of Water and Environmental Protection Water Quality Protection Note 22 (WQPN22): Irrigation with nutrient rich wastewater* in determining an appropriate ISF area size to accommodate the proposed nutrient loading from TWW irrigation. The applicant advises that the soil type within the ISF is considered to be risk Category C as detailed in WQPN22.

Based on the following inputs:

- the anticipated discharge quality for TWW (targets) outlined in Table 2;

- an irrigation area of 1.0 ha; and
- and an effluent volume (throughout) of 14.72 m^3/d of TWW outlined in Table 1.

The irrigation loading rates will be 161 kg/ha/year for Total Nitrogen (TN) and 42.98 kg/ha/year for Total Phosphorus (TP). Category C nutrient loading rates from WQPN22 are 300 kg/ha/year for TN and 50 kg/ha/year for TP respectively. This indicates that the proposed sprayfield size is sufficient to accommodate the TN and TP loadings proposed for discharge through irrigation.

It is noted that due to the dilution of the TWW stream with RO reject, creating a 'blended effluent' stream for final irrigation, the loading rates of TN and TP will decrease. The applicant will also manage the ISF to prevent any ponding or pooling of blended effluent.

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 construction / operation which have been considered in this decision report are detailed in Table 3 below. Table 3 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 3: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction of WWTP, vehicle movements, lift-off from soils and earthworks etc.	Air / windborne pathway	• Physical separation from sensitive receptors. • Visual inspections of dust plumes/emissions onsite will be undertaken during construction works to ensure that dust control measures are implemented and effective. • Small size for construction site, so speed will be minimal – vehicles all on defined roads. • Water cart as required.
Noise			• Works will be conducted in accordance with the *Environmental Protection (Noise) Regulations 1997.* • Construction during daytime only. • Siting location for sensitive receptors.

Emission	Sources	Potential pathways	Proposed controls
			• Vehicles and equipment will be fitted with appropriate noise controls. • All plant, equipment, and vehicles will be regularly inspected and maintained.
Operation (Time-limited operations)			
Dust	Operation of WWTP and vehicles movements	Air / windborne pathway	• Physical separation from sensitive receptors. • Water cart as required.
Nosie			• Physical separation from sensitive receptors. • Operations comply with the *Environmental Protection (Noise) Regulations 1997.* • Limited vehicle movements required. • Containerised WWTP has noise protection.
Odour	Operation of WWTP and abnormal operations of the WWTP		• Physical separation from sensitive receptors. • Containerised system with enclosed in a sea container. • Daily plant inspection and maintenance. • Sludge removed from Premises. • 50 m buffer for ISF.
Discharges to land	Treated wastewater containing contaminants (e.g. nutrients, pathogens, metals)	Discharge to land and subsurface seepage causing contamination of soil, degradation of groundwater quality and impacts to downgradient receptors.	• Physical separation from sensitive receptors. • Advanced secondary treatment. • Target TWW Parameters. • ISF area of at least 1.0 ha with a 50 m buffer. • Spray and run-off will not occur beyond the boundary of the ISF. • Sprinklers evenly distributed within the ISF to avoid pooling/water logging and erosion. • Suitable storage will be maintained in the treated wastewater tank. • Fencing and signage installed around ISF. • Monitoring of TWW during Time-limited operations (180 days). • Flow meter installed to monitor TWW

Emission	Sources	Potential pathways	Proposed controls
			discharged to the ISF. • Depth to groundwater is 12mbgl.
Spills / Leaks	Operation of WWTP	Direct discharge to land and groundwater	• Daily inspection and maintenance. • All storage components are impermeable. • High level alarms. • Sufficient freeboard in each tank. • Spare pumps kept on site. • Sludge will be stored in separate sludge storage tanks and removed off-site. • TWW pipelines to ISF will be HDPE.
Contaminated Stormwater	Operation of WWTP	Direct discharge to land and surface water	• Physical separation from sensitive receptors. • All wastewater treatment infrastructure will be bunded.

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors 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 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 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	**Distance from prescribed activity**
Station Homestead	15km south of the Premises
Environmental receptors	**Distance from prescribed activity**
Groundwater	12mbgl.
Surface drainage lines	750m west of WWTP.
Native vegetation – dominant vegetation unit is Mulga Flats (poor condition), typically consisting of flat sandy plains and *Acacia aneura* shrub	Within and surrounding the premises.
Cultural receptors	**Distance from prescribed activity**
Aboriginal heritage places	There are potentially up to 65 Aboriginal heritage places located within or surrounding the premises boundary, with 23 registered sites located at the middle to southern portion of the premises,

	beginning at the Crusader Complex pits and ending around Songvang TSF4. These sites are primarily artefacts/scatter in nature. The Lawlers Creek (Place ID 20666) flows along the eastern and southern portions of Songvang TSF4 and is also a registered Aboriginal heritage site, classified as 'mythological' and a water source. The Applicant have noted that Aboriginal heritage place values are not expected to be impacted as a result of the granting of this works approval.

3.2 Risk ratings

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

Where the applicant 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 applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

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

Works approval W2852/2024/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 5 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 construction and operation

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction of WWTP and ISF including vehicle movements (reversing beepers).	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 15 km south	Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	N/A	N/A
	Noise			Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	N/A	N/A
Operation **(including time-limited-operations operations)**								
Operation of WWTP and ISF including vehicle movements (reversing beepers).	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 15 km south	Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	N/A	N/A
	Noise			Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	N/A	N/A
	Odour			Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	N/A	N/A
	Discharges to Land	Direct discharge to land, resulting in impacts to ecological health and amenity. Contamination of	Groundwater 12mbgl	Refer to Section 3.1	C = Slight L = Unlikely **Low risk**	Y	Condition 1, 2, 3, 4, 5, 6, 7, 8, 11 and 12.	N/A

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval / licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		groundwater						
	Spills / Leaks	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality Contamination of groundwater	Surface drainage line 750 m west Groundwater 12mbgl	Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	Condition 1 and 6.	N/A

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

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

4. Consultation

Table 6 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 on 13 January 2025	Comment due 3 February 2025. None received.	N/A
Local Government Authority advised of proposal on 13 January 2025	Shire of Leonora did not respond.	Noted.
Tijwarl Aboriginal Corporation advised of proposal on 13 January 2025	Tijwarl Corporation did not respond.	Noted.
Department of Mines, Energy, Industry Regulation and Safety (DEMIRS) advised of proposal 13 January 2024	DEMIRS replied on 21 January 2025 advising the proposed Waste Water Treatment Plant (WWTP) and associated irrigation field on M 36/55 is a compatible activity within the footprint for Mining Proposal Reg ID 118700, approved 13/03/2024. There are no sensitive receptors in vicinity of facility, nor any beneficial groundwater users. The risk of sedimentation or discharge causing environmental harm to surrounding vegetation or downstream drainage lines is mitigated by proposed WWTP management strategies and considered to meet DEMIRS environmental objectives. Existing tenement conditions can satisfactorily manage any non-compliance with DEMIRS environmental objectives.	Noted.
Department of Planning, Lands and Heritage (DPLH) advised of proposal on 13 January 2024	DPLH responded on 23 January 2025 advising: A review of the Register of Places and Objects, as well as the DPLH Aboriginal Heritage Database, concludes that the subject area does not intersect with any known Aboriginal heritage Places or Registered Sites. Therefore, based on the current information held by DPLH, no approvals under the Aboriginal Heritage Act 1972 (AHA) are required in this instance. Please note that limited Aboriginal heritage surveys	Noted. The applicant will be notified of DPLH advice in this Amendment Report.

	have been completed over the subject land and, as such, it is unknown if there is Aboriginal cultural heritage present. Therefore, the proponent needs to be made aware of its obligations under the AHA. DPLH also advises that the proponent regularly checks ACHIS should new Aboriginal Cultural Heritage be reported within your subject area. You can search ACHIS by using the following link: https://espatial.dplh.wa.gov.au/ACHIS/index.html?viewer=ACHIS.	
Department of Health (DoH) advised of proposal on 13 January 2025	DoH provided a response on 24 January 2025 advising: The Department of Health (DOH) has received an Application to Construct / Install an Apparatus for the Treatment of Sewage from Agnew Gold Mining Company Pty Ltd in accordance with the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974. The DOH is currently assessing the application (The DOH's application number: 250.24). The details provided in the application to construct align with those in the Department of Water and Environmental Regulation work approval application APP-0026142. The DOH will be able to provide further comments after completion of application assessment process.	Noted. The Delegated Officer will await further commentary on DOH's application, noting that no information has been provided that would prevent DWER from granting the works approval application.
Applicant was provided with draft documents on 10 February 2025	Applicant responded on 5 March 2025: *Please see comments regarding the draft works approval - W2852/2024/1.* ***IR-T13 Decision Report Template*** • ***Condition 2.3*** *– The document states:* "Above-ground cast iron hammer-type sprinklers… radius of 30m." *Please update to specify plastic type sprinklers with a 15m radius.* ***IR-T05 Works Approval Template*** • ***Condition 1, Table 1 (2b)*** *– Sprinkler specifications should be updated to 1.2m* ***in height only*** *– it currently notes 1.20m x 1.2m.* • ***Condition 1, Table 1 (2b)*** *– Please confirm what is required for this buffer. Is it just no infrastructure within 50m of the sprayfield?*	Condition 2.3 of the Decision Report (DR) should be section 2.3 of the DR. The DR has been amended to specify plastic type sprinklers and radius of 15 m. Condition 1 Table 1 (2b) has been amended to be 1.2 m height only. Condition 1 Table 1 (2b) buffer has been removed from the Works Approval noting small throughput of the WWTP and low risk assessment outcome. Works Approval condition 6 Table 4 does not allow blended effluent to be discharged from the Irrigation Spray Field.

5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.