Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Licence

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

Licence Number	L8245/2008/3
Applicant	Water Corporation
ACN	28 033 434 917
File number	DER2014/001477-1~2
Premises	Narngulu Wastewater Treatment Plant Legal description - Lot 150 on Deposited Plan 78656 and Lot 1782 on Deposited Plan 248686
Date of report	3 October 2024
Decision	Licence granted

Abbie Crawford

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Abbie Crawford
MANAGER, WASTE INDUSTRIES
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 operation of the premises. As a result of this assessment, licence L8245/2008/3 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 29 May 2024, the applicant submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act).

The application is for a licence renewal relating to the operation of the Narngulu Wastewater Treatment Plant (WWTP). This premises relates to Category 54 activities and assessed design capacities listed under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined under licence L8245/2008/3. 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 licence L8245/2008/3.

The Narngulu WWTP is designed to treat up to 3,500 m^3/day of sewage waste accepted via the sewer network and via tankers. Wastewater undergoes a screening process before being treated to a secondary standard using an aerated lagoon system with a detention time of 3.7 days and dispersing all treated wastewater (TWW) via onsite infiltration. Category K130 waste (sewage waste from the reticulated sewerage network) is accepted on the premises via tanker receival infrastructure which directly disposes waste into Pond 1 (Reactor Basin).

Initial sludge stabilisation takes place in the settling basins. Sludge from the settling basins is withdrawn periodically and placed in the sludge Drying Beds (1 and 2) where further sludge dewatering occurs. Sludge from the infiltration ponds is also deposited in these beds. Dried sludge is removed and disposed of at an approved landfill.

Treated wastewater from the settling basins is pumped into infiltration lagoons capable of infiltrating 110 mm/day. The infiltration area has sufficient capacity to allow for periodic resting and cleaning to sustain infiltration rates. A schematic of the premises is shown in Figure 1.

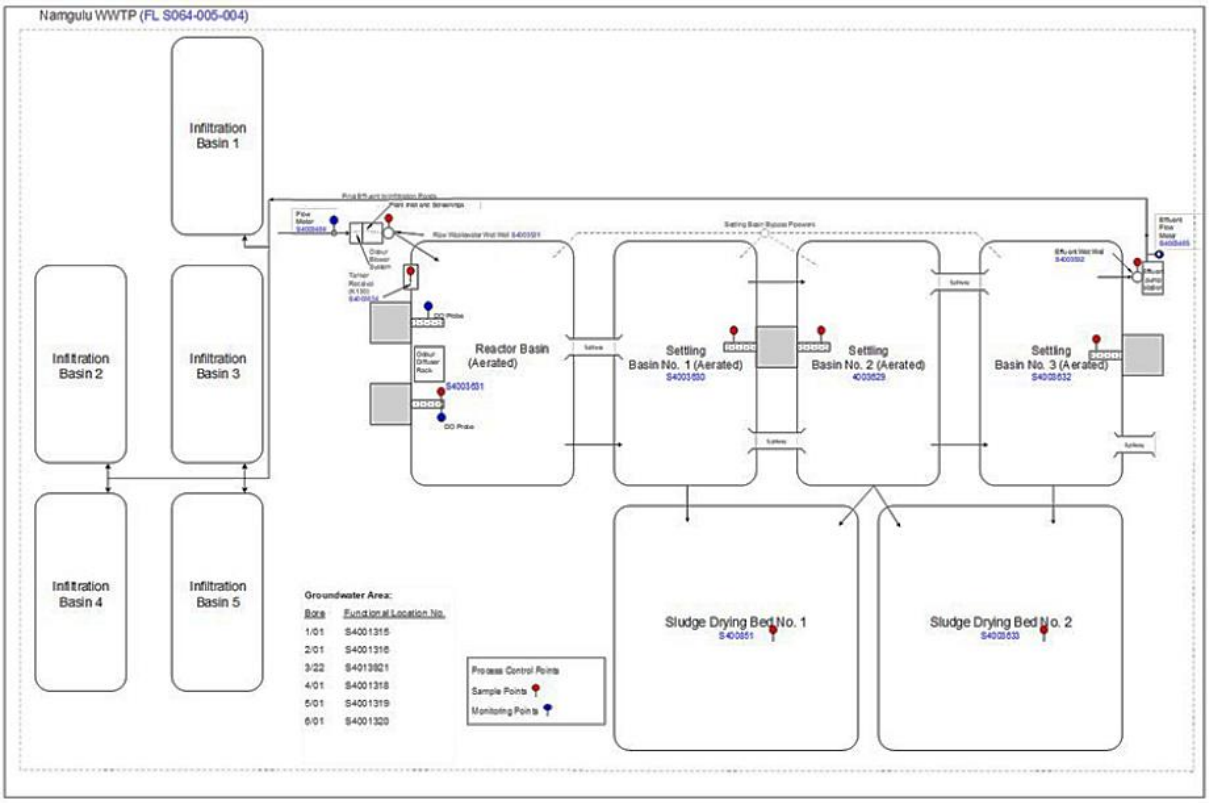


Figure 1: Premises schematic

3. Location and siting

3.1 Siting context

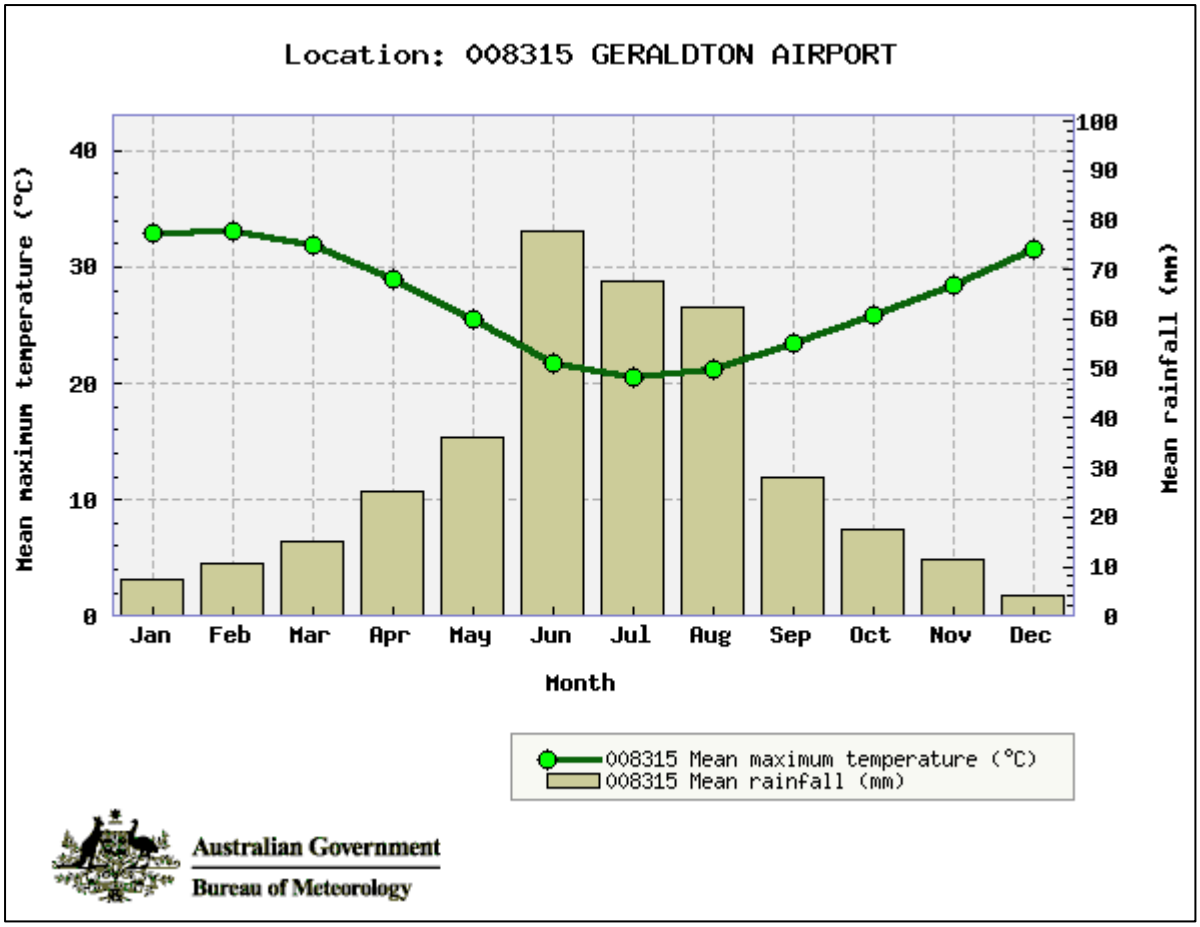
The Narngulu WWTP is located on Lot 150 on Deposited Plan 78656 and Lot 1782 on Deposited Plan 248686, Narngulu, located within the City of Greater Geraldton. The Narngulu WWTP is located approximately 1.5 km east of the residential suburb of Wandina and approximately 6 km south-east of the Geraldton town center.

3.2 Environmental siting

3.2.1 Climate and rainfall

Greater Geraldton experiences a Mediterranean type climate, with hot dry summers, cool mild winters with consistent year round wind. The Bureau of Meteorology (BoM) data from the Geraldton Airport weather station (Station No. 008315) shows that the area in the vicinity of the premises has an annual rainfall of 362.2 mm (based on data from 2011 to 2024), with the majority of rainfall received between June and August.

The average maximum temperature is 33.1°C, with the hottest month being February, and the average minimum temperature being 8.9°C, with the coldest month being August. The monthly mean rainfall and maximum temperature are shown on Figure 2.



Source: BoM (Station No. 008315)

Figure 2: Rainfall and maximum temperature Geraldton (2011-2024)

3.2.2 Wind direction and strength

Based on the climate data for the Geraldton Airport Comparison station (Station No. 008051; 1941 to 2014), the prevailing wind direction is north-easterly in the morning and southerly in the afternoon. Wind roses are presented in Figure 3.

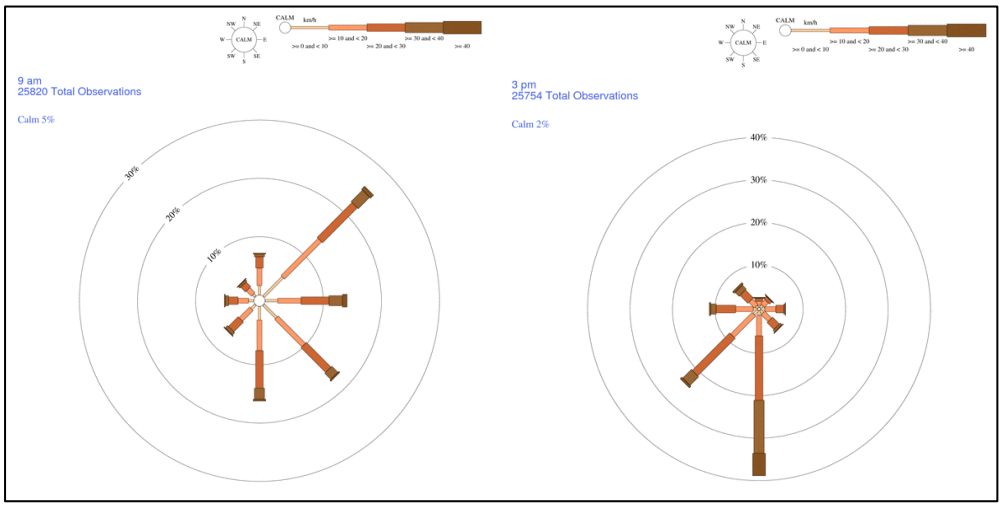


Figure 3: Wind direction and strength at Geraldton at 9am (left) and 3pm (right)

3.2.3 Topography

The majority of the premises is generally flat with the average height approximately 20 m AHD. The premises gradually increases in the south-western corner of the premises where the infiltration ponds are situated to a maximum of 35 m AHD. The topography of the premises is shown in Figure 4.

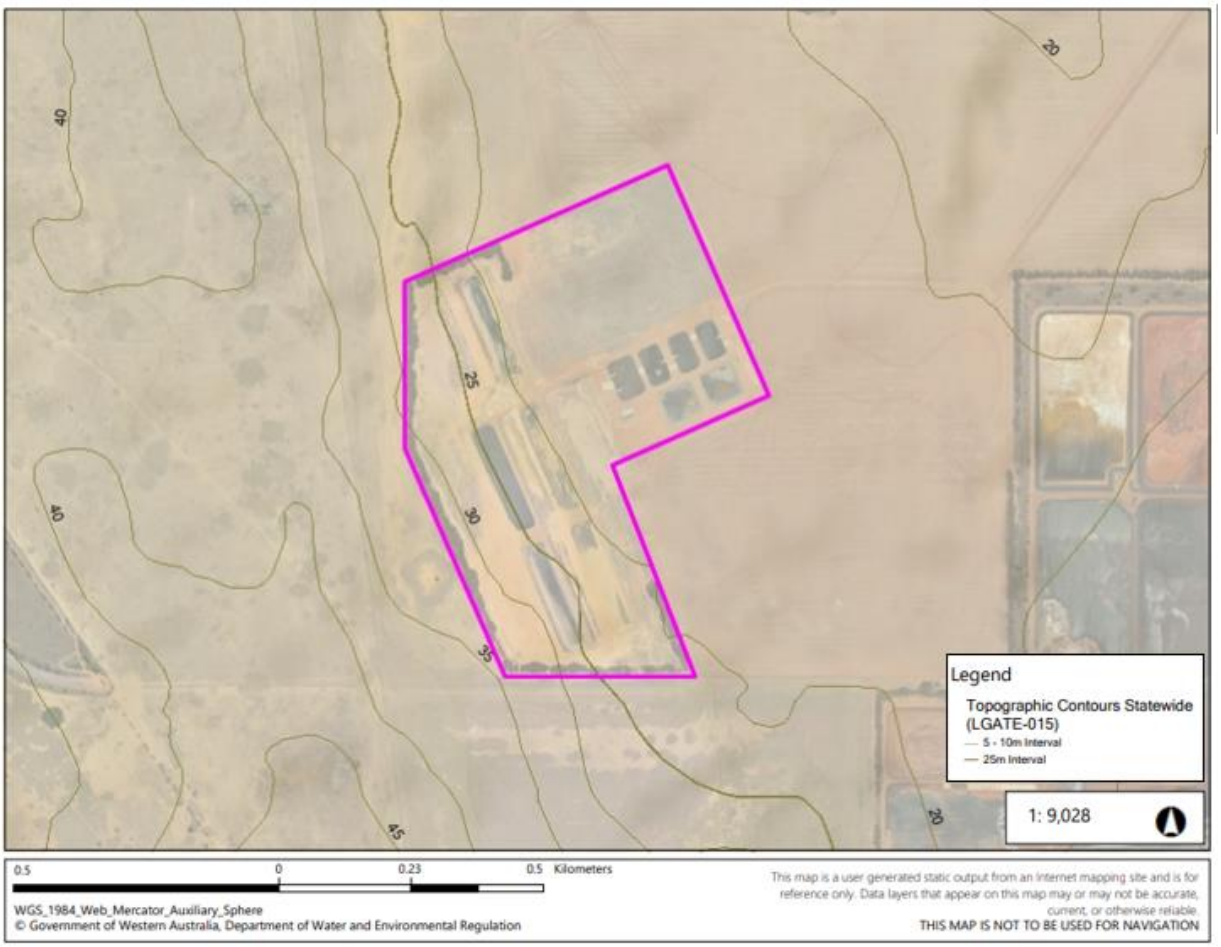


Figure 4: Topography of the premises and surrounding area

3.2.4 Geology

The geology of the area is described as quaternary coastal limestone and overlaying podsolised sand-eolianite and leached quartz sand. Aurora Environmental undertook intrusive investigations in April 2020 to construct groundwater monitoring bores. The generalised soil profile encountered (to a maximum depth of 39 m bgl) has been summarised below (Aurora 2021):

- SAND – fine to coarse grained, moderately graded, yellow/white/beige/light brown, some non-plastic fines.
- GRAVELLY SAND – fine to course grained, moderately to well graded, tan/white, fine gravels, sub-rounded to sub-angular.
- SILTY SAND – fine to medium grained, moderately graded, low to medium plasticity, soft to moderate hardness, orange/grey/dark brown/red/orange.
- LIMESTONE – fine grained, poorly graded, rounded, quartz with calcareous cement, hard.

3.2.5 Hydrology

The Indian Ocean lies approximately 3.1 km west of the premises. No other surface water bodies exist within the vicinity of the premises.

3.2.6 Hydrogeology

The premises is situated within the Arrowsmith hydrozone overlaying the unconfined Perth – Superficial Swan aquifer. Groundwater typically flows from east to west, discharging into the Indian Ocean.

Groundwater recharge to the Superficial aquifer is mainly by direct infiltration from rainfall over permeable sand and limestone, predominantly during winter and early spring. Recharge may also occur from the underlying confined Mesozoic Cattamarra Coal Measures aquifer where hydraulic connection exists between the aquifers (DoW 2017).

A groundwater investigation was conducted at the premises between April 2020 and June 2021 by Aurora Environmental (Aurora 2021). The investigation found that:

- Depth to groundwater in the vicinity of the premises ranged from 15.345 to 34.835 m below ground level (mbgl);
- Salinity ranged from marginal (994 µS/cm) to saline (11,210 µS/m);
- Operations at the adjacent premises appear to be contributing to groundwater impacts in the form of total dissolved solids (TDS), boron and nitrate with these parameters generally being of lower concentration in the downgradient wells compared to upgradient wells.

3.3 Residential and sensitive 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 1 and Figure 5 below provides a summary of potential human 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 1: Sensitive human receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Residential premises	The suburb of Wandina lies approximately 1.4 km east of the premises
Geraldton Junior and Senior Motocross Club	Directly adjacent on the northern boundary of the premises
Agricultural land	Mixed use agricultural land (grazing and cropping) immediately adjacent and within the prescribed premises boundary.
Groundwater users	Five registered groundwater bore users 2km to 2.5 km west to south-west of the prescribed premises boundary. Groundwater is abstracted for irrigation of public open spaces and irrigation Wandina Primary School oval. Groundwater is abstracted from the

Human receptors	Distance from prescribed activity
	unconfined aquifer.

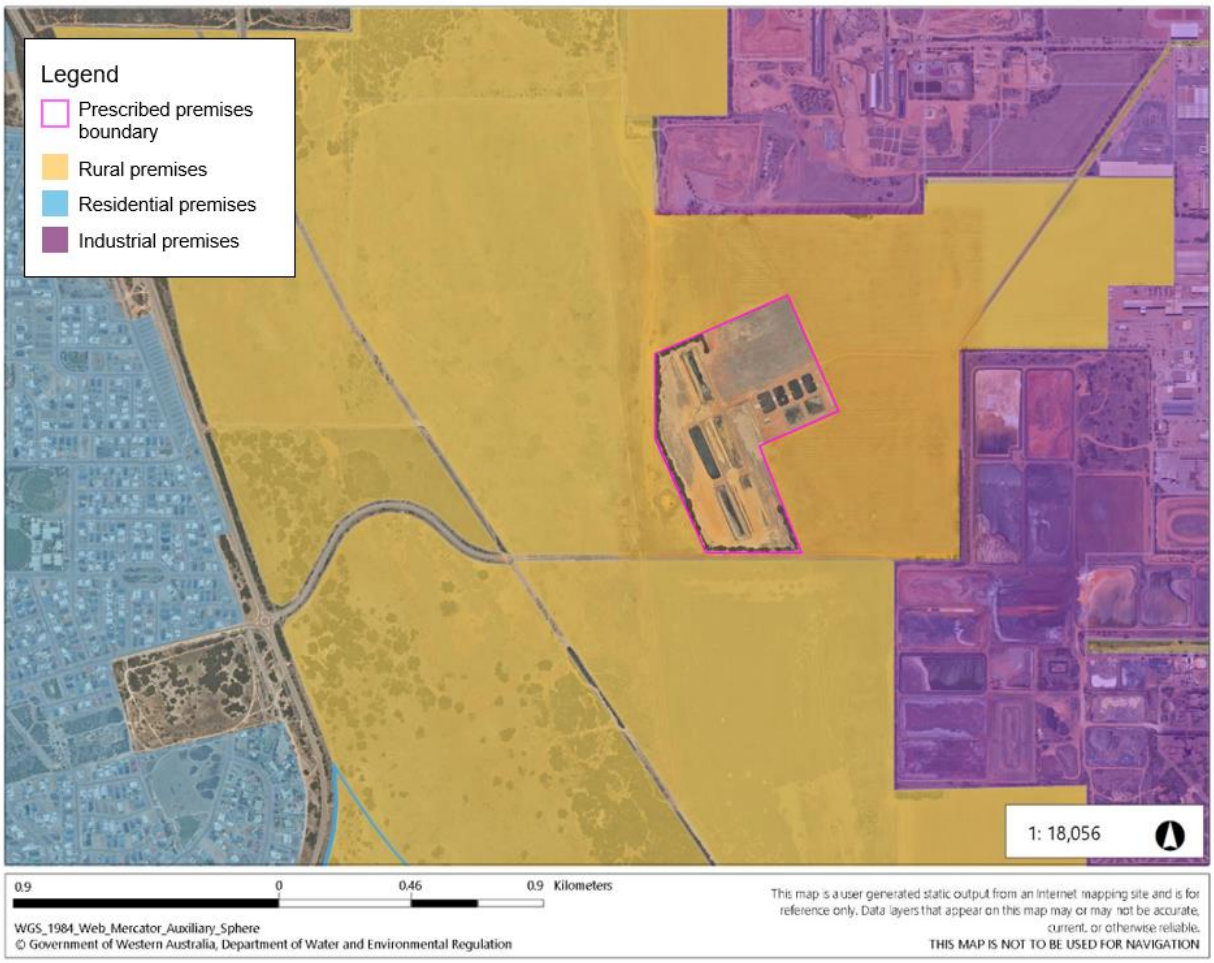


Figure 5: Residential and sensitive receptors in relation to the prescribed premises

3.4 Specified ecosystems and ecological receptors

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at, or emissions and discharges from, the premises. The description of specified ecosystems and distances from the premises are discussed in Table 2.

Table 2: Environmental receptors and distance from prescribed premises

Environmental receptors	Distance from prescribed activity
Flora and fauna	
Threatened and Priority Ecological Communities (TEC / PEC) Priority 1 Ecological Community – Coastal sands dominated by *Acacia rostellifera, Eucalyptus oraria* and *Eucalyptus obtusiflora* (Geraldton area)	Found within 1.7 km of the prescribed premises
Groundwater	
Underlying groundwater	Groundwater monitoring undertaken at the site indicated that groundwater is between 15 and 29 m below ground level. Regional groundwater flow is in a west-southwestly direction toward the Indian Ocean.
Rights in Water and Irrigation act 1914 (RIWI Act) Proclaimed Groundwater Area Arrowsmith Groundwater Area	The premises is within the proclaimed area
Surface water bodies	
Rights in Water and Irrigation act 1914 (RIWI Act) Proclaimed Surface Water Areas and Irrigation Districts Greenough River and Tribuaries Catchment Area	The premises is partially within the proclaimed area

3.5 Aboriginal heritage

The premises is located within the Yamatji Nation Native Title Agreement area.

There are no recorded Aboriginal Cultural Heritage sites within or in the vicinity of the premises.

4. 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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises 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
Operation			
Noise	Operation of WWTP Acceptance and treatment of sewage waste	Air/windborne pathway	No proposed controls
Odour		Air/windborne pathway	The lagoons are designed to maintain a hydraulic retention time of 1.5 to 2.5 days to reduce algal growth. All lagoons are aerated.
Pests / vermin		Breeding of mosquitos (biological pathway)	Ponds are aerated. The lagoons are designed to maintain a hydraulic retention time of 1.5 to 2.5 days. Infiltration ponds have an infiltration rate of 110 mm/day and are filled to a maximum depth of 1 m.
Sewage Treated wastewater Solid wastes / sludge		Overland flow resulting from spills, leaks or loss of containment Spills / leaks resulting in seepage to soil and groundwater	Sludges are placed into clay lined sludge stabilisation lagoons. Emergency overflow/bypass manual bar screen (for preliminary treatment). Facility maximum capacity = 170L/s, to meet projected maximum ultimate instantaneous inflow from conveyance system of 165L/s.
Treated waste water	Disposal of treated wastewater via infiltration	Infiltration into groundwater	Infiltration ponds have an infiltration rate of 110 mm/day and are filled to a maximum depth of 1 m.

4.2 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 4.1. 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 4.1), 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 licence 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 4.

Licence L8245/2008/3 that accompanies this decision report authorises emissions associated with the operation of the premises.

The conditions in the issued licence, as outlined in Table 4 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 events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Operation of WWTP Acceptance and treatment of sewage waste	Noise	Air / windborne pathway causing impacts to health and amenity	Residential premises 1.4 km east of premises	Refer to Section 4.1	C = Minor L = Unlikely **Medium Risk**	Y	N/A	Emission to be regulated under the *Environmental Protection (Noise) Regulations 1997* (EP Noise Regulations)
	Odour	Air / windborne pathway causing impacts to health and amenity	Residential premises 1.4 km east of premises Motocross club directly adjacent north of premises	Refer to Section 4.1	C = Moderate L = Unlikely **Medium Risk**	Y	Conditions 1, 3 & 15	N/A
	Pests / vermin	Breeding of mosquitos causing impacts to human health and amenity	Residential premises 1.4 km east of premises Motocross club directly adjacent north of premises	Refer to Section 4.1	C = Moderate L = Rare **Medium Risk**	Y	Conditions 1, 3 & 15	N/A
	Sewage Treated wastewater Solid wastes / sludge	Spills / leaks resulting in migration into surface water ways causing ecosystem disturbance or impacting surface water	Residential premises 1.4 km east of premises Agricultural land adjacent to premises Priority	Refer to Section 4.1	C = Major L = Unlikely **Medium Risk**	N	Conditions 6 & 15 Conditions 1, 3, 4, 5	Infrastructure requirements have been included in condition 1 to specify pond freeboard limits, the inlet works hardstand must drain leachate back to the treatment process and leachate from the drying beds must be returned

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		quality and amenity Spills / leaks resulting in seepage to soil and groundwater causing contamination and impacting water quality	Ecological Communities within 1.7 km of premises Underlying groundwater 15 – 29 mbgl Groundwater users downgradient of premises					to the reactor basin. Condition 3 has been included to specify that grit and screenings must be stored in an impermeable receptacle or container which is stored on a hardstand that drains leachate back to the treatment process. Condition 4 has been included as a standard spill management condition. Condition 5 has been included as a standard stormwater management condition.
Disposal of treated wastewater via infiltration	Treated waste water	Infiltration into groundwater causing contamination and impacting water quality	Agricultural land adjacent to premises Priority Ecological Communities within 1.7 km of premises Underlying groundwater 15 – 29 mbgl Groundwater users downgradient of premises	Refer to Section 4.1	See detailed risk assessment outlined in Section 4.3			

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.

4.3 Detailed risk assessment for treated wastewater / groundwater contamination

4.3.1 Description of treated wastewater / groundwater contamination

Treated wastewater (TWW) is directed to one of five infiltration basins located on the premises. TWW is discharged via infiltration and seeps through soil to groundwater. If high concentrations of contaminants remain in the TWW after the treatment process, then infiltration may lead to a degradation in groundwater quality which may in term have adverse impacts to down gradient beneficial users of groundwater.

4.3.2 Identification and general characterisation of emission

Only sewage waste is accepted onto the premises either via the reticulated sewerage network or via tankers. Sewage waste is treated via screening and an aerated lagoon system consisting of a reactor basin to accommodate bioconversion and flocculation followed by three settling basins dedicated to sedimentation, solid stabilisation and sludge storage. The system is designed to maintain a hydraulic retention time in the range of 1.5 to 2.5 days. Treated waste water is then pumped into the infiltration basins which have been designed with an infiltration rate of 110 mm/day.

An Environmental Site Assessment (ESA; Aurora 2021) was conducted at the premises between April 2020 and June 2021. During this time, 3 samples of effluent (TWW) and one sample of influent (sewage) were collected. A summary of the results is presented in Table 5.

Table 5: Influent and effluent quality at Narngulu WWTP (Aurora 2021)

Parameter	Units	Effluent			Influent
		April 2020	October 2020	June 2021	(June 2021)
Field parameters					
pH	pH units	7.67	7.72	8.01	7.75
Electrical conductivity	µS/cm	1,270	2,510	2,055	2,098
Total dissolved solids	mg/L	826	1,632	1,336	1,364
Dissolved oxygen	mg/L	1.67	1.50	5.90	7.15
Redox potential	mV	283.1	-	281.8	296.8
Analytical results					
Total nitrogen as N	mg/L	71.0	66.1	47.1	50
Total phosphorous as P	mg/L	7.60	9.52	6.17	6.08
Faecal coliforms	CFU/100mL	~70,000	1,600	~12,000	110,000
E. coli	CFU/100mL	~70,000	1,600	8,800	130,000

Groundwater is located approximately 24 to 28 m bgl in the vicinity of the infiltration basins and groundwater flow is in a west, south-westerly direction. Three rounds of groundwater monitoring were conducted as part of the ESA in April 2020, October 2020 and June 2021. The investigation identified up gradient sources of contaminants of potential concern (COPCs) including the Iluka property and various other commercial/industrial operations making it difficult to discern regional background concentrations and any potential impacts associated with the discharge of TWW from the infiltration ponds. Results from the investigation found that:

- Boron concentrations tended to be higher in up gradient bores, which are attributed to the Iluka operations.
- Concentrations of pathogens (faecal coliforms and *E. coli*) have a high degree of variability in both up gradient and down gradient wells with no apparent direct correlation. Concentrations of *E. coli* exceeded the Guidelines for the non-potable uses of recycled water in Western Australia (NPUG; DoH 2024) criterion in 11 of the 13 monitoring bores sampled.
- Ammonium and ammonia tended to be the dominant form of nitrogen in the effluent samples while nitrate tended to be the dominant form in groundwater. Ammonium and ammonia are likely quickly oxidized in the unsaturated zone via microbial processes. Concentrations of ammonia exceeded NPUG values in 3/01, 4/01 and 1/20, the bores directly downgradient from the infiltration ponds. Groundwater bores further downgradient did not exceed adopted guideline values.
- Concentrations of phosphorus tended to be several orders of magnitude lower in groundwater samples compared to effluent samples.

Per- and polyfluoroalkyl substances (PFAS) were not included as a COPC in the ESA and it is unknown if any impacts to groundwater from PFAS exist from the infiltration of treated wastewater.

Groundwater monitoring conducted as part of quarterly monitoring requirements under L8245/2008/2 shows an increasing trend in total nitrogen in downgradient bores. Total dissolved solids, pH and phosphorus remain relatively stable in downgradient wells.

4.3.3 Description of potential adverse impact from the emission

Receptors that may be impacted by contaminated groundwater as a result of direct infiltration of treated wastewater include beneficial users of groundwater. Beneficial users of groundwater include livestock (from stock water derived from extraction bores), unregistered and registered abstraction bore users.

There are five registered groundwater abstraction bores downgradient of the premises. Groundwater is abstracted from the unconfined aquifer for the irrigation of public open spaces and for the irrigation of Wandina Primary School. Contaminated groundwater has the potential to cause impacts to human health via direct contact with contaminated water or indirectly through the consumption of produce irrigated with contaminated groundwater. The closest registered bore is approximately 2 km from the premises.

There is potentially one un-registered groundwater bore located down gradient of the premises which is likely used for stock watering. Due to the absence of buildings near the bore, it is unlikely to be used for non-potable purposes.

4.3.4 Applicant controls

The applicant's proposed controls are detailed in Section 4.1.1.

4.3.5 Key findings

The delegated officer has reviewed the information regarding the discharge of treated wastewater / groundwater contamination and has found:

1. Groundwater in the region has beneficial uses to the region for livestock watering and non-potable uses.
2. There are several potential sources of groundwater contamination in the vicinity of the premises.
3. Uncertainty exists regarding the quality of the treated wastewater in regards to persistent organic pollutants (POPs) and pharmaceutical and personal care products (PPCPs).
4. The discharge of treated wastewater via infiltration may be diluting groundwater contaminants from other sources (i.e. boron from the Iluka premises).
5. Elevated levels of nutrients in the groundwater downgradient of the premises is likely due to the discharge of treated wastewater from the premises.
6. Livestock drinking water guideline values for pathogens are not always met in off-site bores.
7. No observed impacts from the premises have been noted to date. Downgradient human receptors (namely the Wandina Primary School) are likely sufficiently removed from the premises to allow for adequate natural attenuation of nutrients and pathogens.

4.3.6 Risk assessment

The delegated officer has:

- considered that the consequence to receptors exposed to treated wastewater / contaminated groundwater through the discharge of treated wastewater from the premises could have major impacts to human health and moderate impacts to livestock health;
- considered that the likelihood of impacts to human receptors is rare based on the separation distance between the premises and sensitive receptors and that the likelihood of impacts to livestock is possible based on concentrations of pathogens in off-site bores;
- determined that the overall risk of impacts from the discharge of treated wastewater to human receptors, based on a consequence of major and likelihood of rare, as **medium**, and, the overall risk to livestock, based on a consequence of moderate and likelihood of possible, as **medium**.

4.3.7 Regulatory controls

In considering the findings of the risk assessment for the discharge of treated wastewater, the delegated officer considers the risk to receptors from contaminated groundwater to be acceptable subject to the additional regulatory controls listed in Table 6 to address uncertainties regarding the quality of water available for use as stock water. The delegated officer considers the separation distance to human receptors to be sufficient to mitigate any risks to human health in conjunction with the additional regulatory controls being applied to manage risk to stock water as detailed in Table 6.

Table 6: Summary of additional regulatory controls for the discharge of treated wastewater

Condition number	Regulatory control
Conditions 13 and 14	The delegated officer does not consider it appropriate for treated wastewater to be impacting groundwater quality in the superficial aquifer in a way that causes exceedances of the Livestock Drinking Water Guidelines where groundwater may be abstracted for use as stock water downgradient of the premises. Monitoring of effluent and groundwater have demonstrated elevated levels of pathogens and total nitrogen, with concentrations of pathogens often exceeding the Livestock Drinking Water Guidelines and concentrations of total nitrogen steadily increasing since 2017. The delegated officer notes that a level of natural attenuation occurs in the unsaturated zone during infiltration. Condition 13 has been included to adopt the Livestock Drinking Water Guidelines as trigger values for faecal coliforms and nitrate (as N) when monitored in downgradient bores 3/22 (replacement bore for 3/01) and 4/01. Noting that there are multiple sources of COPCs in the vicinity of the premises, condition 14 has been included to require the licence holder to investigate the cause of the trigger and undertake management actions where required. The delegated officer considers condition 13 and 14 appropriate to mitigate the risk to livestock health through the abstraction of groundwater for beneficial use as stock water at agricultural premises downgradient from the premises.

5. Consultation

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

Table 7: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 25 July 2024	None received	N/A
Local Government Authority advised of proposal on 25 July 2024	None received	N/A
Department of Health (DoH) advised of proposal 25 July 2024	The DoH provided an email response on 20 August 2024 stating that the DoH had received an application for the Narngulu WWTP and has requested further information from the proponent.	Noted.
Applicant was provided with draft documents on 17	See Appendix 1	See Appendix 1

September 2024		

6. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that the application to renew licence L8245/2008/3 will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

References

1. Aurora Environmental 2021, *Environmental Site Assessment – Narngulu Wastewater Treatment Plant*, Perth, Western Australia.
2. Australian and New Zealand Environment and Conservation Council (ANZECC), Agriculture and Resource Management Council of Australia and New Zealand 2000, *Australian and New Zealand guidelines for fresh and marine water quality, Volume 3, Primary industries – Rationale and background information,* Australia.
3. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Department of Health (DoH) 2024, *Guideline for the non-potable uses of recycled water in Western Australia*, Perth, Western Australia.
5. Department of Water (DoW) 2017, *Northern Perth Basin: Geology, hydrogeology and groundwater resources*, Perth, Western Australia.
6. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
7. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Risk Assessments*, Perth, Western Australia.

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

Condition	Summary of applicant's comment	Department's response
Condition 1, Table 1	Table 1, 1(c): Vegetation and floating debris cannot be fully prevented from growing or accumulating onto pond surfaces and embankments, however regular management activities occur to remove and reduce growth. **Requested amendment:** (c) Vegetation and floating debris (emergent or otherwise) must be prevented **(as far as practicable)** from growing or accumulating onto pond surfaces and embankments.	The department does not consider the statement "as far as practicable" as enforceable. The condition has not been changed.
	Table 1, 3(a): The reactor basin has three (3) duty and one (1) standby aerator and are controlled by dissolved oxygen in the basin and timers. The three (3) duty aerators have a staggered start and stop program. Additionally, when these aerators wear out, Water Corporation will likely replace them with more efficient devices which will have smaller motors. It is therefore not appropriate to licence a particular size or number of aerators. Water Corporation requests that this condition is reworded to be less prescriptive but still enforce the outcome and intent of this condition. **Requested amendment:** (a) ~~**Must have a minimum of four 30kw aerators installed and operating at all times during normal operation**~~ **must be equipped with sufficient aeration capacity to maintain treatment quality.**	Updated to state that the Reactor Basin must be equipped with aerators.
	Table 1, 3(b): The plant has been designed to have a freeboard of 300 mm. **Requested amendment:** (b) A top of embankment freeboard height equal to, or greater than ~~500~~ **300** mm must be maintained;	Freeboard requirement amended to 300 mm.
	Table 1, 4(a): The settling basins have one duty and one standby aerator. Only one aerator runs at a time and cycles on and off up to 8 times across each day. **Requested amendment:**	Updated to state each pond must be equipped with aerators.

Condition	Summary of applicant's comment	Department's response
	a) ~~**Each pond to have installed a minimum of two 7.5kw aerators which are operating at all times**~~ **must be equipped with sufficient aeration capacity to maintain treatment quality;**	
	Table 1, 4(b): The plant has been designed to have a freeboard of 300 mm. **Requested amendment:** (b) A top of embankment freeboard height equal to, or greater than ~~500~~ **300** mm must be maintained;	Freeboard requirement amended to 300 mm.
	Table 1, 4(c): Although the settling basins are configured in series, there may be an operational requirement in the future to bypass (one or more) or run several in parallel. Settling basins will need to be taken offline as required for operational reasons **Requested amendment:** ~~**(c) Must be operated in series; and**~~	Amended as per comment.
	Table 1, 5(b): Sludge drying beds are designed to contain all leachate within them and allowed to evaporate. **Requested amendment:** (b) Leachate from the drying bed must be ~~**collected and drained to the Reactor Basin.**~~ **contained within sludge drying bed as per design.**	Amended as per comment.
	Table 1, 6(a): The plant has been designed to have a freeboard of 300 mm. **Requested amendment:** (a) A top of embankment freeboard height equal to, or greater than ~~500~~ **300** mm must be maintained;	Freeboard requirement amended to 300 mm.
	Table 1, 6(b): The adequate operation of the infiltration basins can be achieved in any number of ways, which will depend on season, basin condition and operational requirements. **Requested amendment:** Must ~~**achieve an infiltration rate of approximately**~~ **be maintained to achieve an adequate infiltration rate.**	Infiltration rate requirement removed.

<table>
<tr><th>Condition</th><th>Summary of applicant's comment</th><th>Department's response</th></tr>
<tr><td>Condition 2, Table 2</td><td>To calculate the treatment capacity of a WWTP Water Corporation uses several standard definitions to describe the flow/treatment conditions which a WWTP will be required to be managed. They include 'average dry weather flow', 'peak dry weather flow', 'maximum month flow', 'peak wet weather flow' and 'peak instantaneous flow'. These definitions are represented in combination by Average Annual Daily Flow (AADF), which is defined by the total annual inflow volume and divided by 365. It there It therefore includes the influence of all domestic, commercial and industrial used water flows, as well as rainfall and groundwater infiltration, and the impact that these inputs have on the variable load which a treatment facility must manage to a specified standard." Therefore, the treatment capacity of 3,500 m^3/day (annual average) is the correct capacity of the WWTP.

Requested amendment:
<table><tr><th>Waste type</th><th>Controlled waste code</th><th>Rate at which waste is received</th><th>Acceptance specification</th></tr><tr><td>Sewage</td><td>N/A</td><td rowspan="2">No more than 3,500 m^3/day (annual average). <s>No more than 100 tonnes per annual period</s></td><td>(a) Accepted via sewerage inflow</td></tr><tr><td>Sewage waste from the reticulated sewerage system</td><td>K130</td><td>(a) Accepted via waste tanker</td></tr></table></td><td>Category 54: Sewage Facility is based on the maximum design capacity of a sewage treatment plant expressed as m^3/day. The department does not consider it appropriate to list the rate at which waste is received as an annual average as the assessment has been undertaken on the assumption that 3,500 m^3/day is the maximum throughput of waste that the plant is capable of receiving. The condition has not been updated. If the licence holder would like the amend the maximum design capacity, the licence holder will be required to apply for a licence amendment.</td></tr>
<tr><td></td><td>K130 sewage from sewer pump station blockages and clean outs throughout Geraldton can be tanked to Narngulu WWTP and deposited in the sludge drying beds. As this is sewage, the quantity of waste accepted should be regulated under Cat 54 and hence be included within the 3,500 m3 facility limit. Water Corporation has not recently discharged K130 via tanker to this site and as such does not expect any significant volumes into the future.

Requested amendment:
<table><tr><th>Waste type</th><th>Controlled waste code</th><th>Rate at which waste is received</th><th>Acceptance specification</th></tr></table></td><td>The acceptance of K130 waste is not regulated under Category 54 as the waste is not accepted onto the premises via the sewerage network, but rather via tankers. Liquid waste received onto the premises via a tanker, regardless of waste type, is regulated under Category 61. The addition of Category 61 is an administrative addition. The licence holder confirmed by email on 1 August 2024 that the premises does not accept more than 100 tonnes per annual period of K130 and that Category 61 was not required. If Category 61 is required in the future, the licence holder will be required to apply for an amendment.</td></tr>
</table>

Condition	Summary of applicant's comment				Department's response
	Sewage	N/A	No more than 3,500 m^3/day **(annual average).** ~~**No more than 100 tonnes per annual period**~~	(a) Accepted via sewerage inflow	
	Sewage waste from the reticulated sewerage system	K130		(a) Accepted via waste tanker	
Condition 3, Table 3	Table 3, 1(a): To calculate the treatment capacity of a WWTP Water Corporation uses several standard definitions to describe the flow/treatment conditions which a WWTP will be required to be managed. They include 'average dry weather flow', 'peak dry weather flow', 'maximum month flow', 'peak wet weather flow' and 'peak instantaneous flow'. These definitions are represented in combination by Average Annual Daily Flow (AADF), which is defined by the total annual inflow volume and divided by 365. It there It therefore includes the influence of all domestic, commercial and industrial used water flows, as well as rainfall and groundwater infiltration, and the impact that these inputs have on the variable load which a treatment facility must manage to a specified standard." Therefore, the treatment capacity of 3,500 m^3/day (annual average) is the correct capacity of the WWTP. **Requested amendment:** (a) Treatment of sewage waste must be maintained at or below the treatment capacity of 3,500 m3 /day **(annual average).**				Condition has not been amended. Reasoning as above.
	Table 3, 2 (waste type) and 2(b) There is no grit collection process at this WWTP. **Requested amendment:** The licence holder must dispose of all collected ~~**grit and**~~ screenings from the pre-treatment area, via a controlled waste carrier to a licensed landfill.				Amended as per comment.
Condition 7, Table 5	Remove note 1 reference next to accepted/removed. No note listed under the table.				Removed as per comment.
Condition 8, Table 6	Ammonia as N is already covered through analysis of ammonium as N. **Requested amendment:** Remove Ammonia as N from the monitoring suite.				Amended as per comment.

Condition	Summary of applicant's comment	Department's response
	Monitoring of Faecal coliforms is not required as *E. coli* is monitored. *E. coli* is considered the most appropriate indicator for pathogen risks to groundwater as faecal coliforms may on some occasions include microorganisms of environmental rather than faecal origins (NHMRC & ARMCANZ 1996). *E. coli* is also the parameter used by ANZG to assess risk to livestock drinking water. **Requested amendment:** Remove faecal coliforms from the monitoring suite.	Updated as per comment.
Condition 9, Table 7	Update wording for Temperature **Requested amendment:** Remove (at 25°C).	Updated as per condition
	BOD, Major Cations and Major Anions are not a contaminant of potential concern and is not listed within the *Guideline, Assessment and Management of Contaminated Sites* (DWER 2021) Appendix B pp 149. Additionally, analysis of these parameters does not increase the interpretive value of the monitoring data set or change our ability to interpret risk to the environment. **Requested amendment:** Remove BOD, major cations and major anions from the monitoring suite.	BOD, major cations and major anions are general water quality parameters and act as important indicators of regional aquifer trends and earlier indicators of contamination. Given the multiple sources of potential contamination in the vicinity of the premises and changes to the regional aquifer due to changing climate, the delegated officer considers it necessary to monitor a limited suite of general water quality parameters to provide sufficient lines of evidence to support the interpretation of monitoring results.
	Ammonia as N is already covered through analysis of ammonium as N. **Requested amendment:** Remove ammonia as N from the monitoring suite.	Amended as per comment.
	Monitoring of Faecal coliforms is not required as *E. coli* is monitored. *E. coli* is considered the most appropriate indicator for pathogen risks to groundwater as faecal coliforms may on some occasions include microorganisms of environmental rather than faecal origins (NHMRC & ARMCANZ 1996) rather than faecal origins (NHMRC & ARMCANZ 1996). *E. coli* is also the parameter used by ANZG to assess risk to livestock drinking water. **Requested amendment:** Remove faecal coliforms from the monitoring suite.	Condition has not been amended. Reasoning as above.

<table>
<tr><th>Condition</th><th>Summary of applicant's comment</th><th>Department's response</th></tr>
<tr><td rowspan="2">Condition 13</td><td>Condition 13 wording updated so exceedance of trigger values will be provided to DWER in AACR/AER. This aligns with Kwinana WRRF Licence L6543/1991.
This update also allows for the inclusion of a yearly averaging period for E. coli.
Requested amendment:
<s>Subject to condition 9, the licence holder must submit to the CEO a written report within 14 days of an exceedance where ambient conditions:</s> The licence holder must, where groundwater monitored in accordance with condition 9:
(a) at the monitoring location listed in Table 8;
(b) for the corresponding parameter;
(c) exceed the corresponding trigger value;
<s>When monitored in accordance with condition 9.</s> submit to the CEO a written summary of the exceedance(s) for the annual period as part of c the Annual Audit Compliance Report required by condition 18 and biennial Environmental Report required by condition 19.</td><td>The delegated officer has amended the condition to require the report to be submitted biennially as part of the licence holders biennial reporting requirements.</td></tr>
<tr><td>E. coli suggested to replace faecal coliforms.
E. coli is considered the most appropriate indicator for pathogen risks to groundwater as faecal coliforms may on some occasions include microorganisms of environmental rather than faecal origins (NHMRC & ARMCANZ 1996) rather than faecal origins (NHMRC & ARMCANZ 1996). E. coli is also the parameter used by ANZG to assess risk to livestock drinking water.
The ANZG livestock drinking water guidelines state "in testing for E. coli, it is recommended that a median value of E. coli is used, based on several readings over time from a regular monitoring program." Therefore, an averaging period of a 'year' has been added to the E. coli trigger value of 100 CFU/100mL. Nitrate as N remain a single spot sample for a trigger value in-line with guidance.
Requested amendment:
<table>
<tr><th>Monitoring bore location</th><th>Parameter</th><th>Trigger value</th><th>Averaging period</th></tr>
<tr><td rowspan="2">3/22 & 4/01</td><td><s>Faecal Coliforms</s> E. coli</td><td>100 CFU or MPN /100mL</td><td>Yearly</td></tr>
<tr><td>Nitrate as N</td><td>90.3 mg/L</td><td>Spot</td></tr>
</table>
</td><td>The delegated officer notes that the ANZG Livestock Drinking Water Guidelines have not been published and are available as a draft for public comment. The delegated officer has reviewed the risk assessment and has determined that using E. Coli is an appropriate substitute for faecal coliforms for use as an indicator species.
The delegated officer has reviewed the risk assessment and determined that adopting a yearly averaging period for faecal coliforms is acceptable.</td></tr>
</table>

Condition	Summary of applicant's comment	Department's response
Condition 14	Updated to reflect proposed changes to condition 13. Removed reference to volume/emissions. **Requested amendment:** The licence holder must include the following **information** ~~**in the report referred to in the condition 13**~~ in relation to any exceedances of any of the trigger values identified in ~~**that**~~ condition **13**: (a) the nature, ~~**volume,**~~ and characteristics of the ~~**emissions or**~~ ambient concentrations exceedance; (b) the time and date when the exceedance occurred; (c) whether any impacts to humans, the environment or livestock occurred as a result of the exceedance; ~~**and, if so, what that impact was and where the impact occurred;**~~	The delegated officer has updated the wording of the condition to reflect that reporting will be conducted as part of the biennial Environmental Report.
Condition 19	Table 9, conditions 1 and 3(a) Inspections and audits is the process in which Water Corporation verifies adequate maintenance. **Requested amendment:** (a) A summary of inspections and ~~**maintenance**~~ **audits** performed to address the requirements of Table 1 and Table 3.	Audits have been included in the reporting requirements.
	Table 9, condition 8(c) wording updated to align with waste inputs and outputs monitoring (Condition 7, table 5) which requires monthly averaging treated wastewater outlet pipe. **Requested amendment:** (c) **Monthly** volume (in m^3 or kL) of treated wastewater ~~**applied daily to each irrigation area**~~ **disposed to infiltration basins for an annual period presented in table format** ~~**and monthly cumulative volumes;**~~	Updated as per comment.
	Table 9, condition 8(d) & condition 9(e) water corporation can provide tabulated excel results on request, this is not considered required as a standard condition. **Requested amendment:** Remove condition.	Condition amended to remove reference to requiring tabulated excel results. Results are still expected to be presented in a table within the report as per the previous licence's reporting requirements.
	Table 9, condition 8(e) wording updated as there are no effluent limits in the licence.	Updated as per comment.

Condition	Summary of applicant's comment	Department's response
	Table 9, condition 8(d) removed as raw data can be provided to DWER upon request. **Requested amendment:** Remove condition.	
	Table 9, conditions 8(f), 9(c), 9(d) and 9(f) wording updated/deleted to align with environment report condition wording in recent Licence L6316/1991 (Wagin WWTP). Suggest deleting reference to *Guideline Assessment and management of contaminated sites* as there are other guidelines that should not be ignored i.e. ANZG livestock drinking water guidelines. **Requested amendment:** 8(f) an interpretive summary and assessment of the results against relevant assessment levels ~~**for water, as published in the Guideline Assessment and management of contaminated sites and**~~ **, with rational provided to justify why assessment levels have been assigned; and** 9(c) ~~**A summary of the field and laboratory quality assurance / quality control (QA/QC) program;**~~ **an assessment of reliability of field procedures and laboratory results;** ~~**9(d) Copies of the field monitoring records and field QA/QC documentation;**~~ 9(f) an interpretive summary and assessment of the results against relevant assessment levels ~~**for water, as published in the Guideline Assessment and management of contaminated sites and**~~ **, with rational provided to justify why assessment levels have been assigned;**	8(f) and 8(f) updated as per comment. 9(c) and 9(d) have been removed. The delegated officer expects quality assurance and quality control documentation to be able to be provided upon request if required.
	Table 9, conditions 9(g) wording updated to include reference to groundwater trigger value. **Requested amendment:** (g) an interpretive summary and assessment of results against previous monitoring results **and relevant trigger values within the licence**;	Updated as per comment.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY					
Application type					
Works approval	☐				
Licence	☐	Relevant works approval number:		None	☐
		Has the works approval been complied with?		Yes ☐ No ☐	
		Has time limited operations under the works approval demonstrated acceptable operations?		Yes ☐ No ☐ N/A ☐	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?		Yes ☐ No ☐	
		Date Report received:			
Renewal	☒	Current licence number:	L8245/2008/2		
Amendment to works approval	☐	Current works approval number:			
Amendment to licence	☐	Current licence number:			
		Relevant works approval number:		N/A	☐
Registration	☐	Current works approval number:		None	☐
Date application received		29 May 2024			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Water Corporation			
Premises name		Narngulu Wastewater Treatment Plant			
Premises location		Lot 150 on Diagram 78656 Lot 1782 on Plan 248686			
Local Government Authority		City of Greater Geraldton			
Application documents					
HPCM file reference number:		DER2014/001477-1~2			
Key application documents (additional to application form):		Renewal application Supporting documentation			
Scope of application/assessment					
Summary of proposed activities or changes to existing operations.		Operation of a 3.5MLD WWTP and discharge of TWW via infiltration			

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Proposed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 54: Sewage Facility	3,500 m^3/day	

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: N/A Managed under Part V ☒ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: N/A EPA Report No: N/A
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No: N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☒ General lease ☐ Expiry: Mining lease / tenement ☐ Expiry: Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: N/A Expiry date: N/A If N/A explain why? Consistent with current land use
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A Licence / permit not required.

Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☒ No ☐	Name: Arrowsmith Groundwater Area / Greenough River and Tributaries Catchment Area Type: Proclaimed Groundwater Area/Surface Water Area Has Regulatory Services (Water) been consulted? Yes ☒ No ☐ N/A ☐ Regional office: Mid-West Gascoyne
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☒
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☐ No ☒	N/A
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	N/A
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	N/A
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	Classification: not contaminated – unrestricted use (NC–UU) Date of classification: 13 March 2013