EPL 297
Monitoring Report
Darwin Crocodile Farm

Reporting Period: 1 June 2024 – 31 May 2025

Porosus Pty Ltd

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I Tanya Hollamby have reviewed this report and I confirm that to the best of my knowledge and ability all the information provided in the report is true and accurate.

Signature	
Date	30-05-25

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ACRONYMS

BoD	Biochemical oxygen demand
BoM	Bureau of Meteorology
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene
COD	Chemical Oxygen Demand
DO	Dissolved Oyxgen
EC	Electrical Conductivity
EMP	Environmental Management Plan
EPL	Environment Protection Licence
QA/QC	Quality Assurance and Quality Control
LOR	Limit of Reporting
mAHD	Metres with respect to the Australian Height Datum
mBGL	Metres Below Ground Level
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan (PFAS)
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
ORP	Oxidation Reduction Potential
WMPC	Waste Management and Pollution Control Act
WMPC Act	*Waste Management and Pollution Control Act*

1 INTRODUCTION

EcOz Pty Ltd was engaged by Porosus Pty Ltd (Porosus) to undertake groundwater, surface water, discharge and soil monitoring and assess the compliance in accordance with Environment Protection Licence 297 (EPL297) at Darwin Crocodile Farm (herein referred as to 'DCF') located at Lot 0000A Hundred of Strangways plan(s) LTO79/007 and Section 06094 Hundred of Strangways plan(s) LTO2018/012 45 Gulnare Rd, Bees Creek and 1340 Stuart Hwy, Bees Creek Northern Territory (NT) (herein referred as to 'the site'). Refer to Figure 1-1 for site location.

Monitoring Reports are required annually, as per Condition 57 of EPL297. These must be prepared in accordance with the NT EPA 'Guideline for Reporting on Environmental Monitoring'. Each report must include all requirements as set out in EPL297 Condition 58.

This annual monitoring report is the fifth Monitoring Report since commencement of EPL297 on 29 May 2020 and covers all water quality and soil monitoring undertaken for the reporting period starting 1 June 2024 and ending 31 May 2025 (herein referred to as the 'reporting period').

1.1 Purpose and scope

This monitoring report is prepared in accordance with the following EPL297 conditions:

Condition 57

The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, by 31 May each year.

Condition 58

The licensee must ensure that each Monitoring Report:

58.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';

58.2 includes a tabulation of all monitoring data required as a condition of this licence;

58.3 calculations of maximum total annual loads of Nitrogen and Phosphorous required as a condition of this licence;

58.4 reports on trigger value exceedances and investigations required as a condition of this licence;

58.5 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available); and

58.6 includes an assessment of environmental impact from the activity.

The EPL licence does not in any way relieve the licence holder from its obligations to comply with the Waste (WMPC Act), Management and Pollution Control Act.

1.2 EPL 297 compliance monitoring and reporting

EPL297 authorises discharge of wastewater to land from the authorised discharge point, see Figure 1-2. The authorised discharge point is located at the southern end of the farm, where all wastewater from farm operations is directed. From here, the water is pumped to the irrigation area that encompasses the northern portion of the farm property, where it is irrigated onto fodder crops.

To monitor for potential environmental impacts from this activity, surface water, groundwater and soil monitoring at DCF is undertaken in accordance with EPL297 and all monitoring related conditions of the

licence; i.e. Conditions 41 to 46 to ensure that operations do not impact waterways downstream i.e. Bees Creek, Elizabeth River and Darwin Harbour or groundwater beneath the site. The DCF Irrigation Management Plan (EcOz 2020) details the monitoring sites, physical (field) and laboratory parameters measured, sampling methods and procedures. Monitoring site locations are shown below in Figure 1-3 and detailed in Table 5-1. Parameters to be measured, monitoring frequency and trigger values - taken from Attachment A of EPL297 - are also outlined below in Table 5-2, Table 5-3, Table 5-4 and Table 5-5. In addition to the above, the volumes and timing of irrigated water application must be recorded; as per EPL297 Condition 37.

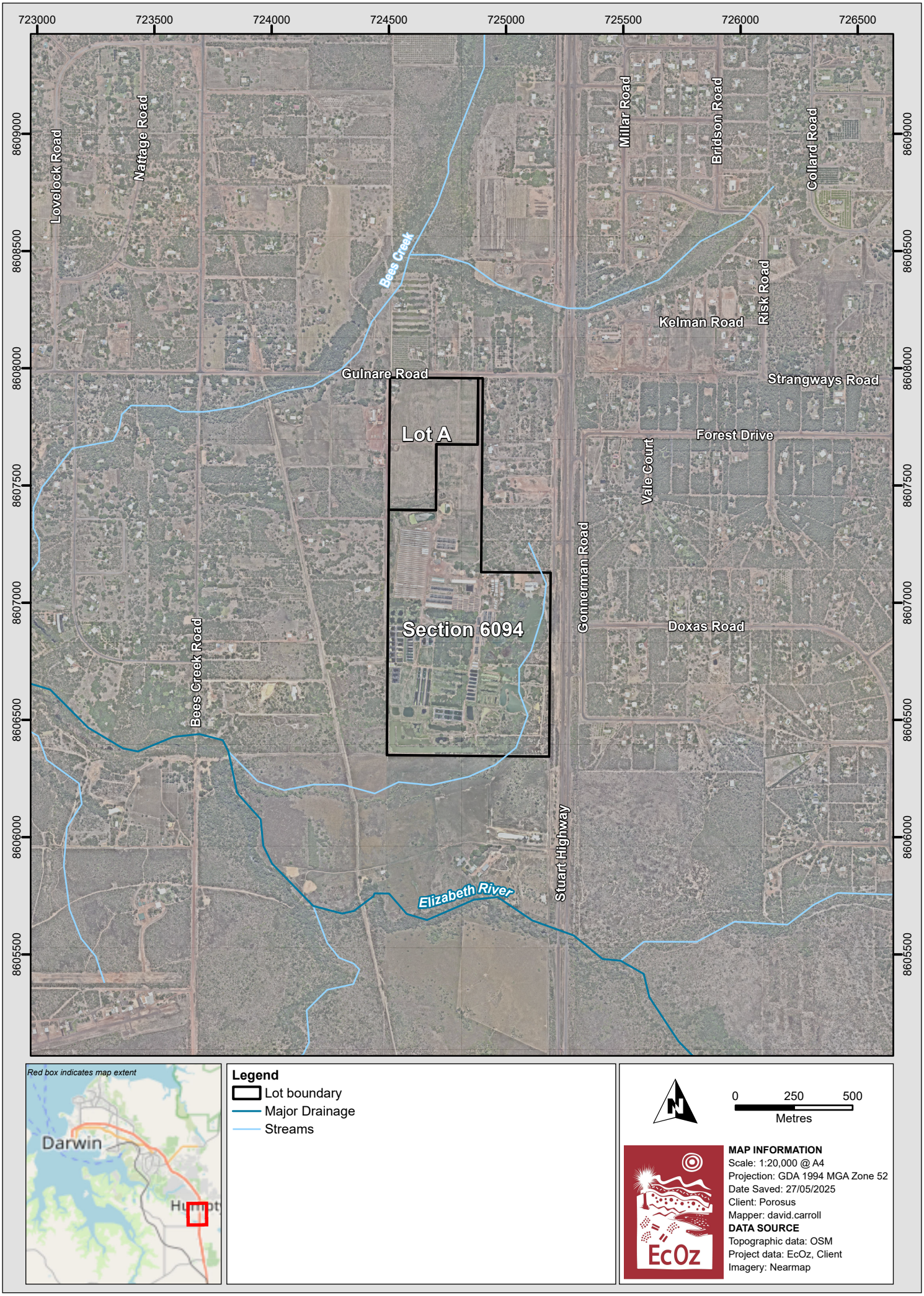
1.2.1 Unauthorised discharge

Any off-site discharge of wastewater from DCF is a non-compliance against Conditions 27 and 35 of EPL297. Currently during the wet season, the volumes of water flowing to the DCF southern boundary are more than what can be irrigated onsite in accordance with EPL297. Therefore, for extended periods during the wet season (depending on rainfall) water in the ponds along the southern boundary of the DCF site overflow and discharge over a spillway into the neighbouring property to the south. From here, the water then flows into the Elizabeth River. This passive discharge contains a component of farm wastewater, and both stormwater from across the DCF site and a significant proportion of stormwater from off-site areas east of the Stuart Highway. Incidences of this off-site discharge must be recorded as a non-compliance as per Condition 49, and reported to the NT EPA, as per Condition 50.

Given the frequency and duration of these unauthorised discharges during the wet season, the NT EPA was consulted about how to approach non-compliance reporting. The following clarifications were provided in a letter from the NT EPA on 15 October 2020:

- Each unauthorised discharge would be considered a separate event, and the non-compliance conditions would apply each time.
- The duration of each unauthorised discharge is from the time the discharge starts to the time it ceases. If the discharge is occurring during the notification, then Condition 51.2 would require it to be stated when the non-compliance began and that it is ongoing. Conditions 51.3, 51.6 and 51.7 will be key pieces on information if the discharge is ongoing.
- Condition 51.8 requires the Licensee to nominate a date for when an incident investigation report will be submitted to the NT EPA. It is suggested that if the discharge is ongoing then the nominated date is set for a period of time after discharge ceases or is expected to cease.
- Combining multiple discharge events in a single investigation report is acceptable provided that there is not considerable lag following the first event and that each discharge event is investigated adequately.

During the reporting period, off-site discharge over the southern DCF boundary commenced on 3 December 2024. The NT EPA was notified of this discharge in an email to waste.ntepa@nt.gov.au on 3 December 2024. Information addressing the Condition 51 requirements were provided, which concluded that an investigation report on the non-compliance would be provided upon completion of the discharge. An incident investigation report is provided for this non-compliance in Section 8.1.



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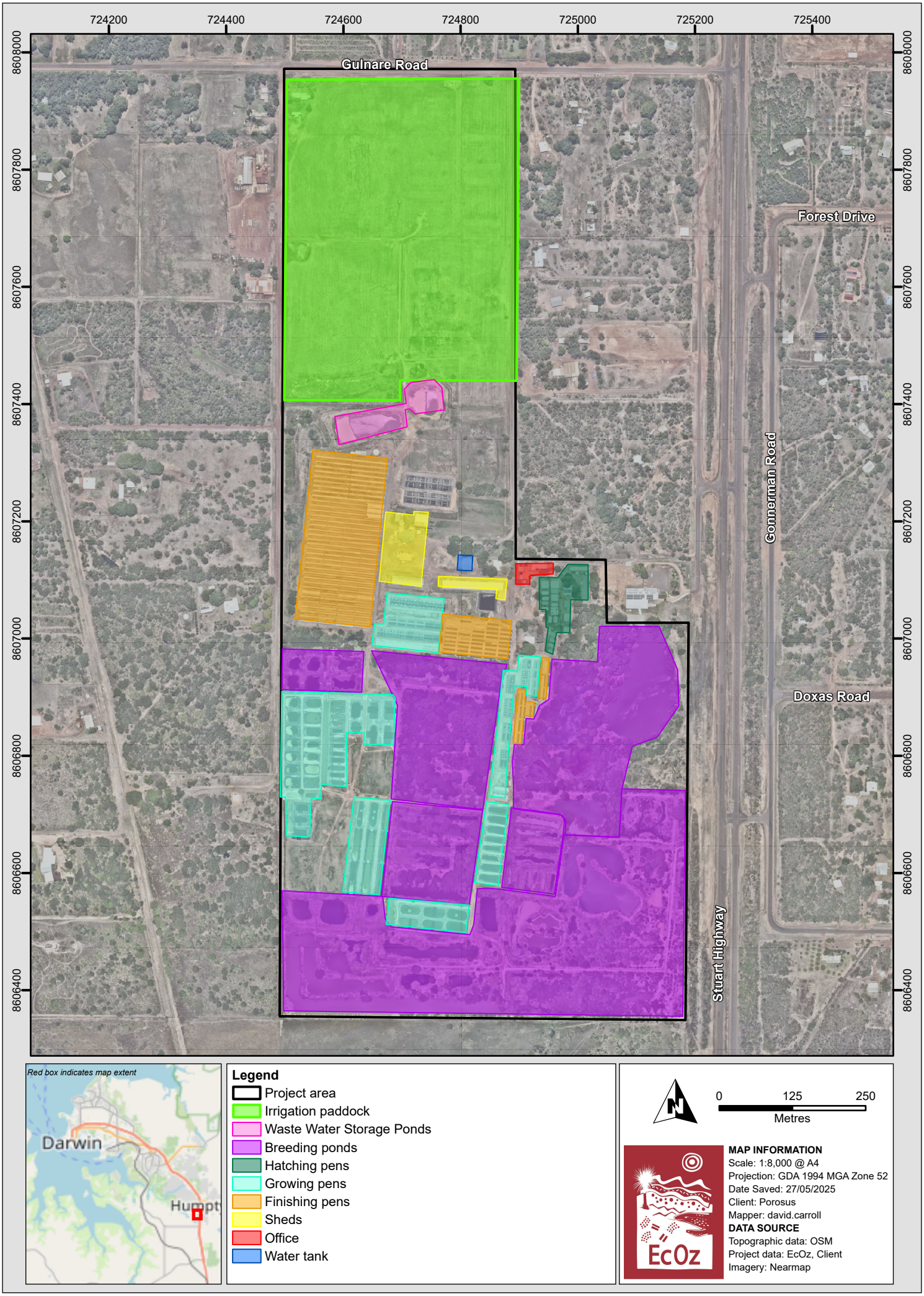
Layout: Figure 2-1. Map showing site location

Figure 1-1. Site Location



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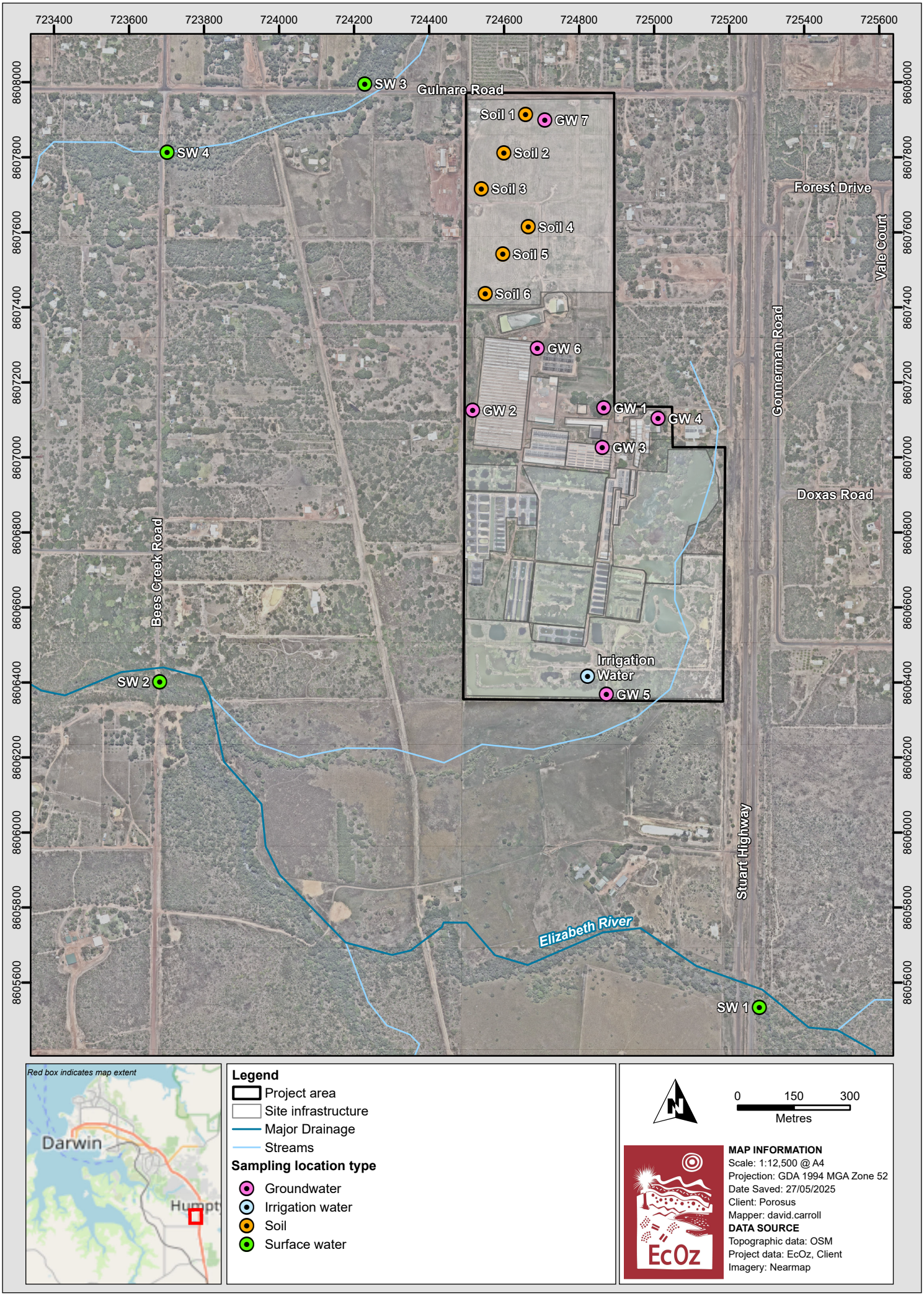
Layout: Figure 2-2. Map showing site layout and infrastructure

Figure 1-2. Site Layout



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Layout: Figure 7-1 Map showing monitoring locations

Figure 1-3 Monitoring locations

2 DCF OPERATIONS OVERVIEW

The information provided in Section 2.1, Section 2.2, Section 2.3 is a brief overview of DCF operations, water supplies and wastewater flows. For details regarding the potential contaminants at DCF, the potential migration pathways and receptors, see the EcOz (2021) Conceptual Site Model report. For more detail, refer to the following documents:

- EcOz 2019, *Supporting information for the Darwin Crocodile Farm EPL application*, report prepared for Porosus Pty Ltd by EcOz Pty Ltd, October 2019.
- EcOz 2020, *Irrigation Management Plan, Darwin Crocodile Farm*, report prepared for Porosus Pty Ltd by EcOz Pty Ltd, February 2020.
- EcOz 2021, *Conceptual Site Model, Darwin Crocodile Farm*, report prepared for Porosus Pty Ltd by EcOz Pty Ltd, June 2021.

2.1 Farm operations

The crocodile production process at DCF is summarised as follows:

- Eggs are collected from breeding pens and lagoons (in addition to wild-collected eggs) and are assessed and cleaned in egg laboratory, with viable eggs transferred to the incubator room.
- Animals hatch in incubator then are immediately transferred to hatchling pens.
- When animals are about one year old, they are transferred to grow-out pens.
- When animals approach a size suitable for market, they are transferred to finishing pens for 6 - 12 months to ensure best possible skin and meat condition.
- Animals are harvested from the finishing pens, prepared for transport, and then sent to separate facility for further processing.

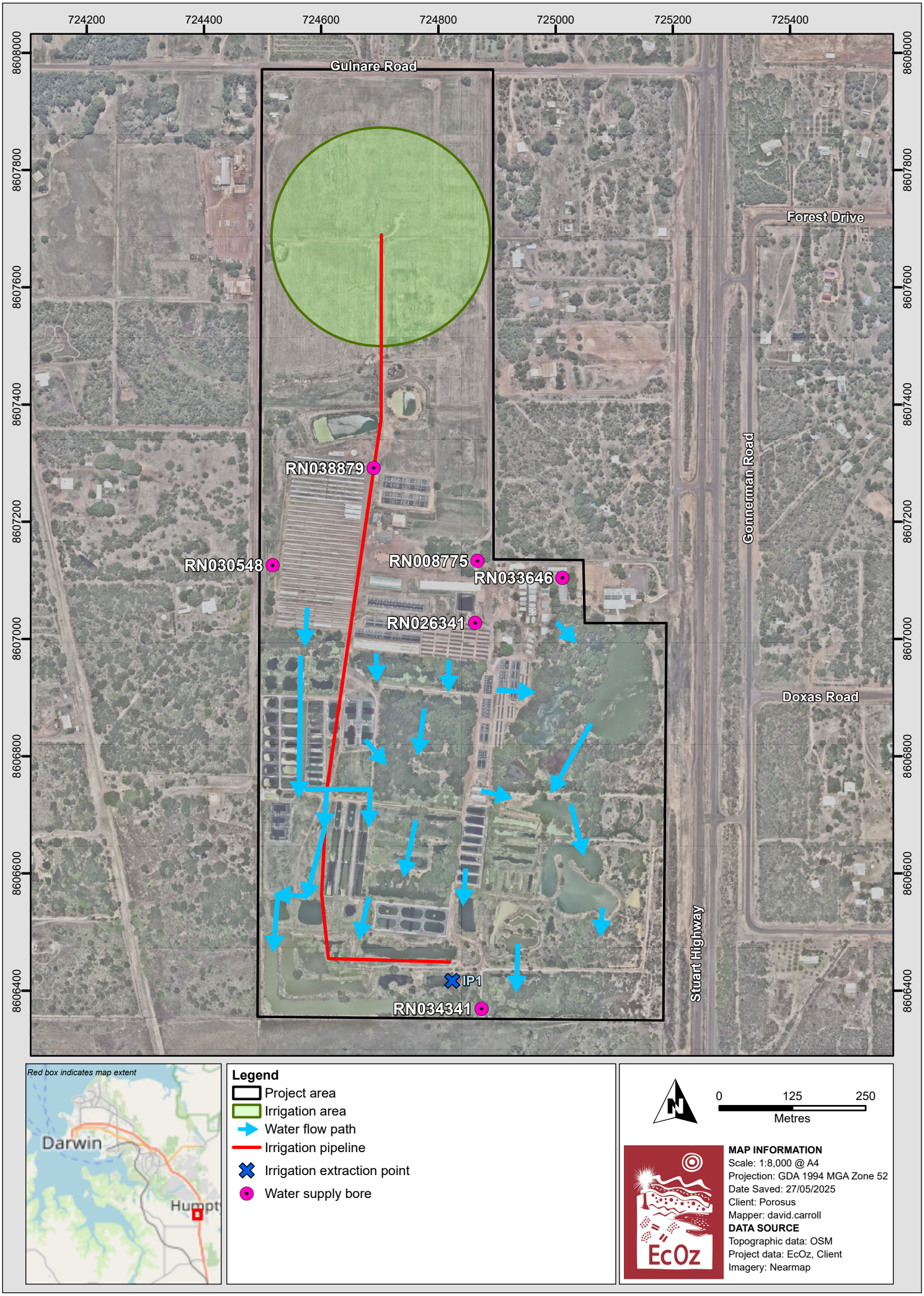
Currently DCF harvests 200 - 300 animals per week for processing to produce raw crocodile skins, meat products and other saleable by-products. The processing is undertaken at a neighbouring processing facility (within the same lot). It operates as a separate business and manages wastewater separately through a septic system.

2.2 Water supply and usage

DCF currently holds a groundwater extraction licence (Licence no. WSF01) which entitles, a maximum extraction entitlement of 700 ML/year combined from seven (7) on-site water supply bores (GW1-GW6 and GW7) (no extraction from GW7 was been undertaken for the reporting period) is allowed for the site (refer Figure 1-3 and Table 2-1 for groundwater bore details). Volumes must be reported to NT Water Resources Division as per the WSF01 licence conditions.

The aquifer utilised is in the Wildman Siltstone Formation. Each bore either specifically supplies a particular section(s) of the farm or supplies water directly to water storage facilities, which it then distributes as required to different farm areas for general crocodile husbandry. The primary use of water is for regular flushing of the different pens for maintenance of hygiene and health of individuals. Due to the high quantities of water required during the cleaning of the pens, there are two water storage facilities: a 2.5 ML water tank and a 1.5 ML storage dam. These storage facilities allow for the pens to be cleaned and refilled experientially as crocodiles require access to clean water. On average, the water usage at DCF is estimated at 1,600 KL/day. For the onsite office and administration facilities potable water is supplied (average 770 KL/month). All groundwater bores on DCF have an automated flow meter to record the volumes of water extracted.

Bore locations and movement of water flow through project area are shown in Figure 2-1.



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Layout: Figure 4-1. Map showing bores, water flow paths and proposed irrigation infrastructure

Figure 2-1. Map showing bores, water flow paths and proposed irrigation infrastructure

Table 2-1. Groundwater bore details

Registered Bore Number	EPL297 Monitoring Bore ID	DCF Bore Name	Bore Purpose	Latitude	Longitude
RN008775	GW1	Lindsay's bore	Extracting bore	-12.591672	131.069881
RN030548	GW2	West Wing bore	Extracting bore	-12.591763	131.066668
RN026341	GW3	Main bore	Extracting bore	-12.592629	131.069854
RN033646	GW4	Hatchery bore	Extracting bore	-12.591921	131.071218
RN034341	GW5	Murwangi bore	Extracting bore	-12.598577	131.070002
RN038879	GW6	Recirculation bore	Extracting bore	-12.590256	131.068242
RN05932	GW7	Monitoring bore	Monitoring bore	-12.5847531	131.068383

Water volume is mostly extracted from GW3 (78.5%), followed by GW5 and GW6 (9.7% and 7.7% respectively). Volume extracted per bore are presented in Table 2-2 below.

Table 2-2. Water volumes extracted for current (June 2024 – May 2025) and previous (June 2024 – May 2025) reporting periods

Registered Bore Number	EPL297 Monitoring Bore ID	Total water extracted (kL) 2023/24	% of total	Total water extracted (kL) 2024/25	% of total
RN008775	GW1	9,881	1.5%	10,055	1.3%
RN030548	GW2	0	0%	1	0%
RN026341	GW3	548,321	81.5%	611,767	78.5%
RN033646	GW4	0	0%	1	0%
RN034341	GW5	71,673	10.7%	75,811	9.7%
RN038879	GW6	42,570	6.3%	59,869	7.7%
RN025932	GW7	0	0%	21,796	2.8%

Annual extraction volumes have remained below 700 ML/year for the periods from 2020 - 2025 presented in Table 2-3 below. Volumes extracted 2024 – 2025 met the licence requirements. However, extracting volumes for April 2025 have not been provided by the client at the time of this report.

Table 2-3. Monthly volume extracted from extracting bores for current (June 2024 – May 2025) and historical reporting periods (June 2020 – May 2024)

Month	Volume extracted (kL)				
	2020/21	2021/22	2022/23	2023/24	2024/25
May	56,744	70,459	55,015	56,123	64,669
June	50,520	61,841	59,574	61,350	60,667
July	69,251	67,554	68,443	51,660	55,041
August	63,077	54,507	62,375	63,580	60,768

Month	Volume extracted (kL)				
	2020/21	2021/22	2022/23	2023/24	2024/25
September	48,509	53,641	58,375	55,184	51,783
October	44,292	44,495	49,722	61,171	51,783
November	49,079	39,481	60,994	56,945	51,029
December	33,072	37,279	61,161	53,545	47,209
January	41,817	40,655	57,482	42,424	54,261
February	40,446	41,203	51,109	57,448	52,048
March	57,598	55,702	58,311	59,294	53,984
April	53,544	62,954	50,352	53,721	47,210
Total	**607,950**	**629,772**	**692,913**	**672,445**	**656,049**

2.3 Wastewater flow

Water obtained from the bores is pumped through the hatchery, grower and finishing pens. The effluent from each stage discharges into numerous breeding lagoons and constructed earthen ponds on the property (Figure 1-2). The water flows through the breeding areas in a southerly direction before being detained in a series of large storage ponds on the southern boundary. This flow of wastewater through the lagoons facilitates a bioremediation process reducing the nutrient and microbial levels in the wastewater.

The crocodile farming pens have been constructed to prevent ingress of stormwater runoff; however, the breeding areas are not constructed to prevent stormwater inundation. Therefore, as the farm effluent moves through the breeding lagoons and the earthen ponds, the wastewater is subject to dilution from stormwater. This assists with the bioremediation process.

Water retained in the storage ponds on the southern boundary of the site is pumped to the irrigation area occupying the northern portion of site, where it is used to irrigate pasture grasses.

During the wet season, water at times flows over a spillway located along the southern boundary of the DCF into the neighbouring property to the south, from where it then flows into the Elizabeth River. This passive discharge contains a component of farm wastewater, along with stormwater from across the DCF site, as well as a significant proportion of stormwater from offsite areas east of the Stuart Highway.

A new wastewater storage facility was completed in November 2022 which aims to increase farm storage capacity of waste waters and reduce unauthorised discharges. Currently these ponds collect wastewater from pens prior to being discharged though the facilities drainage system to the southern boundary. It is the future intention that these new ponds will serve as the irrigation source with all sites run off/ drainage and water from the existing irrigation source pond being pumped to these ponds prior to irrigation. This will allow irrigation to occur throughout the dry season when historically this has not been possible due to the irrigation source pond containing breeding crocodiles.

3 ENVIRONMENTAL SETTING

3.1 Climate

The region has a tropical monsoonal climate, with distinct wet and dry seasons, and little variation in temperature. The wet season is characterised by higher humidity and rainfall and occurs between October and April. The dry season extends from May to September and is characterised by lower humidity and very little rainfall.

Climate observations are made by the Bureau of Meteorology (BoM 2025). The closest BoM weather monitoring station to the site with long-term data is McMinns Lagoon (station number No. 14219). Mean annual rainfall recorded at this station for all years (1976 – 2025) is 1,892.3 mm, with the highest rainfall occurring in January (463,6 mm) and the lowest in July (0.7mm) (see Table 3-1).

Table 3-1. Mean annual rainfall all years 1976 - 2025 (BoM station No. 14219)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	463.6	378.6	326.3	106.6	16.8	1.2	0.7	3.4	16.9	79.4	181.6	307.8

Rainfall during the reporting period

Figure 3-1 shows monthly rainfall taken from the McMinns Lagoon BoM station 14219 (BoM meteorology, 2025) for the reporting period (June 2024 – May 2025) and historical average rainfall (1976 - 2025). Results show that monthly total rainfall for the reporting period was above the average during September, October 2024 and April 2025; while monthly total rainfall during October, December, January, February and March, were below the historical average.

Total rainfall for the reporting period was lower than the historical average (1,638 mm and 1,702 mm respectively).

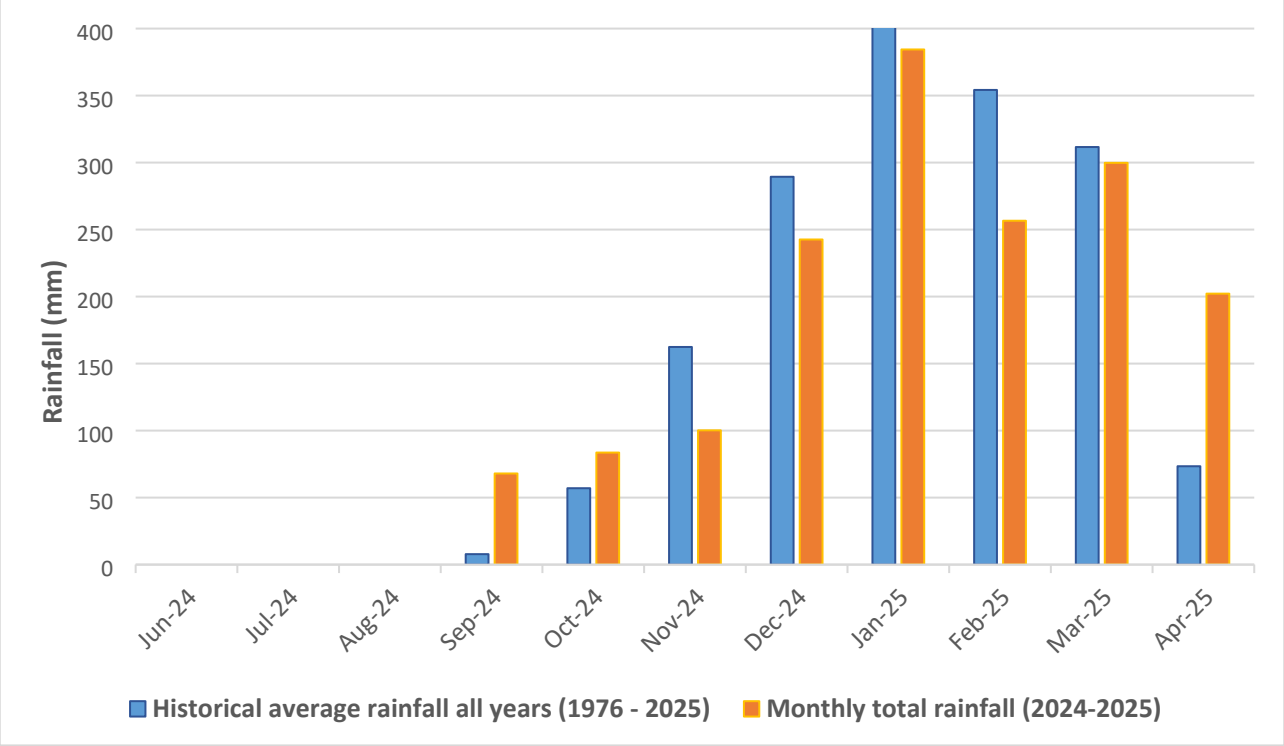

Figure 3-1. Monthly rainfall (BoM station 14219)

3.2 Topography and landform

DCF is located on an area that goes from 25 – 15 m AHD sloping towards the south of the site. The site bordered by privately owned lots zoned Rural Living to the north, south and west, with the Stuart Highway bordering the site to the east. Many of the surrounding lots are rural subdivisions, used for rural living, while some lots north and south of DCF are used for horticultural and agricultural purposes. The lots to the north of DCF are separated by Gulnare Road. The site is located approximately 1.7 km east of the edge of the Darwin Harbour Conservation Area. The Howard sand plains conservation area is located approximately 2.5 km east of DCF on the opposite side of the Stuart Highway.

3.3 Surface water

Surface water from the operational farm area of the site sheet flows towards the southern boundary of the site. The sheet flow continues into the neighbouring property where any un-retained runoff would enter a minor creek which feeds into the Elizabeth River. The irrigation area sheet flows to the northwestern boundary of the site towards the drainage lines on Gulnare Road (approximately 300m from site) which feed into a separate arm of the Elizabeth River. The upper reaches of the Elizabeth River (part of the Darwin Harbour Conservation Area) are located approximately 1.7km west of the site. There is currently a large stormwater culvert under the Stuart Highway directly adjacent to the southeastern border of the site, which feeds large volumes of stormwater into the site during rain events. Works are currently underway with the relevant stakeholders to relocate this drainage line around the property boundary, so the run-on does not have impacts on the site wastewater management.

3.4 Groundwater

The property lies within the Darwin Rural Water Control District and groundwater extracted, as granted by the licence, is sourced from the South Alligator groundwater system.

4 DISCHARGES

Irrigation was undertaken during the late dry season/early wet season period and was timed to occur when soils in the irrigation area were not saturated to avoid runoff. There was a significant irrigation discharge in February 2025, this corresponds with a period of lower-than-average rainfall (Figure 3-1).

Table 4-1 outlines the discharges that occurred to land i.e. irrigation applied to the irrigation area using water pumped from the authorised irrigation point. The total irrigation volume for the reporting period (9516 ML) was lower than the irrigation volume from the previous reporting period (June 2023 - May 2024) (11.931 ML). Refer to Appendix A for irrigation log.

Table 4-1. Irrigation discharges during reporting period June 2024 - May 2025

Month	Irrigation (ML)
Jun 2024	0
Jul 2024	0
Aug 2024	0
Sep 2024	0
Oct 2024	4,453
Nov 2024	4,019
Dec 2024	1,044
Jan 2025	0
Feb 2025	0
Mar 2025	0
Apr 2025	0
May 2025	0
Total	9516

5 MONITORING UNDERTAKEN

Monitoring was undertaken as per EPL297 requirements using the methods outlined in the DCF Irrigation Management Plan (EcOz 2020). Refer to Section 5.3 for a summary of the methodology.

5.1 Monitoring sites

Surface water, groundwater bores and soil monitoring sites are shown in Figure 1-3 and detailed in Table 5-1.

Table 5-1. Surface water, groundwater and soil monitoring details.

Site ID	Context and Purpose	GPS Coordinates	
		Latitude	Longitude
Surface Water Sites			
Irrigation Source	"Authorised discharge point" listed in EPL297. Located at southern end of DCF property. All wastewater from farm operations flow to this point. Represents water applied to the irrigation area occupying the northern portion of DCF. Also represents passive discharge water quality flowing across the DCF southern boundary during the wet season.	-12.598208	131.069494
SW1	Elizabeth River upstream monitoring site – located upstream of DCF passive discharge from southern boundary.	-12.606080	131.073815
SW2	Elizabeth River downstream monitoring site – located downstream of DCF passive discharge from southern boundary.	-12.598357	131.059043
SW3	Bees Creek upstream monitoring site – located upstream of runoff from DCF irrigation area.	-12.583912	131.063956
SW4	Bees Creek downstream monitoring site – located downstream of runoff from DCF irrigation area.	-12.585606	131.059124
Groundwater Bores			
GW1	RN008775, Lindsay's bore used to supply water to farm operations.	-12.591672	131.069881
GW2	RN030548, West Wing Bore used to supply water to farm operations.	-12.591763	131.066668
GW3	RN026341, Main bore used to supply farm operations.	-12.592629	131.069854
GW4	RN033646, Hatchery bore used to supply water to farm operations.	-12.591921	131.071218
GW5	RN034341, Murwangi bore used to supply water to farm operations.	-12.598577	131.070002
GW6	RN038879, Recirculation bore used to supply water to farm operations.	-12.590256	131.068242
GW7	RN025932, Monitoring bore – used for groundwater quality monitoring beneath irrigation area. Bore is not equipped and not used for water supply.	-12.584753	131.068383
Soil Sites			
Soil 1	Soil sites are spread across the irrigation area	-12.584615	131.067910
Soil 2		-12.585550	131.067385
Soil 3		-12.586416	131.066839
Soil 4		-12.587329	131.067996

Soil 5		-12.587991	131.067379
Soil 6		-12.588947	131.066995

5.2 Monitoring frequency, parameters and trigger values

5.2.1 Irrigation

Authorised Irrigation Monitoring program for irrigation water was undertaken for the parameters and trigger values as outlined in Table 5-2 below.

Table 5-2. Monitoring program and trigger values for irrigation water

Monitoring Sites	Parameter	Trigger Values	Sampling Frequency
Authorised Irrigation Source (IS) Latitude -12.598208° Longitude 131.069494°	pH	6-9 [1]	Monthly when discharging and quarterly when not discharging
	EC	1,300 µS/cm [1]	
	Total N	125 mg/L [1]	
	Total P	12 mg/L [1]	
	E.coli, Enterococci and Total coliforms	1,000 CFU/mL (fodder) [1]	
	Cations and Anions (Ca, Mg, Na, K, SO4, Cl, CO_3 + HCO_3)	N/A	

[1] Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 3 – Chapter 9 – Primary Industries (ANZECC, 2000).

5.2.2 Groundwater

Monitoring program for groundwater was undertaken for the parameters and trigger values as outlined in Table 5-3 below.

Table 5-3. Monitoring program and trigger values for groundwater sites

Monitoring Sites	Parameter	Trigger values	Sampling frequency
GW1, GW2, GW3, GW4, GW5, GW6 and GW7	Standing Water Level	N/A	Monthly
	pH	7-8.5 [1]	Quarterly
	EC	400 µS/cm [1]	
	Total N	Any increase from previous monitoring round	
	Total P		
	E.coli, Enterococci and total coliforms		
	Cations and Anions (Ca, Mg, Na, K, SO4, Cl, CO3 and HCO3)	N/A	

[1] Darwin Harbour Water Quality Objectives for groundwater.

5.2.3 Surface water

Monitoring program for irrigation water was undertaken for the parameters and trigger values as outlined in Table 5-4 below.

Table 5-4. Monitoring program and trigger values for surface water sites

Monitoring sites	Parameter	Trigger values	Sampling frequency
SW1*, SW2, SW3* and SW4	pH	6.0-7.5 * [1]	3 times during the Wet season (start, during, and end)
	EC	200µS/cm * [1,2]	
	Total N	0.23 mg/L * [1,2]	
	Total P	0.01mg/L * [1,2]	
	E.coli, Enterococci and total coliforms	Any increase from previous monitoring round	

*Trigger values not applicable.

[1] Darwin Harbour Water Quality Objectives for freshwater rivers and streams.

[2] If the concentration at SW1 is greater than the trigger value then the concentration at SW1 becomes the trigger value.

5.2.4 Soils

Monitoring program for soil was undertaken for the parameters and trigger values as outlined in Table 5-5 below.

Table 5-5. Monitoring program and trigger values for soil sites

Monitoring sites	Parameter	Trigger values *	Sampling frequency
SS1, SS2, SS3, SS4, SS5, SS6	pH	6-8	Annually
	EC	Any increase from previous round	
	Total N		
	Total P		
	E.coli, Enterococci and total coliforms		

* B horizon results

5.3 Sampling procedures

All sampling was undertaken in accordance with the DCF Irrigation Management Plan (EcOz 2020) and the following standards and guidelines:

- Australian/New Zealand Standard on Water Quality Sampling - *Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* (AS/NZS 5667.1:1998), Standards Australia, New South Wales.
- Australian Standard/New Zealand Standard on Water Quality Sampling - *Part 4: Guidance on sampling from lakes, natural and manmade* (AS/NZS 5667.4:1998), Standards Australia, New South Wales.
- Australian/New Zealand Standard on Water Quality Sampling - *Part 6: Guidance on sampling of rivers and streams* (AS/NZS 5667.6:1998), Standards Australia, New South Wales.
- Australian Standard/New Zealand Standard on Water Quality Sampling – *Part 10: Guidance on sampling of waste waters* (AN/NZS 5667.10:1998), Standards Australia, New South Wales.
- Australian/New Zealand Standard on Water Quality Sampling – *Part 11: Guidance on sampling of*
- *groundwater* (AN/NZS 5667.11:1998), Standards Australia, New South Wales.
- Department of Environment and Conservation 2004, *Use of Effluent by Irrigation; Environmental Guidelines*, Department of Environment and Conservation (DEC), New South Wales Government, Sydney.

All sampling was undertaken by either EcOz Environmental Consultants, or Maurita Fleming from Porosus, who has received on-site training in sampling methods from EcOz Senior Environmental Consultant Amy Pilmore, as well as on-going guidance from EcOz. Details about sampling methodology is summarised in Table 5-6 below.

Table 5-6. Sampling methodology

Procedure	Detail
Surface water sampling	Samples collected using a long pole with a lab-supplied sample bottle on the end. Sample was decanted from this bottle into the ALS-supplied bottles. Field parameters (i.e. pH, temperature, dissolved oxygen (DO), oxidation reduction potential (ORP), turbidity and electrical conductivity (EC)) were measured directly in the water body using a water quality meter.
Groundwater sampling	Groundwater bores samples were undertaken with pump, with the exemption of GW7. Pump was turned on and the water ran for at least 10 min and until field parameters stabilised. Field parameters were recorded, and laboratory samples collected directly into the laboratory supplied bottles. GW7 was sampled using a low flow pump, and purged until stable field readings were achieved prior to recording the field parameters and collecting samples for laboratory analysis.
Soil sampling	Soil samples were collected from the B horizon (around 0.4 to 0.5 m below ground surface) using a mechanical augur which is decontaminated between each sample site.
Laboratory	All laboratory samples were collected into ALS Laboratory-supplied sample bottles/jars; some of which contained preservative when required.
Preservation	All samples were kept cold in an esky with ice bricks until dispatched to the ALS shopfront on the same day as sampling in order to meet holding times.
Observations	All surface water, groundwater and soil field parameters and observations were recorded on a dedicated Field Data Sheet, developed to ensure all EPL297 information requirements as per Condition 46 are collected. Field parameter meter was calibrated immediately prior to each sampling round.
Documentation	All field and laboratory results were stored in an Excel database maintained by EcOz. All field data sheets (scanned copies), and laboratory documentation were stored in an online filing system maintained by EcOz (M-Files). Porosus also maintain copies of all laboratory documentation.

5.4 Monitoring compliance undertaken during the reporting period

Sample frequency compliance

All sampling frequencies were compliant except for surface water sampling. This is due to surface water sites being dry during sampling event in November 2024. Refer to Table 5-7 below.

Table 5-7. Compliance with EPL297 monitoring requirements.

Site ID	Sampling		Frequency required for compliance	Frequency compliance	Comments
	Date	Sample ID			
AUTHORISED IRRIGATION POINT					
Irrigation source (IS)	14/08/2024	IS	Monthly during discharge, quarterly when not discharging	Compliant	Authorised discharge was undertaken during October, November, December and February, Monthly monitoring compliant with EPL monitoring requirements. Quarterly monitoring when not discharging undertaken in August 2024, April 2025 & May 2025
	28/10/2024	IS			
	25/11/2024	IS			
	16/12/2024	IS			
	20/02/2025	IS			
	27/03/2025	IS			
	28/04/2025	IS			
	08/05/2025	IS			
SURFACE WATER					
SW1 SW2 SW3 SW4	25/11/2024	-	Three times during the Wet season (start, middle and end)	Not compliant	Surface water sites dry on 25/11/2024. Not compliant due to SW3 and SW4 only sampled twice (20/02/2025 & 08/05/2025).
	16/12/2024	SW1, SW2			
	03/02/2025	SW1, SW2			
	20/02/2025	SW1, SW2, SW3, SW4			
	28/04/2025	SW1, SW2			
	08/05/2025	SW1, SW2, SW3, SW4			
GROUNDWATER					
GW1 GW2 GW3 GW4 (decommissioned) GW5 GW6 GW7	14/08/2024	GW1, GW3, GW5, GW6, GW7	Quarterly water monitoring	Compliant	GW4 decommissioned and not considered for compliance requirements. Samples for GW3 and GW7 not taken on 20/02/2025 and 08/05/2025.
	25/11/2025	GW1, GW5, GW7			
	20/02/2025	GW1, GW2, GW5, GW6			
	08/05/2025	GW1, GW2, GW5, GW6			
SOIL					
SS1 SS2 SS3 SS4 SS5 SS6	12/05/2024	SS1, SS2, SS3, SS4, SS5, SS6	Annually	Compliant	-

Parameters compliance

A total of 11 compliances and 6 non-compliances were found for parameters.

- 5 compliances and 0 non-compliances were detected for irrigation source.
- 4 compliance and 0 non-compliances for surface water.
- 4 compliances and 1 non-compliance for groundwater.
- 1 compliance for soil.

Refer to Table 5-8 below.

Table 5-8. Parameter compliance for the reporting period.

Site ID	Sampling		Parameters required for compliance	Parameters required sampled	Parameter compliance	Comments
	Date	Sample ID				
AUTHORISED IRRIGATION POINT						
Irrigation source (IS)	14/08/2024	IS	pH EC Total N Total P *E.coli*, *Enterococci*, Total coliforms Cations and Anions (Ca, Mg, Na, K, SO4, Cl, CO_3 + HCO_3	pH, EC(lab), Total N, Total P, *E.coli*, Enterococci, Total coliforms Cations and Anions	Compliant	-
	28/10/2024	IS		pH, EC(lab), Total N, Total P, *E.coli*, Enterococci, Total coliforms Cations and Anions	Compliant	-
	25/11/2025	IS		pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms Cations and Anions	Compliant	-
	16/12/2024*	IS		EC(lab), Total N, Total P, *E.coli*, Enterococci, Total coliforms Cations and Anions	Compliant	Except for pH
	28/04/2025*	IS		EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms Cations and Anions	Compliant	Except pH
	08/05/2025	IS		pH, EC(lab), Total N, Total P, *E.coli*, Enterococci, Total coliforms Cations and Anions	Compliant	-
*An attempt to collect pH and temperature was undertaken between 16/12/2024 and 28/04/2025 monitoring round on the 27/03/2025.						
SURFACE WATER						

Site ID	Sampling		Parameters required for compliance	Parameters required sampled	Parameter compliance	Comments
	Date	Sample ID				
SW1 SW2 SW3 SW4	25/11/2024	-	pH EC Total N Total P *E.coli*, *Enterococci,* Total coliforms	-	-	Surface water sites dry on 25/11/2024.
	16/12/2024	SW1, SW2		pH, EC (lab), Total N, Total P, *E.coli*, *Enterococci,* Total coliforms	Compliant	Compliant except for SW3, SW4.
	3/02/2025	SW1, SW2		pH, EC, Total N, Total P, *E.coli*, *Enterococci*, Total coliforms	Compliant	Compliant except for SW3, SW4.
	20/02/2025	SW1, SW2, SW3, SW4		pH, EC, Total N, Total P, Enterococci, Total coliforms	Compliant	-
	08/05/2025	SW1, SW2, SW3, SW4		pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms	Compliant	-
GROUNDWATER						
GW1 GW2 GW3 GW4 (decommission) GW5 GW6 GW7	14/08/2024	GW1, GW3, GW5, GW6, GW7	pH EC Total N Total P *E.coli*, *Enterococci,* Total coliforms	pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms	Compliant	GW4 decommissioned
	25/11/2024	GW1, GW5, GW7		pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms	Compliant	
	20/02/2025	GW1, GW2, GW5, GW6		pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms	Compliant	
	08/05/2025	GW1, GW2, GW5, GW6		pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms	Compliant	
	SWL				Not compliant	SWL not provided
SOIL						

Site ID	Sampling		Parameters required for compliance	Parameters required sampled	Parameter compliance	Comments
	Date	Sample ID				
SS1 SS2 SS3 SS4 SS5 SS6	12/05/2024	SS1, SS2, SS3, SS4, SS5, SS6	pH EC Total N Total P *E.coli*, Enterococci, Total coliforms	pH, EC, Total N, Total P, *E.coli*, Enterococci, Total coliforms	Compliant	-

6 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

A summary and assessment of quality assurance and quality control (QAQC) is summarised in Section 6.1 and Section 6.2 measures implemented during field sampling and laboratory analysis conducted under EPL297. The objective is to evaluate the reliability and integrity of monitoring data used to assess compliance with licence conditions and relevant environmental standards.

6.1 Field QA/QC assessment

Field QAQC practices were consistent with industry best practice and adequate to support data integrity. Information regarding the full assessment against the field QA/QC sampling methodology can be found below in Table 6-1 below.

Table 6-1. Assessment of Field QA/QC.

Action	Summary
Field personnel	Soil samples were collected by EcOz-trained environmental staff with prior experience in contaminated site assessments and field sampling. Water samples were collected by JCF staff trained by EcOz Environmental staff.
PPE and staff safety	Standard PPE used (hi-vis, steel caps, gloves); no sunscreen used due to PFAS risk; job safety plans completed.
Weather conditions	Surface water sampling: 24–33 °C, wet (Nov 2024 – May 2025); Soil sampling: 22-32 °C (May), during dry/wet transition.
Meter calibration	Water quality meters were calibrated prior to each sampling event
Sample collection	Gloves changed between samples; PFAS-appropriate (Teflon-free) jars used; methods observed by independent auditor (June 2024).
Sample labelling	Unique IDs with depth (if applicable) and collection date recorded on each container.
Chain of Custody (COC)	Full COC documentation completed and signed for all samples sent to NATA labs (ALS, Envirolab)
Sample storage	Preserved and chilled immediately after collection; transported in cool storage to laboratories.
Decontamination	All equipment decontaminated between sites by decon water.

6.2 Holding times and sampling preservation

Holding times were met for all submitted samples, confirming sample integrity upon arrival at the laboratory.

The laboratories reported that all samples were received in appropriately pre-treated and preserved containers. Samples were received preserved and chilled at the relevant laboratory.

The sample temperature readings recorded on the Sample Receipt Notification (SRN) were variable and above the NEPM and NATA requirements of 6 degrees. The variance in sample receipt temperatures is likely due to the short duration between sample collection and delivery to the Darwin ALS Lab. The impact on data quality is considered minimal, as the samples may not have had sufficient time to cool from the ambient outside temperatures (30–35°C) to the laboratory-required range (0–6°C) but are still in the process of cooling. Once received in Darwin, the samples are promptly transported to a laboratory in Sydney, where they are stored under appropriate conditions, ensuring compliance with preservation criteria.

7 RESULTS AND DISCUSSION

7.1 Authorised irrigation source quality

Table 7-1 provides the water quality results for all sampling undertaken during the reporting period of the authorised irrigation source or "IS". To allow for long-term trend analysis, this table also includes all results for the irrigation source since monitoring began in 2020, when EPL297 was issued.

Exceedances of the trigger level were found for Total coliforms (8 exceedances), and *Enterococci* (1 exceedance) for the reporting period. Table 7-1 below provides a summary of Authorised Irrigation Source (IS) monitoring finding for the monitoring period.

Table 7-1 Trigger values exceedances for Authorised Irrigation Source (reporting period)

Analyte	Guideline	Results range	Monitoring round exceeding trigger value
Total coliforms	1,000 CFU/mL	11,000 – 770,000 CFU/100 mL	14/08/2025
			28/10/2024
			25/11/2024
			16/12/2024
			03/02/2025
			20/02/2025
			28/04/2025
			08/05/2025
Enterococci	1,000 CFU/mL	49 – 1,300 CFU/100 mL	08/05/2025

According to the results detailed in Table 7-1 above and Section 5.4 (Table 5-7 and Table 5-8), the following is discussed:

- No trigger values for temperature, and ORP, RDS, salinity, DO, turbidity, NOx as N, TKN as N, Ca, Mg, Na, K, total anion, total cation, ionic balance, hydroxide alkalinity, carbonate alkalinity, bicarbonate alkalinity, total alkalinity, chloride and SO4 have been defined.
- Exceedances of total coliforms were found for all monitoring rounds. However, no exceedances were found for *E. coli* and only one (1) exceedance was found for *Enterococci* (08/05/2025) during the reporting period. The maximum total coliforms was recorded on 28/04/2025 (77,000 CFU/100 mL) which might be caused by *Enterococci.*

Table 7-2. Authorised irrigation source quality monitoring results (2020 – 2025)

Concentrations in breach of EPL297 trigger values for irrigation water are highlighted in red

Site ID	Date	pH	Temp	ORP	EC	TDS	Sal	DO	Turb	TDS (lab)	BOD	NH3	NO2-N	NO3-N	NOx as N	TKN as N	TN	Reactive P	TP	Ca	Mg	Na	K	Total Anions	Total Cations	Ionic Balance	SAR	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	SO4	Chloride	Chlorphyll a	Oil & Grease	Faecal Coliforms	Total Coliforms	*E.coli*	*Enterococci*
EPL297 Appendix A, Table 1		**6.0-9.0**			**1300**												**125**		**12**																			**1000**	**1000**	**1000**
IS	24/02/2020	7.62			299						2	0.69	<0.01	0.02	0.02	4.8	4.8		0.63																			42000	2700	1400
IS	10/03/2020	7.52			206						2	1.06	0.09	0.19	0.28	1.4	1.7		0.31																			50000	3500	~300
IS	2/09/2020	9.31	29.7	99	385	252	0.2	107	7.9						0.03	0.8	0.8		0.02	13	26	18	7	4.06	3.75			<1	17	140	158	4	29				5800	19	~5
IS	10/12/2020	8.22	30.1	130	512	333	0.2	14	47.5						0.04	1.3	1.3		0.12	23	26	16	8	4.47	4.19			<1	<1	179	179	5	28				14000	36	32
IS	14/01/2021	-			-										<0.01	0.5	0.5		0.02	19	11	5	3	2.32	2.15			<1	<1	103	103	2	8				1500	24	25
IS	2/03/2021	-			-										<0.01	0.2	0.2		0.01	17	10	3	2	1.96	1.85			<1	<1	90	90	1	5				4400	8	<1
IS	17/05/2021	8.82	30.9	196	663	431	0.30	32	32.0						<0.01	0.4	0.4		0.01	20	17	9	3	2.85	2.86			<1	<1	127	127	<1	11				12000	5	49
IS	26/10/2021	-			418										<0.01	0.7	0.7		0.04	16	28	17	7	4.75	4.02	8.26		<1	<1	185	185	3	35				5800	93	~6
IS	8/12/2021	-			374										<0.01	0.9	0.9		0.02	14	28	18	7	4.11	3.96	1.80		<1	7	149	156	3	33				4100	29	25
IS	11/01/2022	-			284										0.03	1.3	1.3		0.27	21	20	11	6	3.68	3.32	5.00		<1	<1	153	153	4	19				7100	280	25
IS	16/02/2022	7.41	30.5	76	233	152	0.11	37	-						<0.01	0.7	0.7		0.05	-	-	-	-	-	-	-		-	-	-	-	-	-				3100	~310	220
IS	13/04/2022	-			238										<0.01	0.8	0.8		0.04	19	14	7	3	2.52	2.48	-		<1	<1	112	112	<1	10				2400	920	37
IS	18/05/2022	7.78			297	193	0.14	29	6.2						<0.01	0.7	0.7		0.05	21	16	10	3	3.00	2.88	2.17		<1	<1	132	132	<1	13				~1500	130	~900
IS	9/11/2022	7.26	31.0	-	399	259	0.20	96	9.5						<0.01	1.1	1.1		0.09	22	26	17	7	4.41	4.16	2.95		<1	<1	178	178	3	28				~2200	~16	15
IS	12/12/2022														<0.01	1.4	1.4		0.13	21	21	13	6	3.74	3.5			<1	<1	153	153	3	22				>2400	66	57
IS	4/01/2023				226										0.03	0.7	0.7		0.08	17	12	8	2	2.54	2.24			<1	<1	113	113	<1	10				14000	310	170
IS	24/08/2023	7.89	25.2	259	379	246	0.18	52	9.3						0.02	0.7	0.7		0.05	22	26	15	5	3.98	4.02	0.51		<1	<1	161	161	4	24				31000	62	~6
IS	21/09/2023	7.20	27.6		394(lab)										0.03	1.3	1.3		0.12	20	27	17	5	4.19	4.09	1.24		<1	<1	166	166	4	28				24000	19	~10
IS	11/10/2023	8.10	29.7		362 (lab)										0.02	1.1	1.1		0.10	18	28	19	6	4.13	4.18	0.68		<1	<1	160	160	4	30				~>2400	26	<1
IS	8/11/2023	8.14	30.0	476	398	259	0.19	33	5.8						0.01	1.1	1.1		0.06	12	25	21	6	4.04	3.72	4.02		<1	<1	153	153	5	31				6900	60	~9
IS	12/12/2023	6.80	29.0		339 (lab)										<0.01	1.0	1.0		0.14	21	20	14	5	3.40	3.43	0.51		<1	<1	134	134	2	24				33000	220	75
IS	9/01/2024				346 (lab)										0.01	1.5	1.5		0.15	23	20	14	7	3.70	3.58	1.61		<1	<1	152	152	2	22				120000	70	160
IS	6/02/2024	7.28	30.0	240	229	149	0.11	46	10.7						<0.01	0.8	0.8		0.09	18	13	6	2	2.34	2.28	----		<1	<1	100	100	<1	12				65000	430	230
IS	14/03/2024				282 (lab										<0.01	0.6	0.6		0.05	27	20	4	<1	3.21	3.17	0.6		<1	<1	152	152	<1	6				>4800	1500.0	200
IS	18/04/2024				300 (lab)										<0.01	1	1		0.32	27	18	10	4	3.09	3.37	4.23		<1	<1	134	134	1	14				20000	110	30
IS	13/05/2024	7.68	27.9	394	365	237	0.17	48	11.2						<0.01	1.0	1.0		0.2	26.0	19.0	13.0	4.0	3.6	3.5	0.7		<1	<1	154.0	154.0	1.0	17.0				37000	~270	700.0
IS	14/08/2024	7.53	24.9	276	500	325	0.24	51	13.7						<0.01	2.9	2.9		0.6	29.0	26.0	19.0	6.0	5.1	4.6	5.3		<1	<1	211.0	211.0	2.0	29.0				180000	~240	49.0
IS	28/10/2024	8.40	29.0	-	376 (lab)	-	-	-	-						0.01	1.6	1.6		0.1	23.0	23.0	19.0	6.0	4.4	4.0	4.5		<1	<1	161.0	161.0	<10	42.0				58000	300.0	540.0
IS	25/11/2024	7.45	30.0	193	663	431	0.32	43	5.3						0.0	1.2	1.2		0.0	25.0	23.0	25.0	8.0	4.4	4.4	0.6		<1	<1	168.0	168.0	3.0	34.0				16000	64.0	120.0
IS	16/12/2024	7.80	29.0	-	375 (lab)	-	-	-	-						0.03	1.1	1.1		0.1	24.0	20.0	20.0	6.0	4.2	3.9	4.1		<1	<1	160.0	160.0	2.0	34.0				11000	100.0	73.0
IS	3/02/2025	7.20	29.0	-	273 (lab)	-	-	-	-						0.0	1.2	1.2		0.0	18.0	14.0	11.0	4.0	3.0	2.6	----		<1	<1	121.0	121.0	1.0	18.0				14000	70.0	92.0
IS	20/02/2025	7.50	29.9	203	454	295	0.22	80	2.8						0.1	1.0	1.1		0.1	25.0	14.0	10.0	4.0	2.8	2.9	----		<1	<1	122.0	122.0	2.0	13.0				25000	160.0	270.0
IS	27/03/2025	6.80	26.0																																			
IS	28/04/2025	7.20	28.0	-	276.0	-	-	-	-						0.0	2.5	2.5		0.8	22.0	13.0	9.0	4.0	3.1	2.8	4.6		<1	<1	136.0	136.0	<1	14.0				770000	85.0	80.0
IS	8/05/2025	7.38	27.1	136.2	637.0	414.0	0.31	39.7	2.87						<0.01	1.0	1.0		0.31	0.3	14.0	10.0	4.0	3.0	2.8	-		<1	<1	129.0	129.0	14.0	14.0				71000	41.0	1300.0

Historical trend for authorised irrigation source

Historical trend for the data from the authorised irrigation source (2020 – 2025) is presented and summarised as follows:

- pH only presented an exceedance in 2020. However, pH values are shown in a range from 6.5 to 8.5 from 2021, which is reduces the variability of the data from that date. Data gaps with no pH information is observed across the data base.
- Data for all monitoring rounds presented variability in their results (ranged from 200 – 700 µS/cm). It was noted that historical EC did not exceed trigger values in any of the historical monitoring rounds.
- TN has historically been below trigger value (125 mg/L) where the highest value was 4.8 mg/L in 2020. No long-term increasing or decreasing trends are evident and has been stable throughout the monitoring years ranging from 0.2 – 4.8 mg/L. Similar situation occurred with historical TN, where trigger values (12 mg/L) has not been exceeded and historical TP increasing or decreasing trends trend are not evident and has been stable throughout the monitoring years ranging from 0.02 – 0.8 mg/L.
- *E. coli* trigger values have only been exceeded the first two historical monitoring rounds (24/02/2020 and 10/03/2020) and in one monitoring round in 14/03/2024. It is observed that the concentration values decreased drastically from first monitoring round to beginning of 2021 and values historically have ranged from 8 - 3,500 CFU/100mL.
- *Enterococci* trigger values have only been exceeded during the first (20/02/2020) and last (08/05/2025) monitoring round. It is observed that the concentration values decreased drastically from first monitoring round, but no clear trend is presented in the remaining monitoring rounds.
- Historical total coliforms have historically exceeded trigger values. Values have exponentially increased throughout the years, ranging from 5,000 to over 50,000 CFU/100 mL from 2024.

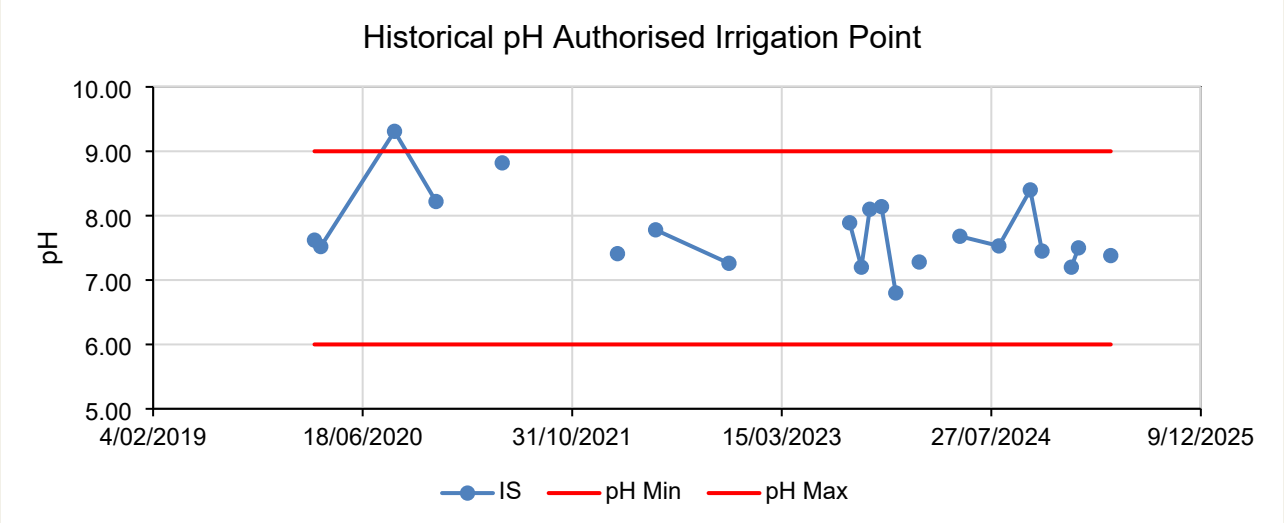

Figure 7-1. Graph of historical pH values measured at Authorised Irrigation Point (2019-2025).

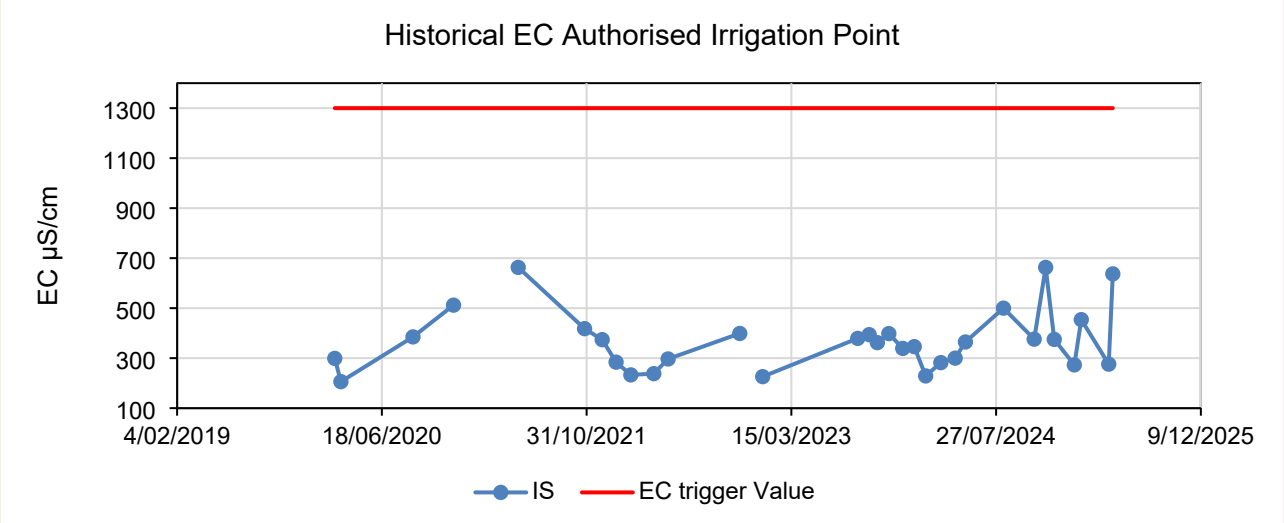

Figure 7-2. Graph of historical EC values measured at Authorised Irrigation Point (2019-2025).

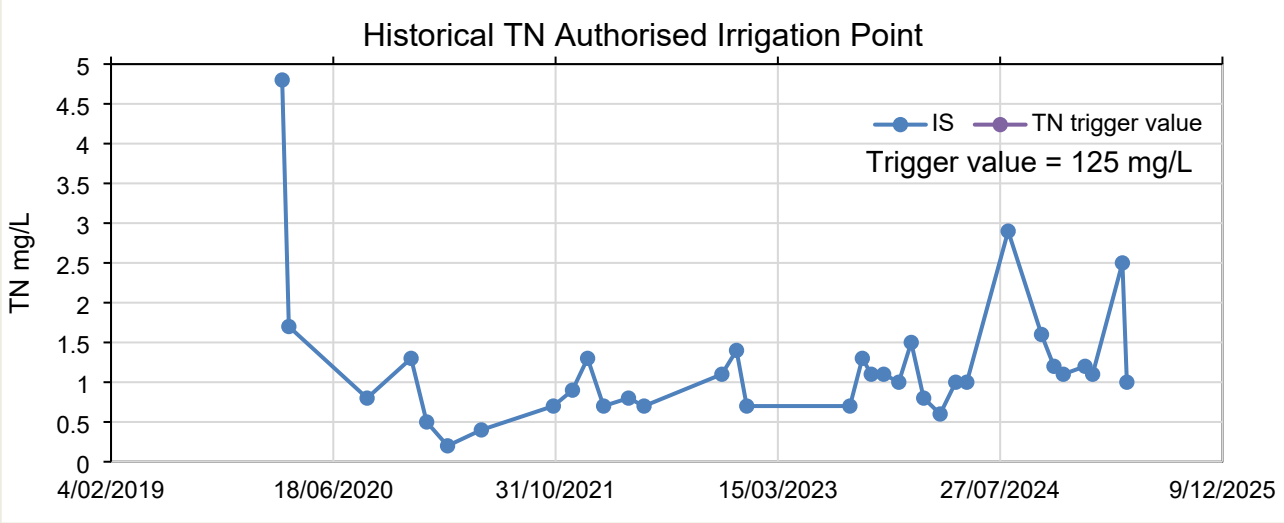

Figure 7-3. Historical Total Nitrogen values measured at Authorised Irrigation Point (2019 – 2025)

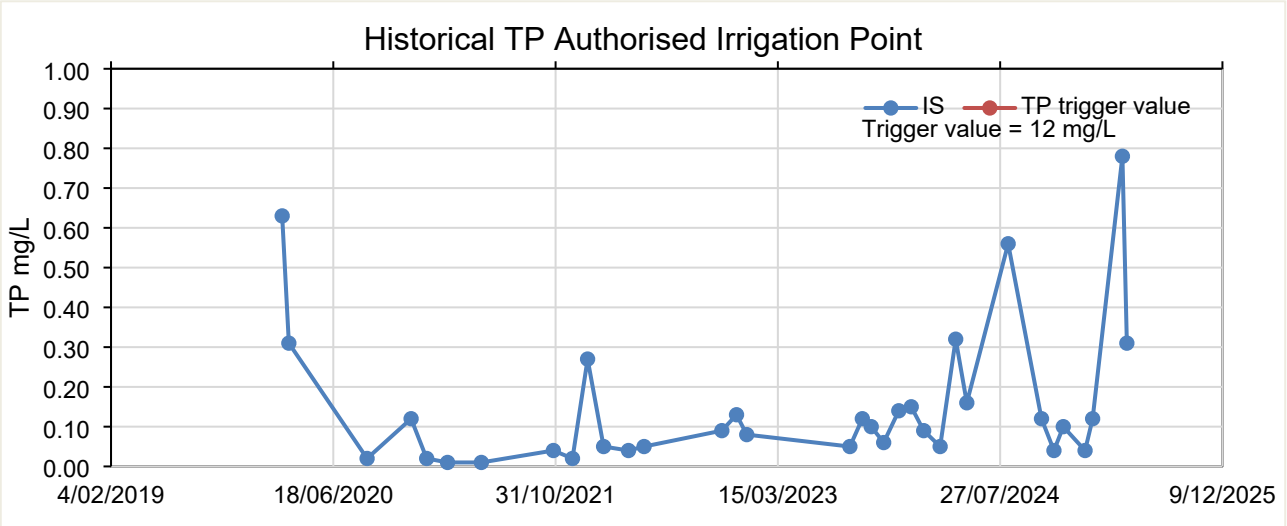

Figure 7-4. Historical Total Phosphorus values measured at Authorised Irrigation Point (2019 – 2025)

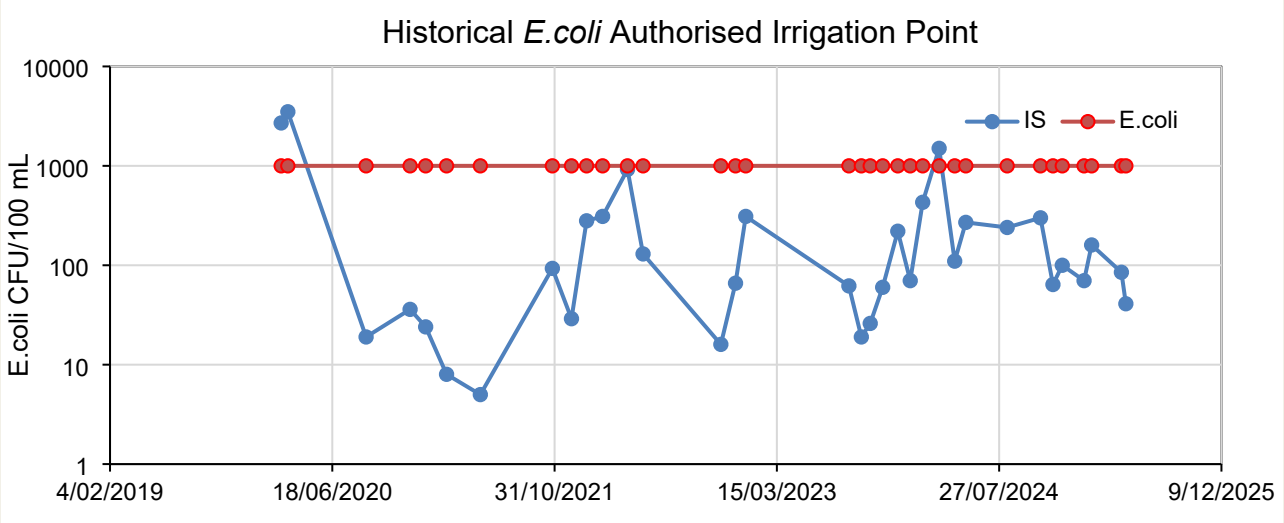

Figure 7-5. Historical *E. Coli* values measured at Authorised Irrigation Point (2019 -2025)

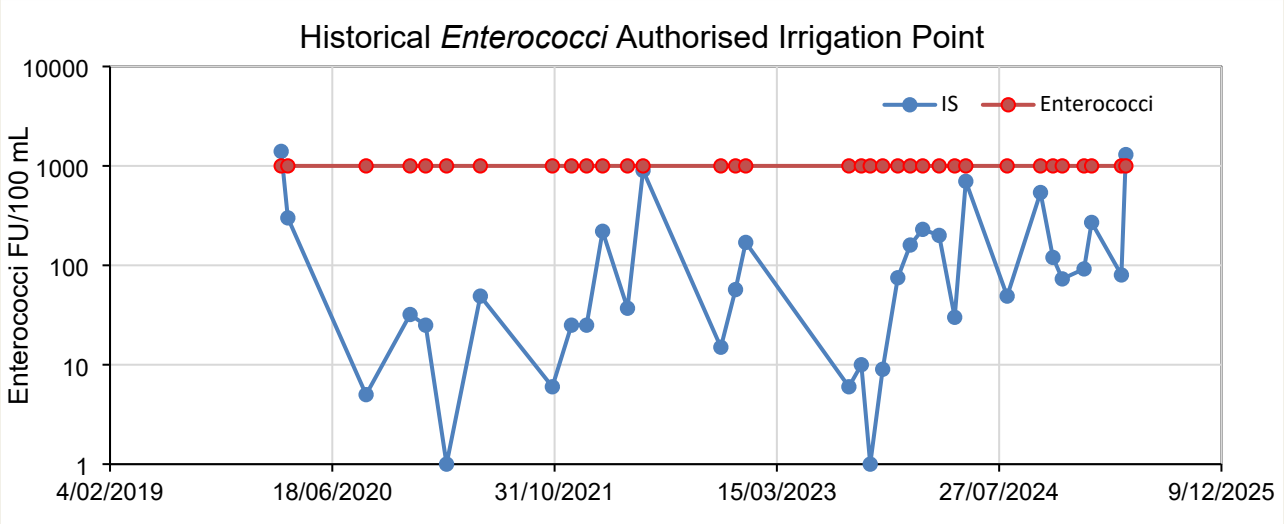

Figure 7-6. Historical *Enterococci* values measured at Authorised Irrigation Point (2019-2025)

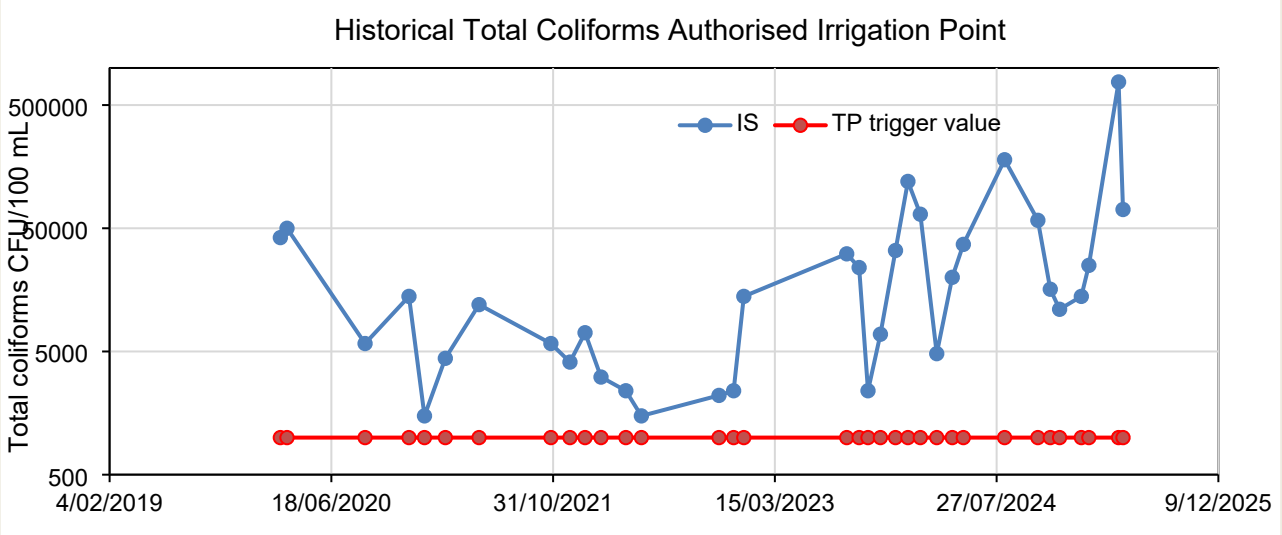

Figure 7-7. Historical Total Coliforms values measured at Authorised Irrigation Point (2019- 2025)

Non-compliance assessment

According to the EPL conditions, frequency and parameters monitoring are summarised as follows:

- Frequency compliance was met for discharge, monthly and quarterly monitoring for the reporting period.
- Parameter sampling compliance was met for all monitoring rounds (6) for the reporting period.

7.2 Groundwater quality

Exceedances of the trigger level were found for pH (9 exceedances), EC (14 exceedances), TN (4 exceedances), TP (4 exceedances), Total coliforms (11 exceedances), *E. coli* (6 exceedances), Enterococci (9 exceedances) for the reporting period. Table 7-3, Table 7-4, Table 7-5 & Table 7-6 below provides a summary of the surface water monitoring findings for the monitoring period.

According to the results detailed in Section 5.4 (Table 5-7 and Table 5-8), the following is discussed:

- No trigger values for temperature, and ORP, RDS, salinity, DO, turbidity, NOx as N, TKN as N, Ca, Mg, Na, K, total anion, total cation, ionic balance, hydroxide alkalinity, carbonate alkalinity, bicarbonate alkalinity, total alkalinity, chloride and SO4 have been defined.
- Exceedances of pH were detected at GW1, GW2, GW6, and GW7. All (4) monitoring rounds detected exceedances. pH largely remained within the guideline values at GW3 and GW5 while GW6 tended to record values slightly below the minimum guideline value. As discussed in the previous report, testing in 1993 returned a pH value of 4.85 (bore report available on NR Maps). This may indicate that the groundwater is naturally acidic in the area.
- Exceedances of EC were detected at all the sampling points and monitoring rounds (4) with the exception of GW7 (no exceedances for any of the monitoring rounds for the reporting period).
- Exceedances of TN were detected for all monitoring rounds (four (4)) and at GW1, GW6, GW2. No detections above LOR were detected for GW5 during for the reportion period.
- Exceedances of TP were detected at GW2, GW5, GW6, GW7. However, variation between sampling location was minimal (<LOR – 0.1 mg/L) suggesting that the exceeding values might not be due to DCF activities.

- Exceedances of total coliforms, *E.coli* and *Enterococci* were detected at all (five (5)) sampling locations. However, results were found to have lower bacteriological load at GW6 (results range from LOR – 5.0 CFU/100 mL for total coliforms, LOR - ~1 CFU/100 for *E.coli*, and <LOR (no detects) for *Enterococci*. Limited exceedances at monitoring round on the 14/08/2024, with no detections above LOR for *E. coli.*

Table 7-3. Trigger value exceedances for pH in groundwater during reporting period

Analyte	Guideline (pH)	Results range	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (pH)
pH	7.0 - 8.5	5.74 – 8.00	14/08/2024	**GW1**	6.84
				GW7	5.74
			25/11/2024	**GW2**	6.87
				GW6	6.52
				GW7	6.09
			20/02/2025	**GW1**	6.24
				GW2	6.89
			08/05/2025	**GW1**	5.89
				GW6	6.94

Table 7-4. Trigger value exceedances for EC in groundwater during reporting period

Analyte	Guideline (µS/cm)	Results range (µS/cm)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (µS/cm)
EC	400	66 – 1052	14/08/2024	**GW1**	400
				GW3	460
				GW5	554
				GW6	944
			25/11/2024	**GW2**	835
				GW5	779
				GW6	742
			20/02/2025	**GW1**	572
				GW2	909
				GW5	867
				GW6	1,052
			08/05/2025	**GW1**	613
				GW2	892
				GW5	828
				GW6	886

Table 7-5. Trigger value exceedances for TN and TP in groundwater during reporting period

Analyte	Guideline	Results range (mg/L)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (mg/L)
TN	Any increase from previous	<LOR – 7.4	14/08/2024	**GW1**	7.4
			25/11/2024	**GW6**	0.6

	monitoring round		20/02/2025	**GW2**	1.9
			08/05/2025	**GW6**	0.6
TP	Any increase from previous monitoring round	<LOR – 0.04	14/08/2024	**GW6**	0.01
			25/11/2025	**GW2**	0.04
				GW7	0.1
			08/05/2025	**GW5**	0.05

Table 7-6. Trigger value exceedances for total coliforms, *E.coli* and *Enterococci* in groundwater during reporting period

Analyte	Guideline (µS/cm)	Results range (µS/cm)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (CFU/100 mL)
Total Coliforms	Any increase from previous monitoring round	<LOR – 140,000	14/08/2024	**GW5**	860
			25/11/2024	**GW1**	4,100
				GW2	1,200
				GW6	5
				GW7	110,000
			20/02/2025	**GW5**	70
			08/05/2025	**GW1**	2,3000
				GW2	10,000
				GW3	200
				GW5	96
				GW7	140,000
E.coli	Any increase from previous monitoring round	<LOR – 1,100	25/11/2024	**GW1**	12
				GW5	~1
				GW7	21
			08/05/2025	**GW1**	1,100
				GW2	680
				GW3	~6
Enterococci	Any increase from previous monitoring round	<LOR -	14/08/2024	**GW5**	~2
			25/11/2024	**GW1**	23
				GW2	140
				GW7	47
			20/02/2025	**GW1**	34

				GW5	180
			08/05/2025	**GW2**	1200
				GW3	~3
				GW7	86,000

Table 7-7. Groundwater quality monitoring results 2019 - 2025

Concentrations in breach of EPL297 trigger values are highlighted in red.

Site ID	Date	pH	Temp	ORP	EC	TDS	Sal	DO	Turb	TDS (lab)	BOD	NH3	NO2-N	NO3-N	NOx as N	TKN as N	TN	Reactive P	TP	Ca	Mg	Na	K	Total Anions	Total Cations	Ionic Balance	SAR	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	SO4	Chloride	Chlorphyll a	Oil & Grease	Faecal Coliforms	Total Coliforms	*E.coli*	*Enterococci*
Units		-	°C	mV	µS/cm	mg/L	ppt	%	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/m3	mg/L	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL
LOR		-	-	-	-	-	-	-	-	10	1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.01	1	1	1	1	0.01	0.01	0.01	0.01	1	1	1	1	1	1	1	5	1	1	1	1
EPL297 Appendix A, Table		6.0-9.0			1300												125		12																		1000	1000	1000
EPL297 Appendix A, Table		7.0-8.5			400												any increase from previous		any increase from previous																		any increase from previous	any increase from previous	any increase from previous
EPL297 Appendix A, Table		6.0-7.5			200												0.23		0.01																		any increase from previous	any increase from previous	any increase from previous
GW1	12/06/2019	5.63	30.0	200	308	200	0.1	4	3.4	175	<2	0.05	<0.01	6.68	6.68		7.8	<0.01	<0.01	27	10	14	<1	3.04	2.78		0.58				114	3	25	<1	<5	12		12	12
GW2	16/07/2019	7.11	30.2	141	530	345	0.25	63	16.1	322	<2	<0.01	<0.01	0.17	0.17		0.2	<0.01	<0.01	73	30	9	1	5.96	6.53		0.22				277	4	12	<1	<5	~<1		~<1	~2
GW3	16/07/2019	7.47	29.8	83	399	259	0.19	52	25.5	228	<2	0.01	<0.01	0.07	0.07		0.3	<0.01	0.03	54	22	2	1	4.37	4.62		0.06				210	3	4	<1	<5	~<1		~<1	<1
GW4	16/07/2019	7.07	30.1	83	325	211	0.15	65	29.8	188	<2	0.02	<0.01	0.33	0.33		0.4	0.01	0.02	41	17	3	<1	3.24	3.58		0.10				152	3	5	<1	<5	<1		<1	<1
GW5	16/07/2019	7.46	28.7	141	490	319	0.23	63	8.4	272	<2	0.02	<0.01	0.02	0.02		<0.1	<0.01	<0.01	53	31	9	<1	5.07	5.59		0.24				225	2	19	<1	<5	~<1		~<1	<1
GW6	16/07/2019	7.14	31.0	110	587	371	0.27	35	11.7	307	<2	<0.01	<0.01	1.65	1.65		1.6	<0.01	0.01	74	27	6	<1	5.59	6.18		0.15				263	2	6	<1	<5	~<1		~<1	<1
GW7	10/09/2019	6.97	30.5	200	66	43	0.03	63	127.0	60.0	3	0.03	<0.01	3.56	3.56		4.1	<0.01	<0.01	4.0	2.0	1.0	<1	0.31	0.41		0.10				7	<1	6.0	<1	<5	~<1		~<1	<1
GW1	25/02/2020	5.81	30.3	203	274	179	0.1	30	26.2			0.17	<0.01	5.22	5.22		5.8	<0.01	<0.01	18	7	19	<1	2.02	2.30		0.96				56	3	27							
GW2	25/02/2020	7.18	30.7	211	719	467	0.4	41	74.1			0.02	<0.01	1.79	1.79		2.2	<0.01	0.03	74	28	33	<1	7.88	7.43		0.83				278	7	41							
GW3	25/02/2020	7.97	30.6	114	433	282	0.2	47	7.2			0.02	<0.01	0.08	0.08		<0.1	<0.01	0.02	54	22	2	1	4.73	4.62		0.06				101	2	4							
GW4	25/02/2020	6.88	31.0	159	336	219	0.2	45	30.8			0.02	<0.01	0.36	0.36		0.4	<0.01	<0.01	39	15	3	<1	3.43	3.31		0.10				115	2	6							
GW5	25/02/2020	6.93	30.2	89	542	351	0.3	50	15.3			<0.01	<0.01	0.03	0.03		<0.1	<0.01	0.03	48	30	11	<1	5.86	5.34		0.31					2	20							
GW6	25/02/2020	6.96	31.7	188	622	404	0.3	12	2.7			0.11	<0.01	0.24	0.24		0.4	<0.01	0.01	62	29	10	1	6.76	5.94		0.26					4	13							
GW7	25/02/2020	7.50	30.6	191	437	284	0.2	42	4.3			0.03	<0.01	3.34	3.34		3.7	<0.01	<0.01	40	28	6	<1	4.76	4.56		0.18					3	8							
GW1	2/09/2020	5.75	30.7	150	330	212	0.2	68	7.8						5.89	0.6	6.5		0.01	10.0	4.0	37.0	<1	2.19	2.44			<1	<1	31.0	31	1.0	55.0			2	<1	<1
GW2	2/09/2020	6.99	31.5	113	615	403	0.3	28	5.3						1.47	0.2	1.7		<0.01	73.0	27.0	6.0	<1	6.58	6.12			<1	<1	318	318	3	6			2	<1	<1
GW3	2/09/2020	7.34	31.7	-70	468	305	0.2	43	1.8						0.08	<0.1	<0.1		0.07	57.0	23.0	2.0	1.0	5.03	4.85			<1	<1	243	243	3	4			<1	<1	<1
GW4	2/09/2020	6.78	31.7	103	381	247	0.2	36	41.6						0.40	<0.1	0.4		0.05	44.0	17.0	3.0	<1	3.99	3.72			<1	<1	188	188	3	6			<1	<1	<1
GW5	2/09/2020	7.46	30.6	97	580	377	0.3	79	1.9						0.03	0.1	0.1		0.02	59.0	35.0	12.0	<1	6.19	6.35			<1	<1	278	278	2	21			<1	<1	~1
GW6	2/09/2020	7.04	31.8	82	656	429	0.3	33	1.7						0.18	<0.1	0.2		<0.01	77.0	31.0	12.0	2.0	7.64	6.97			<1	<1	360	360	4	13			<1	<1	<1
GW1	10/12/2020	5.42	30.5	230	369	239	0.2	66	5.4						5.86	0.6	6.5		<0.01	8	4	35	<1	2.41	2.25			<1	<1	27	27	14	56			<1	<1	<1
GW2	10/12/2020	7.09	30.6	168	801	520	0.4	27	32.6						1.93	0.2	2.1		0.02	82	27	16	<1	7.04	7.01			<1	<1	304	304	3	32			1800	59	95
GW3	10/12/2020	7.61	31.2	166	496	322	0.2	42	6.2						0.08	<0.1	<0.1		0.02	53	20	3	1	4.85	4.45			<1	<1	234	234	3	4			<1	<1	<1
GW4	10/12/2020	6.73	30.3	19	459	302	0.2	39	15.4						0.39	<0.1	0.4		<0.01	40	15	4	<1	3.53	3.40			<1	<1	165	165	3	6			<1	<1	<1
GW5	10/12/2020	7.54	30.1	193	665	442	0.3	42	7.9						0.04	<0.1	<0.1		<0.01	54	30	10	<1	6.04	5.60			<1	<1	269	269	2	22			3	<1	<1
GW6	10/12/2020	7.02	31.4	168	800	515	0.4	33	2.1						0.19	<0.1	0.2		<0.01	74	29	10	2	6.41	6.56			<1	<1	296	296	5	14			1	<1	<1
GW7	10/12/2020	5.69	33.7	268	100	653	0.1	39	17.0						3.25	0.5	3.8		<0.01	5	5	2	<1	0.79	0.75			<1	<1	34	34	<1	4			270	<1	<1
GW1	2/03/2021	-			-										3.78	0.6	4.4		0.01	6	3	27	<1	1.73	1.72			<1	<1	15	15	<1	41			1	<1	<1
GW2	2/03/2021	-			-										0.49	<0.1	0.5		0.04	68	28	45	8	8.23	7.86			<1	<1	322	322	9	57			730	5	720
GW3	2/03/2021	-			-										0.21	<0.1	0.2		0.03	56	21	3	1	5.01	4.68			<1	<1	239	239	3	6			23	<1	<1
GW4	2/03/2021	-			-										3.42	0.7	4.1		0.37	10	5	32	<1	2.12	2.30			<1	<1	43	43	5	41			130	2	<2
GW5	2/03/2021	-			-										<0.01	<0.1	<0.1		0.03	57	32	10	<1	6.32	5.91			<1	<1	282	282	2	23			2	<1	<1
GW6	2/03/2021	-			-										0.30	<0.1	0.3		<0.01	77	30	10	1	7.03	6.77			<1	<1	320	320	5	19			10	1	<1
GW1	17/05/2021	6.10	29.5	241	315	205	0.20	50	3.9						6.06	0.7	6.8		<0.01	25	9	25	1	2.93	3.10			<1	<1	76	76	2	34			1700	130	10
GW2	17/05/2021	7.13	30.0	206	804	523	0.40	23	88.8						0.50	0.3	0.8		0.06	80	31	37	<1	8.18	8.15			<1	<1	345	345	9	39			410	<1	~60
GW3	17/05/2021	7.68	30.4	166	480	313	0.20	98	37.4						0.27	0.1	0.4		0.07	58	21	3	1	4.89	4.78			<1	<1	237	237	2	4			28	<1	<1
GW4	17/05/2021	6.45	29.2	182	386	251	0.20	100	48.6						1.43	0.3	1.7		0.05	26	10	19	<1	2.79	2.95			<1	<1	104	104	3	23			1	<1	<1
GW5	17/05/2021	7.40	29.2	211	579	376	0.30	58	4.1						<0.01	<0.1	<0.1		0.03	58	31	12	<1	6.02	5.97			<1	<1	272	272	1	20			<1	<1	<1
GW6	17/05/2021	7.11	30.9	196	663	431	0.30	32	32.0						0.22	<0.1	0.2		0.03	75	29	12	2	7.14	6.70			<1	<1	328	328	4	18			460	170	~1
GW7	18/05/2021	6.67	29.3	164	167	108	0.10	147	45.4						0.23	1.2	1.4		0.04	2	2	2	<1	0.63	0.35			<1	<1	25	25	1	4			4884	<10	243
GW1	12/08/2021	6.30	30.9	255	351	228	0.17	95	1.6						6.70	0.5	7.2		<0.01	36	13	17	<1	3.57	3.60	0.53		<1	<1	116	116	2	25			~34	~3	<1
GW2	12/08/2021	6.93	30.1	174	745	485	0.36	43	66.5						1.45	0.2	1.6		0.02	104	31	19	<1	7.82	8.57	4.54		<1	<1	344	344	5	30			~30	<1	95
GW3	12/08/2021	7.43	31.2	161	458	298	0.22	84	2.1						0.14	<0.1	0.1		0.02	67	24	3	1	6.39	5.47	7.70		<1	<1	246	246	3	50			<1	<1	<1
GW4	12/08/2021	6.59	31.0	242	297	193	0.14	61	8.0						0.37	<0.1	0.4		<0.01	34	14	8	<1	2.96	3.20	3.83		<1	<1	132	132	2	10			~3	<1	<1
GW5	12/08/2021	7.38	30.2	214	577	375	0.28	96	23.0						<0.01	1.9	1.9		0.07	64	32	11	<1	6.20	6.30	0.84		<1	<1	280	280	2	20			~1100	320	~6
GW6	12/08/2021	7.08	31.8	183	660	429	0.32	92	4.2						0.23	<0.1	0.2		<0.01	92	32	11	1	7.01	7.73	4.89		<1	<1	324	324	4	16			<1	<1	<1
GW7	12/08/2021	5.25	31.9	306	72	47	0.03	85	16.4						4.30	0.7	5.0		0.03	4	3	2	<1	0.24	0.53	----		<1	<1	5	5	<1	5			<1	<1	<1
GW1	11/11/2021	6.55	30.8	252	332	216	0.16	48	4.7						4.92	0.6	5.5		<0.01	31	13	12	<1	3.18	3.14	0.62		<1	<1	121	121	4	24			17000	1800	1400
GW2	11/11/2021	7.43	30.9	229	690	448	0.33	73	20.9						1.86	0.3	2.2		0.02	86	29	16	<1	7.45	7.37	0.52		<1	<1	324	324	5	31			~160	~30	100
GW3	11/11/2021	7.79	32.0	210	434	282	0.20	82	4.1						0.14	0.1	0.2		0.02	56	24	2	1	5.01	4.88	1.30		<1	<1	242	242	3	4			~<1	<1	~2
GW4	11/11/2021	6.70	31.0	255	253	164	0.12	54	6.1						0.18	<0.1	0.2		0.02	25	12	7	<1	2.81	2.54	----		<1	<1	123	123	2	11			~8	~7	~6
GW5	11/11/2021	7.19	30.6	240	546	355	0.26	52	14.5						<0.01	<0.1	<0.1		0.03	57	33	10	<1	6.31	6.00	2.58		<1	<1	280	280	2	24			~1100	~200	31
GW6	11/11/2021	7.50	31.8	234	621	404	0.30	89	8.7						0.19	<0.1	0.2		0.01	76	31	10	2	7.24	6.83	2.89		<1	<1	334	334	4	17			~<1	~<1	<1
GW7	11/11/2021	5.59	33.7	318	72	47	0.03	62	175.0						3.97	0.6	4.6		<0.01	4	3	1	<1	0.47	0.49	----		<1	<1	15	15	<1	6			~30	~<1	<1
GW1	16/02/2022	6.64	30.4	86	325	210	0.15	75	3.4						4.00	0.7	4.7		0.01	26	11	16	<1	2.60	2.90	----		<1	<1	92	92	3	25			~2600	530	~45
GW3	16/02/2022	7.31	31.9	61	457	299	0.22	75	2.6						0.10	<0.1	0.1		0.03	55	22	3	1	4.73	4.71	0.21		<1	<1	228	228	3	4			~220	<2	<2
GW5	16/02/2022	6.85	30.7	80	593	383	0.28	26	3.2						<0.01	<0.1	<0.1		0.02	54	32	12	<1	6.04	5.85	1.64		<1	<1	268	268	2	23			~<1	<1	<1
GW6	16/02/2022	6.90	31.8	84	661	429	0.32	19	3.7						0.26	<0.1	0.3		<0.01	74	31	11	1	6.80	6.75	0.42		<1	<1	310	310	5	18			~1	<1	~1
GW7	16/02/2022	5.45	32.1	129	107	69	0.05	71	2.6						2.17	0.5	2.7		0.01	3	7	3	<1	0.73	0.86	----		<1	<1	10	10	20	4			~170	~<1	<1
GW1	18/05/2022	6.11			347	225	0.16	75	1.7						5.98	0.7	6.7		<0.01	24	10	24	1	3.12	3.09	0.56		<1	<1	77	77	3	37			140	41	~4
GW2	18/05/2022	7.18			758	494	0.37	43	1000+						0.21	0.2	0.4		0.16	74	28	39	1	7.58	7.72	0.88		<1	<1	294	294	9	54			~200	~60	260
GW3	18/05/2022	7.82			439	286	0.21	71	4.9						0.19	0.1	0.3		0.02	52	19	6	2	4.50	4.47	0.32		<1	<1	215	215	3	5			~3	~<1	~1
GW5	18/05/2022	7.05			554	364	0.27	39	7.4						<0.01	<0.1	<0.1		0.02	54	29	12	1	5.80	5.63	1.54		<1	<1	256	256	2	23			~230	~<1	10
GW6	18/05/2022	7.19			636	416	0.30	3	5.1						0.27	<0.1	0.3		<0.01	72	28	12	2	6.45	6.47	0.15		<1	<1	288	288	5	21			~2	~<1	<1
GW7	18/05/2022	3.79			73	47	0.03	13	1000+						0.70	2.1	2.8		0.06	2	2	4	<1	0.66	0.44	----		<1	<1	26	26	<1	5			11000	400	~12
GW1	4/08/2022	6.15	31.0	165	363	236	0.17	103	2.4						6.67	0.6	7.3		0.02	28	11	18	<1	2.89	3.08	3.25		<1	<1	95	95	3	33			<1	~4	<1
GW2	4/08/2022	7.01	30.8	155	730	475	0.31	62	52.5						1.47	0.3	1.8		0.03	83	28	17	<1	7.27	7.18	0.56		<1	<1	308	308	6	35			28	~290	26
GW3	4/08/2022	7.41	31.4	148	448	293	0.21	58	15.1						0.11	0.1	0.2		0.03	52	20	3	1	4.08	4.4	3.73		<1	<1	193	193	4	5			<1	~<1	<1
GW5	4/08/2022	6.86	30.2	145	573	371	0.27	47	1.6						<0.01	<0.1	<0.1		0.01	53	29	12	<1	5.46	5.55	0.83		<1	<1	236	236	2	25			11	~17	~1
GW6	4/08/2022	6.97	31.8	150	653	423	0.31	77	6.4						0.22	<0.1	0.2		0.02	73	28	12	1	6.98	6.49	3.59		<1	<1	313	313	5	22			<1	~600	<1
GW7	4/08/2022	5.49	31.1	180	69	46	0.03	81	32.6						3.58	0.4	4		<0.01	4	3	2	<1	0.27	0.53	----		<1	<1	5	5	<1	6			<1	~74	<1
GW1	9/11/2022	6.34	29.6	-	250	163	0.10	70	10.6						5.08	0.7	5.8		0.02	7	3	35	<1	2.09	2.12	----		<1	<1	16	16	<1	48			~130	10	~7
GW3	9/11/2022	6.94	30.9	-	412	268	0.20	69	2.5						0.1	0.1	0.2		0.05	55	22	2	1	5.03	4.67	3.74		<1	<1	243	243	3	4			~37	~3	<1
GW5	9/11/2022	6.62	29.8	-	563	366	0.30	87	3.3						<0.01	0.1	0.1		0.04	60	34	11	1	6.38	6.3	0.68		<1	<1	280	280	4	25			~9	<1	~6
GW6	9/11/2022	6.62	31.5	-	620	403	0.30	99	1.0						0.24	0.1	0.3		0.03	77	31	12	2	7.26	6.97	2.07		<1	<1	330	330	5	20			~<1	<1	<1
GW7	9/11/2022	6.14	36.7	-	65	43	0.00	64	22.4						2.92	0.8	3.7		0.02	4	3	2	<1	0.32	0.53	----		<1	<1	9	9	<1	5			1400	~1	<1
GW3	6/02/2023	7.59	31.4	-	399	258	0.20	77	3.2						0.3	0.1	0.4		0.03	55	20	2	1	4.45	4.5	0.58		<1	<1	214	214	3	4			960	<1	<1
GW5	6/02/2023	7.26	30.5	-	539	14	0.30	38	13.5						0.1	<0.1	0.1		0.05	50	30	10	<1	5.71	5.4	2.81		<1	<1	246	246	3	26			~2600	<1	<1
GW6	6/02/2023	7.52	31.6	-	555	361	0.30	26	2.5						0.4	0.2	0.6		0.01	66	28	9	1	6.4	6.01	3.09		<1	<1	284	284	5	22			~39	~1	<1
GW7	6/02/2023	7.42	30.8	-	70	46	0.00	23	38.6						2.5	1.2	3.7		0.02	2	2	2	<1	0.47	0.35	----		<1	<1	18	18	<1	4			1500	~1	<1
GW1	11/05/2023	6.39	29.2	226	614	170	0.16	77	1.1						6.28	1.5	7.8		0.04	24	8	24	<1	2.92	2.90	----		<1	<1	322	322	9	57			22	~1	~1
GW3	11/05/2023	7.43	30.3	226	423	192	0.18	67	3.4						0.10	0.2	0.3		0.06	41	16	2	<1	4.69	3.45	15.20		<1	<1	226	226	3	4			97	<1	<1
GW5	11/05/2023	6.73	28.5	234	540	255	0.24	28	2.6						0.02	<0.1	<0.1		0.04	43	31	9	<1	6.12	5.09	9.21		<1	<1	269	269	2	25			700	~1	<1
GW6	11/05/2023	6.94	30.5	236	738	334	0.32	29	1.1						1.42	0.2	1.6		0.05	60	33	20	<1	7.80	6.58	8.51		<1	<1	294	294	6	64			85	18	~1
GW7	11/05/2023	6.19	28.9	167	52	24	0.02	38	21.0						2.36	0.5	2.9		0.04	2	2	2	<1	0.37	0.35	----		<1	<1	13	13	<1	4			65000	~85	~120

Site ID	Date	pH	Temp	ORP	EC	TDS	Sal	DO	Turb	TDS (lab)	BOD	NH3	NO2-N	NO3-N	NOx as N	TKN as N	TN	Reactive P	TP	Ca	Mg	Na	K	Total Anions	Total Cations	Ionic Balance	SAR	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	SO4	Chloride	Chlorphyll a	Oil & Grease	Faecal Coliforms	Total Coliforms	*E.coli*	*Enterococci*
	Units	-	°C	mV	µS/cm	mg/L	ppt	%	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/m3	mg/L	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL
	LOR	-	-	-	-	-	-	-	-	10	1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.01	1	1	1	1	0.01	0.01	0.01	0.01	1	1	1	1	1	1	1	5	1	1	1	1
EPL297 Appendix A, Table		**6.0-9.0**			**1300**												**125**		**12**																		**1000**	**1000**	**1000**
EPL297 Appendix A, Table		**7.0-8.5**			**400**												any increase from previous		any increase from previous																		any increase from previous	any increase from previous	any increase from previous
EPL297 Appendix A, Table		**6.0-7.5**			**200**												**0.23**		**0.01**																		any increase from previous	any increase from previous	any increase from previous
GW1	24/08/2023	6.29	30.1	413	371	241	0.17	62	0.6						6.55	0.9	7.4		0.01	31	12	21	<1	3.48	3.45	0.44		<1	<1	95	95	3	35				26	~5	~1
GW3	24/08/2023	7.44	31.0	632	448	291	0.21	50	1.2						0.23	<0.1	0.2		0.03	57	22	7	1	4.83	4.98	1.60		<1	<1	223	223	3	11				<1	<1	<1
GW5	24/08/2023	7.23	28.9	272	568	371	0.27	58	2.1						<0.01	<0.1	<0.1		0.03	61	33	12	<1	5.98	6.28	2.45		<1	<1	262	262	2	25				~130	<1	<1
GW7	24/08/2023	5.78	29.8	378	83	53	0.04	51	1000+						3.42	1.4	4.8		0.07	4	3	3	<1	0.46	0.58	----		<1	<1	11	11	2	7				20000	<1	~20
GW1	8/11/2023	6.5	30.2	303	347	226	0.16	40	23.4						4.29	0.8	5.1		0.02	11	4	48	<1	3.24	2.96	4.45		<1	<1	37	37	1	88				430000	67000	66
GW3	8/11/2023	7.13	31.1	708	456	299	0.22	21	4.0						0.10	0.1	0.2		0.03	46	20	9	1	4.85	4.36	5.32		<1	<1	224	224	3	11				<1	<1	<1
GW5	8/11/2023	7.31	30.5	608	585	384	0.28	55	10.0						<0.01	0.1	0.1		0.04	50	32	15	<1	6.18	5.78	3.32		<1	<1	269	269	2	27				~5	<1	~1
GW6	8/11/2023	7.11	31.2	426	689	449	0.33	31	3.5						0.36	0.1	0.5		0.02	70	30	19	1	7.29	6.81	3.38		<1	<1	305	305	6	38				270	<1	<1
GW7	8/11/2023	5.48	31.7	350	71	47	0.03	43	OR						3.14	0.9	4.0		0.04	3	3	2	<1	0.29	0.48	-		<1	<1	6	6	<1	6				110	<1	<1
GW1	6/02/2024	6.43	30.5	190	214	139	0.10	91	7.9						3.62	0.4	4.0		0.02	3	2	34	<1	1.47	1.79	----		<1	<1	6	6	<1	48				1300	100	160
GW3	6/02/2024	7.25	31.6	545	457	297	0.22	77	2.5						0.16	<0.1	0.2		0.03	54	23	8	1	5.03	4.96	0.7		<1	<1	232	232	4	11				<1	<1	<1
GW5	6/02/2024	6.49	30.3	260	624	406	0.30	54	1.0						<0.01	<0.1	<0.1		0.02	58	36	13	<1	6.32	6.42	0.76		<1	<1	275	275	2	28				5500	<1	<1
GW7	6/02/2024	6.69	31.7	366	81	53	0.04	62	7.7						3.08	0.6	3.7		0.01	2	3	3	<1	0.46	0.48	----		<1	<1	12	12	<1	8				~240	<1	<1
GW3	13/05/2024	7.62	29.9	585	461	300	0.23	47	2.2						0.2	<0.1	0.2		0.04	50.0	20.0	7.0	1.0	5.0	4.5	5.4		<1	<1	232.0	232.0	3.0	10.0				11.0	<1	<1
GW5	13/05/2024	7.33	29.9	541	597	388	0.29	97	2.9						<0.01	<0.1	<0.1		0.03	54.0	30.0	12.0	<1	6.3	5.7	5.0		<1	<1	277.0	277.0	2.0	25.0				77.0	<1	<1
GW6	13/05/2024	7.18	30.6	352	692	450	0.33	71	0.3						0.5	0.2	0.7		<0.01	65.0	32.0	16.0	1.0	7.2	6.6	4.5		<1	<1	313.0	313.0	6.0	30.0				~1	<1	<1
GW7	13/05/2024	5.92	33.2	201	63	41	0.03	18	4.8						2.0	0.4	2.4		0.02	3.0	3.0	2.0	<1	0.4	0.5	----		<1	<1	17.0	17.0	<1	3.0				1400.0	~1	<1
GW1	14/08/2024	6.84	29.7	622	400	260	0.19	89	211.7						6.2	1.2	7.4		0.01	29.0	11.0	25.0	<1	3.1	3.4	5.4		<1	<1	96.0	96.0	2.0	40.0				<1	<1	<1
GW3	14/08/2024	8.00	28.2	631	460	299	0.22	96	1.0						0.1	<0.1	0.1		0.02	53.0	22.0	7.0	1.0	4.9	4.8	0.8		<1	<1	226.0	226.0	3.0	10.0				<1	<1	<1
GW5	14/08/2024	7.39	28.6	328	554	357	0.26	94	13.0						<0.01	<0.1	<0.1		0.03	50.0	31.0	11.0	<1	6.1	5.5	5.1		<1	<1	270.0	270.0	2.0	24.0				860.0	<1	~2
GW6	14/08/2024	7.12	31.4	819	944	614	0.46	37	61.2						0.5	<0.1	0.5		0.01	71.0	32.0	61.0	1.0	9.9	8.9	5.4		<1	<1	331.0	331.0	2.0	114.0				<1	<1	<1
GW7	14/08/2024	5.74	31.7	375	66	42	0.03	10	157.0						1.7	0.3	2.0		0.01	4.0	2.0	<1	<1	0.4	0.4	3.7		<1	<1	14.0	14.0	<1	4.0				~2	<1	<1
GW1	25/11/2024	6.11	30.9	197	624	406	0.30	57	38.2						6.4	0.9	7.3		<0.01	27.0	10.0	24.0	<1	3.1	3.2	1.4		<1	<1	94.0	94.0	3.0	42.0				4100.0	12.0	23.0
GW2	25/11/2024	6.87	31.4	215	835	543	0.40	65	6.4						0.5	0.2	0.7		0.04	67.0	26.0	10.0	2.0	6.2	6.0	1.8		<1	<1	294.0	294.0	4.0	8.0				1200.0	140.0	140.0
GW5	25/11/2024	7.21	30.1	186	779	507	0.38	90	3.4						0.0	<0.1	<0.1		<0.01	46.0	31.0	17.0	<1	6.2	5.6	4.9		<1	<1	268.0	268.0	2.0	27.0				8.0	~1	~1
GW6	25/11/2024	6.52	30.7	219	742	481	0.36	42	120.8						0.4	0.2	0.6		<0.01	68.0	29.0	19.0	2.0	7.3	6.7	4.6		<1	<1	306.0	306.0	7.0	37.0				5.0	~1	<1
GW7	25/11/2024	6.09	30.3	178	286	186	0.13	37	153.6						0.2	1.7	1.9		0.1	3.0	2.0	2.0	1.0	0.7	0.4	----		<1	<1	27.0	27.0	<1	4.0				110000.0	21.0	47.0
GW1	20/02/2025	6.24	31.1	221	572	372	0.27	96	7.8						6.2	0.5	6.7		<0.01	21.0	9.0	29.0	1.0	3.2	3.1	1.2		<1	<1	74.0	74.0	2.0	42.0				150.0	11.0	34.0
GW2	20/02/2025	6.89	31.2	188	909	591	0.44	72	0.9						1.9	<0.1	1.9		0.01	73.0	26.0	6.0	<1	6.5	6.0	3.4		<1	<1	303.0	303.0	2.0	13.0				~6	<1	<1
GW5	20/02/2025	7.36	29.4	213	867	562	0.42	124	0.0						<0.01	<0.1	<0.1		<0.01	59.0	34.0	12.0	<1	6.2	6.3	0.7		<1	<1	273.0	273.0	2.0	24.0				70.0	<1	180.0
GW6	20/02/2025	7.17	31.6	187	1052	684	0.51	90	5.6						0.5	<0.1	0.5		<0.01	77.0	31.0	17.0	1.0	7.2	7.2	0.2		<1	<1	308.0	308.0	6.0	32.0				~4	<1	<1
GW1	8/05/2025	5.89	30.2	175.0	613.0	399.0	0.29	55.9	46.79						4.99	0.6	5.6		<0.01	16.0	7.0	32.0	<1	2.5	2.8	-		<1	<1	61.0	61.0	2.0	44.0				23000.0	1100.0	<1
GW2	8/05/2025	7.07	30.1	129.7	892.0	580.0	0.43	49.9	4.05						0.68	0.3	1.0		<0.01	69.0	28.0	31.0	<1	6.7	7.1	2.7		<1	<1	288.0	288.0	6.0	30.0				~10000	680.0	1200.0
GW3	8/05/2025	7.95	29.3	210.1	640.0	421.0	0.51	95.5	3.4						0.03	0.1	0.1		<0.01	51.0	21.0	3.0	1.0	4.3	4.4	1.1		<1	<1	208.0	208.0	3.0	4.0				~200	~6	~3
GW5	8/05/2025	7.25	29.6	141.2	828.0	539.0	0.40	90.4	23.91						0.02	<0.1	<0.1		0.05	54.0	33.0	13.0	<1	5.8	6.0	1.3		<1	<1	254.0	254.0	2.0	25.0				96.0	<1	<1
GW6	8/05/2025	6.94	31.0	153.5	886.0	575.0	0.43	35.5	9.30						0.43	0.2	0.6		<0.01	74.0	31.0	17.0	1.0	6.7	7.0	2.4		<1	<1	284.0	284.0	5.0	32.0				~1	<1	<1
GW7	8/05/2025	7.37	29.7	157.6	248.5	162.0	0.12	48.2	17.65						0.02	0.6	0.6		0.04	0.04	<1	2.0	1.0	0.3	0.1	-		<1	<1	13.0	13.0	<1	<1				140000.0	<1	86000.0

Historical trends for groundwater

Historical trend for the data (2020 – 2025) is presented and summarised as follows:

- pH exceedances of the trigger values (7.0 – 8.5) have historically been observed for most of the GW bores (GW2, GW3, GW4, GW5 and GW6) with the exception of GW1 and GW7 which have been below the trigger values for the monitoring rounds. As most of the groundwater used onsite is extracted from GW7, pH is not considered a risk. No long-term increasing or decreasing trends are evident throughout the years.
- Similar situation is observed for EC trigger values (400 µS/cm) which have historically been exceeded by most of the GW bores bores (GW2, GW3, GW4, GW5 and GW6) with the exception of GW1 (exempting 11/05/2023 and last three monitoring rounds on 25/11/2024, 20/02/2025 and 08/05/2025) and GW7 which have been below trigger values for the monitoring rounds. EC general trend shows an increase in EC concentration for the last reporting period.
- No long-term increasing or decreasing trends are evident for TN throughout the years. GW5 and GW6 were found to be the GW bores with lower TN concentrations while GW1 and G7 were found to be the bores with highest TN concentrations. Values ranged from <LOR – 7.8 mg/L
- No long-term increasing or decreasing trends are evident for TP throughout the years with values ranging from <LOR – 0.37 mg/L. The highest historical concentration was found for GW4 in 02/03/2021 with a concentration of 0.37 mg/L.
- No long-term increasing or decreasing trends are evident for *E.coli* throughout the years with values ranging from <LOR – 6,700 CFU/100 mL and highest historical concentration was found in 08/11/2023. Gaps in *E.coli* concentrations are present from 2019 to end of 2020 for all GW bores.
- An evident increase in *Enterococci* is evident for GW7 in the reporting period, however, no other evident trends are observed for the other GW bores. Gaps in *Enterococci* concentrations are present from 2019 to the end of 2020 for all GW bores.
- Historical total coliforms have an increase in the trend for the reporting period for GW7, which matches with *Enterococci* concentrations for this bore. This suggests that historical total coliforms in increasing trend for GW7 might be caused because of *enterococci* concentrations. Concentration of total coliforms in GW1 is highly variable with concentration ranging <LOR - 430,000 CFU/100 mL. Gaps in historical total coliforms are present from 2019 to the end of 2020 for all GW bores.
- It is noted that last monitoring round for GW2 was undertaken 04/08/2022.

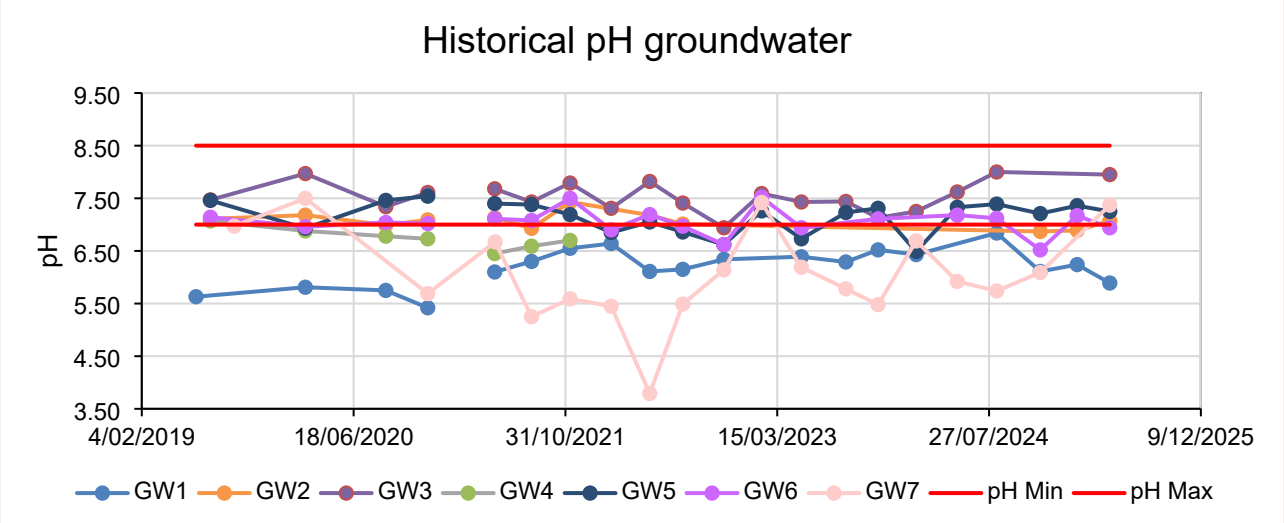

Figure 7-8. Historical pH values measured in groundwater bores (2019 – 2025)

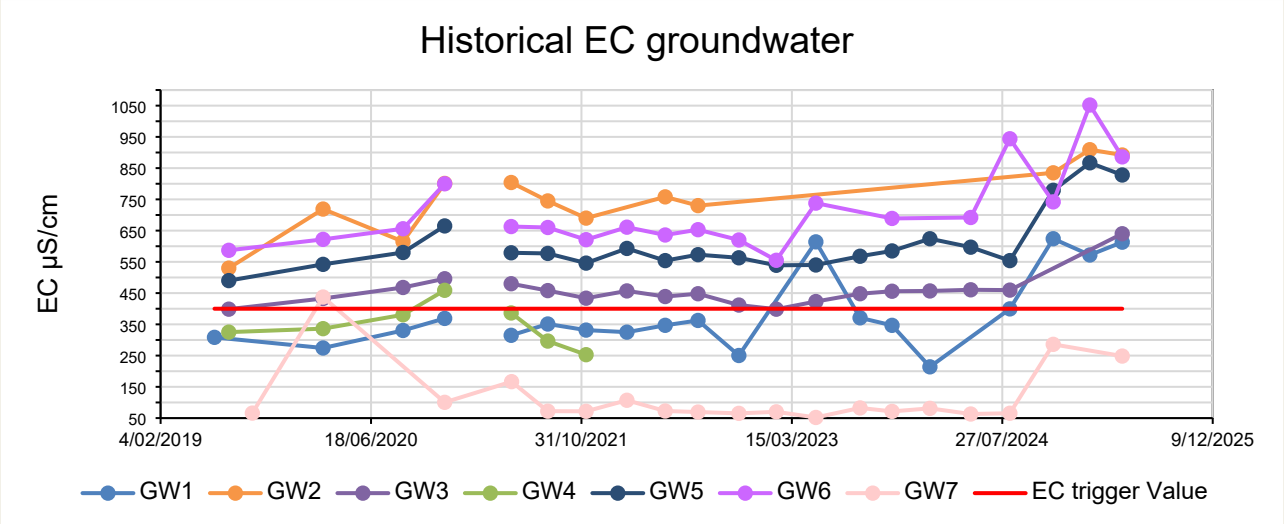

Figure 7-9. Historical EC values measured in groundwater bores (2019 – 2025)

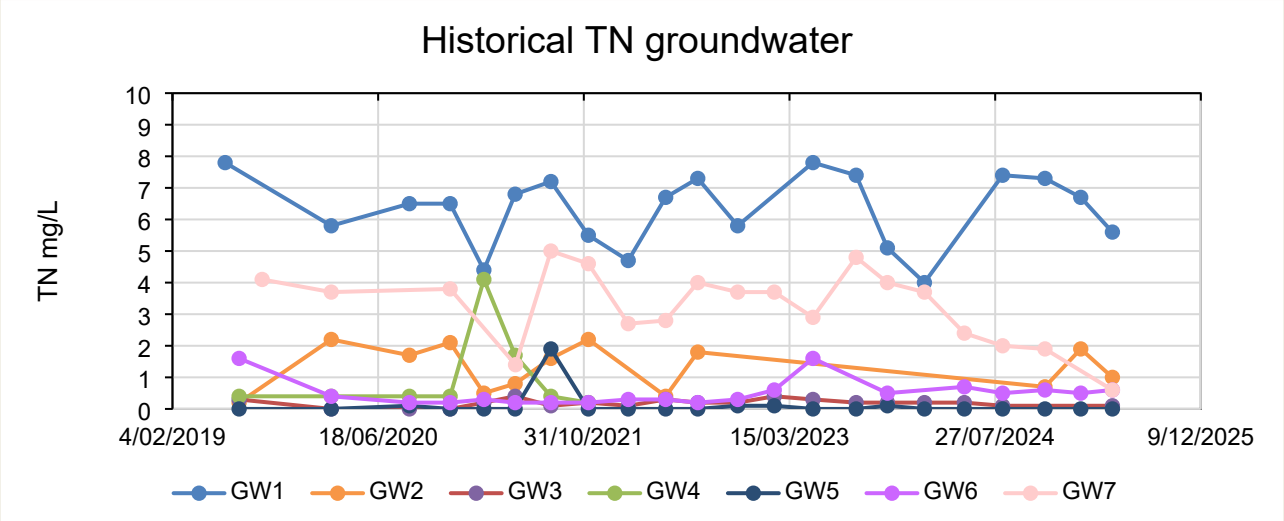

Figure 7-10. Historical Total Nitrogen (TN) values measured in groundwater bores (2019 – 2025)

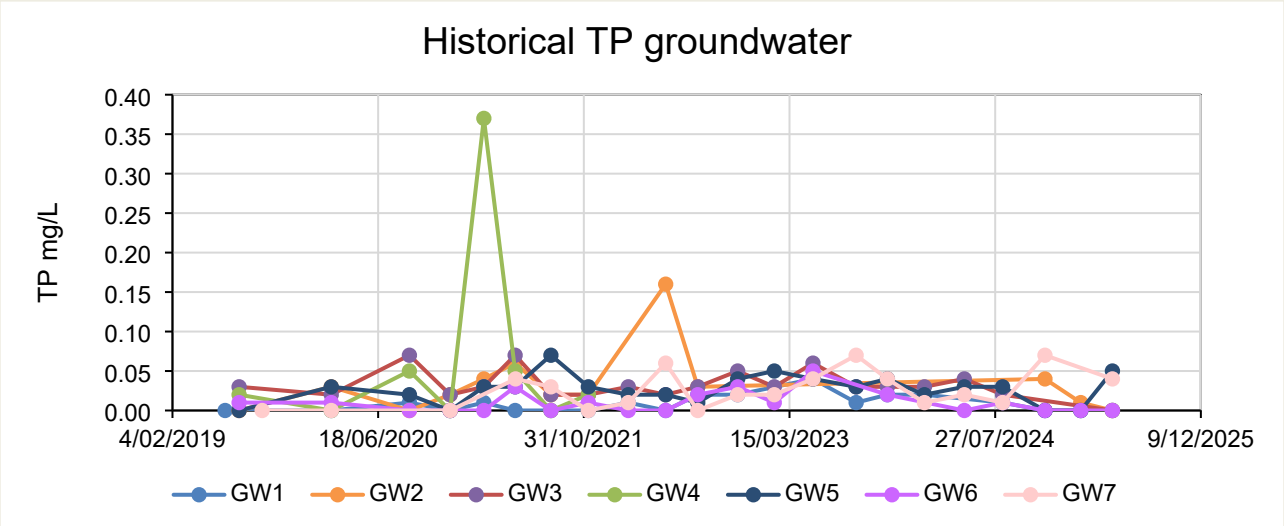

Figure 7-11. Historical Total Phosphorus (TP) values measured in groundwater bores (2019 – 2025)

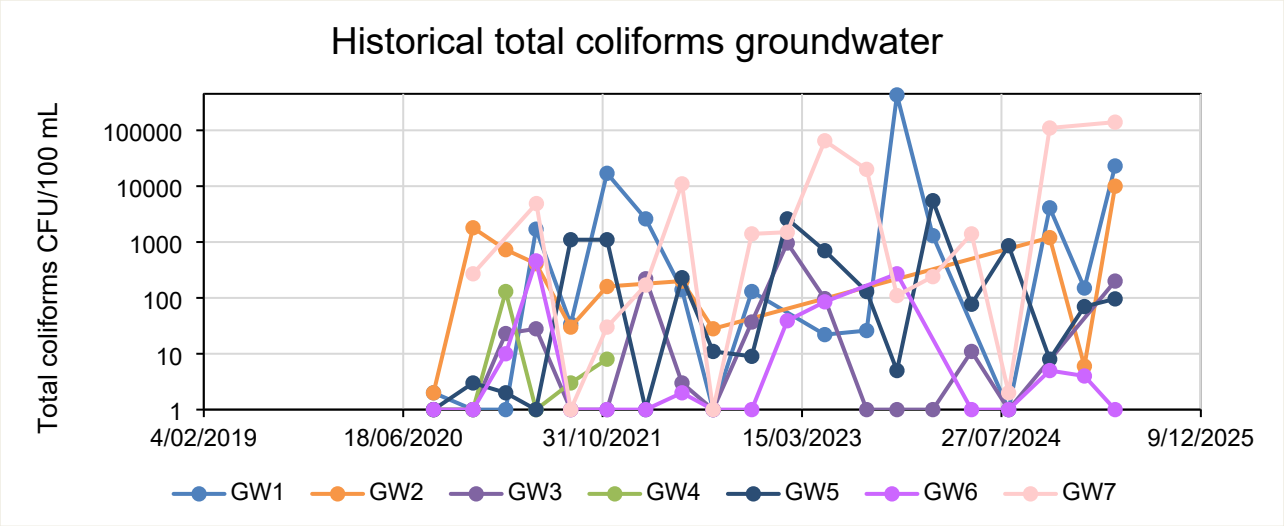

Figure 7-12. Historical total coliforms values measured in groundwater bores (2019 – 2025)

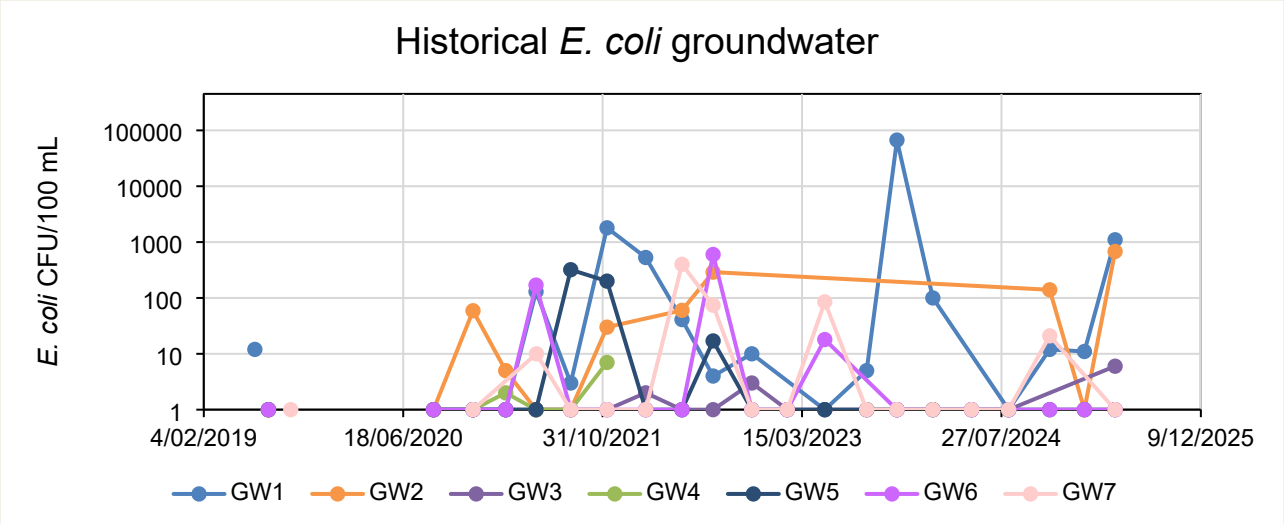

Figure 7-13. Historical *E. coli* values measured in groundwater bores (2019 – 2025)

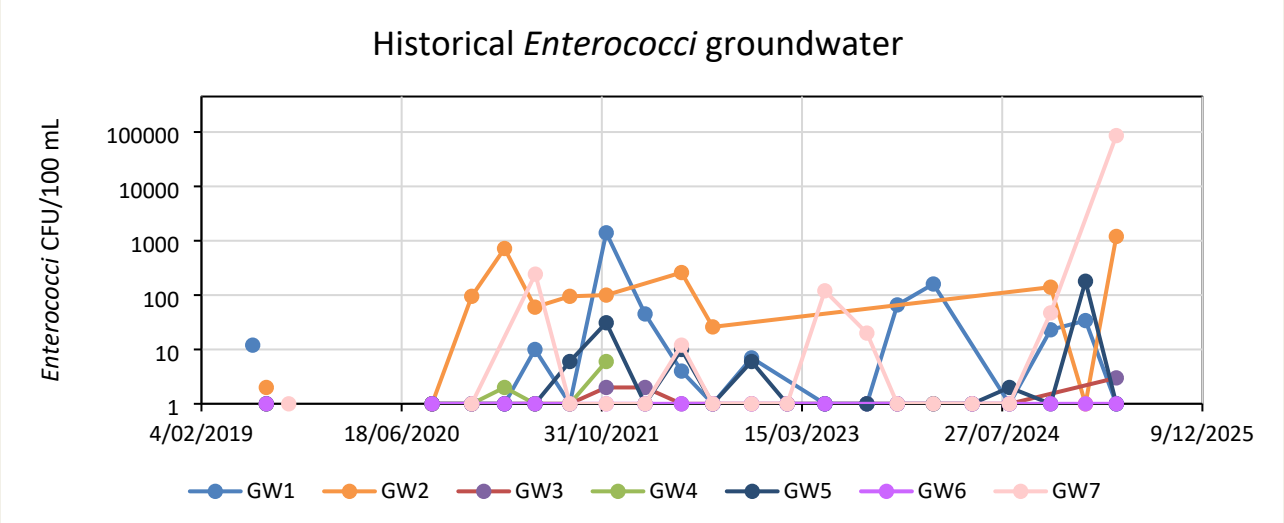

Figure 7-14. Historical *Enterococci* values measured in groundwater bores (2019 – 2025)

Non-compliance assessment

According to the EPL conditions, frequency and parameters monitoring are summarised as follows:

- Sample frequency compliance was met for the quarterly monitoring, however, GW3 and GW7 were not sampled on 20/02/2025 and 08/05/2025. It is noted that sampling of GW4 was not sampled due to this bore found decommissioned.
- Parameter sampling compliance was met for all groundwater monitoring rounds undertaken for the monitoring period.

Groundwater Standing Water Levels

Groundwater standing water level data was not provided to EcOz and so no assessment on historical SWLs has been undertaken.

7.3 Surface water quality

Exceedances of the trigger level were found for Total coliforms (8 exceedances), *E.coli* (8 exceedances), Enterococci (9 exceedances), EC (1 (8 exceedance), TN (12 exceedances), and TP (7 exceedances), for the reporting period. Table 7-11 below provides a summary of the surface water monitoring finding for the monitoring period.

According to the results detailed in Table 7-8, Table 7-9, Table 7-10 & Table 7-11 and Section 5.4 (Table 5-7 and Table 5-8), the following is discussed:

- No trigger values for pH, temperature, and ORP, RDS, salinity, DO, turbidity, NOx as N, TKN as N, Ca, Mg, Na, K, total anion, total cation, ionic balance, hydroxide alkalinity, carbonate alkalinity, bicarbonate alkalinity, total alkalinity and SO4 have been defined.
- No exceedances of the trigger values were detected for pH.
- Exceedances of EC were detected at SW1 and SW2 for one monitoring round only (08/05/2025).
- Exceedances of TN were detected for all 5 monitoring rounds and all 4 sampling locations. However, variation between sampling location was minimal (results range 0.2 – 0.7 mg/L), suggesting that the exceeding values might not be due to DCF activities.

- Exceedances of TP were detected at 2 out of 4 sampling locations. However, variation between sampling location was minimal (<LOR – 0.1 mg/L) suggesting that the exceeding values might not be due to DCF activities.
- Exceedances of total coliforms, *E.coli* and *Enterococci* were detected at all 4 sampling locations. Limited exceedances were found for the last two monitoring rounds (*E.coli* 120 CFU/100 mL and Enterococci 300 CFU/100 mL at SW2), suggesting that bacteriological load have been reduced during these monitoring rounds sampling period. On the contrary, results also suggest that bacteriological load was greater upstream (SW1) than downstream (SW4).

Table 7-8. Trigger value exceedances for total coliforms, *E. Coli* and *Enterococci* in surface water during the reporting period

Analyte	Guideline	Results range (CFU/100mL)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (CFU/100mL)
Total coliforms	Any increase form previous monitoring round.	6,500 – 39,000	16/12/2025	**SW1**	6,500
				SW2	7,200
			03/02/2025	**SW1**	9,200
				SW2	7,700
			20/02/2025	**SW1**	27,000
				SW2	20,000
				SW3	23,000
				SW4	39,000
E.coli	Any increase form previous monitoring round.	100 – 6,400	16/12/2025	**SW1**	100
			03/02/2025	**SW1**	160
				SW2	140
			20/02/2025	**SW1**	710
				SW2	990
				SW3	2,400
				SW4	6,400
			08/05/2025	**SW2**	120
Enterococci	Any increase form previous monitoring round.	65 – 690	16/12/2024	**SW1**	220
				SW2	65
			3/02/2025	**SW1**	80
				SW2	98
			20/02/2025	**SW1**	690
				SW2	140
				SW3	250
				SW4	210

Analyte	Guideline	Results range (CFU/100mL)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (CFU/100mL)
			28/04/2025	**SW2**	300

Table 7-9. Trigger value exceedances for EC in surface water during the reporting period

Analyte	Guideline*	Results range (µS/cm)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (µS/cm)
Electric Conductivity (EC)	200µS/cm	50 – 270	08/05/2025	**SW1**	525
				SW2	270

* If the concentration at SW1 is greater than the trigger value, then the concentration at SW1 becomes the trigger value

Table 7-10. Trigger value exceedances for TN and TP in surface water during the reporting period

Analyte	Guideline*	Results range (mg/L)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (mg/L)
Total Nitrogen (TN)	0.23 mg/L	0.2 – 0.7	16/12/2024	**SW1**	0.6
				SW2	0.7
			03/02/2025	**SW1**	0.4
				SW2	0.5
			20/02/2025	**SW1**	0.4
				SW2	0.4
				SW4	0.3
			28/04/2025	**SW1**	0.3
				SW2	0.3
			08/05/2025	**SW1**	0.4
				SW2	0.4
				SW3	0.5
Total Phosphorus	0.01mg/L	<LOR – 0.1	16/12/2024	**SW1**	0.02
				SW2	0.1
			03/02/2024	**SW1**	0.02
				SW2	0.04
			28/04/2025	**SW1**	0.02
			08/05/2025	**SW1**	0.01

Analyte	Guideline*	Results range (mg/L)	Sample ID exceeding trigger value		
			Sample date	Sample ID	Result (mg/L)
				SW2	0.01

**If the concentration at SW1 is greater than the trigger value, then the concentration at SW1 becomes the trigger value.*

Table 7-11. Surface water quality monitoring results (2020 – 2025)

Concentrations in breach of EPL297 trigger values are highlighted in red.

Site ID	Date	pH	Temp	ORP	EC	TDS	Sal	DO	Turb	TDS (lab)	BOD	NH3	NO2-N	NO3-N	NOx as N	TKN as N	TN	Reactive P	TP	Ca	Mg	Na	K	Total Anions	Total Cations	Ionic Balance	SAR	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	SO4	Chloride	Chlorphyll a	Oil & Grease	Faecal Coliforms	Total Coliforms	*E.coli*	*Enterococci*
EPL297 Appendix A, Table 3 trigger values for surface water		**6.0-7.5**			**200**												**0.23**		**0.01**																		any increase from previous	any increase from previous	any increase from previous
SW1	24/02/2020	7.17			60						2	0.08	<0.01	0.03	0.03	0.8	0.8		0.02																		5800	200	~500
SW2	24/02/2020	7.35			82						2	0.10	<0.01	0.05	0.05	0.7	0.8		0.01																		~7300	1900	70
SW3	25/02/2020	5.83	29.6	129	41	27	0.0	51	10.6		<2	0.13	<0.01	0.03	0.03		0.3	<0.01	<0.01	<1	<1	3	<1	0.24	0.13		0.72					<1	3				10000	260	220
SW4	25/02/2020	6.01	29.1	240	31	20	0.0	48	11.8		<2	0.04	<0.01	0.07	0.07		0.3	<0.01	0.03	1	<1	4	<1	0.31	0.22		0.82					<1	6				12000	220	210
SW1	10/03/2020	6.89			38						<2	0.02	<0.01	<0.01	<0.01	0.5	0.5		0.02																		40000	280	230
SW2	10/03/2020	6.96			45						2	0.03	<0.01	0.01	0.01	0.4	0.4		0.02																		19000	220	250
SW1	10/12/2020	7.01	28.1	152	251	163	0.1	21	46.5						0.13	0.6	0.7		0.02	14	5	2	2	1.40	1.25			<1	<1	67	67	<1	2				24000	140	54
SW2	10/12/2020	7.78	28.1	156	600	390	0.3	61	42.8						0.05	1.4	1.4		0.13	26	24	18	8	4.44	4.26			<1	<1	180	180	<1	30				28000	230	64
SW3	10/12/2020	5.89	28.2	213	63	41	0.0	33	41.9						0.63	0.6	1.2		0.02	2	1	4	1	0.41	0.38			<1	<1	7	7	1	9				34000	520	310
SW4	10/12/2020	6.63	28.7	192	67	44	0.0	32	43.2						0.56	0.6	1.2		0.03	2	1	4	1	0.46	0.38			<1	<1	8	8	2	9				24000	230	110
SW1	14/01/2021	-			-										0.03	1.1	1.1		0.09	8	3	2	1	0.84	0.76			<1	<1	38	38	<10	3				3200	28	250
SW2	14/01/2021	-			-										0.03	0.4	0.4		0.02	4	2	2	1	0.52	0.48			<1	<1	22	22	<10	3				4400	180	160
SW3	14/01/2021	-			-										0.08	0.2	0.3		<0.01	2	1	4	<1	0.36	0.36			<1	<1	11	11	<10	5				3700	~220	~60
SW4	14/01/2021	-			-										0.07	0.2	0.3		<0.01	1	<1	3	<1	0.30	0.18			<1	<1	8	8	<1	5				4300	~210	160
SW2	1/03/2021	-			-										<0.01	0.2	0.2		0.01	3	1	2	<1	0.36	0.32			<1	<1	14	14	<1	3				17000	170	~120
SW4	1/03/2021	-			-										0.09	<0.1	<0.1		<0.01	1	<1	3	<1	0.22	0.18			<1	<1	4	4	<1	5				8700	310	~120
SW1	2/03/2021	-			-										<0.01	0.2	0.2		0.01	3	1	2	<1	0.30	0.32			<1	<1	11	11	<1	3				16000	170	~140
SW3	2/03/2021	-			-										0.12	<0.1	0.1		<0.01	1	<1	3	<1	0.23	0.18			<1	<1	6	6	<1	4				7700	370	72
SW1	17/05/2021	7.06	21.9	247	52	34	0.00	47	9.1						0.02	0.3	0.3		0.01	4	2	3	<1	0.52	0.49			<1	<1	23	23	<1	2				12000	70	190
SW2	17/05/2021	7.10	22.5	237	93	61	0.00	41	5.6						0.05	0.3	0.4		0.01	9	4	3	<1	1.02	0.91			<1	<1	47	47	<1	3				10000	82	140
SW3	17/05/2021	6.66	22.0	254	32	21	0.00	55	7.4						0.07	0.2	0.3		<0.01	<1	<1	4	<1	0.25	0.17			<1	<1	7	7	<1	4				4600	390	490
SW4	17/05/2021	7.16	22.3	175	36	23	0.00	64	7.8						0.06	0.2	0.3		<0.01	<1	<1	4	<1	0.25	0.17			<1	<1	7	7	<1	4				8200	520	300
SW1	11/01/2022				40										0.01	0.4	0.4		0.02	4	2	2	<1	0.56	0.45	-		<1	<1	24	24	<1	3				7700	41	22
SW2	11/01/2022	-			48										<0.01	0.5	0.5		0.02	5	2	2	<1	0.60	0.50	-		<1	<1	26	26	<1	3				4400	100	39
SW3	11/01/2022	-			28										<0.01	0.4	0.4		0.02	1	<1	3	<1	0.28	0.18	-		<1	<1	7	7	<1	5				11000	100	88
SW4	11/01/2022	-			26										0.01	0.5	0.5		0.02	1	<1	3	<1	0.26	0.18	-		<1	<1	6	6	<1	5				15000	550	160
SW1	16/02/2022	6.75	29.9	98	96	63	0.04	103	9.1						0.08	0.3	0.4		0.02																		~5200	~190	180
SW2	16/02/2022	6.26	29.7	107	42	27	0.01	77	7.4						0.02	0.3	0.3		0.02																		~2200	~230	230
SW3	16/02/2022	5.72	29.0	126	31	20	0.01	124	11.0						0.08	0.3	0.4		0.01																		~830	260	110
SW4	16/02/2022	7.76	29.3	123	33	21	0.01	97	13.0						0.07	0.2	0.3		0.10																		1000	350	120
SW1	18/05/2022	6.91			64	42	0.03	78	11.5						0.02	0.2	0.2		<0.01																		2600	~90	200
SW2	18/05/2022	7.44			95	62	0.04	81	-						0.03	0.2	0.2		0.02																		1000	100	140
SW3	18/05/2022	7.43			32	21	0.01	92	7.9						0.04	0.1	0.1		<0.01																		2600	330	260
SW4	18/05/2022	7.62			34	22	0.01	95	7.9						0.04	0.2	0.2		0.02																		2200	250	280
SW1	6/02/2024	6.88	30.8	250	56	36	0.02	93	3.8						<0.01	0.2	0.2		0.02	----	----	----	----	----	----	----		----	----	----	----	----	----	----			2500	84	130
SW2	6/02/2024	6.65	30.7	312	41	27	0.02	94	4.9						<0.01	0.3	0.3		0.02	----	----	----	----	----	----	----		----	----	----	----	----	----	----			3500	86	150
SW3	6/02/2024	6.41	30.6	361	39	25	0.02	93	5.3						0.08	0.2	0.3		0.01	----	----	----	----	----	----	----		----	----	----	----	----	----	----			3000	~210	100
SW4	6/02/2024	6.35	30.5	299	33	21	0.01	95	3.6						0.08	0.2	0.3		0.02	----	----	----	----	----	----	----		----	----	----	----	----	----	----			3300	150	100
SW1	14/03/2024				29 (lab)										<0.01	0.4	0.4		0.01	2	1	2	<1	0.65	0.27	----		<1	<1	14	14	<1	13				>4800	260.0	100
SW2	14/03/2024				37 (lab)										<0.01	0.5	0.5		<0.01	3	2	2	<1	0.73	0.40	----		<1	<1	18	18	<1	13				>4800	210.0	160.00
SW1	18/04/2024				48 (lab										<0.01	0.3	0.3		0.02	4	2	2	<1	0.54	0.45	----		<1	<1	23	23	<1	3				5800	52	120
SW1	13/05/2024	6.83	27.0	219	47	31	0.02	86	4.6						0.0	0.4	0.4		0.03	-	-	-	-	-	-	-		-	-	-	-	-	-	-			5300.0	~92	110.0
SW2	13/05/2024	6.73	27.7	224	71	46	0.03	75	203.0						0.1	0.3	0.4		0.04	-	-	-	-	-	-	-		-	-	-	-	-	-	-			4100.0	~110	64.0
SW3	13/05/2024	6.52	28.7	208	31	20	0.01	98	1.7						0.1	0.3	0.4		0.01	-	-	-	-	-	-	-		-	-	-	-	-	-	-			5700.0	120.0	150.0
SW4	13/05/2024	6.43	27.5	216	28	18	0.01	98	1.6						0.1	0.2	0.2		<0.01	-	-	-	-	-	-	-		-	-	-	-	-	-	-			5800.0	~42	190.0
SW1	16/12/2024	6.20	30.0	-	68 (lab)	-	-	-	-						0.0	0.6	0.6		0.02	6.0	2.0	3.0	<1	0.8	0.6	----		<1	<1	28.0	28.0	<1	7.0				6500.0	100.0	220.0
SW2	16/12/2024	6.20	29.0	-	115 (lab)	-	-	-	-						<0.01	0.7	0.7		0.1	9.0	4.0	5.0	2.0	1.3	1.1	----		<1	<1	50.0	50.0	<1	10.0				7200.0	140.0	65.0
SW1	3/02/2025	6.20	29.0	-	58 (lab)	-	-	-	-						<0.01	0.4	0.4		0.02	6.0	2.0	3.0	<1	0.7	0.6	----		<1	<1	27.0	27.0	<1	4.0				9200.0	160.0	280.0
SW2	3/02/2025	6.20	29.0	-	78 (lab)	-	-	-	-						0.0	0.5	0.5		0.04	8.0	4.0	3.0	<1	0.9	0.9	----		<1	<1	37.0	37.0	<1	5.0				7700.0	140.0	98.0
SW1	20/02/2025	6.92	29.2	174	80	52	0.04	123	6.3						0.0	0.4	0.4		<0.01	----	----	----	----	----	----	----		----	----	----	----	----	----	----			27000.0	710.0	690.0
SW2	20/02/2025	6.78	29.5	164	95	62	0.04	115	6.2						0.0	0.4	0.4		<0.01	----	----	----	----	----	----	----		----	----	----	----	----	----	----			20000.0	990.0	140.0
SW3	20/02/2025	7.30	28.1	141	50	32	0.02	104	5.2						0.0	0.2	0.2		<0.01	----	----	----	----	----	----	----		----	----	----	----	----	----	----			23000.0	2400.0	250.0
SW4	20/02/2025	6.76	28.3	161	54	35	0.02	119	6.1						0.0	0.3	0.3		<0.01	----	----	----	----	----	----	----		----	----	----	----	----	----	----			39000.0	6400.0	210.0
SW1	28/04/2025	-	-	-	29.0	-	-	-	-						<0.01	0.3	0.3		0.02	3.0	<1	2.0	<1	0.3	0.2	----		<1	<1	13.0	13.0	<1	3.0				17000.0	290.0	500.0
SW2	28/04/2025	-	-	-	37.0	-	-	-	-						0.0	0.3	0.3		<0.01	4.0	1.0	2.0	<1	0.4	0.4	----		<1	<1	18.0	18.0	<1	2.0				15000.0	120.0	300.0
SW1	8/05/2025	7.16	26.4	130.2	252.0	164.0	0.12	95.4	3.99						0.01	0.4	0.4		0.01																		9800.0	260.0	290.0
SW2	8/05/2025	7.03	27.1	161.9	270.8	176.0	0.13	91.6	5.22						0.02	0.4	0.4		<0.01																		10000.0	120.0	190.0
SW3	8/05/2025	6.64	25.9	159.0	243.7	158.0	0.11	93.6	4.25						0.07	0.4	0.5		0.01																		11000.0	760.0	200.0
SW4	8/05/2025	6.57	26.0	162.3	242.1	157.0	0.11	97.7	4.20						0.07	0.1	0.2		<0.01																		21000.0	760.0	150.0

Historical trend for surface water

Historical trend for the data (2020 – 2025) is presented and summarised as follows:

- pH exceedances of the trigger values (6 – 7.5) have been historically found for SW2, SW3 and SW4 with the exemption of SW1. Data gap is observed from end of 2020 to end of 2021 for all surface water sampling locations. No long-term increased or decreased is observed for surface water sampling locations with the exemption of SW3 which presents an increase trend.
- EC exceedances of the trigger values (200 µS/cm) have been found for in two monitoring rounds for SW1 (10/12/2020 and last monitoring round (08/05/2025)) and in one monitoring round for SW4 (08/05/2025). An increased trend for SW1 and SW1 was observed in 2025.
- Exceedances of TN trigger values (0.01 mg/L) is observed historically throughout all sampling locations and throughout all monitoring rounds. Concentration for TN have historically decreased with a slight increase from June 2024 - May 2025. However, it is noted that TN concentration ranged from <LOR – 1.4 mg/L.
- TP concentrations trend has shown a drastically decreased from 2020 with a slight increase from June 2024 – May 2025, which is similar with TN trends. Higher historical TP concentrations are observed in SW2 (0.13 mg/L for 10/12/2020 monitoring round) and SW4 (0.1 mg/L for 16/02/2022 monitoring round). Exceedances of the trigger values are observed historically throughout all sampling locations and throughout all monitoring rounds.
- An increase in concentration valued for *E.coli* are observed for all sampling locations for the reporting period. A considerable increase of E.coli is observed for SW4 (6,400 CFU/100 mL for 20/02/2025 monitoring round) and SW3 (2,400 CFU/100 mL for 20/02/2025 monitoring round).
- A slight increase for the sampling locations and an increase in concentration valued for *Enterococci* are observed for SW1 for the reporting period (690 CFU/100 mL for 20/02/2025 monitoring round).
- Total coliforms show a drastically decreased of total coliform concentrations for all sampling locations from 2020 – 2021 with a stabilisation period during 2011 – end of 2023. Increase in total coliforms concentration is observed for the reporting period. Considering *E. coli* and *Enterococci* concentrations, the reporting period faecal concentration might be originally from *E.coli* high concentrations at SW3 and SW4 sampling location, *Enterococci* at SW1 and by E.*coli* and *Enterococci* at SW2.

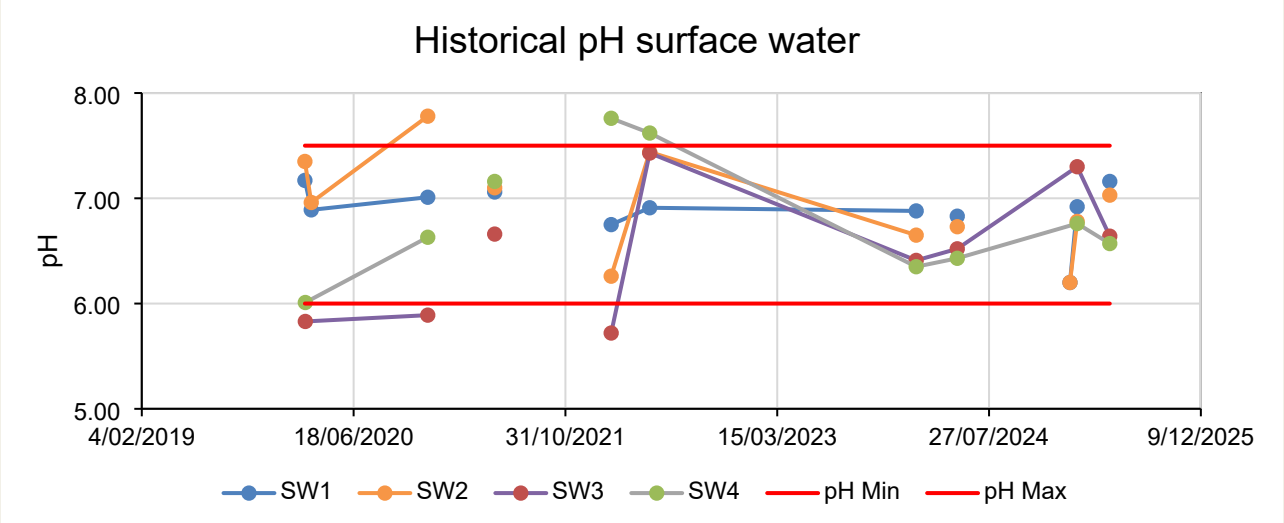

Figure 7-15. Historical pH values measured in surface water (2020 – 2025)

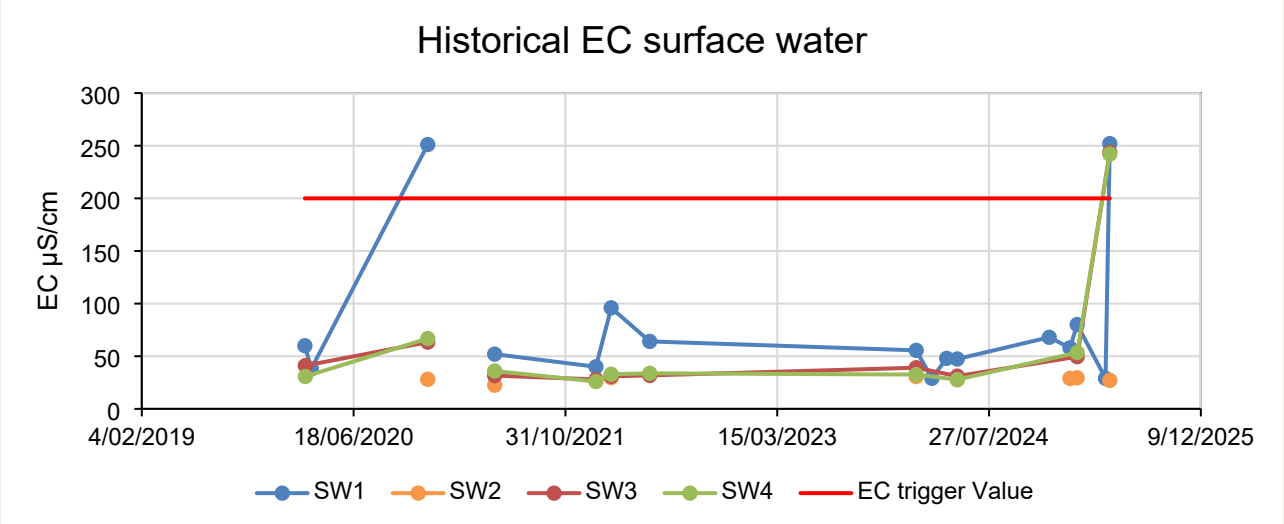

Figure 7-16. Historical EC values measured in surface water (2020 – 2025)

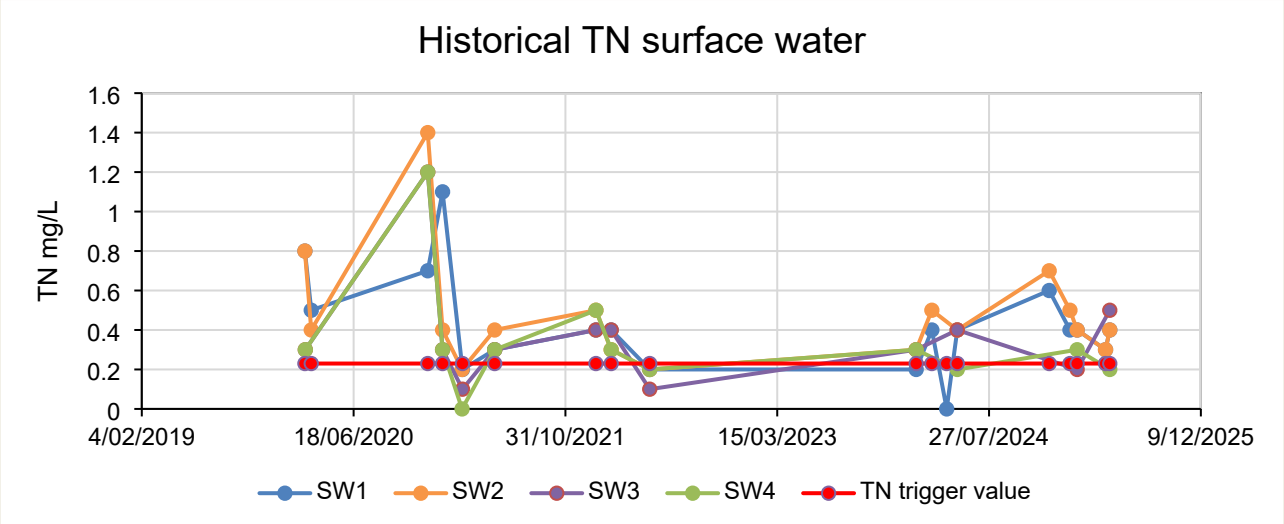

Figure 7-17. Historical TN values measured in surface water (2020 – 2025)

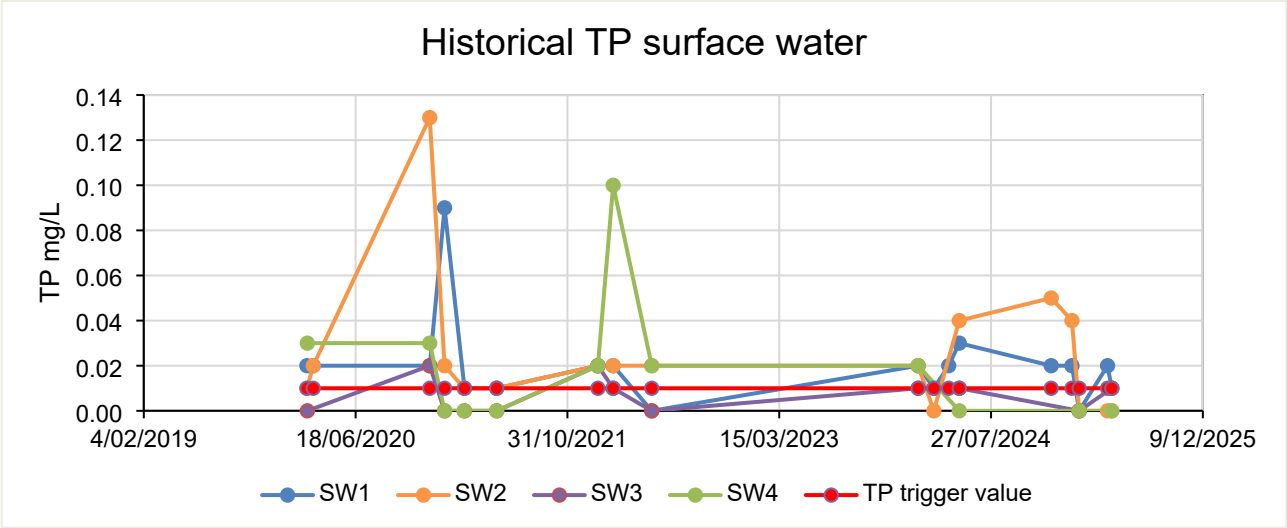

Figure 7-18. Historical TP values measured in surface water (2020 – 2025)

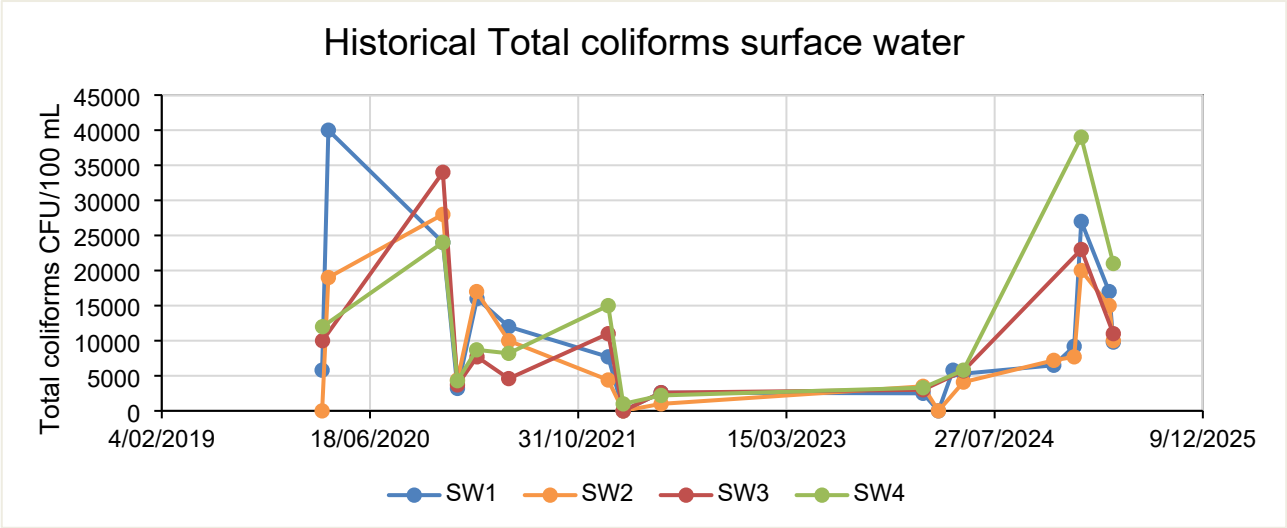

Figure 7-19. Historical total coliforms values measured in surface water (2020 – 2025)

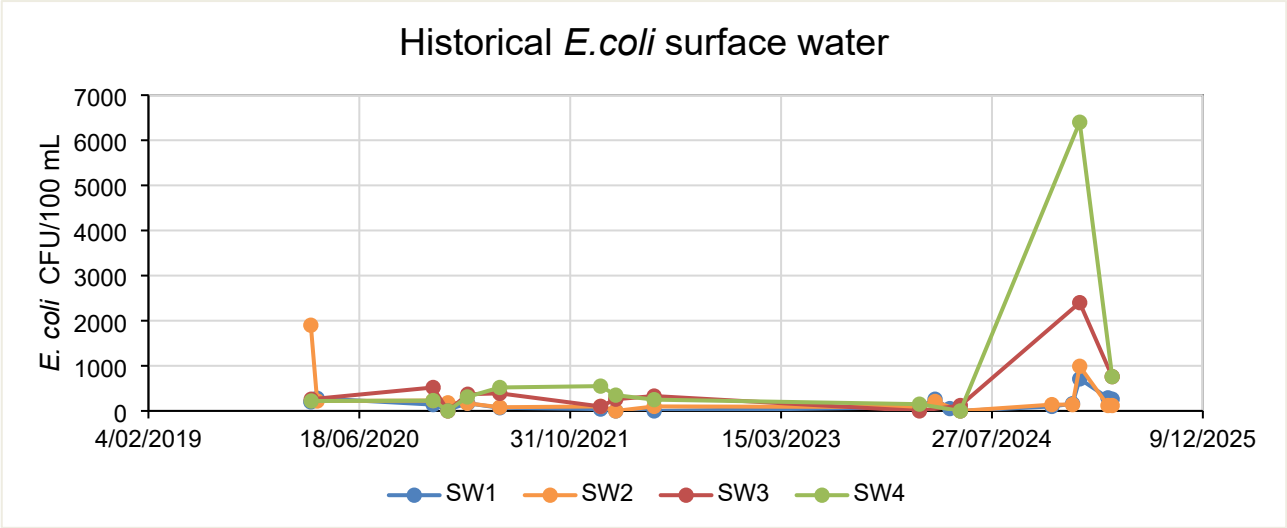

Figure 7-20. Historical *E. coli* values measured in surface water (2020 – 2025)

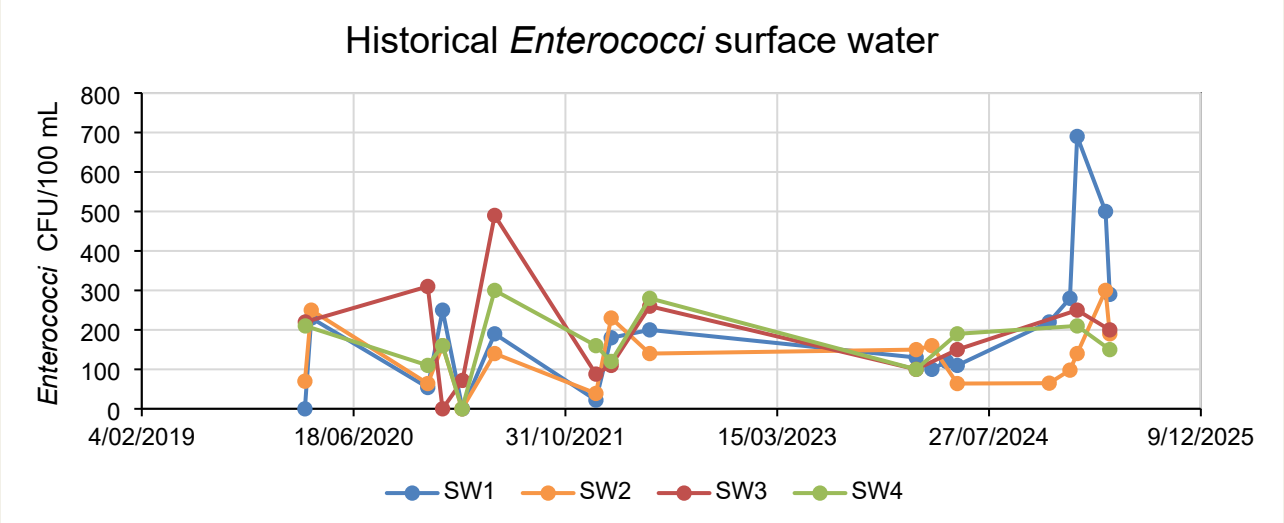

Figure 7-21. Historical *Enterococci* values measured in surface water (2020 – 2025)

Non-compliance assessment

According to the EPL conditions, frequency and parameters monitoring are summarised as follows:

- Sample frequency compliance was met in two monitoring events only (20/02/2025 and 08/05/2025) of a total of 5 monitoring rounds. Three (3) monitoring rounds were undertaken during wet season as per requirements. However, because of lack of sampling monitoring for SW3 and SW4 (16/12/2024 and 28/04/2025), is it not considered not compliant for sample frequency.
- Parameter sampling compliance was met for all (5) the monitoring rounds.

7.4 Soil quality

Exceedances of the trigger level were found for pH (6 exceedances, all samples), EC (6 exceedances, all samples), TN (5 exceedances), TP (3 exceedances), Total coliforms (6 exceedances, all samples), and Enterococci (6 exceedances, all samples) for the reporting period.

According to the results and Section 5.4 (Table 5-7 and Table 5-8), the following is discussed:

- No trigger values for NOx as N, TKN as N, have been defined.
- Exceedances of pH for trigger values (6 - 8) were detected at all sampling locations (SS1, SS2, SS3, SS4, SS5 and SS6). pH values range from 5.1 – 5.9.
- Exceedances of EC were detected at most of the sampling locations (SS1, SS2, SS3, SS4, and SS6) with the exemption for SS05. EC values range from 36 – 238 µS/cm.
- Exceedances of TN were detected at most of the sampling locations (SS1, SS2, SS3, SS4, and SS6) with the exemption for SS05. TN concentrations range from 480 – 1460 mg/kg
- Exceedances of TP were detected at SS1. SS4 and SS6. TP concentrations range from 75 – 696 mg/kg. Even though the highest value for TP is 696 mg/kg (SS5), this was not considered an exceedance due to the value was below the concentration from the last reporting period.
- Exceedances of total coliforms, *Enterococci* were detected at all sampling locations. No exceedances of *E.coli* were observed; hence, it is inferred that exceedances of total coliforms are given by *Enterococci* concentrations.

Table 7-12. Trigger value exceedances for pH in soil during reporting period

Analyte	Guideline (pH)	Results range (pH)	Sample ID exceeding trigger value		
			Sampled date	Sample ID	Result (pH)
pH	6.0 – 8.0	5.0 – 5.9	12/05/2025	**SS1**	5.1
				SS2	5.0
				SS3	5.4
				SS4	5.2
				SS5	5.9
				SS6	5.5

Table 7-13. Trigger value exceedances for EC in soil during reporting period

Analyte	Guideline	Results range (µS/cm)	Sample ID exceeding trigger value		
			Sampled date	Sample ID	Result (µS/cm)
EC	Any increase from previous round	36 – 238	12/05/2025	**SS1**	36
				SS2	55
				SS3	40
				SS4	140
				SS6	238

Table 7-14. Trigger value exceedances for TN and TP in soil during reporting period

Analyte	Guideline	Results range (mg/kg)	Sample ID exceeding trigger value		
			Sampled date	Sample ID	Result (mg/kg)
TN	Any increase from previous round	480 – 1460	12/05/2025	**SS1**	980
				SS2	860
				SS3	860
				SS4	1,070
				SS6	1,460
TP	Any increase from previous round	75 – 696	12/05/2025	**SS1**	164
				SS4	151
				SS6	328

Table 7-15. Trigger value exceedances for *Enterococci* and total coliforms in soil during reporting period

Analyte	Guideline	Results range (CFU/100 mL)	Sample ID exceeding trigger value		
			Sampled date	Sample ID	Result (CFU/100 mL)
Enterococci	Any increase from previous round	670 – 9,000	12/05/2025	**SS1**	2,400
				SS2	3,700
				SS3	1,800
				SS4	3,300
				SS5	9,000
				SS6	670
Total coliforms	Any increase from previous round	2,500 – >27,000	12/05/2025	**SS1**	4,600
				SS2	2,500
				SS3	8,900
				SS4	>26,000
				SS5	>26,000
				SS6	>27,000

Table 7-16. Soil monitoring results baseline sampling (2019 – 2025)

Concentrations in breach of EPL297 trigger values are highlighted in red.

Site ID	Date	Depth	Moisture Content	pH	EC	NOx	TKN	TN	TP	Enterococci	Total Coliforms	*E.coli*
	Units:	m	%	pH units	µS/cm	mg/kg	mg/kg	mg/g	mg/kg	MPN/g	MPN/g	MPN/g
	LOR:	0.1	0.1	0.1	1	0.1	20	20	2	10	10	10
EPL297 trigger values				6-8	Any increase from previous			Any increase from previous	Any increase from previous	Any increase from previous	Any increase from previous	Any increase from previous
SS1	12/06/2019	0.4	1.0	6.0	11	0.5	340	340	86			
SS1	12/06/2019	1.0	2.9	6.0	11	3.3	170	170	52			
SS1	18/05/2021	0.4	7.1	5.5	30	1.1	310	310	95	2100	<11	11
SS1	12/04/2022	0.4	7.3	6.0	8	0.5	340	340	91	21	49	10
SS1	27/03/2023	0.4	10.6	5.1	14	0.4	300	300	58	990	370	11
SS1	14/05/2024	0.4	1.7	5.1	21	0.6	470	470	48	380	10	10
SS1	12/05/2025		3.7	5.1	36	2.1	980	980	164	2400	4600	11
SS2	13/06/2019	0.4	0.9	7.4	6	1.5	250	250	46			
SS2	13/06/2019	1.0	1.8	7.4	8	2.0	220	220	57			
SS2	18/05/2021	0.4	4.6	5.7	32	0.9	560	560	137	520	78	11
SS2	12/04/2022	0.4	7.2	6.0	6	0.4	260	260	56	16	49	10
SS2	27/03/2023	0.4	7.3	5.5	29	0.4	230	230	67	150	<11	11
SS2	14/05/2024	0.4	2.7	5.2	43	0.5	810	810	123	1400	1200	11
SS2	12/05/2025		2.0	5.0	55	0.4	860	860	75	3700	2500	10
SS3	13/06/2019	0.4	3.1	7.3	8	2.3	280	280	79			
SS3	13/06/2019	1.0	5.0	7.7	6	1.6	200	200	80			

Site ID	Date	Depth	Moisture Content	pH	EC	NOx	TKN	TN	TP	Enterococci	Total Coliforms	*E.coli*
	Units:	m	%	pH units	µS/cm	mg/kg	mg/kg	mg/g	mg/kg	MPN/g	MPN/g	MPN/g
	LOR:	0.1	0.1	0.1	1	0.1	20	20	2	10	10	10
SS3	18/05/2021	0.4	6.0	6.0	50	0.6	180	180	90	1100	120	11
SS3	12/04/2022	0.4	7.2	6.2	7	1.2	220	220	81	28	49	10
SS3	27/03/2023	0.4	7.6	5.2	36	0.6	190	190	62	350	22	11
SS3	14/05/2024	0.4	2.4	5.4	19	0.3	590	590	86	570	21	10
SS3	12/05/2025		1.9	5.4	40	0.7	860	860	75	1800	8900	10
SS4	13/06/2019	0.4	1.9	7.8	9	2.1	400	400	78			
SS4	13/06/2019	1.0	2.7	7.5	6	2.5	420	420	78			
SS4	18/05/2021	0.4	5.1	5.1	25	0.6	360	360	99	2300	<11	11
SS4	12/04/2022	0.4	7.0	5.4	8	1.0	210	210	49	<10	29	10
SS4	27/03/2023	0.4	8.4	4.8	19	0.4	180	180	70	81	6700	11
SS4	14/05/2024	0.4	3.0	5.1	41	0.3	470	470	87	270	110	10
SS4	12/05/2025		3.9	5.2	140	8.9	1060	1070	151	3300	>26000	11
SS5	13/06/2019	0.4	5.0	8.0	6	6.2	1210	1220	794			
SS5	13/06/2019	1.0	3.8	8.1	15	3.6	950	950	462			
SS5	18/05/2021	0.4	4.8	6.1	48	0.4	300	300	319	79	22	11
SS5	12/04/2022	0.4	12.6	7.6	63	1.2	1580	1580	2210	38	49	10
SS5	27/03/2023	0.4	11.8	5.8	71	0.3	260	260	235	47	>27000	11
SS5	14/05/2024	0.4	5.9	6.8	178	0.6	600	600	902	170	2200	11
SS5	12/05/2025		9.6	5.9	132	4.3	480	480	696	9000	>26000	11
SS6	13/06/2019	0.4	3.5	7.7	7	8.9	470	480	96			
SS6	13/06/2019	1.0	4.5	7.8	9	10.4	450	460	134			

Site ID	Date	Depth	Moisture Content	pH	EC	NOx	TKN	TN	TP	Enterococci	Total Coliforms	*E.coli*
	Units:	m	%	pH units	µS/cm	mg/kg	mg/kg	mg/g	mg/kg	MPN/g	MPN/g	MPN/g
	LOR:	0.1	0.1	0.1	1	0.1	20	20	2	10	10	10
SS6	18/05/2021	0.4	5.9	6.8	65	1.1	210	210	350	93	1200	11
SS6	12/04/2022	0.4	11.7	6.9	9	1.4	270	270	178	<10	47	10
SS6	27/03/2023	0.4	16.6	5.3	211	0.8	260	260	410	<12	>28000	12
SS6	14/05/2024	0.4	7.8	8.0	192	0.8	400	400	124	<11	<11	11
SS6	12/05/2025		7.0	5.5	238	3.6	1460	1460	328	670	>27000	11

Historical trend for soil

Historical trend for the data (2019 – 2025) is presented and summarised as follows:

- pH exceedances of the trigger values (6 – 8) have been historically found for all sampling locations. Long term decrease of pH is observed for all sampling location. A peak in pH concentration was identified at SS6 (14/05/2024) and decreased drastically in the next monitoring round (12/05/2025). pH values for the reporting period were identified as the lower historical values, with all the pH detected below 6.
- Increase of EC values were identified for soil from 2022 – 2025. Highest EC values were detected for SS6 and SS5 with ranges of 7 – 238 µS/cm and 6 – 178 µS/cm respectively.
- Increase of TN concentration was identified for soil from 2023 -2025. An outlier TN value was detected for SS5 for 12/04/2022 (1,580 mg/kg), not following the trend that from 2021 – 2023 was stable for the other sampling locations.
- TP concentrations show an increase from 2024 – 2025. An outlier TN value was detected for SS5 for 12/04/2022 (2,210 mg/kg), not following the trend that from 2021 – 2023 was stable for the other sampling locations, similarly with TN concentrations mentioned above.
- Increase in total coliforms concentration is observed for the reporting period. *E. coli* concentrations were historically detected <LOR. *Enterococci* concentrations, show an increase in the reporting period, suggesting total coliforms increase is given by high concentrations of *Enterococci*.

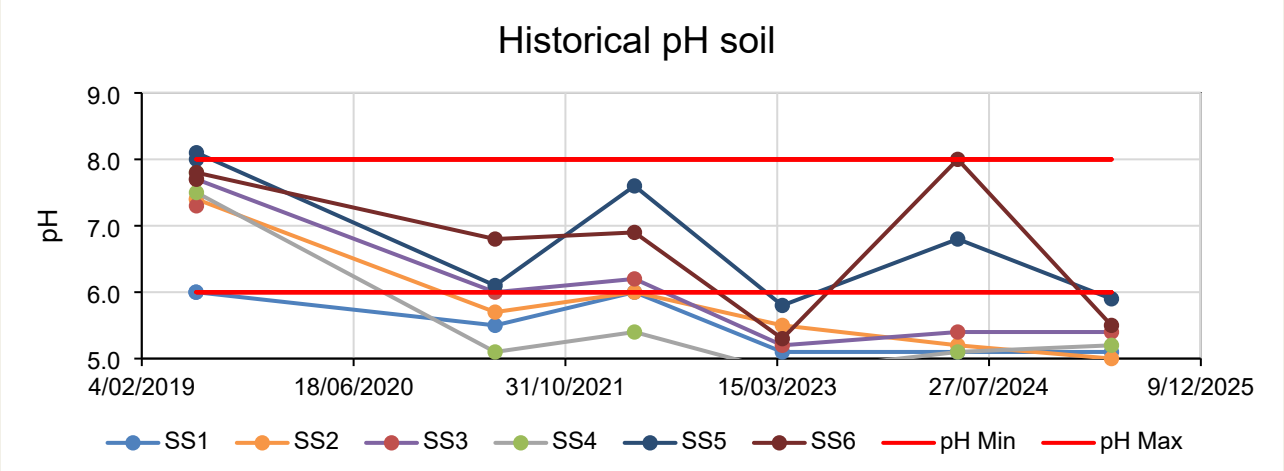

Figure 7-22. Historical pH values measured in soil (2019 – 2025)

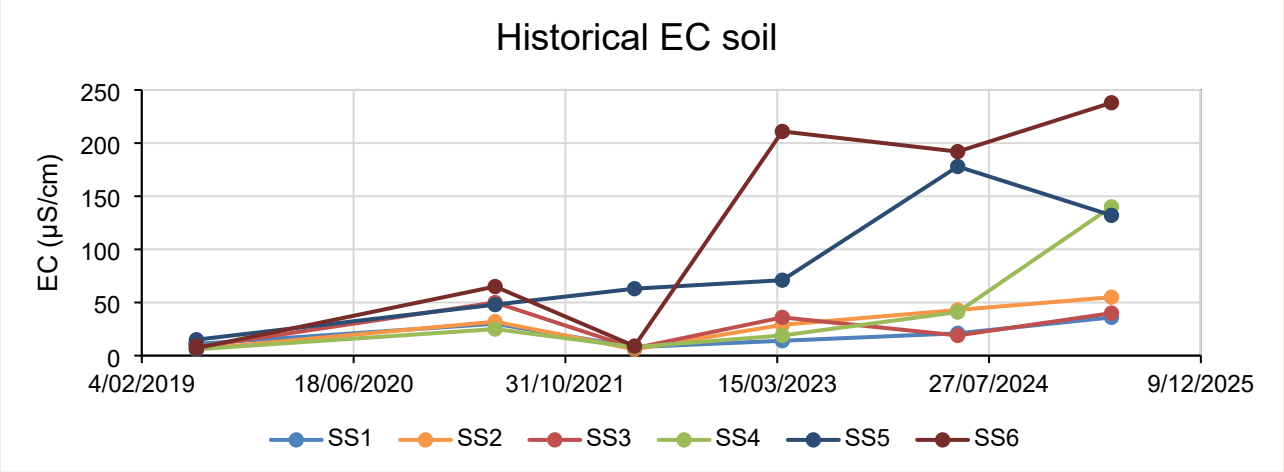

Figure 7-23. Historical EC values measured in soil (2019 – 2025)

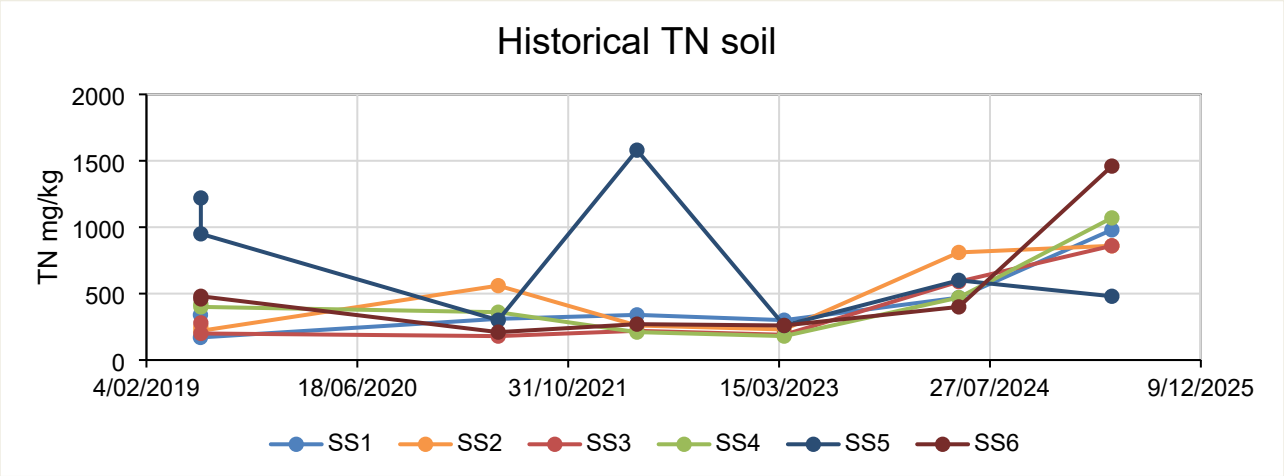

Figure 7-24. Historical TN values measured in soil (2019 – 2025)

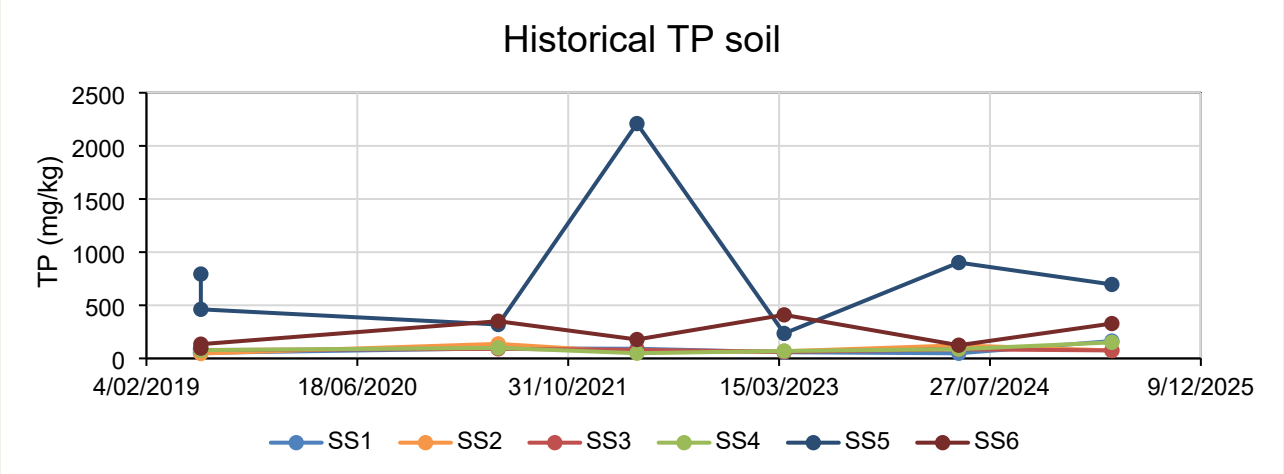

Figure 7-25. Historical TP values measured in soil (2019 – 2025)

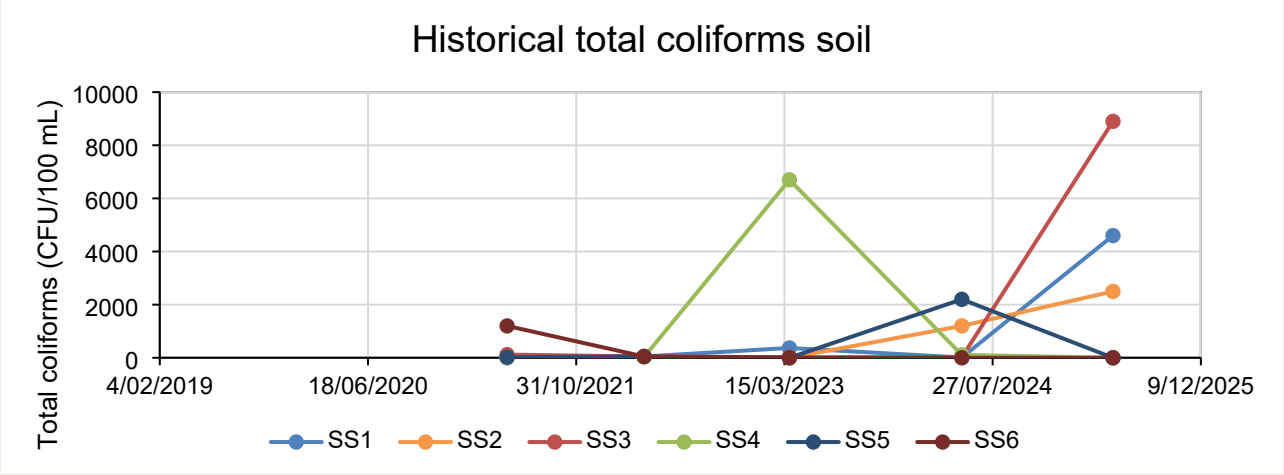

Figure 7-26. Historical total coliforms values measured in soil (2019 – 2025)

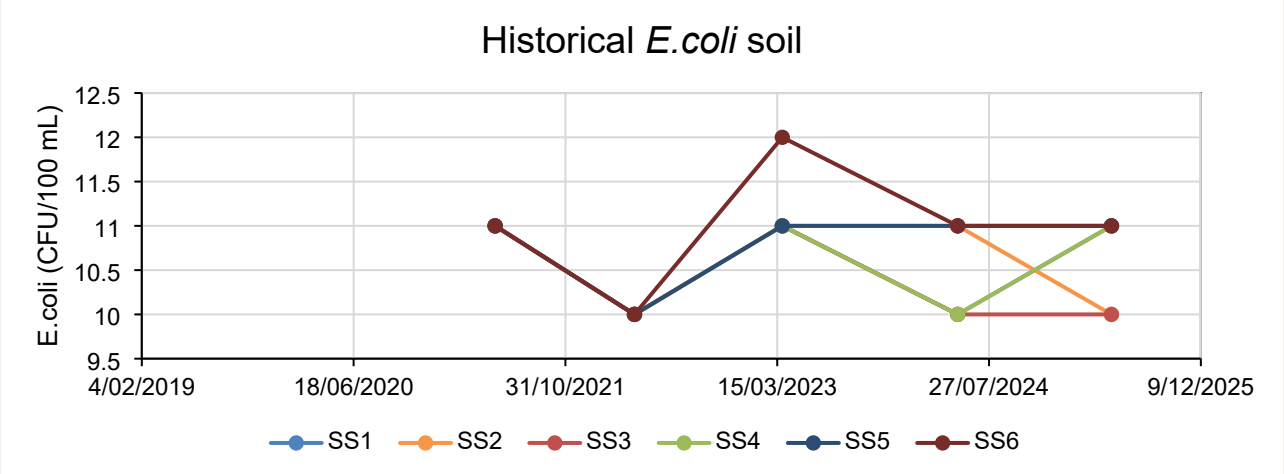

Figure 7-27. Historical *E. coli* values measured in soil (2019 – 2025)

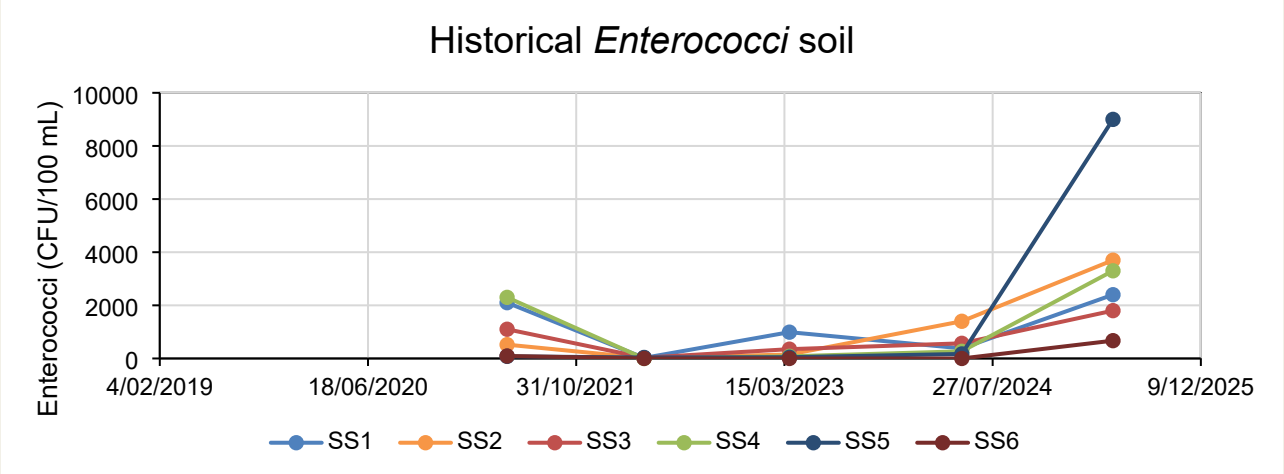

Figure 7-28. Historical *Enterococci* values measured in soil (2019 – 2025)

Non-compliance assessment

Soil monitoring was found to be compliant for both frequency and parameter requirements for the reporting period.

8 UNAUTHORISED DISCHARGE REPORT

This section provides an investigation report covering the unauthorised discharge of wastewater from DCF over the southern boundary of the site into the neighbouring property to the south. From here, water flows down a drainage line into the Elizabeth River, which then flows into Darwin Harbour.

The discharge started on October 2024 and continued until February 2025, caused by the accumulation of wet season rainfall and runoff into the ponds at the southern boundary of the site. Rainfall during the 2024-25 wet season was below the average (see Section 0). Discharge continued throughout, with a very small trickle continuing to flow over the spillway.

8.1 Non-compliance notification

The NT EPA was notified of the commencement of discharge on 3 December 2024 in an email to Waste.NTEPA@nt.gov.au. The following information addressing the Condition 51 requirements was provided in the email:

> When the non-compliance was detected and by whom
>
> 3 December 2024 by Damien Brabrook
>
> The date and time of the non-compliance
>
> 7:30am 3 December 2024
>
> As agreed this is notification of the beginning of our discharge, we will notify once the rains are over and there will be no further discharge.
>
> The actual and potential causes and contributing factors to the non-compliance
>
> The rain overnight was enough water to cause overflow. The catchment area of the Stuart Highway drain is very large and causes a large influx of water onto the property.
>
> The risk of environmental harm arising from the non-compliance
>
> Minor. Discharges occur from this location every wet season, wastewater is heavily diluted by rainwater and flows towards a catchment that is subject to runoff from similar surrounding land uses (agricultural/horticultural). Surface water monitoring upstream and downstream will continue as per the EPL conditions.
>
> The action(s) that have or will be undertaken to ensure the non-compliance does not reoccur
>
> Continue to irrigate when we can, ensuring compliance with IMP.
>
> If no action was taken, why no action was taken
>
> NA
>
> A date when an incident investigation report will be submitted to the NT EPA
>
> On completion of the non-compliance, which is weather dependent.

8.2 Discharge volume

Discharge volumes over the spillway are calculated using the established relationship between water levels in the main pond and discharge flow rates, as derived by EnviroTech (2021). Water levels in the main pond are continuously measured (every 10 minutes) using a logger and converted to a flow rate using the rating table in EnviroTech (2021). The volume discharged is 5,374 ML.

8.3 Discharge water quality and environmental impacts

Monitoring conducted during the reporting period identified potential exceedances of Total coliforms, *E.coli.* and *Enterococci*, for the reporting period. Data analysis undertaken in previous years did not show any evidence of increasing trends of potential pollutants. There were no visual indicators of contamination in the creek. Site management will ensure that surface water samples are collected during the next monitoring period in order to continue tracking any trends.

8.4 Corrective actions

A wastewater storage facility was completed in November 2022 which aims to increase farm storage capacity of waste waters and reduce unauthorised discharges. Currently these ponds collect wastewater from pens prior to being discharged though the facilities drainage system to the southern boundary. It is the future intention that these new ponds will serve as the irrigation source with all sites run off/ drainage and water from the existing irrigation source pond being pumped to these ponds prior to irrigation. This will allow irrigation to occur throughout the dry season when historically this has not been possible due to the irrigation source pond containing breeding crocodiles. The ponds have been sized based on historical rainfall data and wastewater generation volumes in order to minimise the risk of overflow.

Porosus has requested assistance from the EPA and DPT of planning and infrastructure to improve the stormwater management from the Stuart highway.

9 NUTRIENT LOADS (TOTAL N AND P LOADS)

Condition 37 of EPL297 states that:

The licensee must ensure that the total annual loads of Total Nitrogen and Total Phosphorus applied to land from the authorised discharge point do not exceed the calculated maximum total annual loads:

37.1 The total annual load for total nitrogen must be calculated using the equations detailed in the NSW environmental guideline Use of Effluent by Irrigation and be based on the specific soil type and crop present in the irrigation area receiving wastewater from the authorised discharge point.

37.2 The total annual load of total phosphorus must be based on the annual maximum uptake of phosphorus for the specific crop type present as listed in Table 4.2 of the NSW environmental guideline Use of Effluent by Irrigation.

Total annual loads of TN and TP applied to the irrigation area using water from the authorised discharge point (irrigation source) are calculated below:

In regard to the total TN and TP load applied to the irrigation area during the reporting period, the total volume of irrigated water was 9516 ML, and the median TN and TP concentrations of the irrigation water were 1.2 mg/L and 0.1 mg/L respectively. This equates to a total load of 11.42 kg of TN and 0.95 kg of TP applied to the irrigation area over the reporting period.

Table 4.2 in the NSW Environmental Guidelines, Use of Effluent by Irrigation (DEC 2004) lists grain crops only and thus information could only be used for grain sorghum, where the average yield is approx. 2.5 tonnes/ha/dry matter, with a nutrient content of 2.1 % nitrogen and 0.3 % phosphorus. This equals a nitrogen removal of 1050 kg/ha/annum and a phosphorus removal of 150 kg/ha/annum. On total irrigation area of 20 ha.

10 CONCLUSIONS AND RECOMMENDATIONS

The following conclusion and recommendations are summarised as per the results and findings of this report:

- Soil monitoring was undertaken as per EPL297 requirements. Groundwater, surface water and irrigation source did not meet frequency and parameter compliance requirements.
- Exceedances of trigger values were found for soil, groundwater, surface water and irrigation source. Faecal exceedances of soil, groundwater and surface water was identified for the reporting period. It is recommended that further investigation is required to identify the source and prevent future exceedances at the site.
- Loads of TN and TP currently applied to the irrigation area are sustainable.

11 REFERENCES

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APPENDIX A IRRIGATION LOG

Month	Start Read	End Read	Irrigated (ML)
Jun-24	67031	67031	-
Jul-24	67031	67031	-
Aug-24	67031	67031	-
Sep-24	67031	67031	-
Oct-24	67031	71484	4,453
Nov-24	71484	75503	4,019
Dec-24	75503	76547	1,044
Jan-25	76547	76547	-
Feb-25	76547	76547	-
Mar-25		0	-
Apr-25	0	0	-
May-25	0	0	-
Jun-25	0	0	-