



## Application for Works Approval

### Division 3, Part V *Environmental Protection Act 1986*

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**Works Approval Number** W6201/2018/1

**Applicant** Water Corporation

**File Number** DER2018/001585

**Premises** Exmouth North Wastewater Treatment Plant  
Murat and Willersdorf Roads  
  
Legal description -  
Part of Lot 43 on Deposited Plan 209471  
Certificate of Title Volume 1873 Folio 708

**Date of Report** 14/08/2020

**Status of Report** Final

## Table of Contents

<b>1. Definitions of terms and acronyms</b>	<b>1</b>
<b>2. Purpose and scope of assessment</b>	<b>4</b>
2.1 Application details	4
<b>3. Background</b>	<b>5</b>
<b>4. Overview of Premises</b>	<b>5</b>
4.1 Operational aspects	5
4.2 Infrastructure	11
4.3 Exclusions to the Premises	12
<b>5. Legislative context</b>	<b>13</b>
5.1 Other relevant approvals	13
5.1.1 Planning approvals	13
5.1.2 Department of Health	13
5.1.3 Federal Legislation	13
5.2 Part V of the EP Act	13
5.2.1 Applicable regulations, standards and guidelines	13
5.2.2 Works approval and licence history	13
5.2.3 Clearing	14
<b>6. Modelling and monitoring data</b>	<b>14</b>
6.1 Monitoring of local ecosystem – subterranean fauna	14
6.2 Monitoring of discharges to Groundwater and marine ecosystem	15
6.3 Monitoring of discharges to land	19
<b>7. Consultation</b>	<b>20</b>
<b>8. Location and siting</b>	<b>21</b>
8.1 Siting context	21
8.2 Residential and sensitive Premises	23
8.3 Specified ecosystems	23
8.4 Groundwater and water sources	24
8.5 Soil type	25
8.6 Meteorology	25
<b>9. Risk assessment</b>	<b>26</b>
9.1 Determination of emission, pathway and receptor	26
9.2 Consequence and likelihood of risk events	43
9.3 Acceptability and treatment of Risk Event	44
9.4 Risk Assessment – Discharges to Land	44

9.4.1	Description of Discharges to Land.....	44
9.4.2	Identification and general characterisation of emission.....	44
9.4.3	Description of potential adverse impact from the emission .....	45
9.4.4	Criteria for assessment.....	45
9.4.5	Applicant controls .....	45
9.4.6	Key findings.....	46
9.4.7	Consequence .....	46
9.4.8	Likelihood of Risk Event .....	47
9.4.9	Overall rating of Discharges to Land.....	47
9.5	Risk Assessment – Overtopping.....	47
9.5.1	Description of Overtopping .....	47
9.5.2	Identification and general characterisation of emission.....	47
9.5.3	Description of potential adverse impact from the emission .....	47
9.5.4	Criteria for assessment.....	48
9.5.5	Applicant controls .....	48
9.5.6	Key findings.....	48
9.5.7	Risk Rating of Overtopping.....	49
9.6	Risk Assessment – Discharge to unlined Infiltration / Evaporation pond.....	49
9.6.1	Description of Infiltration .....	49
9.6.2	Identification and general characterisation of emission.....	49
9.6.3	Description of potential adverse impact from the emission .....	49
9.6.4	Criteria for assessment.....	49
9.6.5	Applicant controls .....	50
9.6.6	Key findings.....	50
9.6.7	Risk Rating of Infiltration.....	50
9.7	Risk Assessment – Odour .....	51
9.7.1	Description of Odour .....	51
9.7.2	Identification and general characterisation of emission.....	51
9.7.3	Description of potential adverse impact from the emission .....	51
9.7.4	Criteria for assessment.....	51
9.7.5	Applicant controls .....	52
9.7.6	Key findings.....	52
9.7.7	Consequence .....	52
9.7.8	Likelihood of Risk Event .....	53
9.7.9	Overall rating of Odour .....	53
9.8	Summary of acceptability and treatment of Risk Events .....	53
<b>10.</b>	<b>Regulatory controls .....</b>	<b>54</b>

10.1	Works Approval controls .....	54
<b>11.</b>	<b>Determination of Works Approval conditions .....</b>	<b>55</b>
<b>12.</b>	<b>Applicant’s comments.....</b>	<b>55</b>
<b>13.</b>	<b>Conclusion .....</b>	<b>55</b>
	<b>Appendix 1: Key documents .....</b>	<b>56</b>
	<b>Appendix 2: Stakeholder comments on Application.....</b>	<b>57</b>
	<b>Appendix 3: Summary of applicant’s comments on risk assessment and draft conditions .....</b>	<b>60</b>
	<b>Attachment 1: Site Plan .....</b>	<b>68</b>

## 1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

**Table 1: Definitions**

Term	Definition
Applicant	Water Corporation
ADWF	Average Dry Weather Flow
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
ANZECC	Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Paper No. 4. Australian and New Zealand Environment and Conservation Council. Agriculture and Resource Management Council of Australia and New Zealand, Canberra, ACT October 2000
BoM	Bureau of Meteorology
BOD	Biochemical Oxygen Demand
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DBCA	Department of Biodiversity Conservation and Attractions
DWER	Department of Water and Environmental Regulation  As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.

DoH	Department of Health
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review
EWWTTP	Exmouth Wastewater Treatment Plant
ENWWTP	Exmouth North Wastewater Treatment Plant
Licence Holder	Water Corporation
m <sup>3</sup>	cubic metres
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mg/L	milligrams per litre
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
NWHA	Ningaloo Coast World Heritage Advisory Committee
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Primary Activities	as defined in Schedule 2 of the Revised Licence
PDWF	Peak Dry Weather Flow
PWWF	Peak Wet Weather Flow
P&DC	Production and Design Capacity
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i>
SoE	Shire of Exmouth

Turf Guidelines	The Western Australian Environmental Guidelines for the Establishment and Maintenance of Turf Grass Areas (Government of Western Australia) 2015
TN	Total Nitrogen
TP	Total Phosphorus
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
WQPN 22	Water Quality Protection Note 22; Irrigation With Nutrient Rich Waste Water (Department of Water) 2008
WWTP	Wastewater Treatment Plant

## 2. Purpose and scope of assessment

The Applicant currently operates the existing EWWTP under Licence L5980/1991/7 but due to ongoing environmental discharge and buffer concerns the Applicant intends to construct and operate a new ENWWTP, located approximately 1.5km north of the existing EWWTP. Once the new ENWWTP has been constructed, commissioned and begins operations, the existing EWWTP will be decommissioned.

The new ENWWTP will have a P&DC of 1000 m<sup>3</sup> (1ML) per day capacity ADWF and will be configured to allow for staged capacity upgrades as inflow increase in the future. The ENWWTP will comprise the following works:

- Rotary inlet screens;
- A Bituminous geomembrane lined Smart pond consisting of an Anaerobic zone (concrete lined) in-situ within the Facultative pond above for BOD removal and designed to eliminate odour;
- A Bituminous geomembrane lined Maturation pond optimised for BOD removal and CFU reduction;
- A Bituminous geomembrane lined Winter Storage pond to provide storage for the SoE recycled water scheme;
- An unlined emergency Infiltration / Evaporation pond for disposal of treated wastewater;
- Water pumps to lift treated water from the storage pond to a Filtration and Chlorination Unit where it flows by gravity to the three (off-site) 350kL storage tanks for the reuse scheme;
- Filtration unit with automatic backwash facilities for the filtration of treated water to remove residual algae;
- On-line sludge removal facility for planned de-sludging of the anaerobic pond;
- A Geobag dewatering lined hardstand pad with suitable gravity drainage to facultative pond for drained water;
- A Chlorination module which will be a packaged unit;
- Copper Ioniser to manage blue-green algae for the SoE recycled reuse scheme;
- Instrumentation and control panel; and
- A solar powered electrical system with battery storage and small diesel generator to provide back-up power of short duration.

The ENWWTP ponds are designed to cater for a maximum 1 in 10 year event (220mm of rain in 72 hours) and the winter storage pond will need to use a 200mm freeboard to cope with this extra rainfall. The winter storage pond capacity is 17ML and will be sufficient to balance normal flows until 2075.

Additional infrastructure to be constructed, but not assessed as part of this Prescribed Premises activity, is provided in section 4.3 below. This infrastructure primarily relates to the SoE reuse scheme.

The treated wastewater from the ENWWTP is proposed to be used within the SoE reuse scheme which will deliver treated wastewater to the Exmouth Golf Course, two sporting ovals (Talanjee and Kooboaroo) and roadside verges as per current reuse scheme. It is anticipated that this will encompass 24.8ha in total (18ha Golf Course and 6ha Ovals and open space).

### 2.1 Application details

Table 2 lists the documents submitted during the assessment process.



**Table 2: Documents and information submitted during the assessment process**

Document/information description	Date received
Application form	31 October 2018
CSO1088 and CSO2693 Exmouth North WWTP Works Approval Application Supporting Information October 2018	31 October 2018

### 3. Background

The Applicant has applied for a Category 54 Sewage facility works approval to construct the ENWWTP.

Table 3 lists the prescribed premises categories that have been applied for.

**Table 3: Prescribed Premises Categories in the Existing Licence**

Classification of Premises	Description	Approved Premises production or design capacity or throughput
54	Sewage facility; premises – (a) on which sewage is treated (excluding septic tanks) ; or (b) from which treated sewage is discharged onto land or into waters	1000m <sup>3</sup> /day

## 4. Overview of Premises

### 4.1 Operational aspects

The proposed work subject of the works approval Application are to construct a new ENWWTP with a P&DC of 1ML per day. The proposed works include:

- Rotary inlet screens: screenings will be washed and dropped into a bin for off-site disposal;
- A Bituminous geomembrane lined Smart pond consisting of an Anaerobic zone (concrete lined) in-situ within the Facultative pond above for BOD removal and designed to eliminate odour;
- A Bituminous geomembrane lined Maturation pond optimised for BOD removal and CFU reduction;
- A Bituminous geomembrane lined Winter Storage pond to provide storage for the SoE recycled water scheme;
- An unlined emergency Infiltration / Evaporation pond for disposal of treated wastewater;
- Water pumps to lift treated water from the storage pond to a Filtration and Chlorination Unit where it flows by gravity to the three (off-site) 350kL storage tanks for the reuse scheme;
- Filtration unit with automatic backwash facilities for the filtration of treated water to remove residual algae;
- On-line sludge removal facility for planned de-sludging of the anaerobic pond;
- A Geobag dewatering lined hardstand pad with suitable gravity pipe infrastructure to head of plant for drained water;

- A Chlorination module which will be a packaged unit;
- Copper Ioniser to manage blue-green algae for the SoE recycled reuse scheme but point of dosing will be downstream of maturation pond;
- Instrumentation and control panel; and
- A solar powered electrical system with battery storage and small diesel generator to provide back-up power of short duration.

The ENWWTP ponds are designed to cater for a maximum 1 in 10 year event (220mm of rain in 72 hours) and the winter storage pond will need to use a 200mm freeboard to cope with this extra rainfall. The winter storage pond capacity is 17ML and will be sufficient to balance normal flows until 2075.

The main components of the new ENWWTP are provided in Attachment 1. Figure 1 provides a conceptual schematic overview of the proposed new ENWWTP (noting the three reuse tanks will not be located within the premises boundary). Figure 2 provides an overview of the existing EWWTP and proposed new ENWWTP.

### **Wastewater Treatment Ponds**

The new ENWWTP will consist of three (3) treatment ponds:

- A lined Smart pond consisting of an Anaerobic pot in-situ within the Facultative pond above for BOD removal and designed to eliminate odour;
- A lined Maturation pond optimised for BOD removal and CFU reduction; and
- A lined winter Storage pond to provide storage for the SoE recycled water scheme.

All three ponds will be Bituminous geomembrane lined that will meet a permeability of at least  $1 \times 10^{-9}$  m/s.

The following information was used to determine the size of the storage pond:

- Area of reuse was 8.5ha of land (two ovals and roadside verge) and 4.9ha for the Exmouth Golf Course. The irrigation area has now expanded to 16.3ha with planned further expansion to approximately 24.8ha to include all of the Exmouth Golf Course.
- One in 10 year rainfall event is considered to be 220mm of rainfall over a 72 hour period.
- Rainfall and evaporation data from Exmouth SILO site;
- Inflows into the WWTP assumed the worst case scenario with average annual ADWF at 1 ML/day (current flow are approximately 0.34ML/day with minimal growth expected);
- Daily water demands per hectare needed to be applied to the two ovals and Exmouth Golf Course for optimum use of water and nutrients as determined in the agronomic study (submitted as Attachment 7b of the Application); and
- Facultative and maturation pond dimensions and volumes.

All three ponds are designed to cater for a maximum 1 in 10 year rainfall event (220mm of rain in 72 hours). The winter storage pond will need to use the 200mm freeboard if it happens to be full when the event occurs. The 17ML winter storage dam capacity is sufficient to balance normal flows until 2075. Pond volumes are provided in Figure 3.

The WWTP is expected to achieve wastewater treatment for the following parameters:

- TN at less than 40mg/L;
- TP at 10mg/L;
- BOD at 40-50mg/L;
- TSS less than 20-200mg/L (expected upon filtration is <20mg/L);

- TDS approximately 1350mg/L; and
- *E.coli* less than 1,000cfu/100mL (comply with DoH low risk scheme).

### **Emergency Infiltration / Evaporation pond**

An unlined emergency Infiltration / Evaporation pond is proposed. The intended purpose of the Infiltration / Evaporation pond as outlined in the original application was to be used for up to one month per year to cater for extreme rainfall events – 1 in 10 year rainfall events like cyclones. and for when the SoE reuse scheme requires maintenance and treated wastewater cannot be irrigated.

The application was later revised to indicate that the pond would be utilised only in extreme rainfall events (one in 10 year rainfall event is considered to be 220mm of rainfall over a 72 hour period).

### **Chlorination Unit**

A packaged Chlorination unit will be installed at the ENWWTP. The Chlorination unit will be employed to disinfect the treated wastewater prior to irrigation for the SoE reuse scheme. The Chlorination unit will meet the following Water Corporation standards:

- Average dosing rate of 4mg/L;
- Maximum dosing rate of 20mg/L;
- Minimum accurate turndown = 10% of maximum 20mg/L;
- Wastewater flow = 17.4L/s for 16 hours per day; and
- The average maximum dose rate will be 0.25kg/h and 1.25kg/h. A four 70kg chlorine cylinder (2 duty and 2 standby) configuration is proposed. The maximum cylinder changeover frequency will be 35 days at 4mg/L and 7 days at 20mg/L.

### **Copper Ioniser**

The copper ioniser will work to control level of normal algae in the storage pond, with some minor residual copper in the treated wastewater. Noting that copper dosing already occurs at the existing EWWTP.

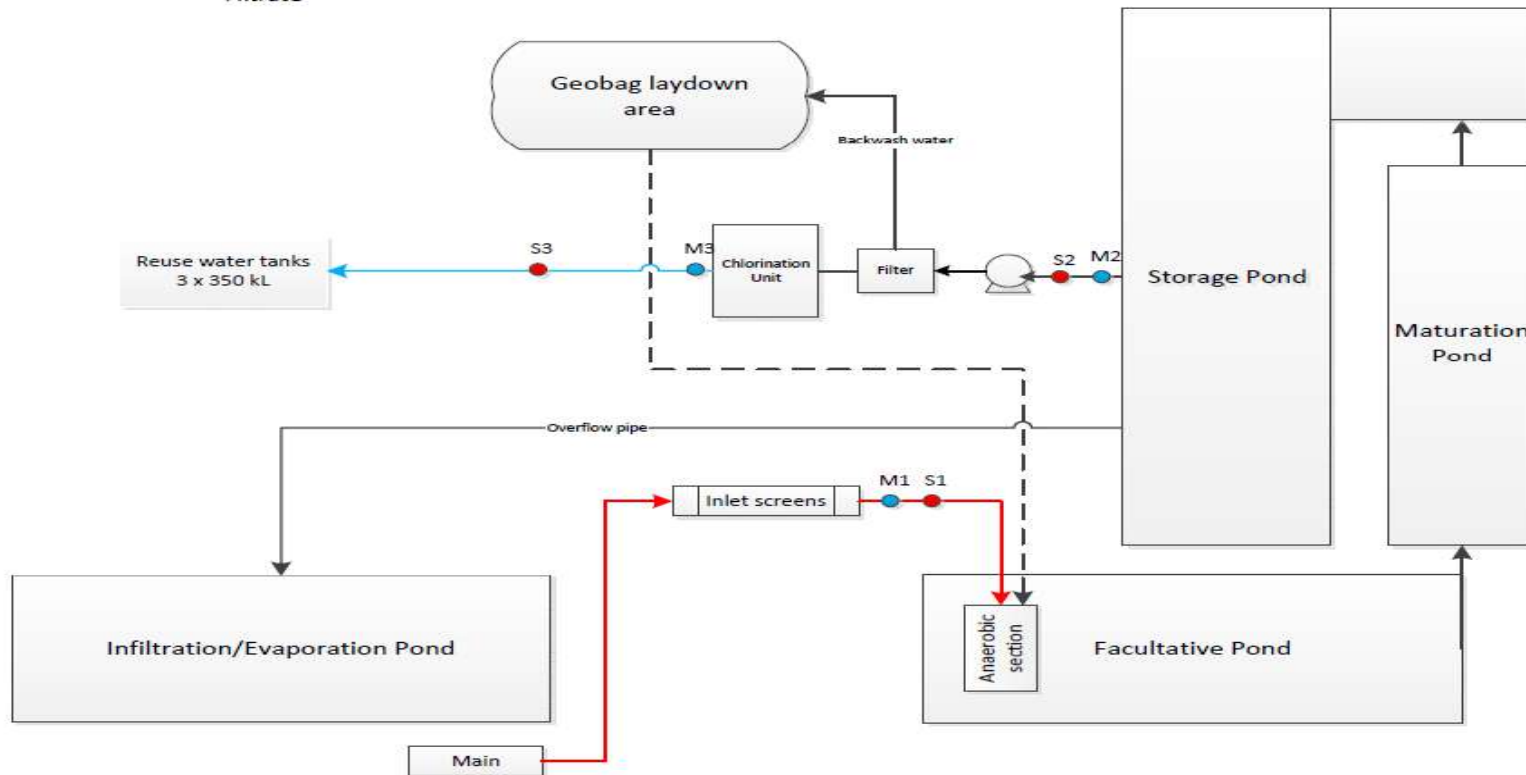
- The copper ioniser would physically be located immediately west of the chlorination and filtration units, but the actual point of dosing will be immediately downstream of the maturation pond.
- No new sampling points will be added to the plant. Treated water samples can be taken immediately upstream and downstream of the filter unit.
- Based on information for existing installations, the dose rate is likely to be about 0.48mg/L into the stream, with a residual not exceeding 0.3mg/L; aligning with the ADWG which suggests a residual of 1mg/L for aesthetic purposes. See Table 10.6 of ADWG.
- Containment measures for the Copper Ioniser to prevent oversupply or loss of dosing reagent; there is no reagent as such. It is a copper ioniser, so copper is generated as required (like a pool chlorinator cathode and anode set up). When turned off, it is merely a box with some copper rods in it which is entirely harmless.

### **Geobag lined hardstand pad**

Currently partly treated sludge is transported and disposed to the Exmouth landfill. For the proposed new ENWWTP, biosolids sludge will be pumped out from the ponds to the Geobags situated on a lined hardstand pad for dewatering. The hardstand pad will be concrete lined that will meet a permeability of at least  $1 \times 10^{-9}$  m/s. Any resultant liquid fraction from the dewatering process will drain back into the facultative pond under gravity for continued treatment. Dewatered sludge will then be transported off site and disposed to landfill. It is proposed that sludge will be pumped out of the anaerobic pond every three to six months while the remaining ponds will be more infrequent.

- Monitoring Point
- Sampling point
- Raw wastewater
- Wastewater
- Reuse water
- - - Filtrate

Pond	Area (TOB) (m <sup>2</sup> )	Area (TWL) (m <sup>2</sup> )	Area (Mid depth) (m <sup>2</sup> )	Volume (m <sup>3</sup> )	Water Depth (m)
Anaerobic	N/A	N/A	N/A	1306	3.5 (below Fac. pond)
Facultative	8400	7809	6956	10445	1.5
Maturation	3800	3404	3026	3029	1.0
Storage	12300	11682	N/A	17614	Varies 1.0 to 2.0
Evaporation	8400 (6225 floor)	N/A	N/A	N/A	0.9



**Figure 1 Conceptual schematic overview**



**Figure 2 WWTP overview**

## 4.2 Infrastructure

The Sewage facility infrastructure, as it relates to Category 54 activities, is detailed in Table 4 and with reference to the Site Plan (Attachment 1).

Table 4 lists infrastructure associated with each prescribed premises category.

**Table 4: Sewage facility Category 54 infrastructure**

	Infrastructure	Site Plan Reference
	<b>Prescribed Activity Category 54</b>	
Exmouth North Wastewater Treatment Plant		
1	Rotary inlet screens	Attachment 1 Site Plan
2	A lined Smart pond consisting of a concrete lined Anaerobic pot within the Facultative pond	
3	A lined Maturation pond	
4	A lined Winter Storage pond	
5	An unlined emergency Infiltration / Evaporation pond	
6	On-line sludge removal facility for planned de-sludging of the anaerobic pond	
7	A Geobag dewatering lined hardstand pad with suitable pump back infrastructure to head of plant for drained water	
8	A Chlorination module which will be a packaged unit	
	<b>Directly related activities</b>	
Activities directly relate to Primary activity		
1	A Filtration unit	Attachment 1 Site Plan
2	Copper Ioniser	
3	Instrumentation and control panel	
4	A solar powered electrical system with battery storage and small diesel generator to provide back-up power of short duration	
5	Water pumps to lift treated water from the storage pond to a Filtration and Chlorination Unit where it flows by gravity to the three (off-site) 350kL storage tanks for the reuse scheme	
	<b>Other activities</b>	

	Infrastructure	Site Plan Reference
Activities proposed but not regulated under this Works Approval		
1	Sewer pump station B at the existing EWWTP to pump all wastewater to the new ENWWTP	N/A
2	Approximately 2km of Pressure Main from the transfer pump station B to the new ENWWTP	
3	Three 350kL Storage Tanks to store treated wastewater prior to delivery to the SoE reuse scheme (located on Willersdorf Road - 1.3km south from the new ENWWTP)	
4	Pump and Pipeline to distribute reuse scheme wastewater	
5	Additional sprinkler heads at Exmouth Golf Course to irrigate the whole golf course	

### 4.3 Exclusions to the Premises

The infrastructure and associated activities that are not described by the assessment as they are outside of the prescribed activity regulatory capture include:

- Construction of a sewer pump station B at the existing EWWTP to pump all wastewater to the new ENWWTP.
- Construction of approximately 2km of Pressure Main from the transfer pump station B to the new ENWWTP;
- Three 350kL Storage Tanks to store treated wastewater prior to delivery to the SoE reuse scheme (located on Willersdorf Road 1.3km south from the new ENWWTP);
- Pump and Pipeline to distribute reuse scheme wastewater; and
- Additional sprinkler heads at Exmouth Golf Course to irrigate the whole golf course;

Given the proposed construction works for pump station B at the existing EWWTP this construction activity would normally trigger section 53 of the EP Act and thus require a separate works approval to this Application. The Applicant has submitted a Licence Amendment Application (October 2019) for the existing EWWTP (L5980/1991/7) to alter the premises boundary to allow construction of pump station B; therefore there is no requirement for a works approval at the existing EWWTP.

It is noted that the construction of pump station B at the existing EWWTP premises will be subject to dewatering for possibly two months in association with construction of the new ENWWTP. This construction activity is not part of the proposed new ENWWTP Premises (the Premises will constitute the WWTP ponds and associated infrastructure identified in Attachment 1 Site Plan; the infrastructure identified above will not be part of the Premises) nor is there a dedicated Prescribed premises category for this activity and therefore will not be assessed as part of this Application. General provisions of the EP Act apply in these circumstances to mitigate emissions into the environment. The Applicant has undertaken a Dewatering environmental assessment. Dewatering will require an application for a 5C Licence under the RIWI Act for which a hydrogeological assessment and modelling will be required as part of that application to take water which is outside of the scope of this works approval Application.



## 5. Legislative context

### 5.1 Other relevant approvals

#### 5.1.1 Planning approvals

The Applicant has advised in the Application that Planning Approval is not required. No further information has been submitted in this regard. Consultation with the relevant Local Government has been documented in section 7 below.

#### 5.1.2 Department of Health

The existing reuse scheme is undertaken by SoE in accordance with their DoH 'Recycled Water Scheme Approval' number B39/EX000. Treated wastewater used in the SoE reuse scheme must comply with the requirements of the DoH Guidelines for the *Non-potable uses of Recycled Water in Western Australia* for Low Risk use as well as the conditions contained within the SoE DoH approval for the recycling scheme. The Applicant has advised in the Application that once the Works Approval has been submitted the Applicant will apply for DoH approval for the relocation of the EWWTP and upgrades to the SoE reuse scheme. No approval has been provided. Consultation with DoH has been documented in section 7 below.

#### 5.1.3 Federal Legislation

##### *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*

The Applicant has advised in the Application that the proposed EWWTP does not require referral or assessment under the *Environment Protection and Biodiversity Conservation Act 1999* as the proposed new EWWTP will not cause a significant impact on the environment.

### 5.2 Part V of the EP Act

#### 5.2.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Land Use Planning (February 2017)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guidance Statement: Publication of Annual Audit Compliance Reports (May 2016)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessments (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

#### 5.2.2 Works approval and licence history

Table 5 summarises the works approval and licence history for the premises.

**Table 5: Works approval and licence history**

Instrument	Issued	Nature and extent of works approval, licence or amendment
W6201/2018/1	Draft	New ENWWTP

### 5.2.3 Clearing

The Applicant has advised in the Application that 19ha of land will be cleared as part of construction activities for the new ENWWTP and associated civil works required to be constructed for the reuse scheme. The Applicant has advised that the Applicant will assess the clearing through their Statewide Clearing Permit CPS185/8 as possible exemptions

DWER Native Vegetation Branch have confirmed they have no objection to the Applicant utilising CPS 185 for clearing.

## 6. Modelling and monitoring data

### 6.1 Monitoring of local ecosystem – subterranean fauna

The Exmouth peninsula has an extensive network of limestone caves and karst features that support a rich subterranean fauna communities with many stygofauna species occurring on the associated coastal plain and many Troglifauna species found in Cape Range. Previous studies in the area have identified species of high conservation values with some species receiving special protection under environmental legislation (EPBC Act). The Applicant has commissioned a detailed specialist subterranean environmental assessment which involved two separate sampling events which assessed the potential impacts from current and future operations on subterranean species. The assessment is provided as Attachment 3C in the Application.

The following are excerpts from the Executive summary noting that the references to dewatering drawdown apply to pump station B at the Existing EWWTP which are not subject to this assessment (refer to section 4.3 above):

- *A total of 34 stygofauna samples were collected from 23 bores in June and August 2016 to provide additional information about the composition of the stygofauna community in the vicinity of the new WWTP and associated operations; these include 19 samples from impact areas that have the potential to be impacted and 15 samples unlikely to be affected by WWTP operations. A total of 423 specimens belonging to at least 18 species of stygofauna were collected. In November 2016, a further 40 samples were collected from sites in the surrounding areas that will not be affected by WWRP operations and an additional 607 animals belonging to at least 23 species of stygofauna were collected. Records of 10 species in the vicinity of the WWTP appear to represent the only known occurrences of those species.*
- *Troglifauna are unlikely to be affected by the proposed WWTP but the temporary groundwater drawdown, and saltwater intrusion, may potentially impact on stygofauna. Spatial modelling of drawdown is not available and, and area comprising the existing WWTP and irrigation areas was considered large enough to encompass any potential impacts arising from the proposed WWTP and associated operations. No impacts are expected around the proposed WWTP itself.*
- *One species of stygofauna, the copepod *Dussartcyclops* sp. B12, is known only from this indicative area of impact. This species is unlikely to be threatened by either groundwater drawdown / seawater intrusion or nutrient concentrations associated with historical and proposed watering of turf in Exmouth.*

- Similarly, it is considered that the habitat of the two listed fish species occurring in the vicinity of the Project will not be significantly impacted by Project development or operation. The closest records of the two species, the blind gudgeon *Milyeringa veritas* and blind cave eel *Ophisternon candidum*, are from Kubura Well to the north of the indicative impact area. Groundwater quality is expected to improve over time as a result of the proposed irrigation of a larger area of turf associated with the proposed new WWTP.
- Accordingly, it is considered unlikely that installation and operation of the proposed new WWTP will affect the conservation status of any subterranean fauna species.

**Key finding: The Delegated Officer has reviewed the information regarding discharges to land and has found:**

1. *The Delegated Officer has considered the results of the subterranean fauna assessment and advice received from DBCA and considers that there will be no foreseeable significant impacts to the subterranean fauna environment resulting from irrigation from the proposed new ENWWTP.*
2. *Potential impacts related to temporary groundwater drawdown noted in the subterranean groundwater assessment relate to dewatering works outside of the boundary at the EWWTP, which are outside of the scope of this assessment. The information has been passed on to the area of the Department who will be regulating the dewatering under the RIWI Act.*
3. *The initial application proposed use of the Infiltration / Evaporation pond for up to one month per year.*
4. *The Applicant revised the scope of use for the Infiltration / Evaporation pond to extreme rainfall events at or above a 1 in 10 year ARI.*
5. *Whilst the proposed new ENWWTP has significant storage capacity, multiple 1 in 10 year rainfall events could occur in a given year and the applicant has not provided information relating to the potential impacts to stygofauna from these events*
6. *Further information relating to the potential impacts to stygofauna from discharge events would be required before authorisation for such discharge is able to be provided. It is expected that this information along with consideration for appropriate monitoring protocols will be provided as part of the upcoming Licence application.*

## 6.2 Monitoring of discharges to Groundwater and marine ecosystem

Exmouth Gulf is part of a marine conservation reserve and the nearshore receiving environment is afforded a high level of protection by the State. Accordingly the Applicant commissioned a marine environmental impact assessment on groundwater modelling of predicted N concentrations reaching Exmouth Gulf from the new ENWWTP and SoE reuse scheme. The full assessment is provided as Attachment 3C in the Application.

Expected TN and TP loads discharging at the coast were modelled by the Applicant based on an irrigation rate of 18ML/ha/yr for the proposed irrigation area of 24.8ha in total (18ha Golf Course and 6ha Ovals and open space) for a WWTP inflow of 365ML/year; refer to Table 6 below.

**Table 6: Model assumptions**

Irrigation rate	18ML/ha/yr
Area irrigated	24.8ha
Treated wastewater TN concentration	40mg/L (634kg/ha/yr)
Treated wastewater TP concentration	6mg/L (75kg/ha/yr)

The modelled TN load discharging to the marine environment during irrigation (11 months per annual period) was approximately 20kg/day distributed across approximately 1.3km of coastline; refer to Figure 4. Alternately, during the non-irrigation period (one month per annual period) the TN load is approximately 17kg/day; refer to Figure 5. Infiltrated TP doesn't reach the coast for 20 years and only at loads and concentrations that are not ecologically significant.

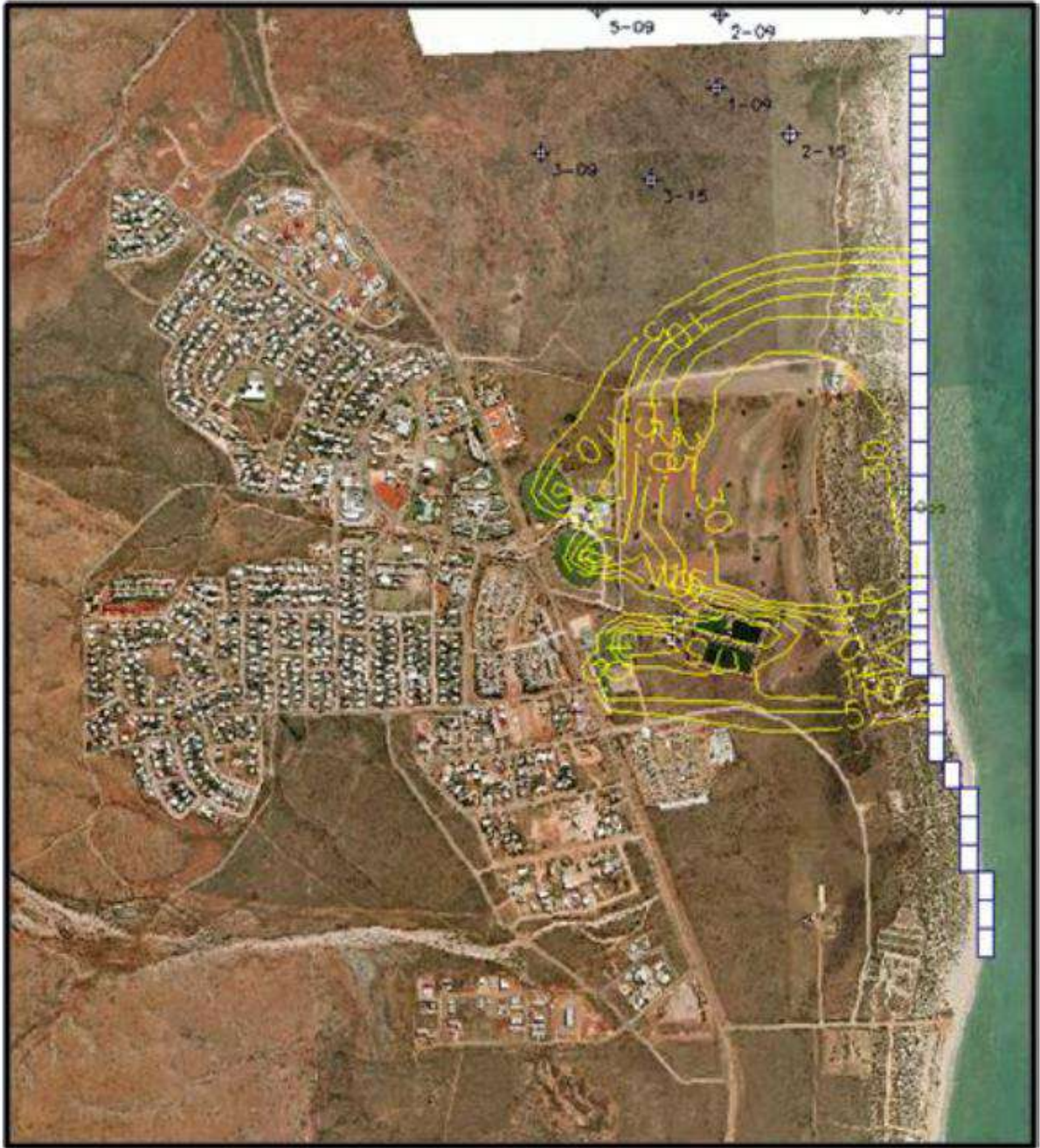
### Comparison with Guidelines

The concentration of TN at the proposed new ENWWTP is 40mg/L and results of the modeling (Figure 4) indicate a maximum Nitrogen concentration at discharge on the coast between 25 and 30mg/L. The ANZECC guideline default TN as a chemical stressor in tropical inshore marine waters is 0.1mg/L. Exmouth Gulf background concentrations are not available so background concentrations from Onslow have been used as a comparison. These concentrations are based on Onslow Industry (Chevron) research with a site specific trigger of 0.225mg/L based on 80<sup>th</sup> percentile and the mean concentration of TN as 0.146mg/L was used as an estimate for background. If these values are assumed also for Exmouth Gulf then worst case concentrations in the groundwater discharge would require between 1:315 and 1:378 dilutions to meet the site specific trigger.

The proposed increase of irrigated treated wastewater within the SoE reuse scheme results in TN discharge volumes and loads that have been shown to be sustainable elsewhere. The numerical model suggests that TN loadings at the marine coastline in Exmouth Gulf are very low compared to these sustainable licensed point sources and groundwater loads elsewhere; refer to Table 7 below.

**Table 7 EWWTP loads compared to other authorised WWTP loads**

Premises	Modelled TN load
Exmouth (new WWTP)	20 kg/day
Alkimos (L8434/2010/1)	56 kg/day
Jurien Bay (L8050/1991/3)	33.6 kg/day
Halls Head (L5997/1992/11)	42.4 kg/day
Lancelin (L6362/1991/12)	17.1 kg/day
Kalbari (L5954/1991/4)	7.7 kg/day



**Figure 4 Modelled groundwater TN irrigation concentrations**



**Figure 5 Modelled groundwater TN Infiltration concentrations**

Based on the assimilative capacity of the receiving marine environment is adequate to cope with such diffuse discharges at these low TN loads it is unlikely that there will be any significant measurable change in the local marine ecosystem.

**Key finding:** *The Delegated Officer has considered discharges to the marine environment from the proposed new ENWWTP and notes that although it is likely that relatively small increases in nitrogen concentrations in groundwater discharging at the Exmouth Gulf coastline will occur, these slight increases in nearshore nitrogen concentrations are expected to be within a range of natural variation and will not pose a foreseeable significant impact to the environment.*

## 6.3 Monitoring of discharges to land

The proposed new ENWWTP will discharge treated wastewater to the SoE reuse scheme which will deliver treated wastewater to the Exmouth Golf Course, two sporting ovals (Talanjee and Koobooroo) and roadside verges as per current reuse scheme. It is anticipated that this will encompass 24.8ha in total (18ha Golf Course and 6ha Ovals and open space). The Applicant has commissioned an Exmouth Effluent Reuse Scheme Preliminary Nutrient Risk Assessment and Management Plan as part of the Application. The full assessment is provided as Attachment 7B in the Application.

The following are excerpts from the Executive summary:

- *During the 2015-2016 annual period the total volume of water supplied to the reuse scheme amounted to 100ML. The application of such volumes are considered to be inadequate in terms of plant water and nutrient requirements and presented a low risk of nutrient loss when compared with the accepted guidelines.*
- *Following the development of a nominal irrigation scheme for the reuse scheme, based on plant water demand for optimum turf grass production in Exmouth, it was determined that the volume of water available is insufficient to meet the current requirements of the SoE reuse scheme.*
- *The results of leaf tissue analysis indicate that in general plant health was within accepted parameters and that no deficiencies or toxicities were occurring. The soil analysis research indicated that the soil type present may have a greater capacity to readily precipitate reactive Phosphorus than previously thought. However further work is required in order to confirm the performance of the reuse scheme under such conditions.*
- *When comparing the SoE reuse scheme to the Turf Guidelines consideration has been given to the climatic differences between Perth and Exmouth and the impacts this has on the plants water demands and nutrient requirements.*
- *WQPN 22 has been used to assess the relative loading rates of the SoE reuse scheme.*
- *In general it was found that the SoE reuse scheme has loading rates that are considered to be within acceptable ranges, in fact, the loading rates of inorganic Nitrogen were considered to be low compared with WQPN 22 and Filterable Reactive Phosphorus levels to be slightly elevated in comparison with the criteria applied to the Risk Category selected for the site.*
- *Due to the characteristics of the soil type present, it was deemed that the Turf Guidelines were not applicable when assessing soil Phosphorus levels. This is the result of the Colwell Phosphorus due to the reagents used in this technique dissolving precipitated Calcium Phosphorus therefor reducing the perceived levels of available Phosphorus.*
- *In general it was found that the SoE reuse scheme could be considered to be fulfilling its role as a means to dispose of treated wastewater in a manner that is socially, economically and environmentally responsible provided best practice turf management principles are applied.*

**Key finding: The Delegated Officer has reviewed the information regarding discharges to land and has found:**

1. *The Exmouth Effluent Reuse Scheme Preliminary Nutrient Risk Assessment and Management Plan is not intended to be a comprehensive risk assessment but a guide to assist decision making.*
2. *The Reuse scheme annual irrigation rate is calculated at 18ML/ha in order to optimise plant growth (turf grass).*
3. *DWER Contaminated sites has reviewed the Application and advice that:*
  - (a) *A hydraulic loading assessment indicates that sufficient land area is available to dispose of irrigated wastewater by evapotranspiration in Exmouth;*
  - (b) *If it is assumed that the average concentration of nitrogen produced by the WWTP will be 40 mg/L, insufficient land will be available in the proposed irrigation scheme for vegetation to completely remove this nutrient. Consequently, it is likely that nitrogen would accumulate in the soil profile in irrigated areas and would be periodically flushed into groundwater during heavy rainfall events; and*
  - (c) *Sufficient land area is available in the proposed irrigation scheme to remove phosphorus that is applied to soils in the wastewater irrigation scheme.*
4. *Further investigation is warranted regarding loading rates and groundwater monitoring cognisant with existing, and historic, nutrient overloading at the existing EWWTP and Reuse scheme. Further investigation through appropriate licence conditions will assess anticipated risk reduction from impacts to groundwater and marine environment with the expansion of the Reuse scheme; which has been designed, developed and implemented to improve current environmental impact risk and emissions.*

## 7. Consultation

DWER advertised the works approval application on 16 April 2019 seeking public comment(s); submissions were open for 21 days and closed 7 May 2019. DWER received no submissions.

DWER consulted with the following Organisations or Government Departments in accordance with section 54 of the EP Act as DWER considered they may have a direct interest in the subject matter of the Application and invited comment on the proposal.

- DWER sent a letter dated 16 April 2019 to SoE requesting advice / comment on the Works Approval Application. SoE responded with a written submission on 17 April 2019.
- DWER sent a letter dated 16 April 2019 to DoH requesting advice / comment on the Works Approval Application. No Comment.
- DWER sent a letter dated 16 April 2019 to DBCA requesting advice / comment on the Works Approval Application. DBCA responded with a written submission on 29 May 2019
- DWER sent correspondence dated 8 May 2019 to NWAHA requesting advice/comment on the Works Approval Application. NWAHA provided a written response on 17 June 2019.

All Stakeholder responses are provided in Appendix 2 below.



## 8. Location and siting

### 8.1 Siting context

The site is currently located on Commonwealth Government (Department of Defence) land, which is Lot 43 on Deposited Plan 209471. However, the Applicant has obtained a 99 year lease for the Premises at this location from Department of Defence. The Applicant submitted the lease as part of the Application.

The new ENWWTP site is on flat lying alluvial plain that is around two to eight metres above sea level that slopes generally towards the east to Exmouth Gulf. There are two poorly defined drainage lines that are ephemeral and thus only flow during rainfall events.

The ENWWTP is located on the north eastern edge of the Town of Exmouth. The premises is 19ha in size and is surrounded by native vegetation. The Exmouth Gulf is located 750m to the east. Residential Lots are located 560m south west from the Ponds. Refer to Figure 6 below for the location of the ENWWTP. Table 8 provides the Premises boundary coordinates (GDA1994).

**Table 8 Premises boundary coordinates**

<b>Point location</b>	<b>Easting</b>	<b>Northing</b>
NW	203266 m	7573278 m
NE	203736 m	7573278 m
SW	203266 m	7572770 m
SE	203736 m	7572770 m



**Figure 6 EWWTP location overview**

## 8.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 9.

**Table 9: Receptors and distance from activity boundary**

Sensitive Land Uses	Distance from Prescribed Activity
Residential Premises	560m south west of Ponds

## 8.3 Specified ecosystems

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 distances to specified ecosystems are shown in Table 10. Table 10 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting*.

**Table 10: Environmental values**

Specified ecosystems	Distance from the Premises
Important wetlands – Western Australia Cape Range Subterranean Waterways	Lies underneath and surrounds Premises boundary and extends north, south and east. High level of ecosystem protection
Contaminated Sites – Remediated for restricted use	Surrounds Premises boundary
Biological component	Distance from the Premises
Threatened/Priority Fauna	<p>South west Premises boundary:</p> <ul style="list-style-type: none"> <li>• Spear beaked cave shrimp <i>Stygiocaris stylifera</i></li> <li>• Cave gudgeon <i>Milyeringa veritas</i></li> <li>• Blind cave ell <i>Ophisternon candidum</i></li> </ul> <p>400m south premises boundary Little curlew <i>Numenius minutus</i></p> <p>750m east Premises boundary Green turtle <i>Chelonia mydas</i></p> <p>350m North east Premises boundary Cave gudgeon <i>Milyeringa veritas</i></p> <p>550m North east Premises boundary:</p> <ul style="list-style-type: none"> <li>• Greater sand plover <i>Charadrius leschenaultii</i></li> <li>• Lesser sand plover <i>Charadrius mongolus</i></li> </ul>

	<ul style="list-style-type: none"> <li>• Crested turn <i>Thalasseus bergii</i></li> <li>• Common greenshank <i>Tringa nebularia</i></li> <li>• Ruddy turnstone <i>Arenaria interpres</i></li> <li>• Peregrine falcon <i>Falco peregrinus</i></li> <li>• Pacific golden plover <i>Pluvialis fulva</i></li> <li>• Grey plover <i>Pluvialis squatarola</i></li> <li>• Oriental plover <i>Charadrius veredus</i></li> <li>• Bar tailed godwit <i>Limosa lappanica</i></li> <li>• Red neck stint <i>Calidris ruficollis</i></li> <li>• Whimbrel <i>Numenius phaeopus</i></li> <li>• Rosetail tern <i>Sterna dougallii</i></li> </ul>
<b>Other relevant ecosystem values</b>	<b>Distance from the Premises</b>
Exmouth Gulf	750m East of Prescribed Premises 280m east of the Exmouth golf Course

## 8.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 11.

**Table 11: Groundwater and water sources**

<b>Groundwater and water sources</b>	<b>Distance from Premises</b>	<b>Environmental value</b>
Public drinking water source areas	1230m south west of Premises boundary	Potable water
RIWI Act Groundwater Areas	Gascoyne Groundwater Area Underlies and surrounds Premises boundary	Groundwater abstraction
Watercourses – Non-perennial	Crosses Premises boundary in north east corner	Aesthetic
Groundwater	<p>Depth to groundwater encountered at approximately 1.92m bgl at bore 2/15 to 6.42m bgl at bore 4/09 (based on information within works approval W6201/2018/1). Variation driven by tidal variation.</p> <p>Groundwater is moderately saline (3,000 – 10,000 mg/L TDS)</p> <p>Four bores located within</p>	<p>Water is not used for potable or industrial use.</p> <p>Groundwater system linked to Exmouth Gulf marine ecosystem located 750m east of the Premises boundary.</p> <p>Except during high tide groundwater flows to the east discharging into the Exmouth Gulf coastline.</p>

	500m of Premises (based on available GIS dataset –WIN Groundwater Sites) but status is unknown.	
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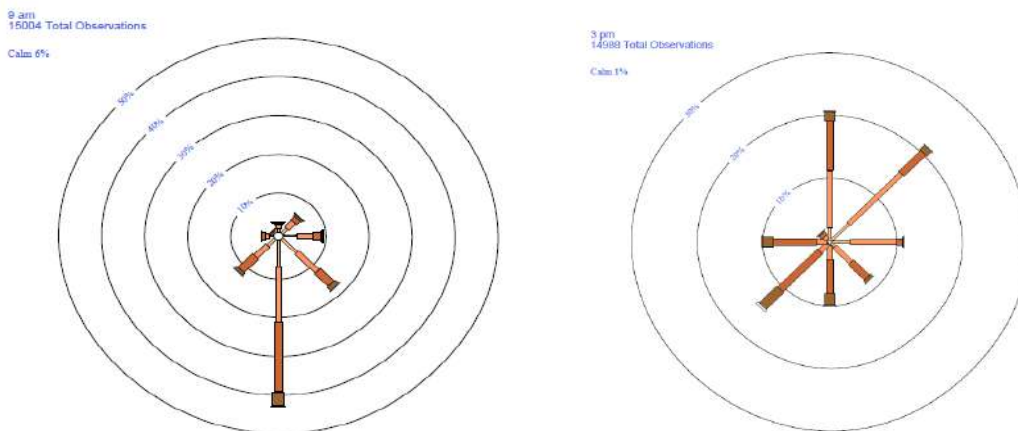
## 8.5 Soil type

DWER’s GIS identifies the soil class as BB10 - Narrow coastal plain flanking unit Fy2; some saline flats and a few sand dunes: chief soils appear to be shallow loams on limestone (Um5.11) and (Um5.5 l) with sands (Uc5.11) also overlying limestone. There are some red sands (Uc5.1) in dunes and a coastal fringe of recent shelly sand (Uc1.11). Occurs on sheet(s): 6

## 8.6 Meteorology

The climate of the Exmouth region of Western Australia is arid, semi-desert to sub-tropical climate, with variable summer and winter rainfall. Cyclonic activity can be significant, and cyclonic systems may affect the coast and hinterland annually. Based on long-term climatic data from the nearest BoM weather station with comprehensive data for both rainfall and temperature from Learmonth Airport (BoM Station 5007, approximately 33 km south of the Premises, the mean annual rainfall since 1945 is 260.7 mm. The mean maximum temperatures since 1975 range between 24.2°C and 37.9°C.

The respective annual 9am and 3pm wind roses for Exmouth are taken from BoM Learmonth Airport site, located approximately 33 km south from the Premises and are represented in Figure 7 below.



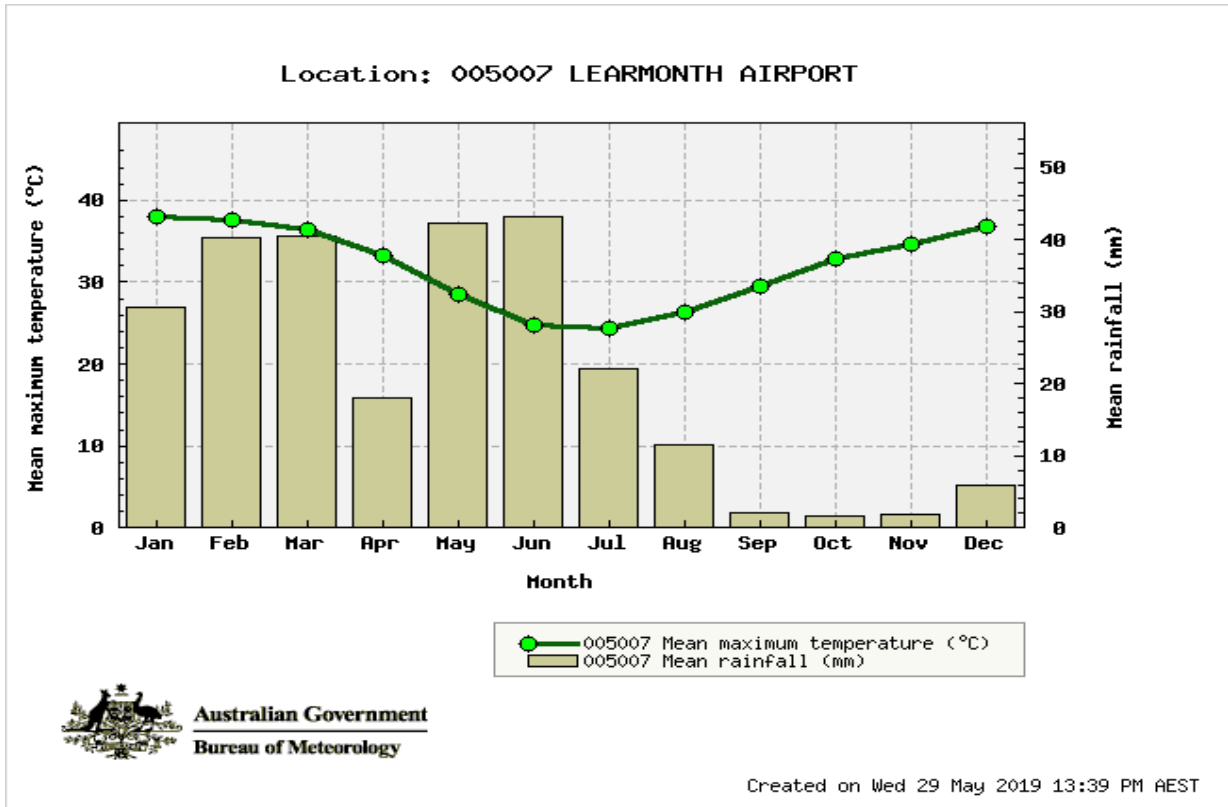
**Figure 7 9am and 3pm Wind rose**

*“It is important to note that these wind roses show historical wind speed and wind direction data for Learmonth Airport weather station and should not be used to predict future data”*

### Rainfall and temperature

The closest weather station for rainfall data is Learmonth Airport 30km south - site 005007. Maximum average rainfall is received in May / June and February / March annually. Minimum average rainfall is received September to November annually (Figure 8).

Highest average temperatures are experienced January, February and March annually. Lowest average temperatures are experienced June, July and August (Figure 8).



**Figure 8: Average annual rainfall and temperature at Learmonth site 005007.**

Source: Bureau of Meteorology website [www.bom.gov.au](http://www.bom.gov.au)

## 9. Risk assessment

### 9.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

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. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 12, 13 and 14.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 12, 13 and 14 below. The Applicant has advised they would like to Commission the new ENWWTP for six (6) months.

**Table 12. Identification of emissions, pathway and receptors *during construction***

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
<b>Construction of new ENWWTP</b>	Vehicle movements on unsealed access roads and civil activities	Noise	Residential premises - 560m south west of Ponds	Air / wind dispersion	Amenity impacts causing nuisance	<p>No</p> <p>Predominant wind at 9am is from the South and will push Noise north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the North and North East and may push Noise towards sensitive receptors if wind conditions are strong.</p> <p>The Applicant has to comply with regulation 13 of the Noise Regs for Construction works.</p> <p>Construction work limited between 7.00 and 19.00 hours Monday to Saturday and contractor required to ensure works conducted in accordance with section 4 of AS2436-2010.</p> <p>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.</p> <p>Noise can be adequately regulated by the EP Noise Regs</p>
		Dust			Health and amenity impacts - Potential suppression of photosynthetic and respiratory functions	

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
						<p>Only a very small area of internal gravel track occurs within the Premises and combined with limited ability for vehicles to speed there will be minimal dust disturbance.</p> <p>Applicant has a Construction Management Plan that identifies dust emission controls and the Contractor must adhere to the Management Plan. No visible dust plumes are to extend more than 10m off the development area.</p> <p>The Delegated Officer has considered the separation distance between the source and receptors as a guide to inform the risk of dust emissions as not foreseeable.</p> <p>Dust can be adequately regulated by section 49 of the EP Act.</p>
	Construction of new ENWWTP and associated infrastructure	Noise			Amenity impacts causing nuisance	<p>No</p> <p>Predominant wind at 9am is from the South and will push Noise north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the North and North East and may push Noise towards sensitive receptors if wind conditions are strong.</p> <p>The Applicant has to comply with regulation 13 of the Noise Regs for Construction works.</p> <p>Construction work limited between 7.00 and 19.00 hours Monday to Saturday and contractor required to ensure works</p>



Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway		
						<p>conducted in accordance with section 4 of AS2436-2010.</p> <p>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.</p> <p>Noise can be adequately regulated by the EP Noise Regs.</p>
		Dust				

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway		
	Construction of new ENWWTP and associated infrastructure	Odour	Residential premises - 560m south west of Ponds	Air / wind dispersion	Amenity impacts causing nuisance	No  No Emission. Construction activities to build the ENWWTP and associated civil works will not generate significant odour emissions.
<b>Construction of new ENWWTP</b>	Onsite operational equipment	Spills of chemicals – hydrocarbon	Direct discharge to land	Vegetation adjacent to Premises	Soil contamination inhibiting vegetation survival and growth	No  Small amounts of hydrocarbons will be used during construction activities for Heavy Vehicles. Spills kits available on site. Contractor must comply with Applicant Construction Environment Management Plant. The fuel storage facility will be contained within self-bunded fuel tanks which meets Australian Standard AS1692.  The Delegated Officer considers a self-bunded hardstand facility will adequately contain potential chemical spills to minimise the potential for direct discharge to land.  Hydrocarbon spills can be regulated under the UDR.

**Table 13. Identification of emissions, pathway and receptors *during commissioning***

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
<b>Wastewater Treatment Plant</b>	Operation of treatment ponds including sludge drying bed	Noise from operation of ponds and movement of light vehicles	Residential premises - 560m south west of Ponds	Air / wind dispersion	Amenity impacts causing nuisance	No	<p>Predominant wind at 9am is from the South and will push Noise north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the North and North East and may push Noise towards sensitive receptors if wind conditions are strong.</p> <p>There will only be very limited access to the WWTP so vehicle movement will be restricted and infrequent. The size of the Premises does not allow for vehicles to gain speed.</p> <p>Solar power will provide power options for the ENWWTP and the emergency generator will only operate as required to facilitate commissioning and will not be operational full time.</p> <p>The Delegated Officer considers the separation distance between the source and receptors as adequate to inform the risk of noise emissions as not foreseeable.</p> <p>Noise can be adequately regulated by the EP Noise Regs.</p>
		Dust from movement of vehicles / use of	Residential premises - 560m south west of Ponds	Air / wind dispersion	Health and amenity impacts – Potential suppression of photosynthetic and	No	<p>Predominant wind at 9am is from the South and will push Dust north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the</p>

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		ponds			respiratory functions	<p>North and North East and may push Dust towards sensitive receptors if wind conditions are strong.</p> <p>Only a very small area of internal gravel track occurs within the Premises and combined with limited ability for vehicles to speed there will be minimal dust disturbance. During commissioning it is not expected the ponds will cause dust emissions.</p> <p>The Delegated officer considers the separation distance between the source and receptors as adequate to inform the risk of dust emissions as not foreseeable.</p> <p>Dust can be adequately regulated by section 49 of the EP Act.</p>
	Treatment of sewage during commissioning	Odour	Residential premises - 560m south west of Ponds	Air / wind dispersion	Amenity impacts causing nuisance	Yes See section 9.7
	Sewage pond	Discharge of treated effluent	SoE Reuse Scheme Humans Groundwater	Direct discharge to land Direct contact and ingestion of irrigation mist	Soil contamination (nutrient loading) inhibiting vegetation growth and survival Groundwater contamination Public health impacts including gastroenteritis and other diseases	Yes See section 9.4

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway		
	Sewage pond	Overtopping of ponds resulting in sewage discharge to land and groundwater	Vegetation and fauna adjacent to discharge area, groundwater surrounding the area	Direct discharge to land Seepage through soil into groundwater	Soil contamination (nutrient loading) inhibiting vegetation growth and survival Groundwater contamination	No  Commissioning will only be for six (6) months and it is not expected that volumes will reach pond capacity or freeboard during this time. Commissioning will occur during the Winter when cyclones are not expected; it is noted however, and as highlighted in Figure 8, the majority of rainfall occurs in May and June but collectively this average rainfall is less than 80mm in total which is not a large volume. The most likely period for overtopping will be during Operations and accordingly the risk will be assessed for Operations.  The Delegated Officer considers the separation distance between the source and receptors and limited volumes produced during commissioning as adequate to inform the risk of overtopping emissions as not foreseeable.
	Sewage pond	Seepage: Leachate from base of unlined emergency Infiltration / Evaporation pond	Groundwater dependent ecosystems Stygofauna Depth to groundwater encountered at approximately 1.92m bgl at bore 2/15 to 6.42m bgl at bore 4/09 (based on information within works approval W6201/2018/1). Variation driven by tidal variation.	Seepage: lateral and vertical subsurface migration of leachate to groundwater	Groundwater contamination (nutrient loading)	Yes  See section 9.6

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Groundwater is moderately saline (3,000 – 10,000 mg/L TDS)				
	Sewage pond	Stormwater contamination	Vegetation adjacent to Premises Surface water – adjacent ephemeral creeks	Direct discharge	Soil contamination inhibiting vegetation survival and growth Surface water contamination.	<p>No</p> <p>The new ENWWTP will be constructed with rock pitching on pond walls to the north and east to protect the ENWWTP from flood inundation,</p> <p>The site is generally very flat and any runoff intercepted by the new infrastructure will come from the west. This water will be directed around the new ENWWTP to the north and south, allowing further surface run-off via rip-rap protection structures.</p> <p>Commissioning will only be for six (6) months and it is not expected that volumes will reach pond capacity or freeboard during this time. Commissioning will occur during the Winter when cyclones are not expected; it is noted however, and as highlighted in Figure 8, the majority of rainfall occurs in May and June but collectively this average rainfall is less than 80mm in total which is not a large volume. The most likely period for stormwater emissions will be during Operations and accordingly the risk will be assessed for Operations.</p> <p>The Delegated Officer considers a purpose built rock pitching structures facility will adequately contain potential</p>

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
							stormwater issues for contaminated stormwater discharge to land and surface water. No further risk assessment is required.
<b>Chlorination Unit</b>	Onsite operational equipment	Release of chlorine gas	Residential premises - 560m south west of Ponds	Air / wind dispersion (Chlorine gas bottles)	Amenity impacts causing nuisance	No	<p>Predominant wind at 9am is from the South and will push Dust north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the North and North East and may push air emissions towards sensitive receptors if wind conditions are strong.</p> <p>A permanent chlorination unit will be installed to provide treatment for the Reuse Scheme. The chlorination unit chemicals will be contained within a closed facility that is designed to capture chemicals and prevent them from entering the environment.</p> <p>All chemicals stored in purpose built facility that complies with AS3780: The storage and handling of corrosive substances.</p> <p>The Delegated Officer considers the separation distance between the source and receptors as adequate to inform the risk of impacts from chlorine gas emissions as not foreseeable.</p>
<b>Copper Ioniser</b>	Onsite operational equipment	Release of copper	Residential premises - 560m south west of Ponds	Air / wind dispersion Direct discharge to	Amenity impacts causing nuisance Soil contamination inhibiting vegetation	No	<p>Predominant wind at 9am is from the South and will push Dust north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the North and North East and may push air</p>

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway		
				land	survival and growth Surface water contamination.	<p>emissions towards sensitive receptors if wind conditions are strong.</p> <p>When turned off, it is merely a box with some copper rods in it which is entirely harmless.</p> <p>Residual copper less than AWDG</p> <p>The Delegated Officer considers the separation distance between the source and receptors as adequate to inform the risk of impacts from copper emissions as not foreseeable.</p>
<b>Emergency Generator</b>	Onsite operational equipment	Spills of chemicals - hydrocarbon	Vegetation adjacent to Premises	Direct discharge to land resulting in overland flow or contamination of groundwater	Soil contamination inhibiting vegetation survival and growth	<p>No</p> <p>A permanent generator will be installed to provide emergency power supply for. The fuel storage facility will be contained within self-bunded fuel tanks which meets Australian Standard AS1692.</p> <p>The Delegated Officer considers a self-bunded hardstand facility will adequately contain potential chemical spills to minimise the potential for direct discharge to land.</p> <p>Hydrocarbon spills can be regulated under the UDR.</p>



**Table 14: Identification of emissions, pathway and receptors during operation**

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
<b>Wastewater Treatment Plant</b>	Operation of treatment ponds including sludge drying bed	Noise from operation of ponds and movement of light vehicles	Residential premises - 560m south west of Ponds	Air / wind dispersion	Amenity impacts causing nuisance	No  Predominant wind at 9am is from the South and will push Noise north away from sensitive receptors.  Predominant wind at 3pm is from the North and North East and may push Noise towards sensitive receptors if wind conditions are strong.  There will only be very limited access to the ENWWTP so vehicle movement will be restricted and infrequent. The size of the Premises does not allow for vehicles to gain speed.  The emergency generator will only operate as required to facilitate commissioning and will not be operational full time.  The Delegated Officer considers the separation distance between the source and receptors as adequate to inform the risk of noise emissions as not foreseeable.  Noise can be adequately regulated by the EP Noise Regs.
		Dust from movement of vehicles / use of	Residential premises - 560m south west of Ponds	Air / wind dispersion	Health and amenity impacts - Potential suppression of photosynthetic and	No  Predominant wind at 9am is from the South and will push Dust north away from sensitive receptors.

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		ponds			respiratory functions	<p>Predominant wind at 3pm is from the North and North East and may push Dust towards sensitive receptors if wind conditions are strong.</p> <p>Only a very small area of internal gravel track occurs within the Premises and combined with limited ability for vehicles to speed there will be minimal dust disturbance. During commissioning it is not expected the ponds will cause dust emissions.</p> <p>The Delegated Officer considers the separation distance between the source and receptors as adequate to inform the risk of dust emissions as not foreseeable.</p> <p>Dust can be adequately regulated by section 49 of the EP Act.</p>
Treatment of sewage	Odour	Residential premises - 560m south west of Ponds	Air / wind dispersion	Amenity impacts causing nuisance	Yes	<p>See section 9.7</p> <p>It is noted that the ENWWTP design will incorporate potentially significant odour sources such as the anaerobic pot. No information has been provided in the application regarding odour generation potential or odour modelling relating to the new WWTP.</p> <p>The Delegated Officer considers that whilst odour emissions are likely to form a low to moderate risk from the ENWWTP operations, there is insufficient information to inform a detailed risk assessment at this time. It is expected that the future license</p>



Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
			Variation driven by tidal variation. Groundwater is moderately saline (3,000 – 10,000 mg/L TDS)			
	Sewage pond	Stormwater contamination	Vegetation adjacent to Premises Surface water – adjacent ephemeral creeks	Direct discharge	Soil contamination inhibiting vegetation survival and growth Surface water contamination.	No  The new ENWWTP will be constructed with rock pitching on pond walls to the north and east to protect the ENWWTP from flood inundation,  The site is generally very flat and any runoff intercepted by the new infrastructure will come from the west. This water will be directed around the new WWTP to the north and south, allowing further surface run-off via rip-rap protection structures.  The Delegated Officer considers a purpose built rock pitching structures facility will adequately contain potential stormwater issues for contaminated stormwater discharge to land and surface water. No further risk assessment is required.
<b>Chlorination Unit</b>	Onsite operational equipment	Chlorine gas	Residential premises - 560m south west of Ponds	Air / wind dispersion (Chlorine gas bottles)	Amenity and health impacts	No  Predominant wind at 9am is from the South and will push Dust north away from sensitive receptors.  Predominant wind at 3pm is from the North and North East and may push Dust towards sensitive receptors if wind conditions are strong.  A permanent chlorination unit will be installed to provide treatment for the

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
						<p>Reuse Scheme. The chlorination unit chemicals will be contained within a closed facility that is designed to capture chemicals and prevent them from entering the environment.</p> <p>All chemicals stored in purpose built facility that complies with AS3780: The storage and handling of corrosive substances.</p> <p>The Delegated Officer considers a purpose built facility will adequately contain potential chemical spills to minimise the potential for direct discharge to land. No further risk assessment is required.</p>
<b>Copper Ioniser</b>	Onsite operational equipment	Release of copper	Residential premises - 560m south west of Ponds	<p>Air / wind dispersion</p> <p>Direct discharge to land</p>	<p>Amenity impacts causing nuisance</p> <p>Soil contamination inhibiting vegetation survival and growth</p> <p>Surface water contamination.</p>	<p>No</p> <p>Predominant wind at 9am is from the South and will push Dust north away from sensitive receptors.</p> <p>Predominant wind at 3pm is from the North and North East and may push air emissions towards sensitive receptors if wind conditions are strong.</p> <p>When turned off, it is merely a box with some copper rods in it which is entirely harmless.</p> <p>Residual copper less than AWDG</p> <p>The Delegated Officer considers the separation distance between the source and receptors as adequate to inform the risk of impacts from copper emissions as not foreseeable.</p>

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
<b>Emergency Generator</b>	Onsite operational equipment	Spills of chemicals - hydrocarbon	Direct discharge to land	Vegetation adjacent to Premises	Soil contamination inhibiting vegetation survival and growth	<p>No</p> <p>A permanent generator will be installed to provide emergency power supply for. The fuel storage facility will be contained within self-bunded fuel tanks which meets Australian Standard AS1692.</p> <p>The Delegated Officer considers a self-bunded hardstand facility will adequately contain potential chemical spills to minimise the potential for direct discharge to land.</p> <p>Hydrocarbon spills can be regulated under the UDR.</p>

## 9.2 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 15 below.

**Table 15: 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 16 below.

**Table 16: 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	<ul style="list-style-type: none"> <li>onsite impacts: catastrophic</li> <li>offsite impacts local scale: high level or above</li> <li>offsite impacts wider scale: mid-level or above</li> <li>Mid to long-term or permanent impact to an area of high conservation value or special significance<sup>^</sup></li> <li>Specific Consequence Criteria (for environment) are significantly exceeded</li> </ul>	<ul style="list-style-type: none"> <li>Loss of life</li> <li>Adverse health effects: high level or ongoing medical treatment</li> <li>Specific Consequence Criteria (for public health) are significantly exceeded</li> <li>Local scale impacts: permanent loss of amenity</li> </ul>
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> <li>onsite impacts: high level</li> <li>offsite impacts local scale: mid-level</li> <li>offsite impacts wider scale: low level</li> <li>Short-term impact to an area of high conservation value or special significance<sup>^</sup></li> <li>Specific Consequence Criteria (for environment) are exceeded</li> </ul>	<ul style="list-style-type: none"> <li>Adverse health effects: mid-level or frequent medical treatment</li> <li>Specific Consequence Criteria (for public health) are exceeded</li> <li>Local scale impacts: high level impact to amenity</li> </ul>
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> <li>onsite impacts: mid-level</li> <li>offsite impacts local scale: low level</li> <li>offsite impacts wider scale: minimal</li> <li>Specific Consequence Criteria (for environment) are at risk of not being met</li> </ul>	<ul style="list-style-type: none"> <li>Adverse health effects: low level or occasional medical treatment</li> <li>Specific Consequence Criteria (for public health) are at risk of not being met</li> <li>Local scale impacts: mid-level impact to amenity</li> </ul>
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> <li>onsite impacts: low level</li> <li>offsite impacts local scale: minimal</li> <li>offsite impacts wider scale: not detectable</li> <li>Specific Consequence Criteria (for environment) likely to be met</li> </ul>	<ul style="list-style-type: none"> <li>Specific Consequence Criteria (for public health) are likely to be met</li> <li>Local scale impacts: low level impact to amenity</li> </ul>
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> <li>onsite impact: minimal</li> <li>Specific Consequence Criteria (for environment) met</li> </ul>	<ul style="list-style-type: none"> <li>Local scale: minimal to amenity</li> <li>Specific Consequence Criteria (for public health) met</li> </ul>

<sup>^</sup> Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

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

“onsite” means within the Prescribed Premises boundary.

### 9.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 17 below:

**Table 17: Risk treatment table**

Rating of Risk Event	Acceptability	Treatment
<b>Extreme</b>	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
<b>High</b>	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.
<b>Medium</b>	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.
<b>Low</b>	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

### 9.4 Risk Assessment – Discharges to Land

#### 9.4.1 Description of Discharges to Land

The treated sewage from the ENWWTP will be transferred from the ENWWTP and stored within the three (3) dedicated storage tanks for use under the SoE reuse scheme. The treated wastewater will be consumed within the SoE reuse scheme which will deliver treated wastewater to the Exmouth Golf Course, two sporting ovals (Talanjee and Koobooroo) and roadside verges as per current reuse scheme. It is anticipated that this will encompass 24.8ha in total (18ha Golf Course and 6ha Ovals and open verge space).

During irrigation to the reuse scheme a number of parameters within the treated wastewater, nutrients such as TN and TP, metals and organic matter (BOD, TSS and TDS), will be discharged to land and excess parameters not taken up by the Turf grass will seep subsurface and may lead to contamination of vegetation within and adjacent to the reuse scheme and groundwater. Contaminated groundwater from the Exmouth Golf Course may also discharge to the Exmouth Gulf marine zone located 280m east.

During irrigation the release of pathogens by direct contact and ingestion of irrigation mist may lead to humans suffering public health concerns including gastroenteritis and other diseases.

It is not expected that Discharges to Land will occur during Commissioning in significant quantity as Commissioning is only for six (6) months and volumes are not expected to be large. Discharges to Land will occur consistently for operations (excluding extreme rainfall events) each annual period and accordingly discharges to land will be risk assessed under Operations.

#### 9.4.2 Identification and general characterisation of emission



Discharges to Land will occur consistently for each annual period and the production and design capacity of the ENWWTP is 1ML/day. The Premises will receive a continuous inflow loading of sewage up to 1ML/day subject to seasonal fluctuations. As sewage proceeds through the treatment ponds some contaminants undergo biological treatment and some contaminants settle to the base of the ponds to form sludge. Generally, as the sewage proceeds through the treatment ponds, the concentration of contaminants decreases. The quantity and quality of sewage, raw or treated, discharged to land will vary depending on the nature of the inflows as there will be daily variances during the year and effectiveness of the sewage facility treatment process. The new ENWWTP is expected to achieve wastewater treatment for parameters TN at less than 40mg/L, TP at 10mg/L, BOD less than 40mg/L, TSS less than 20mg/L, TDS approximately 1350mg/L and *E.coli* less than 100cfu/100mL respectively.

### 9.4.3 Description of potential adverse impact from the emission

Based on the reuse scheme there is discharges to land and subsequent possible discharge to groundwater and to Exmouth Gulf coast (280m east of the Golf Course). Potential impacts on ecology of flora (vegetation) groundwater (Subterranean ecosystem) and marine environment (Exmouth Gulf) from the addition of nutrients and dissolved solids. Excess TN and TP can lead to leaching of Nitrogen and Phosphorus into ground water, over-stimulation of plant growth (decreasing yields) and stimulation of algal growth in ground / marine water and eutrophication.

Groundwater contamination may inhibit groundwater dependant ecosystems.

The subterranean ecosystem (high level of ecosystem protection) and the Exmouth Gulf marine environment are of significant conservation value (Table 10).

### 9.4.4 Criteria for assessment

Relevant land and surface water quality criteria include:

- NSW EPA 1998. Environment & Health Protection Guidelines: On-site Sewage Management for Single Households.
- US EPA 2006. Process design manual, land treatment of municipal wastewater effluents. Report EPA/625/R-06/016.
- Department of Health (2011) Guidelines for the non-potable uses of recycled water in Western Australia.
- ANZECC & ARMCANZ (2000) – heavy metals criteria for irrigation use.
- Department of Environment Regulation (2014) Assessment and management of contaminated sites: Contaminated sites guidelines.

### 9.4.5 Applicant controls

The ENWWTP will not increase production and design capacity from the existing EWWTP 1ML/day. Applicant controls include:

- Area of reuse was 8.5ha of land (two ovals and roadside verge) and 4.9ha for the Exmouth Golf Course. The irrigation area has now expanded to 16.3ha with planned further expansion to approximately 24.8ha to include all of the Exmouth Golf Course.
- The reuse scheme will operate for consistently over the annual period (year).
- Three 350kL storage tanks store treated wastewater prior to irrigation.
- The Applicant has drafted the Exmouth Effluent Reuse Scheme Preliminary Nutrient Risk Assessment and Management Plan.
- The Applicant has committed to groundwater monitoring to assess impacts to the environment from discharges to land and subsequently groundwater.

- The Chlorination unit will meet the following Water Corporation standards:
  - i. Average dosing rate of 4mg/L;
  - ii. Maximum dosing rate of 20mg/L;
  - iii. Minimum accurate turndown = 10% of maximum 20mg/L;
  - iv. Wastewater flow = 17.4L/s for 16 hours per day; and
  - v. The average maximum dose rate will be 0.25kg/h and 1.25kg/h. A four 70kg chlorine cylinder (2 duty and 2 standby) configuration is proposed. The maximum cylinder changeover frequency will be 35 days at 4mg/L and 7 days at 20mg/L.

#### 9.4.6 Key findings

**The Delegated Officer has reviewed the information regarding Discharges to Land and has found:**

1. *The SoE reuse scheme will operate consistently for the annual period (year).*
2. *The ENWWTP production and design capacity will not change and will remain at 1ML/day once the works are completed.*
3. *There will be an increase in irrigation area from 8.5ha to 24.8ha which provides a greater surface area to irrigate the same 1ML/day volume of treated wastewater – a 291% increase.*
4. *This increase in irrigation area (surface area) and spatial separation from the proposed new ENWWTP reduces the risk from elevated nutrient levels.*
5. *DWER Contaminated sites has reviewed the Application and advise that:*
  - (a) *A hydraulic loading assessment indicates that sufficient land area is available to dispose of irrigated wastewater by evapotranspiration in Exmouth;*
  - (b) *If it is assumed that the average concentration of nitrogen produced by the WWTP will be 40 mg/L, insufficient land will be available in the proposed irrigation scheme for vegetation to completely remove this nutrient. Consequently, it is likely that nitrogen would accumulate in the soil profile in irrigated areas and would be periodically flushed into groundwater during heavy rainfall events; and*
  - (c) *Sufficient land area is available in the proposed irrigation scheme to remove phosphorus that is applied to soils in the wastewater irrigation scheme.*
6. *Further investigation is warranted regarding loading rates and groundwater monitoring cognisant with existing, and historic, nutrient overloading at the existing EWWTP and Reuse scheme. Further investigation through appropriate licence conditions will assess anticipated risk reduction from impacts to groundwater and marine environment with the expansion of the Reuse scheme; which has been designed, developed and implemented to improve current environmental impact risk and emissions.*

#### 9.4.7 Consequence

If discharges to land occurs, then the Delegated Officer has determined that the impact of

discharges to land will be mid level on-site impacts, low level off-site impacts local scale, minimal off-site impacts wider scale and specific consequence criteria are at risk of not being met. Therefore, the Delegated Officer considers the consequence of discharges to land to be **Moderate**.

#### 9.4.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of discharges to land could occur at some time. Therefore, the Delegated Officer considers the likelihood of discharges to land to be **Possible**.

#### 9.4.9 Overall rating of Discharges to Land

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of discharges to land is **Medium**.

### 9.5 Risk Assessment – Overtopping

#### 9.5.1 Description of Overtopping

Discharge of raw, partially treated and/ or treated sewage may occur from the ENWWTP ponds, a sludge drying hardstand and/ or pipes via overtopping or structural failure (*e.g. pipeline failure or pond wall collapse*). The discharges could contain contaminants including heavy metals, nutrients, pathogens, phenols and surfactants. Contaminants could impact the terrestrial ecosystem functions and also enter groundwater subterranean ecosystems. Overtopping is most likely associated with Cyclones or Monsoonal troughs.

It is not expected that Overtopping will occur during Commissioning as Commissioning is only for six (6) months and volumes are not expected to reach pond capacity. Commissioning will occur in the winter season (May – October 2020) and cyclones are not expected at this time. Although high rainfall does occur in May and June, refer to Figure 8, the collective total is less than 80mm which is not excessive. Overtopping will most likely occur during Operation.

#### 9.5.2 Identification and general characterisation of emission

The Premises receives a continuous inflow loading of sewage up to 1ML day subject to seasonal fluctuations. As sewage proceeds through the treatment ponds some contaminants undergo biological treatment and some contaminants settle to the base of the ponds to form sludge. Generally, as the sewage proceeds through the treatment ponds, the concentration of contaminants decreases. The quantity and quality of sewage, raw or treated, discharge via overtopping will vary depending on the nature of the containment overtopping at the time, location of failure within the sewage facility, hydraulic load being placed on the sewage facility, effectiveness of the sewage facility treatment process, capacity to direct wastewater away, ambient meteorological conditions including potential infiltration of stormwater within the sewage conveyance network and response time to resolve the overtopping. Rainfall events may cause overtopping especially when a cyclone strikes Exmouth; the unpredictable volume of rain during cyclones demonstrates that there may be reasonably foreseeable limitations to the proposed containment capacity at the Premises and overtopping is considered foreseeable as one-off events within this risk assessment and will likely be coincidental with and diluted by high volumes of rainfall (cyclones).

#### 9.5.3 Description of potential adverse impact from the emission

Soil contamination may inhibit vegetation growth and cause health impacts to fauna.

Groundwater contamination may inhibit groundwater dependant ecosystems and impact the

subterranean fauna. Depth to groundwater encountered at approximately 1.92m bgl at bore 2/15 to 6.42m bgl at bore 4/09 (based on information within works approval W6201/2018/1). Variation driven by tidal variation. Troglifauna and stygofauna are present in the immediate area and three Threatened/Priority Fauna (Spear beaked cave shrimp *Stygocaris stylfera*, Cave gudgeon *Milyeringa veritas* and Blind cave eel *Ophisternon candidum*) occur on the south west ENWWTP Premises boundary (Table 10).

#### 9.5.4 Criteria for assessment

Relevant land and surface water quality criteria include:

- National Environment Protection (Assessment of Site Contamination) Measure 1999; and
- ANZECC & ARMCANZ (2000) – freshwater and marine waters criteria.

#### 9.5.5 Applicant controls

The ENWWTP will not increase production and design capacity from the existing EWWTP 1ML/day. The new ENWWTP will maintain the current production and design capacity of 1ML/day. Hydraulic controls include:

- Each pond embankment will have a minimum of 200mm freeboard.
- All ponds to manage the 1 in 10 rainfall event (220mm of rain in 72 hours);
- Emergency spillways will be constructed between each of the ponds to allow flow rather than embankment breach and the winter storage pond will also have an emergency weir to mitigate embankment collapse; and
- 17ML winter storage pond capacity is sufficient to balance normal flows until 2075

#### 9.5.6 Key findings

**The Delegated Officer has reviewed the information regarding overtopping and has found:**

1. *The ENWWTP production and design capacity will be at 1ML/day once the works are completed.*
2. *All three ponds (Smart, Maturation and winter Storage ponds) are designed to cater for a maximum 1 in 10 year rainfall event (220mm of rain in 72 hours).*
3. *The winter Storage pond will need to use the 200mm freeboard to cope with this extra rainfall.*
4. *The 17ML winter storage dam capacity is sufficient to balance normal flows until 2075.*
5. *The Applicant has commissioned a detailed specialist subterranean environmental assessment which involved two separate sampling events which assessed the potential impacts from current and future operations on subterranean species as discussed in section 6.1 above.*
6. *The subterranean environmental assessment appears to have been (incorrectly) based on a model in which there would be 'no interaction with groundwater at the WWTP' despite the original application proposing 1 ML/discharge for up to one month per year.*
7. *The Delegated Officer therefore has concluded that the subterranean environmental assessment did not consider risks to stygofauna from overtopping events.*

8. *There is insufficient information in the application to enable an assessment of risks to stygofauna from overtopping.*

### 9.5.7 Risk Rating of Overtopping

There is insufficient information in the application to enable an assessment of risks to stygofauna from overtopping events. This discharge is therefore not currently authorised under this assessment. It is expected that the future licence application will contain sufficient information to permit an assessment of this discharge.

## 9.6 Risk Assessment – Discharge to unlined Infiltration / Evaporation pond

### 9.6.1 Description of Infiltration

The application initially sought to authorise discharge to the unlined Infiltration / Evaporation pond at the ENWWTP for 1 month per year. The application was later revised for discharge to occur only in extreme rainfall events (1 in 10 year). The pond has been constructed to operate with an infiltration rate of 1ML/day to match the new ENWWTP production and design capacity. The rate of seepage is subject to the hydraulic load within the pond, permeability of the base soils and nature of the hydrogeology (chief soils appear to be shallow loams on limestone with sands also overlying limestone indicated in section 8.5).

Sewage and sewage sludge wastes could contain contaminants including heavy metals, nutrients, pathogens, phenols and surfactants that may be mobilised within seepage generated from ponds containing sewage wastes. The nature of the containments within the seepage and interaction with the soil profile and hydraulic and biogeochemical processes will affect the distribution of containments within the unsaturated and saturated soils beneath the pond and in groundwater.

### 9.6.2 Identification and general characterisation of emission

As sewage proceeds through the treatment ponds some contaminants undergo biological treatment and some contaminants settle to the base of the ponds to form sludge. Generally, as the sewage proceeds through the treatment ponds, the concentration of contaminants decreases. The quantity and quality of sewage, raw or treated, discharge via seepage will vary depending on the nature of the containment pond at the time, hydraulic load being placed on the sewage facility, effectiveness of the sewage facility treatment process, capacity to direct stormwater away and ambient meteorological conditions including potential evaporation.

### 9.6.3 Description of potential adverse impact from the emission

Soil contamination may inhibit vegetation growth and cause health impacts to fauna.

Groundwater contamination may inhibit groundwater dependant ecosystems (Stygofauna/Troglofauna subterranean environment). Depth to groundwater encountered at approximately 1.92m bgl at bore 2/15 to 6.42m bgl at bore 4/09 (based on information within works approval W6201/2018/1). Variation driven by tidal variation. Troglofauna and stygofauna are present in the immediate area and three Threatened/Priority Fauna (Spear beaked cave shrimp *Stygiocaris styflera*, Cave gudgeon *Milyeringa veritas* and Blind cave eel *Ophisternon candidum*) occur on the south west ENWWTP Premises boundary (Table 10).

### 9.6.4 Criteria for assessment

Relevant land and surface water quality criteria include:

- National Environment Protection (Assessment of Site Contamination) Measure 1999; and

- ANZECC & ARMCANZ (2000) – freshwater and marine waters criteria.

### 9.6.5 Applicant controls

The Applicant has assessed infiltration from the ENWWTP Infiltration pond in their Application and the results are discussed in section 6.2 above.

### 9.6.6 Key findings

**The Delegated Officer has reviewed the information regarding infiltration and has found that;**

1. *The initial application sought approval to discharge to the infiltration/evaporation pond for up to one month in each year. This was later revised to rainfall events in excess of a 1 in 10 year rainfall event.*
2. *The Delegate Officer considers that it is foreseeable that multiple 1 in 10 year rainfall events could occur in a single year.*
3. *The Infiltration / Evaporation pond has been designed to infiltrate 1ML/day to match the production and design capacity of the new ENWWTP.*
4. *Depth to groundwater is approximately 1.92m bgl at bore 2/15 to 6.42m bgl at bore 4/09 (based on information within works approval W6201/2018/1). Variation driven by tidal variation.*
5. *The Applicant has committed to undertaking a monitoring program to include groundwater monitoring bores (both up and down gradient) to monitor ambient groundwater parameters to assess impacts from discharges to the environment from the ENWWTP. Bore design and location should form part of the future licence application.*
6. *The Applicant has commissioned a detailed specialist subterranean environmental assessment which involved two separate sampling events which assessed the potential impacts from current and future operations on subterranean species as discussed in section 6.1 above.*
7. *The subterranean environmental assessment appears to have been (incorrectly) based on a model in which there would be 'no interaction with groundwater at the WWTP' despite the original application proposing 1 ML/discharge to the infiltration ponds for up to one month per year.*
8. *The Delegated Officer therefore has concluded that the subterranean environmental assessment did not consider risks to stygofauna from infiltration.*
9. *There is insufficient information in the application to enable an assessment of risks to stygofauna from infiltration.*

### 9.6.7 Risk Rating of Infiltration

There is insufficient information in the application to enable an assessment of risks to stygofauna from infiltration. This discharge is therefore not currently authorised under this assessment. It is expected that the future licence application will contain sufficient information to permit an assessment of this discharge.

## 9.7 Risk Assessment – Odour

### 9.7.1 Description of Odour

#### Commissioning

It is intended that the ENWWTP will be operational while Commissioning of the ENWWTP occurs. Odour will be generated during this period therefore odour emissions for commissioning have been assessed under Commissioning aspects as per Table 13. Odour may be generated by the acceptance, storage and treatment of sewage wastes during commissioning. Given the ENWWTP will be a new ENWWTP it is not envisioned that sludge will be processed during commissioning.

#### Operations

Odour may be generated by the acceptance, storage and treatment of sewage wastes, removal and processing of sewage sludge. Sewage can contain high loads of BOD and can also contain aromatic molecules which can result in odour. Odour emissions can also be exasperated where overloading of the ENWWTP occurs which can be considered a foreseeable abnormal operating conditions.

### 9.7.2 Identification and general characterisation of emission

Odour will occur intermittently from ponds during the proposed commissioning and operation of the ENWWTP. Once the commissioning and operations starts odour emissions will occur from the treatment of sewage up to 1MD. Abnormal operating conditions may give rise to higher frequency and duration odour emission events.

Predominant wind at 9am is from the South and will push Odour north away from sensitive receptors.

Predominant wind at 3pm is from the North and North East and may push Odour towards sensitive receptors if wind conditions are strong.

### 9.7.3 Description of potential adverse impact from the emission

Odour has the potential to cause amenity impacts causing nuisance to local sensitive receptors and the general public. Meteorological factors are expected to have a significant influence on the pathway for odour emissions and therefore the potential level of impact on receptors. Residential receptors are expected to be most sensitive.

### 9.7.4 Criteria for assessment

No specific consequence criteria are applicable. The health, welfare, convenience, comfort and amenity of receptors are relevant in determining the consequence of odour. The closest residential receptors are 560m south west of the ENWWTP. Only one odour complaint in the last five (5) years has been recorded by DWER in relation to the existing EWWTP. The proposed new ENWWTP is located further away from sensitive receptors. It is not envisioned that any biosolids or resultant sludge will be generated during commissioning.

### 9.7.5 Applicant controls

#### Commissioning

This assessment has reviewed the controls set out in Table 18 below.

**Table 18: Applicant's proposed controls for odour.**

Control type	Infrastructure control	Operational control
Siting	Sewage facility siting	Distance to sensitive receptors and general treatment process

#### Operations

This assessment has reviewed the controls set out in Table 19 below.

**Table 19: Applicant's proposed controls for odour.**

Control type	Infrastructure control	Operational control
Siting	Sewage facility siting	Distance to sensitive receptors and general treatment process
Sewage and sludge treatment	Sewage facility siting	Treatment of sewage through the sewage facility under normal operating conditions.  Screenings are dewatered and will be conveyed to a covered bin and collected for regular disposal to landfill. Sludges are also placed in Geobags and processed on the sludge drying bed. Sludge solids will be transferred off site for disposal.

### 9.7.6 Key findings

**The Delegated Officer has reviewed the information regarding odour and has found:**

- 1. It is noted that the ENWWTP design will incorporate potentially significant odour sources such as the anaerobic pot during commissioning and operation. No information has been provided in the application regarding odour generation potential or odour modelling relating to the new ENWWTP.*
- 2. The Delegated Officer considers that odour emissions are possible and may impact nearby receptors.*
- 3. There is insufficient information to inform a detailed risk assessment of Odour at this time. The Delegated Officer has relied on assumptions in conducting the risk assessment below. It is expected that the future license application will contain sufficient information to enable assessment of operational odour emissions.*

### 9.7.7 Consequence

#### Commissioning

If odour occurs, then the Delegated Officer has determined that the impact of odour will be local scale minimal impacts to amenity. Therefore, the Delegated Officer considers the consequence of odour to be **Slight**.

#### Operations



If odour occurs, then the Delegated Officer has determined that the impact of odour will be local scale minimal impacts to amenity. Therefore, the Delegated Officer considers the consequence of odour to be **Slight**.

### 9.7.8 Likelihood of Risk Event

#### Commissioning

The Delegated Officer has determined that the likelihood of odour could occur at some time. Therefore, the Delegated Officer considers the likelihood of odour to be **Possible**.

#### Operations

The Delegated Officer has determined that the likelihood of odour could occur at some time. Therefore, the Delegated Officer considers the likelihood of odour to be **Possible**.

### 9.7.9 Overall rating of Odour

#### Commissioning

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of odour is **Low**.

#### Operations

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of odour is **Low**.

## 9.8 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 20 below. Controls are described further in section 11.

**Table 20: Risk assessment summary**

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
1.	Discharge to land	Direct discharge to land	Discharge to Land – SoE reuse scheme Contamination of land and groundwater	Infrastructure and management controls. Monitoring	Moderate consequence Possible <b>Medium risk</b>	Acceptable subject to proponent controls conditioned / outcomes based controls

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
2.	Overtopping of ENWWTP ponds	Untreated and treated wastewater	Vegetation and fauna adjacent to discharge area. Seepage through soil into groundwater (stygo fauna)	Infrastructure and management controls.	Insufficient information to enable risk assessment	Overtopping of the ENWWTP is not authorised under this assessment
3.	Infiltration	Seepage from Infiltration / Evaporation Pond	Seepage: lateral and vertical subsurface migration of leachate to groundwater Groundwater contamination (nutrient loading) and stygo fauna	Infrastructure and management controls Monitoring	Insufficient information to enable risk assessment	Discharge to the infiltration/evaporation ponds is not authorised under this assessment
4.	Odour	ENWWTP commissioning and operations	Air / wind dispersion Amenity impacts causing nuisance	Sitting and treatment process	<u>Commissioning and Operation</u> Slight consequence Possible likelihood <b>Low Risk</b>	Acceptable subject to proponent controls conditioned / outcomes based controls

## 10. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out below. The risks are set out in the assessment in section 10 and the controls are detailed in this section. DWER will determine controls having regard to the adequacy of controls proposed by the Applicant. The conditions of the Works Approval will be set to give effect to the determined regulatory controls.

### 10.1 Works Approval controls

- Condition 1, 2 and 3 allows construction of the new ENWWTP as per Table 2 in the works approval and requires a compliance document is submitted to the CEO after completion of the works.
- Condition 4 relates to authorised emissions from the proposed works as covered by conditions 1 and 5-9.
- Condition 6 to 9 relates to the Commissioning of the ENWWTP for six (6) months and includes notification of commencement of commissioning, commissioning for no longer than six months, commissioning monitoring and submission of a commissioning report and an odour condition mitigating odour emissions during Commissioning.

- Condition 10 and 11 requires accurate record keeping and outlines that a Works Approval Holder must comply with a Department Request within 14 days.

## 11. Determination of Works Approval conditions

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

The *Guidance Statement: Licence Duration* has been applied and the issued licence expires in 3 years from date of issue.

Table 19 provides a summary of the conditions to be applied to this works approval.

**Table 19: Summary of conditions to be applied**

Condition Ref	Grounds
Infrastructure and Equipment 1 - 4	These conditions are valid, risk-based and contain appropriate controls.
Emissions 5	This condition is valid, risk-based and consistent with the EP Act.
Commissioning 6 - 8	These conditions are valid, risk-based and contain appropriate controls.
Information 10 and 11	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.

## 12. Applicant's comments

The Applicant was provided with the draft Decision Report and draft issued Works Approval on 18 June 2020 with comments due 13 July 2020. The Applicant requested an extension to 31 July 2020 and provided comments on 27 July 2020 which are summarised, along with DWER's response, in Appendix 3.

## 13. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

*Based on this assessment, it has been determined that the Issued Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.*

**Steve Checker**  
**MANAGER WASTE INDUSTRIES**  
**REGULATORY SERVICES**  
 Delegated Officer  
 under section 20 of the *Environmental Protection Act 1986*

## Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Works Approval Application	W6201/2018/1	DWER records (1758641)
2.	Works Approval Supporting Information	W6201/2018/1	DWER records (1758643)
3.	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	DER 2015a	accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
4.	DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	DER 2015b	
5.	DER, August 2016. <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	DER 2016a	
6.	DER, November 2016. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	DER 2016b	
7.	DER, November 2016. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	DER 2016c	
8.	DWER, June 2019. <i>Guideline: Industry Regulation Guide to Licensing</i> . Department of Water and Environmental Regulation, Perth.	DER 2019b	

## Appendix 2: Stakeholder comments on Application

Submitter	Summary of comment	DWER response
SoE	<ul style="list-style-type: none"> <li>▪ The land to which the proposal refers is zoned as Local Scheme Reserves for Government Services – in this regard the local government agrees with the exemption claimed and that no development approval is required from the local government;</li> <li>▪ The local government is aware of this projects and is very much in support.</li> </ul>	Comments noted regarding no development approval required.
DoH	No comments provided	N/A
DBCA	<ul style="list-style-type: none"> <li>▪ DBCA notes that dewatering is required to enable the proposed pump station to be constructed will only be required for two months and will then cease.</li> <li>▪ DBCA notes that a detailed hydrogeological assessment including spatial modelling of potential groundwater drawdown has not been conducted for the proposal, however, would have provided useful information during the assessment. If additional groundwater modelling is being conducted, DBCA would appreciate being forwarded any results and reports.</li> <li>▪ It is noted that Bennelongia conducted a local and regional assessment of stygofaunal species that identified 19 species of stygofauna within the proposed impact area and reference sites, with one newly identified species currently only recorded from the proposed impact site. The species <i>Dussartyclops</i> sp.12 has only been identified from within the indicative impact</li> </ul>	Comments noted – dewatering will occur at the existing EWWTP, not the new proposed ENWWTP and therefore are not the subject of this works approval assessment. Advice has been passed on to the area of DWER regulating the dewatering activity under the RIWI Act.

Submitter	Summary of comment	DWER response
	<p>zone. DBCA notes that this species is considered likely to have a range extending more widely and is likely to be able to persist during the construction (dewatering) phase. It is acknowledged that all of the other stygofauna species were recorded in a number of bores within and outside of the proposed impact area.</p> <ul style="list-style-type: none"> <li>▪ DBCA notes that the blind gudgeon (<i>Milyeringa veritas</i>) and blind cave ell (<i>Ophisternon candidum</i>) both listed as vulnerable under the BC Act and the <i>Environmental Protection Biodiversity Conservation Act 1999</i> are known at Kubura Well. It is understood that Kubura Well where the species is currently known is considered by Bennelongia to be 'well north of the likely area of impact from drawdown'.</li> <li>▪ It does not appear that specific management measures are proposed in the dewatering management plan addressing potential impacts on threatened stygofauna species. DBCA recommends that a requirement for monitoring of groundwater levels in existing bores and caves such as Kubura Well is conditioned to ensure that groundwater levels are maintained and that proposed drawdown activities do not impact on threatened species habitat.</li> <li>▪ Should groundwater levels at Kubura Well bores be affected and considered attributable to the dewatering project then it is recommended appropriate measures are taken to immediately redress water levels.</li> </ul>	
NWA	<ul style="list-style-type: none"> <li>▪ The Committee notes the potential habitat impact for two EPBC listed species, the blind gudgeon (<i>Milyeringa veritas</i>) and blind cave ell (<i>Ophisternon candidum</i>). The</li> </ul>	Monitoring is discussed in the Decision Report and proposed to occur under the Licence that will be required to operate the new ENWWTP post

Submitter	Summary of comment	DWER response
	<p>Committee recommends ongoing monitoring of the site for potential impact on habitat and conservation status of the species. The subterranean fauna species and habitat within the Ningaloo Coast World Heritage Area are key component of the Outstanding Universal Values of the World Heritage area and a key reason for the World Heritage listing.</p> <ul style="list-style-type: none"> <li>▪ The committee notes the potential impacts on groundwater and marine environment from contamination. The committee recommends appropriate ongoing monitoring for site contamination and leaching into karst aquifers and the marine environment.</li> </ul>	<p>construction. This monitoring will encompass impacts from the ENWWTP and surrounding SoE reuse scheme – which includes the town ovals, verge and golf course.</p> <p>Further information relating to impacts on stygofauna has been requested to be included in the application for licence. Specific monitoring related to the potential impact on the habitat and conservation status of the EPBC listed species will be considered in the licence assessment.</p>

## Appendix 3: Summary of applicant's comments on risk assessment and draft conditions

Decision Document and Condition	Summary of Licence Holder comment	DWER response
<b>Works Approval</b>		
Table 4	<p>Treatment plant outlet changed to outlet of the storage dam.</p> <p>There will be two mag flow meters on the site being:</p> <ol style="list-style-type: none"> <li>1.) In the pressure main immediately upstream of the inlet works; and</li> <li>2.) On the discharge line downstream on the filter, unit to measure flow to the shire tank.</li> </ol>	Table 4 Column 1 changed to Outlet of the Storage Dam.
Table 4	1000kL/d is not defined – change to 1,000m <sup>3</sup> /d (ADWF)	Table 4 relates to commissioning monitoring and does not reference this volume. Unclear what the comment relates to
Table 2	<p>Pond Dimensions:</p> <p>There is always the possibility during construction that the layout may have to be adjusted, to avoid rock, minimise material import etc. We need the flexibility to do this to minimise CAPEX. Note design dimensions can vary.</p> <p>During commissioning and compliance reporting post-construction and post-commissioning the corporation will provide updates in accordance with supported by ASCONS</p>	Noted. Pond dimensions are not considered critical to



Decision Document and Condition	Summary of Licence Holder comment	DWER response
	Condition 2 (a) “where such departure does not increase risk to public health, amenity or the environment.	
Condition 8	Correct condition 8 monitoring to condition 7.	Corrected.
Duration of works approval	05/04/2021 to 26/10/2024 requested.	Commencement date of the works approval will align with grant. The request for duration to extend until 26/10/2024 is consistent with DWER policy and is accepted.
Monitoring point	Refer to drawings.	Noted
Other	<p>The Works Approval does not reference the installation of a Copper Ioniser at the Exmouth North WWTP to manage blue-green algae. The copper ioniser will work to control level of normal algae in the storage pond, with some minor residual copper In the treated wastewater. Noting that copper dosing already occurs at the old Exmouth WWTP.</p> <ul style="list-style-type: none"> <li>• <b>Copper Ioniser Location:</b> The copper ioniser would physically be located immediately west of the chlorination and filtration units, but the actual point of dosing will be immediately downstream of the maturation pond.</li> <li>• <b>Estimated Sampling Points with in the process.</b> No new sampling points will be added to the plant. Treated water samples can be taken immediately upstream and downstream of the filter unit.</li> </ul>	Approval for Copper Ioniser has been added to the Works Approval and Decision Document.

Decision Document and Condition	Summary of Licence Holder comment	DWER response
	<ul style="list-style-type: none"> <li>• <b>How much copper would be left in the stream supplied to the Reuse Scheme in ug/L etc</b> Based on information I have looked through for existing installations, the dose rate is likely to be about 0.48mg/L into the stream, with a residual not exceeding 0.3mg/L. For the purpose of approvals, I'd suggest going with the ADWG which suggests a residual of 1mg/L for aesthetic purposes. See Table 10.6 of ADWG.</li> <li>• <b>Containment measures</b> for the Copper Ioniser to prevent oversupply or loss of dosing reagent. There is no reagent as such. It is a copper ioniser, so copper is generated as required (like a pool chlorinator cathode and anode set up). When turned off, it is merely a box with some copper rods in it which is entirely harmless.</li> </ul> <p>Bluegreen algae management is essential to the operation of the Exmouth Re-use Scheme with the primary purpose to stop blocking of sprinkler heads etc.</p>	
<b>Decision Document</b>		
Section 4.1	<p>Expected <i>E.Coli</i> less than 100 cfu/100mL.</p> <p>Change to <i>E.Coli</i> less than 1,000 cfu/100mL (comply with</p>	Changed

Decision Document and Condition	Summary of Licence Holder comment	DWER response
	DoH low risk scheme)	
Section 9.8 and 6.1	<p>Effectively the emergency infiltration pond is not authorised to be used only under S72 notice and S75. This poses a risk of proceeding to construct an asset without effective protections. DWER need to provide more specific requirement on what information is required. Of note, Water Corporation must-have emergency discharge areas at WWTP's to protect the integrity of assets in extreme rainfall events and ensure treatment and sewerage and sustainable disposal is to the environment is not interrupted.</p> <p>DWER to confirm requirements in more detail around the Stygofauna assessment for the use of the emergency infiltration channel in accordance with relevant guidelines and or other advice from DBCA and Western Australian Museum. Reference the Technical Guidance EPA (December 2016) Subterranean fauna surveys.</p> <p>Use of Emergency Discharge Channel in an extreme rainfall event would be highly diluted Treated wastewater.</p> <p>For Exmouth North WWTP the corporation intends to</p> <ul style="list-style-type: none"> <li>• Quantify the stygofauna population's presence at the Exmouth North WWTP through monitoring wells.</li> <li>• Conduct eDNA analysis to see if species that are present at the proposed Exmouth North WWTP are considered regionally significant.</li> <li>• If they are found not to be regionally significant, the impacts of an emergency discharge are negligible</li> </ul>	<p>Proposed approach agreed. The Delegated Officer considers that as a minimum, confirmation will be expected from the proponents expert third party consultant of the risk posed to stygofauna from emergency discharge at the WWTP along with details of any monitoring or mitigation requirements to ensure that risk events are properly understood, monitored and managed to ensure that unacceptable impacts to stygofauna receptors do not occur.</p>

Decision Document and Condition	Summary of Licence Holder comment	DWER response
	<p>on species persistence. **This type of sampling was carried at Barrow island and the Exmouth Reuse Scheme.</p> <ul style="list-style-type: none"> <li>• This will be carried before construction/commissioning.</li> <li>• Stygofauna reports will be updated to detail the impact of use the emergency infiltration ponds in extreme rainfall events on identified stygofauna populations or species.</li> </ul>	
Section 4.1	<p>The WWTP is expected to achieve wastewater treatment for the following parameters.</p> <p>Wastewater expected quality should be based on the worst-case and best-case scenario. See updated ranges for parameters from the process expertise team for:</p> <p>BOD 40-50mg/L</p> <p><i>E. coli</i> &lt; 1000 cfu/100mL</p> <p>TSS 20-200mg/L (expected upon filtration is &lt;20mg/L but this level can range depending on efficiencies of the filter unit).</p> <ul style="list-style-type: none"> <li>• TSS does not pose a risk to the environment from supply to the Reuse Scheme as it is irrigation to land and does not have a pathway to enter groundwater by its physical nature. TSS would remain on the surface and would mix with soils.</li> <li>• Re-use Scheme irrigation water does not enter and</li> </ul>	Changed

Decision Document and Condition	Summary of Licence Holder comment	DWER response
	surface waters.	
4.1	<p>Does the specific detail of operation need to be listed because average 4mg/L of chlorine to disinfect wastewater will be difficult to achieve.</p> <p>Chlorination unit to achieve 0.2-2mg/L total chlorine as per DoH guidelines</p>	These were the details were provided in the Application, however the referenced parameter from DoH guidelines has been adopted instead as it is more relevant (0.2-2mg/L free chlorine following 30 minutes contact time)
9.7.5, Table 19	Screenings from inlet works will be conveyed to a covered bin, not geobag.	Changed
Page 1 Table 1 Page 4 2 <sup>nd</sup> paragraph Page 6 middle	Replace AWWF with ADWF PDWF (Peak Dry Weather Flow) PWWF (Peak Wet weather Flow)  AWWF is a misnomer. The acronym appears again on pages 4 and 6 where it should read that the “ADWF”. The design capacity of the plant is based on ADWF (1MLD), but hydraulically it is designed to pass the PWWF. (In fact it is designed to take the maximum flow that the pumps can deliver).	Changed
Various	Replace EWWTP with ENWWTP. ENWWTP (Exmouth North WWTP). Both the existing and proposed WWTPs are referred to as EWWTP and the reader needs to work out from the context which one is being referred to. Many times the words “new” or “existing” are used for clarity, but not always.	Review and update of Decision Report to better define.

Decision Document and Condition	Summary of Licence Holder comment	DWER response
Page 4 2 <sup>nd</sup> dot point Page 5 2 <sup>nd</sup> dot point, and a number of other places	Replace “pot” with “zone”. Although we have used the term anaerobic “pot” in the past it is preferred that we use the term anaerobic “zone”.	Changed
Table 3 page 5	Treated sewage. Replace with “treated waste water”. By the time it is treated it is no longer sewage.	This is the wording for Category 54 from the EP Regulations and is not able to be changed.
Page 5, 3 <sup>rd</sup> last dot point	Pump back. Replace with “gravity pipe”. The system is designed for the geobag filtrate to flow back to the facultative pond by gravity. It doesn’t go back to the head of the plant.	Changed
Page 6	Information used to “determine the size of the ponds”. Replace with “determine the size of the storage pond”. The process ponds are sized on the basis of process requirements, and reuse and other issues don’t come into the equation.	Changed
Page 6	“Winter storage pond will need to use the 200mm freeboard”. Replace with “Winter storage pond will need to use the 200mm freeboard if it happens to be full when the event occurs”. In general the storage pond should be operated as empty as possible throughout the year. It wasn’t actually designed as a winter storage, but as a storage to take the water for a period of one month during which the shire couldn’t take the water.	Changed
Page 10 Item 6	Typo. “planed” should be “planned”	Changed

Decision Document and Condition	Summary of Licence Holder comment	DWER response
Page 36	Correction. Replace wording with “The reuse scheme will operate all year round”. Elsewhere in the document, the storage pond is referred to a winter storage pond, but here it refers to year-round irrigation.	Pages 35-36-37 don't reference reuse scheme. It is unclear what this comment is referring to.
Table 1	AWWF incorrectly used	Changed
Section 2	9 <sup>th</sup> bullet – incorrect. There is no pump-back infrastructure for geobag filtrate. Drains by gravity to facultative pond. With gravity drainage of filtrate to facultative pond.	Changed
Section 2	“Coletenache” is not correct, nor is it relevant. Leave it out altogether. Commercial name is not relevant. Only thing that matters is that the lining will be a bituminous geomembrane	Changed
Table 19	Inlet solids are NOT screened and placed in Geobags – Screenings are removed from site to landfill. Screenings are dewatered and collected for regular disposal to landfill”.	Changed

# Attachment 1: Site Plan

