



EPL298-01 Monitoring Report

Katherine Waste Management Facility

Reporting period 1 August 2022 – 31 July 2023

Prepared for: Katherine Town Council



DOCUMENT CONTROL RECORD

Job	EZ23013
Document ID	224747-41
Author(s)	Paula Martinez

DOCUMENT HISTORY

Rev	Reviewed by	Approved by	Issued to	Date
Draft	Jack Dymalla	Jack Dymalla	Katherine Town Council	01/08/2023
1	Jack Dymalla	Jack Dymalla	Katherine Town Council	04/09/2023

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Appendices

Appendix A	Historical data
Appendix B	Historical Data Trends
Appendix C	Monthly operational checklist (September to December 2021)

ACRONYMS

AHD	Australian Height Datum
Al	Aluminium
BOD	Biological Oxygen Demand
BOM	Bureau Of Meteorology
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene
Ca	Calcium
CaCO₃	Alkalinity
Cd	Cadmium
Cl	Chloride
COD	Chemical Oxygen Demand
Cr III	Trivalent chromium
Cr VI	Hexavalent chromium
Cu	Copper
EMP	Environmental Management Plan
EPL	Environment Protection Licence
Fe	Iron
HSL	Health Screening Levels for Petroleum Hydrocarbons
K	Potassium
KTC	Katherine Town Council
KWMF	Katherine Waste Management Facility
Mg	Magnesium
Mn	Manganese
MTBE	Methyl Tert-Butyl Ether
NO₃	Nitrate (as N)
Na	Sodium
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan (PFAS)
NEPM	National Environment (Assessment of Site Contamination) Protection Measure
NH₄	Ammonium
Ni	Nickel
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
Pb	Lead
PFAS	Per- And Polyfluoroalkyl Substances
Se	Selenium
SO₄	Sulfate
SWL	Standing Water Level
TDS	Total Dissolved Solids
TN	Total Nitrogen
TOC	Total Organic Carbon / Top of Casing

TP	Total Phosphorus
TRH/TPH	Total Recoverable Hydrocarbons / Total Petroleum Hydrocarbons
VFA	Volatile Acids as Acetic Acid
VOC	Volatile Organic Compounds
WMPC Act	<i>Waste Management and Pollution Control Act</i>
Zn	Zinc

1 INTRODUCTION

The Katherine Waste Management Facility (KWMF) is a municipal waste resource recovery and disposal site operated by Katherine Town Council (KTC). The facility is located approximately 7 km south of Katherine town centre within NT Portion 5043, on Novis Quarry Road (Figure 1-1). KWMF provides services to domestic and commercial customers in the Katherine area.

The current Environment Protection Licence (EPL) covering the KWMF (i.e. EPL298 - 01), was issued by the Northern Territory Environment Protection Authority (NT EPA) to KTC on 4 August 2022 (expires 3 August 2024). EPL298-01 licences KTC to collect, transport, store, re-cycle, treat or dispose of materials at the KWMF, which are classified as 'listed wastes' under the Northern Territory *Waste Management and Pollution Control Act*.

1.1 Purpose and scope

This Monitoring Report is required as per EPL298-01 conditions 61 and 62, as reproduced below:

61. The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

62. The licensee must ensure that each Monitoring Report is prepared in consultation with a qualified professional and:

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

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

62.3 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity, including potential impacts on beneficial uses of groundwater, over a minimum period of three years (where the data is available);

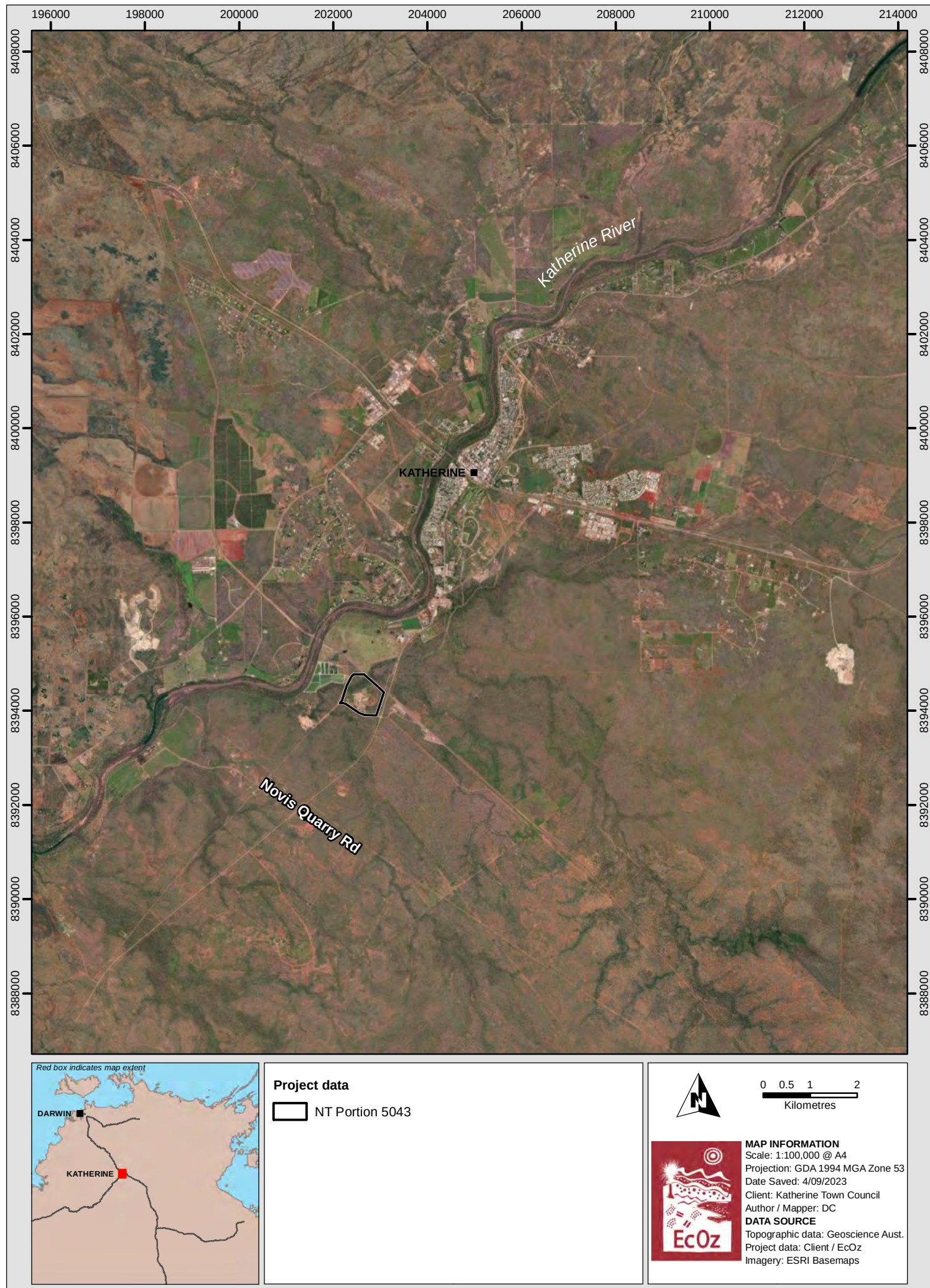
62.4 includes an assessment of environmental impact from the activity;

62.5 includes a review of performance against the measures specified in Document Number 1 of Table 2 [in EPL298 - 01];

62.6 incorporates a progress report, that includes implementation and completion dates, on all recommendations specified in Document Number 2 of Table 2 [in EPL298 - 01]; and

62.7 includes a copy of the qualified professional's endorsement.

The Monitoring Report will cover the period starting 1 August 2022 and ending 31 July 2023.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19181 - KTC EPL Update and EMP\01 Project Files\Figure 2-1 Map showing site layout and infrastructure.mxd

Figure 1-1. KWMF location

2 LANDFILL OPERATIONS OVERVIEW

KTC manage operations at KWMF, and contractors manage kerbside collection.

The KWMF accepts and disposes of general waste from domestic and commercial users and is currently licenced to accept asbestos and tyres (listed wastes) for disposal.

The KWMF also accepts the following materials for landfill or subsequent resource recovery and disposal by contractors at external facilities:

- Chemical drums (only empty and triple washed containers accepted for DrumMuster)
- Tyres (whole or shredded)
- Metal
- Green waste
- Batteries
- Empty gas bottles
- Animal carcasses
- E-waste

The KWMF layout is shown in Figure 2-1. The area method of landfilling (as depicted in Figure 2-2) is used at KWMF whereby, waste is disposed of at an active tip face and is then compacted in a mound above ground (as opposed to trench filling below ground). All landfilling activities occur over the existing landfill that has been in operation since the 1980's.

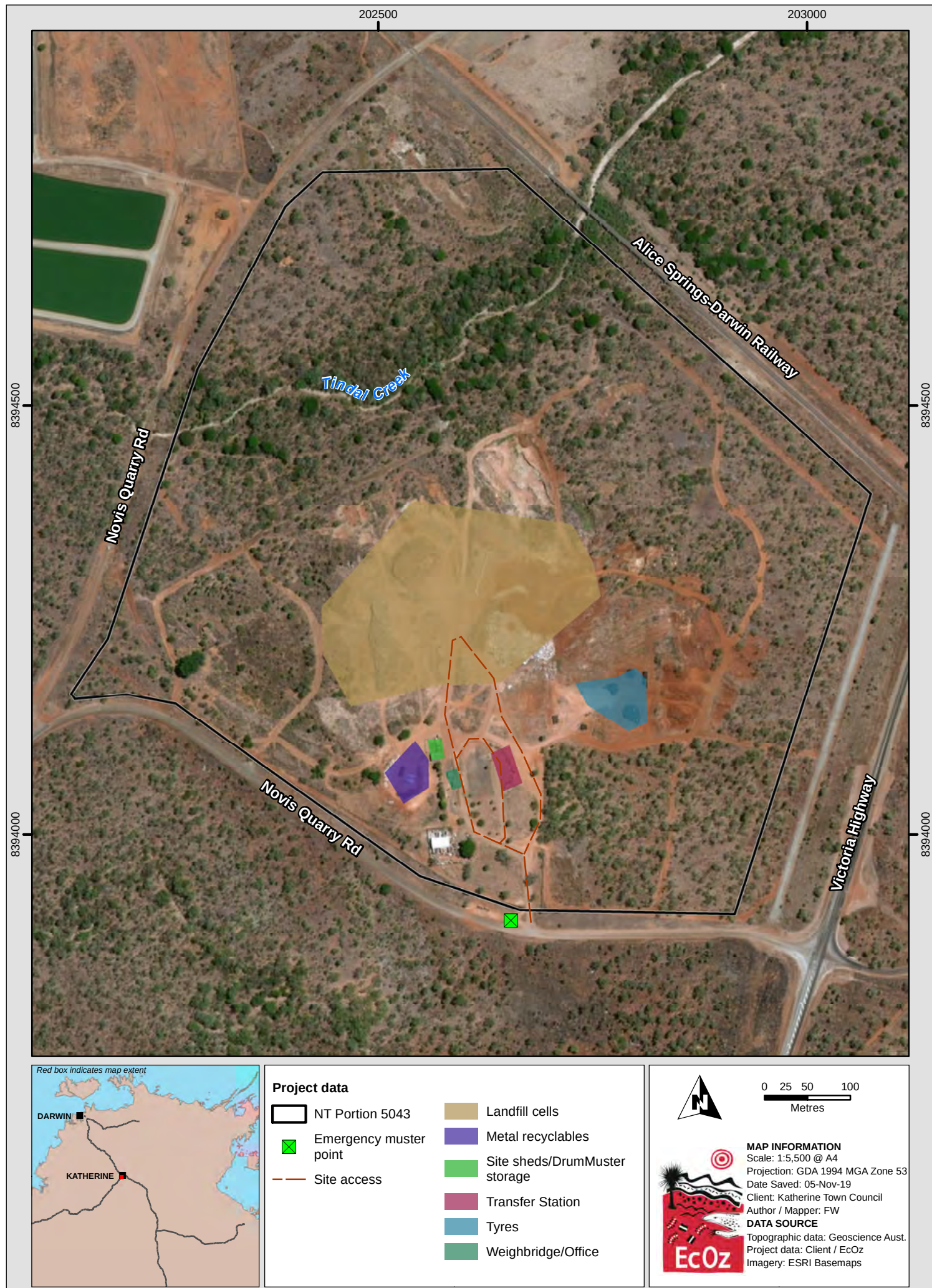
Each day, the waste is covered with daily cover, which is generally spoil material extracted from site or clean fill material accepted at the facility. Daily cover is applied at a minimum thickness of 150 mm, most of which can be retrieved on the following day prior to new waste disposal.

As the active tip area moves progressively along the existing landform (building up the height), the waste disposal areas are covered with a 300 mm intermediate layer of cover material to minimise rainfall infiltration. Final capping layers and rehabilitation are discussed in the GHD (2019) report *Katherine Town Council, Waste Management Facility Closure Plan, Stage 2 Report - Landfill Gas Risk Assessment and Hydrogeological Assessment*.

As landfill operations have been occurring on the site since the 1980's, it is unlikely an engineered liner has been installed beneath the landfill and there is currently no leachate recovery system.

In accordance with the *WMPC Act*, any lateral expansion of the landfill beyond the current footprint will require an Environment Protection Approval. The approval will factor in design considerations detailed in the *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory* (NT EPA 2013) and construction is required to undergo a rigorous quality assurance process. At the present time, there is no intention to expand the current landfill site and the site has been earmarked for closure and rehabilitation.

KTC is required to complete siting, approvals, design, and construction of a new landfill at an alternative site prior to closure of the existing KWMF, which is planned to take place in 2035.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19181 - KTC EPL Update and EMP\01 Project Files\Figure 2-1 Map showing site layout and infrastructure.mxd

Figure 2-1. Map of KWMP layout and infrastructure

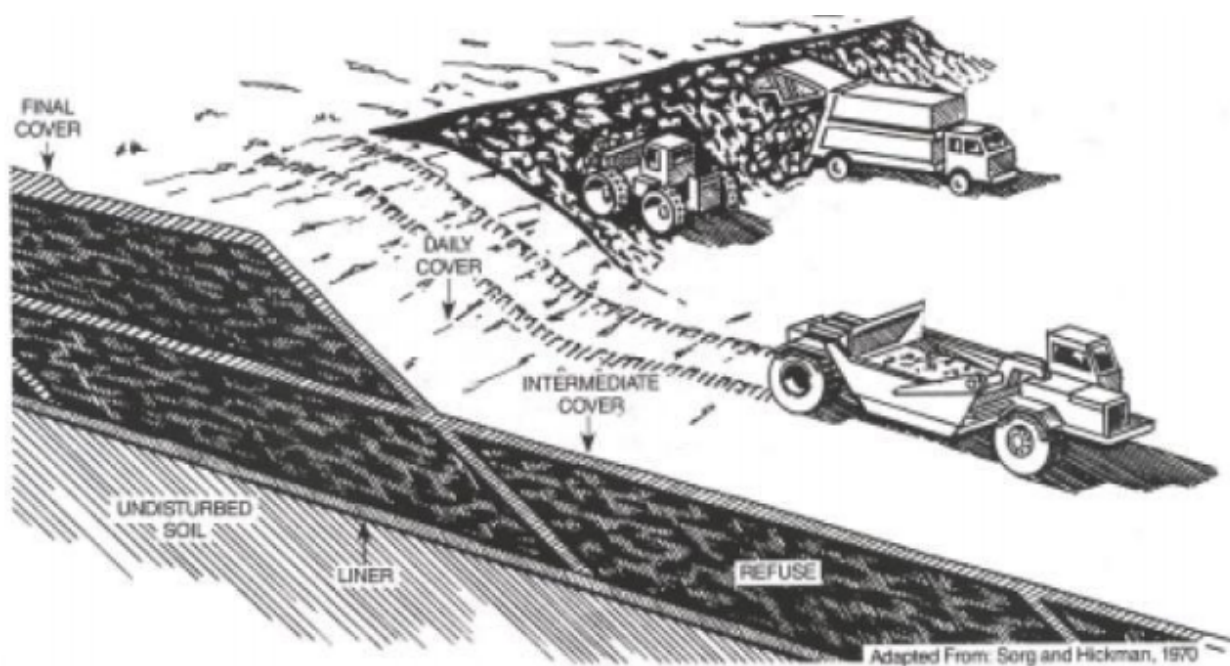


Figure 2-2. Area method of landfilling (taken from NT EPA 2013)

3 ENVIRONMENTAL SETTING

3.1 Climate

Katherine has a tropical savannah climate with distinct wet and dry seasons. The wet season typically occurs from November to April, and the dry season from May to October (see Figure 3-1). The average annual rainfall for Katherine is 967 mm (taken from Bureau of Meteorology Katherine Council Station No. 014902). The driest months are June, July and August, which all have mean monthly rainfall totals of less than 2 mm. The wettest months are December, January and February, with mean monthly rainfall totals of between 198 mm and 237 mm.

The hottest months are September, October, November and December, with mean maximum temperatures between 36°C and 38°C. The coolest months are June, July and August, with mean minimum temperatures between 13°C and 14°C (taken from Bureau of Meteorology Katherine Council Station No. 014932).

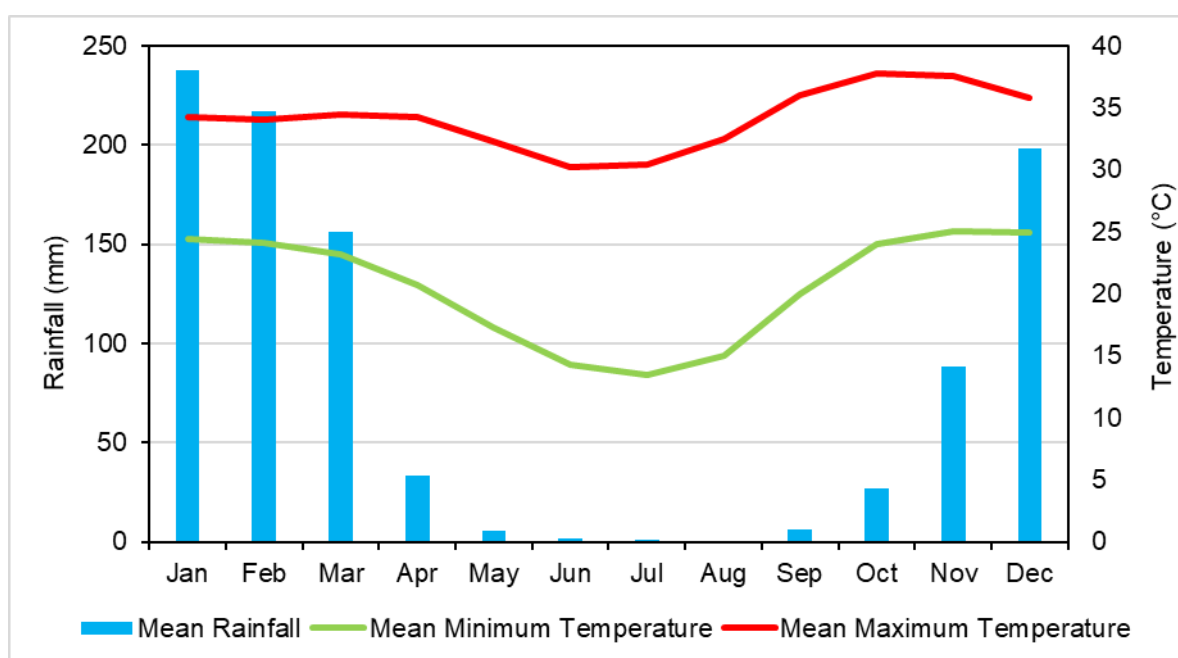


Figure 3-1. Average climate data for Katherine (taken from BoM station ID 014902)

3.1.1 Rainfall during the reporting period

Rainfall during the reporting period in Katherine is shown in Figure 3-2. Of note is that rainfall data was extracted from stations 14902 and 14979. Additionally, the July 2023 monthly rainfall data was not available at the time of writing this report, as such, that of July 2022 was adopted.

As shown in Figure 3-2, most of the rain occurred during the wet season months of November to March. January and February were particularly wet; January recorded 310 mm (compared to the average 237 mm) and February recorded 309 mm (compared to the average 216 mm). November, December and April also had monthly rainfall above their respective average.

Overall, the annual rainfall for the monitoring period (1,108.9 mm) exceeded the annual average (973.5 mm) and was higher than that for the 2021-22 monitoring period (EcOz 2022), but lower than that recorded in the 2020-2021 monitoring period (EcOz 2021).

No rain occurred between July and September 2022 and May and June 2023.

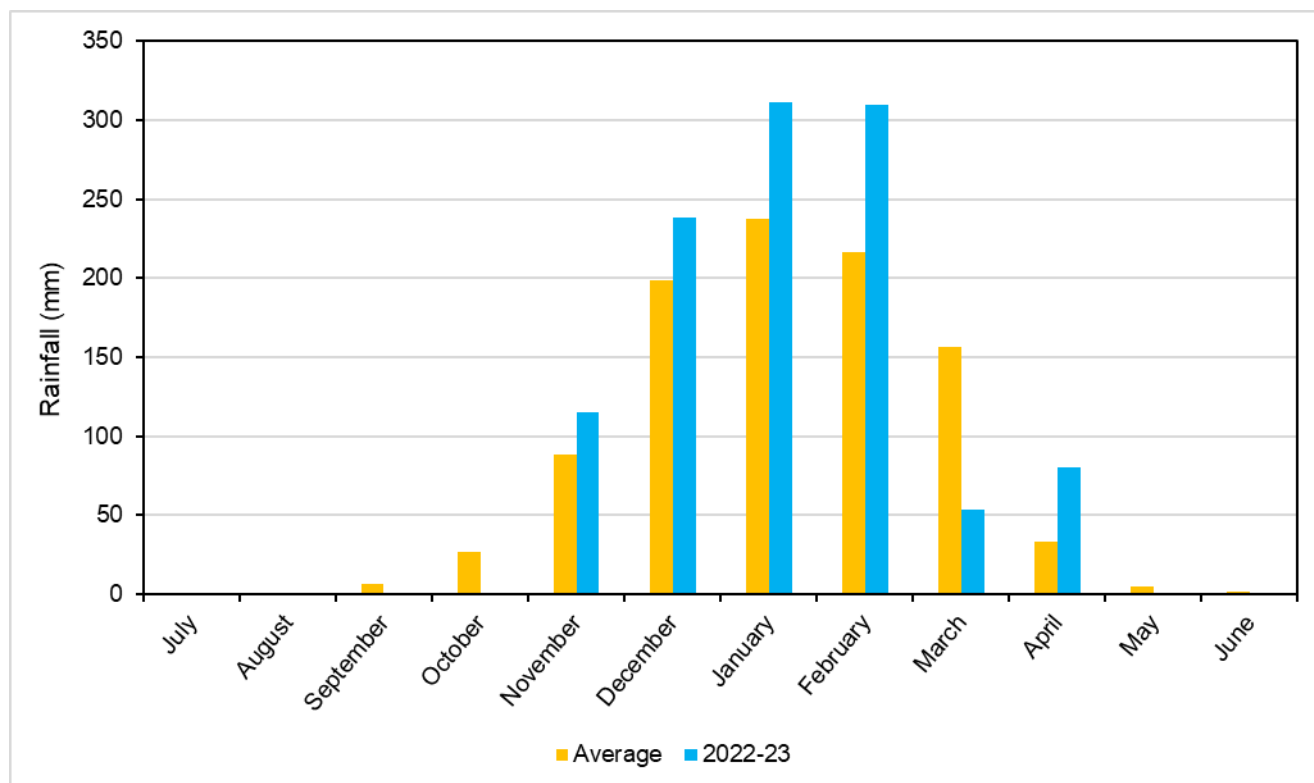


Figure 3-2. Monthly and average rainfall during the reporting period (taken from BoM station ID 014902)

3.2 Topography and landform

The KWMF is on almost-level terrain; very gently sloping towards the northwest. The elevation change is only six metres (not including landfill mounds) starting at 108 mAHD in the south-east, falling to 102 mAHD in the north-west.

Land unit mapping by Howe (2006) indicates that there are three land units within the site (3a, 3b and 7e), and two landforms. The landform is mostly plains, with a small area of drainage system.

Land unit 3b covers most of the site, and is described as very gentle undulating terrain; slopes less than 2%; scattered limestone pavement or rock outcrop.

Land unit 3a is present on the eastern side of the site, and is described as gentle slopes or undulating and dissected terrain; slopes to 2%; severe limestone and sandstone pavement and outcrop.

Land unit 7e is only present along the north-western side of the site associated with Tindal Creek, and is described as major creeks and severely gullied tributaries; includes permanent and ephemeral waters, with poorly drained soils.

3.3 Surface water

The KWMF is approximately 1 km east of the Katherine River and lies within the Katherine River flood plain. Tindal Creek flows in a northeast to southwest direction across the northern part of the site (see Figure 2-1) and surface water runoff from most of the KWMF area flows in a north-westerly direction, towards this creek.

Tindal Creek has a catchment area of 173 km², most of which is upstream of the KWMF. This catchment includes most of the township of Katherine, as well as wide mix of industries, and areas used for horticulture and cattle grazing. The RAAF Base Tindal is also within the catchment and is a known contamination source of per- and polyfluoroalkyl substances (PFAS); see the *Department of Defence, RAAF Base Tindal, Supplementary Detailed Site Investigation Report* (Coffey 2018b).

Tindal Creek is ephemeral and typically only flows during the wet season. In its upper reaches, the creek is fed by surface water from bushland and scrubland, but becomes groundwater-fed in the wet season from Uralla through to the southern edge of Katherine.

South of the KWMF, a tributary of Tindal Creek flows from east to west and joins Tindal Creek approximately 650 m south-west of the site, which then flows into the Katherine River approximately 2 km downstream from KWMF (following the bends of the creek channel).

Flood modelling of the Katherine region (see NRETA 2006) indicates that during a 1 in 20-year flood event, the northern third of the KWMF, along Tindal Creek, would be flooded i.e under at least 2 m of water. During a 1 in 50-year event, the northern half of the site would be flooded, and during a 1 in 100-year event, most of the site would be flooded.

3.4 Geology and groundwater

The KWMF is underlain by rocks of the Daly River Group; namely the middle Cambrian-age Jinduckin Formation, which is predominantly dolomitic siltstone, with interbeds of dolostone and sandstone. Simplified geological sequences recorded at or close to the site (GHD 2019) generally comprise:

- Clay materials to depths up to 3 m
- Limestone (dolomitic) from 3 to 30 m
- Mudstone (siltstone) from 30 to 60 m
- Fractured limestone from 60 to 80 m

The Jinduckin Formation comprises the dolomitic limestone and mudstone/siltstone sequences to 60 m depth, and the fractured limestone at depths greater than 60 m is the Tindall Limestone.

The Tindall Limestone Aquifer is a highly productive and important water resource for the Katherine region (see the *Katherine Tindall Limestone Aquifer Water Allocation Plan 2019-2024*, DENR 2019). The Tindall Limestone Aquifer is used for the Katherine Township water supply, domestic supply for many rural properties, and supports the region's agricultural and other industries. The Tindall Limestone Aquifer also provides base flow to the Katherine River through springs and seepage along the riverbanks, and is responsible for the river maintaining steady flow throughout the dry season.

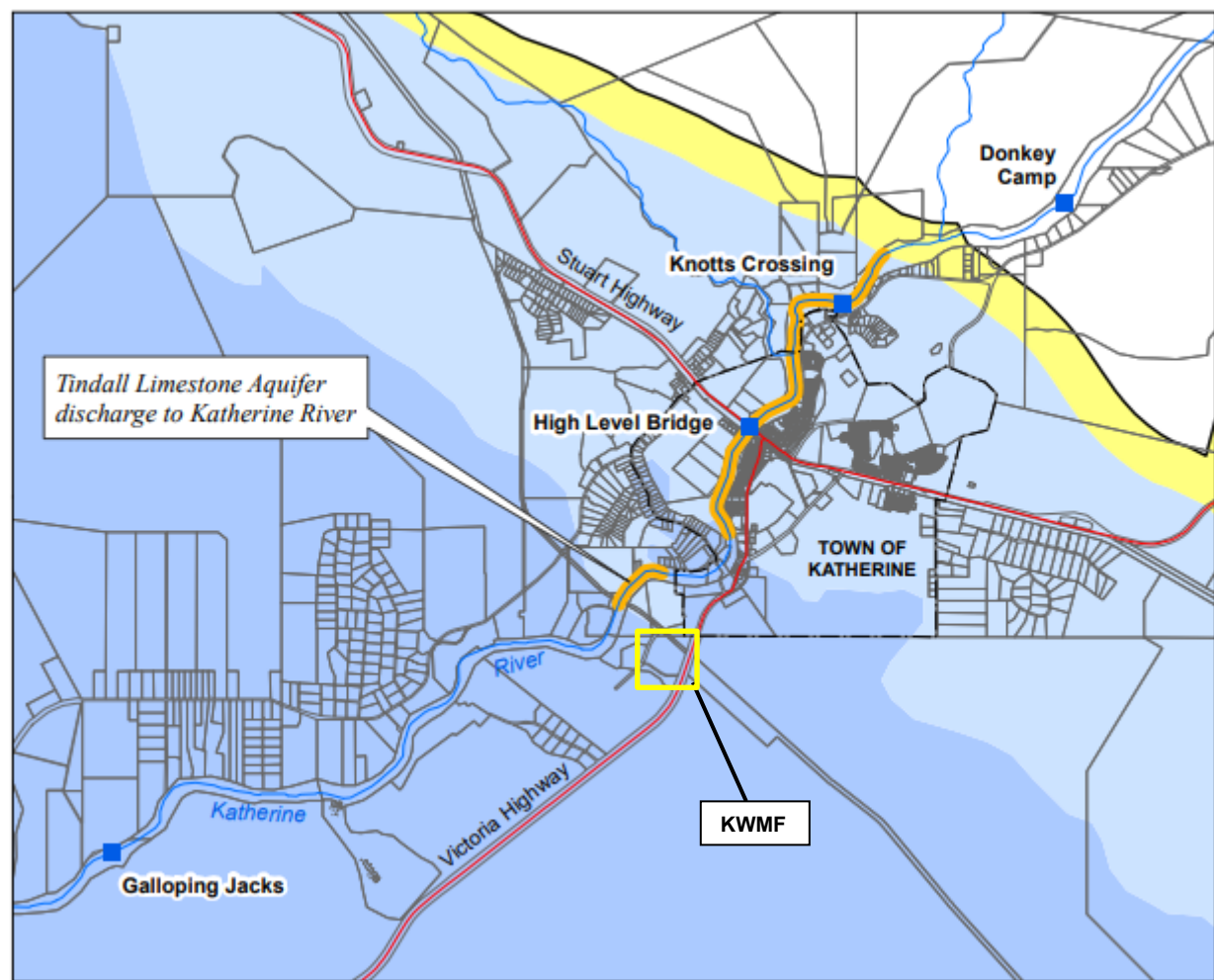
In the area of KWMF, and elsewhere where the Jinduckin Formation occurs, this Formation acts as a confining layer and prevents recharge to the Tindall Limestone Aquifer (see Figure 3-3). Recharge to the Tindall Aquifer only occurs in areas where it is in direct contact with the ground surface. These areas are described as 'unconfined' in Figure 3-3 and do not include the KWMF. Similarly, discharge to the Katherine River through springs and seepage from the Tindall Aquifer only occur where the river crosses the unconfined Tindall Aquifer. These sections of river occur upstream of the KWMF, but do not occur at the section nearest the KWMF (Figure 3-3).

Groundwater bores drilled into the Tindall Limestone Aquifer have yields of typically 50 L/s or more and good water quality. Whereas bores drilled into the Jinduckin Formation have yields of typically less than 5 L/s, sometimes up to 10 L/s, with poor water quality (excessive salinity).

Bore RN040476 located around 670 m north-east and up-gradient of the KWMF, was installed in 2017 as part of a network of bores to investigate the extent of PFAS contamination extending from RAAF Base Tindal; see Coffey (2018b). This bore has a depth of 20 m and groundwater levels monitored in this bore vary seasonally by around 5.2 m, from 3.4 mBGL during the mid-wet season, to 8.6 mBGL at the end of the dry season.

PFAS concentrations measured by Coffey (2018b) in this bore range from <0.01 µg/L up to 0.02 µg/L for PFOS+PFHxS. This is below the *PFAS National Environmental Management Plan (NEMP)* drinking water guideline of 0.07 µg/L (HEPA 2020). Given this shallow bore is in the Jinduckin Formation, and groundwater transport of PFAS from RAAF Base Tindal to the Katherine River is through the Tindall Aquifer, these PFAS concentrations are likely derived from surface water groundwater interaction, where the Katherine River is recharging the Jinduckin aquifer. PFOS concentrations in the Katherine River can at times be above the PFAS NEMP freshwater ecosystem 95% species protection guideline value of 0.13 µg/L.

At a regional scale, groundwater hydraulic gradients fall towards the Katherine River. Standing water levels measured in bores within the KWMF are generally around 10 mBGL, and the differences in levels between these bores show that on-site groundwater gradients generally fall towards central landfilled areas from the northern, eastern and southern site boundaries, before discharging from the site in a northwest direction, towards Tindal Creek and the Katherine River (GHD 2019).



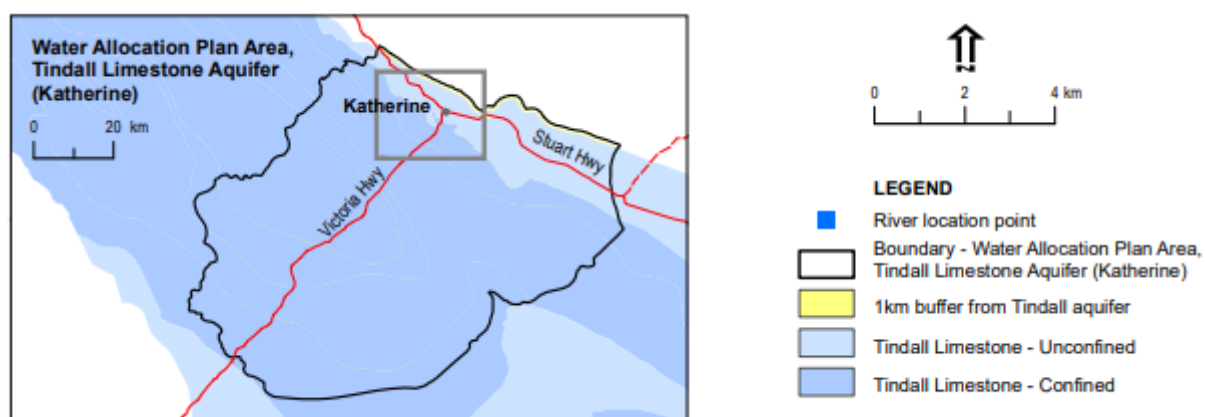


Figure 3-3. Discharge zones into the Katherine River, taken from NRETAS (2009)

4 MONITORING UNDERTAKEN

4.1 Monitoring sites

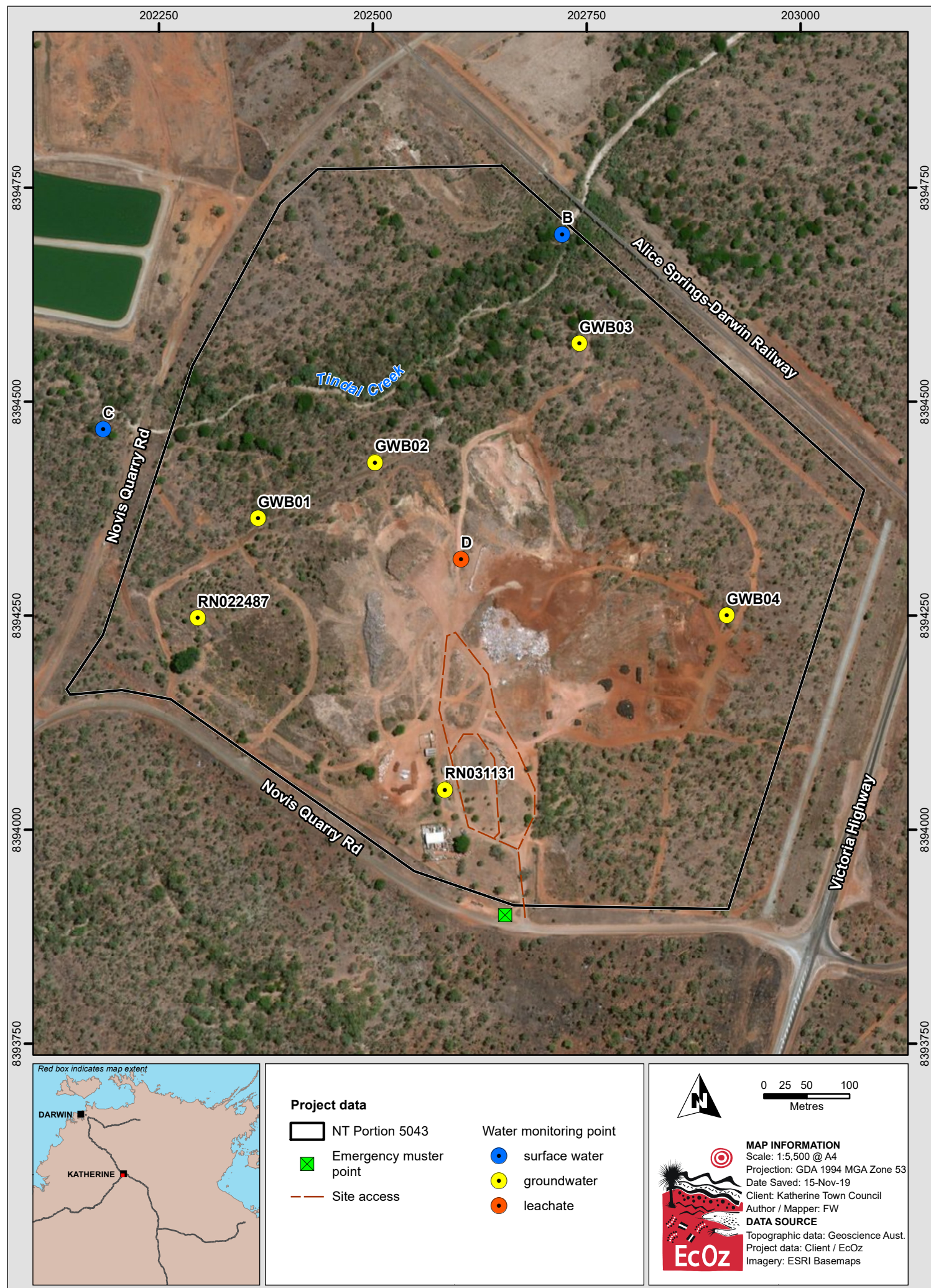
Surface water and groundwater monitoring sites are detailed in Table 4-1 and Table 4-2 respectively and shown in Figure 4-1.

Table 4-1. Surface water monitoring site details

Site Name	GPS Location	Purpose	Type
B	-14.5044°S, 132.242°E	Tindal Creek at railway crossing - upstream of the landfill and any leachate impacts	Surface water
C	-14.5064°S, 132.237°E	Tindal Creek - at Novis Quarry Rd bridge crossing – downstream of the landfill and any potential landfill impacts - this is the EPL298-01 compliance point where trigger values apply	Surface water
LD	Active tip face	Determine quality of leachate source water	Leachate

Table 4-2. Groundwater monitoring bore details

Site Name	GPS Location	Purpose	Screened depth (mBGL)	General lithology
GWA (RN031131)	-14.5103°S, 132.241°E	Water supply (and now also monitoring) installed in 1997 - located upgradient of the landfill	26.3 – 33 m in Jinduckin Formation	Clay, limestone
GWE (RN022487)	-14.5084°S, 132.238°E	Water supply (and now monitoring) bore installed in 1983 – located upgradient of the landfill	Screened 16-23 m in Jinduckin Formation Open hole 28-80 m in Tindall Limestone from 57 m+	Siltstone, limestone, mudstone, limestone and fractures
GWB01	-14.5057°S, 132.239°E	Monitoring bores installed by GHD in 2018 – located downgradient of the landfill	6.4-12.4 m in Jinduckin Formation	Clayey silt, silty clay, silty siltstone, silty sand, sand, sandy gravel
GWB02	-14.5068°S, 132.240°E		8.0-17.0 m in Jinduckin Formation	Clay, clayey phyllite, sand, clayey phyllite, phyllite, siltstone
GWB03	-14.5055°S, 132.242°E	Monitoring bore installed by GHD in 2018 – located upgradient of the landfill	5.6-10.1 m in Jinduckin Formation	Topsoil, silty clay, clay, clayey phyllite, phyllite, siltstone
GWB04	-14.5084°S, 132.244°E		8.0-17.0 m in Jinduckin Formation	Silty clay, clayey phyllite, phyllite, siltstone, sandstone



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\IEZ19181 - KTC EPL Update and EMP\01 Project Files\Figure 8-1 Map of KWMF water monitoring locations.mxd

Figure 4-1 Map of monitoring site locations

4.2 Monitoring frequency, parameters, and trigger values

Monitoring frequency, parameters and trigger values, as required in EPL298-01, are provided in Table 4-3. Trigger values only apply to the downstream surface water monitoring site SWC.

Table 4-3. EPL298 – 01 required parameters, sampling frequency and trigger values

			Surface water		Leachate	Groundwater					
			SWB	SWC		GWA	GWE	GWB01	GWB02	GWB03	GWB04
Parameter	Unit	Trigger values (only apply to SWC)	Frequency								
Field Measurements											
pH	-	6.0-8.0	Quarterly			Monthly					
Temperature	°C	-									
Electrical Conductivity (EC)	µS/cm	20-250									
Dissolved Oxygen (DO)	% Sat	85-120									
REDOX (groundwater only)	mV	-	N/A								
Standing water level (groundwater only)	mAHD	-									
Major ions											
Potassium (K)	mg/L	400	Quarterly			Monthly					
Alkalinity (CaCO ₃)		-									
Calcium (Ca)		500									
Chloride (Cl)		-									
Sodium (Na)		300									
Sulfate (SO ₄)		400									
Magnesium (Mg)		-									
Nutrients											
Total Nitrogen (TN)	µg/L	200-300	Quarterly			Quarterly					
Total Phosphorus (TP)		-									
Nitrate (NO ₃ as N)		-									
Ammonium (NH ₄)		10				Monthly					
Metals											
Aluminium (Al)	µg/L	-	Quarterly			Quarterly					
Cadmium (Cd)		0.2									
Chromium (CrIII)		3.3									
Metals continued											

			Surface water		Leachate	Groundwater					
			SWB	SWC		GWA	GWE	GWB01	GWB02	GWB03	GWB04
Parameter	Unit	Trigger values (only apply to SWC)	Frequency								
Chromium (CrVI)	µg/L	1.0	Quarterly			Quarterly					
Copper (Cu)		1.4									
Iron (Fe)		300									
Lead (Pb)		3.4									
Manganese (Mn)		1900									
Nickel (Ni)		11									
Selenium (Se)		5									
Zinc (Zn)		8.0									
Other Leachate Indicators											
Total Organic Carbon (TOC)	mg/L	-	Quarterly			Monthly					
Total Dissolved Solids (TDS)		-									
Chemical Oxygen Demand (COD)		-									
Biological Oxygen Demand (BOD)		-									
Volatile acids as acetic acid (VFA)		-				Quarterly					
Other											
Total Recoverable Hydrocarbons (TRH)	µg/L	-	Annually			Quarterly					
Polycyclic Aromatic Hydrocarbons (PAHs)		16									
Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN)		950									
Polychlorinated biphenyls (PCB)		-									
PFOS/PFAS (in any form)		-									

4.3 Sampling procedures

All water sampling is undertaken in accordance with the below-listed accepted standards and guidelines for monitoring of water quality:

- *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)
- *Australian/New Zealand Standard on Water Quality Sampling – Part 6: Guidance on sampling of rivers and streams* (AS/NZS 5667.6:1998).
- *Australian/New Zealand Standard on Water Quality Sampling – Part 11: Guidance on sampling of groundwater* (AS/NZS 5667.11:1998), Standards Australia, New South Wales.
- ANZECC & AMRCANZ 2000, *Australian Guidelines for Water Quality Monitoring and Reporting*, National Water Quality Management Strategy Paper No 7, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.
- ANZECC & AMRCANZ 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, National Water Quality Management Strategy Paper No 4, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

Water quality meters used for measuring in-situ surface water and groundwater physical parameters were calibrated in accordance with operating manuals prior to each sampling day and calibration results were recorded in a logbook.

All laboratory samples are analysed by a NATA-accredited laboratory (Envirolabs), which incorporates laboratory duplicates, blanks, and spikes to assess data accuracy.

Duplicates were collected during the reporting period to evaluate the precision of sampling results. The Relative Percentage Difference (RPD) was estimated, when possible. Differences between samples and duplicates did not exceed 20% when concentrations were at least ten times the limit of reporting (LOR), meaning that the results are acceptable. The list of duplicates collected are shown and RPD assessment are provided in the Table 4-4 below.

Table 4-4. RPD assessment

Date	Site	Parameter	RPD Assessment
09/08/2022	RN22487	COD, TOC, chloride and sulfate	Compliant – both results below detection limits or RPD <20%
	RN31131	TDS	Compliant – RPD <20%
	GWB04	Alkalinity as CaCO ₃	Compliant – RPD <20%
13/09/2022	RN022487	Chloride, TOC, sulfate	Compliant – both samples below detection limits or RPD <20%
11/10/2022	RN022487	TRH, PAHs, PCBs, total and dissolved metals, TP, Cr (VI), TOC and PFAS	Compliant - both results below detection limits or RPD <20%
	RN031131	Alkalinity	Compliant – RPD < 20%
09/11/2022	RN022487	Major ions, TOC and COD	Compliant - both results below detection limits or RPD <20%

Date	Site	Parameter	RPD Assessment
	GWB01	COD	Compliant – both below detection limits
06/12/2022	GWB02	Major cations	Compliant – RPD <20%
17/01/2023	RN022487	TRH, PAHs, PCBs, Cr VI (total and dissolved), TN, Total alkalinity and PFAS	Compliant - both results below detection limits or RPD <20%
14/02/2023	RN022487	Major cations and anions, COD and TOC	Compliant – RPD<20%
	RN031131	TDS	
	SWC	Alkalinity	
14/03/2023	RN022487	Major cations	Compliant – RPD <20%
	SWC	COD	Compliant – RPD <20%
21/03/2023	GWB02	Major anions, ammonia	Compliant - both results below detection limits or RPD <20%
17/04/2023	GWB01	TRH, PAHs, PCBs	Compliant - both results below detection limits
	GWB02	TDS	Compliant – RPD <20%
	GWB03	Total alkalinity	Compliant - RPD <20%
	RN022487	TOC, dissolved and total metals, TN, PFAS, major ions and total alkalinity	Compliant - both results below detection limits or RPD <20%, except for PFOS. The RPD for PFOS was above 20%, however, the concentrations recorded were less than 10 times the laboratory limit of reporting.
15/05/2023	RN022487	Total alkalinity, TOC and ammonia as N	Compliant - both results below detection limits or RPD <20%. Of note is that the ammonia in the duplicate sample collected at RN022487 was above detection limits, while it was below the LOR in the primary sample. However, the duplicate sample had a result that is less than ten times the LOR.
	GWB02	COD	Compliant - both results below detection limits
	GWB03	TDS	Compliant - RPD <20%

4.4 Monitoring undertaken during the reporting period

Table 4-5 lists the monitoring that was undertaken during the reporting period. Compliance against EPL298-01 monitoring requirements is outlined.

Table 4-5. Compliance with EPL298-01 monitoring requirements

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
Surface water	SWB	Quarterly (field measurements, major ions, nutrients, metals and metalloids, other leachate indicators)	14/02/23 14/03/23	Compliant – Sites attended quarterly but sample sites were dry in two occasions	Compliant except for: - Annual parameters not analysed in the reporting period
		Annually (TRH, PAH, BTEXN, PCB and PFAS/PFOS)	-		
	SWC	Quarterly (field measurements, major ions, nutrients, metals and metalloids, other leachate indicators)	14/02/23 14/03/23		
		Annually (TRH, PAH, BTEXN, PCB and PFAS/PFOS)	-		
Leachate		Quarterly (field measurements, major ions, nutrients, metals and metalloids, other leachate indicators)	21/03/23 17/04/23	Compliant – Sites attended quarterly but leachate ponding only twice in the reporting period	Compliant
		Annually (TRH, PAH, BTEXN, PCB and PFAS/PFOS)	17/04/23	Compliant	
Groundwater	GWA	Monthly (field measurements, major ions, NH ₄ , TOC, TDS, COD, BOD)	09/08/2022 13/09/2022 11/10/2022 09/11/2022 06/12/2022 17/01/2023 14/02/2023 14/03/2023 17/04/2023 15/05/2023	Ten out of the twelve required sampling rounds completed	Compliant

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	11/10/2022 17/01/2023 17/04/2023	Three out of the four required sampling rounds completed	Compliant
	GWE	Monthly (field measurements, major ions, NH ₄ , TOC, TDS, COD, BOD)	09/08/2022 13/09/2022 11/10/2022 09/11/2022 17/01/2023 14/02/2023 14/03/2023 17/04/2023 15/05/2023	Nine out of the twelve required sampling rounds completed. Sampling was not undertaken in December as the pump was faulty	Compliant
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	11/10/2022 17/01/2023 17/04/2023	Three out of the four required sampling rounds completed	Compliant
	GWB01	Monthly (field measurements, major ions, NH ₄ , TOC, TDS, COD, BOD)	09/08/2022 13/09/2022 11/10/2022 09/11/2022 06/12/2022 17/01/2023 14/02/2023 14/03/2023 17/04/2023 15/05/2023	Seven out of the twelve required sampling rounds completed. Bore was dry in October, December and May	Compliant
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	17/01/2023 17/04/2023	Two out of the four required sampling rounds completed. Bore was dry when sampling was attempted in October.	Compliant
	GWB02	Monthly (field measurements, major ions, NH ₄ , TOC, TDS, COD, BOD)	09/08/2022 13/09/2022 11/10/2022 09/11/2022	Ten out of the twelve required sampling rounds completed	Compliant

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
			06/12/2022 17/01/2023 14/02/2023 21/03/2023 17/04/2023 15/05/2023		
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	11/10/2022 17/01/2023 17/04/2023	Three out of the four required sampling rounds completed	Compliant
	GWB03	Monthly (field measurements, major ions, NH ₄ , TOC, TDS, COD, BOD)	09/08/2022 06/12/2022 14/02/2023 21/03/2023 17/04/2023 15/05/2023	Six out of the twelve required sampling rounds completed. Bore was dry from September to November and in January	Compliant
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	17/04/2023	One out of the four required sampling rounds completed. Bore was dry when sampling was attempted in October and January.	Compliant
	GWB04	Monthly (field measurements, major ions, NH ₄ , TOC, TDS, COD, BOD)	09/08/2022 13/09/2022 11/10/2022 09/11/2022 06/12/2022 17/01/2023 14/02/2023 21/03/2023 17/04/2023 15/05/2023	Ten out of the twelve required sampling rounds completed.	Compliant
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	11/10/2022 17/01/2023 17/04/2023	Three out of the four required sampling rounds completed	Compliant except for: - Field parameters not collected in April 2023

5 RESULTS AND DISCUSSION

5.1 Leachate

Results for the reporting period and historic trends are provided in the sections below.

5.1.1 Leachate quality

The concentrations of parameters measured in the reporting period are provided in Table 5-1 and Table 5-2. Field parameters in the reporting period indicate that leachate was slightly alkaline (pH between 8 and 8.5), low in dissolved oxygen (<30%) and with a high electrical conductivity (>450 $\mu\text{S}/\text{cm}$).

In April 2023, samples for the analysis of TP, TN, total and dissolved metals, VFA, TRH, PAH, BTEXN, PCB and PFAS/PFOS were collected for the first time since monitoring started. As such, no historical data is available to compare the results obtained in this monitoring round.

Major ions concentration in the two samplings undertaken were mostly consistent in the reporting period.

Nutrient concentrations in leachate were high, as expected of this wastewater. Ammonium concentrations ranged between 33 and 16 $\mu\text{g}/\text{L}$. It is evident that TN is also considerably high in leachate, with concentrations being more than two times higher than the trigger value for the same parameter in surface water.

Other leachate indicators (TOC, TDS, COD and BOD) were mostly invariable between March and April, except for the lower TDS concentration recorded in April.

As shown in Table 5-1, total Cu, Fe, Mn, Ni, Zn and Al were detected in the sample collected in April 2023, but only dissolved Cu, Mn and Ni were detected. These results indicate that the metals detected in the leachate are less mobile and that, if leachate is in contact with groundwater or surface water, the metals detected will be less bioavailable.

TPH, PAH, BTEXN and PCBs were not detected in April 2023. However, ten types of PFAS were detected.

Table 5-1. Leachate results in the reporting period – Field parameters, major ions, nutrients, metals and other leachate indicators

PARAMETER	UNIT	LOR	2023	
			MAR	APR
FIELD MEASUREMENTS				
pH	-	-	8.28	8.42
Temperature	°C	-	31.4	25.0
Electrical Conductivity (EC)	µs/cm	-	611	457
Dissolved Oxygen (DO)	mg/L	-	-	-
Dissolved Oxygen (DO)	% Sat	-	14.9	27.4
Redox	-	-	274	225
MAJOR IONS				
Potassium (K)	mg/L	0.5	9.9	10
Alkalinity (CaCO3)		5	250	170
Calcium (Ca)		0.5	46	23
Chloride (Cl)		1	28	28
Sodium (Na)		0.5	15	16
Sulfate (SO4)		1	47	36
Magnesium (Mg)		0.5	33	31
NUTRIENTS				
Total Nitrogen (TN)	µg/L	100	-	-
Total Phosphorus (TP)		50	-	41
Nitrate (as N)		5	-	<5
Ammonium (NH4)		7	33	16
Ammonia (as N)		5	33	16
METALS (TOTAL)				
Cadmium (Cd)	mg/L	0.0001	-	<0.0010
Chromium (Cr(III))		0.005	-	<0.005
Chromium (Cr(VI)		0.005	-	<0.005
Copper (Cu)		0.001	-	0.032
Iron (Fe)		0.01	-	0.46
Lead (Pb)		0.001	-	<0.001
Manganese (Mn)		0.005	-	0.013
Nickel (Ni)		0.001	-	0.0016
Zinc (Zn)		0.001	-	0.0025
Aluminium (Al)		0.01	-	0.3
Selenium (Se)		0.001	-	<0.001
METALS (DISSOLVED)				
Cadmium (Cd)	mg/L	0.0001	-	<0.010
Chromium (Cr(III))		0.005	-	<0.005
Chromium (Cr(VI)		0.005	-	<0.005
Copper (Cu)		0.001	-	0.0019
Iron (Fe)		0.01	-	<0.010
Lead (Pb)		0.001	-	<0.0010
Manganese (Mn)		0.005	-	0.0012
Nickel (Ni)		0.001	-	0.0011
Zinc (Zn)		0.001	-	<0.0010
Aluminium (Al)		0.01	-	<0.010
Selenium (Se)		0.001	-	<0.001
OTHER LEACHATE INDICATORS				
Total Organic Carbon (TOC)	mg/L	1	7.5	9
Total Dissolved Solids (TDS)		5	440	270
Chemical Oxygen Demand (COD)		20	28	22
Biological Oxygen Demand (BOD)		5	16	18
Volatile acids as acetic acid (VFA)		5	-	<5

Table 5-2. Leachate results in the reporting period – TRH, PAH, BTEXN, PCB, PFAS/PFOS

PARAMETER	UNIT	LOR	2023	
			MAR	APR
OTHER				
TRH C6 - C9 Fraction	µg/L	10	-	<10
TRH C10-C14 Fraction		50	-	<50
TRH C15-C28 Fraction		100	-	<100
TRH C29-C36		100	-	<100
MTBE		1	-	<1
Benzene		1	-	<1
Toluene		1	-	<1
Ethylbenzene		1	-	<1
Xylene (m&p)		2	-	<2
Xylene (o)		1	-	<1
Naphthalene		1	-	<1
Aroclor 1016		2	-	<2
Aroclor 1221		2	-	<2
Aroclor 1232		2	-	<2
Aroclor 1242		2	-	<2
Aroclor 1248		2	-	<2
Aroclor 1254		2	-	<2
Aroclor 1260	2	-	<2	
PFOS/PFAS (in any form)				
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.01	-	0.11
Perfluoropentanesulfonic acid (PFPeS)		0.01	-	0.038
Perfluorohexanesulfonic acid (PFHxS)		0.01	-	0.19
Perfluoroheptanesulfonic acid (PFHpS)		0.01	-	0.01
Perfluorooctanesulfonate (PFOS)		0.01	-	0.27
Perfluorodecanesulfonic acid (PFDS)		0.02	-	<0.020
Perfluorobutanoic acid (PFBA)		0.02	-	0.075
Perfluoropentanoic acid (PFPeA)		0.02	-	0.12
Perfluorohexanoic acid (PFHxA)		0.01	-	0.12
Perfluoroheptanoic acid (PFHpA)		0.01	-	0.066
Perfluorooctanoic acid PFOA		0.01	-	0.081
Perfluorononanoic acid (PFNA)		0.01	-	<0.010
Perfluorodecanoic acid (PFDA)		0.02	-	<0.020
Perfluoroundecanoic acid (PFUnDA)		0.02	-	<0.020
Perfluorododecanoic acid (PFDoDA)		0.05	-	<0.050
Perfluorotridecanoic acid (PFTrDA)		0.1	-	<0.10
Perfluorotetradecanoic acid (PFTeDA)		0.5	-	<0.50
4:2 FTS		0.01	-	<0.010
6:2 FTS		0.01	-	<0.010
8:2 FTS		0.02	-	<0.020
10:2 FTS		0.02	-	<0.020
Perfluorooctance sulfonamide (FOSA)		0.1	-	<0.10
Total Positive PFHxS & PFOS		0.01	-	0.46
Total Positive PFOS & PFOA		0.01	-	0.35
Total Positive PFAS		0.01	-	1.1
PAHs				
Naphthalene	µg/L	0.1	-	<0.1
Acenaphthylene		0.1	-	<0.1
Acenaphthene		0.1	-	<0.1
Fluorene		0.1	-	<0.1
Phenanthrene		0.1	-	<0.1
Anthracene		0.1	-	<0.1
Fluoranthene		0.1	-	<0.1
Pyrene		0.1	-	<0.1
Benzo(a)anthracene		0.1	-	<0.1
Chrysene		0.1	-	<0.1
Benzo(b,j,k)fluoranthene		0.2	-	<0.2
Benzo(a)pyrene		0.1	-	<0.1
Indeno(1,2,3-c,d)pyrene		0.1	-	<0.1
Dibenzo(a,h)anthracene		0.1	-	<0.1
Benzo(g,h,i)perylene		0.1	-	<0.1
Benzo(a)pyrene TEQ		0.5	-	<0.5
Total positive PAHs		0.1	-	<0.1

5.1.2 Historic trends

All leachate data available since 2017 is provided in Appendix A. Leachate and surface water quality results for parameters with enough data available are illustrated in Appendix B.

Results available have been variable since 2022. In February 2022, leachate was more acidic, higher in temperature and lower in dissolved oxygen than in March and April 2023. Additionally, the high ammonium and COD concentrations obtained in 2022 appear to indicate a higher content of organic and inorganic substances in the leachate.

Limited data is available to determine any potential trends in leachate characteristics.

5.2 Surface water

Results for the reporting period and historic trends are provided in the sections below. An assessment of the concentrations recorded at SWC with respect to the EPL298-01 trigger values is also provided in Section 5.2.3.

5.2.1 Surface water quality

In the reporting period, field and laboratory parameters were collected twice (February and March). pH concentrations at SWB and SWC in both sampling rounds were mostly within the trigger value range (6-8), with only an exceedance recorded at SWC in March 2023, where a value of 8.39 was recorded. EC was higher at both sampling sites in March than in February 2023. The high EC recorded at both SWB and SWC is potentially influenced by the much lower rainfall recorded in March, which likely leads to water quality in Tindal Creek to be more influenced by the groundwater quality that discharges into the creek. DO was considerably low at both sample sites, which also potentially indicates the influence of groundwater inputs in water quality at Tindal Creek.

Major ions were all below their respective trigger values, and concentrations were mostly invariable between sample sites. When comparing the results obtained in the two sampling rounds, most major ions were lower in February than in March. The lower concentration are a likely result of the higher precipitation in February.

TOC, TDS, COD and BOD also had similar concentrations at both monitoring sites, with only TDS and COD being slightly higher at SWC.

Ammonium at SWB and SWC was below the trigger value (10 µg/L) in February, but above in March. A higher concentration was recorded at SWB than at SWC, indicating that the exceedance reported at SWC (downstream from the facility) is not likely associated with the activities at the KWMF.

Results for the reporting period are provided in Table 5-3.

Table 5-3. Surface water quality in the monitoring period.

PARAMETER	UNIT	LOR	TRIGGER VALUE	Feb 2023		Mar 2023	
				SWB	SWC	SWB	SWC
FIELD MEASUREMENTS							
pH	0	-	6-8	7.96	7.9	7.89	8.39
Temperature	-	-	-	27.8	29.1	34.1	29.2
Electrical Conductivity (EC)	°C	-	20-250	145.2	179.4	407	407
Dissolved Oxygen (DO)	% Sat	-	85-120	-	8.3	8.3	9.4
MAJOR IONS							
Potassium (K)	mg/L	0.5	400	4.8	4.2	4.6	4.7
Alkalinity (CaCO3)		5	-	68	74	220	200
Calcium (Ca)		0.5	400	16	18	36	35
Chloride (Cl)		1	-	1.6	1.6	7.6	7.3
Sodium (Na)		0.5	300	0.95	1.2	7.2	6.6
Sulfate (SO4)		1	500	<1	<1	4.3	4.3
Magnesium (Mg)		0.5	-	5.3	5.5	24	23
NUTRIENTS							
Total Nitrogen (TN)	µg/L	100	200-300	-	-	-	-
Total Phosphorus (TP)		50	-	-	-	-	-
Nitrate (as N)		5	-	-	-	-	-
Ammonium (NH4)		7	10	<7	9.6	22	13
Ammonia (as N)		5	-	6.1	<5	22	13
OTHER LEACHATE INDICATORS							
Total Organic Carbon (TOC)	mg/L	1	-	10	9.9	5.4	5.5
Total Dissolved Solids (TDS)		5	-	150	180	360	420
Chemical Oxygen Demand (COD)		20	-	43	41	29	32
Biological Oxygen Demand (BOD)		5	-	28	32	13	9.1
Volatile acids as acetic acid (VFA)		5	-		-	-	-

5.2.2 Historic trends

All surface water quality data available since 2017 is provided in Appendix A. Leachate and surface water quality results for parameters with enough data available are illustrated in Appendix B.

Historical data indicates that pH values above 8 have been commonly reported at SWC and SWB. As such, the exceedance recorded in March at SWC is not likely associated with an impact from the KWMF. This is also supported by the high EC and low DO that has been commonly reported in previous monitoring rounds at the two surface water sites.

Major ions, TOC, TDS, COD and BOD, also to be influenced by rainfall although further data is required to determine any trend in these parameters, as well as in ammonium concentrations.

5.2.3 SWC trigger value compliance

Condition 58 of EPL298-01 defines the following as a non-compliance:

58.1 An exceedance of a trigger value, as specified in the Monitoring Plan on three consecutive occasions

58.2 An exceedance of a trigger value, as specified in the Monitoring Plan on a single occasion where the parameter measured greater than or equal to three times the trigger value; or

58.3 any subsequent consecutive exceedances of a trigger value, as specified in the Monitoring Plan

Given these considerations, the highest value between the trigger value and concentrations measured at SWC was divided into the lowest. When a range of values were provided as the trigger value, the closest to the concentration measured was used in the calculation. Results of this calculation are shown in Table 5-4.

DO was the only parameter that, in both sampling events, recorded a concentration more than three times the trigger value, representing a *non-compliance*. Non-compliances have always been reported in this parameter. However, the upstream site (SWB) has also recorded DO levels that are three times the trigger value. Therefore, it appears these trigger values need to be reviewed in respect to site-specific conditions.

Table 5-4. SWC trigger values compliance

Exceedance results highlighted in red indicate that the recorded concentration is three times the trigger value.

Parameter	Unit	LOP	Trigger Value	Feb-23		Mar-23	
				SWC	Exceedance	SWC	Exceedance
Field Measurements							
pH	-	-	6-8	7.9	-	8.39	1.0
Electrical Conductivity (EC)	°C	-	20-250	179.4	-	407	1.6
Dissolved Oxygen (DO)	mg/L	-	85-120	8.3	10.2	9.4	9.0
Nutrients							
Ammonium (NH4)	µg/L	7	10	9.6	-	13	1.3

5.3 Groundwater

Groundwater levels, quality and historic trends are provided in the sections below.

5.3.1 Groundwater levels and flow

SWLs recorded in the reporting period (see Table 5-5) and other previous monitoring rounds indicate that all the monitoring bores onsite intercept the same aquifer. SWLs in the 2022-23 monitoring period, followed the seasonal trend seen in previous sampling, which is influenced by rainfall seasonality. SWLs start increasing at the beginning of the wet season, between November and December, and reach the highest levels between January and February. By the end of the wet season, levels start decreasing and reach their lowest commonly between September and October. The trends previously described are clearly seen in Figure 5-1.

The rise in groundwater levels during the 2022-23 reporting period is higher than that reported in 2021-22, which is associated with the higher rainfall recorded during the 2022-23 reporting period (refer to Section 3.1.1). Of note is that on some occasions (December 2022, March, April and May 2023), GWB03 and GWB01 followed different trends to those observed in the other four monitoring bores. This is potentially influenced by the shallow depths of these bores and are a likely indication of the susceptibility of shallow groundwater to rainfall and evaporation.

The groundwater elevation in the six on-site bores indicates that groundwater flows in a north-west direction across the site towards Tindal Creek.

Table 5-5. SWL measured in KWMF bores from August 2022 to July 2023

BORE ID	2022										2023									
	Aug-22		Sep-22		Oct-22		Nov-22		Dec-22		Jan-23		Feb-23		Mar-23		Apr-23		May-23	
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD
GWA (RN031131)	13.65	89.0254	13.78	88.8954	13.78	88.8954	14.25	88.4254	Dry		11.47	91.2054	11.69	90.9854	7.42	95.2554	9.47	93.2054	11.65	91.0254
GWE (RN022487)	11.58	90.5664	11.64	90.5064	11.74	90.4064	11.97	90.1764	11.86	90.2864	10.46	91.6864	9.54	92.6064	6.5	95.6464	8.1	94.0464	9.52	92.6264
GW801	11.69	87.9314	11.85	87.7714	Dry		12.35	87.2714	12.2	87.4214	10.86	88.7614	9.78	89.8414	5.63	93.9914	8.66	90.9614	Dry	
GW802	11.87	87.9251	12	87.7951	12.21	87.5851	12.5	87.2951	12.34	87.4551	10.78	89.0151	9.72	90.0751	5.69	94.1051	8.5	91.2951	9.81	89.9851
GW803	10.65	89.0293	10.62	89.0593	Dry		Dry		8.53	91.1493	10.70	88.9793	8.84	90.8393	4.24	95.4393	6.26	93.4193	7.86	91.8193
GW804	13.48	89.383	13.62	89.243	13.7	89.163	14.1	88.763	13.89	88.973	11.00	91.863	11.37	91.493	7.39	95.473	9.53	93.333	10.94	91.923

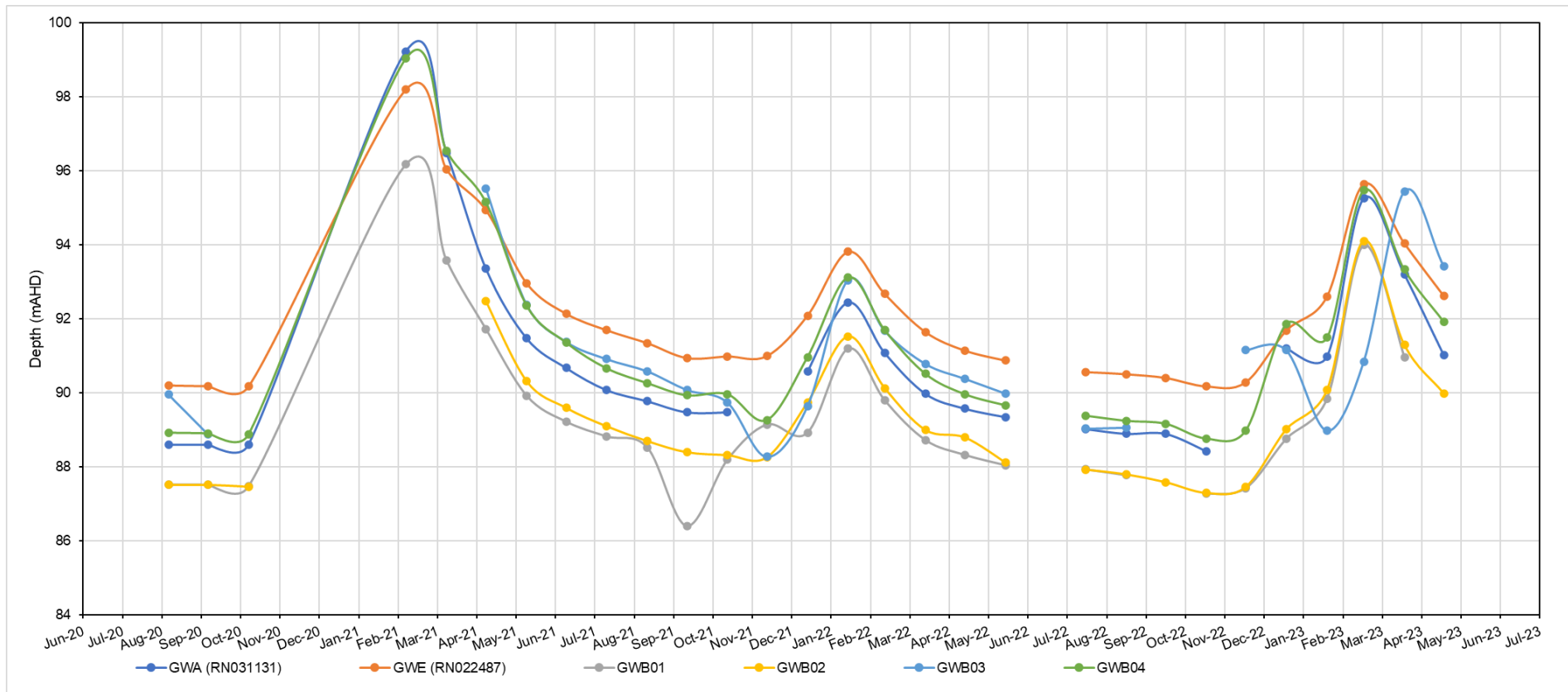


Figure 5-1. Groundwater depths, in mAHd, at each of the six bores monitored since monitoring started in August 2020 at the KWMF.

5.3.2 Groundwater quality

Groundwater quality monitoring results for the reporting period are presented below in Table 5-6 to Table 5-45. Trigger values are not defined for groundwater quality in EPL298-01, rather, concentrations in the two downgradient bores GWB01 and GWB02, are compared to the four up-gradient bores.

Appendix A also contains the tables with all the historic data available for the groundwater bores, including the results of single monitoring rounds undertaken in 2006, 2017 and 2018. Groundwater bores GWB01 to GWB04 were also only installed in 2018, and historic data for these bores is only available for a single monitoring round in 2018. A number of parameters were also not measured during the earlier monitoring rounds e.g., TN, VFA, and not all 28 PFAS currently analysed were analysed pre-2020.

Note that months when monitoring was not undertaken (variable for each parameter; see Table 4-5) were not included in the tables below.

Results tables are not provided below for parameters that recorded concentrations below the LOR for all bores, for all monitoring rounds.

Field parameters

During the monitoring period, pH was variable and ranged between 3.4 and 8.7 (see Table 5-6), the downgradient bore GWB02 appears to report the most variable pH values in the reporting period, while the deepest bore GWA was the less variable.

As shown in Table 5-8, EC ranged between 274 and 3,081 $\mu\text{S}/\text{cm}$ during the monitoring period. High EC concentrations were recorded at GWB03 and GWE in August 2023, but were lower in the following monitoring rounds. The reason causing these spikes is not yet known.

High DO levels were recorded in the last monitoring rounds, with a 50%Sat recorded at GWB03 in May (see Table 5-9).

Table 5-6. pH in the monitoring bores during the reporting period

pH	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	6.2	6.3	5.8	6.1	6.7	6.8	7.8	7.5	8.0	6.5
GWE	7.0	6.5	4.2	7.4		5.7	8.7	7.2	7.6	6.7
GWB01	6.8	6.6		6.7		5.0	8.3	5.2	7.4	
GWB02	6.9	3.7	3.2	7.2	6.0	6.3	8.2	7.4	7.3	3.4
GWB03	5.7				5.8		8.0	7.2	7.1	6.4
GWB04	4.3	3.7	3.5	6.8	6.0	4.8	7.8	6.8		6.1

Table 5-7. Temperature at the monitoring bores in the reporting period.

T (°C)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	29.3	31.8	31.4	29.5	36.2	32.7	32.6	36.4	25.0	25.0
GWE	28.8	29.8	34.6	30.4		31.8	32.4	33.8	24.1	24.8
GWB01	27.0	28.7		32.2		30.6	32.4	29.5	25.0	
GWB02	28.5	29.0	37.6	35.3	31.4	33.5	31.2	29.9	25.0	26.2
GWB03	27.9				29.5		29.3	21.5	23.1	24.3
GWB04	27.3	28.7	25.8	31.3	30.0	28.4	30.9	29.0		23.5

Table 5-8. EC in the monitoring bores during the reporting period

EC (μS/cm)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	317	681	636	696	645	631	704	677	734	656
GWE	1707	570	406	488		812	802	702	662	664
GWB01	1022	947		868		930	945	940	734	
GWB02	847	987	856	881	912	865	961	814	944	848
GWB03	3081				1220		907	799	879	949
GWB04	1059	914	932	897	852	923	889	762		274

Table 5-9. DO in the monitoring bores during the reporting period

DO (%)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	3.3	13.3	3.0	7.2	1.2	2.6		24.1	7.9	24.3
GWE	6.5	12.1	2.8	1.0		2.2	6.0	7.2	8.2	18.8
GWB01	39.3	9.5		1.9		0.9	13.9	13.7	8.0	
GWB02		9.0	1.3	1.9	2.7	1.5		4.7	11.4	14.0
GWB03	34.3				5.2			5.0	10.0	50.5
GWB04	7.6	7.6	4.0	5.0	3.0	2.4		3.9		23.1

Table 5-10. Redox in the monitoring bores during the reporting period

Redox	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	1475.7	397	390	270	381	379	341	348	213	292
GWE	163	183	387	147		159	121		287	189
GWB01	363	345		350			416			
GWB02	350	370	386	330	753	369	295	354	278	191
GWB03	391				268			353		
GWB04		358	385	342	358	387	346	339		813

Major ions

In the reporting period, K concentrations were consistently higher at GWB01 (downgradient bore) and GWB04 than in the other bores (see Table 5-11). The elevated concentrations recorded at GWB01 are not likely associated with an impact from the KWMF, as K in leachate is more than 10 times lower than the concentrations recorded at this bore. As such, these concentrations are potentially naturally occurring.

The deeper bores GWA and GWE always recorded the lowest alkalinity, Ca and Mg concentrations (see Table 5-13 and Table 5-17). Given these bores are up the hydraulic gradient, the concentrations reported are potentially an indication of the natural characteristics of groundwater intercepted at deep depths.

As seen in Table 5-15 and Table 5-14, Na and Cl were commonly high at the two downgradient bores GWB01 and GWB02. These bores are located at similar depths than the upgradient GWB03 and GWB04, where concentrations, particularly of Cl are always much lower. As such, a potential impact from the facility cannot be discarded.

In the reporting period, GWB03 recorded high concentrations of alkalinity, Ca, Na, SO₄ and Mg in August and December 2022 (see Table 5-12 to Table 5-13, and Table 5-15 to Table 5-17). The source of these high concentrations is unknown.

Table 5-11. K in the monitoring bores during the reporting period

K (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	4.6	4.4	4.7	4.7	4.8	4.6	4.7	4.9	4.5	5.4
GWE	5.2	5.1	7.3	6.0		7.1	7.8	5.3	5.6	
GWB01	12.0	13.0		12.0		12.0			14.0	
GWB02	5.9	6.0	6.3	6.0	6.0	5.8	6.1	6.7	5.4	5.9
GWB03	7.8				6.2		4.7	4.4	4.5	4.6
GWB04	7.9	8.1	8.6	8.4	8.4	8.5	8.6	9.3	8.8	8.5

Table 5-12. Alkalinity in the monitoring bores during the reporting period

Alkalinity (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	330	360	350	300	330	310	320	330	360	430
GWE	240	270	200	200		350	360	340	349	407
GWB01	400	430		360		400	410	380	470	
GWB02	440	450	470	430	440	410	470	450	450	560
GWB03	510				480		500	350	370	540
GWB04	450	480	490	420	430	430	460	450	490	407

Table 5-13. Ca in the monitoring bores during the reporting period

Ca (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	72	68	63	66	72	69	69	77	70	81
GWE	41	39	22	33		60	63	68	63	69
GWB01	85	88		74		82	87	90	110	
GWB02	94	96	83	84	92	92	94	67	94	92
GWB03	100				120		93	72	91	100
GWB04	81	75	69	74	76	72	74	74	81	81

Table 5-14. Cl in the monitoring bores during the reporting period

Cl (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	5	5	5	6	5	5	5	5	5	5
GWE	16	17	4	10		41	40	15	8	8
GWB01	48	43		46		39	40	32	89	
GWB02	29	24	20	24	5	29	28	31	25	31
GWB03	10				5		7	11	12	14
GWB04	8	7	7	9	7	7	7	4	6	6

Table 5-15. Na in the monitoring bores during the reporting period

Na (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	6	6	6	6	6	6	6	6	6	6
GWE	14	13	12	10		34	32	15	10	9
GWB01	27	27		23		25	27	22	32	
GWB02	16	6	15	13	13	15	16	41	19	29
GWB03	30				31		12	10	13	14
GWB04	10	9	10	10	10	11	9	8	9	9

Table 5-16. SO₄ in the monitoring bores during the reporting period

SO ₄ (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	5	4	5	5	5	6	5	9	9	10
GWE	11	9	6	8		12	14	9	7	7
GWB01	18	16		16		18	19	18	20	
GWB02	34	29	30	30	28	31	41	32	26	35
GWB03	180				290		43	7	8	26
GWB04	9	8	9	10	9	8	12	7	11	12

Table 5-17. Mg in the monitoring bores during the reporting period

Mg (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	35	32	32	33	34	34	33	35	33	36
GWE	33	30	26	29		45	45	36	37	34
GWB01	43	43		39		44	46	44	55	
GWB02	54	51	47	48	53	54	58	53	49	50
GWB03	80				93		59	40	51	57
GWB04	61	56	53	54	58	56	61	53	65	61

Nutrients

TN and NO₃ (as N) were mostly higher in bores GWB01, GWB02, GWB03 and GWB04, than in the upgradient bores GWA and GWE (see Table 5-18 and Table 5-20). TN concentrations appear to be increasing since October 2022 at bores GWB02, GWB04, GWA and GWE.

As shown in Table 5-19, between October and January, high TP concentrations were recorded at bores GWB01, GWB02 and GWB04. However, concentrations then decreased in April 2023. The spike recorded could potentially be influenced by rainfall seasonality and the potential infiltration of water with high levels of TP at the beginning of the wet season.

NH₄ was always higher at GWB01 than at any other bore in the reporting period (see Table 5-21), except in March and April, when concentrations decreased to levels close to or below the LOR (7 µg/L).

Table 5-18. TN in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TN (µg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<100	200	680
GWE	<100	200	420
GWB01		2100	920
GWB02	380	160	1600
GWB03			4200
GWB04	380	2700	3200

Table 5-19. TP in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TP (µg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<10	<10	<10
GWE	<10	<10	<10
GWB01		20	<10
GWB02	20	10	<10
GWB03			33
GWB04	10	<10	<10

Table 5-20. NO₃ in the monitoring bores during the reporting period

NO ₃ -N (µg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	9	190	720
GWE	7	7	77
GWB01		620	780
GWB02	46	20	1800
GWB03			1800
GWB04	2300	2500	3200

Table 5-21. NH₄ in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

NH ₄ (µg/L)	2022					2023			
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr
GWA	9	45	11	<7	<7	<7	11	11	<7
GWE	190	220	11	63		79	54	9	<7
GWB01	2100	1600		2000		990	110	8	<7
GWB02	10	42	21	<7	<7	7	<7	<7	<7
GWB03	44				<7		<7	<7	<7
GWB04	13	37	9	<7	<7	<7	<7	<7	<7

Dissolved metals

Concentrations of Cd, CrIII, CrVI were not detected in the reporting period. Pb, Al and Se were detected only once in the reporting period at a concentration equal to the respective laboratory limit of reporting. Therefore, the results of these metals are not discussed or presented in this section.

Spikes in Cu and Fe concentrations were recorded in January in bores GWB04 and GWE respectively (see Table 5-22 and Table 5-23); however, the concentrations decreased in the following monitoring round. High concentrations of Mn, Ni and Zn were recorded at the downgradient bores GWB01 and GWB02 and at bores GWB03 and GWB04 (Table 5-24 to Table 5-26). Although these concentrations mostly decrease in the following monitoring round.

Table 5-22. Cu in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

Cu (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	0.001	<0.010
GWE	<0.001	<0.001	<0.001
GWB01		0.005	0.004
GWB02	0.004	<0.0001	<0.0001
GWB03			<0.001
GWB04	0.002	0.029	<0.001

Table 5-23. Fe in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

Fe (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	0.14	0.05	0.76
GWE	<0.01	3.00	0.18
GWB01		0.01	<0.01
GWB02	<0.01	0.08	<0.01
GWB03			0.10
GWB04	<0.010	<0.010	<0.010

Table 5-24. Mn in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

Mn (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	0.004	0.003	0.006
GWE	0.007	0.031	0.007
GWB01		0.130	0.012
GWB02	0.018	0.270	0.003
GWB03			0.054
GWB04	<0.001	0.004	<0.001

Table 5-25. Ni in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

Ni (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.001	<0.001	<0.001
GWE	<0.001	<0.001	<0.001
GWB01		0.003	0.002
GWB02	0.004	0.003	<0.0010
GWB03			<0.001
GWB04	<0.001	0.002	<0.001

Table 5-26. Zn in the monitoring bores during the reporting period

Zn (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	0.007	0.012	0.015
GWE	0.003	0.007	0.009
GWB01		0.007	0.046
GWB02	0.008	0.044	0.005
GWB03			0.013
GWB04	0.024	0.018	0.020

Other leachate indicators

As shown in Table 5-27 to Table 5-31, TOC, TDS, BOD and VFA were variable during the reporting period, with no trends seen. Overall, concentrations between upgradient and downgradient bores do not appear to be considerably different, except at GWB01, where TOC and BOD concentrations were usually higher than those at the other monitoring bores. Of note is that spikes in TDS concentration were recorded at GWB03 in August and December, although concentrations then decreased in the following monitoring rounds.

Spikes in COD concentration were recorded at GWB01 and GWB03 in the reporting period, but overall, concentrations were mostly below the laboratory limit of reporting.

Table 5-27. TOC in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TOC (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	<1	<1	<1	<1	1	<1	<1	<1	2	<1
GWE	<1	<1	<1	1		2	<1	<1	2	<1
GWB01	3	3		4		3	2	<1	10	
GWB02	1	1	3	1	1	1	2	1	2	1
GWB03	6				<1		1	1	2	1
GWB04	1	<1	<1	2	<1	<1	<1	<1	2	1

Table 5-28. TDS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TDS (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	330	350	320	<5	360	360	340	430	410	370
GWE	260	310	180	<5		470	460	440	380	340
GWB01	500	490		<5		530	540	570	660	
GWB02	500	540	500	<5	500	540	570	570	500	520
GWB03	670				830		550	420	390	540
GWB04	440	480	500	<5	480	480	480	520	520	470

Table 5-29. COD in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

COD (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
GWE	<20	<20	<20	<20		<20	<20	<20	<20	<20
GWB01	120	<20		<20		50	<20	<20	<20	
GWB02	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
GWB03	60				<20		<20	<20	<20	<20
GWB04	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Table 5-30. BOD in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

BOD (mg/L)	2022					2023				
	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	<5	<5	<5	16	15	12	15	11	19	<5
GWE	<5	<5	<5	15		10	14	14	19	<5
GWB01	7	7		22		15	18	9	24	
GWB02	<5	<5	<5	18	17	15	18	13	23	<5
GWB03	7				14		17	16	23	<5
GWB04	<5	<5	6	19	14	15	19	15	20	<5

Table 5-31. VFA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

VFA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	54	54	33
GWE	<5	82	51
GWB01		36	44
GWB02	14	100	93
GWB03			26
GWB04	10	48	36

TRH

As shown in Table 5-32, TRH fraction C₁₅-C₂₈ was detected for the first time since monitoring started in January at the downgradient bore GWB01 and in April at bores GWB03 and GWB04. The concentration recorded at GWB01 was more than four times higher than those detected in April.

Table 5-32. TRH C₁₅-C₂₈ fraction concentration in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TRH C15-C28 (µg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<100	<100	<100
GWE	<100	<100	<100
GWB01		820	<100
GWB02	<100	<100	<100
GWB03			200
GWB04	<100	<100	150

PFAS

PFAS concentrations were usually higher in the downgradient bores GWB01 and GWB02 compared to the upgradient bores; see Table 5-33 to Table 5-45. The PFAS forms PFBS, PFPeS and PFHpS were only detected in the downgradient bores.

GWE recorded spikes in PFHxS, PFOS and PFOA in January. Similarly, spikes were recorded in the same month at GWA in concentrations of PFBA, PFPeA, PFHxA, PFHpA and PFOA. These spikes, as well as the PFOS detection in almost all the downgradient bores in April is a potential indicative of the regional-scale PFAS contamination from the RAAF Base Tindall, which is dominated by the fire-fighting foam PFAS forms PFOS, PFHxS and PFOA, and other forms such as those detected in the upgradient bores (Coffey 2018a).

PFDS, PFNA, PFDA, PFUnDA, PFDoDA, PFTTrDA, PFTA, 4:2 FTS, 6:2 FTS, 8:2 FTS, 10:2 FTS and PFOSA were all below the LOR.

The wide mixture of different PFAS types detected in the downgradient bores is indicative of a landfill source.

Table 5-33. PFBS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFBS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.01	<0.01	<0.01
GWE	<0.01	<0.01	<0.01
GWB01		0.08	0.22
GWB02	0.04	0.08	0.10
GWB03			<0.01
GWB04	<0.01	<0.01	<0.01

Table 5-34. PFPeS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFPeS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.01	<0.01	<0.01
GWE	<0.01	<0.01	<0.01
GWB01		0.05	0.14
GWB02	0.03	0.05	0.08
GWB03			<0.01
GWB04	<0.01	<0.01	<0.01

Table 5-35. PFHxS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFHxS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.01	<0.01	<0.01
GWE	<0.01	0.04	<0.01
GWB01		0.37	1.20
GWB02	0.15	0.20	0.35
GWB03			0.01
GWB04	<0.01	<0.01	<0.01

Table 5-36. PFHpS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFHpS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.01	<0.01	<0.01
GWE	<0.01	<0.01	<0.01
GWB01		0.03	0.08
GWB02	0.02	0.02	0.03
GWB03			<0.01
GWB04	<0.01	<0.01	<0.01

Table 5-37. PFOS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFOS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	<0.010	<0.010
GWE	0.02	0.08	0.01
GWB01		0.48	1.60
GWB02	0.18	0.22	0.37
GWB03			0.02
GWB04	<0.01	<0.01	0.01

Table 5-38. PFBA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFBA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.020	0.10	<0.020
GWE	<0.02	<0.02	<0.02
GWB01		0.07	0.16
GWB02	0.05	0.07	0.07
GWB03			<0.02
GWB04	<0.02	<0.02	<0.02

Table 5-39. PFPeA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFPeA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.020	0.20	<0.020
GWE	<0.02	<0.02	<0.02
GWB01		0.05	0.11
GWB02	0.04	0.06	0.05
GWB03			<0.02
GWB04	<0.02	<0.02	<0.02

Table 5-40. PFHxA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFHxA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	0.09	<0.010
GWE	<0.01	<0.01	<0.01
GWB01		0.09	0.17
GWB02	0.09	0.13	0.10
GWB03			<0.01
GWB04	<0.01	<0.01	<0.01

Table 5-41. PFHpA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFHpA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	0.06	<0.010
GWE	<0.01	<0.01	<0.01
GWB01		0.04	0.11
GWB02	0.03	0.04	0.05
GWB03			<0.01
GWB04	<0.01	<0.01	<0.01

Table 5-42. PFOA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

PFOA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	0.02	<0.010
GWE	<0.01	0.02	<0.01
GWB01		0.09	0.22
GWB02	0.05	0.07	0.09
GWB03			<0.01
GWB04	<0.01	<0.01	<0.01

Table 5-43. Total PFHxS + PFOS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TOTAL PFHxS + PFOS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	<0.010	<0.010
GWE	0.02	0.12	0.01
GWB01		0.85	2.80
GWB02	0.33	0.42	0.72
GWB03			0.03
GWB04	<0.01	<0.01	0.01

Table 5-44. Total PFOS + PFOA in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TOTAL PFOS+PFOA (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	0.02	<0.010
GWE	0.02	0.10	0.01
GWB01		0.57	1.80
GWB02	0.23	0.29	0.46
GWB03			0.02
GWB04			0.01

Table 5-45. Total PFAS in the monitoring bores during the reporting period
(Concentrations below the LOR are greyed out)

TOTAL PFAS (mg/L)	2022	2023	
	11-Oct	17-Jan	17-Apr
GWA	<0.010	0.47	<0.010
GWE	0.02	0.13	0.01
GWB01		0.47	4.00
GWB02	0.68	0.95	1.30
GWB03			0.03
GWB04			0.01

Other parameters

PAH, BTEXN and PCBs were all below LOR in all bores during the reporting period.

5.3.3 Historic trends

The highest EC and lowest pH levels recorded since monitoring began were reported in the 2022-23 monitoring period. However, no trend is observed in the concentration of these, or any other, field parameters.

Seasonal trends are not seen in major ions at the monitoring bores, but distinctive trends are seen when comparing results between monitoring bores. The deep bores GWA and GWE consistently had the lowest concentrations of alkalinity, Ca and Mg. In contrast, the shallow and downgradient bores GWB01 and GWB02 commonly show higher concentrations of Cl and Na than the other monitoring bores, with GWB01 often recording higher K concentrations as well. Additionally, major ion concentrations typically display less variability at GWA, GWE and GWB04, while greater variability is observed in the other three monitoring bores, particularly GWB03.

TN and TP in the monitoring bores do not appear to follow seasonal trends, but they do exhibit a more stable concentration in the deep bores GWA and GWE. Of note is that TN concentrations have been increasing in most bores since January 2023, but the concentrations recorded are lower than those reported in previous monitoring rounds.

Data on NH₄ clearly shows that concentrations are higher at GWB01 than in any other monitoring bore. In addition, a seasonal trend is seen at this bore, with concentrations increasing from April to August/September, followed by a decrease, reaching the lowest levels in February/March.

Since monitoring commenced, Cu, Fe, Mn, Ni, and Zn concentrations have displayed high variability at most monitoring bores, particularly at the shallow bores GWB01, GWB02, GWB03 and GWB04. The spikes seen in Mn, Ni and Zn in some bores in January 2023 could be indicating some seasonal variability, as these metals also spiked in January 2022. However, more data is required to better assess the variability of these metals.

TOC and COD concentrations at the shallow downgradient bores GWB01 and GWB02, as well as the shallow upgradient bores GWB03 and GWB04 appear to be consistently higher than in the deep bores GWA and GWE. Similarly, TDS seem to be influenced by bore depth, as the deep bores usually record the lowest concentrations. However, this trend is not seen in the BOD concentrations, which also exhibit high variability across each bore. VFA also do not appear to be influenced by bore depth. Concentrations of all these parameters mostly remain within or below the concentrations recorded in previous monitoring rounds, except for VFA, which considerably increased in January 2023, although concentrations appear to be decreasing subsequently.

PFAS concentrations in the downgradient bores GWB01 and GWB02 have always been higher than at the upgradient bores. The PFAS types detected at GWA and GWE have been commonly detected at these upgradient bores since monitoring started. Overall, the concentrations during the 2022-23 monitoring period were lower than those recorded between April 2021 and April 2022.

A seasonal trend appears to influence PFAS concentrations at bore GWB02, where concentrations seem to increase between October and April, potentially influenced by rainfall seasonality and its impact on the groundwater table. Concentrations at GWB01 appear to increase between January and April; however, more data for this bore is required to determine any potential seasonality in PFAS concentrations.

5.4 Discussion

Trigger value exceedances in pH, EC, DO and NH_4 levels were reported in the monitoring period at downstream surface water site SWC. However, a comparison between these results and those obtained in the upstream site SWB and leachate indicates that the operation of the KWMF is unlikely to be the cause of these results. Historical data available for these sites also supports this conclusion.

Groundwater monitoring results indicate a likely impact of landfill leachate on groundwater quality. Contaminants elevated in the two downgradient bores (GWB01 and GWB02), compared to the upgradient bores were some major ions (Na and Cl), NH_4 , metals (Mn, Ni, Zn) TOC, BOD, COD, and a wide mixture of PFAS types. Of note is that the PFAS types detected in the upgradient bores GWA and GWE are likely derived from the regional-scale PFAS contamination from the RAAF Base Tindall.

The TRH results obtained in the reporting period appear to indicate that the contamination detected in January at the upgradient bore GWB01 later reached the upgradient bores GWB03 and GWB04. The source of TRH in these bores is not yet known, but it is assumed that TRH are migrating from the source of contamination through groundwater. In such a case, the results obtained demonstrate the complexity of the groundwater flow in the area, particularly in the shallower levels, as the contamination was detected in the upgradient bores later than at GWB01, and no detection has been reported at the downgradient bore GWB02. Given that TRH were not detected at GWB01 in April 2023, it is inferred that the source of this contamination is likely temporary. Of note is that a potential cross-contamination of the equipment used to collect the sample cannot be discarded.

6 POTENTIAL ENVIRONMENTAL IMPACTS

Based on the data available, it appears that landfill activities are impacting on groundwater quality, as seen in bores GWB01 and GWB02 with higher concentrations of some dissolved metals, nitrogen species and PFAS.

Potential receptors to contaminated groundwater downgradient of the KWMF are limited. There are no known bores used for any purpose downgradient of the KWMF i.e. no bores to the north west or west of the facility. The sewage ponds for Katherine are located in this area and as such, use of groundwater and/or surface water in this area would not generally be desirable.

It is possible that groundwater from beneath the KWMF seeps into the Katherine River, although the Jinduckin Formation is a relatively poor aquifer in the region, and the Katherine River receives its most important groundwater inputs from springs located upstream that discharge groundwater from the Tindall Limestone Aquifer. The Tindall Limestone Aquifer is not readily recharged by surface water from the KWMF, where the Jinduckin Formation occurs.

Groundwater used at the KWMF is sourced from a bore upgradient of the landfill and as such, on-site workers are not at risk.

The limited surface water data available appears to indicate that activities at the KWMF do not impact on parameters such as those listed in Table 5-3. However, there is not enough data available for contaminants such as PFAS or TRH, to assess the actual impact of the landfill activities.

7 REVIEW OF PERFORMANCE AGAINST EMP MEASURES

As required by Condition 62.5 of EPL298-01, Table 7-1 to Table 7-12 below, provide a review of performance against the measures specified in the *Environmental Management Plan- Katherine Waste Management Facility* (EcOz 2020).

Table 7-1. Measures for general environmental management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Ensure the implementation and compliance of this EMP	Ongoing
	Annual environmental audit of EPL conditions and EMP	EcOz engaged to prepare annual Monitoring Report (i.e. this report)
	Ensure all personnel working at KWMF are given an induction detailing environmental risks and mitigation measures in this EMP, as well as emergency response procedures	All operators are inducted with protocol they have to follow in an emergency situation and evacuation procedure.
Target / performance criteria	Impacts/risks to environment are reduced to acceptable levels	Impacts/risks to water quality are discussed in this Monitoring Report
Monitoring	Daily visual site inspection (general parameters)	Any loose rubbish is picked up every morning.
	Monthly environmental inspection against EPL conditions and this EMP, as per site inspection checklist	Implemented

Table 7-2. Measures for communication, consultation and heritage management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Seek and maintain required approvals from NT EPA regarding landfill design upgrades, monitoring and reporting in accordance with the EPL conditions	TAFT Engineering have developed Integrated Environmental Management Plan and provided recommendations to optimise use of current facility and engage with the NT EPA to assist Council with approval processes.
	Develop and distribute newsletters or leaflets to inform users of KWMF of any updates or changes to the landfill operations or site. Have this information also on the KTC website.	KTC website and social media is used to update users about, accepted waste streams, alternative disposal and/or recycling options and

EMP measure:		Current implementation progress:
		cost benefits for separating waste streams.
	Place notices in the newspaper when any significant works or changes are being planned/undertaken	N/A
	In the event a sacred site or heritage artefact is uncovered, the KTC must inform the Heritage Branch as soon as possible and follow further advice	N/A
	All complaints shall be logged in the complaints register and appropriate action undertaken	No complaints received in the reporting period
Target / performance criteria	Minimal complaints from users of KWMF and surrounding landowners/users	Nil
	Minimal complaints from local community	Complaint actioned as soon as possible
	Appropriate management of sacred sites or heritage items discoveries	Nil
	Any complaints have been addressed and responded to	No complaints received in the reporting period
Monitoring	Review of complaints register to ensure it is being used correctly	Implemented
	Annual audit to ensure that monitoring and reporting are being undertaken as per the EPL conditions and EMP	Implemented

Table 7-3. Measures for waste acceptance and disposal management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Relevant staff are to be trained on the types of waste accepted and pre-approvals required – this will be done through inductions and toolbox talks/staff meetings	Ongoing – On the job training provided to staff and discussed in regular staff meetings.
	Clear signage and communication to make landfill users aware of the types of waste accepted at KWMF	Clear signs are in place. Users are also instructed on the weighbridge as they drive in. Plans are in place to implement more signs.
	At the weighbridge – conduct visual inspections of waste loads and question driver regarding types of wastes within the load.	Manual and visual inspections are carried out for every load that comes in. Weighbridge staff go out and have a closer look at the waste

EMP measure:		Current implementation progress:
		pile. CCTV is also in place to monitor the incoming waste loads.
	If not general waste, seek compliance documentation to verify type of wastes and prior approval if applicable.	Any disposal of asbestos requires prior application before user bring it to the waste facility. Acceptance of any degassed white goods will require certificate, if not, users will be charged extra for KTC to organise onsite degassing.
	Any waste not listed in the EPL can only be accepted after special approval from NT EPA	Anything that is non-compliant with NT EPA is not accepted.
	Only clean fill can be accepted for disposal. Soil being brought to KWMF from potentially contaminated sites will require validation sampling results to be assessed against the NSW EPA <i>Waste Classification Guidelines</i> .	Soil from potentially contaminated site is verified with NT EPA before being accepted at the facility.
	Provide assistance and clear directions on correct waste disposal areas	Weighbridge staff provide clear directions to users as they drive in.
	Clearly labelled signs at transfer stations	Implemented
	Salvage of recyclable materials incorrectly disposed of	Implemented – When the waste from transfer station is transferred to the tip face, staff go through the waste and remove any recyclables or hazardous objects and are placed on respective pile.
	Regular clean-up of scattered and inappropriately disposed waste	Any loose rubbish is picked up every morning and disposed appropriately.
	Apply daily cover, temporary cover and capping as required	Implemented
	Only domestic users are permitted to use the transfer station unless directed by the weighbridge operator	Implemented
	Accepted wastes are only to be stored within approved areas and storage vessels	Implemented
	All liquid waste (toilets, ablutions etc.) will be disposed of directly into site septic tanks, which will be managed as required	Liquid waste is not accepted – not licenced
	All drivers will be instructed to remain on alert for evidence of hot loads (smoke/fire) and to alert KWMF staff	Implemented – Staff are constantly alert for evidence of hot loads. Firefighting equipment is located at

EMP measure:		Current implementation progress:
		accessible area for use when required.
Target / performance criteria	No acceptance of unapproved wastes	Nil
	No significant impacts or environmental harm	Nil
	No breach of EPL conditions	Nil
	All wastes disposed of in accordance with EPL and industry standards	Implemented
Monitoring	Visual monitoring of loads to ensure appropriate acceptance of wastes	Visual monitoring of every waste load is carried out at the Weighbridge
	Water quality monitoring as per schedule	Minor breaches as outlined in this Monitoring Report. Unable to complete some sampling due to Tindal Creek not flowing.
	Visual inspections of waste transfer stations and active tip face shall occur at least daily in the dry season and at least twice daily in the wet season	Implemented

Table 7-4. Measures for storage and use of chemicals, oils and fuels management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Any spills or leaks of hazardous materials will be treated in accordance with the emergency response plan – spill response procedure	The facility does not accept hazardous materials. Battery storage is underneath the shade which keeps rain away. Spill kit is ready for use when required
	All chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their SDS	All chemicals and fuels are bunded and stored on a shed and are locked appropriately. In the reporting period, receiving and storing waste oil ceased at the facility.
	SDS will be available in a folder where the chemicals, oils and fuels are stored	Implemented. The folder is kept in the office. All operators and tradesmen are made aware about the location of the folder.
	Storage of oils and fuels must be in accordance with Australian Standards (AS1940 – The storage and handling of flammable and combustible liquids)	Implemented

EMP measure:		Current implementation progress:
	Chemical use will be in accordance with the appropriate SDS	Implemented
	Volumes of stored chemicals, oils and fuels will be kept to a minimum where possible	Implemented
	Spill response kits to be stored and maintained in all storage areas	Implemented
	Site staff to be trained in spill response as part of the induction process	Implemented
Target / performance criteria	No spills or leaks of hazardous substances	Nil
	No breach of EPL	Nil in relation to this aspect
	Reporting of spills/leaks to NT EPA	Nil
Monitoring	Daily visual inspections of waste disposal areas to identify any hazards or spills	Daily inspection is carried out
	Monthly site inspection to check correct use and storage of hazardous materials and for signs of any spills or leaks	Implemented

Table 7-5. Measures for storm water, erosion and sediment control management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Install and maintain surface water diversion structures as required to ensure that clean and dirty water do not mix.	Ongoing – Implementation of drain and bunding
	Use appropriate cover and capping materials (temporary daily cover where required)	Implemented - Constant supply of capping material is delivered to site.
	Implement and maintain erosion and sediment control measures where necessary	Ongoing – Bunding upgrade when required.
	Prevent contamination of storm water from chemicals, oils and fuels stored and used on site by use of appropriate bunding and covers	Implemented
	Ensure appropriate management of spills	Implemented
	Ensure progressive rehabilitation of disturbed areas	Ongoing noxious weed management implemented.
	Monitor for signs of erosion and take corrective actions where required	Daily site inspection
Target / performance criteria	No sedimentation of the surrounding environment	Nil to date
	No impacts to surface water or groundwater within KWMMF	Minor impacts detected, as outlined in Section 5 of this Monitoring Report
	Erosion and sediment control measures are implemented and maintained where necessary	Implemented
	Disturbed areas are rehabilitated as soon as possible	Implemented
Monitoring	Ensure water quality monitoring is undertaken in accordance with the monitoring plan	Minor breaches as outlined in this Monitoring Report. Unable to complete some sampling due to Tindal Creek been dry

EMP measure:		Current implementation progress:
	Inspection of waste disposal areas following heavy rainfall events	Implemented
	Site inspections to include checks for signs of erosion and monitoring of erosion and sediment control measures as well as surface water diversion structures, as per the site inspection schedule	Implemented

Table 7-6. Measures for leachate management, specified in the Environmental Management Plan-Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Ensure appropriate disposal of wastes into landfill cells	5:1 batters around the edge of landfill filled with waste and covered in capping.
	Use of appropriate cover and capping for landfill cells	Use of 2 types of soil (lower grade soil and higher dry content) for cover and capping.
	Minimise exposed tip face area to reduce rainfall infiltration Monitor all active waste areas following high rainfall events for signs of discoloured runoff / leachate Where leachate contamination of surface run-off is visible, construct diversions to direct leachate back into landfill	Implemented – construction of drains where required.
	Minimise the surface area and volumes of green waste kept on site	Constant heaping of the mulch/green waste to reduce risk of fire.
Target / performance criteria	No incidents or monitoring results in breach of the EPL	Some water quality trigger values were breached, but these are not likely associated with the activities carried at the facility.
	No detectable leachate flowing from KWMF operations area	Likely infiltration into groundwater as seen in groundwater monitoring results presented in this Monitoring Report, but does not represent a potential risk for receptors, as discussed in Section 5.3.3
	No impacts to the surface water or groundwater at KWMF	Minor impacts, as described in Section 5 of this Monitoring Report
Monitoring	Ensure water quality monitoring is undertaken in accordance with the monitoring plan	Minor breaches as outlined in this Monitoring Report. Unable to sample any surface water site during the reporting period, and some parameters to be tested in leachate were not analysed.
	Inspection of waste disposal areas following heavy rainfall events	Implemented
	Conduct site inspections on water quality controls as per the site inspection schedule	Daily and monthly inspections

Table 7-7. Measures for dust, odour and aesthetics management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Dust suppression through the use of a water cart/truck will be undertaken when necessary	Implemented as required
	Speed limits on site will be enforced to reduce the amount of dust	Speed limit of 20km/hr implemented within the facility
	Progressive revegetation of disturbed areas will be undertaken to reduce generation of dust	Revegetation will be carried out after capping is implemented.
	Transfer station skip bins will be emptied when full and at least at the close of each working day	Implemented
	Skip bins used at the transfer station are to be cleaned at least monthly to prevent build-up of odours	Monthly clean
	Wastes that cause odour are to be covered immediately	Implemented
	Scattered rubbish will be cleaned up regularly	Implemented - daily
	Waste stations / storage areas are to be kept tidy	Implemented
Target / performance criteria	No complaints received from KWMF users, employees and surrounding land owners/users relating to dust, odour or aesthetics	Nil received
Monitoring	Daily site inspection to include visual checks of cleanliness and tidiness	Implemented
	Visual monitoring for excessive dust generation	Implemented

Table 7-8. Measures for noise management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Maintain all equipment and machinery to manufacturers standards	Implemented- daily check and regular service of machinery is carried out.
	Conduct all operations during standard work hours	Implemented
Target / performance criteria	No complaints received from KWMF users, employees and surrounding land owners/users relating to noise	Nil received
Monitoring	If noise outside of what is considered normal operational noise is to occur, notification and details will be given to the public and surrounding land owners via newspapers and letter drops	Work not carried out outside of normal operational hours.
	Noise monitoring will be undertaken in the event of a complaint	N/A

Table 7-9. Measures for litter management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Litter will be regularly cleaned up and disposed of appropriately by KWMF staff	Implemented daily
	The perimeter fence is designed to reduce wind-blown litter leaving the KWMF. This fence will be maintained.	Implemented – fence recently upgraded.
	Additional litter fencing should be installed near Tindal Creek if existing fencing is inadequate in preventing windblown litter from entering the waterway.	Implemented (temporary fencing around active tip face)
Target / performance criteria	No complaints received from KWMF users, employees and surrounding land owners/users relating to litter	Nil received
Monitoring	Daily site inspections to include a visual check for litter	Implemented
	Monthly formal site inspection including inspection of litter and litter controls	See Appendix C for <i>Monthly Operational Checklist</i> from August 2022 to May 2023

Table 7-10. Measures for flora and fauna management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	All clearing at KWMF will have the required approvals undertaken by KTC	Implemented
	Any sightings of threatened fauna species are to be reported to the Site Manager to determine whether the animal is at risk and requires relocation	Nil
	Report any injured fauna to the Site Manager	Nil
	No pets / domestic animals allowed to be brought onto KWMF	Implemented
	Speed limits will be enforced to minimise potential for fauna impact	Implemented - Speed limit of 20km/hr
	Disturbed areas will be progressively rehabilitated, and done so with species local to the surrounding environment	The rehabilitation of the site will be progressive as areas reach final levels (Taft Engineering, 2022). Species to be used are yet to be defined
	Perimeter fencing around the landfill site to prevent large fauna entering the site	Implemented
Target / performance	No significant impacts to flora and fauna	Nil
	No injured fauna as a result of KWMF activities	Nil

EMP measure:		Current implementation progress:
criteria	Disturbed areas progressively rehabilitated with local native species, and achieving a minimum 80% groundcover within the first year	The rehabilitation of the site will be progressive as areas reach final levels (Taft Engineering, 2022). Species to be used are yet to be defined
Monitoring	Monthly site inspections to check for signs of impacted flora and fauna	Implemented
	Monitoring of rehabilitation areas will be undertaken to ensure it is to an acceptable standard (i.e. a minimum 80% groundcover within the first year)	The rehabilitation of the site will be progressive as areas reach final levels (Taft Engineering, 2022). Species to be used are yet to be defined

Table 7-11. Measures for pests and weeds management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Declared weeds are not to be disposed of at KWMF without prior approval from KTC and the NT EPA	Declared weeds not accepted at the facility
	Weeds identified on site will be managed in accordance with the KTC WMP	Ongoing
	Regular pest control activities to be undertaken at KWMF, including use of bait stations etc.	Ongoing
	Where an infestation has been identified, a qualified, licensed pest control contractor will be called in to control the infestation	Implemented
	Boundary fence to be regularly inspected and maintained to prevent access to animals	Implemented
	The pooling of water will be prevented where possible, to decrease the breeding grounds for mosquitos	Implemented
Target / performance criteria	No declared weeds or introduction of noxious weeds at KWMF	Ongoing
	No spread of weeds from KWMF to surrounding environment	Bellyache bush (<i>Jatropha gossypifolia</i>) is growing within the facility and reported to weed management and dealt with appropriately.
	No introduction of feral / pest species at KWMF	Nil
	No feral / pest / vector infestations at KWMF	Nil
Monitoring	A weed survey is to be undertaken at least annually	Nil
	Monthly site inspection to check for presence of pests and weeds in operational areas	Implemented

Table 7-12. Measures for fire prevention management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Appropriate management of waste disposal into landfill cells to ensure no hot loads or smoking loads	Implemented
	Ensure a clean and tidy operations area to minimise ignition sources	Implemented
	Appropriate hot works procedures – no hot works undertaken during fire bans or near flammable materials	Implemented
	Maintain fire-fighting equipment including extinguishers in date and accessible water cart.	Implemented
	Smoking only to occur in designated smoking areas	Implemented
	Maintain a 4 m wide fire break around the perimeter of the KWMF, around buildings and operational areas	Implemented
Target / performance criteria	Fire risk from and to the KWMF is reduced	Implemented
	No fires started at KWMF	Nil
Monitoring	Visual monitoring of loads going to landfill cells for evidence of smoking or hot loads	Implemented – frequent checks carried out
	Site inspections to include checks for fire fighting equipment and fire risks such as site tidiness, appropriate hot works permits etc.	Implemented

8 PROGRESS ON RECOMMENDATIONS

As required by Condition 62.6 of EPL298-01, Table 8-1 provides a progress report, that includes implementation and completion dates, on all recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment* (GHD 2019).

Table 8-1. Progress report on recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment* (GHD 2019)

Recommendations		Implementation
1.(i) Adopt a passive venting system to allow LFG to vent safely from the landfill		On-going. The incorporation of a passive landfill gas collection system underneath the capping system will be explored for management of residual gas underneath the final system (Taft Engineering, 2022).
1.(ii) Monitoring inside the WMF office using a continuous monitor to detect methane for a period of one month		Not undertaken yet.
1.(iii) Update the LFGRA when conditions at, or near, the site change such that the LFG risk profile may change (conditions specified in Waste Management Facility Closure Plan)		No changes in the LFG risk profile have been identified so far.
2. Continue to implement existing leachate management practices around operational areas of the landfill, including:	Diversion of surface water away from active tipping areas to minimise leachate generation	On-going. According to the report developed by Taft Engineering (2022), a clean surface diversion is proposed to be established to prevent clean stormwater from entering within the site operating area.
	Keep size of tipping area as small as possible to reduce leachate generation	On-going. A track loader is currently used to place and compact the waste in order to guarantee that active or exposed tipping areas remain as small as possible (Taft Engineering, 2022).
	Use intermediate cover to close off a cell which will not receive additional lifts of waste or final cover for some time Spread at least 300 mm of soil over the waste, so it is not left exposed.	On-going. In areas not active or not expected to be active for greater than 3 months Interim Cover will be placed. Interim cover will be 500mm average depth. The Intermediate Cover must be constructed with appropriate material and compacted, graded and sloped towards surface water drains (Taft Engineering, 2022).
	Consider engineering lining and leachate collection systems for areas constructed beyond current landfill footprint.	To be considered.
2.(i) Placement of additional cover soils on landfill areas where intermediate cover is presently less than 300 mm		On-going.
2.(ii) Progressive construction of a final cap on areas filled to final surface contours		On-going. A conceptual layout of the proposed final landform is provided in the <i>Integrated</i>

Recommendations	Implementation
	<i>Environmental Management Plan – Katherine Town Council Waste Management Facility</i> by Taft Engineering (2022).
3. Incorporation of full lateral extent of wastes in the final cap designed during Stage 3	To be implemented. A conceptual layout of the proposed final landform is provided in the <i>Integrated Environmental Management Plan – Katherine Town Council Waste Management Facility</i> by Taft Engineering (2022).
4. Biannual surface water and groundwater monitoring, undertaken at the end of dry season and the end of the wet season.	On-going – Please refer to Table 4-5 for details on groundwater and surface water monitoring undertaken in the reporting period.
5. Installation of two leachate monitoring bores within closed landfill areas	None installed so far

9 CONCLUSIONS AND RECOMMENDATIONS

During the 2022-23 reporting period, concentrations that did not comply with the trigger values were reported in the downstream surface water site SWC. For instance, DO levels at the site were always three times higher than the adopted criteria, which is a non-compliance with the EPL298-01 licence. However, these results are unlikely to be associated with the activities undertaken at the KWMF, as similar concentrations were recorded in the upstream site SWB. Therefore, when sufficient data is available, it is recommended that site specific trigger values are derived for the site.

As it has been seen in previous monitoring periods, the impact of KWMF on groundwater quality was evident in the downgradient bores GWB01 and GWB02. Higher concentrations in some major ions, NH₄, Mn, Ni, Zn, TOC, BOD, COD and some PFAS types were detected at the downgradient bores. The exposure of potential receptors to the contaminated groundwater downgradient of the landfill is low, given that no known bores are used for any purpose downgradient of the landfill. Also, seeping of groundwater from beneath the KWMF into the Katherine River is unlikely, given that this river receives most of its inputs from the Tindall Limestone Aquifer which is not recharged by surface water from the area where the KWMF is located.

In the monitoring period, TRH fraction C₁₅-C₂₈ was detected in groundwater for the first time since monitoring started. However, the results obtained appear to indicate that the contamination is potentially linked to a temporary source. The results obtained also indicate that groundwater flows in the area are complex, as the fraction was initially detected only in the downgradient bore GWB01, and in the following monitoring round only at the upgradient GWB03 and GWB04 bores, with no TRH ever detected at the downgradient bore GWB02. However, a potential cross-contamination of the sample cannot be discarded.

The monitoring frequency and parameters analysed were not always compliant with the EPL298-01 requirements. Some of these non-compliances were caused because the sites were dry at the time of sampling, particularly leachate and surface water sites. However, it is essential to improve future monitoring, so it is compliant with EPL298-01 requirements. Of great importance is to keep the quarterly monitoring of surface water (or alternatively four times during the wet season depending on flows), as current data are too limited to assess water quality risks. Additionally, it is essential to comply with all the parameters to be analysed in surface water, particularly on an annual basis, as this data is determinant to identify any potential impacts to Tindal Creek.

Most of the measures specified in the *Environmental Management Plan- Katherine Waste Management Facility* have been implemented; however:

- Breaches reported in measures 'water quality monitoring as per schedule' mentioned in Table 7-3 and 'Ensure water quality monitoring is undertaken in accordance with the monitoring plan' mentioned in Table 7-5 and Table 7-6. Improvements in the water quality monitoring are recommended.
- Minor breaches reported in measures 'no impacts to surface water or groundwater within KWMF' mentioned in Table 7-5 and Table 7-6 and 'no detectable leachate flowing from KWMF operations area' in Table 7-6 as impacts were identified, as mentioned in Section 5.

The *Integrated Environmental Management Plan* prepared by Taft Engineering, addresses most of the recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment*. The implementation of most recommendations is on-going or have not been implemented yet; therefore, completion dates are not provided in this report.

10 REFERENCES

- Bureau of Meteorology (2021). *Climate Data Online*. [online] Available at: <http://www.bom.gov.au/climate/data/> [Accessed 30 September 2021]
- Coffey (2018a). *Department of Defence, RAAF Base Tindal, Detailed Site Investigation Report – Appendix Tables*, September 2018, Prepared by Coffey Environments Australia Pty Ltd for Department of Defence, Abbotsford, Victoria. Available at: <https://www.defence.gov.au/about/locations-property/pfas/pfas-management-sites/raaf-base-tindal> [Accessed 28 July 2023]
- Coffey (2018b). *Department of Defence, RAAF Base Tindal, Supplementary Detailed Site Investigation Report*, September 2018, Prepared by Coffey Environments Australia Pty Ltd for Department of Defence, Abbotsford, Victoria. Available at: <https://www.defence.gov.au/about/locations-property/pfas/pfas-management-sites/raaf-base-tindal> [Accessed 27 July 2023]
- DENR (2019). *Katherine Tindall Limestone Aquifer Water Allocation Plan 2019-2024*, Department of Environment and Natural Resources, Northern Territory Government, Darwin, Australia
- EcOz (2020). *Environmental Management Plan- Katherine Waste Management Facility*, April 2020, Report prepared for Katherine Town Council by EcOz Environmental Consultants Pty Ltd, [online] Available at: https://ntepa.nt.gov.au/_data/assets/pdf_file/0006/905919/Environmental-Management-Plan.pdf [Accessed 24 September 2021]
- EcOz (2021) *EPL298 Monitoring Report – Katherine Waste Management Facility, Reporting Period 1 July 2020 – 30 June 2021 by EcOz Environmental Consultants Pty Ltd* [online] Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://ntepa.nt.gov.au/_data/assets/pdf_file/0004/1146892/EPL298-KWMF-Monitoring-Report-2020-2021.pdf [Accessed 14 July 2023]
- EcOz (2022) *EPL298 Monitoring Report – Katherine Waste Management Facility, Reporting Period 1 July 2021 – 30 June 2022 by EcOz Environmental Consultants Pty Ltd* [online] Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://ntepa.nt.gov.au/_data/assets/pdf_file/0005/1124906/epl298-kwmf-annual-monitoring-report2021.pdf [Accessed 14 July 2023]
- GHD (2019). *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment*. [unpublished], August 2019, report prepared for Katherine Town Council by GHD Pty Ltd.
- Golder Associates Pty Ltd (2021). *Katherine Landfill Environmental Audit of Sub-surface Fires Report* (Golder Associates, 2021) [unpublished], August 2021, report prepared for Katherine Town Council by Golder Associates Pty Ltd.
- HEPA (2020). *PFAS National Environmental Management Plan*, Version 2.0, January 2020, National Chemicals Working Group of the Heads of EPAs Australia and New Zealand (HEPA).
- Howe, D. (2006). *Land Resources of the Daly River Basin*. Darwin: Northern Territory Government Department of National Resources, Environment, and the Arts.
- Kruse, P. and Munson, T. (2013). Chapter 31: Daly Basin: in Ahmad M and Munson T (compilers). *‘Geology and mineral resources of the Northern Territory’ Northern Territory Geological Survey Special Publication 5*. Darwin: Northern Territory Government.
- NRETA (2006). *Katherine Town Area, Computer 5% AEP (1 in 20 Year) Flood Extent, and Flood Surface Contours*, June 2006, Department of National Resources, Environment, and the Arts (NRETA).
- NRETA (2006). *Katherine Town Area, Computer 2% AEP (1 in 50 Year) Flood Extent, and Flood Surface Contours*, June 2006, Department of National Resources, Environment, and the Arts (NRETA).

NRETA (2006). *Katherine Town Area, Computer 1% AEP (1 in 100 Year) Flood Extent, and Flood Surface Contours*, June 2006, Department of National Resources, Environment, and the Arts (NRETA).

NT EPA (2013). *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory*, January 2013, Northern Territory Environment Protection Authority (NT EPA), NT Government, Darwin

Taft Engineering (2022). *Integrated Environmental Management Plan – Katherine Town Council Waste Management Facility*. [unpublished], July 2022, report prepared for Katherine Town Council by Taft Engineering.

APPENDIX A HISTORICAL DATA

All historical data for surface water, groundwater and leachate are presented in the tables below.

Leachate

LEACHATE MEASUREMENTS					
PARAMETER	UNIT	LOR	2022	2023	
			FEB	MAR	APR
FIELD MEASUREMENTS					
pH	-	-	6.10	8.28	8.42
Temperature	°C	-	34.4	31.4	25.0
Electrical Conductivity (EC)	µs/cm	-	275	611	457
Dissolved Oxygen (DO)	mg/L	-	-	-	-
Dissolved Oxygen (DO)	% Sat	-	7.3	14.9	27.4
Redox	-	-	-	274	225
MAJOR IONS					
Potassium (K)	mg/L	0.5	7.6	9.9	10
Alkalinity (CaCO3)		5	110	250	170
Calcium (Ca)		0.5	25	46	23
Chloride (Cl)		1	9	28	28
Sodium (Na)		0.5	5.1	15	16
Sulfate (SO4)		1	9	47	36
Magnesium (Mg)		0.5	7	33	31
NUTRIENTS					
Total Nitrogen (TN)	µg/L	100	-	-	<5
Total Phosphorus (TP)		50	-	-	41
Nitrate (as N)		5	-	-	<5
Ammonium (NH4)		7	250	33	16
Ammonia (as N)		5	190	33	16
METALS (TOTAL)					
Cadmium (Cd)	mg/L	0.0001	-	-	<0.0010
Chromium (Cr(III))		0.005	-	-	<0.005
Chromium (CrVI)		0.005	-	-	<0.005
Copper (Cu)		0.001	-	-	0.032
Iron (Fe)		0.01	-	-	0.46
Lead (Pb)		0.001	-	-	<0.001
Manganese (Mn)		0.005	-	-	0.013
Nickel (Ni)		0.001	-	-	0.0016
Zinc (Zn)		0.001	-	-	0.0025
Aluminium (Al)		0.01	-	-	0.3
Selenium (Se)		0.001	-	-	<0.001
METALS (DISSOLVED)					
Cadmium (Cd)	mg/L	0.0001	-	-	<0.010
Chromium (Cr(III))		0.005	-	-	<0.005
Chromium (CrVI)		0.005	-	-	<0.005
Copper (Cu)		0.001	-	-	0.0019
Iron (Fe)		0.01	-	-	<0.010
Lead (Pb)		0.001	-	-	<0.0010
Manganese (Mn)		0.005	-	-	0.0012
Nickel (Ni)		0.001	-	-	0.0011
Zinc (Zn)		0.001	-	-	<0.0010
Aluminium (Al)		0.01	-	-	<0.010
Selenium (Se)		0.001	-	-	<0.001
OTHER LEACHATE INDICATORS					
Total Organic Carbon (TOC)	mg/L	1	14	7.5	9
Total Dissolved Solids (TDS)		5	470	440	270
Chemical Oxygen Demand (COD)		20	66	28	22
Biological Oxygen Demand (BOD)		5	5	16	18
Volatile acids as acetic acid (VFA)		5	-	-	<5

LEACHATE MEASUREMENTS						
PARAMETER		UNIT	LOR	2022		2023
				FEB	MAR	APR
OTHER						
TRH C6 - C9 Fraction	µg/L	10	-	-	-	<10
TRH C10-C14 Fraction		50	-	-	-	<50
TRH C15-C28 Fraction		100	-	-	-	<100
TRH C29-C36		100	-	-	-	<100
MTBE		1	-	-	-	<1
Benzene		1	-	-	-	<1
Toluene		1	-	-	-	<1
Ethylbenzene		1	-	-	-	<1
Xylene (m&p)		2	-	-	-	<2
Xylene (o)		1	-	-	-	<1
Naphthalene		1	-	-	-	<1
Aroclor 1016		2	-	-	-	<2
Aroclor 1221		2	-	-	-	<2
Aroclor 1232		2	-	-	-	<2
Aroclor 1242		2	-	-	-	<2
Aroclor 1248		2	-	-	-	<2
Aroclor 1254	2	-	-	-	<2	
Aroclor 1260	2	-	-	-	<2	
PFOS/PFAS (in any form)						
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.01	-	-	-	0.11
Perfluoropentanesulfonic acid (PFPeS)		0.01	-	-	-	0.038
Perfluorohexanesulfonic acid (PFHxS)		0.01	-	-	-	0.19
Perfluoroheptanesulfonic acid (PFHpS)		0.01	-	-	-	0.01
Perfluorooctanesulfonate (PFOS)		0.01	-	-	-	0.27
Perfluorodecanesulfonic acid (PFDS)		0.02	-	-	-	<0.020
Perfluorobutanoic acid (PFBA)		0.02	-	-	-	0.075
Perfluoropentanoic acid (PFPeA)		0.02	-	-	-	0.12
Perfluorohexanoic acid (PFHxA)		0.01	-	-	-	0.12
Perfluoroheptanoic acid (PFHpA)		0.01	-	-	-	0.066
Perfluorooctanoic acid (PFOA)		0.01	-	-	-	0.081
Perfluorononanoic acid (PFNA)		0.01	-	-	-	<0.010
Perfluorodecanoic acid (PFDA)		0.02	-	-	-	<0.020
Perfluoroundecanoic acid (PFUnDA)		0.02	-	-	-	<0.020
Perfluorododecanoic acid (PFDoDA)		0.05	-	-	-	<0.050
Perfluorotridecanoic acid (PFTrDA)		0.1	-	-	-	<0.10
Perfluorotetradecanoic acid (PFTeDA)		0.5	-	-	-	<0.50
4:2 FTS		0.01	-	-	-	<0.010
6:2 FTS		0.01	-	-	-	<0.010
8:2 FTS		0.02	-	-	-	<0.020
10:2 FTS	0.02	-	-	-	<0.020	
Perfluorooctance sulfonamide (FOSA)	0.1	-	-	-	<0.10	
Total Positive PFHxS & PFOS	0.01	-	-	-	0.46	
Total Positive PFOS & PFOA	0.01	-	-	-	0.35	
Total Positive PFAS	0.01	-	-	-	1.1	
PAHs						
Naphthalene	µg/L	0.1	-	-	-	<0.1
Acenaphthylene		0.1	-	-	-	<0.1
Acenaphthene		0.1	-	-	-	<0.1
Fluorene		0.1	-	-	-	<0.1
Phenanthrene		0.1	-	-	-	<0.1
Anthracene		0.1	-	-	-	<0.1
Fluoranthene		0.1	-	-	-	<0.1
Pyrene		0.1	-	-	-	<0.1
Benzo(a)anthracene		0.1	-	-	-	<0.1
Chrysene		0.1	-	-	-	<0.1
Benzo(b,j,k)fluoranthene		0.2	-	-	-	<0.2
Benzo(a)pyrene		0.1	-	-	-	<0.1
Indeno(1,2,3-c,d)pyrene		0.1	-	-	-	<0.1
Dibenzo(a,h)anthracene		0.1	-	-	-	<0.1
Benzo(g,h,i)perylene		0.1	-	-	-	<0.1
Benzo(a)pyrene TEQ		0.5	-	-	-	<0.5
Total positive PAHs		0.1	-	-	-	<0.1

Surface water

PARAMETER	UNIT	LOR	TRIGGER VALUE	May 2017		Dec 2020		Mar 2021		Apr 2021		Feb 2023		Mar 2023		
				SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	
FIELD MEASUREMENTS																
pH	0	-	6-8	8.40	8.60	-	-	8.52	8.84	8.42	8.23	7.96	7.9	7.89	8.39	
Temperature	-	-	-	-	-	-	-	28.7	28.2	26	26	27.8	29.1	34.1	29.2	
Electrical Conductivity (EC)	°C	-	20-250	600	580	-	-	566	561	884	884	145.2	179.4	407	407	
Dissolved Oxygen (DO)	% Sat	-	85-120	-	-	-	-	-	14.1	15.2	15.2	-	8.3	8.3	9.4	
MAJOR IONS																
Potassium (K)	mg/L	0.5	400	-	-	4.2	5.1	5.7	5.5	3.8	2.9	4.8	4.2	4.6	4.7	
Alkalinity (CaCO3)		5	-	-	-	77	81	280	280	370	350	68	74	220	200	
Calcium (Ca)		0.5	400	-	-	19	18	54	53	55	39	16	18	36	35	
Chloride (Cl)		1	-	9	9	1	1	8	7	9	9	1.6	1.6	7.6	7.3	
Sodium (Na)		0.5	300	-	-	1.7	1.3	9	8.4	9.4	7.6	0.95	1.2	7.2	6.6	
Sulfate (SO4)		1	500	-	-	<1	<1	7	6	4	4	<1	<1	4.3	4.3	
Magnesium (Mg)		0.5	-	-	-	5.5	5.8	31	30	40	30	5.3	5.5	24	23	
NUTRIENTS																
Total Nitrogen (TN)	µg/L	100	200-300	-	-	600	700	-	-	400	300	-	-	-	-	
Total Phosphorus (TP)		50	-	-	-	<50	60	-	-	<50	<50	-	-	-	-	
Nitrate (as N)		5	-	-	-	<5	<5	-	-	<5	<5	-	-	-	-	
Ammonium (NH4)		7	10	-	-	38	82	-	-	-	-	<2	9.6	22	13	
Ammonia (as N)		5	-	-	-	<5	<5	29	64	-	-	<5	<5	6.1	<5	22
METALS (TOTAL)																
Cadmium (Cd)	mg/L	0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-	-	-	
Chromium (Cr(III))		0.005	0.0033	-	-	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	-	
Chromium (Cr(VI))		0.005	0.001	-	-	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	-	
Copper (Cu)		0.001	0.0014	<0.001	<0.001	0.003	0.003	-	-	<0.001	<0.001	-	-	-	-	
Iron (Fe)		0.01	0.3	-	-	1.9	2	-	-	0.05	0.04	-	-	-	-	
Lead (Pb)		0.001	0.0034	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-	-	-	
Manganese (Mn)		0.005	1.9	-	-	0.025	0.029	-	-	<0.005	<0.005	-	-	-	-	
Nickel (Ni)		0.001	0.013	<0.001	<0.001	0.001	0.002	-	-	<0.001	<0.001	-	-	-	-	
Zinc (Zn)		0.001	0.008	0.002	0.001	0.007	0.005	-	-	0.001	0.002	-	-	-	-	
Aluminium (Al)		0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (Se)		0.001	-	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	
METALS (DISSOLVED)																
Cadmium (Cd)	mg/L	0.0001	0.0002	<0.0001	<0.0001	-	<0.0001	-	-	<0.0001	<0.0001	-	-	-	-	
Chromium (Cr(III))		0.005	0.0033	-	-	-	<0.005	-	-	<0.005	<0.005	-	-	-	-	
Chromium (Cr(VI))		0.005	0.001	-	-	-	<0.005	-	-	<0.005	<0.005	-	-	-	-	
Copper (Cu)		0.001	0.0014	<0.001	<0.001	-	0.002	-	-	<0.001	<0.001	-	-	-	-	
Iron (Fe)		0.01	0.3	-	-	-	0.03	-	-	<0.01	<0.01	-	-	-	-	
Lead (Pb)		0.001	0.0034	<0.001	<0.001	-	<0.001	-	-	<0.001	<0.001	-	-	-	-	
Manganese (Mn)		0.005	1.9	-	-	-	0.007	-	-	<0.005	<0.005	-	-	-	-	
Nickel (Ni)		0.001	0.013	<0.001	<0.001	-	<0.001	-	-	<0.001	<0.001	-	-	-	-	
Zinc (Zn)		0.001	0.008	0.005	0.006	-	0.002	-	-	0.001	0.001	-	-	-	-	
Aluminium (Al)		0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (Se)		0.001	-	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	
OTHER LEACHATE INDICATORS																
Total Organic Carbon (TOC)	mg/L	1	-	-	-	11	9	8	8	5	5	10	9.9	5.4	5.5	
Total Dissolved Solids (TDS)		5	-	-	-	86	100	310	310	420	380	150	180	360	420	
Chemical Oxygen Demand (COD)		20	-	35	45	<20	<20	<40	<40	<20	<20	43	41	29	32	
Biological Oxygen Demand (BOD)		5	-	-	-	28	28	20	26	<5	10	28	32	13	9.1	
Volatile acids as acetic acid (VFA)		5	-	-	-	13	13	-	-	<5	<5	-	-	-	-	

UNIT	LOR	TRIGGER VALUE	May 2017		Dec 2020		Mar 2021		Apr 2021		Feb 2023		Mar 2023	
			SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC
µg/L	10	-	-	-	-	-	-	-	<10	<10	-	-	-	-
	50	-	-	-	-	-	-	-	<50	<50	-	-	-	-
	100	-	-	-	-	-	-	-	<100	<100	-	-	-	-
	100	-	-	-	-	-	-	-	<100	<100	-	-	-	-
	1	-	-	-	-	-	-	-	<1	<1	-	-	-	-
	1	950	-	-	-	-	-	-	<1	<1	-	-	-	-
	1	950	-	-	-	-	-	-	<1	<1	-	-	-	-
	1	950	-	-	-	-	-	-	<1	<1	-	-	-	-
	2	950	-	-	-	-	-	-	<2	<2	-	-	-	-
	1	950	-	-	-	-	-	-	<1	<1	-	-	-	-
	1	950	-	-	-	-	-	-	<1	<1	-	-	-	-
	2	-	-	-	-	-	-	-	<2	<2	-	-	-	-
	2	-	-	-	-	-	-	-	<2	<2	-	-	-	-
	2	-	-	-	-	-	-	-	<2	<2	-	-	-	-
	2	-	-	-	-	-	-	-	<2	<2	-	-	-	-
	2	-	-	-	-	-	-	-	<2	<2	-	-	-	-
µg/L	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-
	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-
	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-
	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-
	0.05	-	-	-	-	-	-	-	<0.05	<0.05	-	-	-	-
	0.1	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-
	0.5	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-
µg/L	0.1	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-
	0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-

Groundwater

Standing Water Levels

BORE ID	2018		2019		2020												2021															
	Jul-18		May-19		Sep-20		Oct-20		Nov-20		Dec-20		Mar-21		Apr-21		May-21		Jun-21		Jul-21		Aug-21		Sep-21		Oct-21		Nov-21		Dec-21	
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD		
GWA (RN031131)	-	-	12.621	90.0544	14.07	88.6054	14.072	88.6034	14.07	88.6054	-	-	3.45	99.2254	6.2	96.4754	9.32	93.3554	11.2	91.4754	12	90.6754	12.6	90.0754	12.9	89.7754	13.2	89.4754	13.2	89.4754	Not measured	
GWE (RN022487)	-	-	10.361	91.7854	11.944	90.2024	11.964	90.1824	11.976	90.1704	-	-	3.94	98.2064	6.1	96.0464	7.2	94.9464	9.18	92.9664	10	92.1464	10.45	91.6964	10.8	91.3464	11.2	90.9464	11.16	90.9864	11.15	90.9964
GWBO1	9.945	89.6764	10.913	88.7084	12.103	87.5184	12.106	87.5154	12.154	87.4674	-	-	3.45	96.1714	6.05	93.5714	7.9	91.7214	9.7	89.9214	10.4	89.2214	10.8	88.8214	11.1	88.5214	13.22	86.4014	11.43	88.1914	10.48	89.1414
GWBO2	9.727	90.0681	10.853	88.9421	12.287	87.5081	12.283	87.5121	12.332	87.4631	-	-	-	-	-	-	7.32	92.4751	9.48	90.3151	10.2	89.5951	10.7	89.0951	11.1	88.6951	11.4	88.3951	11.48	88.3151	11.54	88.2551
GWBO3	6.655	93.0243	8.819	90.8603	9.724	89.9553	10.795	88.8843	-	-	-	-	-	-	-	-	4.16	95.5193	7.3	92.3793	8.3	91.3793	8.77	90.9093	9.1	90.5793	9.6	90.0793	9.94	89.7393	11.41	88.2693
GWBO4	10.379	92.484	12.257	90.606	13.943	88.9200	13.957	88.906	13.99	88.873	-	-	3.82	99.043	6.32	96.543	7.71	95.153	10.5	92.363	11.5	91.363	12.2	90.663	12.6	90.263	12.93	89.933	12.9	89.963	13.6	89.263

BORE ID	2022																												2023							
	Jan-22		Feb-22		Mar-22		Apr-22		May-22		Jun-22		Jul-22		Aug-22		Sep-22		Oct-22		Nov-22		Dec-22		Jan-23		Feb-23		Mar-23		Apr-23		May-23			
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD		
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD		
GWA (RN031131)	12.1	90.5754	10.23	92.4454	11.6	91.0754	12.7	89.9754	13.1	89.5754	13.33	89.3454			13.65	89.0254	13.78	88.8954	13.78	88.8954	14.25	88.4254	Dry		11.47	91.2054	11.69	90.9854	7.42	95.2554	9.47	93.2054	11.65	91.0254		
GWE (RN022487)	10.06	92.0864	8.33	93.8164	9.47	92.6764	10.5	91.6464	11	91.1464	11.27	90.8764			11.58	90.5664	11.64	90.5064	11.74	90.4064	11.97	90.1764	11.86	90.2864	10.46	91.6864	9.54	92.6064	6.5	95.6464	8.1	94.0464	9.52	92.6264		
GWBO1	10.7	88.9214	8.43	91.1914	9.83	89.7914	10.9	88.7214	11.3	88.3214	11.58	88.0414			11.69	87.9314	11.85	87.7714	Dry		12.35	87.2714	12.2	87.4214	10.86	88.7614	9.78	89.8414	5.63	93.9914	8.66	90.9614	Dry			
GWBO2	10.06	89.7351	8.27	91.5251	9.67	90.1251	10.8	88.9951	11	88.7951	11.68	88.1151			11.87	87.9251	12	87.7951	12.21	87.5851	12.34	87.4551	10.78	89.0151	9.72	90.0751	5.69	94.1051	8.5	91.2951	9.81	89.9851				
GWBO3	10.05	89.6293	6.63	93.0493	8.01	91.6693	8.9	90.7793	9.3	90.3793	9.7	89.9793			10.65	89.0293	10.62	89.0593	Dry		12.35	87.2951	12.34	87.4551	8.53	91.1493	10.70	88.9793	8.84	90.8393	4.24	95.4393	6.26	93.4193	7.86	91.8193
GWBO4	11.9	90.963	9.74	93.123	11.17	91.693	12.35	90.513	12.9	89.963	13.2	89.663			13.48	89.383	13.62	89.243	13.7	89.163	14.1	88.763	13.89	88.973	11.00	91.863	11.37	91.493	7.39	95.473	9.53	93.333	10.94	91.923		

Field measurements

Redox only started to be measured in April 2022, as such, the table below only comprises the months since monitoring of this parameter started.

pH	2006	2017	2018	2020								2021								2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May			
GWA	7.1	7.2	6.9	7.8	5.6	5.8	6.7	7.2	7.1	7.2	6.4	6.3	5.8	6.9	7.9	8.1	5.3	8.4	6.0	9.1	8.5	8.1	6.0	6.2	6.3	5.8	6.1	6.7	6.8	7.8	7.5	8.0	6.5			
GWE				7.7	5.5	5.8	6.5	7.6	7.8	8.5	6.4	6.6	7.0	7.9	8.5	8.2	6.9	8.5	6.1	9.3	8.6	8.0	9.1	7.0	6.5	4.2	7.4		5.7	8.7	7.2	7.6	6.7			
GWBO1			6.6		5.7	5.7		7.1	7.2	7.1	6.6	6.5	6.0	7.0	7.5	7.1	7.9	6.7	9.0	7.8	8.8	4.2	6.8	6.6		6.7		5.0	8.3	5.2	7.4					
GWBO2			7.0		6.1	4.4	6.3			7.1	6.5	6.0	6.7	7.6	7.9	6.6	5.9	8.2	6.3	8.9	7.5	8.5	5.0	6.9	3.7	3.2	7.2	6.0	6.3	8.2	7.4	7.3	3.4			
GWBO3			7.1							7.1	6.9	5.8	7.1	7.8	8.1	7.5	5.9	8.7	6.0	8.7	6.6	7.0	6.7	5.7				5.8	8.0	7.2	7.1	6.4				
GWBO4			6.7		6.6	5.7	6.4	7.2	7.0	7.1	6.8	7.0	6.1	7.1	8.3	7.8	5.5	7.7	5.5	8.6	6.5	6.0	6.2	4.3	3.7	3.5	6.8	6.0	4.8	7.8	6.8		6.1			

T (°C)	2006	2017	2018	2020												2021												2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May											
GWA				33.1	33.2	34.1	33.3	32.8	33.4	32.9	33.2	31.4	31.3	30.1	31.4	32.4	32.6	35.6	35.3	32.0	30.7	32.9	31.2	28.0	29.3	31.8	31.4	29.5	36.2	32.7	32.6	36.4	25.0	25.0										
GWE					30.1	34.9	33.2	34.1	34.6	32.7	32.0	32.0	31.2	31.2	31.4	32.4	31.1	33.4	35.0	32.4	32.9	31.3	30.3	27.9	28.8	29.8	34.6	30.4		31.8	32.4	33.8	24.1	24.8										
GWBO1				31.2		30.0	29.4		36.2	33.1	29.9	30.3	31.3	30.0	30.1		30.9	33.0	32.2	31.8	31.9	31.5	30.7	28.6	27.0	28.7		32.2		30.6	32.4	29.5	25.0											
GWBO2				30.6		36.3	32.7		31.5		30.7	30.6	30.6	30.9	31.4	34.0	29.9	34.2	33.3	31.1	31.9	31.6	31.8	25.2	28.5	29.0	37.6	35.3	31.4	33.5	31.2	29.9	25.0	26.2										
GWBO3				27.1							27.3	29.6	27.7	29.7	31.1	31.8	27.4	32.2	36.4	28.8	31.0	29.3	29.8	24.5	27.9			29.5		29.3	21.5	23.1	24.3											
GWBO4				30.9		31.5	30.4	30.7	33.8	31.2	32.0	28.7	28.7	29.4	29.5	31.9	31.6	31.7	31.3	30.9	32.0	28.2	29.9	24.4	27.3	28.7	25.8	31.3	30.0	28.4	30.9	29.0		23.5										

EC (µs/cm)	2006	2017	2018	2020												2021												2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May											
GWA	727	700	770	578	640	645	540	915	710	352	811	1120	766	835	759	737	619	735	700	710	730	729	730	317	681	636	696	645	631	704	677	734	656											
GWE				664	588	708	661	679	652	478	715	587	611	513	579	448	598	459	630	626	622	605	570	1707	570	436	488		812	802	702	662	664											
GWBO1			1111		788	738		813	791	617	1220	1120	1177	1073		1010	984	1020	1020	1020	1020	1045	1030	1022	947		868		930	945	940	734												
GWBO2			894		765	866	748			553	1018	1154	1063	1086	863	1000	955	1034	1100	1701	984	1005	1000	847	987		856	881	912	865	961	814	944	848										
GWBO3			684							435	952	1120	973	1050	1600	1049	1077	1192	892	998	966	1017	1060	3081			1220		907	799	879	949												
GWBO4			1043			839	911	776	838	1120	478	971	1016	1000	1030	894	910	887	975	982	930	1014	920	850	1059	914	932	897	852	923	889	762	274											

DO (%)	2006	2017	2018	2020					2021												2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	
GWA			22.7	5.3	5.7	3.9	4.4				11.1	6.0	7.6	5.6	4.1	3.8	1.9	4.1	11.9	2.4	3.6	5.3	22.9	4.4	10.1	8.2	3.3	13.3	3.0	7.2	1.2	2.6		24.1	7.9	24.3	
GWE				2.7	1.7	1.7	3.4				11.9	4.5	6.9	6.7	3.7	4.3	6.3	3.0	9.1	2.0	4.1	5.5	5.4	3.0	2.4	4.5	6.5	12.1	2.8	1.0	2.2	6.0	7.2	8.2	18.8		
GW801			3.9		1.9	0.8					12.7	4.1	5.9	3.7	4.1	4.2	2.0		5.8	2.4	4.4	5.6	20.6	3.3	2.9	2.4	39.3	9.5		1.9		0.9	13.9	13.7	8.0		
GW802			63.5		5.2	2.7	3.1						7.7	3.8	6.0	4.0	2.1	4.7	4.0	8.6	4.0	4.2	4.0	2.1	2.1	1.8		9.0	1.3	1.9	2.7	1.5	4.7	11.4	14.0		
GW803			44.2										9.5	3.5	4.9	3.2	1.4	7.3	4.9	2.0	3.8	3.7	12.6	3.5	1.7	2.1	34.3			5.2			5.0	10.0	50.5		
GW804			27.7		6.7	4.5	4.3				8.1	7.6	6.9	7.4	4.0	4.3	33.0	6.6	4.2	2.9	4.8	8.3	5.7	2.0	2.3	5.9	7.6	7.6	4.0	5.0	3.0	2.4		3.9	23.1		

Redox	2022								2023				
	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA	369.0	400.0	418.0	1475.7	397	390	270	381	379	341	348	213	292
GWE	85.0	124.0	162.0	163	183	387	147		159	121		287	189
GW801	277.0	367.0	395.0	363	345		350			416			
GW802	299.0	382.0	335.0	350	370	386	330	753	369	295	354	278	191
GW803	233.0	320.0	318.0	391				268		353			
GW804	338.0	220.0	333.0		358	385	342	358	387	346	339		813

Major ions

K (mg/L)	2006	2017	2018	2020												2021												2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May							
GWA			5.7	4.4	4.6	4.5	5.7	5.0			9.4	4.1		4.4	5.0	5.2	4.5	3.9	5.1	5.3	4.7	4.8	4.8	4.7	5.2	5.1		4.6	4.4	4.7	4.7	4.8	4.6	4.7	4.9	4.5	5.4							
GWE				5.7	5.9	6.5	7.1				7.6	4.6			5.5	5.5	5.4	5.0	4.8	6.5	5.7	6.0	5.5	5.4	6.3	5.2	5.4		5.2	5.1	7.3	6.0		7.1	7.8	5.3	5.6							
GW801			15.0		11.0	11.0					11.0	7.6			15.0	16.0	16.0	14.0		14.0	14.0	14.0	14.0	14.0	14.0	14.0			12.0	13.0		12.0		12.0		14.0								
GW802			7.7		5.7	6.1	6.5						5.9	5.3	6.0	6.0	6.9	5.4	5.8	6.4	6.0	6.8	6.7	5.3	6.4	6.0		5.9	6.0	6.3	6.0	6.0	5.8	6.1	6.7	5.4	5.9							
GW803			4.4										4.4	4.1	4.6	4.9	4.5	4.7	5.4	6.5	5.9	4.8	4.8	4.9	5.2	5.7		7.8			6.2		4.7	4.4	4.5	4.6								
GW804			8.8		7.9	8.2	7.7				9.0	6.8		8.0	8.2	8.9	7.8	8.0	8.4	9.6	8.4	8.6	8.3	7.8	8.4	8.4		7.9	8.1	8.6	8.4	8.4	8.5	8.6	9.3	8.8	8.5							

Alkalinity (mg/L)	2006	2017	2018	2020							2021												2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May		
GWA			360	350	350	350	340	350			400	340		340	360	370	350	340	340	350	340	340	340	360	350	350		330	360	350	300	330	310	320	330	360	430		
GWE				340	330	390	390				320	320		290	280	300	280	280	200	300	250	320	300	290	280	250		240	270	200	200		350	360	340	349	407		
GW801			440		430	430					350	390		440	440	440	440		390	420	430	450	440	420	430	420		400	430		360		400	410	380	470			
GW802			370		450	460	460						420	440	450	460	460	460	450	460	450	460	450	450	470	460		440	450	470	430	440	410	470	450	450	560		
GW803			300										380	420	460	490	480	500	450	500	530	400	460	470	490	480		510			480		500	350	370	540			
GW804			520		510	510	510				420	450		450	460	490	480	470	450	470	480	470	470	480	470	490		450	480	490	420	430	430	460	450	490	407		

Ca (mg/L)	2006	2017	2018	2020							2021												2022												2023				
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May		
GWA			76	75	74	73	79	69			100	68		73	76	69	71	66	72	71	71	65	74	67	74	74		72	68	63	66	72	69	69	77	70	81		
GWE				60	54	69	75				67	48		53	53	53	48	54	26	57	29	49	59	52	50	47		41	39	22	33		60	63	68	63	69		
GW801			95		80	81					83	77		100	95	86	87	84	84	94	92	88	100	92	96	91		85	88		74		82	87	90	110	92		
GW802			76		91	96	97						100	98	100	95	95	94	91	95	92	91	110	83	110	97		94	96	83	84	92	92	94	67	94	92		
GW803			53								77			86	98	84	89	93	84	95	95	77	98	86	89	92		100			120		93	72	91	100			
GW804			83		84	83	85				73	59		78	78	75	79	80	77	87	76	68	80	75	80	82		81	75	69	74	76	72	74	74	81	81		

Cl (mg/L)	2006	2017	2018	2020							2021										2022										2023							
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	
	12	7	6	5	5	5	5	4			10	4		5	5	4	5	6	5	5	5	5	5	5	5	5		5	5	5	6	5	5	5	5	5		
GWA				24	25	31	32																															
GWE			56		28	27					24	42		86	75	66	56	52	48	51	53	57	60	56	51		16	17	4	10		41	40	15	8	8		
GW801			18		10	12	14							51	44	42	37	51	38	27	25	39	48	48	43	37	27		29	24	20	24	5	29	28	31	25	31
GW802													12	15	11	10	10	11	8	7	7	11	11	10	9	9		10				5	5	7	11	12	14	
GW803			11		11	12	12			5	5			7	7	6	7	7	6	6	6	5	6	10	7	7	7		8	7	7	9	7	7	7	4	6	6
GW804																																						

Na (mg/L)	2006	2017	2018	2020							2021							2022							2023													
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	11-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	
GWA			7	6	6	6	6	6			13	6		6	6	4	6	5	6	7	6	6	6	6	7	6	9	8	6	6	6	6	6	6	6	6	6	
GWE				22	21	28	31				11	8		9	8	8	8	9	9	8	10	9	10	12	11	10		14	13	12	10		34	32	15	10	9	
GWB01			38		22	22					18	16		38	36	34	31		28	28	30	29	29	29	29	29		27	27		23		25	27	22	32		
GWB02			17		11	11	12						25	22	20	18	24	16	14	15	18	25	26	18	20	16	16		6	15	13	13		15	16	41	19	29
GWB03			18										11	16	21	20	22	22	23	26	27	14	18	18	22	22	27	30						12	10	13		
GWB05			15		14	14	15				10	10		10	9	9	10	9	9	10	10	10	8	9	10	10	10	10	9	10	10	10	10	11	9	8	9	9

SO4 (mg/L)	2006	2017	2018	2020							2021							2022							2023												
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA			5	4	4	4	4	4			59	5		5	6	7	6	6	5	5	6	5	2	7	6	6		5	4	5	5	5	6	5	9	9	10
GWE				<1	<1	11	11				6	5		6	6	7	6	5	5	<1	3	2	2	5	7	6		11	9	6	8		12	14	9	7	7
GWBO1			19		14	13					34	37		35	25	25	21		19	21	23	29	30	25	23	20		18	16		16		18	19	18	20	
GWBO2			28		17	27	33						38	36	38	39	42	36	35	35	42	50	49	45	41	36		34	29	30	30	28	31	41	32	26	35
GWBO3			8										6	23	68	51	75	76	99	110	150	11	26	32	62	67		180			290			43	7	8	26
GWBO4			8		7	8	8				5	7		10	11	13	14	11	10	10	11	9	10	13	11	10		9	8	9	10	9	8	12	7	11	12

Mg (mg/L)	2006	2017	2018	2020							2021							2022							2023												
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA			39	36	35	36	34	37			41	31		33	34	34	34	28	33	32	33	31	33	32	36	36		35	32	32	33	34	34	33	35	33	36
GWE				39	36	43	43				31	26		31	29	31	29	31	26	31	28	30	34	33	32	31		33	30	26	29		45	45	36	37	34
GWBO1			44		45	45					40	38		45	43	40	41		37	41	41	44	45	44	45	43		43	43		39		44	46	44	55	
GWBO2			44		50	52	53						44	49	53	51	51	52	52	52	49	48	55	49	59	54		54	51	47	48	53	54	58	53	49	50
GWBO3			36										40	49	63	52	60	63	62	68	68	41	59	56	62	64		80			93		59	40	51	57	
GWBO4			66		63	62	63				50	47		58	57	54	57	57	56	61	55	52	60	54	58	58		61	56	53	54	58	56	61	53	65	61

Nutrients

TN (µg/L)	2006	2017	2018	2020				2021				2022			2023		
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA				200		200		100		600	500	600	700	<100	200	680	
GWE				500		300		300		300	300	1000	200	<100	200	420	
GW/B01					1900	2000		1700		4900		7500	1500		2100	920	
GW/B02					<100	100			1100	600	600	600	1500	380	160	1600	
GW/B03									1900	7100	4100	1000	5300			4200	
GW/B04					200	300		4000		2800	2800	2300	1300	380	2700	3200	

TP (µg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	AUG	14-Sep	26-Oct	16-Nov	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA			<50	<50		<50		<50		<50	<50	<50	<50	<10	<10	<10
GWE				<50		<50		<50		<50	<50	<50	<50	<10	<10	<10
GW/B01			<50		<50	<50		<50		<50	<50	<50	110		20	<10
GW/B02			<50		<50	<50			<50	<50	80	<50	<50	20	10	<10
GW/B03			60						<50	<50	140	750	370			33
GW/B04			<50		<50	<50		<50		<50	<50	<50	<50	10	<10	<10

NO3-N (µg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	AUG	14-Sep	26-Oct	16-Nov	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA			270	130		100		8		450	340	470	540	9	190	720
GWE				7		17		100		<5	9	9	<5	7	7	77
GW/B01			220		18	13		1300		170		5400	12		620	780
GW/B02			94		<5	<5			630	150	32	320	1200	46	20	1800
GW/B03			47						1900	6400	3600	300	5100			1800
GW/B04			150		160	160		3800		2400	2600	2100	1200	2300	2500	3200

NH4 (µg/L)	2006	2017	2018	2020							2021							2022							2023										
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA			<5	<7			<7	<7				17			10		<7	63		55	17	<7	9	<7		9	45	11	<7	<7	<7	11	11	<7	
GWE				370			49	<7				29			110		11	150		83	42	120	120	150			190	220	11	63		79	54	9	<7
GW801			2900									3500			6100		5400	4000	740	380	1100	1200	1900			2100	1600		2000		990	110	8	<7	
GW802			1000								71	8			800				<7	<7	<7	<7	10			10	42	21	<7	<7	<7	<7	<7	<7	
GW803			360								<7	<7			13		26	42	<7	<7	8	35	34			44			<7	<7	<7	<7	<7	<7	
GW804			130									<7			13		9	64		18	7		12	13			13	37	9	<7	<7	<7	<7	<7	<7

Dissolved metals

Cd (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA		<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.010	<0.010	<0.010		
GWE				<0.0001		<0.0001	<0.0001		<0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
GW801			<0.0001		<0.0001	<0.0001	<0.0001		<0.0001			<0.0001	<0.0001		<0.0001	<0.0001		
GW802			<0.0001		<0.0001	<0.0001		<0.0001	<0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
GW803			<0.0001					<0.0001	<0.0001			<0.0001	<0.0001	<0.0001		<0.0001		
GW804			<0.0001		<0.0001	<0.0001	<0.0001		<0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		

CrIII (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA				<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
GWE				<0.005		<0.005	<0.005		<0.005			<0.005	<0.005	<0.005	<0.005	<0.005		
GW801					<0.005	<0.005	<0.005		<0.005			<0.005	<0.005		<0.005	<0.005		
GW802				<0.005	<0.005	<0.005		<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005		
GW803								<0.005	<0.005			<0.005	<0.005	<0.005		<0.005		
GW804				<0.005	<0.005	<0.005		<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005		

CrVI (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA				<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
GWE				<0.005		<0.005	<0.005		<0.005			<0.005	<0.005	<0.005	<0.005	<0.005		
GW801					<0.005	<0.005	<0.005		<0.005			<0.005	<0.005		<0.005	<0.005		
GW802				<0.005	<0.005	<0.005		<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005		
GW803								<0.005	<0.005			<0.005	<0.005	<0.005		<0.005		
GW804				<0.005	<0.005	<0.005		<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005		

Cu (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA		<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	0.002	0.001	0.006	0.010	<0.010	0.001	<0.010		
GWE				<0.001		<0.001	<0.001		<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
GW801			0.018		<0.001	<0.001	0.002		0.005			0.007	0.005		0.005	0.004		
GW802			<0.001		<0.001	<0.001		0.005	0.003			0.003	0.002	0.004		<0.0001		
GW803			0.023					<0.001	0.002			<0.001	0.001	<0.001		<0.001		
GW804			0.008		0.002	0.002	<0.001		0.020			0.002	0.003	0.002	0.002	0.029	<0.001	

Fe (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA			0.03	<0.1		<0.01	0.03		<0.01	0.03	0.08	0.01	<0.01	0.14	0.05	0.76		
GWE				3.70		<0.01	<0.01		0.11		1.10	<0.01	0.68	<0.01	3.00	0.18		
GW801			0.01		0.18	0.24	<0.01		<0.01			<0.01	0.01		0.01	<0.01		
GW802			<0.01		<0.01	<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	0.08	<0.01		
GW803			0.01					<0.01	<0.01			<0.01	0.09			0.10		
GW804			0.01		<0.01	<0.01	<0.01		<0.01		0.03	<0.01	<0.01	<0.01	<0.01	<0.01		

Pb (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA		<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
GWE				<0.001		<0.001	<0.001		<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
GW801			<0.001		<0.001	<0.001	<0.001		<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
GW802			<0.001		<0.001	<0.001		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
GW803			0.001		<0.001	<0.001		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
GW804			<0.001		<0.001	<0.001	<0.001		<0.001			<0.001	<0.001	0.001	<0.001	<0.001		

Mn (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA			<0.005	<0.005		<0.005	0.018		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.004	0.003	0.006	
GWE				0.012		<0.005	<0.005		0.008		0.019	<0.005	0.020	0.007	0.031	0.007		
GW801			0.210		0.240	0.220	0.006		0.380			0.015	0.140		0.130	0.012		
GW802			<0.005		0.016	0.007		0.005	0.029		0.032	0.009	0.022	0.018	0.270	0.003		
GW803			0.007					<0.005	0.054		0.097	0.110	0.100			0.054		
GW804			0.029		<0.005	<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.005	0.004	<0.001		

Ni (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA		<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
GWE				0.002		<0.001	<0.001		<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
GW801			0.010		0.002	0.002	0.001		0.004			0.002	0.003		0.003	0.002		
GW802			0.007		0.002	0.002		0.002	0.003		0.004	0.003	0.003	0.004	0.003	<0.001		
GW803			0.004					<0.001	0.002			0.003	0.005	0.003		<0.001		
GW804			0.003		<0.001	<0.001	<0.001		0.004		<0.001	0.002	<0.001	<0.001	0.002	<0.001		

Zn (mg/L)	2006	2017	2018	2020					2021					2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr		
GWA		0.005	0.008	0.005		0.004	0.015		0.011	0.032	0.009	0.071	0.025	0.007	0.012	0.015		
GWE				<0.001		0.001	0.002		0.002		0.003	0.007	0.004	0.003	0.007	0.009		
GW801			0.015		0.002	0.003	0.004		0.004			0.009	0.008		0.007	0.046		
GW802			0.019		<0.001	<0.001		0.003	0.003		0.005	0.005	0.003	0.008	0.044	0.005		
GW803			0.025					0.003	0.007		0.005	0.007	0.008			0.013		
GW804			0.013		0.021	0.016	0.015		0.033		0.032	0.046	0.051	0.024	0.018	0.020		

Al (mg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA									<0.01		<0.01		<0.01	<0.010	<0.010	<0.010
GWE									<0.01		<0.01		<0.01	<0.01	<0.01	<0.01
GW801									<0.01				<0.01		<0.01	<0.01
GW802								<0.01	<0.01		<0.01		<0.01	<0.01	0.010	<0.01
GW803								<0.01	<0.01		<0.01		<0.01		<0.01	<0.01
GW804									<0.01		<0.01		<0.01	<0.01	<0.01	<0.01

Se (mg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA									<0.001		<0.001		<0.001	<0.001	<0.001	<0.001
GWE									<0.001		<0.001		<0.001	<0.001	<0.001	<0.001
GW801									<0.001				<0.001		<0.001	<0.001
GW802								<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001
GW803								<0.001	<0.001		0.001		<0.001			<0.001
GW804									0.002		0.002		0.001	0.001	<0.001	<0.001



KATHERINE
TOWN COUNCIL

Other leachate



EcOz
Environmental
Consultants

TOC (mg/L)	2006	2017	2018	2020					2021										2022										2023									
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	
GWA			<1	<1	<1	<1	<1	<1			<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1		<1	<1	<1	<1	1		<1	<1	<1	2	<1
GWE				<1							<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	1		2	<1	<1	<1		
GWB01			5		2	1					2	2		6	5	5	5		3	4	3	2	2	4	4	4		3	3		4		3	2	<1	10	2	
GWB02			<1		<1	<1	<1						3	2	2	2	3	2	<1	<1	3	2	2	2	2	2		1	1	3	1	1	1	2	1	2	1	
GWB03			1								1		<1	2	3	2	1	4	4	<1	4	2	<1	1	9	3		6			<1		1	1	2	1		
GWB04			<1				<1				1	<1	<1	<1	3	3	2	1	<1	<1	<1	<1	<1	5	<1	2		1	<1	<1	2	<1	<1	<1	<1	2	1	

TDS (mg/l)	2006	2017	2018	2020					2021										2022										2023								
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA			380	370	370	350	350	340			470	360		400	320	380	330	360	350	380	320	320	260	360	310	360		330	350	320	<5	360	360	340	430	410	370
GWE					400	370	430	450			300	380		320	260	340	250	300	180	540	220	290	240	260	260	290		260	310	180	<5	470	460	440	380	340	
GWB01			590			480	450				450	630		680	640	520	520		530	490	550	560	530	500	510	540		500	490		<5	530	540	570	660		
GWB02			440			470	450	500					560	620	570	620	610	520	550	520	530	590	560	540	500	550		500	540	500		540	570	570	500	520	
GWB03			340										390	530	540	630	520	580	590	670	580	450	450	490	530	610		670			830	550	420	390	540		
GWB04			530			540	470	510			420	510		460	460	500	470	650	500	540	440	480	390	520	470	490		440	480	500	<5	480	480	520	520	470	

COD (mg/L)	2006	2017	2018	2020					2021												2022										2023					
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr
GWA		41		<20	<20	<20	<20	<20			<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
GWE				<20	<20	<20	<20	<20			<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
GWB01				<20	<20	<20	<20	<20			<20	<20		64	<20	<20	220		<20	240	<20	<20	38	50	360	24		120	<20		<20	50	<20	<20	<20	<20
GWB02				<20	<20	<20	<20	<20					46	<20	<20	<20	<20	67	<20	<20	<20	21	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20
GWB03				<20	<20	<20	<20	<20					33	39	<20	<20	<20	100	220	<20	72	<20	<20	<20	<20	48		60		<20	<20	<20	<20	<20	<20	
GWB04				<20	<20	<20	<20	<20			<20	<20		6	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	

BOD (mg/L)	2006	2017	2018	2020					2021										2022										2023								
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	1-Jan	1-Feb	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May
GWA			<5	<5	10	13	6	14			32	11		<5	<5	20	<5	19	14	<5	<5	5	<5	6	<5	<5		<5	<5	<5	16	15	12	15	11	19	<5
GWE				<5	13	12	<5				7			<5	<5	19	<5	23	13	<5	<5	<5	<5	<5	<5	<5		<5	<5	<5	15	10	14	14	19	<5	
GWB01			<5		13	18					31	12		13	<5	22	6		20	<5	9	6	7	10	8	8		7	7		22	15	18	9	24	19	
GWB02			<5		13	17	10						7	<5	<5	29	<5	29	17	<5	9	6	<5	6	<5	9		<5	<5	<5	18	15	18	13	23	<5	
GWB03			<5										<5	17	<5	22	11	28	19	<5	15	14	<5	7	7	10		7			14	17	16	23	<5		
GWB04			<5		<5	20	10				29	9		6	<5	<5	6	6	18	<5	10	6	<5	13	6	8		<5	<5	6	19	14	15	19	15	20	<5

VFA (mg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA				<5		<5	5		9	<5	33	<5	54	54	33	
GWE				<5		76	5		<5	<5	<5	9	<5	82	51	
GWB01					16	20	6		16		7	29		36	44	
GWB02					<5	29		16	12	<5	18	19	14	100	93	
GWB03								12	22	11	7	18			26	
GWB04					<5	12	5		11	10	6	11	10	48	36	

TRH, PAH, BTEXN and PCB

TRH C6-C9 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<10	<10		<10	<10		<10	<10	<10	<10	<10	<10	<10	
GWE		<10		<10	<10		<10	<10	<10	<10	<10	<10	<10	
GWB01	<10		<10	<10	<10		<10		<10	<10		<10	<10	
GWB02	<10		<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	
GWB03	<10					<10	<10	<10	<10	<10			<10	
GWB04	<10		<10	<10	<10		<10	<10	<10	<10	<10	<10	<10	

TRH C10-C14 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<50	<10		<10	<50		<50	<50	<50	<50	<50	<50	<50	
GWE		<10		<10	<50		<50	<50	<50	<50	<50	<50	<50	
GWB01	<10		<50	<50	<50		<50		<50	<50		<50	<50	
GWB02	<10		<50	<50		<50	<50	<50	<50	<50	<50	<50	<50	
GWB03	<10					<50	<50	<50	<50	<50			<50	
GWB04	<10		<50	<50	<50		<50	<50	<50	<50	<50	<50	<50	

TRH C15-C28 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<100	<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	
GWE		<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	
GWB01	<10		<100	<100	<100		<100		<100	<100		820	<100	
GWB02	<10		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	
GWB03	<10					<100	<100	<100	<100	<100			200	
GWB04	<10		<100	<100	<100		<100	<100	<100	<100	<100	<100	150	

TRH C29-C36 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<100	<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	
GWE		<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	
GWB01	<100		<100	<100	<100		<100		<100	<100		<100	<100	
GWB02	<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	
GWB03	<100					<100	<100	<100	<100	<100			<100	
GWB04	<100		<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	

MTBE (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWB01			<1	<1	<1		<1		<1	<1		<1	<1	
GWB02			<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
GWB03						<1	<1	<1	<1	<1			<1	
GWB04			<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	

C6H6 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1	
GWB02	<1		<1			<1	<1	<1	<1	<1	<1	<1	<1	
GWB03	<1					<1	<1	<1	<1	<1			<1	
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	

C7H8 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1	
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
GWB03	<1					<1	<1	<1	<1	<1			<1	
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	

C8H10 (µg/L)	2018	2020		2021				2022			2023		
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1
GWB02	<1		<1			<1	<1	<1	<1	<1	<1	<1	<1
GWB03	<1					<1	<1	<1	<1	<1			<1
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1

C8H10 M+P (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<2	<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01	<2		<2	<2	<2		<2		<2	<2		<2	<2	
GWB02	<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	
GWB03	<2					<2	<2	<2	<2	<2			<2	
GWB04	<2		<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

C8H10 O (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1	
GWB02	<1		<1	<1		<1	<1	<1	<1	<1		<1	<1	
GWB03	<1					<1	<1	<1	<1	<1			<1	
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	

C10H8 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1	
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
GWB03	<1					<1	<1	<1	<1	<1			<1	
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	

AROCLOR 1016 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

AROCLOR 1221 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2			<2	<2	<2	<2	<2	<2	<2	<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

AROCLOR 1232 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2			<2	<2	<2	<2	<2	<2		<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

AROCLOR 1242 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

AROCLOR 1248 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2			<2	<2	<2	<2	<2	<2		<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

AROCLOR 1254 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2	<2		<2	<2	<2	<2	<2	<2		<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

AROCLOR 1260 (µg/L)	2018	2020				2021				2022			2023	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	
GWB01			<2	<2	<2		<2		<2	<2		<2	<2	
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	
GWB03						<2	<2	<2	<2	<2			<2	
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	

PFAS

PFBS (mg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA				<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
GWE				<0.01		<0.01	<0.01		<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	
GWB01					0.05	0.04	0.10		0.10		0.10	0.10		0.08	0.22	
GWB02						0.02		0.18	0.15	0.12	0.14	0.12	0.04	0.08	0.10	
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	
GWB04				<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	

PFPeS (mg/L)	2006	2017	2018	2020				2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	
GWA				<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
GWE				<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
GWB01					0.04	0.03	0.07		0.08		0.08	0.08		0.05	0.14	
GWB02						0.02		0.14	0.10	0.07	0.09	0.08	0.03	0.05	0.08	
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	
GWB04														<0.01		

PFHxS (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA		0.04		<0.01		<0.01	<0.01		0.03	<0.01	0.02	0.02	<0.01	<0.01	<0.01
GWE				0.03		0.04			0.01	0.04				0.04	
GWB01					0.19	0.17	0.58		1.10		0.62	0.83		0.37	1.20
GWB02					0.04	0.06		0.57	0.49	0.28	0.48	0.42	0.15	0.20	0.35
GWB03								0.02	<0.01	<0.01	<0.01	<0.01			0.01
GWB04									0.01						

PFHpS (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GWE															
GWB01					0.01	0.01	0.04		0.10		0.04	0.06		0.03	0.08
GWB02								0.07	0.06	0.05	0.06	0.06	0.02	0.02	0.03
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

PFOS (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA		0.09		<0.01		<0.01	<0.01		0.05	<0.01	<0.01	0.03	<0.01	<0.01	<0.01
GWE				0.06		0.06			0.04	0.12		0.02	0.02	0.08	0.01
GWB01					0.24	0.23	1.20		2.30		0.90	1.40		0.48	1.60
GWB02					0.04	0.04		0.69	0.45	0.51	0.69	0.59	0.18	0.22	0.37
GWB03								0.03	0.01	<0.01	<0.01	<0.01			0.02
GWB04									0.04						0.01

PFDS (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GWE															
GWB01					<0.02	<0.02	<0.02		<0.02		<0.02	<0.02		<0.02	<0.02
GWB02															
GWB03								<0.02	<0.02	<0.02	<0.02	<0.02			<0.02
GWB04															

PFBA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				0.03		0.03	<0.02		0.20	<0.02	0.20	0.20	<0.02	0.10	<0.02
GWE															
GWB01					0.05	0.05	0.06		0.10		0.08	0.10		0.07	0.16
GWB02						0.02		0.10	0.10	0.10	0.10	0.10	0.05	0.07	0.07
GWB03								<0.02	<0.02	<0.02	<0.02	<0.02			<0.02
GWB04															

PFPeA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				0.05		0.05	0.04		0.31	0.03	0.32	0.35	<0.02	0.20	<0.02
GWE															
GWB01					0.04	0.03	0.07		0.09		0.05	0.06		0.05	0.11
GWB02								0.20	0.10	0.10	0.10	0.10	0.04	0.06	0.05
GWB03								<0.02	<0.02	<0.02	<0.02	<0.02			<0.02
GWB04															

PFHxA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				0.03		0.02	<0.01		0.14	0.01	0.15	0.16	<0.01	0.09	<0.01
GWE										0.03					
GWB01					0.06	0.06	0.14		0.23		0.11	0.14		0.09	0.17
GWB02					0.02	0.04		0.36	0.34	0.25	0.29	0.26	0.09	0.13	0.10
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

PFHpA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				0.01		0.01	<0.01		0.09	<0.01	0.08	0.10	<0.01	0.06	<0.01
GWE										0.01					
GWB01					0.03	0.03	0.07		0.09		0.05	0.05		0.04	0.11
GWB02						0.01		0.13	0.11	0.09	0.09	0.09	0.03	0.04	0.05
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

PFOA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA		0.06		<0.01		<0.01	<0.01		0.05	<0.01	0.03	0.05	<0.010	0.02	<0.010
GWE				0.01		<0.01			<0.01	0.02			<0.010	0.02	<0.010
GWB01					0.06	0.06	0.16		0.21		0.12	0.15		0.09	0.22
GWB02						0.02		0.24	0.16	0.12	0.18	0.16	0.05	0.07	0.09
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

PFNA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWE															
GWB01					<0.01	<0.01	<0.01		<0.01		<0.01	<0.01		<0.01	<0.01
GWB02															
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

PFDA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GWE															
GWB01					<0.02	<0.02	<0.02		<0.02		<0.02	<0.02		<0.02	<0.02
GWB02															
GWB03								<0.02	<0.02	<0.02	<0.02	<0.02			<0.02
GWB04															

PFUnDA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GWE															
GWB01					<0.02	<0.02	<0.02		<0.02		<0.02	<0.02		<0.02	<0.02
GWB02															
GWB03								<0.02	<0.02	<0.02	<0.02	<0.02			<0.02
GWB04															

PFDODA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
GWE															
GWB01					<0.05	<0.05	<0.05		<0.05		<0.05	<0.05		<0.05	<0.05
GWB02															
GWB03								<0.05	<0.05	<0.05	<0.05	<0.05			<0.05
GWB04							<0.05								

PFTrDA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.1		<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
GWE															
GWB01					<0.1	<0.1	<0.1		<0.1		<0.1	<0.1		<0.1	<0.1
GWB02															
GWB03								<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
GWB04															

PFTA (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
GWE															
GWB01					<0.5	<0.5	<0.5		<0.5		<0.5	<0.5		<0.5	<0.5
GWB02															
GWB03								<0.5	<0.5	<0.5	<0.5	<0.5			<0.5
GWB04															

4:2 FTS (mg/L)	2006	2017	2018	2020			2021				2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GWE															
GWB01					<0.01	<0.01	<0.01		<0.01		<0.01	<0.01		<0.01	<0.01
GWB02															
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

6:2 FTS (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA		<0.01		<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
GWE															
GWB01					<0.01	<0.01	<0.01		<0.01		<0.01	<0.01		<0.01	<0.01
GWB02															
GWB03								<0.01	<0.01	<0.01	<0.01	<0.01			<0.01
GWB04															

8:2 FTS (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA		<0.01		<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GWE															
GWB01				<0.02	<0.02	<0.02			<0.02		<0.02	<0.02		<0.02	<0.02
GWB02															
GWB03								<0.01	<0.01	<0.02	<0.02	<0.02			<0.02
GWB04															

10:2 FTS (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GWE															
GWB01				<0.02	<0.02	<0.02			<0.02		<0.02	<0.02		<0.02	<0.02
GWB02															
GWB03								<0.01	<0.01	<0.02	<0.02	<0.02			<0.02
GWB04															

PFOSA (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.1		<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
GWE															
GWB01				<0.1	<0.1	<0.1			<0.1		<0.1	<0.1		<0.1	<0.1
GWB02															
GWB03								<0.1	<0.1	<0.1	<0.1	<0.1			<0.1
GWB04															

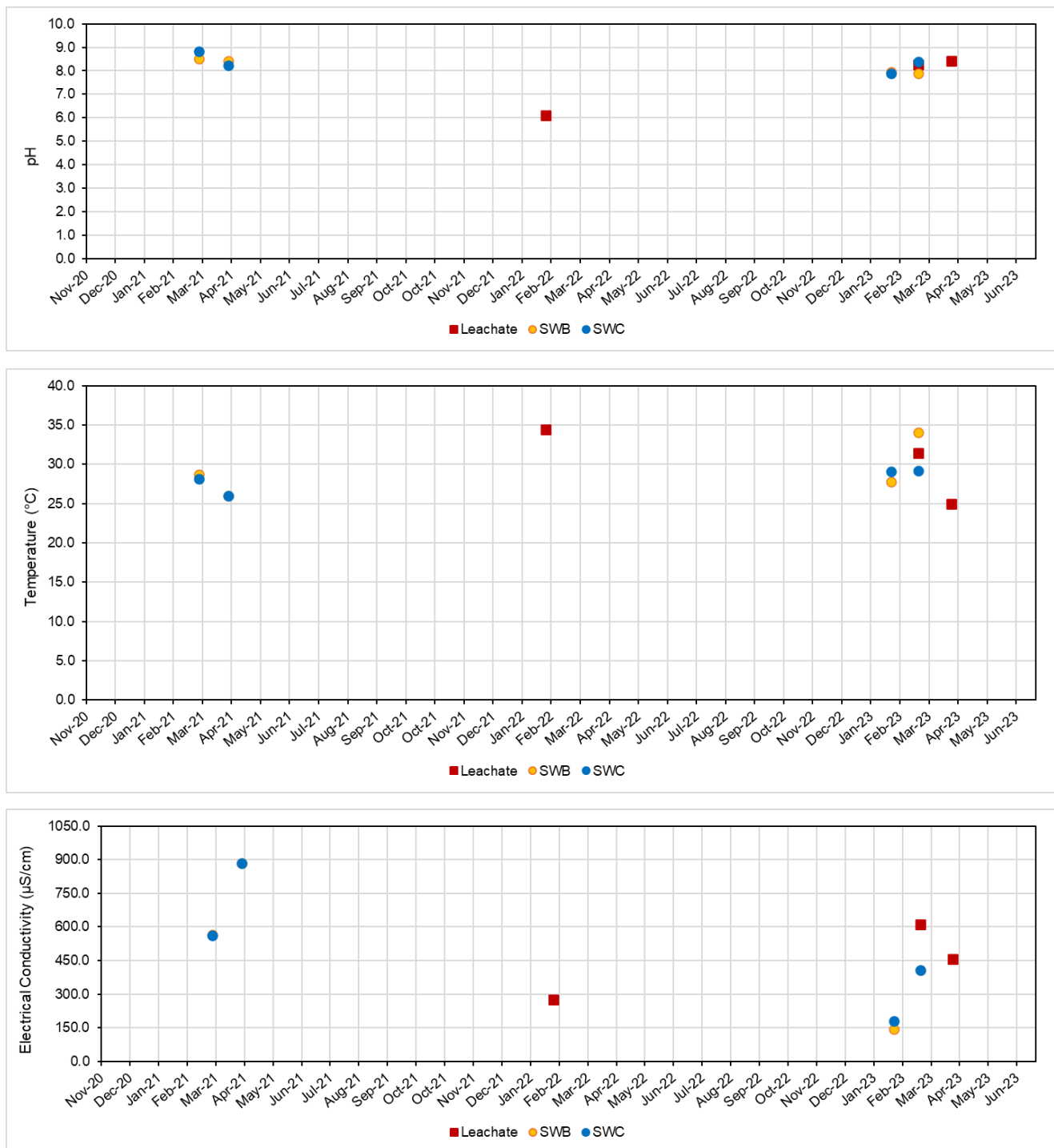
TOTAL PFHxS + PFOS (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.01		<0.01	<0.01		0.08	<0.01	0.02	0.05	<0.010	<0.010	<0.010
GWE				0.09		0.10			0.05	0.16		0.02	0.02	0.12	0.01
GWB01					0.43	0.40	1.80		3.40		1.50	2.20		0.85	2.80
GWB02						0.10		1.30	0.94	0.79	1.20	1.00	0.33	0.42	0.72
GWB03								0.05	0.01	<0.01	<0.01	<0.01			0.03
GWB04									0.05						0.01

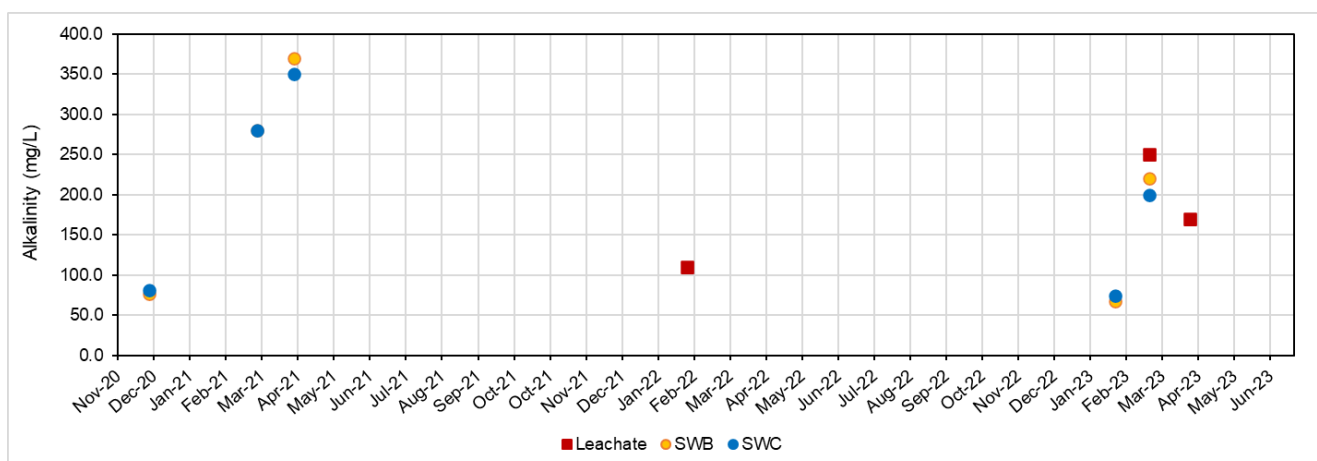
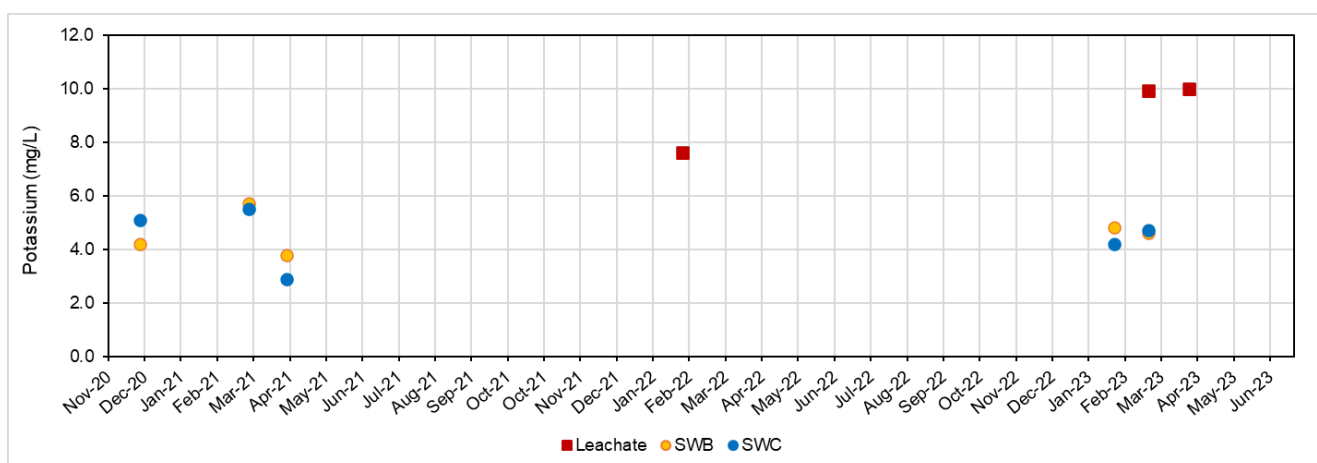
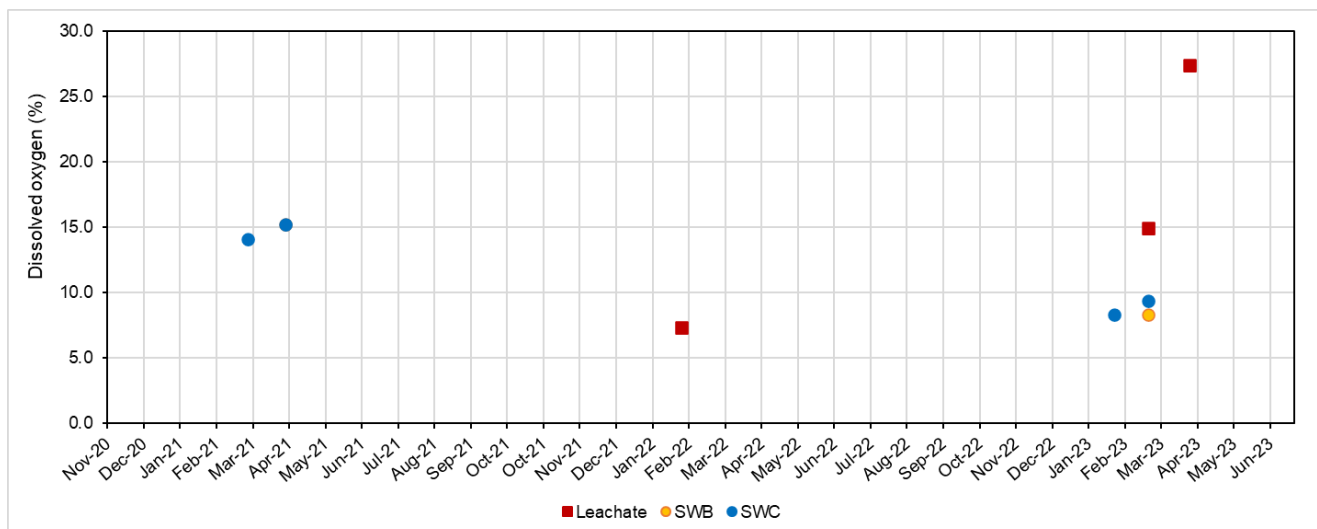
TOTAL PFOS+PFOA (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				<0.01		<0.01	<0.01		0.10	<0.01	0.03	0.08	<0.010	0.02	<0.010
GWE				0.07		0.06			0.04	0.14		0.02	0.02	0.10	0.01
GWB01					0.30	0.29	1.40		2.50		1.00	1.60		0.57	1.80
GWB02						0.06		0.93	0.61	0.63	0.87	0.75	0.23	0.29	0.46
GWB03								0.03	0.01	<0.01	<0.01	<0.01			0.02
GWB04									0.04						0.01

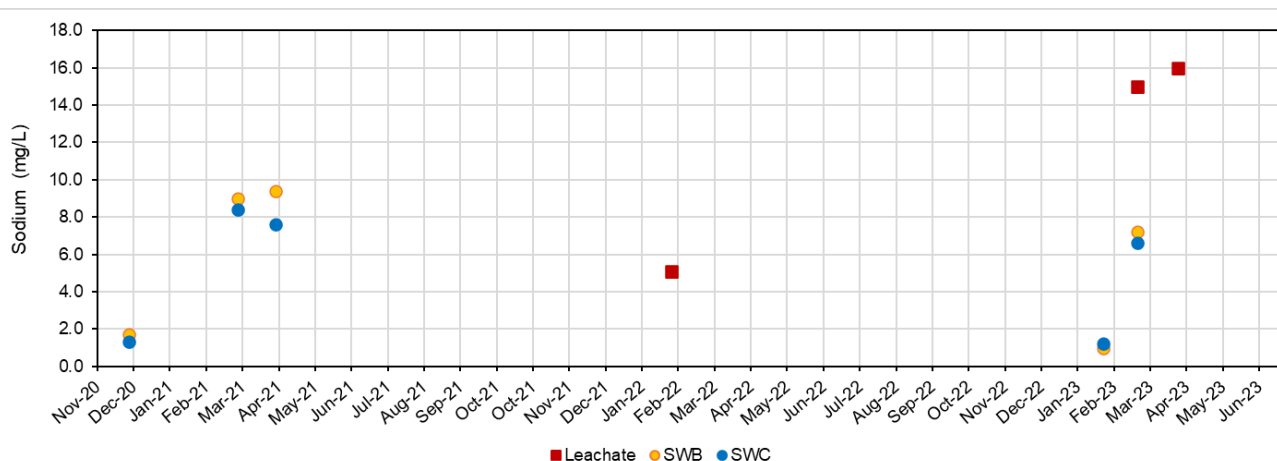
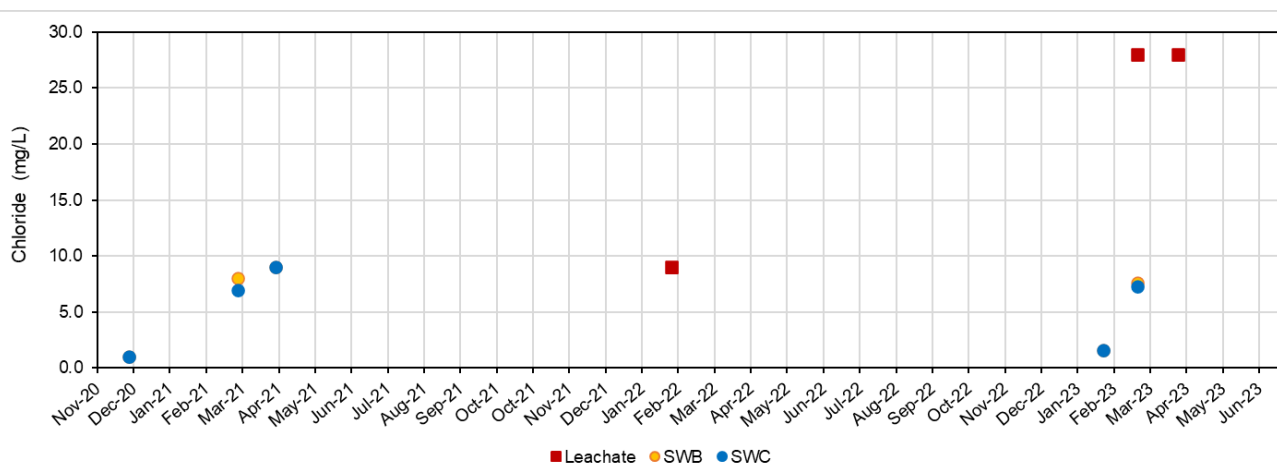
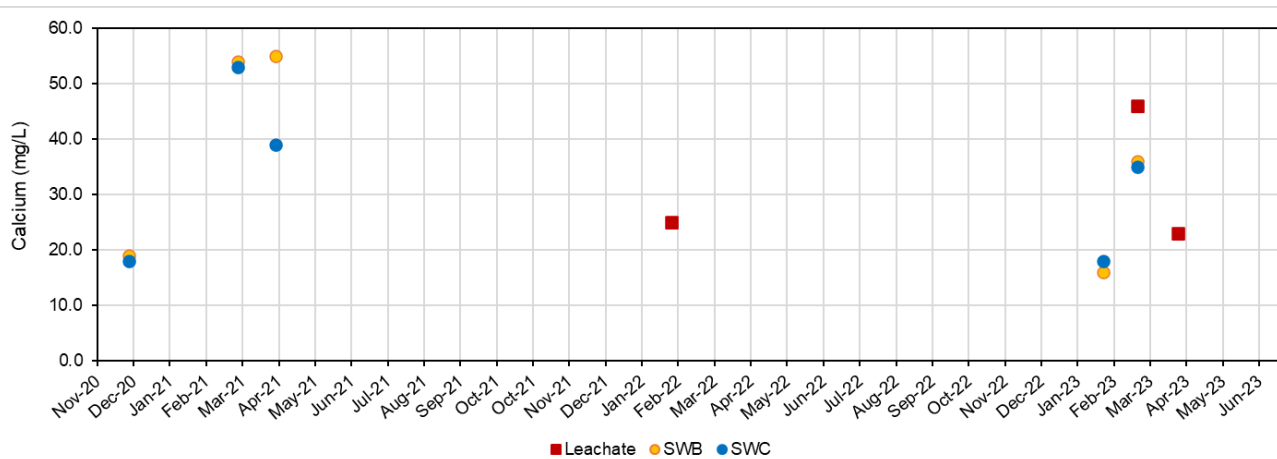
TOTAL PFAS (mg/L)	2006	2017	2018	2020				2021			2022			2023	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr
GWA				0.12		0.11	0.04		0.87	0.04	0.80	0.91	<0.010	0.47	<0.010
GWE				0.10		0.10			0.05	0.25		0.02	0.02	0.13	0.01
GWB01					0.77	0.71	2.50		4.40		2.20	3.00		0.47	4.00
GWB02						0.23		2.70	2.10	1.70	2.20	2.00	0.68	0.95	1.30
GWB03								0.05	0.01	<0.01	<0.01	<0.01			0.03
GWB04									0.05						0.01

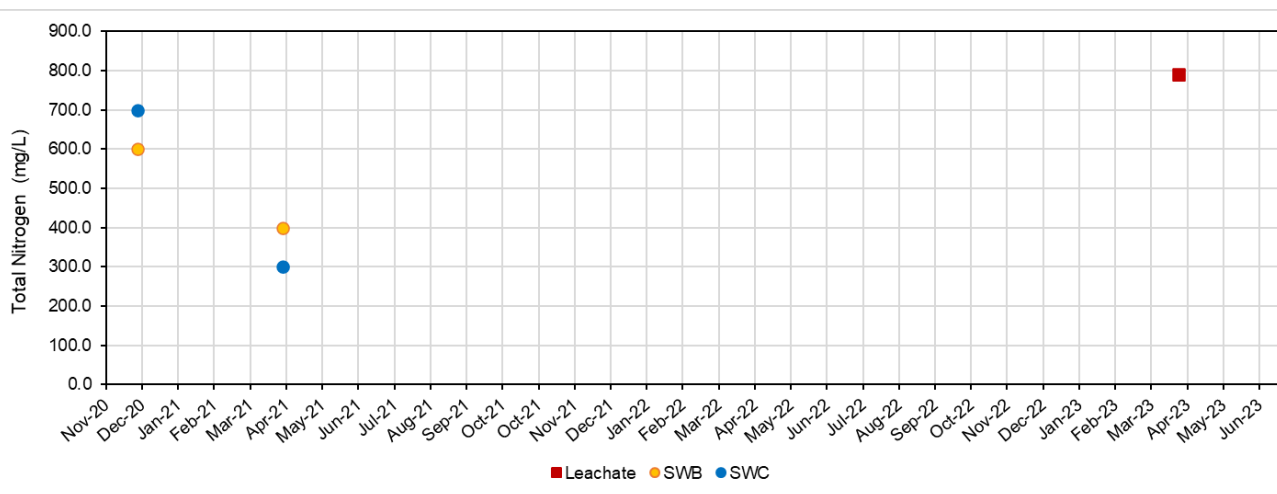
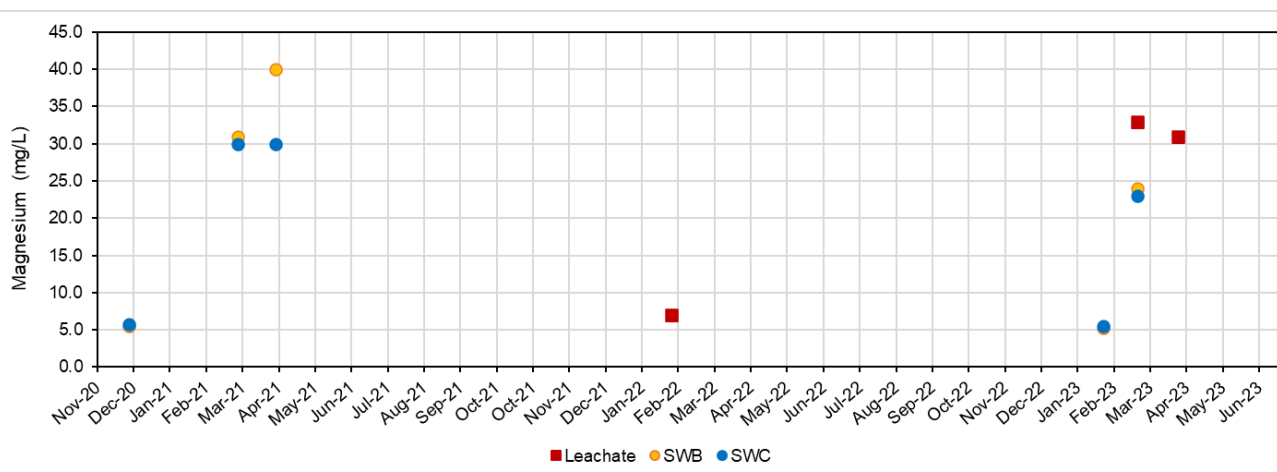
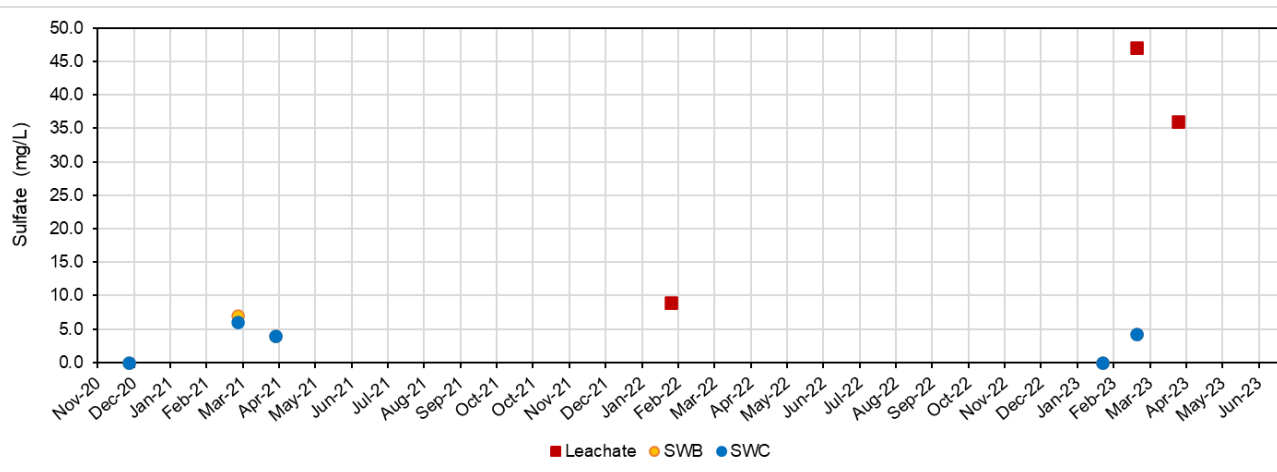
APPENDIX B HISTORICAL DATA TRENDS

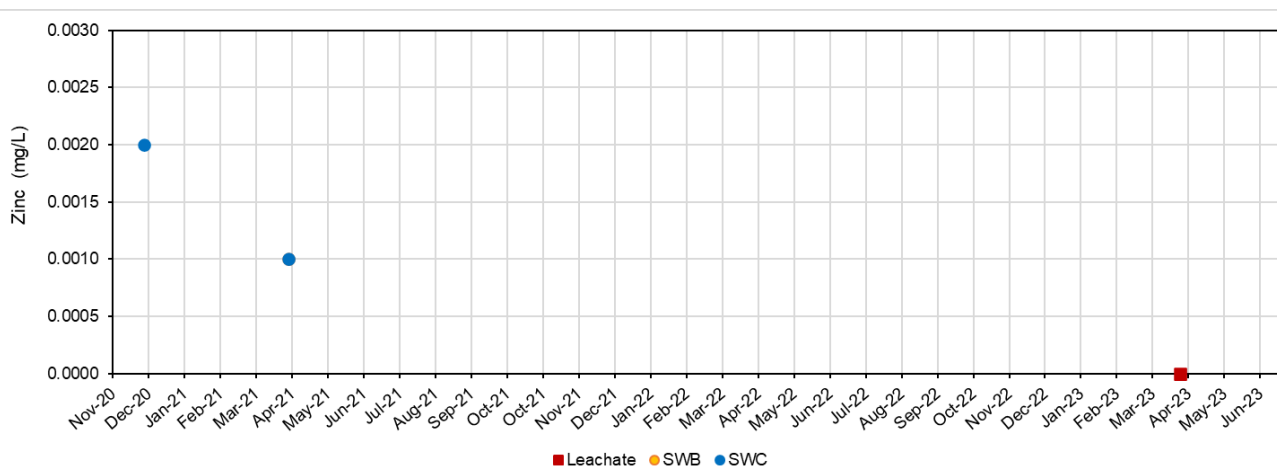
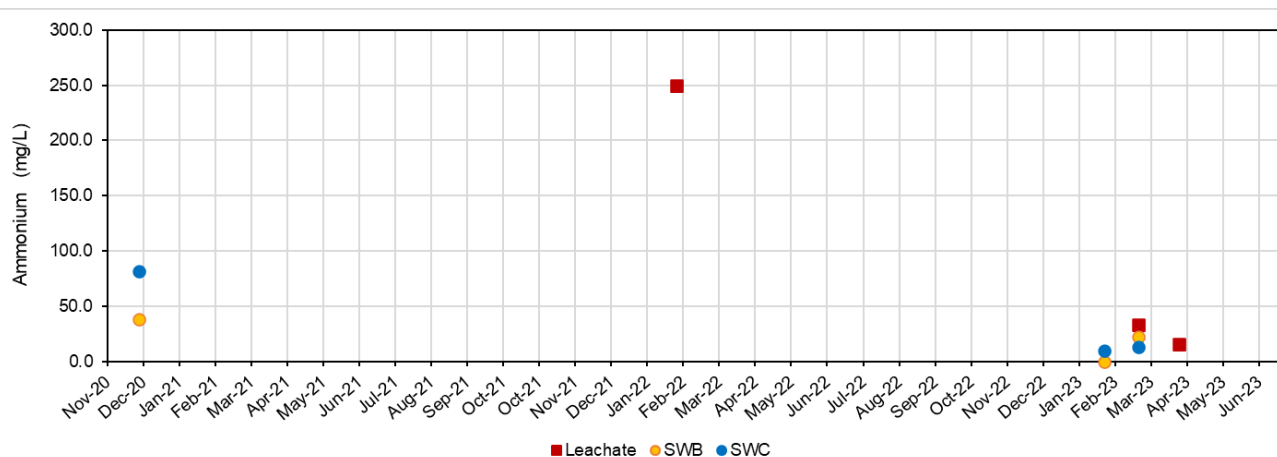
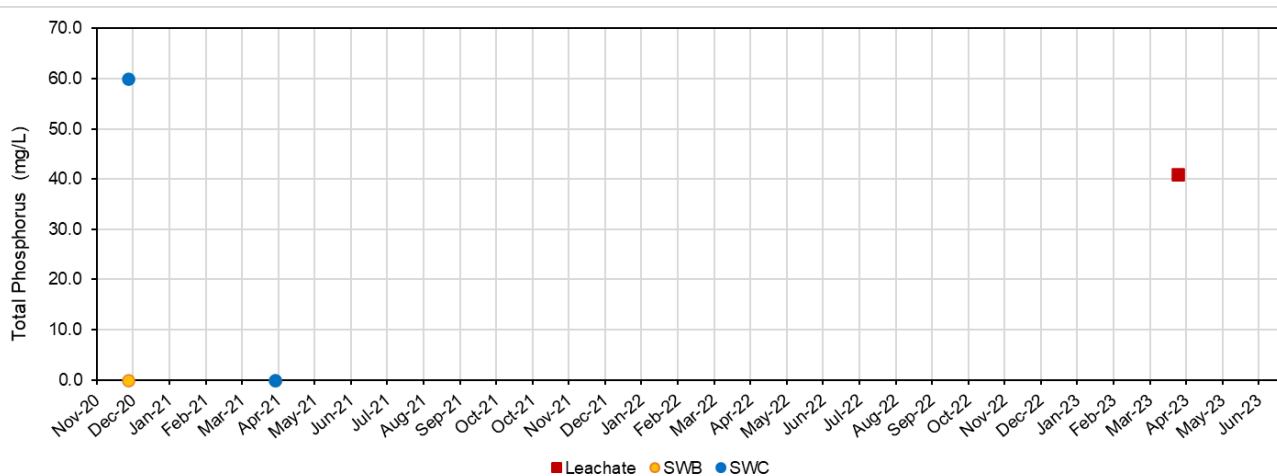
Surface water and leachate

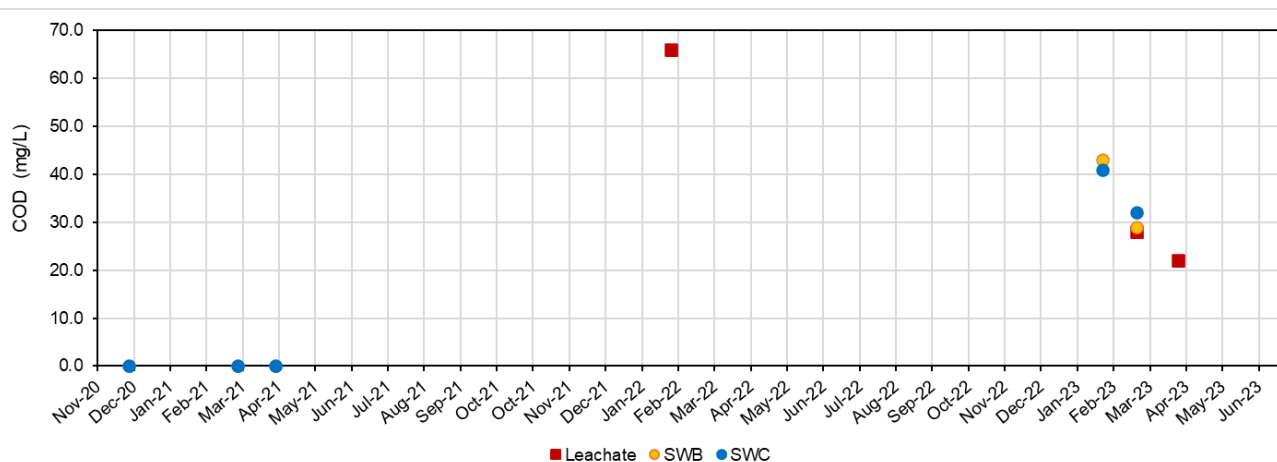
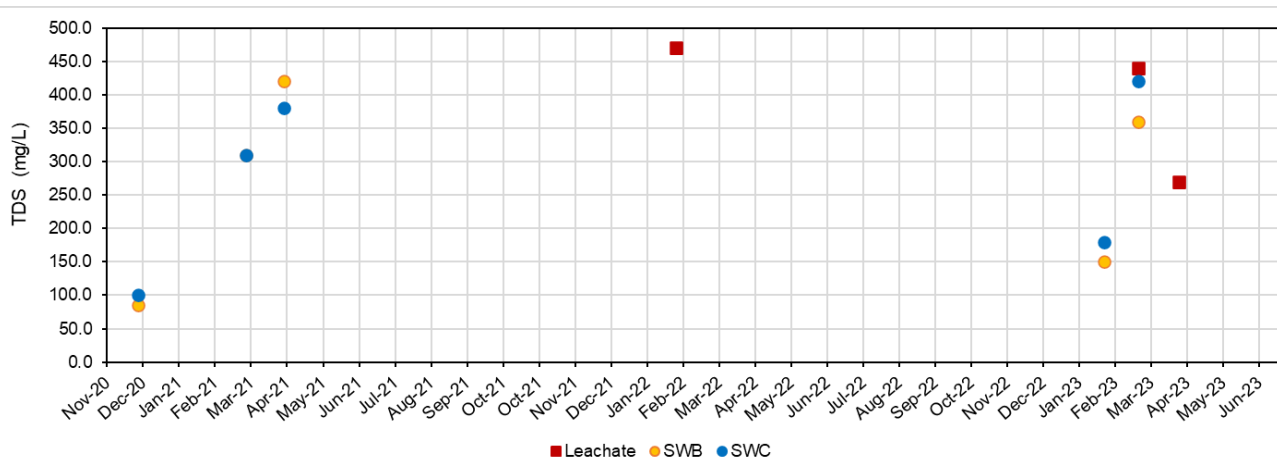
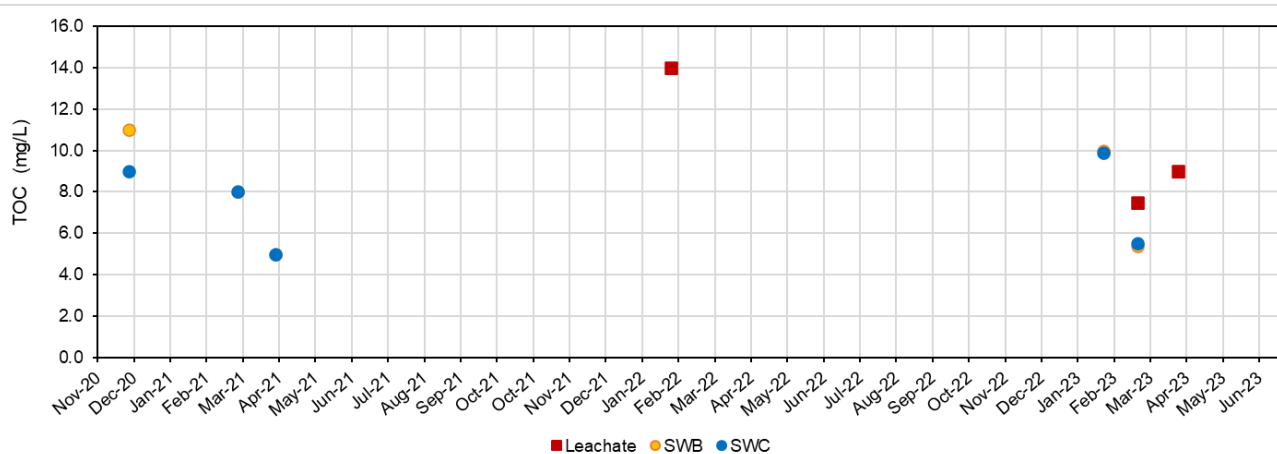


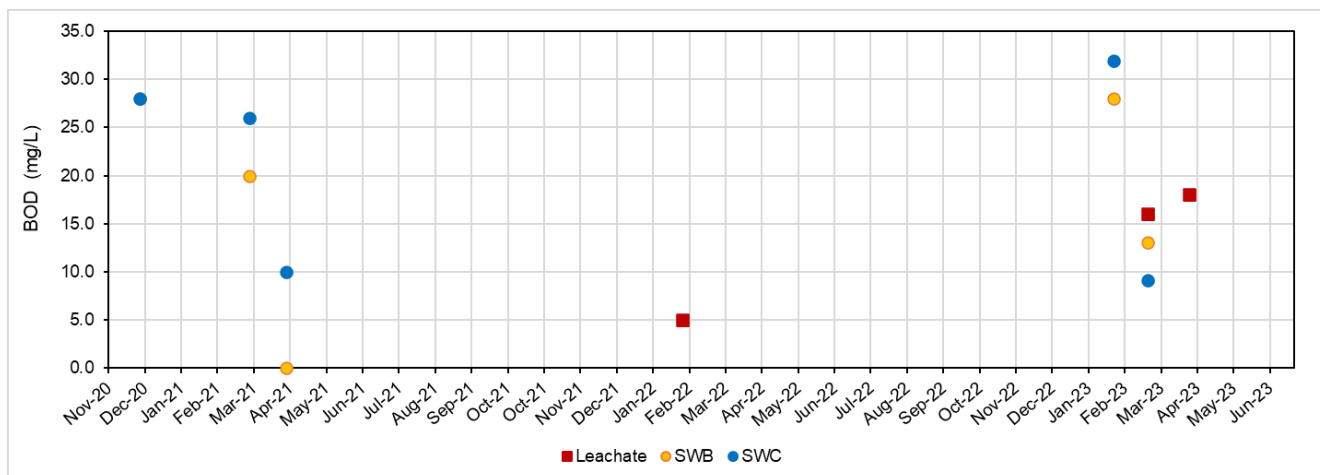




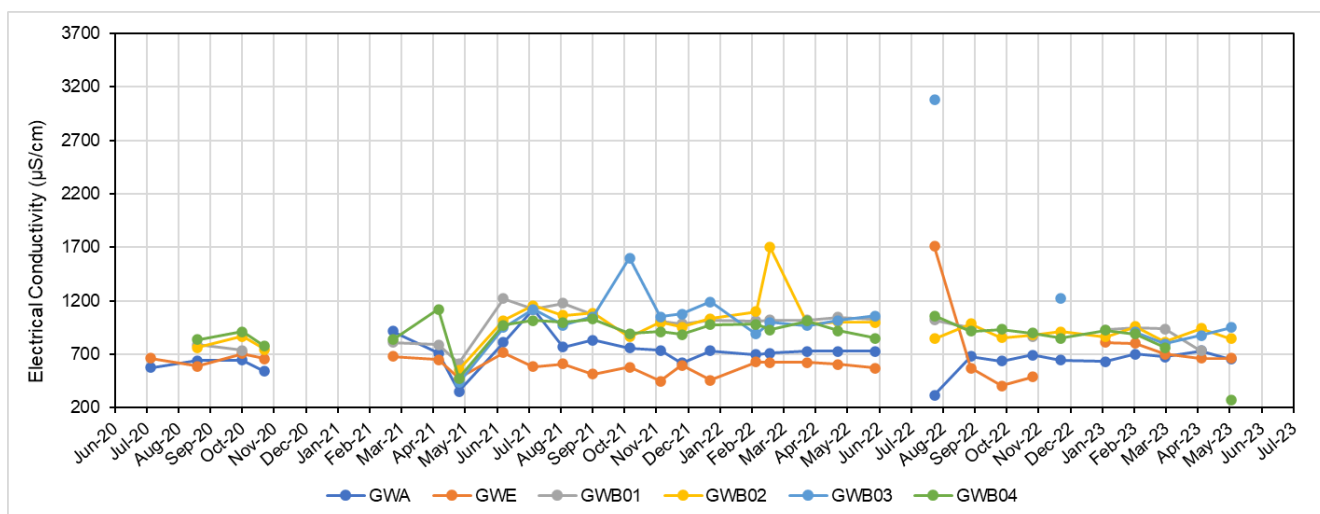
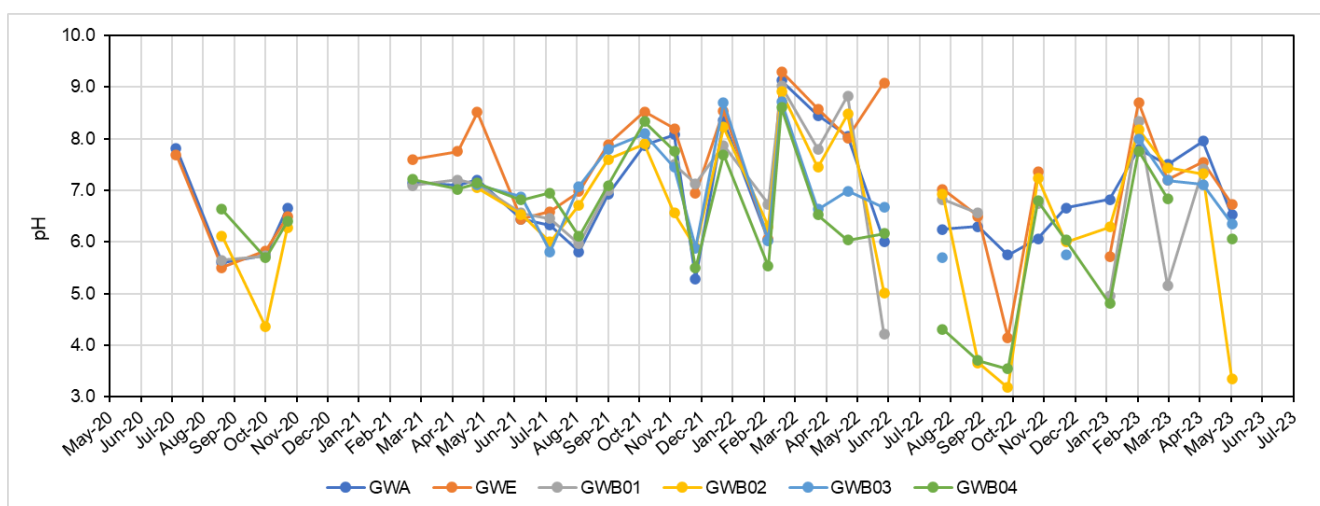


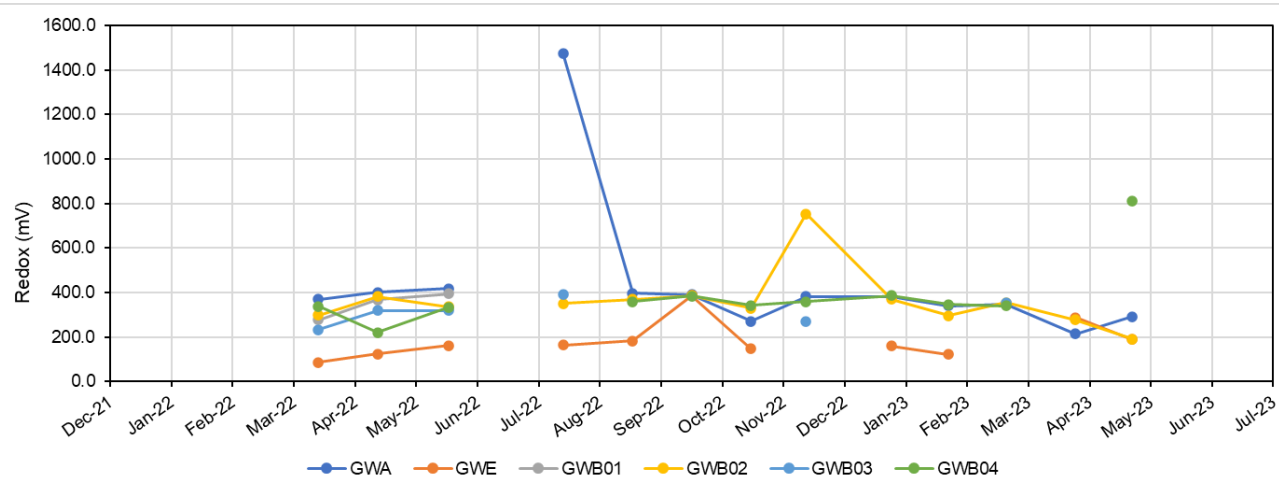
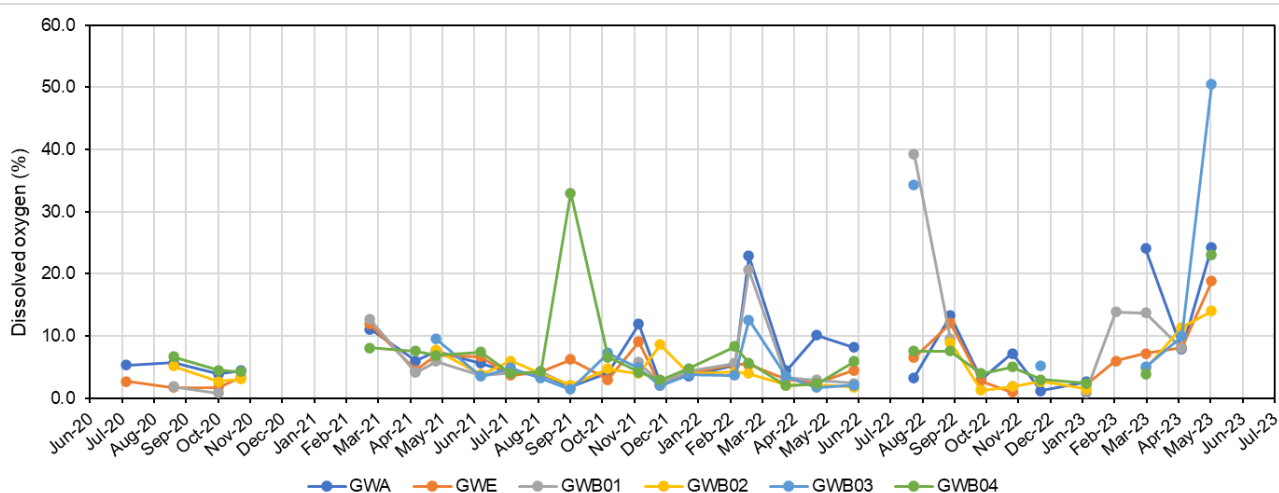
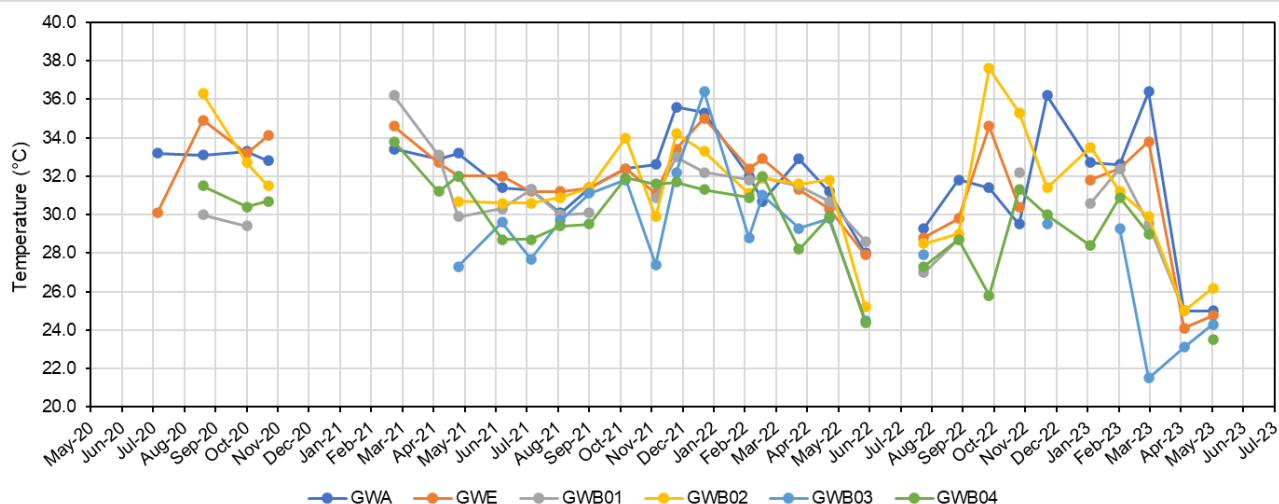




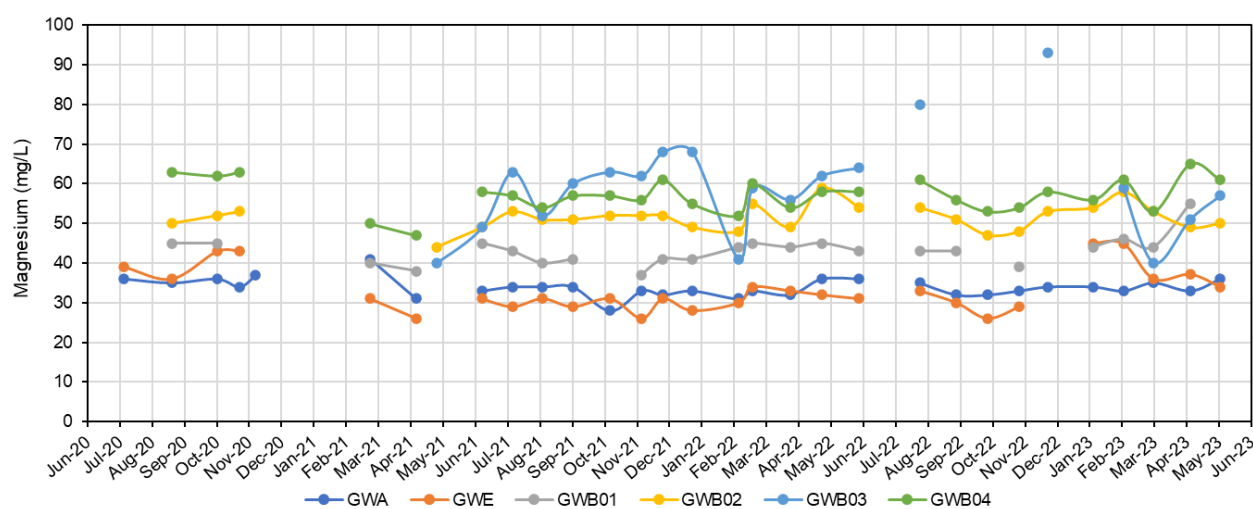
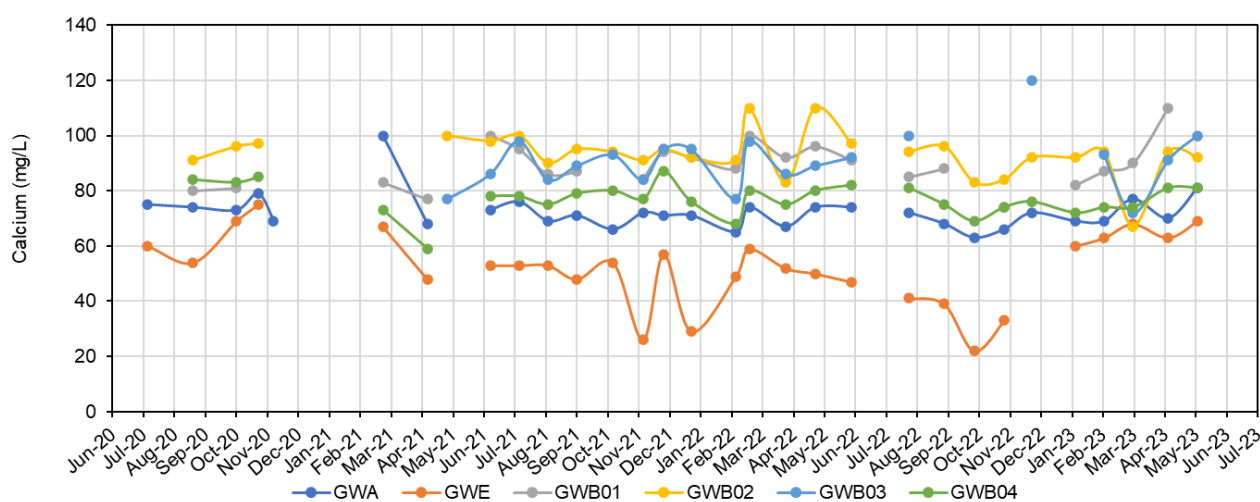
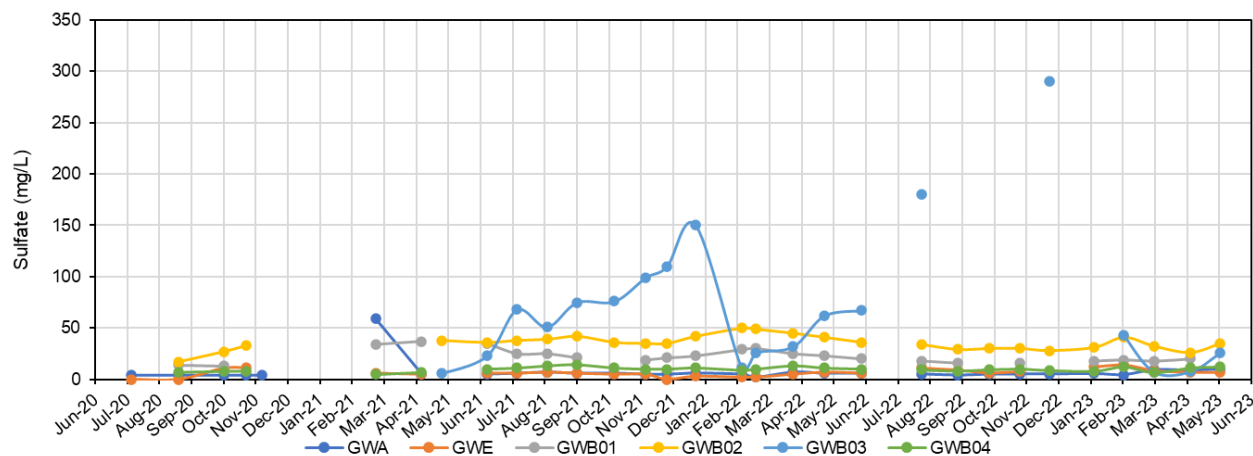


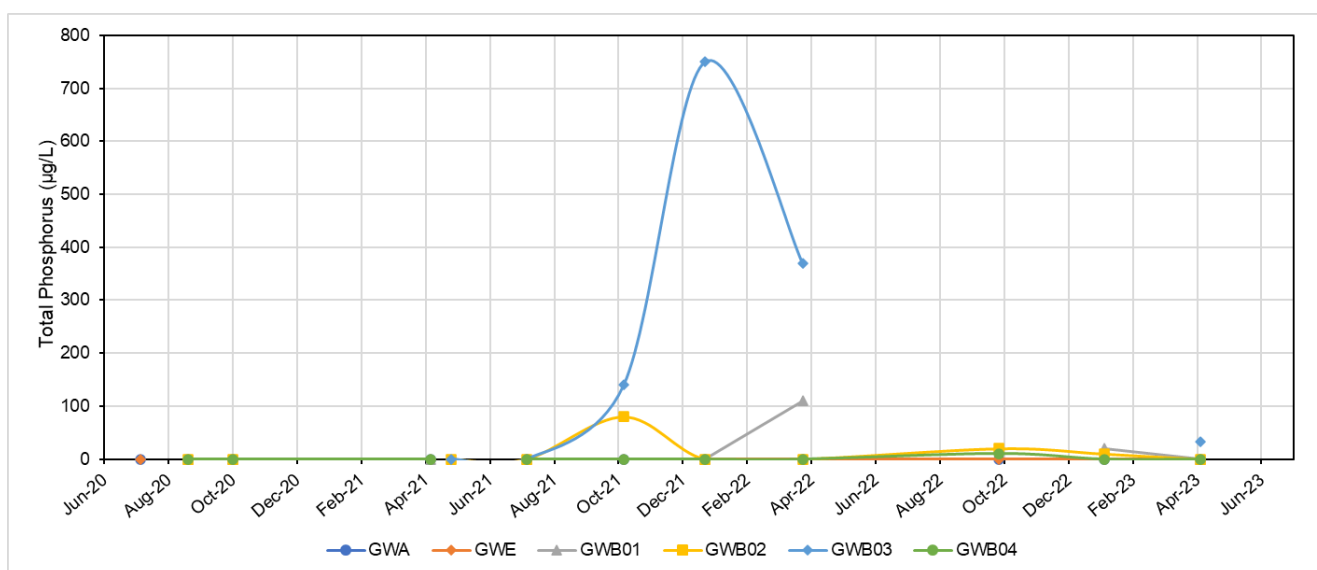
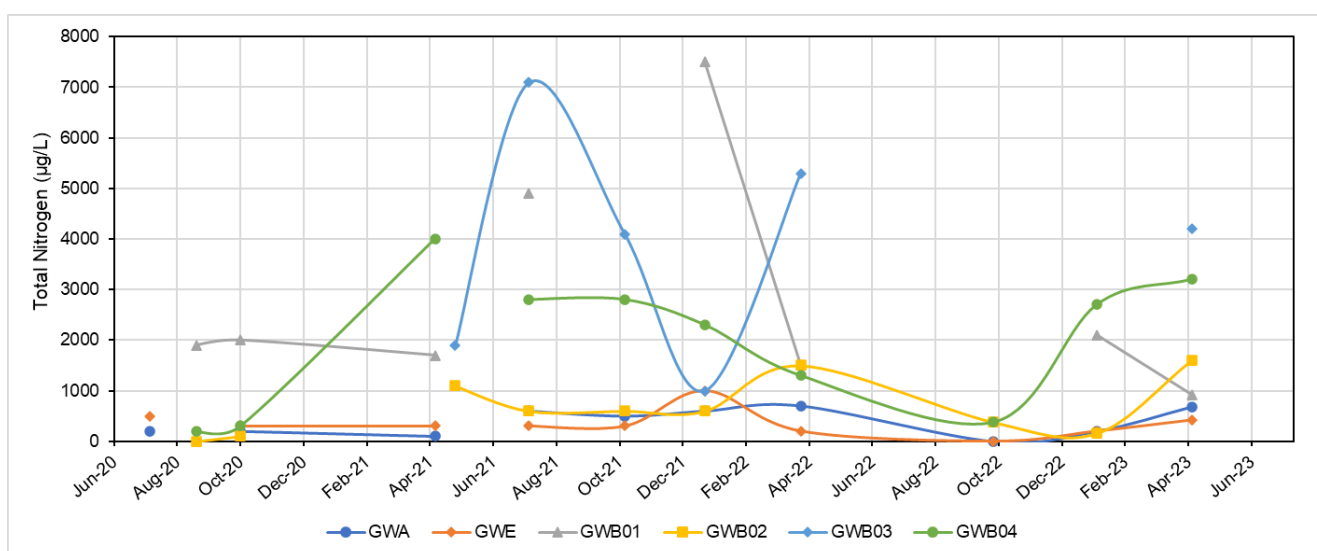
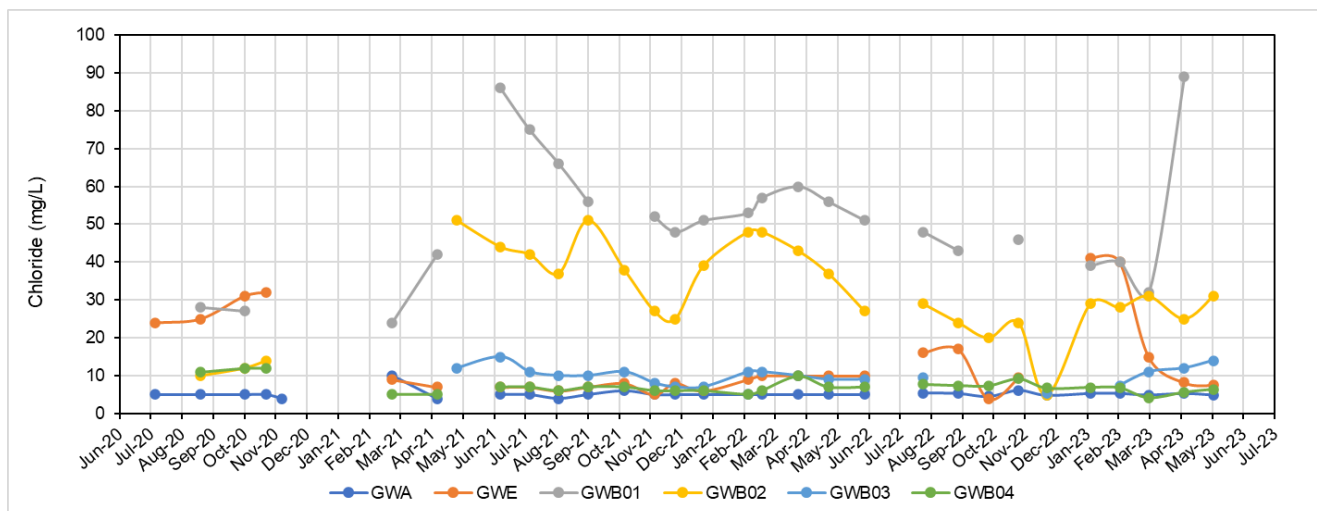
Groundwater

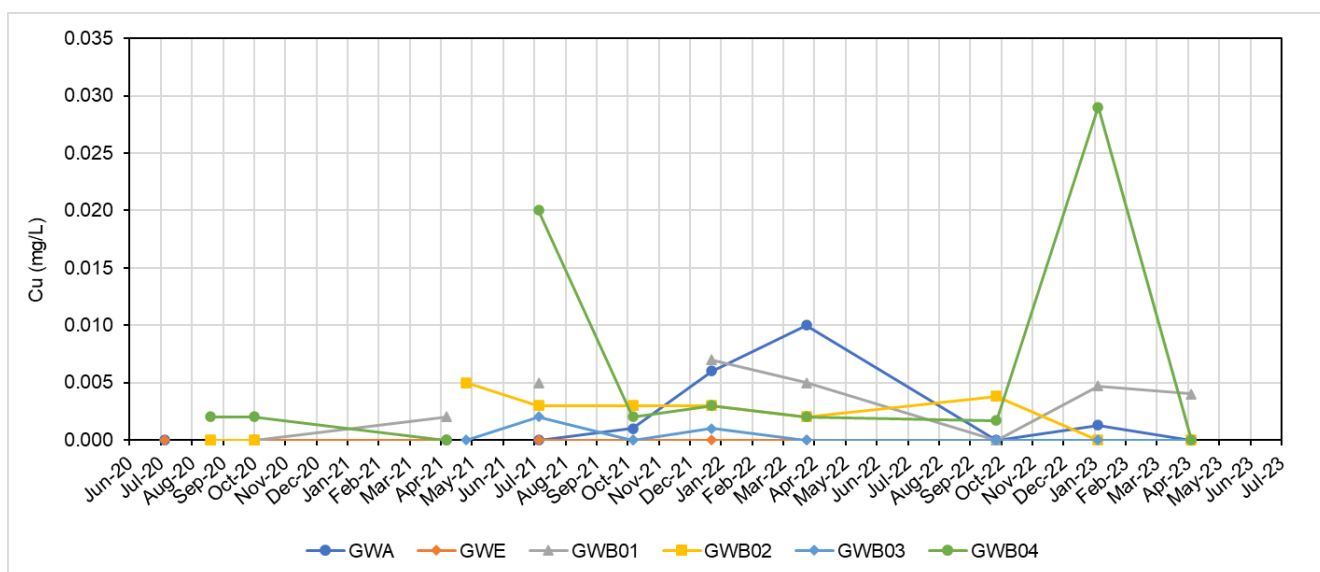
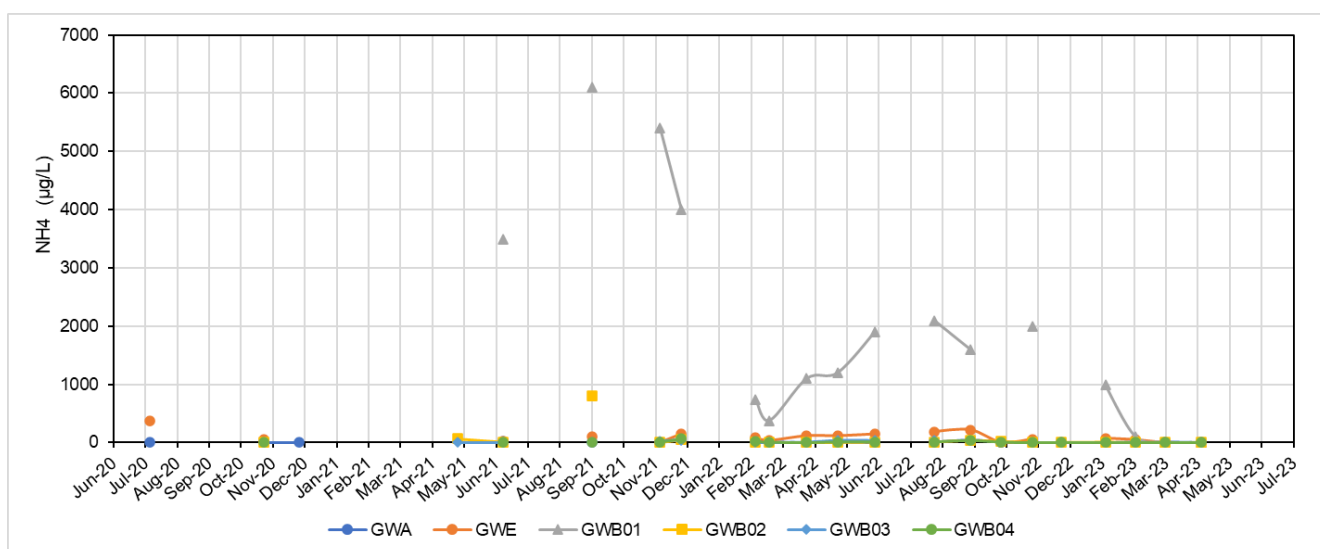
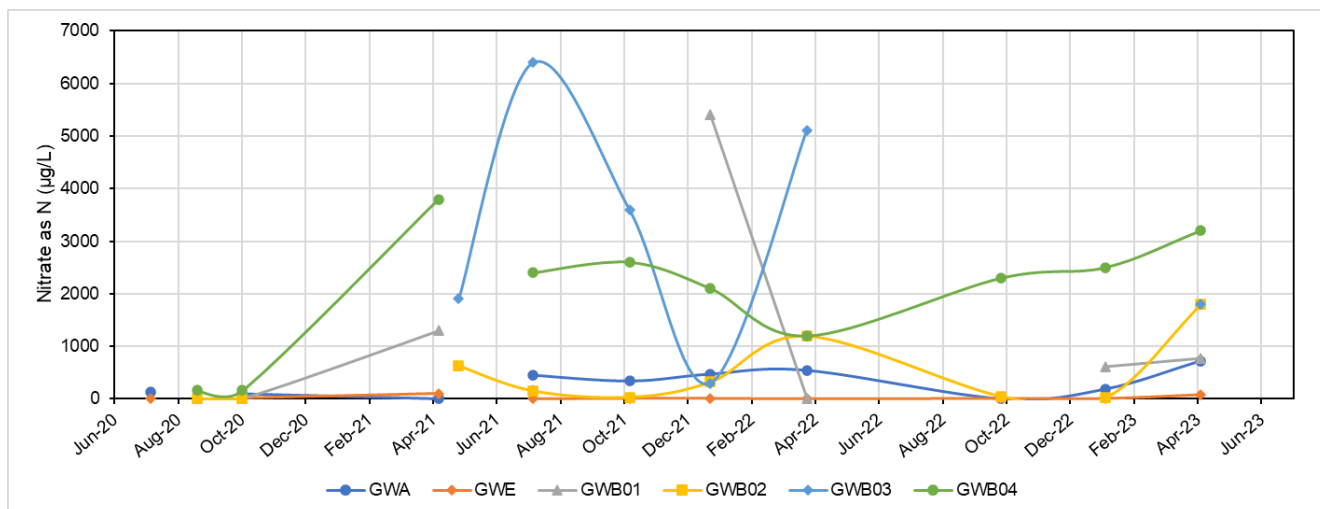


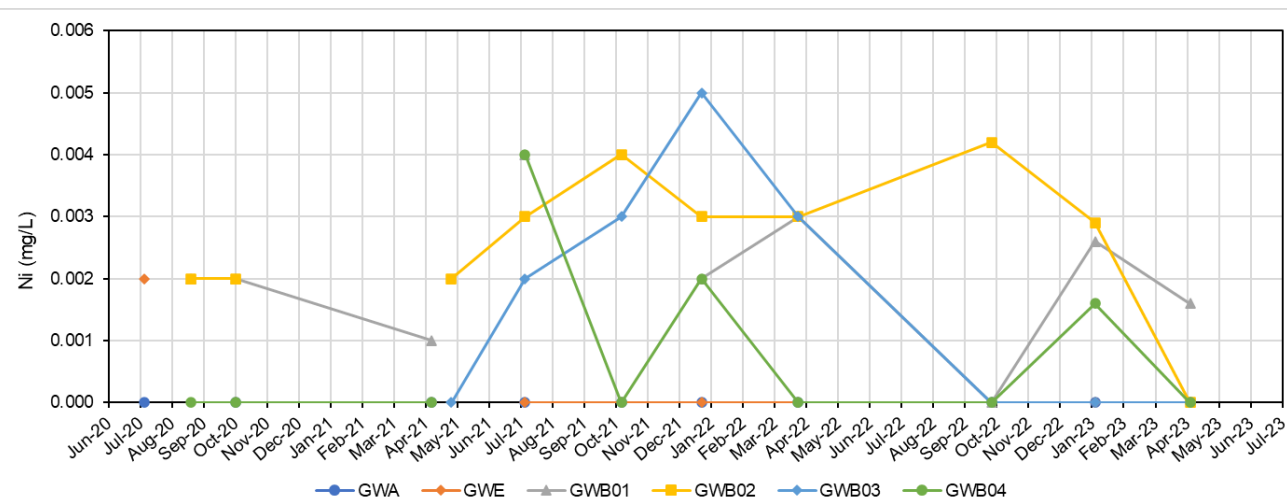
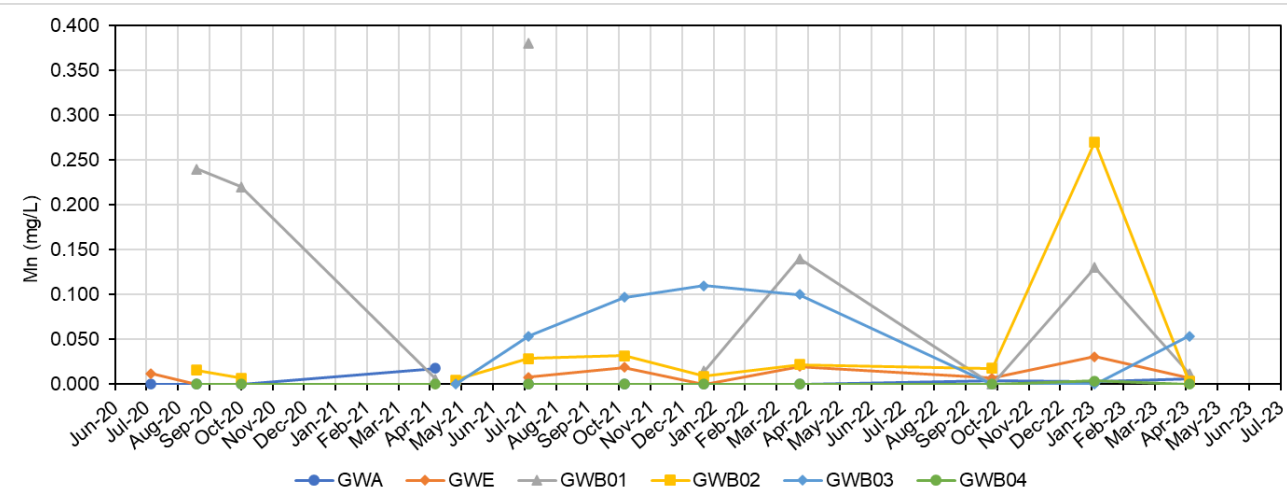
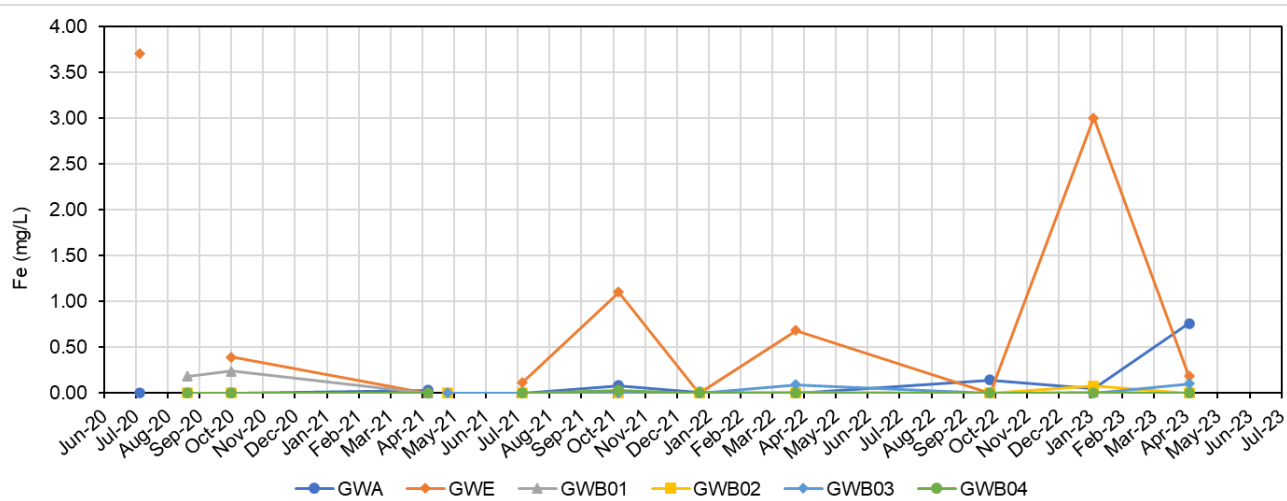


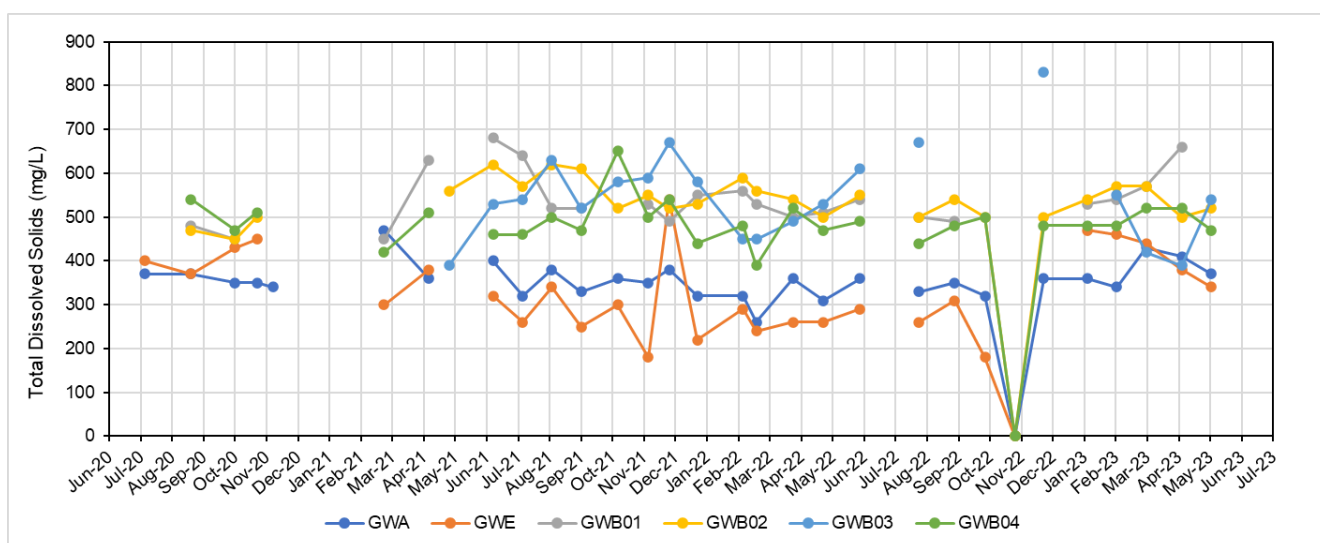
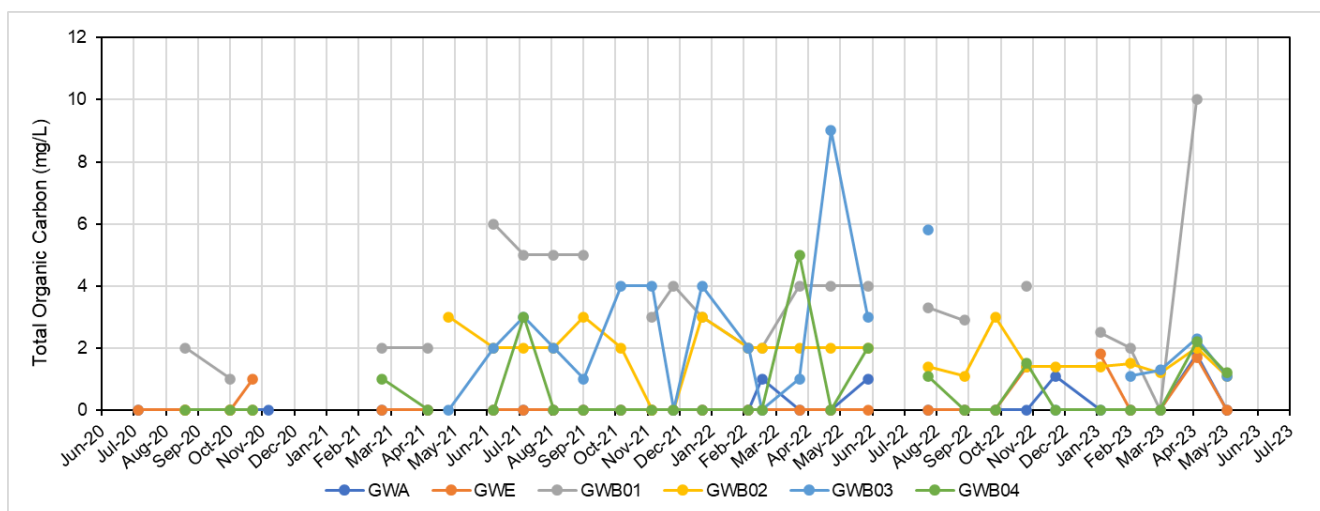
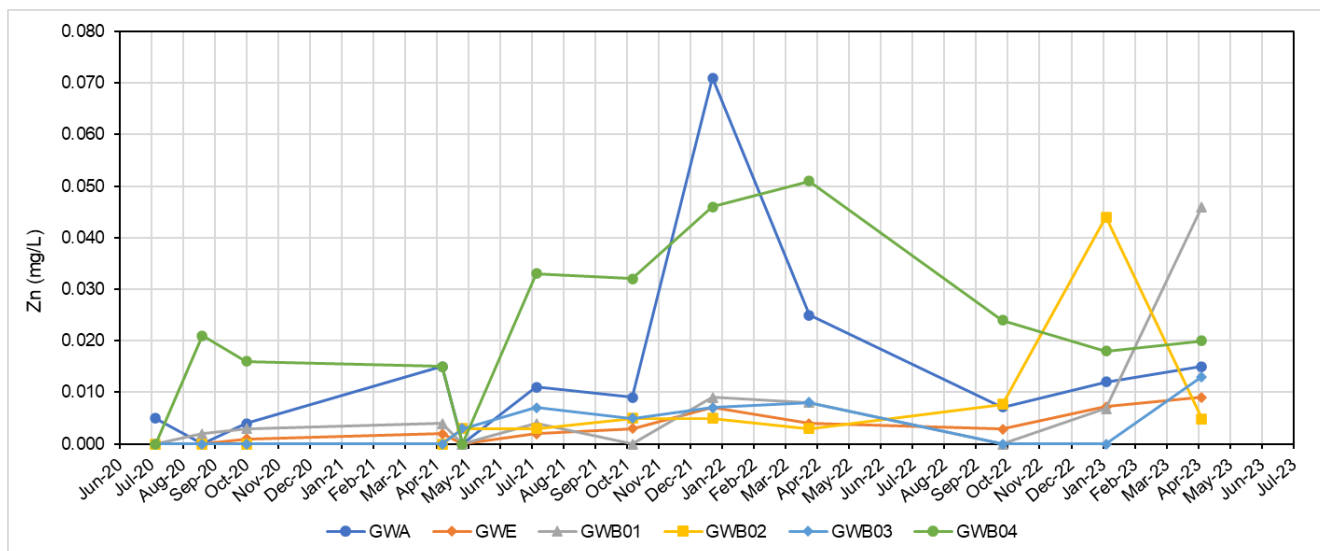


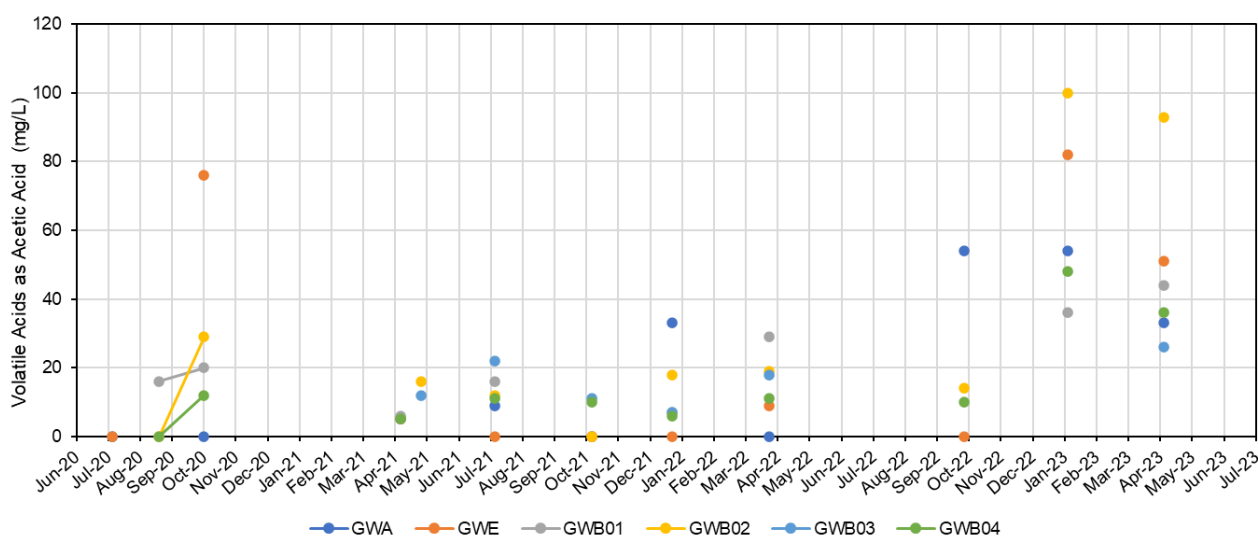
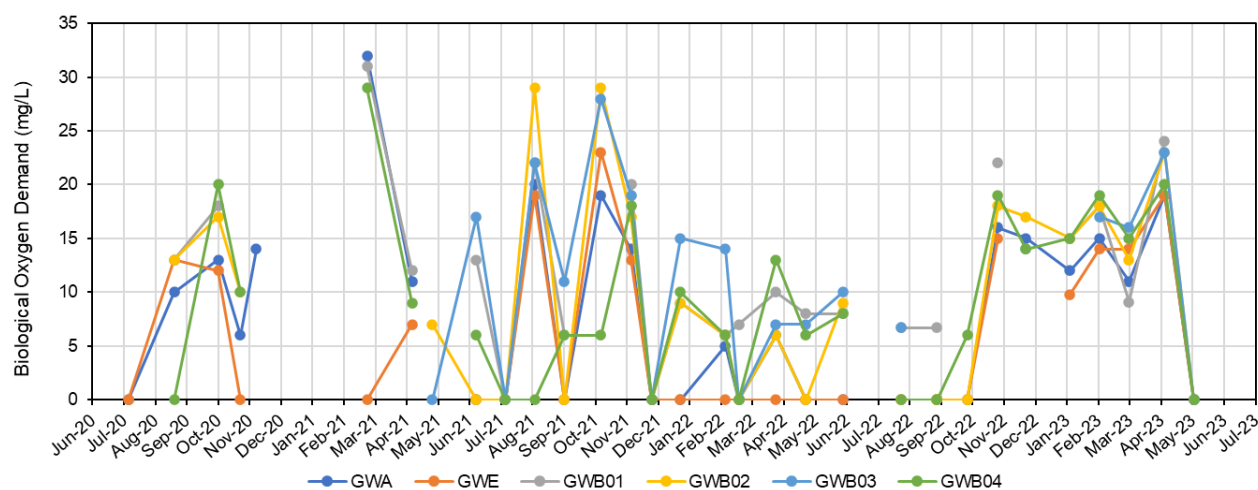
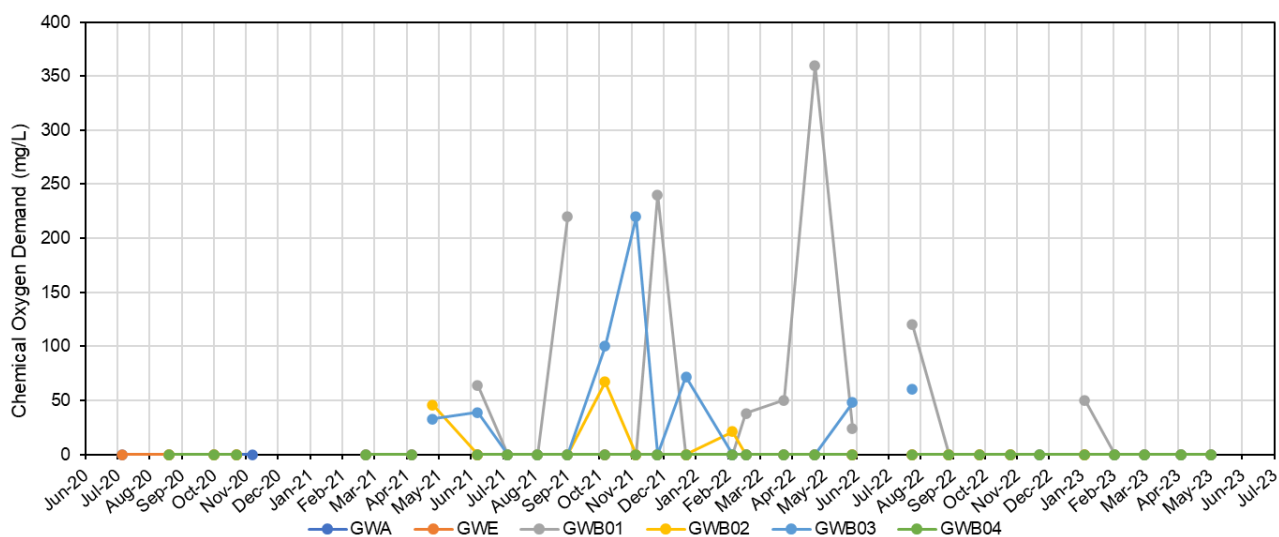


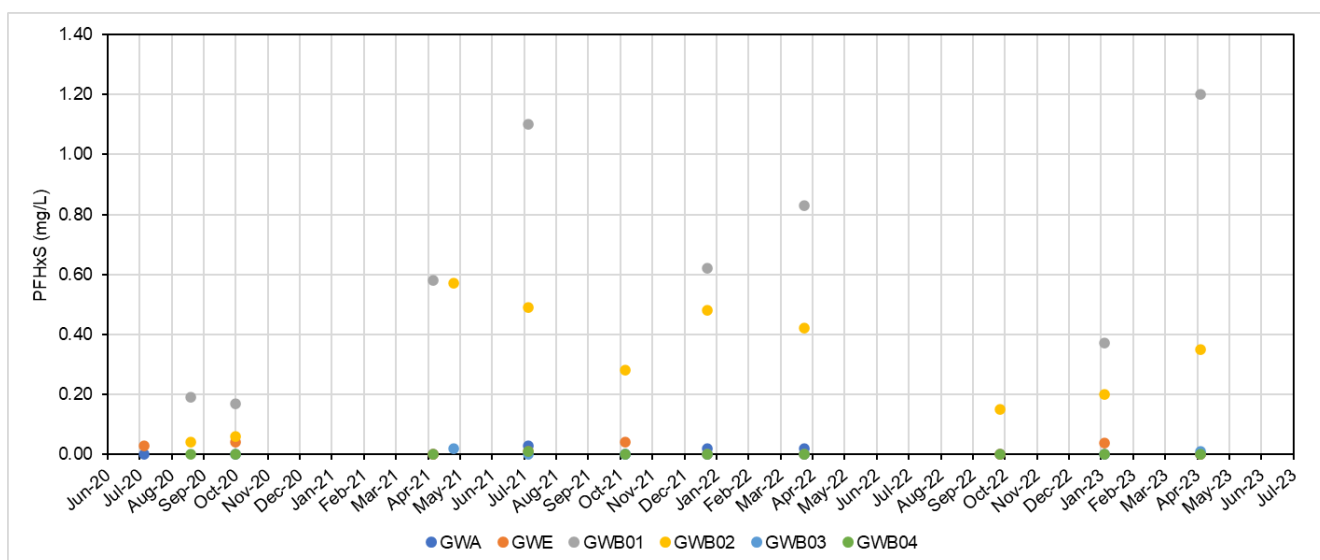
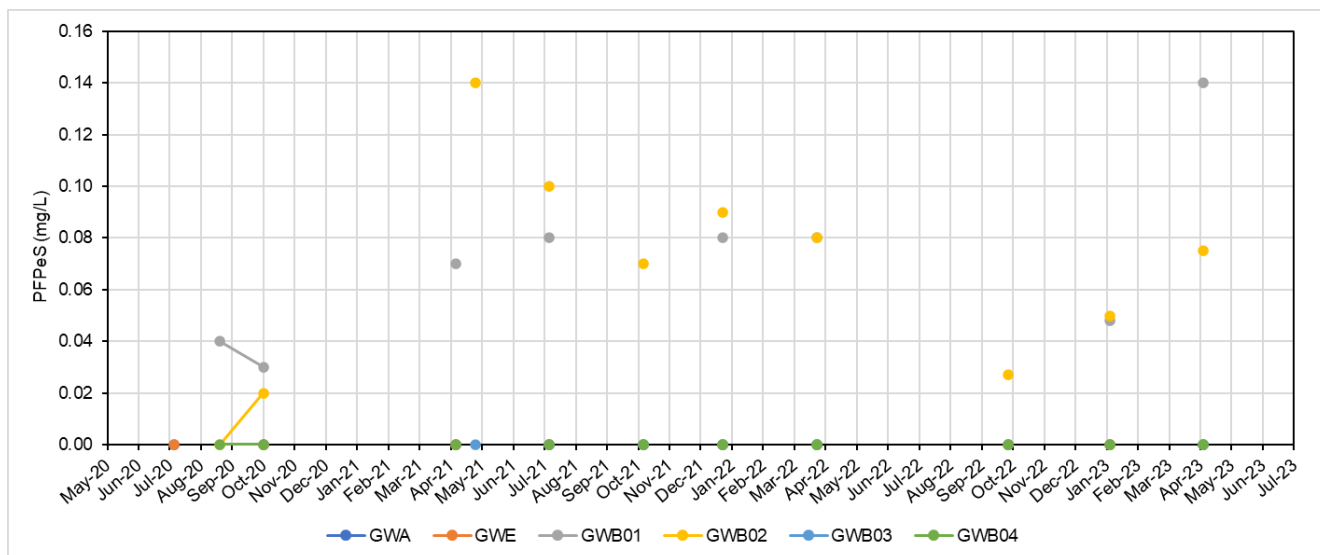
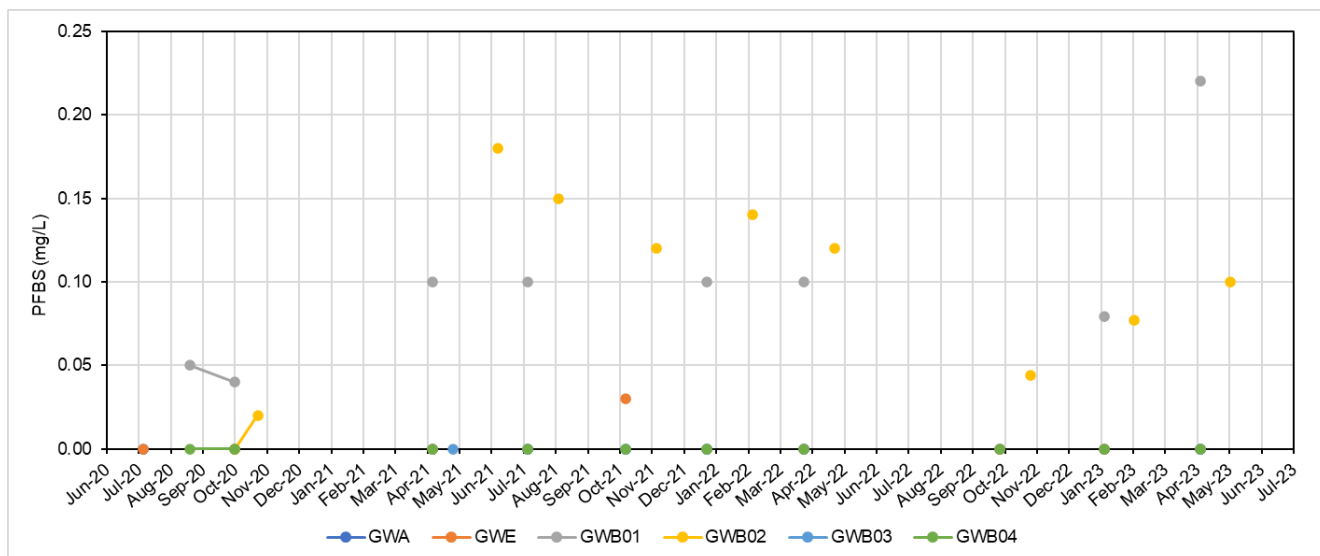


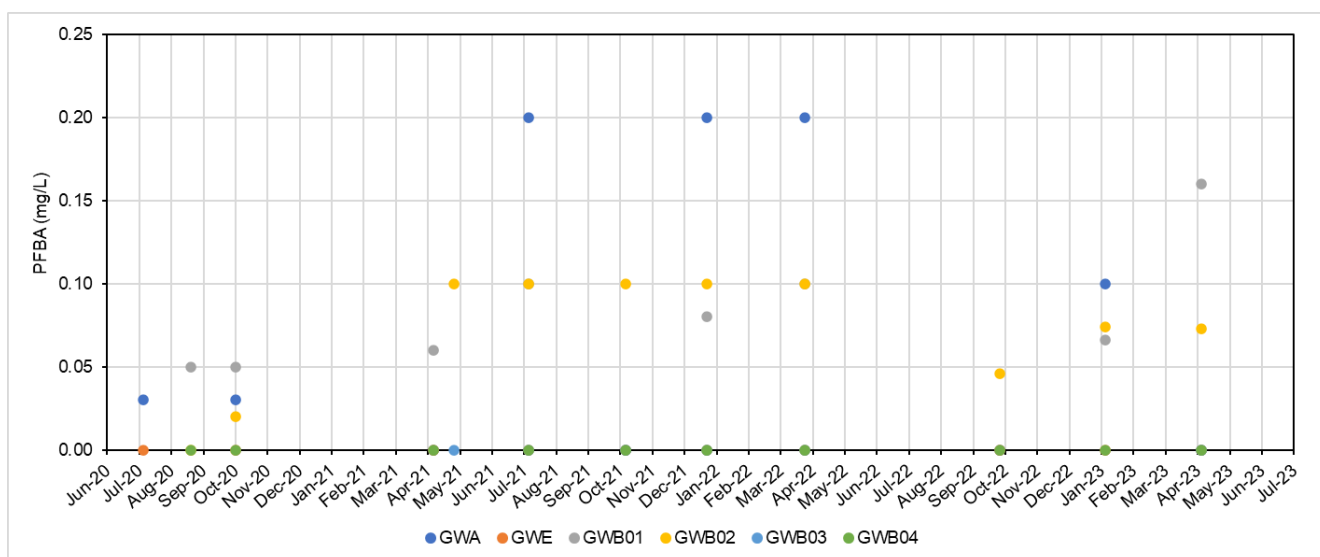
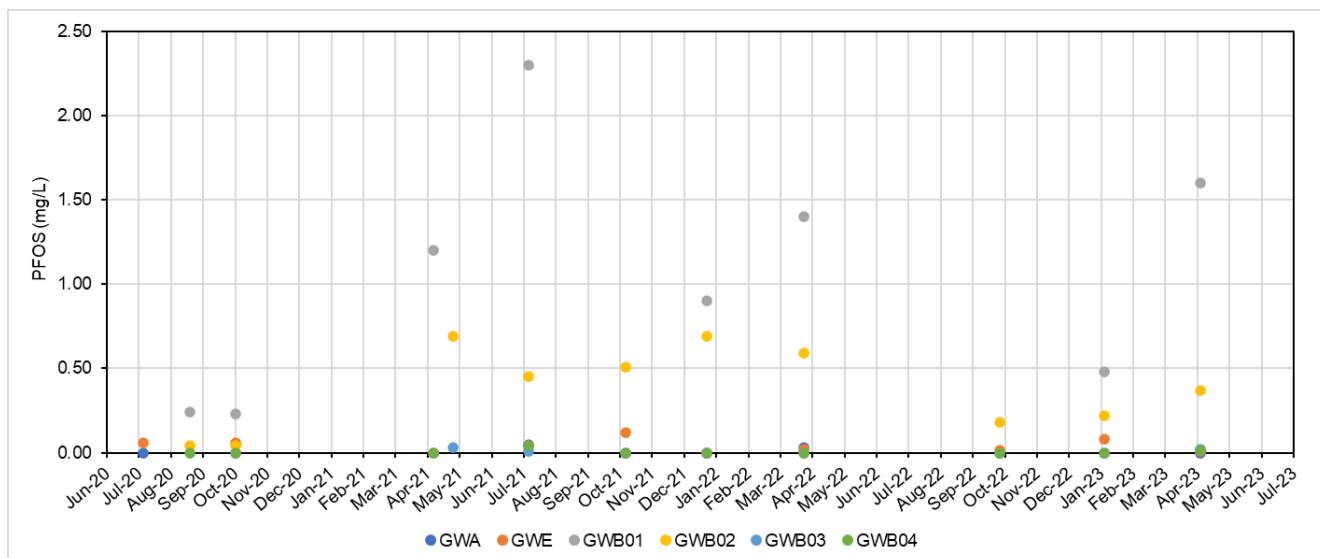
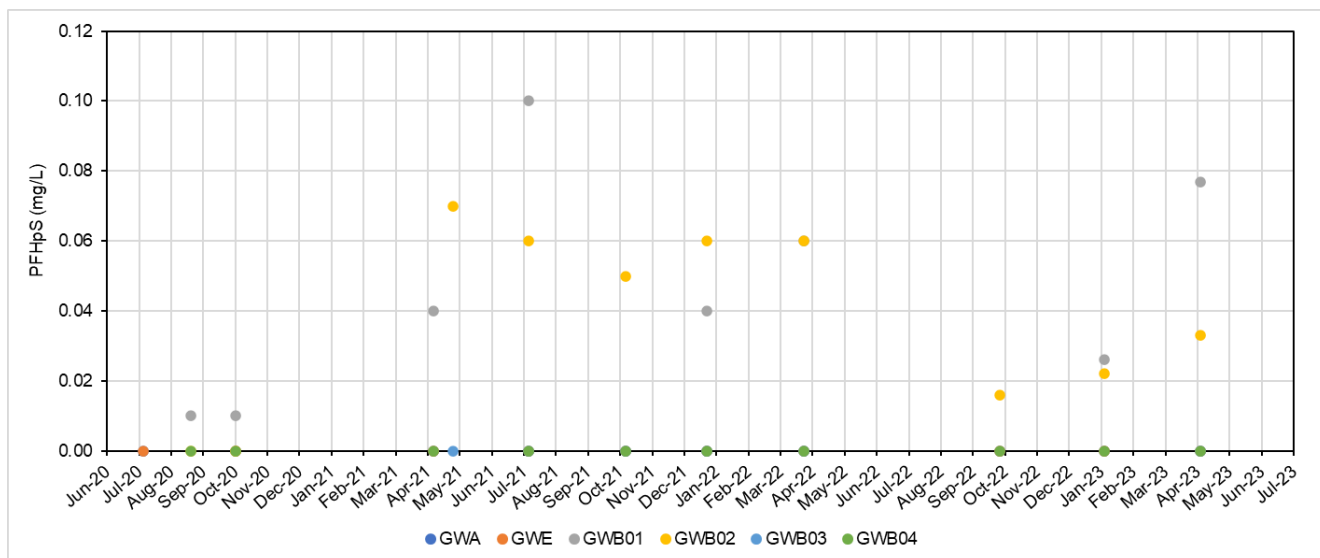


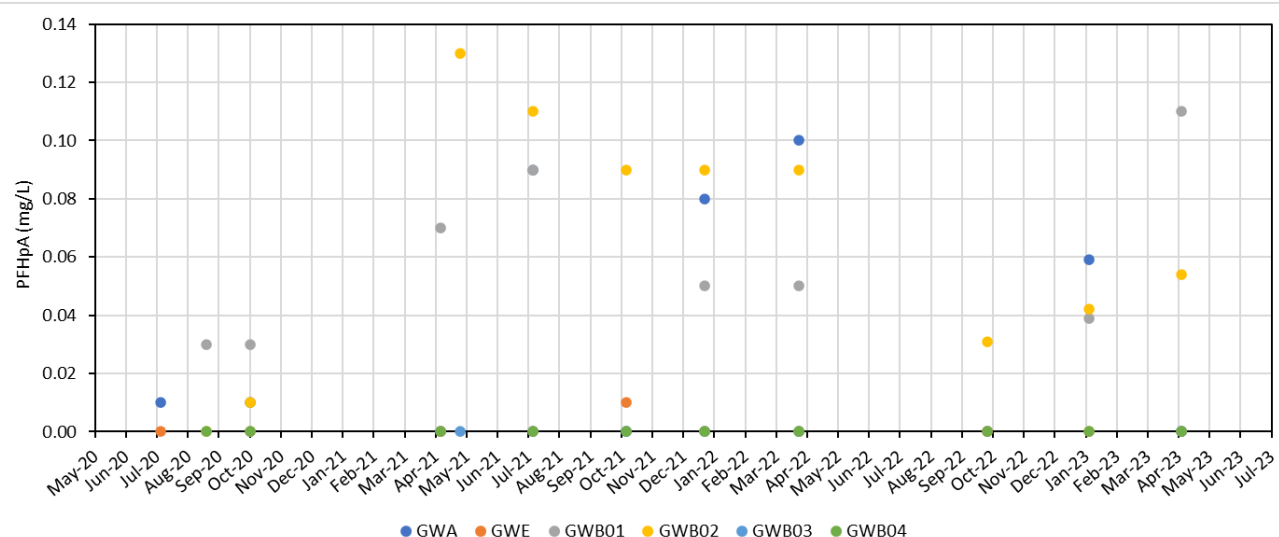
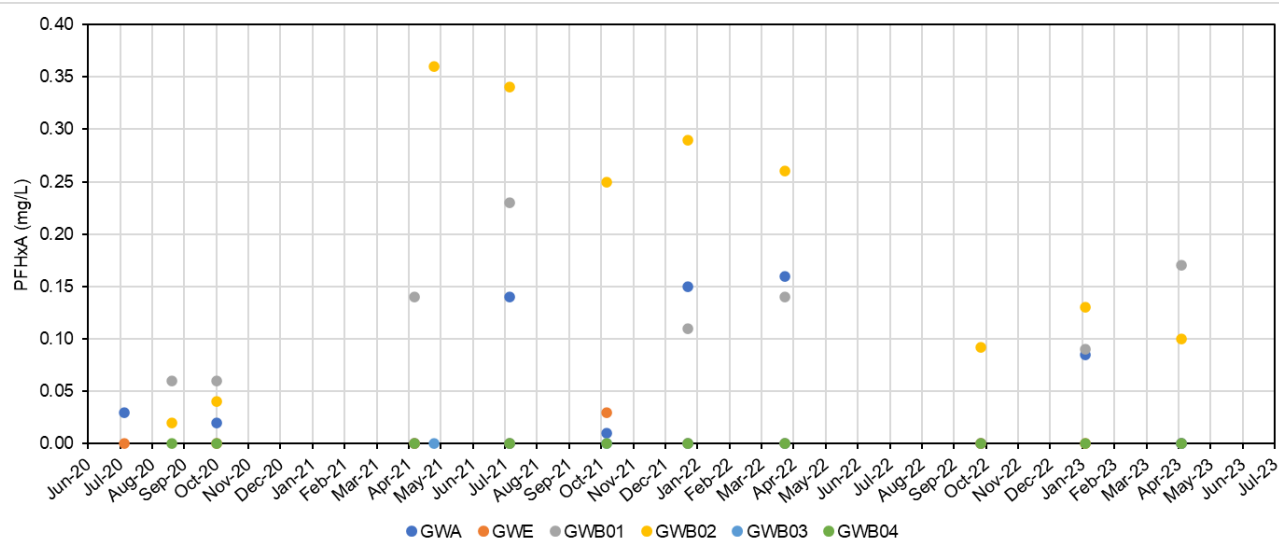
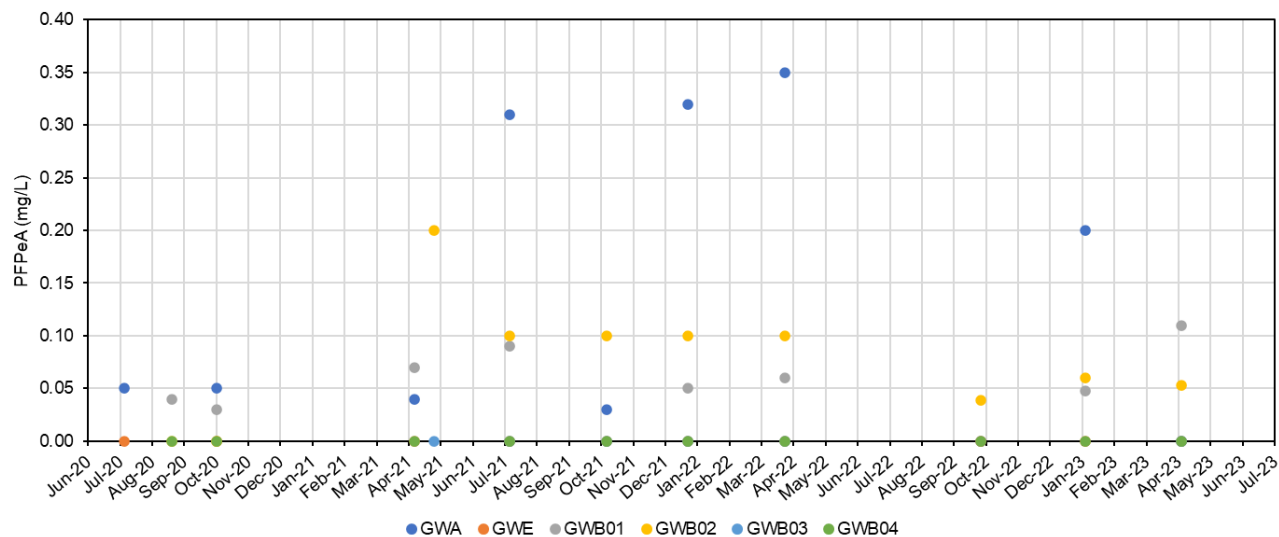


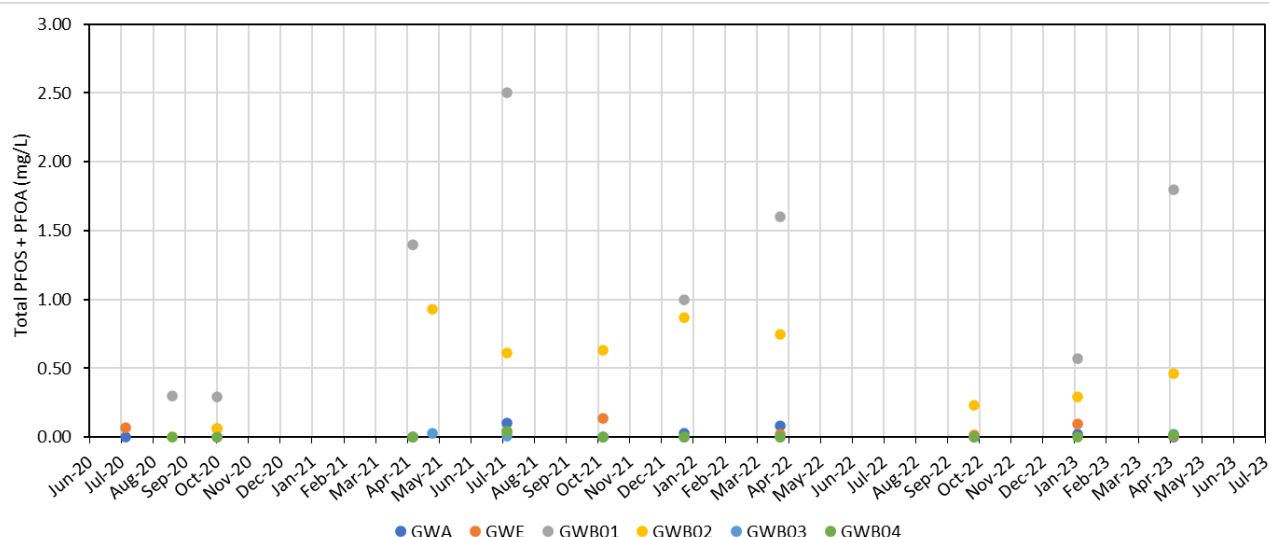
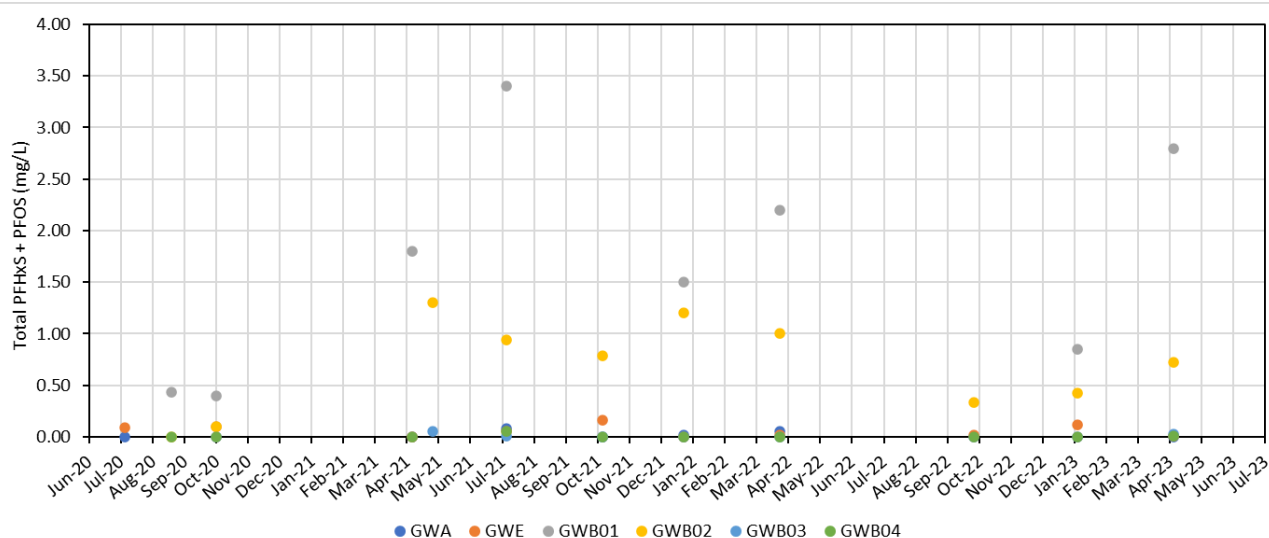
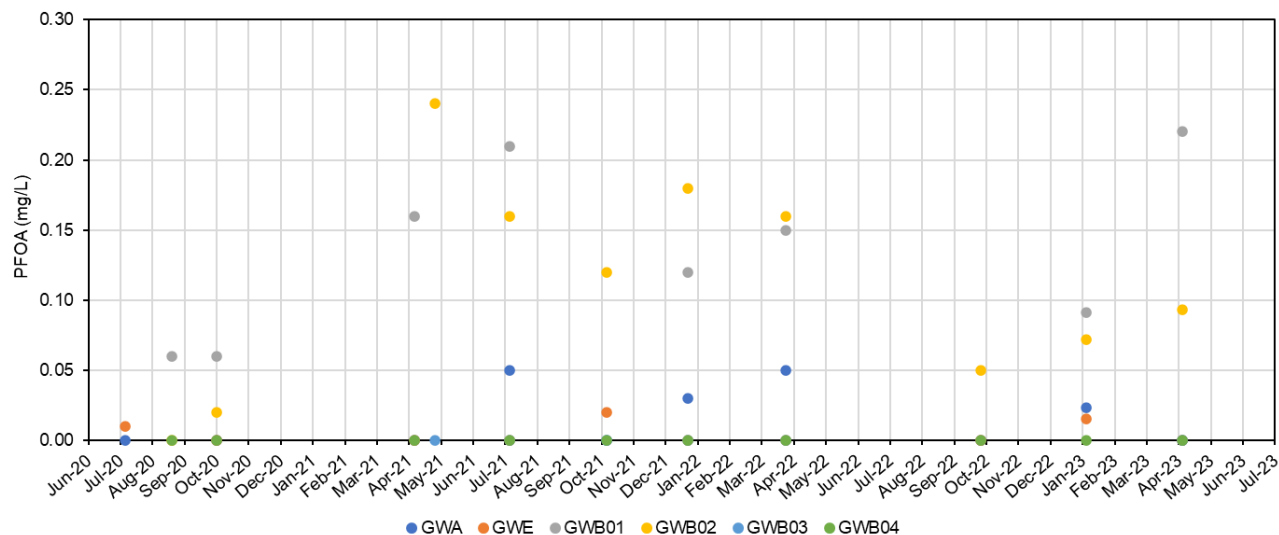


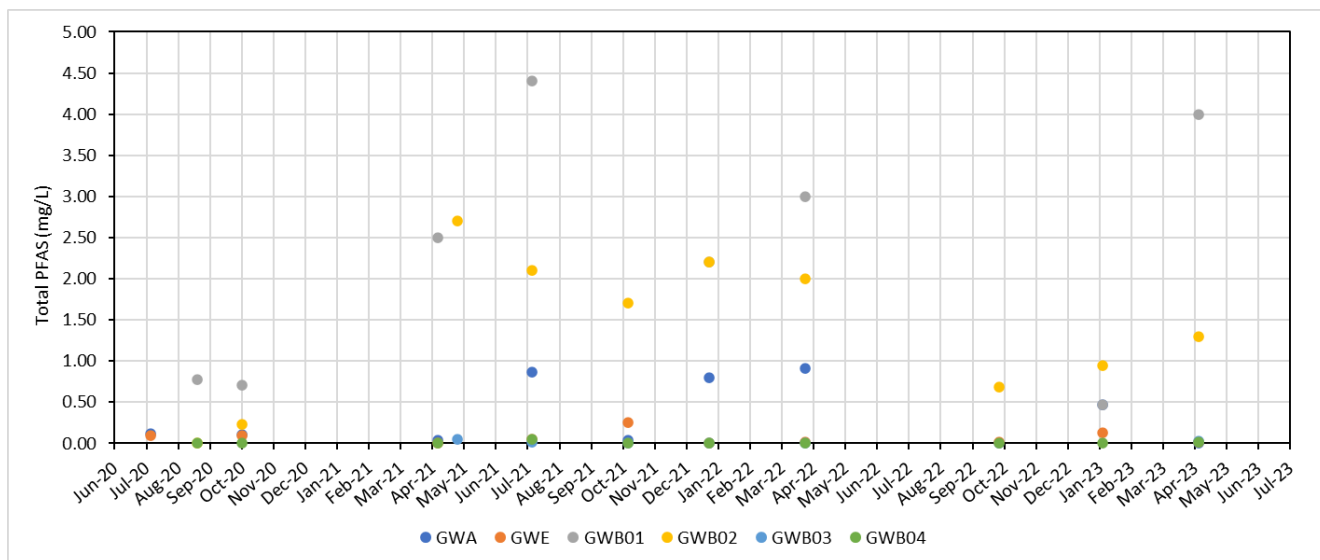












APPENDIX C MONTHLY OPERATIONAL CHECKLIST (SEPTEMBER TO DECEMBER 2021)

KWMF Site Inspection Checklist



Work Area / Location: **W.M.F.**

Date and Time: **20/8/22.**

Inspected by Name(s): **CRAIG WALKER**
 (include all personnel who took part in the inspection) Position(s): **COORDINATOR**
 Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	
5.	Is the boundary fence in good working order?	☒	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	still work in progress
12.	Are surface water structures free from erosion or scour?	☐	☒	☐	-Epa Brought to attention erosion & RUBBISH.
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	which has now been Rectified
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☒	☐	☐	to be cleaned up
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	But need moving

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☒	☐	☐	
30.	Have any injured fauna been reported to the Site Manager?	☒	☐	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☐	☒	☐	
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	Need New pump for Tanker
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☒	☐	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is correct? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☐	☐	☒	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	checked and removed Daily
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☐	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☒	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	signage repairs needed
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☒	☐	
76.	Has the appropriate incident response been initiated?	☒	☐	☐	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person
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Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist



Work Area / Location: **W MF**
 Inspected by Name(s): **CRAIG WALKER**
 (include all personnel who took part in the inspection) Position(s): **COORDINATOR**
 Signature(s): *[Signature]*

Date and Time: **30/9/22**
2.30pm

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	
5.	Is the boundary fence in good working order?	☒	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	new staff still learning but getting there.
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	extra Bunding carried out.
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	watered Daily.
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☒	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☒	☐	☐	
30.	Have any injured fauna been reported to the Site Manager?	☒	☐	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☐	☒	☐	
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☒	☐	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☒	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	ASAP
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☐	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☐	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
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Incidents and reporting

- | | | | | | |
|-----|--|--------------------------|--------------------------|-------------------------------------|--|
| 75. | Have any incidents occurred or been identified that require NT EPA notification? | ☐ | ☐ | ☒ | |
| 76. | Has the appropriate incident response been initiated? | ☐ | ☐ | ☒ | |

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person
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Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist



Work Area / Location: **W.M.F.**

Date and Time: **31/10/2022**
3.30pm

Inspected by Name(s): **CRAIG WALKER**
(include all personnel who took part in the inspection) Position(s): **CORRECTOR**
Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	
5.	Is the boundary fence in good working order?	☒	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☒	☐	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☒	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☒	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☐	☒	☐	
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☒	☐	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

new pump needed
new TANK ordered
BULK

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☒	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☐	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☐	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☐	☒	
76.	Has the appropriate incident response been initiated?	☐	☐	☒	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person
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Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist



Work Area / Location: **WMF**

Date and Time: **9.00 AM 29/12/22**

Inspected by Name(s): **CRAIG WALKER**
 (include all personnel who took part in the inspection) Position(s): **COORDINATOR**
 Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	(Fine)
5.	Is the boundary fence in good working order?	☒	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☒	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☒	☐	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☐	☒	
30.	Have any injured fauna been reported to the Site Manager?	☐	☐	☒	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☒	☐	☐	lots weeds cant spray to wet
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☒	☐	☐	will be sprayed and Graded after wet
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	Does need spraying for weeds again weather permitting
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☐	☐	☒	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	waiting on contractors
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☒	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☒	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
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Incidents and reporting

- | | | | | | |
|-----|--|-------------------------------------|--------------------------|--------------------------|--|
| 75. | Have any incidents occurred or been identified that require NT EPA notification? | ☒ | ☐ | ☐ | |
| 76. | Has the appropriate incident response been initiated? | ☒ | ☐ | ☐ | |

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person
	mulch fire.	PUT OUT Roll in water down.	8/12/22.	CRAIG WALKER.

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist



Work Area / Location: **WMF**

Inspected by Name(s): **CRAIG WATER**

(include all personnel who took part in the inspection) Position(s): **COORDINATOR**

Signature(s):

Date and Time: **31/1/2023**
1.00pm

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	
5.	Is the boundary fence in good working order?	☒	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☒	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☐	☒	
30.	Have any injured fauna been reported to the Site Manager?	☐	☐	☒	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☒	☐	☐	To wet to do anything yet.
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	need new pump for fire Tanker.
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	To wet to do anything yet.
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☒	☒	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☒	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☒	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☒	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

Does need weed spray, weather dependent.

waiting on contractor.

KWMF Site Inspection Checklist



#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☐	☒	
76.	Has the appropriate incident response been initiated?	☐	☐	☒	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person
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Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist



Work Area / Location:

KWMF

Date and Time:

28.02.2023

Inspected by Name(s):

[Signature]

Norman Stanley

(include all personnel who took part in the inspection)

Position(s):

Municipal officer.

Signature(s):

#	Inspection Items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	
5.	Is the boundary fence in good working order?	☐	☒	☐	<i>partial fence needs upgrade.</i>
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☒	☐	☐	<i>under control ; cleaned up regularly</i>
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist



**ENVIRONMENTAL
CONSULTANTS**

#	Inspection Items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☒	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☒	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☒	☐	☐	Ongoing poisoning work, situation under control
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☐	☒	☐	wet conditions, achieved once the land is dry becomes accessible
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☒	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	get polled out as soon as stuff notice the contamination
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☐	☐	No Odour.
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☐	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☒	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☒	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person
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Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

Work Area / Location: **WMPF**

Date and Time: **9:00am 29/03/2023**

Inspected by Name(s): **Brett Kimpton & Anurkha Shrestha**
(include all personnel who took part in the inspection) Position(s): **Manager / Administration officer**
Signature(s):  

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☒	☐	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☒	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☒	☐	☐	no incidents
5.	Is the boundary fence in good working order?	☐	☒	☐	fence in the green waste falling down
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☐	☒	☐	Need to make a complaint register
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☒	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☒	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☒	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☒	☐	☐	ongoing poisoning around areas
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☐	☒	☐	sign needs to be erected on site
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☐	☒	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☐	☒	☐	
48.	Are tyres stacked in accordance with the CEMP?	☒	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☒	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☐	☒	composting happening at site at the time
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☐	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☐	☒	☐	
65.	All waste oil is contained within the bund?	☒	☐	☐	
66.	Empty oil containers are kept within the wheelie bins?	☒	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☒	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☒	

Issues raised during inspection				
#	Identified Hazard	Actions Required	Due Date	Responsible Person
47.	No signage at the Tyre Dump point	sign to be ordered		Anuksha/ Nirodha
39.	Designated smoking area	sign to be ordered from Macs fire		Brett / Anuksha
	Fire Break - need to cut fire break			Brett / Normy

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

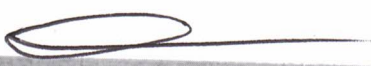
Other Comments/ Notes:

KWMF Site Inspection Checklist



Work Area / Location: **KATHERINE WMF**

Date and Time: **26/4/23**
0800

Inspected by Name(s): **BRETT KIMPTON**
(include all personnel who took part in the inspection) Position(s): **SERVICES MANAGER**
Signature(s): 

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☒	☐	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☒	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☒	☐	☐	
4.	Have all incidents been reported?	☐	☐	☒	
5.	Is the boundary fence in good working order?	☒	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☒	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed?	☒	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☒	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☒	☐	☐	
10.	Are all surface water courses unobstructed?	☒	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☒	☐	☐	
12.	Are surface water structures free from erosion or scour?	☒	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☒	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☒	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☒	☐	☐	
16.	Are activities in the area creating minimal dust?	☒	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☒	☐	☐	DAILY
18.	Are speed limits being enforced at site to reduce dust?	☒	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☒	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☒	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☒	☒	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☒	☐	☐	
24.	Is bunding in good condition?	☒	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☒	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☒	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☒	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☐	☐	☒	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☒	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☐	☒	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☒	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☒	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☐	☒	☐	
34.	Are pests and weeds being managed/controlled on site?	☒	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☒	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☒	☐	☐	
37.	Are appropriate hot works procedures being followed?	☒	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☒	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☒	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☒	☐	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☒	☐	☐	
42.	All containers are contained?	☒	☐	☐	
43.	All containers are empty?	☒	☐	☐	
44.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☒	☐	☐	
46.	All waste is contained?	☒	☐	☐	
47.	Signage is erected? Not faded?	☒	☒	☐	
48.	Are tyres stacked in accordance with the CEMP?	☒	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☒	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☒	☐	☐	
51.	All waste is contained?	☒	☐	☐	
52.	Signage is erected? Not faded?	☒	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☒	☐	☐	
54.	Is all green waste contained within the area?	☒	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☒	☐	
56.	Signage is erected? Not faded?	☒	☐	☐	
57.	Does the green waste require shredding/composting?	☐	☒	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☒	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☒	☐	☐	
60.	All waste is contained?	☒	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☒	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☒	☐	☐	
63.	Signage is erected? Not faded?	☒	☐	☐	
64.	No cross contamination of wastes?	☒	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☒	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☒	
Landfill cells					
67.	Is cover material being placed as required?	☒	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☒	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☒	☐	
70.	Signage is erected? Not faded?	☒	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☒	☐	☐	
72.	All asbestos covered as per Regulations?	☒	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☒	☐	☐	
74.	Signage is erected? Not faded?	☒	☐	☐	

KWMF Site Inspection Checklist



#	Inspection Items	Yes	No	N/A	Comments
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Incidents and reporting

75. Have any incidents occurred or been identified that require NT EPA notification? ☐ Yes ☒ No ☐ N/A
76. Has the appropriate incident response been initiated? ☐ Yes ☐ No ☒ N/A

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person
	TYRE SIGNAGE NEEDED	NEW SIGN	15/6/23	BRETT IL.

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:



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