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	W6936/2024/1
Applicant	Numans Accommodation Village Pty Ltd
ACN	127 136 154
File number	DER2024/000229
Premises	Numans Accommodation Village Hodd Road Collie WA Legal description - Lot 8 on Deposited Plan 14975 Certificate of Title Volume 1683 Folio 635 As defined by the coordinates in Schedule 1 of the Works Approval
Date of report	19 August 2024
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, works approval W6936/2024/1 (W6936) 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

On 16 May 2024, 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 relating to a Wastewater Treatment Plant (WWTP) at the premises which will service the 500 persons temporary stay Numans Accommodation Village. The premises is approximately 3.5 km northeast of Collie.

The premises relates to the category / categories and assessed production / design capacity under Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations) which are defined in works approval W6936. 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 W6936.

2.3 Overview of premises

The application outlines the proposed construction of the Numans Wastewater Treatment Plant (NWWTP) with a Production and Desing Capacity (P&DC) of 99 m^3/day. The NWWTP is proposed to be comprised of the following infrastructure:

- 3 x 50kL primary treatment tanks.
- 4 x 50kL Anaerobic Baffle Reactors (ABR) tanks.
- ABR 50kL Pump Chamber tank.
- 5 x ABSORBS bed sand filters.
- 50kL Irrigation storage tank.

All treated wastewater (TWW) is to be fully contained within the NWWTP infrastructure. Irrigation of TWW is proposed to two irrigation sprayfield areas of 2.5 ha in size each.

The NWWTP treatment process consists of:

- an ABR to produce a high-quality effluent with reduced Total Suspended Solids (TSS) to be sequentially dosed to the ABSORDS Filter;
- ABSORBS™ advanced secondary treatment filtration beds. The pump chamber for dosing the beds at 40 L/m^3/day in line with Department of Health (DoH) approval;
- Poly Aluminium Chloride (PAC23) for Phosphorus reduction; and.
- Chlorine disinfection, CT11.

Figure 1 provides a process overview of the NWWTP.

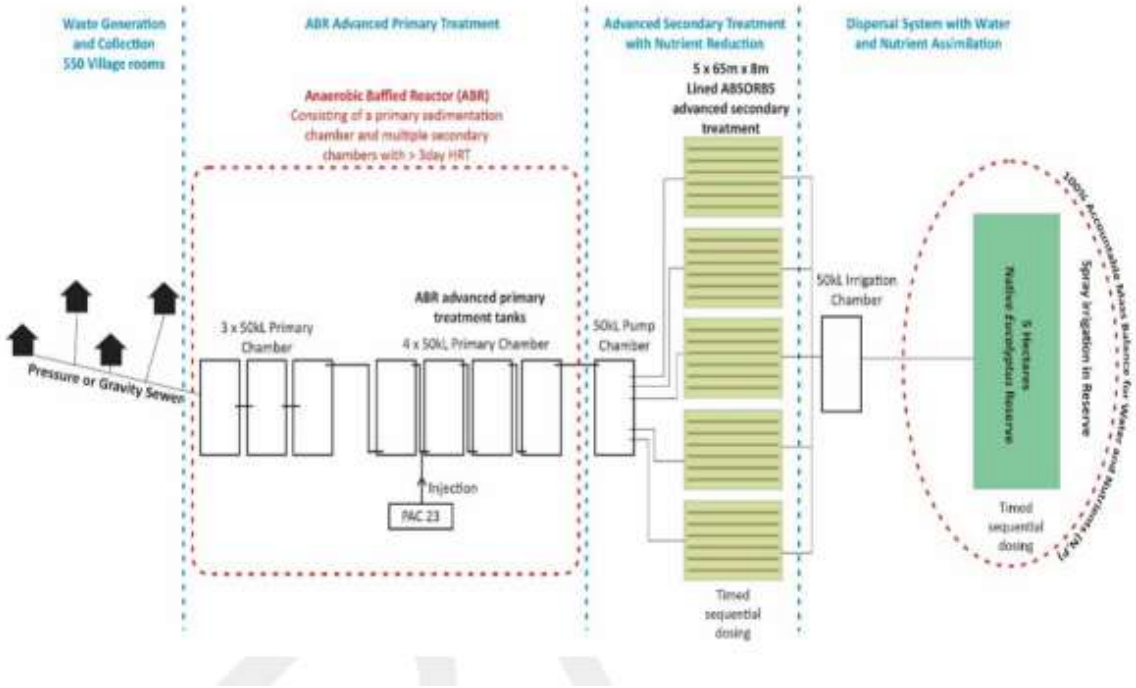

Figure 1: Numans WWTP process overview

Figure 2: NWWTP overview

The WWTP will be completely contained underground. Waste will be gravity fed and primarily treated within multiple anaerobic baffled reactor tanks (ABR) then delivered to an advanced secondary treatment system, in a lined sub-surface aerobic ABSORBS™ Filter. The ABR Pump Tank and ABSORBS pump chamber will have 1-day emergency storage capacity. Figure 2 provides an overview of the NWWTP and Irrigation sprayfield.

The ABSORBS secondary treatment system will consist of 2,475m2 of deep bed sand filter which will be lined and have a loading rate of 40mm/m2. Five ABSORBS beds will be installed and the dimensions of each bed/sand filter will be 65m long x 8m wide. Construction will be staged as the Numans Accommodation Village increases in capacity. The system will drain under gravity to a pump chamber which will pump to the irrigation sprayfield areas.

All TWW will be discharged to the two irrigation sprayfield areas, which contain existing (degraded) wooded tree lots comprising Marri and Jarrah Eucalyptus trees. Each irrigation sprayfield will include a fence to restrict access and will be sized to 2.5 hectares, providing 5 hectares of total irrigation area.

The Applicant has requested Commissioning of the WWTP post construction activities for a period of 6 weeks to ensure the WWTP was achieving desired output criteria. As the application was for a Category 85 (sewage facility), once the respective Works Approval Environmental Compliance Report (ECR) form has been submitted to the department, the Applicant would apply for a Category 85 Registration to authorise the ongoing operation of the WWTP at the premises.

Key finding: During the assessment of this works approval application, technical advice was sought from DWER's principal hydrogeologist on the suitability of the irrigation of treated wastewater to woodlots containing degraded native vegetation (Marri and Jarrah trees). This technical advice is summarised in section 2.5 below.

On review of the technical advice, the Delegated Officer concluded that the application would be better progressed as a Category 54 (sewage facility) instead of a Category 85 (sewage facility), with ongoing operations authorised under a Licence instead of a Registration. This permits DWER to monitor the irrigation of TWW to the woodlots to ensure no impacts to the environment are resulting from this ongoing operation. The applicant was approached regarding the change of category / ongoing regulation to the premises and was agreeable to the change.

As such, the works approval has progressed as a Category 54 application with a maximum permissible P&DC of 100m^3/day, with this P&DC to be reflected on the works approval. Time limited operations will also be authorised through works approval conditions to permit the applicant time to apply for a Licence on the completion of the commissioning phase.

2.4 Irrigation of treated wastewater

The applicant has provided the below information in support of the irrigation of TWW to native vegetation.

2.4.1 Drainage

The Applicant has advised that the irrigation of TWW to the irrigation sprayfield areas can be managed through the use of vegetation to recharge and lower the groundwater table. The applicant has relied on past studies to inform their assessment, where it has been found that there is a lowering of the water table under effluent irrigated Eucalyptus plantations on specific sites. Additionally, this is thought to keep nutrients within the rootzone of vegetation so that they can be utilised via uptake.

Key Finding: The Delegated Officer has sought technical advice from DWER's principal hydrogeologist to inform the assessment of TWW irrigation. The outcomes of this technical advice are highlighted in Section 2.5 below.

The technical advice notes that it is unlikely that intensive drawdown will occur beneath remnant trees to the same extent that is seen beneath Eucalypt forests, as in planted woodlots, tree health and spacing has been optimised to maximise the transpiration rate, which in turn can cause local lowering of the water table to take place. The remnant wild jarrah trees are likely to have much lower transpiration rates which would progressively decrease with their age and disease-burden. They also would not necessarily be spaced at an optimum density to maximise the uptake of water from the soil profile and the underlying regolith.

The Delegated Officer will consider this advice when undertaking the risk assessment for this activity. The risk assessment is detailed in Section 4 below.

2.4.2 Water balance

The Applicant has prepared a water balance for the irrigation sprayfield areas to demonstrate that the area designated to received TWW is sufficient to prevent any adverse environmental effects. The Applicant has modelled the water balance using the *Food and Agriculture Organisation Irrigation and Drainage Paper 56 1998*, which acts to determining a reference value for a notational crop, multiplying it by relevant factors, primarily the Crop Coefficient (Kc), to determine an estimated water demand for a situation (ETc). This methodology also takes into consideration significant meteorological and climatic conditions, and plant water consumption parameters.

In undertaking the water balance, the Applicant has assigned the following parameters:

- 43 years of Site-specific rainfall and evapotranspiration data, obtained from the Australian Bureau of Meteorology;
- A crop coefficient Kc=1, suitable for the water demand of the Eucalyptus woodland;
- A daily time-step water balance model developed and reported monthly;
- Daily 99kL wastewater application;
- Plant available water (PAW) storage capacity in the soil profile (170mm/m), total soil water storage to 3 m is 400mm;
- Deep percolation modelled at 3m of soil depth (suitable for Eucalyptus); and
- Commencement value for water storage is set to be 50% of PAW storage capacity (200mm) at the end of February.

The model represents the most conservative conditions of peak design flow for a 90th percentile wet year.

Based on the above model, the Applicant has concluded:

- For 90th percentile, average and 10th percentile rainfall years there is a water deficit of 403, 511, and 522mm/a respectively, meaning that all of the water can be used by plants;
- In the months of April to October, at modelled Peak Design Flow, rainfall plus wastewater exceeds crop demand.
- Given the water storage capacity in the soil, during this period, rainfall and applied wastewater will be stored in the soil profile. The results show that there is no percolation happening below 275cm, even in a 90th percentile year. For an average year, no percolation is occurring below 250cm.
- Considering rooting depths for Eucalyptus of 5–10m, there is no risk of deep percolation below the root zone from rainfall plus wastewater on this site.

- This demonstrates that under Eucalyptus there is a significant amount of redundant, unused water storage capacity within the soil. It can be seen that in wintertime the soil reaches field capacity. The redundant storage capacity is greater than the PAW regardless of the time of the year.

Key Finding: The Delegated Officer has sought technical advice from DWER's principal hydrogeologist to inform the assessment of TWW irrigation. The outcomes of this technical advice are highlighted in Section 2.5 below.

The technical advice notes the following:

- As it is unlikely that intensive drawdown will occur beneath remnant trees to the same extent that is seen beneath Eucalypt forests, the potential transpiration rate from the irrigated woodland could be much lower than the assumed value used in the water balance model.
- The assumption that the depth to groundwater beneath the irrigation area will always exceed two metres is unlikely to be the case because of the likely characteristics of the weathered profile that has developed on granitic bedrock beneath the wastewater irrigation area. The site is likely to be underlain by a lateritic weathering profile that has formed on granitic basement rocks. Although permanent groundwater is likely to be only present in saprock at the base of the weathered profile, periodically a perched water table will form in gravelly and sandy materials in the upper part of the profile during winter months. This shallow groundwater flow would have the potential to transport nutrients offsite from the irrigation area to the nearby creek. It is anticipated that the frequency and duration of shallow groundwater flow events would increase when wastewater irrigation commences at the site.
- It is recommended that a monitoring bore is installed near the creek channel immediately downgradient of the irrigation area. This would be necessary to assess whether the wastewater irrigation scheme would cause significant increases in water and nutrient discharges to the creek.

The Delegated Officer will consider this advice when undertaking the risk assessment for this activity. The risk assessment is detailed in Section 4 below.

2.4.3 Nutrient balance

The Applicant has provided evidence to demonstrate that nutrients can be sustainably managed passively managed using plants when irrigated with TWW. Additionally, the Applicant has provided an overview of nutrient reduction for Nitrogen (N) and Phosphorus (P) as these nutrients move through the stages of the wastewater treatment system.

The applicant has used generated concentrations of N and P based on their WWTP output results from another similar premises (West Musgrave WA), being 50 mg/L for N and 15mg/L for P. Based on the NWWTP generating 36.135ML/a of wastewater based on the peak design flow (99 m^3/day), the annual load of N will be 1807kg and the annual load of P will be 542kg.

The expected nutrient reduction potential resulting from each treatment process is outline below.

Table 26 Annual nutrient production

Nutrient production	N	P
Concentration (mg/L)	50	15
Wastewater generation (L/d)	99,000	
Annual nutrient generation (kg)	1807	542

Table 28 ABSORBS™ nutrient reduction

Nutrient production	N	P
Residual nutrient to ABSORBS™ (kg)	1753	499
ABSORBS™ nutrient reduction (%)	21%	30%
Residual nutrient to PAC treatment (kg)	1385	349

Table 29 PAC dosing system nutrient removal and N loss via spray irrigation

Nutrient production	N	P
Residual nutrient from ABSORBS™ (kg)	1385	349
PAC treatment system nutrient reduction (%)	0%	60%
Residual nutrient to irrigation (kg)	1385	140
Spray irrigation loss (%)	20%	0%
Residual nutrient to soil (kg)	1108	140

Based on the final residual nutrients to soil loading for N and P, the Applicant has undertaken additional modelling to determine the percentage of N and P that may be attenuated in underlying soils. This has conservatively been modelled at 60% for N and 50% for P.

The Applicant has also assigned nutrient assimilation rates for Eucalyptus species as outlined below and informed by various literature.

Table 35 Nutrient assimilation for Eucalyptus from various sources

Species	N kg/ha/a	P kg/ha/a	K kg/ha/a
Eucalyptus (Ali, 2017)	127	13	65
Eucalyptus (Gardner, 2003)	175	91	
Average Eucalyptus	151	52	
Conservative modelling	**100**	**15**	

Based on this information, the Applicant has calculated the below nutrient assimilation rates within the proposed irrigation sprayfield areas. This demonstrates that there will be a nutrient deficit at the premises within the irrigation sprayfield areas and no excess nutrient accumulation will result from the application of TWW in the designated areas.

Table 36 Eucalyptus *nutrient* assimilation

Parameter	Units	Nitrogen	Phosphorus
Eucalyptus plantation plant assimilation	kg/ha/a	100	15
Nutrient assimilation for 5ha	kg	500	75
Residual nutrient post native Eucalyptus reserve	kg	-57	-5

Key Finding: The Delegated Officer notes that the removal of phosphorus by Polyaluminuim Chloride (PAC) dosing does not result in a definitive percentage reduction since the reduction potential of this treatment methodology is validated in field. Additionally, the percentage of nutrient irrigation loss calculated for spray irrigation is also an estimate. Therefore, the Delegated Officer considers that the nutrient loading value for N and P with the most assurance prior to discharge to land is that obtained after ABSORBs treatment and prior to PAC treatment, until the nutrient removal capacity using PAC treatment can be validated for P.

The Delegated Officer has also sought technical advice from DWER's principal hydrogeologist to inform the assessment of TWW irrigation. The outcomes of this technical advice are highlighted in Section 2.5 below.

The technical advices notes the following:

- The soils that underlie the jarrah forests are very nutrient deficient, and consequently the natural growth rate of trees in these forests is commonly less than 1

m^3/ha/a. Although the growth rate of trees in these forests can be increased by the application of artificial fertilisers, it appears that a significant proportion of the applied nutrients accumulates in leaf litter that falls from jarrah trees. In particular, the leaf litter is a significant sink for phosphorus that is removed from the soil profile by plant uptake, and both the amount of leaf litter and its phosphorus content can increase significantly after the application of nutrients to jarrah trees. This could be a significant management issue in the irrigated woodland, as jarrah leaf litter is not readily biodegraded in soils.

- Jarrah trees are also highly susceptible to fungal infections, and so there would be an increased risk that trees would progressively die when soil water and nutrient levels are increased in the proposed wastewater irrigation area. Consequently, the proposed wastewater irrigation scheme may not be sustainable, and the existing trees in the irrigation area may need to be progressively replaced by other eucalypt species (such as *E. globulus*) that are better suited to growing with the application of treated wastewater.

The Delegated Officer will consider this advice when undertaking the risk assessment for this activity. The risk assessment is detailed in Section 4 below.

2.5 Technical Advice

Technical advice has been sought from internal experts within DWER to assist with the assessment of the suitability of TWW irrigation to land containing remnant native vegetation (Marri and Karri trees). This advice is summarised as follows.

2.5.1 Terrestrial Ecosystems advice

The terrestrial ecosystems branch within DWER have advised the following:

- The works approval application does not provide a clear understanding of the composition and condition of the flora and vegetation targeted for irrigation with TWW. The vegetation within the proposed irrigation sprayfield areas is also not referenced consistently throughout the supporting documentation (i.e. 'Jarrah-Marri Woodland', 'Eucalyptus Plantation' and 'tree lot').
- Based on photographs provided, the vegetation may represent either uncleared vegetation affected by historical grazing or cleared vegetation with replated native tree species. The proposed irrigation areas also appear to have no native understory.
- The likely scenario is that the irrigated areas would see a proliferation in weedy ground cover species due to increased water and nutrient availability. This may result in the escape of exotic species into the surrounding higher value remnant vegetation and exotic species outcompeting slower growing native species.
- It is recommended that:
    - If the works approval application is likely to be processed without the applicant undertaking further flora and fauna studies to allow the characterisarion of existing environmental values, a weed management plan should be implemented for the life of the irrigation program focused on the identification and containment of weeds in the local area that are likely to proliferate during irrigation of remnant vegetation; and
    - Hydrological advice should be sought to confirm the accuracy of the water balance calculations undertaken as a part of the assessment, and address concerns surrounding the potential for eutrophication.

2.5.2 Contaminated Sites advice

The principal hydrogeologist within DWER's contaminated sites branch has advised the following:

- The minimum area of degraded jarrah woodland that would be required to enable wastewater irrigation to take place on a long-term basis without causing excessive seepage of water and dissolved chemical constituents into groundwater is about 3 hectares. As the supporting application documents indicate that the actual irrigation area will be a total of 5 hectares, it is considered that sufficient land area will be available to accommodate the required hydraulic loading of treated wastewater to soils.
- This is provided that there is an active program of biomass removal (weeds and woody material) from the area. This would be necessary to prevent the excessive accumulation of nutrients in the irrigation area, and to manage the risk of nutrient release to environmental receptors through the effects of fire.
- It is considered that a 100-metre buffer distance should be adequate to prevent significant amounts of nutrients discharging to the creek near the irrigation area. However, as it is possible that there is a seasonal perched aquifer in the area that is a potential pathway for transporting nutrients from the irrigation area to the creek, it is recommended that a monitoring bore is installed near the creek to assess this risk. This would be necessary to assess whether the wastewater irrigation scheme would cause significant increases in water and nutrient discharges to the creek.
- The bore should be slotted for a 6-metre interval (or to refusal on bedrock) below the point of groundwater interception in the drilled borehole. It is recommended that this bore is monitored on an annual basis (preferably when groundwater levels are at their highest elevation in September or October) for the following suite of parameters:
    - pH; electrical conductivity; total dissolved solids; major ions (sodium, potassium, calcium, magnesium, bicarbonate, sulfate, chloride); nitrogen compounds (total nitrogen, ammonium-nitrogen, nitrate-nitrogen); and total phosphorus.
- It is recommended that concentration limits for nitrogen and phosphorus compounds in groundwater are set based on their highest levels that are monitored during the first three years of operation of the wastewater irrigation scheme (these samples are considered to be background levels). Concentrations that exceed these levels after this period (or significant upward trends in N and P concentrations) should trigger a management response to reduce the amount of nutrients that are discharged to groundwater from the wastewater irrigation area.
- Based on information that is provided in the NSW wastewater irrigation guidelines (NSW DEC, 2004), the following soil monitoring program is recommended for the irrigation area at Numans Accommodation facility:
    - At least one composite near-surface soil sample should be collected for each hectare of the irrigation area (i.e., a total of 5 composite samples) on at least a three-yearly basis. Each composite sample will consist of 40 samples collected from the depth interval of 0-10 cm collected in each one-hectare area; and
    - Composite soil-profile samples collected from within the irrigation area. The composite soil samples will be collected within a 5 metre diameter plot and will be compiled from at least five sites within this plot. Samples from each sample site will be collected at depth intervals of about 0-20 cm, 20-40 cm, 40-70 cm, and 70-100 cm which will be combined to form composite samples for these depth intervals. Wherever possible, the samples should be collected from specific soil horizons; and
    - The soil samples should be analysed for the parameters indicated below:

Table 1 : Recommended soil monitoring strategy

Constituent[1]	Frequency of sampling: Surface soil	Frequency of sampling: Soil profile at four depth increments
pH (no units)	Annually	Annually
Electrical conductivity (EC) (dS/m)	Annually	Annually
Nitrate-N	Annually	Annually
Total N	After 3 years	N/A
Available P	Annually	N/A
Total P	After 3 years	Every 3 years
Exchangeable sodium percentage	Annually	Every 3 years
Heavy metals and pesticides	After 10 years[3]	N/A
P sorption capacity[2] (kg/ha)	After 3 years (site-specific)	Every 3 years (site-specific)

Notes: 1. mg/L unless otherwise stated.
2. As recommended by an accredited laboratory or soil scientist.
3. Or more frequently if any are identified/calculated as a particular risk factor in effluent.

- The results of the soil program will indicate whether nutrients and other chemical constituents of potential concern are accumulating within soils in the irrigation area, and whether there are potential adverse impacts on soil structure.
- It is not considered that the irrigation of remnant jarrah forest with wastewater will be sustainable. This is due to the likely susceptibility of these trees to fungal infections and other plant diseases when nutrient-poor and seasonally-dry conditions in natural soils are changed due to the effects of wastewater irrigation. Consequently, it is recommended that the existing trees in the proposed irrigation area are progressively replaced with other eucalypt species that are better suited to growing under wastewater irrigation.

Key Finding: Noting the above advice, the Delegated Officer considers that there is a need to validate the potential for nutrient migration and attenuation through soil and groundwater monitoring programs. The implementation of these programs through conditions in the works approval and subsequent licence is discussed in Section 5 below.

A groundwater monitoring program (including the installation of any monitoring bores) has not been proposed by the Applicant has a part of the supporting documentation.

Since ongoing monitoring and reporting on monitoring programs can only be conditioned for ongoing operations through a Licence, the Delegated Officer has discussed with the applicant the need for progressing this application as a Category 54 (sewage facility) leading to regulation under a licence, instead of as a Category 85 (sewage facility) leading to regulation under a registration. Without the avenue to include monitoring controls for the operational portion of the life of the NWWTP, the risk rating for the irrigation of TWW may increase for the premises as there remains uncertainty around whether the irrigation of TWW will result in adverse effects to the environment.

As such, the Applicant has agreed to progress the application as a Category 54 so that ongoing monitoring may be conditioned at the premises through the subsequent Licence.

The outcomes of this decision in terms of the premises risk assessment are outlined in

Section 4 below.

2.6 Commissioning

Commissioning is proposed for six weeks to ensure the NWWTP is operating efficiently. Table 1 outlines the parameters to be analysed for and the sample frequency. Table 1 also outlines TWW compared to Australian and New Zealand Environment and Conservation Council (ANZECC) 1997 *Australian Guidelines for Sewerage systems, Effluent Management*, National Water Quality Management Strategy (ANZECC (1997); all TWW parameters are less than ANZECC (1997).

Table 1: NWWTP Commissioning

Parameter	Target	Sample frequency	ANZECC (1997) Category C – secondary treatment for infiltration Appendix 6
Biochemical Oxygen Demand (BOD)	<20 mg/L	Weekly	20-30 mg/L
Total Suspended Solids (TSS)	<30 mg/L	Weekly	25-40 mg/L
Total Nitrogen (TN)	35 mg/L	Weekly	20-50 mg/L
Total Phosphorus (TP)	5 mg/L	Weekly	6-12 mg/L
E. Coli	<10cfn/100mL	Weekly	10^5 – 10^6 org/100ml
pH	6.5 – 8.5 pH Units	Weekly	N/A

3. Aboriginal Heritage

The Applicant has identified that the proposed NWWTP and irrigation spray filed areas are adjacent to a temporary creek of importance for aboriginal cultural heritage. As such, DWER has referred the works approval to the Department of Planning, Lands and Heritage (DPLH) and the South West Aboriginal Land and Sea Council for comment.

Approval under the *Aboriginal Heritage Act 1972* was determined not to be required by DPLH for the proposed works.

Full consultation undertaken by DWER as a part of this assessment is outlined in Section 6 below.

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 construction / operation which have been considered in this decision report are detailed in Table 2 below. Table 2 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 2: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction of NWWTP, vehicle movements, lift-off from soils and earthworks etc.	Air / windborne pathway	• Siting location 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 limited.
Noise			• Works will be conducted in accordance with the *Environmental Protection (Noise) Regulations 1997.* • Siting Location for sensitive receptors. • Vehicles and equipment will be fitted with appropriate noise controls. • All plant, equipment and vehicles will be regularly inspected and maintained. • Construction work is not expected to occur at night.
Commissioning and Operation			
Dust	Operation of NWWTP and vehicles movements	Air / windborne pathway	Siting location from sensitive receptors.
Nosie			• Siting location from sensitive receptors. • Operations comply with the *Environmental Protection (Noise) Regulations 1997.* • NWWTP is underground. • Limited vehicle movements required.
Odour	Operation of NWWTP and abnormal operations of the WWTP		• Siting location from sensitive receptors. • NWWTP is underground.
Discharges to land	Treated wastewater containing	Discharge to land and	• Siting location from sensitive receptors.

Emission	Sources	Potential pathways	Proposed controls
	contaminants (e.g. nutrients, pathogens, metals)	subsurface seepage causing contamination of soil, degradation of groundwater quality and impacts to downgradient receptors.	• Advanced secondary treatment.. • Irrigation area is 5 ha combined. • Irrigation to existing Marri / Jarrah Eucalyptus Trees. • Irrigation Area has good drainage (L2-3-10%) and only a slight slope. • Specific nozzles for surface irrigation. • Groundwater >2.6mbgl • Soil Assessment prior to Construction activities.
Spills / Leaks	Operation of NWWTP	Direct discharge to land and groundwater	• Scheduled servicing every six months. • High level alarms. • ABR and ABSORBS have 1 day emergency capacity. • Spare pumps on site.
Contaminated Stormwater	Operation of NWWTP	Direct discharge to land and surface water	• Siting location from sensitive receptors. • NWWTP is underground. • Irrigation Areas are not susceptible to erosion. • All wastewater treatment and dispersal areas will be bunded with rock swales to mitigate risk of overland flow.

4.1.2 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 3 and Figure 2 above provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

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

Human receptors	Distance from prescribed activity
Residential	140m south west of Irrigation Area 2 800m south west of NWWTP
Environmental receptors	**Distance from prescribed activity**
Creek – seasonal minor	50m west of NWWTP

	150m west of Irrigation Area 1 and 2
Aboriginal Heritage Creek – seasonal minor	50m west of NWWTP 150m west of Irrigation Area 1 and 2
Underlying groundwater	>2.6mbgl
Premises Dam	50m north west of WWTP

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 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 4.

Works approval W6936 that accompanies this decision report authorises construction and commissioning only. The conditions in the issued works approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Based on the detailed risk assessment a Category 54 Licence is required following the commissioning phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises. When the Works Approval Holder submits the Environmental Commissioning Report (CR) required under W6936 the data from the CR will be used in the Licence Application Risk Assessment to ensure the NWWTP is operating within its design parameters.

Table 4: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and time limited operations

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 NWWTP and associated equipment including vehicle movements (reversing beepers).	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the scale of the works and the separation distance between the source and receptors as indicating that the risk of dust emission impacts is not foreseeable. Dust can be adequately regulated by section 49 of the EP Act.
	Noise			Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the separation distance between the source and receptors as a guide to inform the risk of noise emissions as not foreseeable. Noise emissions are adequately regulated under the *Environmental Protection (Noise) Regulations 1997*.
	Discharges to Land	Discharge to land and subsurface seepage causing contamination of soil, degradation of groundwater quality and impacts to downgradient receptors	Groundwater >2,6mbgl Seasonal creek 150m west	Refer to Section 3.1	C = Major L = Likely **High Risk**	N	Condition 1, 2, 3, 15 and 16.	Refer to section 3.3 Under the works approval the following is required: ▪ Installation of a groundwater monitoring bore; ▪ Implementation of a soil monitoring program; and

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**				
								▪ Submission of a Biomass Management Plan (BMP) to ensure TWW discharges to the ISF can be monitored under the Category 54 Licence.
Commissioning								
Commissioning of NWWTP Discharges to Land via Irrigation Vehicle movements	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the scale of the works and the separation distance between the source and receptors as indicating that the risk of dust emission impacts is not foreseeable. Dust can be adequately regulated by section 49 of the EP Act.
	Noise	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the separation distance between the source and receptors as a guide to inform the risk of noise emissions as not foreseeable. Noise emissions are adequately regulated under the *Environmental Protection (Noise) Regulations 1997*.
	Odour	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the scale of the works and the separation distance between the source and receptors as indicating that the risk of odour emission

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**				
								impacts is not foreseeable. Odour can be adequately regulated by section 49 of the EP Act.
	Discharges to Land	Discharge to land and subsurface seepage causing contamination of soil, degradation of groundwater quality and impacts to downgradient receptors	Groundwater >2,6mbgl Seasonal creek 150m west	Refer to Section 3.1	C = Major L = Likely **High Risk**	N	Condition 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14	Refer to section 5
	Spills / Leaks	*Direct discharge to land and groundwater*	Groundwater >2,6mbgl Seasonal creek 150m west of Irrigation Area and Dam 50m north west of the NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	Condition 1, 2, 5 and 11	N/A
	Sediment laden stormwater	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	Seasonal minor creek 150 west Dam 50m northwest of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	Condition 1, 2, 5 and 11	N/A
Operation								
Operation of NWWTP Discharges to Land via Irrigation Vehicle movements	Dust	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the scale of the works and the separation distance between the source and receptors as indicating that the risk of dust emission impacts is not foreseeable.

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**				
								Dust can be adequately regulated by section 49 of the EP Act.
	Noise	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the separation distance between the source and receptors as a guide to inform the risk of noise emissions as not foreseeable. Noise emissions are adequately regulated under the *Environmental Protection (Noise) Regulations 1997*.
	Odour	Air / windborne pathway causing impacts to health and amenity	Residences 140m southwest of Irrigation Area 2 800m south west of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	N/A	N/A The Delegated Officer has considered the scale of the works and the separation distance between the source and receptors as indicating that the risk of odour emission impacts is not foreseeable. Odour can be adequately regulated by section 49 of the EP Act.
	Discharges to Land	Discharge to land and subsurface seepage causing contamination of soil, degradation of groundwater quality and impacts to downgradient receptors	Groundwater >2,6mbgl Seasonal creek 150m west	Refer to Section 3.1	C = Major L = Likely **High Risk**	N	Conditions will be determined under the Category 54 Licence Application	Refer to section 5
	Spills / Leaks	*Direct discharge to land and groundwater*	Groundwater >2,6mbgl Seasonal creek	Refer to Section 3.1	C = Slight L = Unlikely	Y	Conditions will be determined under the Category 54 Licence	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**				
			150m west of Irrigation Area and Dam 50m north west of the NWWTP		**Low Risk**		Application.	
	Sediment laden stormwater	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	Seasonal minor creek 150 west Dam 50m northwest of NWWTP	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	Conditions will be determined under the Category 54 Licence Application	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.

4.3 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 5 below.

Table 5: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 6 below.

Table 6: Risk criteria table

Likelihood		**Consequence**		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		**The following criteria has been used to determine the consequences of a Risk Event occurring:**		
			Environment	**Public health* and amenity (such as air and water quality, noise, and odour)**
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale**: mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guideline: Environmental Siting.*

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*

4.4 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 7 below:

Table 7: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

4.5 Risk assessment – Discharges to Land

4.5.1 Emission characterisation and impact

TWW discharges produced from residential WWTPs have the potential to be a useful resource for irrigating a wide range of crops and tree lots on a sustainable basis. TWW discharges from these sources typically contain high concentrations of nutrients that can help sustain plant growth, and natural biogeochemical processes that take place in soils can help decompose or immobilize other contaminants present in these discharges. Potential environmental impacts from residential WWTP are generally minimised when the following nationally recognized management principles are applied to a given wastewater irrigation scheme:

- Evapotranspiration by plants in the irrigated area should drive both the volume and timing of TWW applications to land. Wherever possible, nutrients and the applied TWW should be utilised within the crop root-zone, and there should be minimal seepage of nutrients and other chemical constituents from the TWW past the root-zone into groundwater; and
- Applications of TWW should not exceed the soil's capacity to provide suitable growing conditions for the irrigated plants or cause long-term changes to soil structure that may adversely affect the capacity of the soil to continue to support plant growth and a healthy soil-fauna.

Therefore, the principal components of a sustainable TWW irrigation scheme are:

- The annual loads of nitrogen and phosphorus applied in TWW do not exceed the uptake capacity of soils and vegetation in the irrigated area. This generally means that TWW is irrigated to a sufficiently large land area such that nutrients are taken up by the trees and removed from the area in harvested biomass;
- The irrigated area should be sufficiently large to enable the applied TWW to be fully utilised by the trees; and

- The chemical composition of the TWW will not cause adverse effects on soil quality and structure in the irrigated area.

Where the principal components of a sustainable TWW irrigation scheme are not achieved, the irrigation of TWW can have the following consequences:

- Eutrophication of neighbouring surface water sources; and
- Degradation of native vegetation, underlying soils and groundwater quality.

4.5.2 Criteria for assessment

NSW DEC, 2004. *Environmental Guidelines: Use of Effluent by Irrigation*. The technical guidelines produced by the NSW Department of Environment and Conservation.

US EPA, 2006. *Process Design Manual, Land Treatment of Municipal Wastewater Effluents*. US EPA Report EPA/625/R-06/016.

DER Guideline: Assessment and Management of Contaminated Sites (2014) provides ecological and human health assessment levels for soil.

4.5.3 Key Findings

The Delegated Officer has reviewed the Applicants justification outing the suitability of the proposed irrigation of the TWW to remnant native vegetation with consideration to technical advice received on the suitability of this activity.

The Delegated Officer notes the following:

- Given the amount of remaining uncertainty surrounding the suitability of the proposed irrigation scheme, it is considered that ongoing groundwater and soil monitoring are required at the premises.
- A biomass management plant will also be required to be submitted to outline how biomass will be cleared from the irrigation sprayfield areas to prevent nutrient accumulation and maximum transpiration rates / nutrient accumulation rates from soils. The removal of biomass has not been addressed by the applicant through the supporting information.
- Conditions will be incorporated into the works approval requiring groundwater monitoring to be undertaken in line with the recommendations outlined in technical advice from DWER's principal hydrogeologist. The location for the installation of 5 groundwater monitoring bores located up, cross and down hydraulic gradient of the WWTP and irrigation sprayfield locations will also be conditioned in the works approval, noting that no bore installation or groundwater monitoring program has been proposed by the applicant in their supporting documentation.
- A Category 85 Registration does not contain condition sets, meaning if the Applicant was to apply for a Category 85 Registration DWER cannot validate the assumptions made in the current application and supporting information. There is also no enforceable method within a Registration to ensure monitoring of ongoing operations is undertaken. If DWER cannot validate the assumptions made, then DWER will need to take a precautionary approach in its assessment of the Registration Application and consider 'worse case' conditions, meaning that the irrigation of TWW in this manner may not be able to be assessed as acceptable.
- As such, the assessment of this application as a Category 54, leading to a Licence which does contain condition sets, is appropriate.
- The provision of the biomass management plan will be required through works approval conditions, however the implementation of the plan will be a requirement under the premises operational licence.

- The provision of a soil sampling plan will be required through works approval conditions, however the implementation of the plan will be a requirements under the premises operational licence.
- Noting the transition to a Licence, DWER has added time-limited operation conditions to the works approval to allow the NWWTP to operate while the Licence application is being assessed.

4.5.4 Consequence

If irrigation of excessive nutrients (P and N) results in increased vegetation and soil degradation, then the Delegated Officer has determined that low-level on-site impacts and high level on site impacts, mid level off-site impacts will result. Therefore, the Delegated Officer considers the consequence excessive nutrients (TP) discharged and land to be **Major**.

4.5.5 Likelihood of Risk Event

The Delegated Officer has determined that the risk event will probably occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of the risk event to be **Likely.**

4.5.6 Overall risk rating of discharge of TWW

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix contained in Guidance Statement: Risk Assessment (DER 2017) and determined that the overall rating for the risk of excessive nutrients (P and N) discharge and soil degradation is **High.**

4.6 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 8 below. Controls are described further in section 4.

Table 8: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	Discharge of TWW to irrigation	TWW	Direct discharge to land, surface water and groundwater	Refer to Section 3.1	Major consequence Likely likelihood **High Risk**	Acceptable subject to regulatory controls

5. Regulatory Controls

Based on risk assessment outcomes, the Delegated Officer will incorporate the following controls into the works approval:

- The installation of groundwater monitoring bores located up, cross and down hydraulic gradient of the WWTP and irrigation sprayfield locations. This is deemed necessary to assess whether TWW is causing significant increases in water and nutrient discharges

to the creek. The indicative location for these bores is outlined in the works approval.

- The implementation of a groundwater monitoring program. This is required to indicate whether nutrients and other chemical constitutes of potential concern are accumulating within soils in the irrigation sprayfield area, whether there are potential adverse impacts on soil structure, and whether the irrigation of TWW is causing significant increases in water and nutrient discharges to the creek.
- The provision of a biomass management plan, outlining how biomass will be cleared from the irrigation sprayfield area to prevent nutrient accumulation and how biomass will be managed and harvested (growing as much biomass as possible without considering the quality of the timber produced would maximise the transpiration rate and the nutrient removal rate from the irrigation area).
- The submission of a soil sampling plan to indicate whether nutrients and other chemical constituents of potential concern are accumulating within the soils in the irrigation sprayfields. The soil sampling will track if the discharge of TWW is causing significant increases in water and nutrient discharges to the creek.
- Monitoring data for TWW and groundwater is required under time-limited operations and the sampled data will be used in the Licence Application assessment to review the TWW discharges.

An outline of regulatory obligations under specified works approval conditions is outlined as follows.

5.1 Infrastructure and equipment

Works Approval condition 1 authorises construction of the NWWTP and the two irrigation sprayfields to required specifications.

Works Approval condition 2 authorises construction the 5 groundwater monitoring bores as part of the groundwater monitoring program to assess environmental impacts from the operation of the NWWTP and two irrigation sprayfields.

Works Approval condition 7 ensures the Works Approval holder only undertakes commissioning of the infrastructure outlined in Table 3.

Works Approval condition 19 ensures the Works Approval holder only undertakes time limited operations of the infrastructure outlined in Table 9.

5.2 Compliance

Works Approval condition 3 requires the submission of a bore construction report within 30 days of being constructed.

Works Approval condition 4 and 5 require the submission of an Environmental Compliance Report 30 calendar days after the infrastructure in condition 1 has been constructed.

Works Approval condition 15 and 16 require the submission of an Environmental Commissioning Report within 30 calendar days of the completion date of environmental commissioning for each item of infrastructure specified in Table 3.

Works Approval condition 27 and 28 the submission of a report on time limited operations 30 calendar days after the completion of time limited operations.

5.3 Commissioning

Works Approval condition 6 and 7 authorises Commissioning of the NWWTP and ensures the Works Approval holder must not operate the NWWTP other than for the purposes of environmental commissioning for a maximum of 90 days, once an Environmental

Commissioning Report has been submitted in accordance with condition 4.

Works Approval condition 9 authorised the discharge of TWW at the discharge point at the irrigation sprayfield areas under commissioning.

Works Approval condition 10 places limits of discharge parameters.

Works Approval condition 11 requires the monitoring of discharges to land during commissioning.

Works Approval condition 12 requires two groundwater samples are collected during Commissioning as required for the parameters listed in Table 7.

Works Approval condition 13 requires all TWW and groundwater samples to be analysed by a NATA laboratory.

5.4 Time limited operations

Works Approval condition 17 and 18 authorises time limited operations of the NWWTP and ensures the Works Approval holder must not operate the NWWTP other than for the purposes of time limited operations for a maximum of 180 days, once an Environmental Commissioning Report has been submitted in accordance with condition 4.

Works Approval condition 21 authorises TWW samples from the designated sample point in Table 11 during time limited operations.

Works Approval condition 22 places limits of discharge parameters.

Works Approval condition 23 requires the monitoring of discharges to land during time limited operations.

Works Approval condition 24 requires groundwater samples are collected during time limited operations as required for the parameters listed in Table 10.

Works Approval condition 25 requires all TWW and groundwater samples to be analysed by a NATA laboratory.

5.5 Specified actions

Works Approval condition 29 requires the submission of a Soil Sampling Plan.

Works Approval condition 30 requires the submission of a Biomass Management Plan.

5.6 Records and Reports

Works Approval condition 16 requires records of all monitoring undertaken under condition 11 and 12 during Commissioning.

Works Approval condition 28 requires records of all monitoring undertaken under condition 22 and 23 during time limited operations.

Works Approval condition 31 requires records of any Complaints.

Works Approval condition 32 and 33 requires the works approval holder to maintain accurate books and that the books must be legible, retained and produced as required.

5.7 Determination of Works Approval conditions

The conditions in the issued Works Approval have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 10 provides a summary of the conditions to be applied to this works approval.

Table 10: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment 1, 2 and 3	These conditions are valid, risk-based and contain appropriate controls.
Compliance Reporting 4 and 5	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.
Commissioning and Monitoring 6, 7, 8, 9, 10, 11, 12, 1, 14, 15 and 16	These conditions are valid, risk-based and consistent with the EP Act.
Time limited operations and Monitoring 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28	These conditions are valid, risk-based and consistent with the EP Act.
Specified Actions 29 and 30	This condition is valid, risk-based and consistent with the EP Act.
Records and Reports 31, 32 and 33	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approval under the EP Act.

6. Consultation

Table 11 provides a summary of the consultation undertaken by the department.

Table 11: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 10 June 2024	None received	N/A
Local Government Authority advised of proposal on 7 June 2024	The Shire of Collie replied on 10 June 2024 confirming that Planning Approval has been granted on 24 April 2024 (P075/23 (amended), DAP/23/02609)	Note – Planning Approval is Granted.
Department of Health (DOH) advised of proposal 7 June 2024	DOH did not respond.	Noted
Department of Lands Panning and Heritage (DPLH) advised of proposal 5 July 2024	DPLH submitted comments on 19 July 2024. A review of the Register of Places and Objects as well as the	DWER notified the applicant on 23 July 2024 that AHA was required and advised that they contact DPLH for further advice.

	Department of Planning, Lands and Heritage (DPLH) Aboriginal Heritage Database concludes that the subject area (M70/1280) intersects with Aboriginal registered Site Collie River Waugal (ID 16713) and Aboriginal heritage place Eight Mile Pool (ID 4690). Therefore, based on the current information held by DPLH, approvals under the Aboriginal Heritage Act 1972 (AHA) are required. It should be emphasised to the proponents that the approval of the works does not count as approval for works under the AHA.	The applicant provided confirmation from DPLH on 26 July 2024 that on provision of additional information, AHA was not required for the proposed works.
South West Aboriginal Land and Sea Council (SWASC) advised of proposal 4 July 2024	SWASC did not respond.	Noted.
Applicant was provided with draft documents on 30 July 2024	Applicant responded on 7 August 2024. Refer to Appendix 1.	Noted Refer to Appendix 1.

7. 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.

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	**Flow Meters** There will be three (3) flow meters: • 1 on the inflow point to the primary chamber; and • 1 for each irrigation output line prior to irrigation on each area. No flow meter is required on the ABSORB bed as this would equal the sum of the two irrigation line flow meters and provide no further information Submission of updated schematic with flow meter locations.	Noted and amended in condition 1. New MagFlow meter location map included in Schedule 1 – Figure 6.
Condition 1 Table 1	**Phosphorus** The modelling used in the SSE and then used in the RWMP uses 5mg/L of P and we believe that this is manageable in the environment regardless of the stated concerns by DWER. As there is soil monitoring required in the Works Approval we feel that P water quality should be 5mg/L as apposed to 4mg/L. See tables 6 and 12 in the and Table 1 of the decision report.	Noted. From reviewing the applicants calculations presented in the supporting documentation to the application it appears that 15 mg/L of phosphorus was used in loading calculations. Therefore, a change in WWTP design specifications from 4mg/L to 5mg/L is appropriate. Changed Condition 1 Table 1, Condition 10 Table 6 and Condition 22 Table 12 TP value to 5 mg/L and Table 1 of the Decision Report.
Condition 2 Table 2 Bore construction dates	**Dates for construction of bores** Suitable date could be 30/12. It is proposed that shallow watertable bores be installed prior to the installation of the WWTP so that some baseline data, albeit limited, can be obtained. The shallow watertable, unconfined aquifer, will be the only aquifer	Noted. Condition 2 - Bore construction timeframe amended to 30 December 2024.

Condition	Summary of applicant's comment	Department's response
	potentially affected by wastewater treatment and dispersal.	
Condition 2 Table 2 Condition 12 Table 8 Condition 24 Table 14	**Groundwater monitoring bores** We feel that the number of bores is excessive and does not reflect CCP assessment. However, we agree that Bores GWB4 and 5 are required and that GWB 2 be shifted to the mid point of the segment GWB 2-GWB3. GWB 2 would provide an uncontaminated groundwater sample and GWB 4 and 5 would provide information related to the impact of irrigation on the groundwater. Also, the irrigation areas have been selected to be down hill (stream) of the top of the hill to ensure unconfined aquifer movement is to the north east away from the top of the ridge and not towards the property boundary and or road. Also as GWB1 would be downstream of the existing dispersal field it would only report information relevant to that system and not provide any relevant information for the new WWTP and dispersal system. For these reasons, 3 bores would be sufficient.	Noted. DWER has sought additional advised from internal hydrogeological experts who have confirmed that the applicants proposed bore locations are suitable. DWER notes that additional bores may be required should monitoring data obtained from the 3 bores indicate that groundwater contamination is occurring. DWER has amended the works approval to three bores – GWB 1, 2 and 3 for condition 2, 12 and 24. A new Groundwater monitoring bore map has been included in Schedule 1 of the works approval.
Condition 29 and 30	**Specified actions:** Soil sampling plan to be submitted by 31/12/2024: the date is suitable. Biomass management plan to be submitted by 31/12/2024: the date is suitable.	Noted. As both dates are suitable there are no changes to condition 29 and 30.
Premises Map	GDA2020 coordinates provided.	Noted. Schedule 2 amended in the Works Approval to identify GDA2020 coordinates.
N/A	**Chlorination** We believe that the treatment train will achieve <100org/100mL. This coupled with sub surface irrigation mitigates any health risks.	DWER requested clarification of this comment. The Applicant has confirmed:

Condition	Summary of applicant's comment	Department's response
	For this reason, we believe that there is no need for chlorination. Albeit chlorination was included in the SSE we have changed to drip irrigation, removing the chlorination requirement. If DWER insists on chlorination we would revert back to surface spray irrigation as per the SSE.	• *this should have read E. Coli <100cfu/100mL* • *no free chlorine monitoring requirements anymore, this should be removed from the works approval. The DoH approval and RWMP does not require chlorination as sub-surface irrigation was specified and approved (see DoH approval).* Accordingly, DWER has removed the requirement to monitor free chlorine from the works approval commissioning and time-limited operations – conditions 10, 11, 22 and 23.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)		
Application type		
Works approval	☒	
Date application received		16 May 2024
Applicant and premises details		
Applicant name/s (full legal name/s)		Numans Accommodation Village Pty Ltd
Premises name		Numans Accommodation Village WWTP
Premises location		Lot 8 on Plan 14975
Local Government Authority		Shire of Collie
Application documents		
HPCM file reference number:		DER2024/000229
Key application documents (additional to application form):		Application Form Attachments Site and Soil Evaluation Report
Scope of application/assessment		
Summary of proposed activities or changes to existing operations.		Works approval Construction of WWTP WWTP consists of an Anaerobic Baffle Reactor (ABR), ABSORBS™ filter advanced secondary treatment system with the effluent further treated with Poly Aluminium Chloride (PAC23) for Phosphorus reduction and dispersed in two plant biodrains totaling 5ha within an existing woodlot. This system approach is largely passive and very robust in its treatment and dispersal of water and nutrients to the extent that the system is 100% accountable mass balance for water and nutrients.

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

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 85: Sewage facility	99m^3/day	N/A

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: 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: EPA Report No:

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)		
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☒ Expiry: 31/12/27 Mining lease / tenement ☐ Expiry: Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☒ No ☐ N/A ☐	Approval: P075/23 Expiry date: If N/A explain why?
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: Licence/permit No: 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: N/A Type: Proclaimed Groundwater Area/Surface Water Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☐ Regional office: Swan Avon / Mid-West Gascoyne / Kwinana Peel / North West / South West / Goldfields / South Coast
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: P1 / P2 / P3 / N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☐ Note: If the proposed activity is not listed as a compatible land use with the PDWSA please consult with the relevant regional office (Regulatory Services - Water) and Water Source Protection (Science and Planning).

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)		
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 ☐	*Environmental Protection (Unauthorised Discharge) Regulations 2004*
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	If Yes include details of which EPP(s) here.
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	If Yes, include details here, e.g. Site is subject to SO_2 requirements of Kwinana EPP.
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☐ No ☒	If Yes include details here. Classification: N/A / possibly contaminated – investigation required (PC–IR) / not contaminated – unrestricted use (NC–UU) / contaminated – restricted use (C–RU) / remediated for restricted use (RRU) / contaminated – remediation required (C–RR) / decontaminated (Decon) Date of classification: N/A