REPORT TO NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

Channel Island Power Station WDL212-02 Annual Monitoring Report

Issued: 28 June 2022

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ISO 9001| ISO 14001| AS/NZS 4801

Document Control Form

TW Report:	Channel Island Power Station WDL212-02 Annual Monitoring Report – Issued 28 June 2022
Revision Number:	Version 1

Revision History

Revision Number	Date	Prepared By	Reviewed By	Approved By
Version 1 Draft	25-Mar-2022	Dr Sandya Nanayakkara	Lillian Furlonger	
Version 1 Final	28-Jun-2022	Lillian Furlonger	Daniel Lane	Daniel Lane

Issue Register

Distribution List	Date Issued	Number of Copies Sent
Territory Generation - jeannie.mcinnes@territorygeneration.com.au	28 June 2022	1

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EXECUTIVE SUMMARY

In accordance with Waste Discharge Licence WDL212-02 Licence Conditions 37 and 38, this Monitoring Report is prepared by Trop Water Pty Ltd on behalf of Territory Generation (TGen) for the period June 2021 – May 2022. Details relating to the water and sediment monitoring program, including interpretation of results from in-situ and laboratory analysis of physical, chemical and biological parameters, are provided.

Monitoring results for the receiving environment (Darwin Harbour) are summarised as follows:

- The total wastewater discharge volume from the Cooling Tower and the Cooling Ponds was 52.16 ML for the reporting period. Total discharge recorded at ADP1 was 43.21 ML.
- pH, Total Nitrogen (TN) and *E. coli* concentrations were within the specified trigger values at NODH3, NODH4, SODH3 and SODH4 during the reporting period (See Section 3.1.2, 3.1.3 and 3.1.5).
- Metals and hydrocarbon concentrations in sediment at sites NODH2 and SODH2 were below the ANZECC/ARMCANZ Interim Sediment Quality Guideline values (ISQG, 2000) and the trigger values defined in WDL-212-02 (WDL212-02, 2020).
- Exceedances of trigger values specified in WDL212-02 for Dissolved Oxygen (22 Feb 2022), Total Suspended Solids (13 Jan and 20 Apr 2022), Nitrite plus Nitrate (28 Oct 2021, 13 Jan, 22 Feb and 20 Apr 2022) and Total Phosphorus (13 Jan 2022) were recorded during the reporting period.
- Of the above-mentioned exceedances, non-compliances were identified on three occasions (13 Jan 2022, 22 Feb 2022 and 20 April 2022) with notification to NTEPA on 03 Feb 2022, 09 Mar 2022 and 9 May 2022, respectively. Incident Investigation Reports relating to the above non-compliances were issued on 08 Feb 2022, 15 Mar 2022 and 17 Jun 2022, respectively (See Appendix B, C and D).
- Under WDL212-02 Licence Condition 35.1, notification of non-compliance was issued for the following exceedances (an exceedance of a trigger value on three consecutive sampling occasions) relating to Nitrogen Oxides (NOx; WDL212-02 Trigger Value for NOx is 20 ug/L):
  - NODH4 on 22 Feb 2022; [NOx] = 24 ug/L
  - NODH4 on 20 Apr 2022; [NOx] = 21 ug/L
- Under WDL212-02 Licence Condition 35.2, notification of non-compliance was issued for the following exceedances (an exceedance of three times or more a trigger value) relating to Total Suspended Solids (TSS; WDL212-02 Trigger Value for TSS is 20 ug/L):
  - NODH3 on 13 Jan 2022; [TSS] = 102 mg/L
  - NODH4 on 13 Jan 2022; [TSS] = 94 mg/L
  - SODH3 on 20 Apr 2022; [TSS] = 50 mg/L
  - SODH4 on 20 Apr 2022; [TSS] = 32 mg/L
- Under WDL212-02 Licence Condition 35.2, notification of non-compliance was issued for the following exceedance (an exceedance of three times or more a trigger value) relating to Total Phosphorus (TP; WDL212-02 Trigger Value for TP is 0.030 mg/L):
  - NODH3 on 13 Jan 2022; [TP] = 0.094 mg/L
- Possible causes for these exceedances and non-compliances are:
  - Stormwater/runoff from Channel Island, Blackmore River and Elizabeth River catchments.
  - Sediment resuspension due to weather conditions (tidal movement and wind-induced mixing e.g. waves) at the time of sampling.
  - Discharge from Darwin Aquaculture Centre (discharge information is unknown).
  - CIPS discharge from ADP1.

Based on the monitoring results for the reporting period, it is unlikely that wastewater discharged from CIPS has negatively impacted the Darwin Harbour receiving environment. Trop Water (on behalf of TGen) will continue to monitor water and sediment quality in the receiving environment in accordance with WDL212-02.

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1 INTRODUCTION

Channel Island Power Station (CIPS) is the largest power station in the Northern Territory, Australia. Since its commissioning in 1986, CIPS is the main source of electricity for the Darwin-Katherine Interconnected system. CIPS currently has 310MW of installed capacity and is operated by Territory Generation (TGen), a corporation owned by the Northern Territory Government.

Wastewater from the CIPS facility is discharged into Darwin Harbour through designated discharge points. The CIPS facility has two discharge outlets to Darwin Harbour (Figure 1). These two outlets receive effluent from different sources as indicated in Figure 2 (Cooling Tower, Cooling Ponds and stormwater). The CIPS facility also incorporates a sewage treatment plant which is licenced and managed under the NT Department of Health *Wastewater Work Design Approval,* (WWDA, 2016).

The Northern Territory Environmental Protection Authority (NTEPA) granted CIPS the first Waste Discharge Licence (WDL 212), for the period November 2015 to November 2017. From June 2018 – June 2020, discharge was managed under WDL 212-01. Wastewater discharged from the CIPS facility to Darwin Harbour is currently managed under the renewed Waste Discharge Licence WDL212-02 issued 18 June 2020. This licence is valid until 18 June 2022. The current licence, WDL212-02 codifies operational practice for the management of waste discharges from the CIPS facility.

WDL212-02 requires the monitoring of water and sediment at designated sampling points. From December 2015 to March 2016, monitoring for WDL 212 was undertaken by National Aluminate Corporation (NALCO) and ECOLAB. Trop Water Pty Ltd (TW, formerly Tropical Water Solutions Pty Ltd) was contracted by TGen in April 2016 to undertake the required monitoring program and to manage the waste discharge licence activities.

This report is prepared by TW on behalf of TGen as a part of WDL212-02 licence renewal requirements. It provides details of the water, wastewater and sediment monitoring program and provides interpretation of *in-situ* and laboratory analysis results for physical, chemical and biological parameters. The reporting period for this report is from June 2021 to May 2022. Monitoring data from April 2016 are presented in graph and table format in Appendix A.

Figure 1: CIPS discharge outlets.

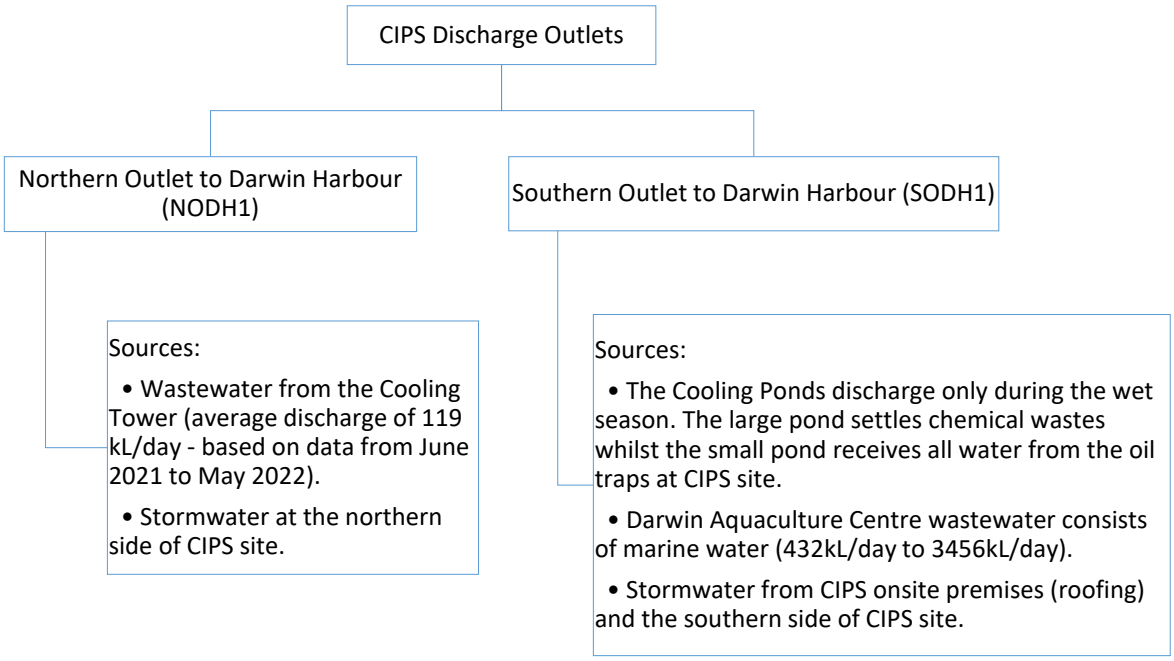


Figure 2: Stormwater and wastewater sources at CIPS Discharge Outlets.

Wastewater discharge from Channel Island Power Station

Channel Island Power Station (CIPS) has two wastewater discharge points (Figure 3); the Cooling Tower discharge (ADP1), and the Cooling Ponds discharge (ADP2).

The Cooling Tower Discharge Point (ADP1) receives wastewater from the Cooling Tower. This wastewater subsequently flows through a drainage line which feeds into the Northern Stormwater Drainage, and out to Darwin Harbour. The Northern Outlet to Darwin Harbour monitoring point (NODH1) is located at the Northern Stormwater Drainage end of pipe.

The Cooling Ponds Discharge Point (ADP2) receives wastewater from two cooling ponds. This wastewater flows into a drainage line that feeds into the Southern Stormwater Drainage and out to Darwin Harbour. The Southern Outlet to Darwin Harbour (SODH1) monitoring point is located at the Southern Stormwater Drainage end of pipe.

As shown in Figure 3, the cooling ponds receive water from the Neutralization Basin and from the Oil and Water Separator plant.

In addition to water from ADP2, SODH1 receives stormwater from the CIPS onsite premises (roofing) and the southern side of the CIPS site.

Discharge from the Cooling Tower mixes with stormwater during rain events drains within the Northern Stormwater Drainage, passing through rocks and mangroves before entering Darwin Harbour.

Mangrove population density around both the Southern and Northern Stormwater Drains is relatively low and the distance of the receiving water body from both stormwater drains is no more than 30 metres.

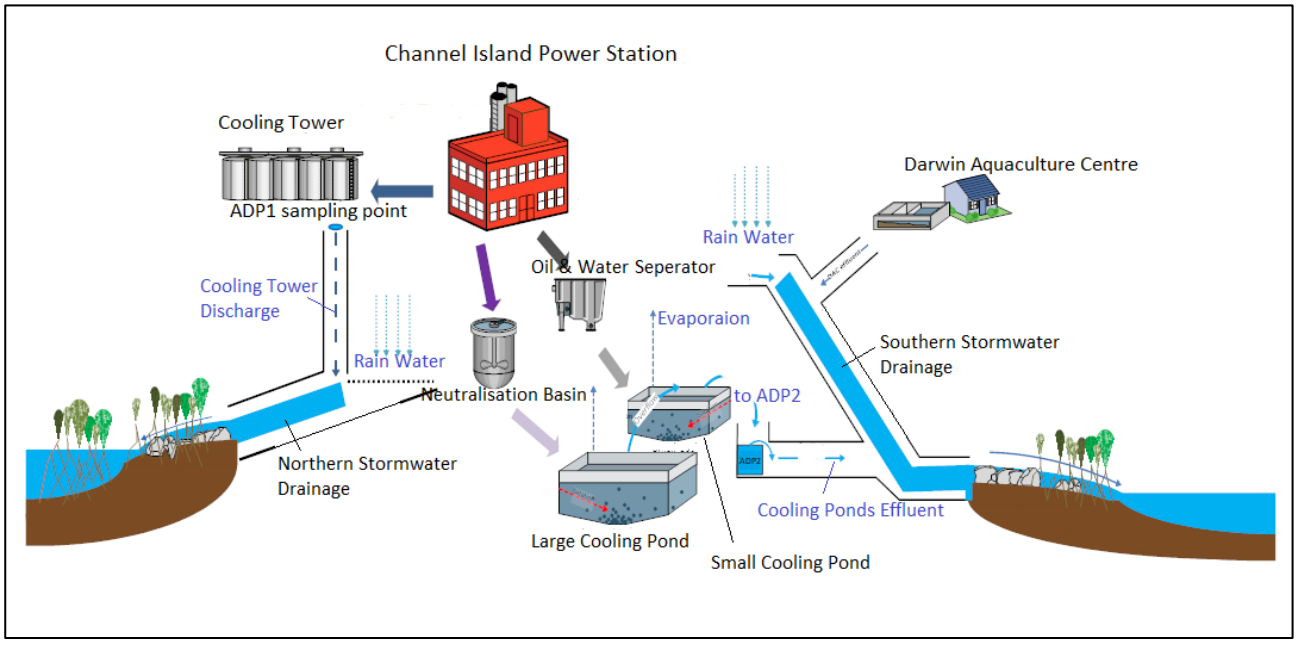


Figure 3: Channel Island Power Station wastewater discharge facility.

2 METHODS

CIPS Monitoring sites under WDL212-02

2.1.1 Water and wastewater monitoring sites

Wastewater discharge monitoring was undertaken at seven (7) sites from April 2016 to May 2018 under WDL 212. Four marine water sites located in Darwin Harbour were added to the monitoring program from July 2018 under WDL 212-01. These four additional marine sites continue to be monitored under WDL212-02. All site codes, site descriptions and site coordinates defined in WDL212-02 are shown in Table 1. Figure 4 shows the relative location of all monitoring sites. Signage identifying each land-based sampling site are shown in Figure 5.

Table 1: Water and Wastewater Monitoring Sites

Site Code	Description	Coordinates (degrees)
SODH1	Southern Outlet to Darwin Harbour (Drain prior to mixing in receiving environment)	Lat: -12.560474 Long: 130.862878
NODH1	Northern Outlet to Darwin Harbour (Drain prior to mixing in receiving environment)	Lat: -12.554271 Long: 130.863497
ADP1	Cooling Tower Wastewater Discharge (Representative of discharge from cooling tower to drainage system that flows to NODH1)	Lat: -12.554760 Long: 130.864906
ILCP	Large Cooling Pond Influent	Lat: -12.555856 Long: 130.86405
ISCP	Small Cooling Pond Influent	Lat: -12.556194 Long: 130.863885
ADP2	Cooling Ponds Wastewater Discharge (Representative of discharge from cooling ponds to drainage system that flows to SODH1)	Lat: -12.556570 Long: 130.863595
SODH3	Southern Discharge Point Mixing Zone (marine)	Lat: --12.560221 Long: 130.863668
SODH4	Southern Receiving Environment Monitoring Point (marine)	Lat: -12.560540 Long: 130.864483
NODH3	Northern Discharge Point Mixing Zone (marine)	Lat: -12.555015 Long: 130.862802
NODH4	Northern Receiving Environment Monitoring Point (marine)	Lat: -12.555441 Long: 130.861803

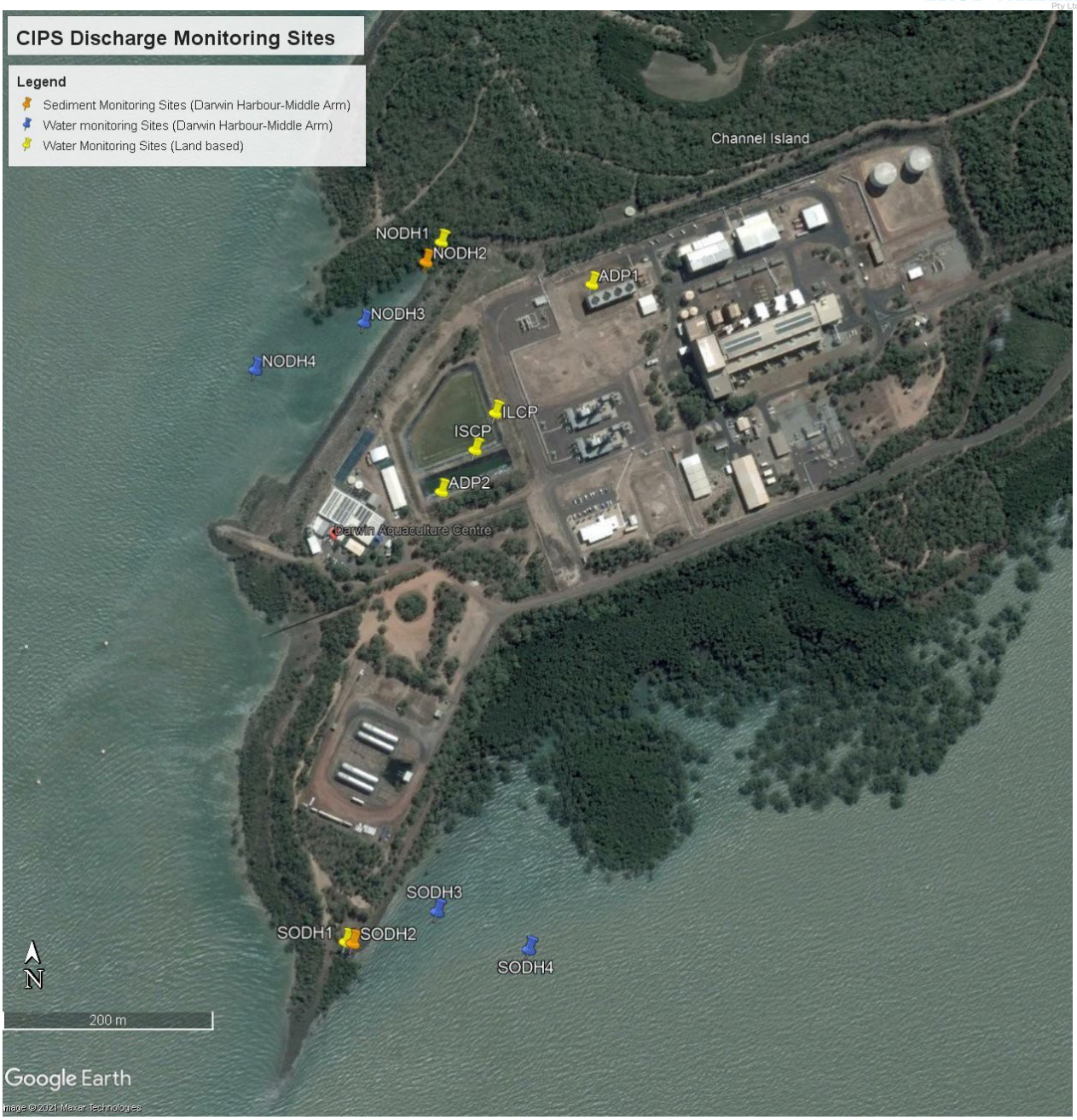


Figure 4: CIPS water and sediment monitoring sites.

Figure 5: Monitoring signs at land-based sites.

2.1.2 Sediment Monitoring sites

Sediment samples in the receiving environment were collected within the area of potential impact in Darwin Harbour (i.e., in the vicinity of sites NODH1 and SODH1) (See Figure 4). The monitored sites are as follows:

- NODH2 - outfall from NODH1 (Lat: -12.554453˚ and Long: 130.863358˚)
- SODH2 - outfall from SODH1 (Lat: -12.6560485˚ and Long: 130.862941˚)

Monitoring frequencies and parameters

2.1.3 Water and wastewater monitoring frequencies and parameters

Table 2 shows the water and wastewater monitoring frequencies and parameters analysed under the WDL212-02 monitoring program.

Table 2: Water and wastewater monitoring frequencies and parameters analysed.

Sites	Monitoring frequency	Parameters
SODH1 NODH1 ADP1 ADP2	Monthly	• Total and Filtered Metals (Aluminium, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Tin, Zinc) • Nutrients (Filterable Reactive Phosphorous, Total Phosphorous, Total Nitrogen, Nitrogen Oxides (NOx), Ammonia NH_3-N • *E. coli* • Physical parameters (pH, Turbidity, Biological Oxygen Demand, Total Suspended Solids, Electrical Conductivity) • In-situ (Free Chlorine, Temperature, Dissolved Oxygen % Saturation)
ILCP ISCP SODH3 SODH4 NODH3 NODH4	Quarterly	

2.1.4 Sediment monitoring frequencies and parameters

Sediment monitoring was undertaken on a quarterly basis at sites NODH2 and SODH2. Samples were analysed for metals (Aluminium, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Tin,

Zinc) and hydrocarbons (Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, Benzene, Ethylbenzene, Xylenes and Toluene).

Sampling procedure

As per Waste Discharge Licence WDL212-02, TW undertook sampling and monitoring in accordance with the *Australian Guidelines for Water Quality Monitoring and Reporting* (AS/NZS 5667; ANZECC/ARMCANZ, 2000).

2.1.5 In-situ measurements

In-situ measurement of Temperature, Electrical Conductivity (EC), Dissolved Oxygen, pH and Salinity at the discharge outlets, two cooling ponds, discharge mixing zones and receiving environment monitoring points, was achieved using a Hydrolab Quanta multiparameter submersible probe. A Hach 2100Q Turbidimeter was used for Turbidity measurements. Samples were collected from the water flow coming out of the designated sampling points in order to obtain the *in-situ* measurements. Field instruments are calibrated prior to each sampling event and post-field checks are undertaken after each sampling event to ensure the instruments' continued operation within the manufacturer's specifications. All calibration records are available upon request.

2.1.6 Sampling for nutrient and metal analysis

Monthly wastewater samples for nutrient and metals analysis from ADP1 and ADP2 sample points were obtained from the outflow through the installed v-notches, while samples from SODH1 and NODH1 were collected from the outflow of the drainage pipes. Samples at Darwin Harbour sites were obtained 0.2 m below the water surface using a peristaltic pump.

SODH1 intermittently had significant saltwater influence from the Darwin Aquaculture Centre and/or tidal influence of water pooling at the SODH1 sampling site. Hence, EC or Salinity of the water had to be determined prior to sample collection. This ensured that the appropriate method of analysis (marine or freshwater analysis) was undertaken by the receiving laboratory.

All collected samples were delivered to Australian Laboratory Services (ALS) Woolner – Environmental located in Darwin. ALS Woolner – Environmental arrange overnight transport of the samples to ALS Sydney – Environmental (NATA Accredited) for analysis.

2.1.7 Sampling for microbiological analysis

Microbiological samples from all sites for monthly and quarterly sampling were collected using a sample pole and manual scooping from flowing drainage pipes. Water samples from the Darwin Harbour sites were collected using a peristaltic pump. All microbiological samples were delivered to the NATA-accredited 'Water Microbiology Laboratory' at Berrimah within 3 hours of sampling.

Monthly and quarterly sampling also included obtaining samples for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) with analysis performed by ALS.

Figure 6 and Figure 7 show sampling at sites in compliance with CIPS WDL212-02.

Figure 6: Sample collection at Influent Large Cooling Pond (ILCP).

Figure 7: Cooling Tower Discharge Collection Point (ADP1).

2.1.8 Sediment sampling

Samples were obtained using a stainless-steel grab sampler that can obtain approximately 700 g of sample and dig up to 15 cm of depth into the sediment. Samples obtained in one successful collection were mixed until the sample was homogenised. Samples were stored in 250 mL glass jars provided by ALS.

Samples obtained were delivered to Australian Laboratory Services (ALS) Woolner – Environmental located in Darwin on the same day of collection. Analysis for hydrocarbons and metals is undertaken by ALS Sydney – Environmental (NATA Accredited).

3 RESULTS

Wastewater Discharge Monitoring Results

A detailed discussion on results obtained during the current reporting period (June 2021 to May 2022) is included in this section. Monitoring results obtained since April 2016 are also presented.

Monitoring results were compared with the trigger values noted in *Water Quality Objectives for Darwin Harbour Region* (WQODH, 2010), WDL212-02 (WDL212-02, 2020) or ANZECC (2000), where available. The trigger values specified in WQODH (2010) are intended to support the maintenance and protection of the ecological condition of the marine and estuarine system of the Darwin Harbour region. Identifying exceedances of trigger values in the monitoring results is required to assess the influence of CIPS discharges on water and sediment quality, if any.

Where monitoring results were less than the laboratory Limit of Reporting, results were replaced with a value equal to the LOR for graphing and statistical calculations. There was no data at some sites due to no discharge occurring at the time of monitoring. Of the twelve sampling events undertaken during this reporting period, no discharge was reported for ADP2 on six occasions. Further, no flow (or minor flow) at ADP2 resulted in no discharge at SODH1. The lack of flow from the Cooling Ponds can be attributed to ponds' capacity to receive discharge from the plant without overflow, especially during the dry season.

3.1.1 Results of in-situ parameters

Temperature

Figure 8 and Figure 9 show the results of Temperature measured at discharge sites and mixing zone/receiving environment (Darwin Harbour), respectively. During the reporting period, Temperature was within the range of 20.0 – 34.1 ˚C at the drains (SODH1 and NODH1) prior to mixing in Darwin Harbour (Figure 8). Temperature at ADP1 (Cooling Tower) ranged from 17.2 – 32.6 ˚C, with an average Temperature of 24.5 ˚C during the reporting period.

As shown in Figure 9, Temperature at all Darwin Harbour sites varied between 25.9 and 31.5 ˚C for during the reporting period. All data, including results for the Cooling Ponds (ILCP and ISCP) are tabled in Appendix A (Table A1).

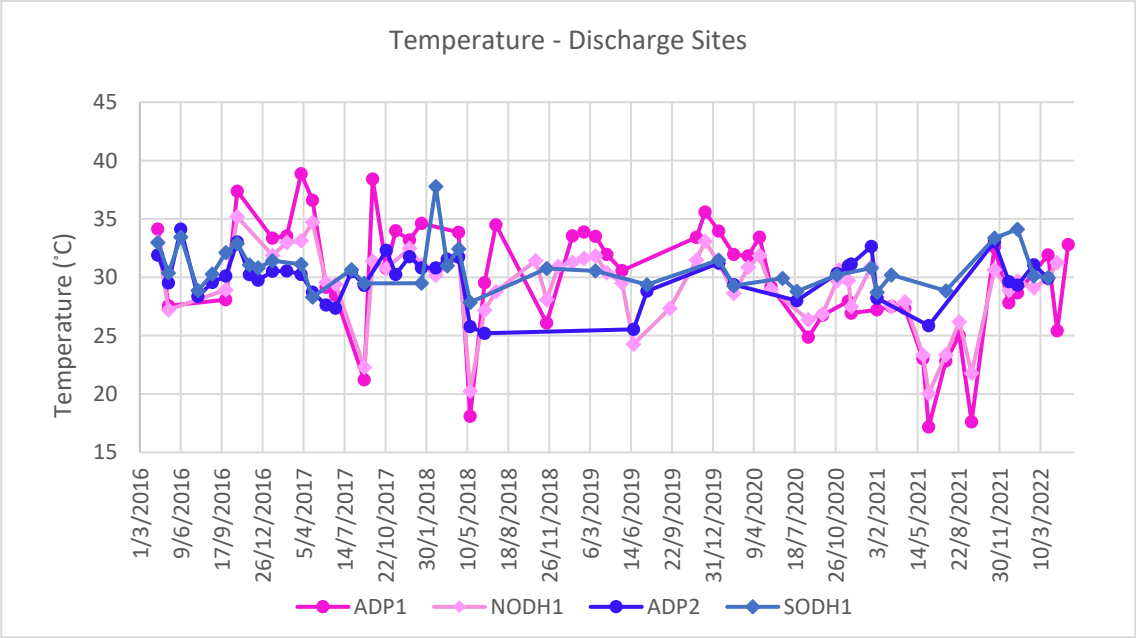


Figure 8: Temperature (°C) at discharge sites from April 2016 to May 2022 (Monthly monitoring).

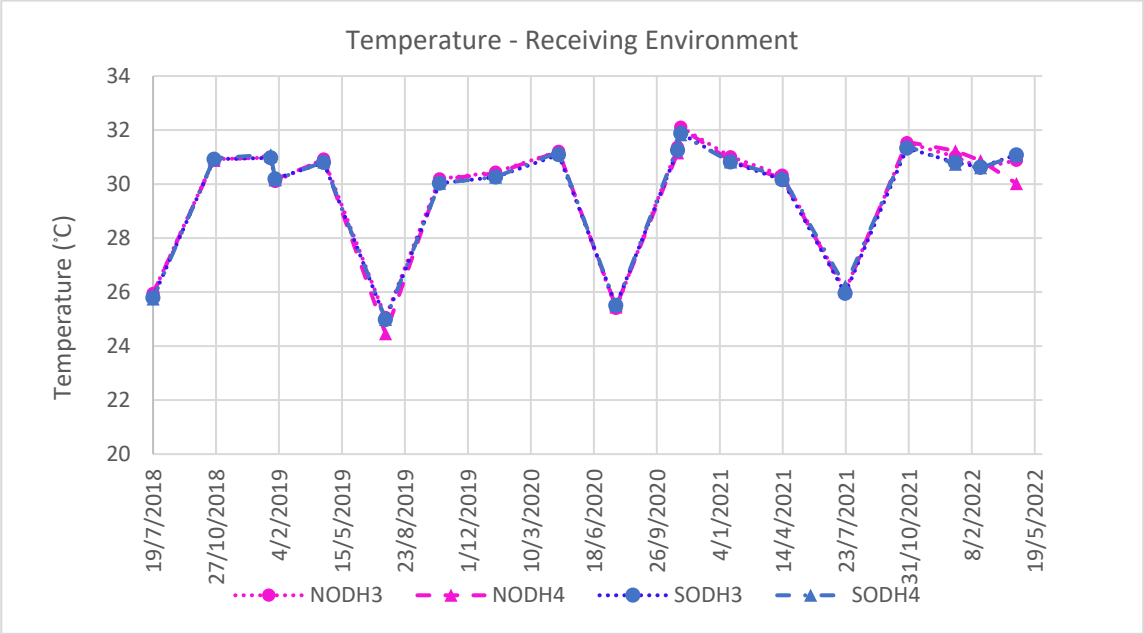


Figure 9: Temperature (°C) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

Dissolved Oxygen

Figure 10 and Figure 11 shows Dissolved Oxygen % Saturation (DO % Sat) at discharge sites and Darwin Harbour monitoring sites (mixing zone/receiving environment). DO % Sat varied from 57.0 % to 115.1 % at discharge sites from June 2021 to May 2022.

With the exception of SODH4 on 22 February 2022, quarterly monitoring results for Darwin Harbour sites show that DO % Sat at all the sites were within the trigger value of >80 % specified in WDL212-02 (Figure 11).

On 22 February 2022, DO % Sat at SODH4 was 76.3 %. DO % Sat at discharge point (ADP2) and discharge outlet (SODH1) were 71.8 % and 63.3 %, respectively.

Hence, DO level at discharge sites were also outside the trigger value. DO is a highly variable parameter. On the day of sampling, 17.0 mm of rainfall at 0900 hrs (BoM station ID: 014260, East Arm) was recorded. Total of 43.2 mm of rainfall was recorded during the week prior to sampling. Wash-off of Oxygen demanding materials could be a contributing factor for slightly lower DO % Sat at SODH4. Table A2, Appendix A shows the DO % Sat data and box and whisker plots at all the CIPS monitoring sites.

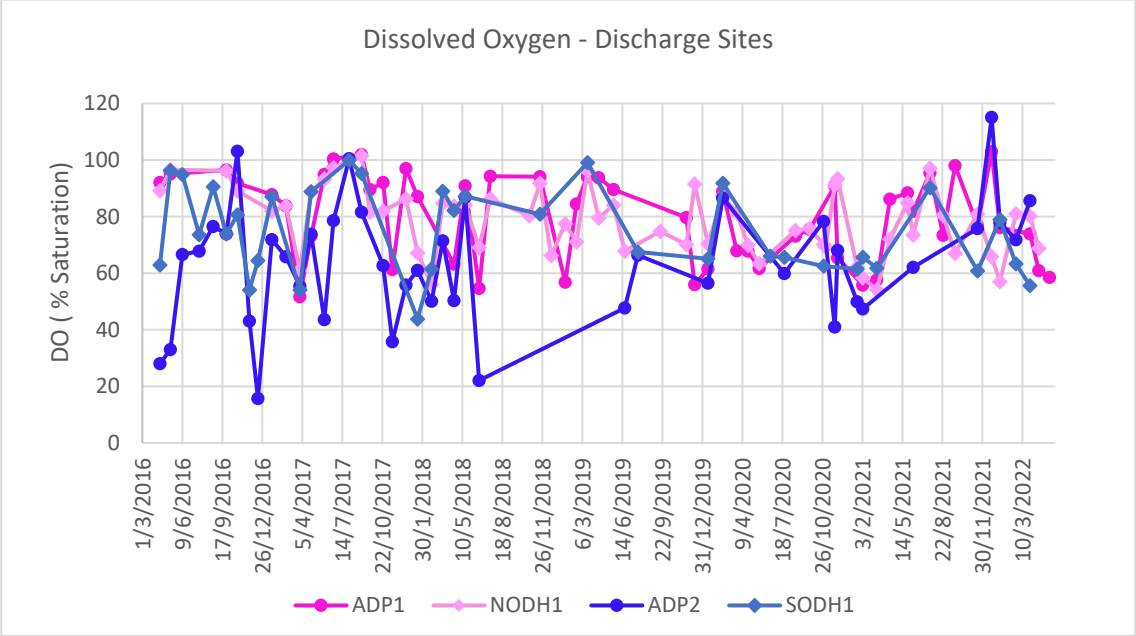


Figure 10: Dissolved Oxygen (% Saturation) at discharge sites from April 2016 to May 2022 (Monthly monitoring).

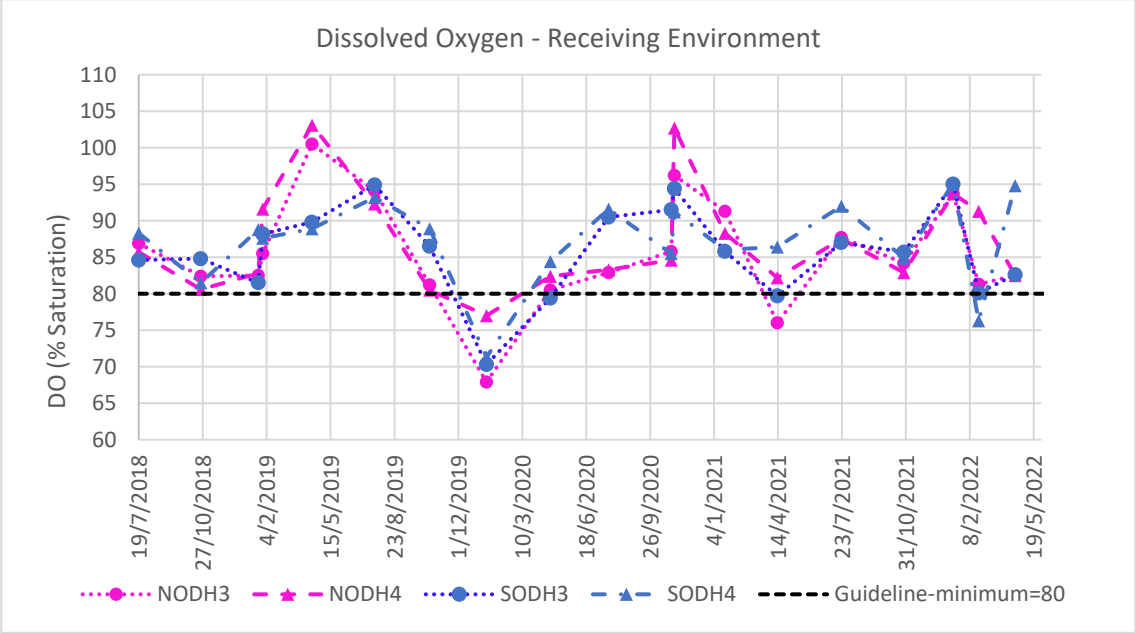


Figure 11: Dissolved Oxygen (% Saturation) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

Free Chlorine

Figure 12 and Figure 13 show Free Chlorine concentration at discharge sites and Darwin Harbour monitoring sites, respectively. There was no, to minimal, Free Chlorine at Darwin Harbour sites (0.00 – 0.07 mg/L for the

current reporting period). Free Chlorine range at ADP1 was 0.63 – 6.70 mg/L during the reporting period. The Cooling Tower water is dosed with Sodium Hypochlorite to disinfect the water and reduce biofilm formation; hence the Free Chlorine concentration is generally higher at ADP1 compared to other sites. Free Chlorine range at NODH1 (downstream of site ADP1), was 0.00 – 3.20 mg/L (See Appendix A3 for monitoring data and box and whisker plots showing data variability at all sites).

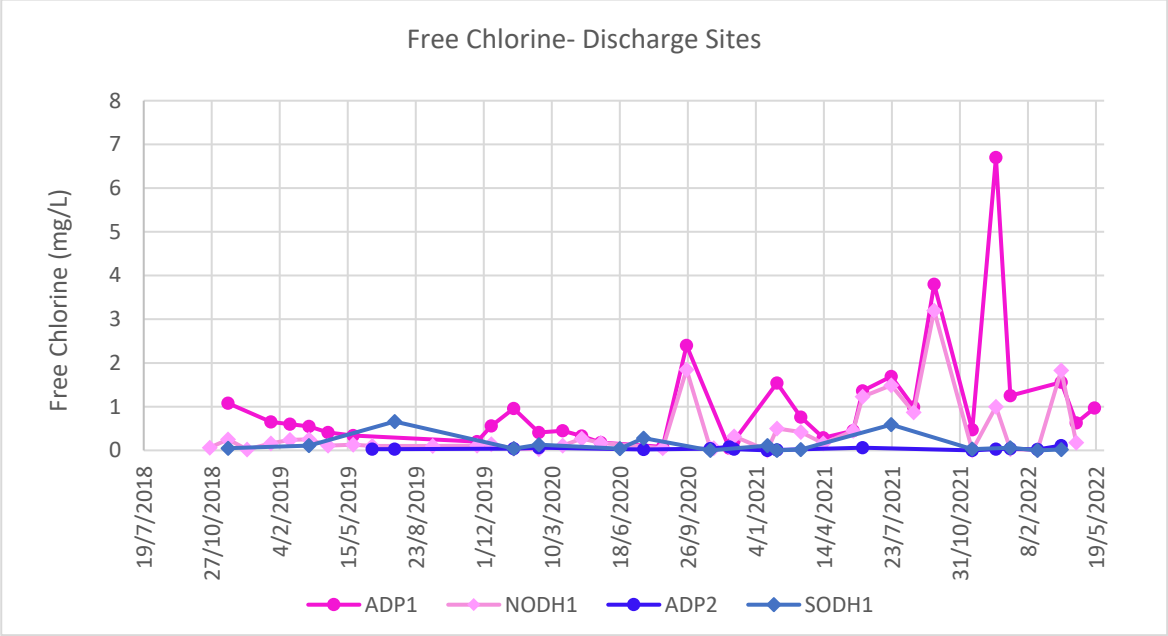


Figure 12: Free Chlorine (mg/L) at discharge sites from July 2018 to May 2022 (Monthly monitoring).

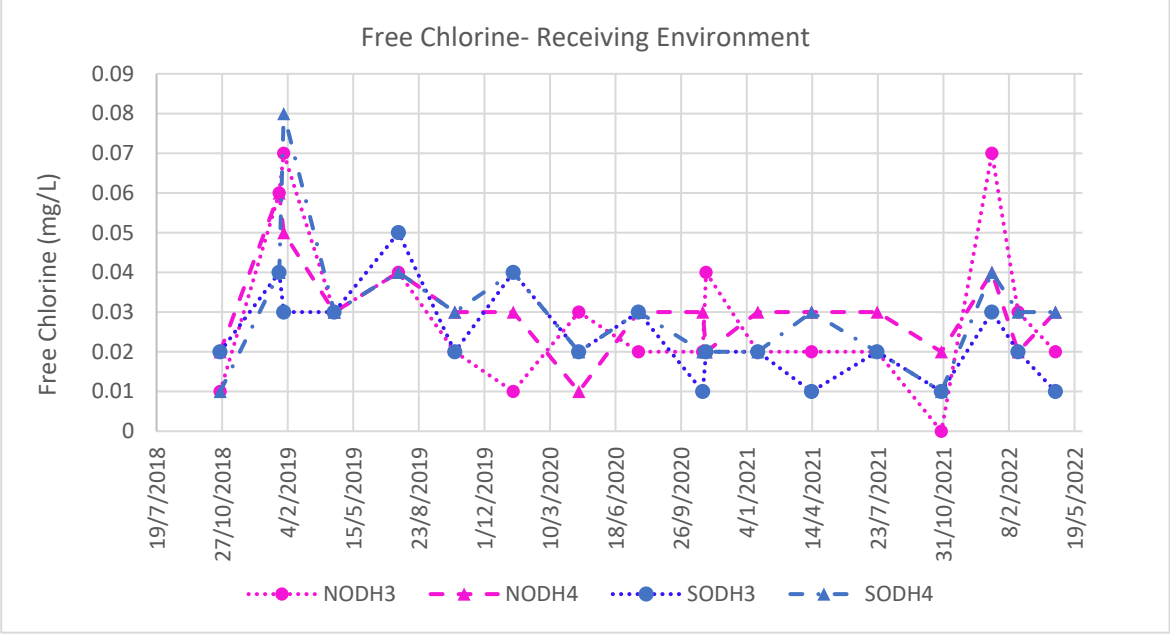


Figure 13: Free Chlorine (mg/L) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

3.1.2 Results of other physical parameters

pH and Total Suspended Solids (TSS) at Darwin Harbour sites for the sampling events from July 2018 to May 2022 are shown in Figure 14 and Figure 15, respectively. The results were compared with the trigger values specified in WDL212-02 (WDL212-02, 2020).

pH at discharge sites (ADP1 and ADP2) varied between 7.37 – 9.43 pH units (Figure A1, Appendix A) during the reporting period. At the southern and northern mixing zones and further downstream sites, pH ranged between 7.37 and 8.01 pH units, (Figure 14).

TSS at site NODH3 and NODH4 on 13 January 2022 were 102 and 94 mg/L, respectively (Figure 15) and was three times above the trigger value of 10 mg/L (WQODH, 2010; WDL212-02). According to Condition 35.2, an exceedance of three times or more the trigger value, is a non-compliance and requires notification to the NTEPA. The NTEPA was notified of the TSS exceedance at NODH3 and NODH4 via email on 03 February 2022 and the Incident Investigation Report was submitted on 08 February 2022 (See Appendix B for a copy of the report). The Incident Investigation Report identified that stormwater runoff from the broader Channel Island catchment, tidal movement and wind-induced mixing of the water column on the day of sampling were likely contributors to this non-compliance. On this day, TSS at ADP1 and NODH1 was <5 mg/L indicating that CIPS discharge was not a contributing factor to the elevated TSS at NODH3. Long term results also show that TSS peaks were recorded during wet season, reinforcing the influence of stormwater runoff on TSS at Darwin Harbour monitoring sites.

Following the non-compliances recorded in January 2022, quarterly sampling was undertaken on 22 February 2022 to verify the results and determine appropriate corrective actions. Results showed that TSS exceedances/non-compliances recorded at NODH3 and NODH4 on the 13 January 2022 sampling event have not continued, thus confirming the influence of weather conditions.

On 20 April 2022, TSS Trigger Value was again exceeded at SODH3 (50 mg/L) and SODH4 (32 mg/L). As these exceedances were of three times or more the trigger value, notification of the non-compliances was issued to the NTEPA. The Incident Investigation Report (see Appendix D) showed elevated Total Suspended Solids in the upper estuary of Darwin Harbour was likely driven by large tidal movements and wind induced mixing, in conjunction with inflows containing high organic loads from catchment runoff.

Figure A1, Table A4 and Table A5 in Appendix A provides results of TSS, Electrical Conductivity (EC) and Turbidity at all monitoring sites, respectively. Biological Oxygen Demand (BOD) at all sites were in the range of 2 – 19 mg/L. The highest recorded BOD of 19 mg/L was recorded at ADP2 on 10 June 2021.

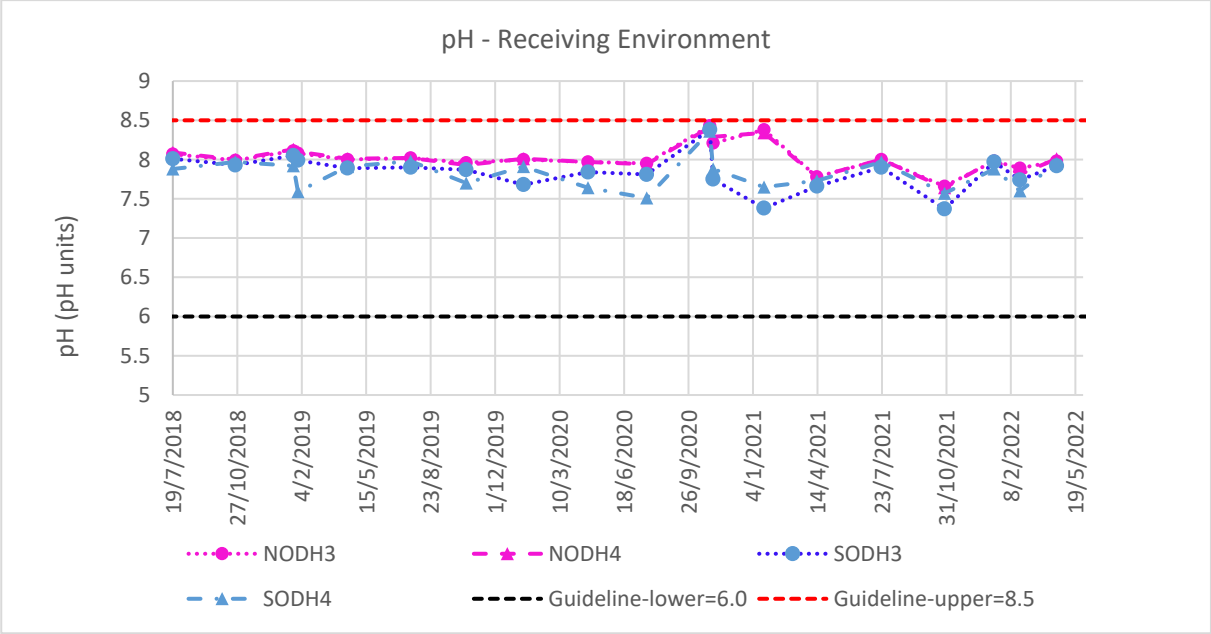


Figure 14: pH (pH units) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

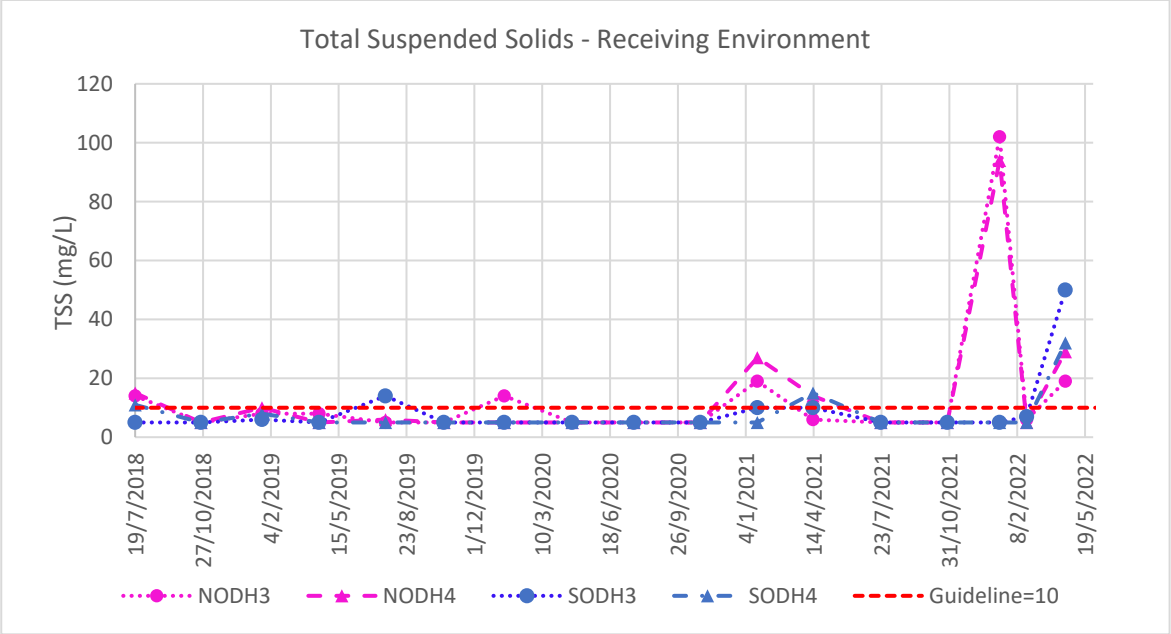


Figure 15: Total Suspended Solids (TSS, mg/L) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

3.1.3 Results of nutrient analysis

Figure 16 to Figure 19 show concentrations of Filterable Reactive Phosphorous (FRP), Total Phosphorous (TP) Nitrite plus Nitrate (NOx) and Total Nitrogen (TN) at sites in the mixing zone/receiving environment (NODH3, NODH4, SODH3 and SODH4). The concentrations were compared with triggers values specified in WDL212-02. NOx, TN and TP results for the discharge sites are shown in Figure A3, A4 and A5 in Appendix A8, respectively.

FRP concentration at all four Darwin Harbour monitoring sites were <0.000 mg/L - 0.004 mg/L (Figure 16) during the reporting period. All the values are below the WDL212-02 (2020) specified trigger value of 0.010 mg/L.

The trigger value of 0.030 mg/L for TP was exceeded on 13 January 2022 at NODH3 and NODH4 (Figure 17). On 13 January 2022, TP concentration at NODH3 and NODH4 were 0.094 mg/L and 0.058 mg/L, respectively. TP concentration at NODH3 was three times higher than the trigger value and hence it was a non-compliance. The NTEPA was notified of the TP non-compliance at NODH3 via email on 03 February 2022 and the Incident Investigation Report was submitted on 08 February 2022 (See Appendix B for a copy of the report).

Exceedances of NOx concentrations were recorded during the reporting period at Darwin Harbour monitoring sites on four occasions at different sites (WDL212-02 trigger value for NOx is 0.02 mg/L). The exceedances occurred at:

- SODH3 (0.022 mg/L), SODH4 (0.023 mg/L) and NODH4 (0.022 mg/L) on 28 October 2021.
- NODH3 (0.021 mg/L) and NODH4 (0.022 mg/L) on 13 January 2022.
- SODH3 (0.026 mg/L), SODH4 (0.026 mg/L), NODH3 (0.024 mg/L) and NODH4 (0.024 mg/L) on 22 February 2022.
- NODH4 (0.021 mg/L), SODH3 (0.022 mg/L) and SODH4 (0.024 mg/L) on 20 April 2022.

Of the NOx exceedances listed above, only the exceedances recorded for NODH4 constituted non-compliance incidents under Condition 35.1 of WDL212-02 (exceedance on three consecutive occasions). This was reported to the NTEPA on 09 March and 09 May 2022 via email, and Incident Investigation Reports were submitted on 15 March and 17 June 2022 (See Appendix C and D for a copy of the reports).

The non-compliances described above were reported to the NTEPA on 03 February 2022 (TSS, TP), 09 March 2022 (NOx), and 09 May (TSS, NOx). Three separate Incident Investigation Reports were submitted on 08 February 2022, 15 March 2022 and 17 June (See Appendix B, C and D). As discussed in Section 3.12 and further in the respective Incident Investigation Reports, these exceedances can be attributed to multiple factors/sources.

- Stormwater/runoff from Channel Island, Blackmore River and Elizabeth River catchments.
- Sediment resuspension due to weather conditions (tidal movement and wind-induced mixing) at the time of sampling.
- Discharge from Darwin Aquaculture Centre (discharge information is unknown).
- CIPS discharge from ADP1.

The influence of wet seasonal weather conditions on water quality at the Darwin Harbour monitoring sites are further confirmed by the long-term data shown in this section (Figure 16 to Figure 19) as peak concentrations are mostly recorded during the November – April period.

TN concentration at all four sites (Darwin Harbour sites) varied between <0.05 and 0.278 mg/L and are less than the trigger value of 0.300 mg/L (WDL212-02, 2020).

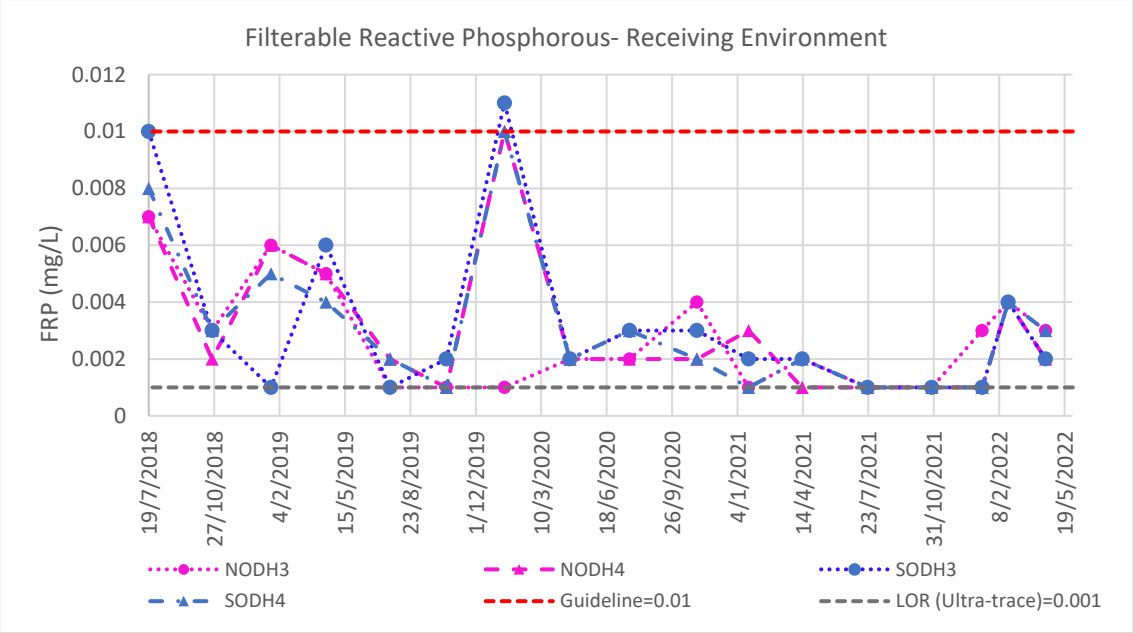


Figure 16 Filterable Reactive Phosphorous concentration (FRP, mg/L) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

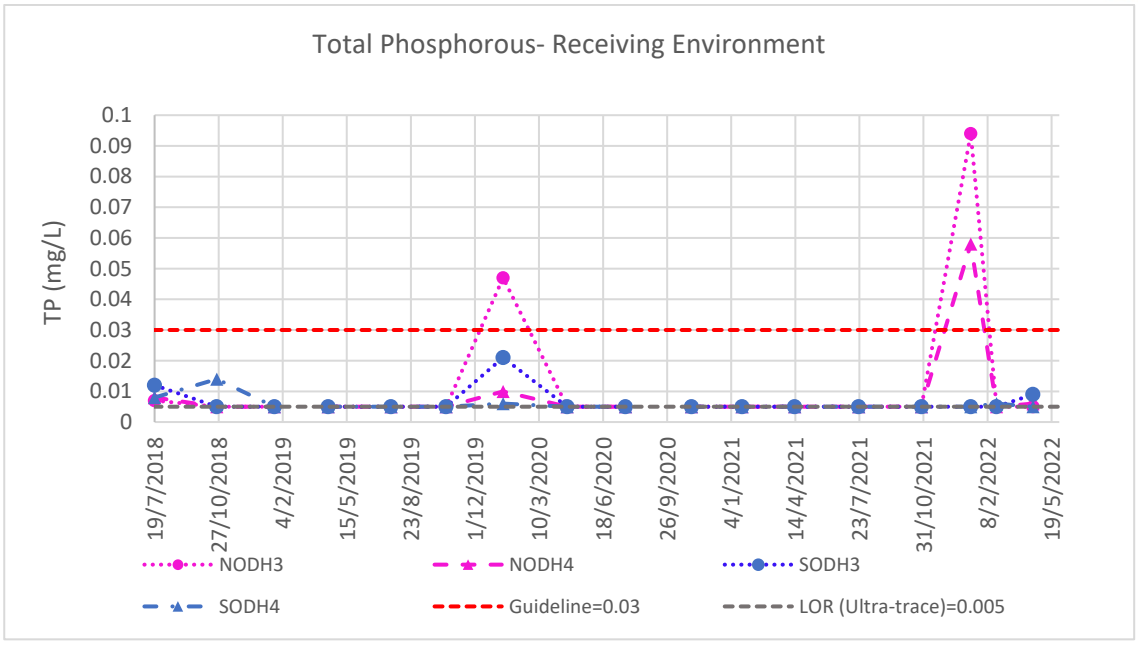


Figure 17: Total Phosphorous concentration (TP, mg/L) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

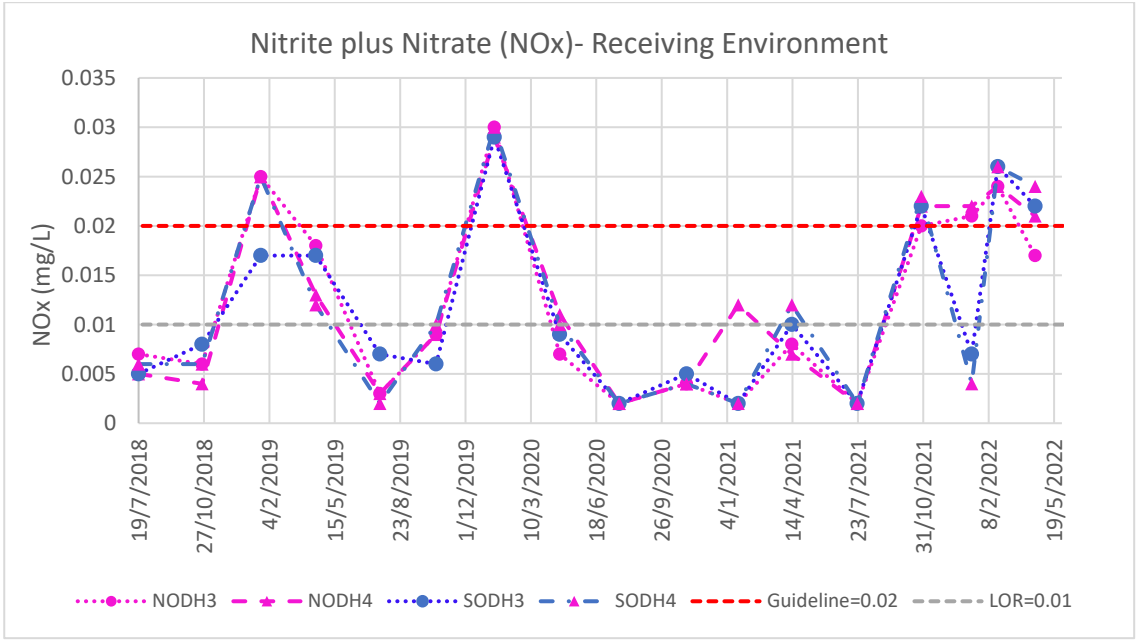


Figure 18: Nitrite plus Nitrate concentration (NOx, mg/L) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

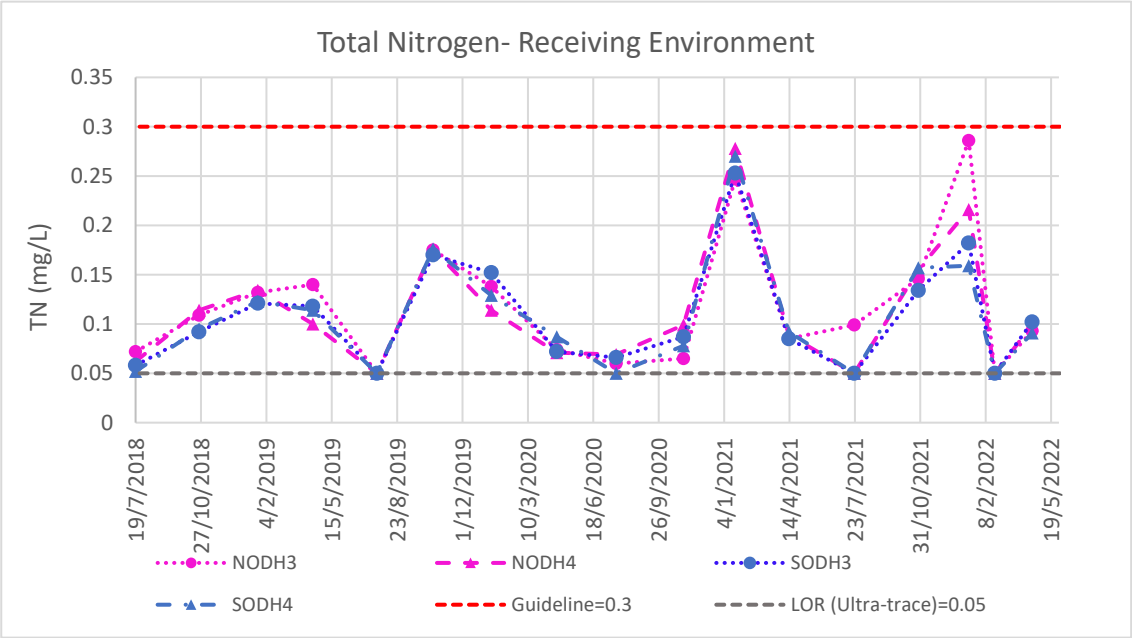


Figure 19: Total Nitrogen concentration (TN, mg/L) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

3.1.4 Results of metal analysis

Water samples were analysed for 11 metal elements (Total and Filtered) as part of the monitoring program and results are shown in Table A6 - A19, Appendix A (results below the laboratory Limit of Reporting (LOR) were replaced with the LOR for each element). Metal concentrations at all the sites located in Darwin Harbour were below the ANZECC/ARMCANZ (2000b) trigger values for most of the cases, which indicate that there is no evidence of metal contamination in Darwin Harbour caused by metals in CIPS's discharged water through the northern and southern outlets during the monitoring period. An instance of ANZECC/ARMCANZ (2000b) trigger value exceedance was recorded at SODH3 (6 µg/L) on 22 January 2019 (prior to this reporting period) for Copper (6 µg/L) and Cobalt (1.1 µg/L) (Table A6). Such exceedances were not recorded for subsequent monitoring events.

3.1.5 Results of microbiological analysis

E. coli concentrations at all the sites are given in Table A20, Appendix A. *E. coli* concentrations at CIPS discharge sites were variable across sampling events. Concentration range for ADP1, NODH1, ADP2 and SODH2 was <1 – 262 MPN/100mL for this reporting period. The factors that would influence *E. coli* concentrations at sites SODH1 and NODH1 are stormwater runoff which carry microbes, the presence of cane toads and/or birds around the sampling sites and sediment/sludge disturbances that could occur during sampling when the water flow is very low.

Figure 20 shows *E. coli* concentrations at Darwin Harbour sites SODH3, SODH4, NODH3 and NODH4. For most of the sampling events, *E. coli* concentrations at these sites were below the LOR. The highest recorded *E. coli* concentration was 6 MPN/100mL on 13 January 2022 indicating that all concentrations were well below the trigger value of 200 MPN/100mL (WDL212-02, 2020).

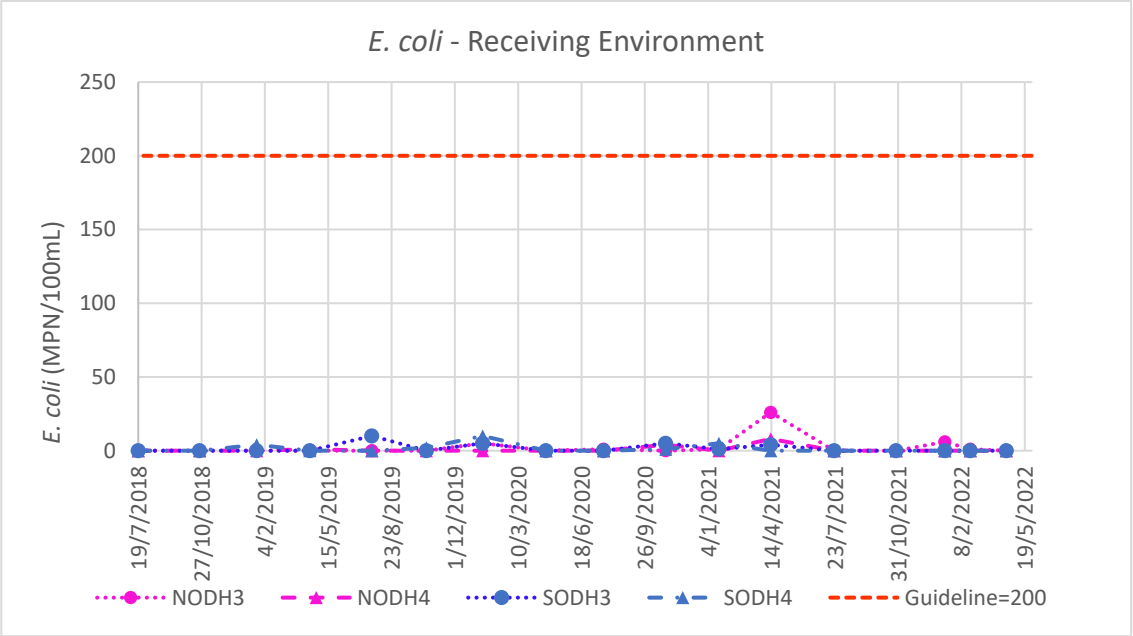


Figure 20: *E. coli* results (MPN/100mL) at sites in the mixing zone/receiving environment from July 2018 to May 2022 (Quarterly monitoring).

Sediment Monitoring Results

Sediment monitoring was undertaken at sites NODH2 and SODH2 on a quarterly basis. Laboratory results were compared with the ANZECC/ARMCANZ Interim Sediment trigger values for environmental sediment monitoring (ISQG, 2000) or WDL212-02 (WDL212-02, 2020) trigger values, where specified.

3.1.6 Results of metal analysis

Metal concentrations of sediment at SODH2 and NODH2 are shown in Table 3 and Table 4, respectively. All the results for the current reporting period are below the ISQG (2000) specified trigger values indicating that water/sediment transport from the CIPS facility has not influenced metals concentrations in the sediment in Darwin Harbour.

Table 3: Sediment-Metal concentrations at SODH2 (Quarterly monitoring). Results < LOR are reported as the LOR.

Metal	Aluminium	Copper	Lead	Nickel	Tin	Zinc	Arsenic	Cadmium	Chromium	Cobalt
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	50	5	5	2	5	5	5	1	2	2
ISQG trigger value-low	Develop SSTV	65	50	21	Develop SSTV	200	20	1.5	80	Develop SSTV
14/4/2016	16200	7	10	10	5	24	14	1	33	7
21/7/2016	8340	5	8	6	5	16	9	1	23	4
25/10/2016	13200	6	10	9	5	23	10	1	30	7
19/1/2017	7880	5	6	5	5	17	7	1	19	4
27/4/2017	10900	5	9	8	5	19	11	1	25	6
31/7/2017	3940	5	5	3	5	10	5	1	12	2
24/10/2017	13600	6	11	9	5	43	16	1	32	7
18/1/2018	19700	8	13	14	5	55	13	1	46	10
19/4/2018	5780	5	7	5	5	15	8	1	16	4
19/7/2018	11900	6	8	8	5	26	13	1	28	6
24/10/2018	12000	5	8	8	5	20	11	1	28	6
22/1/2019	7040	5	6	4	5	20	9	1	19	3
16/4/2019	9910	6	10	7	5	20	14	1	25	6
23/7/2019	10400	5	10	8	5	23	14	1	26	5

Metal	Aluminium	Copper	Lead	Nickel	Tin	Zinc	Arsenic	Cadmium	Chromium	Cobalt
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	50	5	5	2	5	5	5	1	2	2
17/10/2019	11800	5	10	8	5	22	12	1	29	6
14/1/2020	12000	6	10	8	5	20	13	1	32	6
23/4/2020	10400	6	10	7	5	18	14	1	26	5
23/7/2020	4510	8	6	3	5	9	6	1	16	2
29/10/2020	16200	7	11	9	5	23	17	1	29	6
21/1/2021	6810	5	7	5	19	13	9	1	16	4
13/4/2021	4900	5	5	5	5	17	10	1	16	4
22/7/2021	9910	6	9	8	5	22	14	1	27	6
28/10/2021	8210	5	5	5	5	11	9	1	16	3
13/1/2022	13300	6	12	8	5	21	13	1	29	5
22/2/2022	14600	7	8	10	5	24	11	1	31	6
20/04/2022	10600	6	8	8	5	22	10	1	26	5

Table 4: Sediment-Metal concentrations at NODH2 (Quarterly monitoring). Results < LOR are reported as the LOR.

Metal	Aluminium	Copper	Lead	Nickel	Tin	Zinc	Arsenic	Cadmium	Chromium	Cobalt
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	50	5	5	2	5	5	5	1	2	2
ISQG trigger value-low	Develop SSTV	65	50	21	Develop SSTV	200	20	1.5	80	Develop SSTV
21/7/2016	14000	7	12	10	5	70	14	1	35	8
25/10/2016	20400	9	13	14	5	81	15	1	44	9
19/1/2017	16100	8	12	12	5	108	15	1	39	8
31/7/2017	17200	8	12	13	5	86	15	1	42	9
24/10/2017	6400	5	6	4	5	13	9	1	17	3
18/1/2018	6480	5	7	5	5	15	10	1	27	3
19/4/2018	13400	8	12	11	5	162	15	1	36	8
19/7/2018	16100	9	11	11	5	207	15	1	38	8
24/10/2018	16200	7	11	11	5	35	13	1	38	7
22/1/2019	8520	5	8	5	5	28	6	1	16	4
16/4/2019	12500	7	12	10	5	38	16	1	34	8
23/7/2019	12800	7	12	10	5	36	18	1	33	8
17/10/2019	15300	8	12	12	5	65	17	1	40	8
14/1/2020	20000	9	14	13	5	47	20	1	50	9
23/4/2020	16300	7	10	10	5	25	15	1	35	7
23/7/2020	18500	7	11	11	5	28	13	1	35	7
29/10/2020	19300	8	10	11	5	42	13	1	34	7
21/1/2021	12500	7	10	9	5	28	13	1	28	6
13/4/2021	6440	6	8	9	5	32	11	1	27	7
22/7/2021	11000	6	9	9	5	34	14	1	30	6
28/10/2021	22000	11	11	12	5	34	12	1	41	8
13/1/2022	15000	6	15	10	5	27	10	1	33	6
22/2/2022	19300	11	14	14	5	68	13	1	41	7
20/4/2022	14700	7	9	11	5	30	11	1	34	7

3.1.7 Results of hydrocarbon analysis

Total Petroleum Hydrocarbons (TPHs), Polynuclear Aromatic Hydrocarbons (PAHs) and BTEX (Benzene, Toluene, Ethylbenzene, Xylenes) concentrations at SODH2 and NODH2 were less than or equal to the LOR. On this basis, there is no evidence of influence on Darwin Harbour sediment quality in terms of hydrocarbon contamination from CIPS discharge. Results are provided in Table A21 and Table A22, Appendix A.

Flow Rates/Total Discharge

Wastewater discharge volumes from ADP1 (Cooling Tower) which feeds into the Northern Drainage (NODH1) were monitored. Monthly average flow rate in kL/hr is shown in Figure 21. The flow rate during the reporting period (June 2021 – May 2022) varied from 0.8 kL/hr to 15.0 kL/hr. Total discharge from ADP1 for the past 12 months was 43.21 ML. As shown in Figure 21, there was an increase in monthly average discharge from ADP1, specifically from February 2021 to August 2021, when compared to March – July the year before. This notable increase in discharge from ADP1 is the result of:

- A Boiler was offline. This reduced the evaporation rate and up-cycle program in the Cooling Tower. Hence, the water level in the cooling tower increased and overflowed after reaching the set point level.
- The Cooling Tower was required to remain online during this time to maintain the cooling process of the closed loop system.

During the above-mentioned period, the monitoring system associated with the makeup valve for the Cooling Tower water required maintenance. This is reflected in the reduced discharge flow rates from September 2021. Decreased discharge rates are also attributed to the Boiler being brought back online. This results in an increase in the number of cycles the Cooling Tower undergoes prior to discharge, also reducing water consumption.

Figure 22 shows the monthly average flow rate at ADP2 which flows into SODH1. The total reported discharge for the reporting period from ADP2 (Cooling Ponds outlet) was 8.95 ML. On 8 June 2022, Trop Water identified and advised TGen of a suspected fault with the flow meter installed at ADP2 (consistent reading of 25.08 kL/day since January 2021). Trop Water received verification from TGen on 22 June 2022 that the fault would be rectified by September 2022.

In total, CIPS has discharged 52.16 ML of wastewater for the 12-month reporting period (June 2021 to May 2022). The volume of wastewater discharged from the CIPS facility to Darwin Harbour is relatively minor considering the marine water receiving environment. Despite the most recent exceedances and non-compliances described, monitoring data obtained under WDL212-02 indicates that the marine environment of Darwin Harbour has not been negatively impacted.

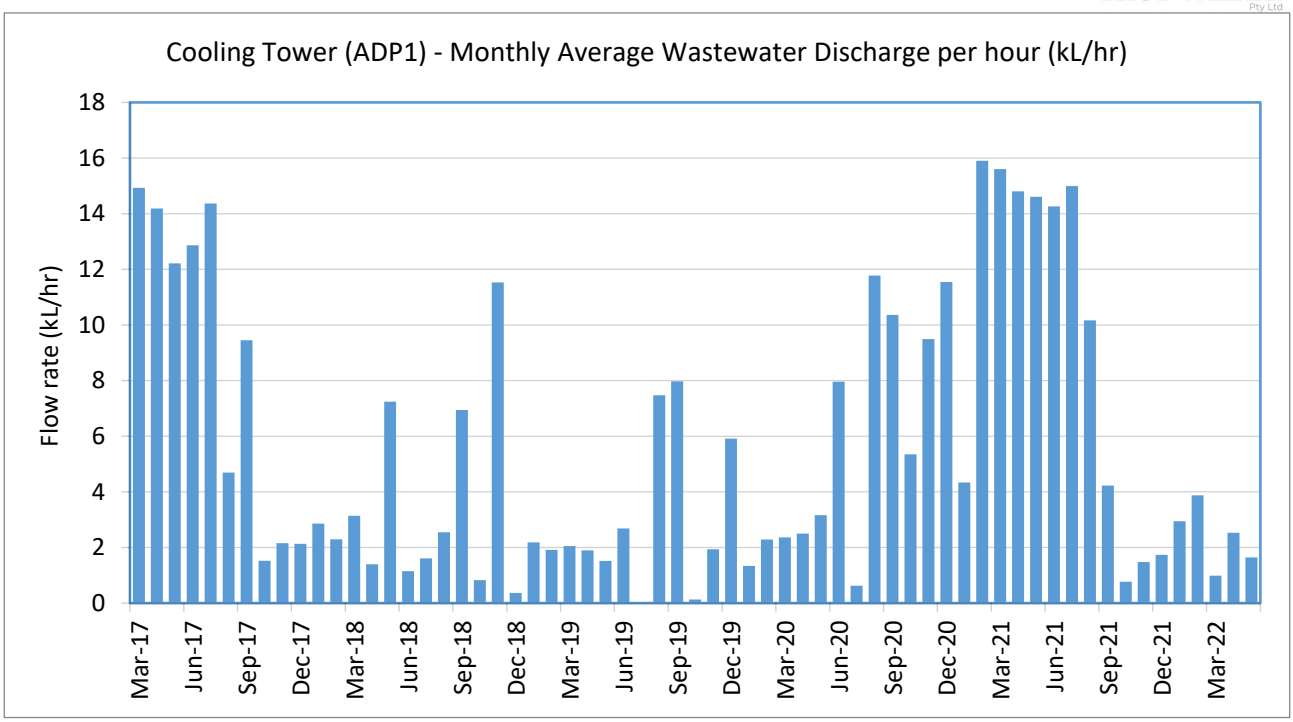


Figure 21: Monthly average wastewater discharge rate (kL/hr) from ADP1 (Cooling Tower).

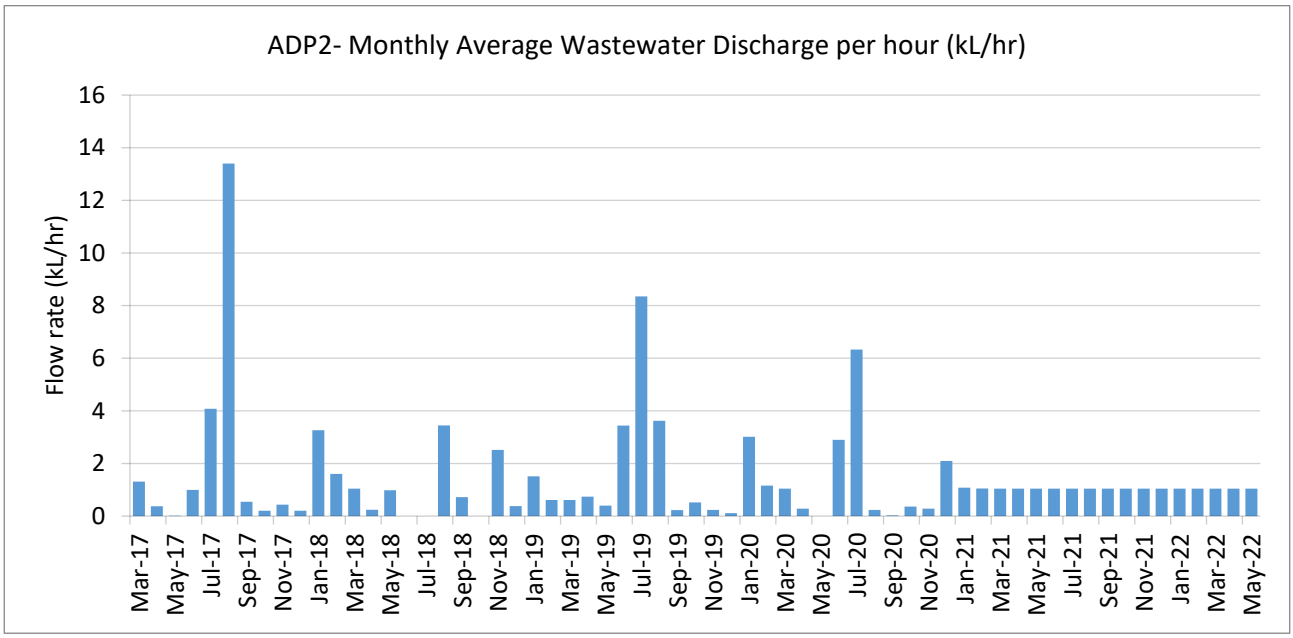


Figure 22: Monthly average wastewater discharge rate (kL/hr) from ADP2 (Cooling Ponds outlet). Note: Flow meter fault was identified for the period Jan 2021–May 2022.

4 CONCLUSIONS

Wastewater discharged from Channel Island Power Station (CIPS) and water and sediment in the Darwin Harbour receiving environment were monitored in accordance with WDL212-02 to assess, prevent, reduce, control and rectify, environmental harm (if any) resulting from the wastewater discharged. Monitoring results for the reporting period, June 2021 to May 2022 are presented and discussed in this report. Tabled and graphed monitoring data from April 2016 are also provided in Appendix A.

The monitoring results from the receiving environment (Darwin Harbour) sites showed that:

- Exceedances of trigger values specified in WDL212-02 for Dissolved Oxygen (22 Feb 2022), Total Suspended Solids (13 Jan and 20 Apr 2022), Nitrite plus Nitrate (28 Oct 2021, 13 Jan, 22 Feb and 20 Apr 2022) and Total Phosphorus (13 Jan 2022) were recorded during the reporting period.
- Of the above-mentioned exceedances, non-compliances were identified on three occasions (13 Jan 2022, 22 Feb 2022 and 20 April 2022) with notification to NTEPA on 03 Feb 2022, 09 Mar 2022 and 9 May 2022, respectively. Incident Investigation Reports relating to the above non-compliances were issued on 08 Feb 2022, 15 Mar 2022 and 17 Jun 2022, respectively (See Appendix B, C and D).
- Under WDL212-02 Licence Condition 35.1, notification of non-compliance was issued for the following exceedances (an exceedance of a trigger value on three consecutive sampling occasions) relating to Nitrogen Oxides (NOx; WDL212-02 Trigger Value for NOx is 20 ug/L):
    - NODH4 on 22 Feb 2022; [NOx] = 24 ug/L
    - NODH4 on 20 Apr 2022; [NOx] = 21 ug/L
- Under WDL212-02 Licence Condition 35.2, notification of non-compliance was issued for the following exceedances (an exceedance of three times or more a trigger value) relating to Total Suspended Solids (TSS; WDL212-02 Trigger Value for TSS is 20 ug/L):
    - NODH3 on 13 Jan 2022; [TSS] = 102 mg/L
    - NODH4 on 13 Jan 2022; [TSS] = 94 mg/L
    - SODH3 on 20 Apr 2022; [TSS] = 50 mg/L
    - SODH4 on 20 Apr 2022; [TSS] = 32 mg/L
- Under WDL212-02 Licence Condition 35.2, notification of non-compliance was issued for the following exceedance (an exceedance of three times or more a trigger value) relating to Total Phosphorus (TP; WDL212-02 Trigger Value for TP is 0.030 mg/L):
    - NODH3 on 13 Jan 2022; [TP] = 0.094 mg/L
- Possible causes for these exceedances and non-compliances are:
    - Stormwater/runoff from Channel Island, Blackmore River and Elizabeth River catchments.
    - Sediment resuspension due to weather conditions (tidal movement and wind-induced mixing e.g. waves) at the time of sampling.
    - Discharge from Darwin Aquaculture Centre (discharge information is unknown).
    - CIPS discharge from ADP1.
- Monitoring results for Total Nitrogen, Ammonia NH3-N, Filterable Reactive Phosphorus, pH and *E. coli* at NODH3, NODH4, SODH3 and SODH4 did not exceed WDL212-02 trigger values during the reporting period.
- Metals and hydrocarbon concentrations in sediment at sites NODH2 and SODH2 were below the ANZECC/ARMCANZ Interim Sediment Quality Guideline values (ISQG, 2000) and the trigger values defined in WDL-212-02 (WDL212-02, 2020).
- The total wastewater discharge volume from the Cooling Tower and Cooling Ponds was 52.16 ML for the reporting period.

Based on the monitoring results for the reporting period, it is unlikely that wastewater discharged from CIPS has negatively impacted the Darwin Harbour receiving environment. Trop Water (on behalf of TGen) will continue to monitor water and sediment quality condition in the receiving environment in accordance with WDL212-02.

REFERENCES

ANZECC/ARMCANZ (2000a): Australian and New Zealand Environment Council & Agriculture and Resource Management Council of Australia and New Zealand, Australian Guidelines for Water Quality Monitoring and Reporting.

ANZECC/ARMCANZ (2000b): Australian and New Zealand Environment Council & Agriculture and Resource Management Council of Australia and New Zealand, Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

SMWW (2005): Standard Methods for the Analysis of Water and Wastewater, 21st Ed. (2005).

WDL 212 (2015): Channel Island Power Station-Waste Discharge Licence, November 2015.

WDL 212-01 (2018): Channel Island Power Station-Waste Discharge Licence, June 2018.

WDL212-02 (2020): Channel Island Power Station-Waste Discharge Licence, June 2020.

WQODH (2010): Water Quality Objectives for the Darwin Harbour Region- Background Document, NRETAS, Northern Territory Government.

http://territorygeneration.com.au/about_territory_generation/our_power_stations

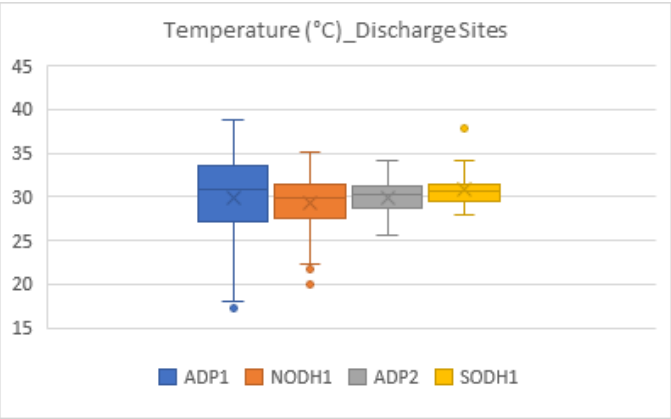
APPENDIX A

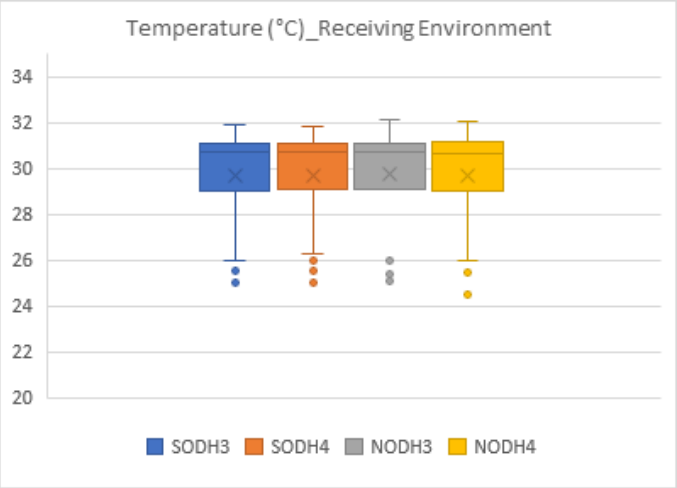
A.1 Temperature

Table A 1: Temperature (°C) at CIPS monitoring sites.

Temperature-Monthly monitoring					Temperature-Quarterly monitoring						
	ADP1	NODH1	ADP2	SODH1		ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
Units (°C)					Units	°C	°C	°C	°C	°C	°C
14/4/2016	34.14	33.03	31.9	32.96	14/4/2016	32.03	32.79				
10/5/2016	27.55	27.21	29.51	30.37	21/7/2016	29.99	27.4				
9/6/2016			34.12	33.45	25/10/2016	34.06					
21/7/2016			28.37	28.87	19/1/2017	32.12	32.04	Sampling at these four sites were started on July 2018 under WDL 212-01			
25/8/2016			29.56	30.27	27/4/2017	27.84	28.31				
27/9/2016	28.07	28.93	30.11	32.11	31/7/2017	31.1					
25/10/2016	37.37	35.19	33.03	32.89	24/10/2017	34.66	36.36				
24/11/2016			30.23	31.06	18/1/2018	32.25	31.12				
15/12/2016			29.75	30.81	19/4/2018	32.68	32.04				
19/1/2017	33.35	31.87	30.52	31.42	19/7/2018	31.1	29.53	25.79	25.95	25.95	25.94
23/2/2017	33.53	32.99	30.54		24/10/2018	33.11	33.33	30.92	30.92	30.92	30.88
30/3/2017	38.87	33.14	30.24	31.11	22/1/2019	32.53	31.42	30.19	30.1	30.1	30.18
27/4/2017	36.61	34.71	28.72	28.3	16/4/2019	31.97	31.61	30.8	30.93	30.93	30.88
30/5/2017	29.15	29.55	27.62		23/7/2019	30.04	27.89	24.98	24.99	25.06	24.46
22/6/2017	28.45	29.41	27.35		17/10/2019	33.11	32.22	30.03	30.03	30.19	30.17
31/7/2017			30.41	30.65	14/1/2020	34.13	33.52	30.26	30.26	30.44	30.4
31/8/2017	21.22	22.29	29.31	29.48	23/4/2020	33.46	32.6	31.09	31.19	31.21	31.2
21/9/2017	38.42	31.38			23/7/2020	29.17	26.77	25.51	25.51	25.4	25.45
24/10/2017	30.76	30.76	32.32		29/10/2020	34.45	35.68	31.25	31.38	31.36	31.16
16/11/2017	33.98		30.24		3/11/2020			31.88	31.83	32.11	32.08
20/12/2017	33.19	32.48	31.76		21/1/2021	34.4	33.04	30.82	30.82	31.01	30.86
18/1/2018	34.62	31.05	30.8	29.49	13/4/2021	34.1	33.03	30.16	30.28	30.33	30.21
22/2/2018		30.18	30.81	37.78	22/7/2021	27.56	26.82	25.95	26.23	26.03	26.03
22/3/2018		30.97	31.54	30.99	28/10/2021	33.61	33.57	31.33	31.41	31.53	31.56
19/4/2018	33.85	31.88	31.73	32.43	13/1/2022	31.95	29.9	30.8	30.74	31.01	31.23
17/5/2018	18.09	20.25	25.77	27.85	22/2/2022	30.45	30.73	30.63	30.61	30.59	30.87
21/6/2018	29.53	27.19	25.2		20/4/2022	32.83	32.35	31.08	31.05	30.88	30.02
19/7/2018	34.49	28.78									
23/8/2018											
20/9/2018											
24/10/2018		31.42									
20/11/2018	26.08	28.09		30.75							
18/12/2018		30.93									
22/1/2019	33.55	31.27									
19/2/2019	33.88	31.61									
19/3/2019	33.51	31.83		30.55							
16/4/2019	31.96	30.39									
23/5/2019	30.57	30.39									
20/6/2019		29.51	25.54								
23/7/2019		24.28	28.81	29.36							
26/8/2019											
17/9/2019		27.34									
17/10/2019											
21/11/2019	33.42	31.48									
12/12/2019	35.59	33.09									
14/1/2020	33.96	31.22	31.21	31.47							
20/2/2020	31.96	28.62	29.36	29.28							
26/3/2020	31.83	30.85									
23/4/2020	33.44	31.85									
21/5/2020	29.19	28.98									
18/6/2020				29.91							
23/7/2020			28	28.79							
20/8/2020	24.86	26.36									
24/9/2020	26.75	26.85									
29/10/2020		29.71	30.31	30.19							
3/11/2020		30.624									
26/11/2020	27.95	29.72	30.97								
3/12/2020	26.93	27.48	31.13								
21/1/2021		30.93	32.64	30.79							
4/2/2021	27.21	28.31	28.2	28.71							
11/3/2021	27.5	27.5		30.2							
13/4/2021	27.33	27.9									
27/5/2021	23.03	23.35									
10/6/2021	17.17	20.04	25.85								
22/7/2021	22.82	23.34		28.84							
24/8/2021	25.03	26.18									
23/9/2021	17.61	21.78									
28/10/2021											
18/11/2021	32.62	30.65	33.04	33.36							
23/12/2021	27.81	28.88	29.62								
13/1/2022	28.66	29.67	29.33	34.12							
22/2/2022		29.11	31.06	30.11							
29/3/2022	31.91	29.89	29.91	29.98							
20/4/2022	25.42	31.26									
17/5/2022	32.81										

*empty cells = no flow, no sampling



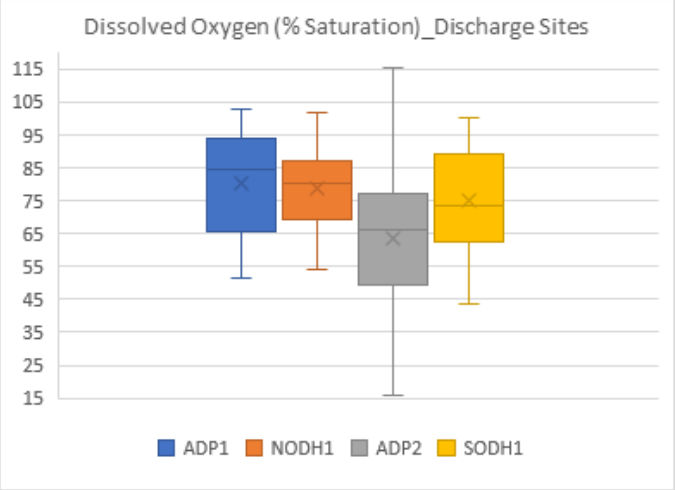


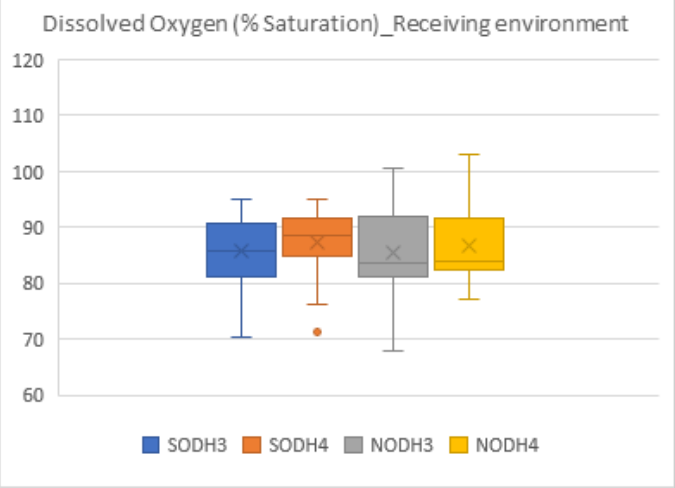
A.2 Dissolved Oxygen

Table A 2: Dissolved Oxygen (% saturation) at CIPS monitoring sites.

Dissolved Oxygen % Saturation - Monthly monitoring				
	ADP1	NODH1	ADP2	SODH1
Units	%	%	%	%
14/4/2016	92.1	89.2	28	62.9
10/5/2016	95.1	96.6	33	96.3
9/6/2016			66.6	94.9
21/7/2016			67.8	73.6
25/8/2016			76.5	90.6
27/9/2016	96.5	96.2	73.9	73.9
25/10/2016	91.8	89.1	103.1	80.7
24/11/2016			43.1	54.1
15/12/2016			15.7	64.5
19/1/2017	87.8	82	71.9	87
23/2/2017	83.8	83.8	65.8	
30/3/2017	51.7	61.2	55.4	54.1
27/4/2017	73.2	88.9	73.8	88.8
30/5/2017	94.9	93.3	43.6	
22/6/2017	100.4	97.3	78.6	
31/7/2017			100.5	99.9
31/8/2017	101.9	101.6	81.6	95.3
21/9/2017	89.6	81.6		
24/10/2017	92.1	82	62.7	
16/11/2017	61.3		35.8	
20/12/2017	97	86.3	55.8	
18/1/2018	87.1	67.2	61	43.8
22/2/2018		56.1	50.1	61.5
22/3/2018		84.7	71.4	89
19/4/2018	63.2	83.7	50.3	82.2
17/5/2018	90.9	84.2	86.9	87.2
21/6/2018	54.6	69.1	22.1	
19/7/2018	94.3	86.3		
23/8/2018				
20/9/2018				
24/10/2018		80.3		
20/11/2018	94.1	91.8		80.9
18/12/2018		66.3		
22/1/2019	56.8	77.5		
19/2/2019	84.5	71.1		
19/3/2019	94.1	71.1		99.1
16/4/2019	93.8	96.2		
23/5/2019	89.6	79.5		
20/6/2019		84.1	47.7	
23/7/2019		67.8	66.4	67.5
26/8/2019				
17/9/2019		74.8		
17/10/2019				
21/11/2019	79.7	70.1		
12/12/2019	56	91.5		
14/1/2020	61.5	70.4	56.5	65.1
20/2/2020	88.9	87.3	86.6	91.8
26/3/2020	67.9	81.3		
23/4/2020	67.8	69.9		
21/5/2020	61.7	63.4		
18/6/2020				66.1
23/7/2020			59.9	65.6
20/8/2020	73.1	75.1		
24/9/2020	75.5	75.8		
29/10/2020		70.2	78.3	62.5
3/11/2020		69.2		
26/11/2020	90.9	91.1	41	
3/12/2020	65.4	93.4	68.1	
21/1/2021		62.2	49.9	61.5
4/2/2021	55.8	58.4	47.4	65.7
11/3/2021	57.6	54.1		61.8
13/4/2021	86.2	72.1		
27/5/2021	88.4	84.9		
10/6/2021	81.9	73.5	62.1	
22/7/2021	95.5	97.1		90.2
24/8/2021	73.4	80.5		
23/9/2021	98	67		
28/10/2021				
18/11/2021	76.8	80.9	75.8	60.8
23/12/2021	103	65.9	115.1	
13/1/2022	76.1	57	77.9	79
22/2/2022		81	71.8	63.3
29/3/2022	73.9	80.2	85.6	55.6
20/4/2022	60.9	68.8		
17/5/2022	58.5			
*empty cells = no flow, no sampling				

Dissolved Oxygen % Saturation - Quartely monitoring						
	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
Units	%	%	%	%	%	%
Guideline-Min			75	75	75	75
Guideline-Max			100	100	100	100
Guideline-Min			**80**	**80**	**80**	**80**
14/04/2016	98.5	108.2	Sampling at these four sites were started on July 2018 under WDL 212-01			
21/07/2016	72.3	77.8				
25/10/2016	116.4					
19/01/2017	96.1	88.9				
27/04/2017	106.3	84.4				
31/07/2017	101.4					
24/10/2017	98.5	123.6				
18/01/2018	71.2	61.6				
19/04/2018	116.9	90.9				
19/07/2018	105.1	88.8	84.6	88.3	86.9	85.7
24/10/2018	83.0	95.2	84.8	81.5	82.4	80.6
22/01/2019	84.3	87.6	81.5	88.8	82.5	82.8
16/04/2019	103.4	64.6	89.8	88.9	100.5	103.1
23/07/2019	81.2	72.7	94.9	93.2	94.1	92.3
17/10/2019	95.0	61.8	86.5	88.9	81.2	80.5
14/01/2020	61.0	60.6	70.3	71.3	67.9	77.0
23/4/2020	77.1	77.6	79.4	84.4	80.5	82.4
23/7/2020	82	68.9	90.5	91.6	82.9	83.3
29/10/2020	95.3	73.5	91.5	85.5	85.8	84.6
3/11/2020			94.4	91.2	96.2	102.7
21/1/2021	60.3	52.2	85.8	86	91.3	88.3
13/4/2021	78.4	63.5	79.7	86.4	76	82.2
22/7/2021	101.5	94.6	87	92	87.7	87.5
28/10/2021	62.1	49.2	85.7	84.9	84.2	82.9
13/1/2022	94.4	94	95	95.1	93.7	93.7
22/2/2022	85.7	81.9	80.1	76.3	81.3	91.3
20/4/2022	73	89.5	82.6	94.8	82.5	82.5



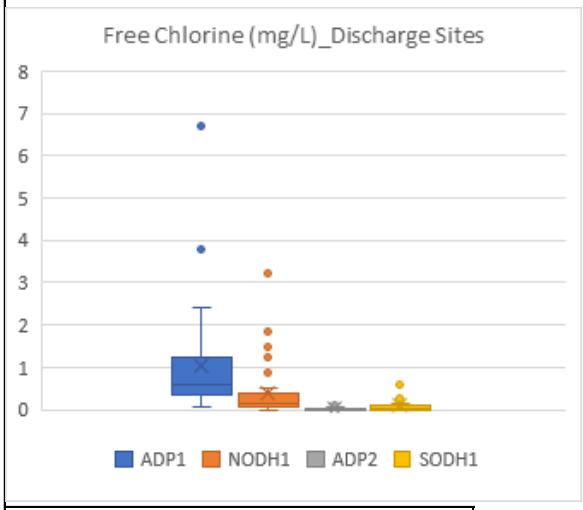


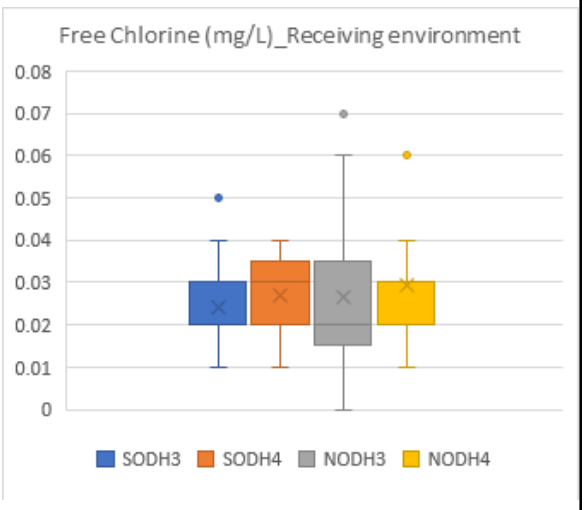
A.3 Free Chlorine

Table A 3: Free Chlorine concentration at CIPS monitoring sites.

Free Chlorine -Monthly monitoring				
	ADP1	NODH1	ADP2	SODH1
Units	mg/L	mg/L	mg/L	mg/L
19/07/2018				
23/08/2018				
20/09/2018				
24/10/2018		0.06		
20/11/2018	1.08	0.25		0.05
18/12/2018		0.02		
22/01/2019	0.65	0.16		
19/02/2019	0.6	0		
19/03/2019	0.55	0.24		0.11
16/04/2019	0.41	0.25		
23/05/2019	0.34	0.11		
20/06/2019		0.13	0.03	
23/07/2019		0.1	0.03	0.66
26/08/2019				
17/09/2019		0.1		
17/10/2019				
21/11/2019	0.2	0.11		
12/12/2019	0.56	0.14		
14/01/2020	0.96	0.04	0.04	0.04
20/02/2020	0.41	0.03	0.06	0.13
26/03/2020	0.45	0.11	0.00	0.00
23/04/2020	0.33	0.27	0.00	0.00
21/05/2020	0.18	0.17	0.00	0.00
18/06/2020		0.00	0.00	0.04
23/07/2020		0.00	0.02	0.28
20/08/2020	0.08	0.05		
24/09/2020	2.40	1.85		
29/10/2020		0.05	0.04	0.00
3/11/2020		0.05	0.00	
26/11/2020	0.05	0.07	0.08	
3/12/2020	0.22	0.32	0.03	
21/01/2021		0.00	0.00	0.11
4/02/2021	1.54	0.50	0.01	
11/03/2021	0.76	0.42	0.00	0.02
13/04/2021	0.29	0.16	0.00	0.00
27/05/2021	0.45	0.45	0.00	0.00
10/6/2021	1.36	1.23	0.06	
22/7/2021	1.69	1.49		0.59
24/8/2021	0.99	0.87		
23/9/2021	3.80	3.20		
28/10/2021				
18/11/2021	0.47	0.00	0.00	0.03
23/12/2021	6.70	1.00	0.03	
13/1/2022	1.25	0.03	0.04	0.06
22/2/2022		0.01	0.02	0.00
29/3/2022	1.56	1.83	0.11	0.02
20/4/2022	0.63	0.18		
17/5/2022	0.97			

Free Chlorine -Quartely monitoring						
	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
19/07/2018						
24/10/2018	0.05	0.03	0.02	0.01	0.01	0.02
22/01/2019	0.07	0.06	0.04	0.04	0.06	0.06
16/04/2019	0.01	0.02	0.03	0.03	0.03	0.03
23/07/2019	0.03	0.02	0.05	0.04	0.04	0.04
17/10/2019	0.03	0.04	0.02	0.03	0.02	0.03
14/01/2020	0.06	0.01	0.04	0.04	0.01	0.03
23/4/2020	0.04	0.04	0.02	0.02	0.03	0.01
23/7/2020	0.02	0.03	0.03	0.03	0.02	0.03
29/10/2020	0.01	0.01	0.01	0.02	0.02	0.03
3/11/2020			0.02	0.02	0.04	0.02
21/1/2021	0.01	0.02	0.02	0.02	0.02	0.03
13/4/2021	0.05	0.03	0.01	0.03	0.02	0.03
22/7/2021	0.07	0.05	0.02	0.02	0.02	0.03
28/10/2021	0.04	0.11	0.01	0.01	0.00	0.02
13/1/2022	0.04	0.02	0.03	0.04	0.07	0.04
22/2/2022	0.02	0.03	0.02	0.03	0.03	0.02
20/4/2022	0.02	0.61	0.02	0.03	0.01	0.03





*empty cells = no flow, no sampling

A.4 pH

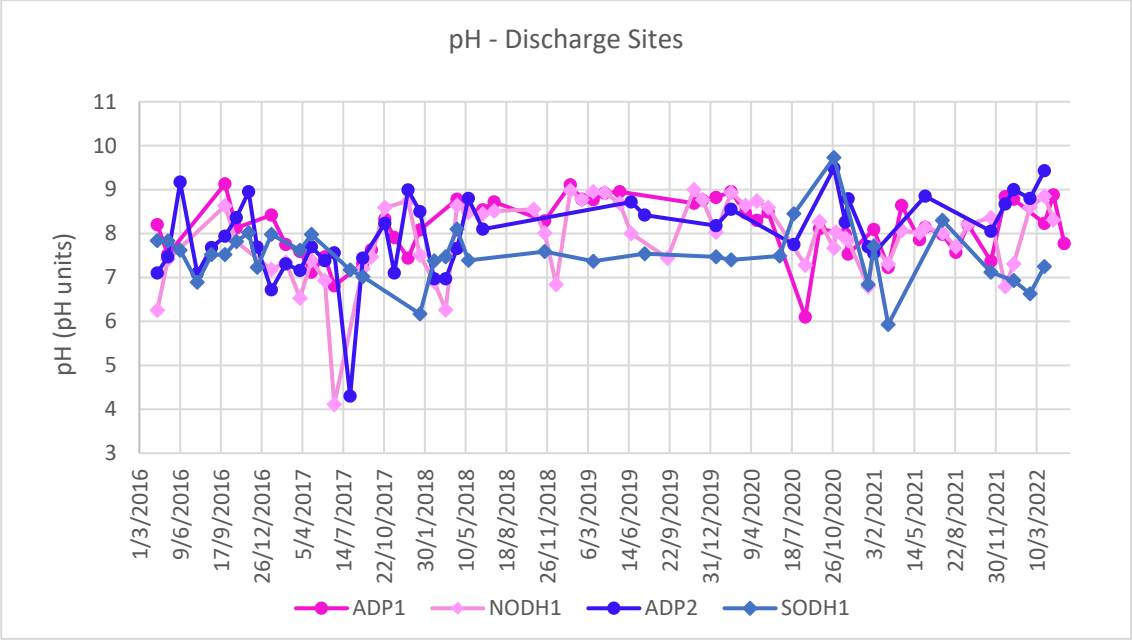


Figure A 1: pH at discharge sites from April 2016 to May 2022 (Monthly monitoring).

A.5 Total Suspended Solids

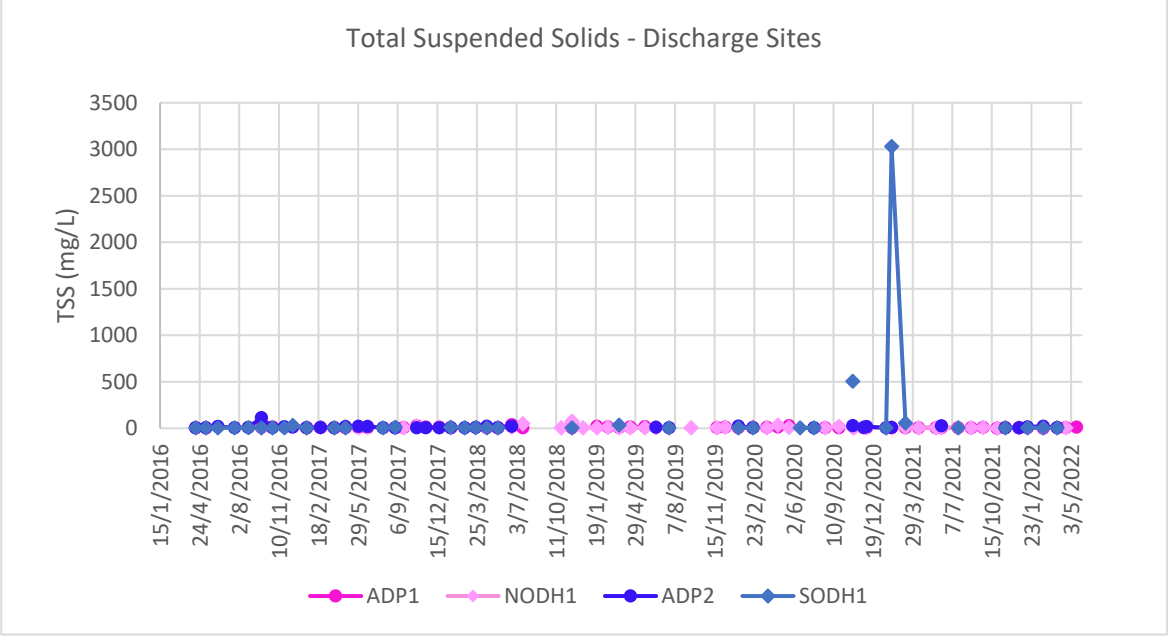


Figure A 2: Total Suspended Solids (TSS) at discharge sites from April 2016 to May 2022 (Monthly monitoring).

A.6 Electrical Conductivity

Table A 4: Electrical Conductivity at CIPS discharge monitoring sites.

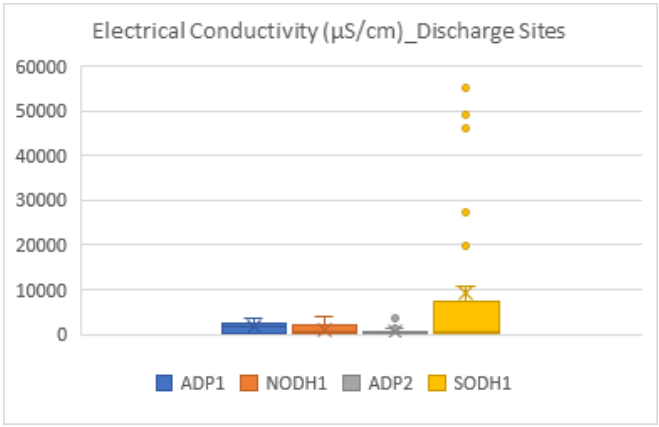
EC-Monthly monitoring

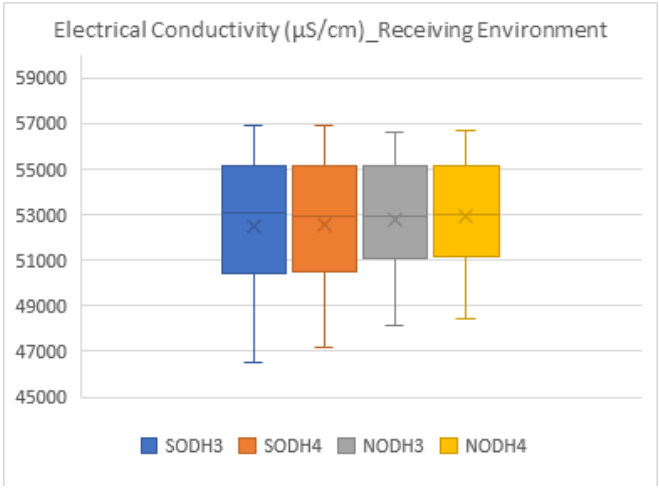
	ADP1	NODH1	ADP2	SODH1
Units	µS/cm	µS/cm	µS/cm	µS/cm
14/4/2016	577	589	111	50000
10/5/2016	105	206	107	19800
9/6/2016			3610	49000
21/7/2016			242	209
25/8/2016			106	108
27/9/2016	247	177	177	1453
25/10/2016	1042	1165	822	4550
24/11/2016			740	55100
15/12/2016			561	164
19/1/2017	724	647	122	484
23/2/2017	134	707	51	
30/3/2017	647	305	54	632
27/4/2017	642	661	53	4780
30/5/2017	712	683	70	
22/6/2017	694	666	80	
31/7/2017			148	63
31/8/2017	183	182	1790	62
21/9/2017	551	826		
24/10/2017	2250	2140	2300	
16/11/2017	2060		1490	
20/12/2017	2420	2450	1200	
18/1/2018	1940	2220	531	790
22/2/2018		147	72	667
22/3/2018		195	228	1407
19/4/2018	2850	1960	263	6050
17/5/2018	915	919	119	51
21/6/2018	1490	1520	164	
19/7/2018	2340	2330		
23/8/2018				
20/9/2018				
24/10/2018		1064		
20/11/2018	676	323		96
18/12/2018		98		
22/1/2019	1780	2310		
19/2/2019	3360			
19/3/2019	3200	1970		7350
16/4/2019	3260	1830		
23/5/2019	3450	2200		
20/6/2019		2080	701	
23/7/2019		107	80	63
26/8/2019				
17/9/2019		142		
17/10/2019				
21/11/2019	2930	1382		
12/12/2019	2990	1295		
14/1/2020	2490	330	169	542
20/2/2020	2640	334	122	256
26/3/2020	2620	2060		
23/4/2020	2580	2410		
21/5/2020	2450	2710		
18/6/2020				74
23/7/2020			89	260
20/8/2020	3760	3780		
24/9/2020	3580	3790		
29/10/2020		519	239	299
3/11/2020		326		
26/11/2020	204	288	257	
3/12/2020	201	204	237	
21/1/2021		127	79	592
4/2/2021	350	220	35	10670
11/3/2021	303	207		20800
13/4/2021	210	188		
27/5/2021	188	184		
10/6/2021	245	243	269	
22/7/2021	200	182		123
24/8/2021	310	313		
23/9/2021	1170	1830		
28/10/2021				
18/11/2021	2500	965	73	46000
23/12/2021	2510	769	122	
13/1/2022	2410	526	110	1890
22/2/2022		144	671	4830
29/3/2022	2510	2380	556	27100
20/4/2022	3440	2130		
17/5/2022	1820			

*empty cells = no flow, no sampling

EC-Quarterly monitoring

	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
Units	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm
14/4/2016	114	2810				
21/7/2016	214	3630				
25/10/2016	803					
19/1/2017	117	1173	Sampling at these four sites were started on July 2018 under WDL 212-01			
27/4/2017	62	990				
31/7/2017	66					
24/10/2017	2120	1770				
18/1/2018	579	2460				
19/4/2018	277	1044				
19/7/2018	204	2270	52700	52600	52500	52600
24/10/2018	238	6910	55300	55400	55200	55100
22/1/2019	131	2200	53400	53300	53400	53400
16/4/2019	109	1343	50200	50200	50800	50900
23/7/2019	71	3020	55100	55100	55100	55300
17/10/2019	201	5230	56900	56900	56600	56700
14/1/2020	166	1.409	51500	51600	52000	52000
23/4/2020	140	1202	50800	51000	51200	51200
23/7/2020	75	1970	56100	56000	55700	55700
29/10/2020	2910	244	55500	55400	55200	55300
3/11/2020			54500	54800	54700	54700
21/1/2021	84	1011	46500	47300	48100	48400
13/4/2021	235	559	51000	51200	51000	51700
22/7/2021	382	684	53600	53500	53300	53500
28/10/2021	120	1330	54600	54700	54500	54400
13/1/2022	103	1170	49700	49600	51100	51300
22/2/2022	665	1100	47100	47200	48600	49300
20/4/2022	547	1470	50500	50600	51300	51100





A.7 Turbidity

Table A 5: Turbidity at CIPS discharge monitoring sites.

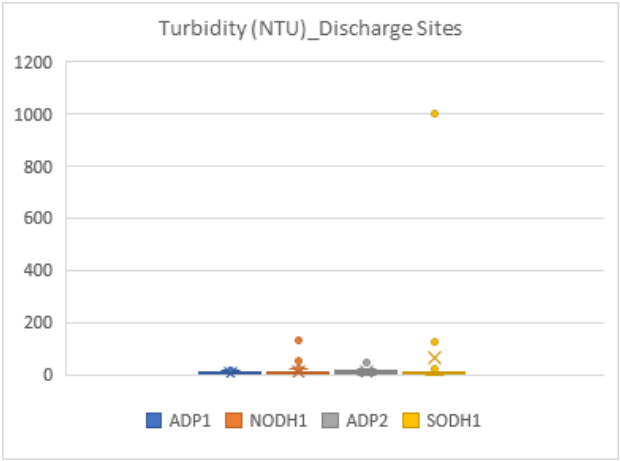
Turbidity -Monthly monitoring

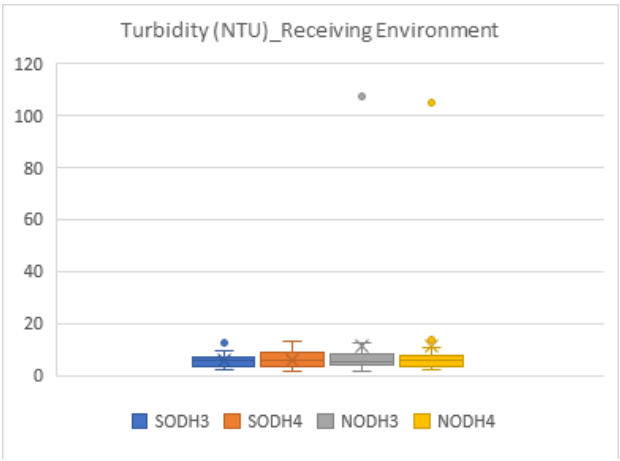
	ADP1	NODH1	ADP2	SODH1
Units	NTU	NTU	NTU	NTU
14/04/2016	6.57	7.43	4.4	0.35
10/05/2016	3.66	4.99	4.38	1.18
9/06/2016			5.52	0.89
21/07/2016			2.14	1.68
25/08/2016			5.61	2.18
27/09/2016	2.18	2.02	19.6	2.25
25/10/2016	10.1	9.89	5.83	7.2
24/11/2016			43.2	1.05
15/12/2016			16.5	125
19/01/2017	13.8	11.1	11.2	1.05
23/02/2017	5.16	9.22	6.57	0
30/03/2017	7.9	12	8.3	3.94
27/04/2017	5.46	5.18	9.27	0.52
30/05/2017	7.35	4.53	13.5	
22/06/2017	5.9	13.1	13.4	
31/07/2017			2.41	1.27
31/08/2017	1.68	1.38	2.99	8.18
21/09/2017	6.1	2.65	0	
24/10/2017	4.16	16.4	1.5	
16/11/2017	7.52		2.91	
20/12/2017	3.57	3.17	3.85	
18/01/2018	4.95	3.74	8.21	3.94
22/02/2018		10.4	3.53	6.26
22/03/2018		6.27	6.39	6.86
19/04/2018	5.61	8.67	11.6	0.8
17/05/2018	2.02	3.8	7.25	1.73
21/06/2018	9.85	18.8	19.9	
19/07/2018	6.21	23.2		
23/08/2018				
20/09/2018				
24/10/2018		4.27		
20/11/2018	2.13	52.2		1.42
18/12/2018		1.9		
22/01/2019	3.59	1.9		
19/02/2019	4.02			
19/03/2019	3.93	1.55		1.54
16/04/2019	5.76	2.15		
23/05/2019	12.5	2.46		
20/06/2019		4.32	8.12	
23/07/2019		3.1	2.18	1
26/08/2019				
17/09/2019		2.98		
17/10/2019				
21/11/2019	5.64	7.23		
12/12/2019	8.05	23.6		
14/01/2020	5.47	18	14.9	22.1
20/02/2020	6.76	27.6	15	8.86
26/03/2020	5.92	2.5		
23/04/2020	7.74	19		
21/05/2020	9.3	131		
18/06/2020				1.37
23/07/2020			2.49	1.11
20/08/2020	0.72	0.62		
24/09/2020	0.95	8.92		
29/10/2020		1.45	23.4	1000
3/11/2020		1.22		
26/11/2020	1.25	8.89	9.55	
3/12/2020	1.12	2.96	16.4	
21/01/2021		6.78	4.08	8.3
4/02/2021	3.84	8.26	8.54	1000
11/03/2021	1.62	9.6		4.4
13/04/2021	0.95	1.13		
27/05/2021	0.61	0.62		
10/6/2021	1.96	1.77	15.7	
22/7/2021	0.8	0.71		0.73
24/8/2021	1.33	1.31		
23/9/2021	4.63	3.22		
28/10/2021				
18/11/2021	3.91	6.53	3.96	1.14
23/12/2021	3.08	4.44	3.47	
13/1/2022	2.05	13.3	13.7	5.09
22/2/2022		3.25	2.51	6.45
29/3/2022	2.44	2.44	4.06	2.29
20/4/2022	2.61	3.06		
17/5/2022	10.1			

*empty cells = no flow, no sampling

Turbidity -Quarterly monitoring

	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
Units	NTU	NTU	NTU	NTU	NTU	NTU
14/04/2016	6.57	12.3				
21/07/2016	2.34	16.3				
25/10/2016	7.92					
19/01/2017	11.4	8.38	Sampling at these four sites were started on July 2018 under WDL 212-01			
27/04/2017	12.7	2.67				
31/07/2017	2.45					
24/10/2017	13.3	21.5				
18/01/2018	9.04	2.9				
19/04/2018	20.2	0.97				
19/07/2018	22.3	1.61	7.05	7.54	5.06	6.1
24/10/2018	4.91	5.43	3.53	5.18	4.27	2.97
22/01/2019	9.46	13	9.2	9.63	12.2	5.75
16/04/2019	6.06	8.89	2.52	2.38	7.37	6.41
23/07/2019	2.37	2.41	2.95	2.65	3.12	3.43
17/10/2019	9.94	7.09	5.68	3.54	5.41	5.42
14/01/2020	16.00	1.40	6.49	6.83	9.55	8.20
23/04/2020	10.7	2.25	6.88	8.48	4.66	5.78
23/07/2020	2.95	1.28	4.4	4.37	3.86	3.95
29/10/2020	1.49	24.6	5.76	6.04	4.79	4.11
3/11/2020			8.62	8.88	6.63	5.31
21/01/2021	4.23	2.91	3.56	3.83	3.39	2.86
13/04/2021	8.06	1.43	5.96	12.9	6.86	7.28
22/7/2021	30.4	1.63	2.24	1.62	1.54	2.12
28/10/2021	10.5	2.37	4.44	4.36	4.27	3.7
13/1/2022	13.7	1.15	4.99	3.42	107	105
22/2/2022	3.96	1.85	6.79	6.49	7.18	13.6
20/4/2022	4.18	8.79	12.2	10.9	10.4	10.6





A.8 Nutrients

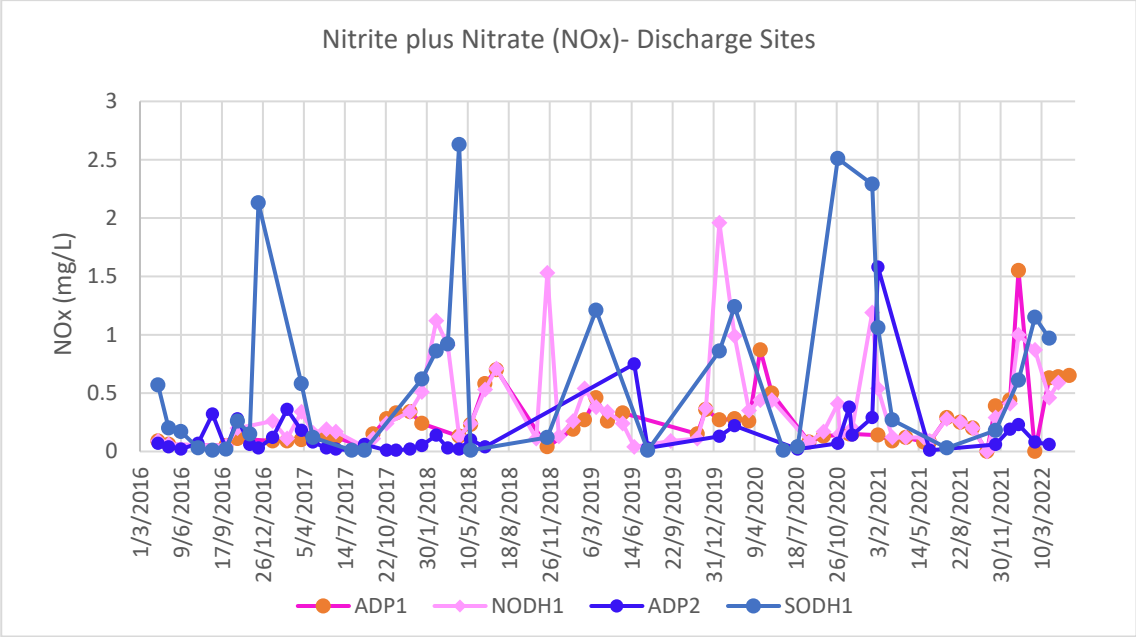


Figure A 3: Nitrite plus Nitrate (NOx, mg/L) at discharge sites from April 2016 to May 2022 (Monthly monitoring).

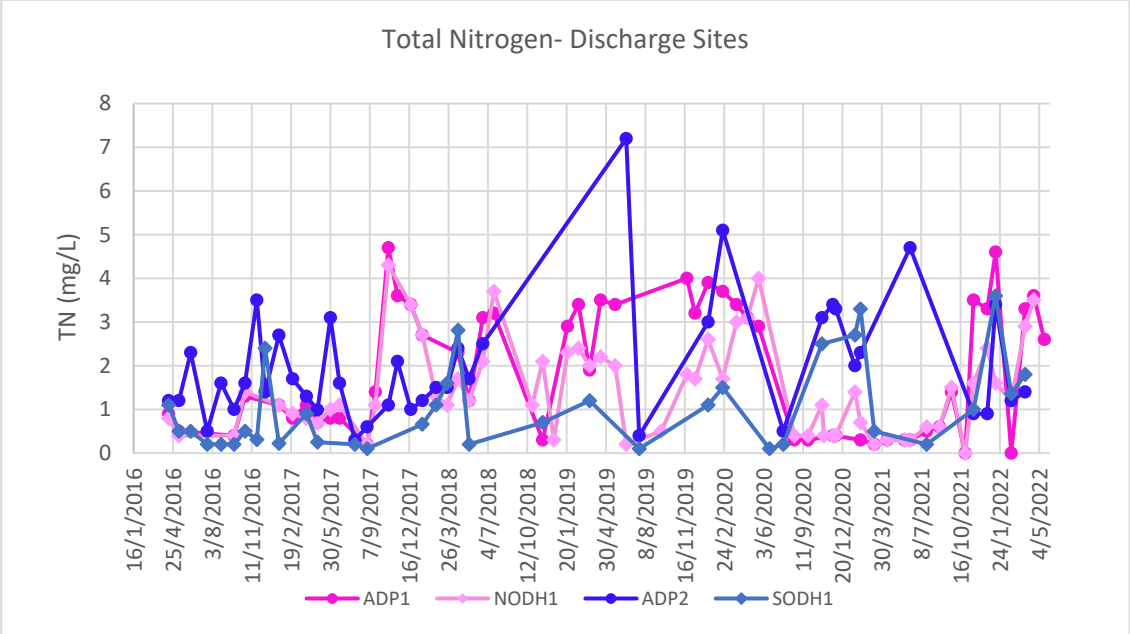


Figure A 4: Total Nitrogen (TN, mg/L) at discharge sites from April 2016 to May 2022 (Monthly monitoring).

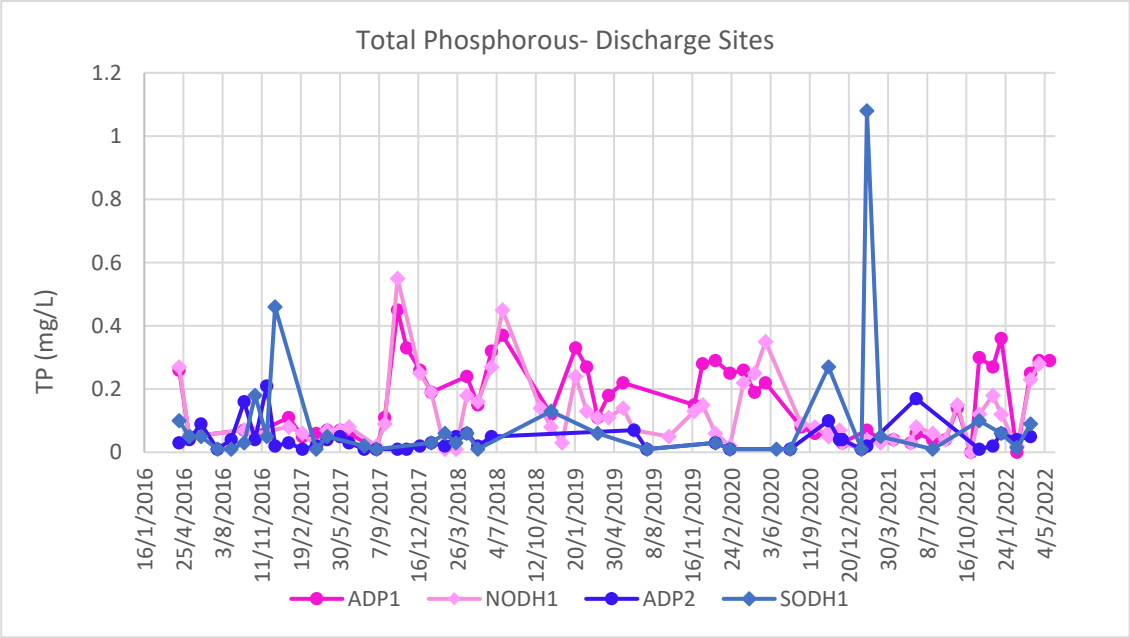


Figure A 5: Total Phosphorus (TP, mg/L) at discharge sites from April 2016 to May 2022 (Monthly monitoring).

A.9 Metals

Table A 6: Filtered and Total Metal concentrations (µg/L) at SODH3. Results < LOR are reported as the LOR.

SODH3	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
19/7/2018	0.00004	164	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
24/10/2018	0.00004	5	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/1/2019	0.00004	5	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
16/4/2019	0.00004	45	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
23/7/2019	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
17/10/2019	0.00004	5	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
14/1/2020	0.00004	5	0.5	0.2	1	0.2	2.2	0.5	5	5	0.2
23/4/2020	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
23/7/2020	0.00004	32	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
29/10/2020	0.00004	60	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	5	0.5	0.2	1	0.2	1.1	0.5	5	5	0.2
13/4/2021	0.00004	5	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
22/7/2021	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
28/10/2021	0.00004	5	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
13/1/2022	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
22/2/2022	0.00004	5	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
20/4/2022	0.00004	5	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2

SODH3	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/7/2018	0.00004	236	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
24/10/2018	0.00004	91	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/1/2019	0.00004	421	1.5	1.1	6	1.4	2.5	1.8	5	8	0.2
16/4/2019	0.00004	98	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
23/7/2019	0.00004	90	0.5	0.2	1	0.2	0.7	0.5	5	5	0.2
17/10/2019	0.00004	112	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
14/1/2020	0.00004	301	0.5	0.3	1	0.2	2.5	0.6	5	5	0.2
23/4/2020	0.00004	239	0.6	0.2	1	0.2	2	0.5	5	5	0.2
23/7/2020	0.00004	78	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
29/10/2020	0.00004	165	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	54	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
13/4/2021	0.00004	161	0.9	0.2	1	0.2	1.6	0.5	5	5	0.2
22/7/2021	0.00004	66	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
28/10/2021	0.00004	91	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
13/1/2022	0.00004	170	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
22/2/2022	0.00004	350	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
20/4/2022	0.00004	432	1.1	0.2	1	0.2	1.8	0.5	5	5	0.2

*Mercury Concentrations are in mg/L

Table A 7: Filtered and Total Metal concentrations (µg/L) at SODH4. Results < LOR are reported as the LOR.

SODH4	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
19/7/2018	0.00004	156	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
24/10/2018	0.00004	5	0.5	0.2	1	0.2	1.6	0.6	5	5	0.2
22/1/2019	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
16/4/2019	0.00004	46	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
23/7/2019	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
17/10/2019	0.00004	5	0.5	0.2	1	0.2	1.9	0.5	5	5	0.2
14/1/2020	0.00004	5	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
23/4/2020	0.00004	5	0.5	0.2	1	0.2	1	0.5	5	5	0.2
23/7/2020	0.00004	31	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
29/10/2020	0.00004	65	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	5	0.5	0.2	1	0.2	1.1	0.5	5	5	0.2
13/4/2021	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
22/7/2021	0.00004	39	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
28/10/2021	0.00004	88	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
13/1/2022	0.00004	103	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
22/2/2022	0.00004	5	0.5	0.2	1	0.2	1	0.5	5	5	0.2
20/4/2022	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2

SODH4	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/7/2018	0.00004	258	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
24/10/2018	0.00004	82	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/1/2019	0.00004	414	1	0.3	1	0.3	1.9	0.8	5	5	0.2
16/4/2019	0.00004	156	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
23/7/2019	0.00004	81	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
17/10/2019	0.00004	62	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
14/1/2020	0.00004	187	0.5	0.2	1	0.2	2.4	0.5	5	5	0.2
23/4/2020	0.00004	279	0.8	0.2	1	0.2	1.6	4.2	5	5	0.2
23/7/2020	0.00004	145	1.1	0.2	1	3.3	1.6	0.5	5	5	0.2
29/10/2020	0.00004	225	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	85	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
13/4/2021	0.00004	352	0.9	0.3	1	0.2	1.8	0.5	5	5	0.2
22/7/2021	0.00004	39	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
28/10/2021	0.00004	88	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
13/1/2022	0.00004	103	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
22/2/2022	0.00004	357	1	0.2	1	0.2	1.5	0.6	5	5	0.2
20/4/2022	0.00004	314	0.6	0.2	1	0.2	1.6	0.5	5	5	0.2

*Mercury Concentrations are in mg/L

Table A 8: Filtered and Total Metal concentrations (µg/L) at NODH3. Results < LOR are reported as the LOR.

NODH3	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
19/7/2018	0.00004	75	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
24/10/2018	0.00004	11	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/1/2019	0.00004	5	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
16/4/2019	0.00004	115	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
23/7/2019	0.00004	5	0.5	0.2	1	0.2	0.7	0.5	5	5	0.2
17/10/2019	0.00004	5	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
14/1/2020	0.00004	5	0.5	0.2	1	0.2	2.4	0.5	5	5	0.2
23/4/2020	0.00004	5	0.5	0.2	1	0.2	0.9	0.5	5	5	0.2
23/7/2020	0.00004	36	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
29/10/2020	0.00004	65	0.5	0.2	1	0.4	1.8	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
13/4/2021	0.00004	5	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
22/7/2021	0.00004	5	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
28/10/2021	0.00004	5	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
13/1/2022	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
22/2/2022	0.00004	5	0.5	0.2	1	0.2	1.4	0.6	5	5	0.2
20/4/2022	0.00004	5	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2

NODH3	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/7/2018	0.00004	250	0.5	0.2	1	0.2	2.2	0.5	5	5	0.2
24/10/2018	0.00004	40	0.5	0.2	3	0.2	1.7	0.5	5	5	0.2
22/1/2019	0.00004	389	0.9	0.3	1	0.2	1.9	0.7	5	5	0.2
16/4/2019	0.00004	274	0.6	0.2	1	0.2	1.7	0.5	5	5	0.2
23/7/2019	0.00004	76	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
17/10/2019	0.00004	34	0.5	0.2	1	0.2	2.2	0.5	5	5	0.2
14/1/2020	0.00004	216	0.6	0.2	1	0.2	2.4	0.9	5	5	0.2
23/4/2020	0.00004	185	0.8	0.2	1	0.2	1.9	0.5	5	5	0.2
23/7/2020	0.00004	92	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
29/10/2020	0.00004	172	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	69	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
13/4/2021	0.00004	229	0.9	0.2	1	0.2	1.6	0.5	5	5	0.2
22/7/2021	0.00004	39	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
28/10/2021	0.00004	64	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
13/1/2022	0.00004	3080	6.6	1.4	1	1.6	3.1	0.5	5	7	0.2
22/2/2022	0.00004	389	0.6	0.2	1	0.2	1.4	0.5	5	5	0.2
20/4/2022	0.00004	287	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2

*Mercury Concentrations are in mg/L

Table A 9: Filtered and Total Metal concentrations (µg/L) at NODH4. Results < LOR are reported as the LOR.

NODH4	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
19/7/2018	0.00004	105	0.5	0.2	1	0.2	1.9	0.5	5	5	0.2
24/10/2018	0.00004	5	0.5	0.2	1	0.2	1.7	0.8	5	5	0.2
22/1/2019	0.00004	5	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
16/4/2019	0.00004	85	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
23/7/2019	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
17/10/2019	0.00004	6	0.5	0.2	1	0.2	1.9	0.5	5	5	0.2
14/1/2020	0.00004	5	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
23/4/2020	0.00004	5	0.5	0.2	1	0.2	1	0.5	5	5	0.2
23/7/2020	0.00004	26	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
29/10/2020	0.00004	42	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/1/2021	0.00004	5	0.5	0.2	1	0.2	1.1	0.5	5	5	0.2
13/4/2021	0.00004	5	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
22/7/2021	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
28/10/2021	0.00004	5	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
13/1/2022	0.00004	5	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
22/2/2022	0.00004	5	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
20/4/2022	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2

NODH4	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	*0.00004*	*5*	*0.5*	*0.2*	*1*	*0.2*	*0.5*	*0.5*	*5*	*5*	*0.2*
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/7/2018	0.00004	220	0.5	0.2	1	0.2	2	0.5	5	5	0.2
24/10/2018	0.00004	74	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
22/1/2019	0.00004	227	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
16/4/2019	0.00004	261	0.5	0.2	1	0.2	1.5	1	5	5	0.2
23/7/2019	0.00004	75	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
17/10/2019	0.00004	77	0.5	0.2	1	0.2	2.4	0.5	5	5	0.2
14/1/2020	0.00004	205	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
23/4/2020	0.00004	151	0.8	0.2	1	0.2	2	0.5	5	5	0.2
23/7/2020	0.00004	74	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
29/10/2020	0.00004	82	0.5	0.2	15	0.2	1.7	0.5	5	10	0.2
3/11/2020											
21/1/2021	0.00004	55	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
13/4/2021	0.00004	173	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
22/7/2021	0.00004	42	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
28/10/2021	0.00004	59	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
13/1/2022	0.00004	2040	4.3	0.9	1	1	2.7	0.5	5	5	0.2
22/2/2022	0.00004	532	1	0.3	1	0.2	1.9	0.7	5	5	0.2
20/4/2022	0.00004	303	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2

*Mercury Concentrations are in mg/L

Table A 10: Filtered Metal concentrations (mg/L) at SODH1. Results < LOR are reported as the LOR.

SODH1	Filtered metal concetrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
10/5/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
9/6/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
21/7/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.042	0.0001
25/8/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.04	0.0001
27/9/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.037	0.0001
25/10/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
24/11/2016	0.0001	5	0.5	0.2	1	0.2	1.8	1.1	5	10	0.001
15/12/2016	0.0001	0.19	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.05	0.0001
19/1/2017	0.0001	5	0.5	0.2	1	0.2	1.3	1.1	5	16	
23/2/2017											
30/3/2017	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.026	0.0001
27/4/2017	0.00004	5	0.5	0.2	1	0.2	1.5	0.9	5	28	0.2
30/5/2017											
22/6/2017											
31/7/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.011	0.0001
31/8/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.036	0.0001
21/9/2017											
24/10/2017											
16/11/2017											
20/12/2017											
18/1/2018	0.00004	6	0.5	0.2	2	0.2	0.5	0.5	5	54	0.2
22/2/2018	0.0001	0.04	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.03	0.0001
22/3/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.043	0.0002
19/4/2018	0.00004	9	0.5	0.2	2	0.2	1.2	0.5	5	22	0.2
17/5/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.029	0.0001
21/6/2018											
19/7/2018											
23/8/2018											
20/9/2018											
24/10/2018											
20/11/2018	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.014	0.0001
18/12/2018											
22/1/2019											
19/2/2019											
19/3/2019	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
16/4/2019											
23/5/2019											
20/6/2019											
23/7/2019	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
26/8/2019											
17/9/2019											
17/10/2019											
21/11/2019											
12/12/2019											
14/1/2020	0.0001	0.07	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.015	0.0001
20/2/2020	0.0001	0.11	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001
26/3/2020											
23/4/2020											
21/5/2020											
18/6/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/7/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
20/8/2020											
24/9/2020											
29/10/2020	0.0001	1.83	0.006	0.001	0.006	0.005	0.001	0.001	0.001	0.097	0.0001
3/11/2020											
26/11/2020											
3/12/2020											
21/1/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012	0.0001
4/2/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.021	0.0001
11/3/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001
13/4/2021											
27/5/2021											
10/6/2021											
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
24/8/2021											
23/9/2021											
28/10/2021											
18/11/2021	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
23/12/2021											
13/1/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/2/2022	0.00004	0.005	0.0002	0.0002	0.0007	0.1	0.0002	0.0006	0.0002	0.008	0.00005
29/3/2022	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.007	0.0001
20/4/2022											
17/5/2022											

Table A 11: Total Metal concentrations (mg/L) at SODH1. Results < LOR are reported as the LOR.

SODH1	Total metal concetrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
10/5/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
9/6/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
21/7/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
25/8/2016	0.0001	3.36	0.017	0.012	0.027	0.008	0.022	0.034	0.001	0.097	0.0001
27/9/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
25/10/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
24/11/2016	0.0001	12	0.5	0.2	1	0.2	1.8	1.1	5	8	0.001
15/12/2016	0.0001	0.84	0.002	0.001	0.006	0.002	0.001	0.001	0.001	0.09	0.0001
19/1/2017	0.0001	25	0.5	0.2	1	0.2	1.5	1.1	5	11	
23/2/2017											
30/3/2017	0.0001	0.1	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.014	0.0003
27/4/2017	0.00004	11	0.5	0.2	1	0.2	1.5	0.6	5	11	0.2
30/5/2017											
22/6/2017											
31/7/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.003	0.001	0.003	0.005	0.0001
31/8/2017	0.0001	0.05	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/9/2017											
24/10/2017											
16/11/2017											
20/12/2017											
18/1/2018	0.00004	112	0.5	0.2	2	0.2	0.5	0.6	5	33	0.2
22/2/2018	0.0001	0.17	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.014	0.0001
22/3/2018	0.0001	0.09	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.019	0.0001
19/4/2018	0.00004	39	0.5	0.2	2	0.2	1.3	0.5	5	13	0.2
17/5/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/6/2018											
19/7/2018											
23/8/2018											
20/9/2018											
24/10/2018											
20/11/2018	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.014	0.0001
18/12/2018											
22/1/2019											
19/2/2019											
19/3/2019	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
16/4/2019											
23/5/2019											
20/6/2019											
23/7/2019	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
26/8/2019											
17/9/2019											
17/10/2019											
21/11/2019											
12/12/2019											
14/1/2020	0.0001	0.49	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.021	0.0001
20/2/2020	0.0001	0.2	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.03	0.0001
26/3/2020											
23/4/2020											
21/5/2020											
18/6/2020	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/7/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
20/8/2020											
24/9/2020											
29/10/2020	0.0001	4.43	0.011	0.001	0.008	0.006	0.001	0.003	0.001	0.104	0.0001
3/11/2020											
26/11/2020											
3/12/2020											
21/1/2021	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.009	0.0001
4/2/2021	0.0001	1.56	0.003	0.001	0.004	0.003	0.001	0.008	0.001	0.067	0.0001
11/3/2021	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.024	0.0002
13/4/2021											
27/5/2021											
10/6/2021											
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
24/8/2021											
23/9/2021											
28/10/2021											
18/11/2021	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
23/12/2021											
13/1/2022	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011	0.0001
22/2/2022	0.00000004	0.005	0.0002	0.0002	0.0007	0.0001	0.0002	0.0006	0.0002	0.008	0.00005
29/3/2022	0.0001	0.03	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.015	0.0001
20/4/2022											
17/5/2022											

Table A 12: Filtered metal concentrations (mg/L) at ADP2. Results < LOR are reported as the LOR.

ADP2	Filtered metal concetrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.04	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.005	0.001	0.053	0.0001
9/06/2016	0.0001	0.02	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.005	0.0001
21/07/2016	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.04	0.0001
25/08/2016	0.0001	0.01	0.001	0.001	0.014	0.001	0.001	0.002	0.001	0.036	0.0001
27/09/2016	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.076	0.0001
25/10/2016	0.0001	0.04	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.069	0.0001
24/11/2016	0.0001	0.7	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.034	0.0001
15/12/2016	0.0001	0.25	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.024	0.0001
19/01/2017	0.0001	0.18	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.038	0.0001
23/02/2017	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.0001
30/03/2017	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001
27/04/2017	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.056	0.0001
30/05/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.045	0.0001
22/06/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.066	0.0001
31/07/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.167	0.0001
31/08/2017	0.0001	0.03	0.002	0.001	0.005	0.001	0.001	0.003	0.001	0.062	0.0001
21/09/2017											
24/10/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.048	0.0001
16/11/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.094	0.0001
20/12/2017	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.011	0.0001
18/01/2018	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.024	0.0001
22/02/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.046	0.0001
22/03/2018	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.086	0.0001
19/04/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.079	0.0001
17/05/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.013	0.0001
21/06/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.025	0.0001
19/07/2018											
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018											
18/12/2018											
22/01/2019											
19/02/2019											
19/03/2019											
16/04/2019											
23/05/2019											
20/06/2019	0.0001	0.02	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.013	0.0001
23/07/2019	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.017	0.0001
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019											
12/12/2019											
14/01/2020	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001
20/02/2020	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
26/03/2020											
23/04/2020											
21/05/2020											
18/06/2020											
23/07/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.014	0.0001
20/08/2020											
24/09/2020											
29/10/2020	0.0001	0.06	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.032	0.0001
3/11/2020											
26/11/2020	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.013	0.0001
3/12/2020	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.02	0.0001
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.037	0.0001
4/02/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.093	0.0001
11/03/2021											
13/04/2021											
27/05/2021											
10/6/2021	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.026	0.0001
22/7/2021											
24/8/2021											
23/9/2021											
28/10/2021											
18/11/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.019	0.0001
23/12/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.029	0.0001
13/1/2022	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.038	0.0001
22/2/2022	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011	0.0001
29/3/2022	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
20/4/2022											
17/5/2022											

Table A 13: Total Metal concentrations (mg/L) at ADP2. Results < LOR are reported as the LOR.

ADP2	Total metal concetrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.026	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.006	0.001	0.014	0.0001
9/06/2016	0.0001	0.03	0.001	0.001	0.001	0.001	0.003	0.003	0.001	0.005	0.0002
21/07/2016	0.0001	0.04	0.001	0.001	0.007	0.001	0.001	0.002	0.001	0.057	0.0001
25/08/2016	0.0001	0.02	0.002	0.001	0.025	0.001	0.001	0.003	0.001	0.048	0.0001
27/09/2016	0.0001	0.4	0.001	0.001	0.003	0.005	0.002	0.002	0.001	0.115	0.0003
25/10/2016	0.0001	0.06	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.018	0.0001
24/11/2016	0.0001	0.6	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.05	0.0001
15/12/2016	0.0001	0.21	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.028	0.0001
19/01/2017	0.0001	0.17	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.028	0.0001
23/02/2017	0.0001	0.18	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.0001
30/03/2017	0.0001	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.035	0.0001
27/04/2017	0.0001	0.02	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.042	0.0001
30/05/2017	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.025	0.0001
22/06/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.059	0.0001
31/07/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.004	0.025	0.0001
31/08/2017	0.0001	0.22	0.005	0.001	0.014	0.001	0.001	0.004	0.001	0.042	0.0001
21/09/2017											
24/10/2017	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.004	0.001	0.034	0.0001
16/11/2017	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.024	0.0001
20/12/2017	0.0001	0.04	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.016	0.0001
18/01/2018	0.0001	0.04	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.018	0.0001
22/02/2018	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.039	0.0001
22/03/2018	0.0001	0.06	0.001	0.001	0.021	0.001	0.001	0.002	0.001	0.06	0.0001
19/04/2018	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.041	0.0001
17/05/2018	0.0001	0.05	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.024	0.0001
21/06/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
19/07/2018											
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018											
18/12/2018											
22/01/2019											
19/02/2019											
19/03/2019											
16/04/2019											
23/05/2019											
20/06/2019	0.0001	0.03	0.001	0.001	0.005	0.001	0.001	0.002	0.001	0.026	0.0001
23/07/2019	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.017	0.0001
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019											
12/12/2019											
14/01/2020	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.062	0.0001
20/02/2020	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.026	0.0001
26/03/2020											
23/04/2020											
21/05/2020											
18/06/2020											
23/07/2020	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.023	0.0001
20/08/2020											
24/09/2020											
29/10/2020	0.0001	0.07	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.027	0.0001
3/11/2020											
26/11/2020	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.032	0.0001
3/12/2020	0.0001	0.08	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.031	0.0001
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.045	0.0001
4/02/2021	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.071	0.0001
11/03/2021											
13/04/2021											
27/05/2021											
10/6/2021	0.0001	0.05	0.001	0.001	0.003	0.001	0.001	0.004	0.001	0.04	0.0003
22/7/2021											
24/8/2021											
23/9/2021											
28/10/2021											
18/11/2021	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.03	0.0001
23/12/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.033	0.0001
13/1/2022	0.0001	0.05	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.06	0.0001
22/2/2022	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.027	0.0001
29/3/2022	0.0001	0.02	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.012	0.0001
20/4/2022											
17/5/2022											

Table A 14: Filtered metal concentrations (mg/L) at NODH1. Results < LOR are reported as the LOR.

NODH1	Filtered metal concetrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.67	0.0001
10/5/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.388	0.0001
9/6/2016											
21/7/2016											
25/8/2016											
27/9/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.345	0.0001
25/10/2016	0.0001	0.01	0.001	0.001	0.005	0.001	0.002	0.001	0.001	0.84	0.0001
24/11/2016											
15/12/2016											
19/1/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.16	0.0001
23/2/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.511	0.0001
30/3/2017	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.474	0.0001
27/4/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.504	0.0001
30/5/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.662	0.0001
22/6/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.932	0.0001
31/7/2017											
31/8/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.368	0.0001
21/9/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.649	0.0001
24/10/2017	0.0001	0.01	0.002	0.001	0.008	0.001	0.006	0.001	0.001	0.064	0.0001
16/11/2017											
20/12/2017	0.0001	0.01	0.003	0.001	0.006	0.001	0.006	0.001	0.001	0.006	0.0001
18/1/2018	0.0001	0.01	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.005	0.0001
22/2/2018	0.0001	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.152	0.0001
22/3/2018	0.0001	0.09	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.149	0.0001
19/4/2018	0.0001	0.01	0.002	0.001	0.003	0.001	0.004	0.001	0.001	0.013	0.0001
17/5/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.013	0.0001
21/6/2018	0.0001	0.01	0.002	0.001	0.002	0.001	0.003	0.001	0.001	0.008	0.0001
19/7/2018	0.0001	0.01	0.003	0.001	0.005	0.001	0.004	0.001	0.001	0.007	0.0001
23/8/2018											
20/9/2018											
24/10/2018	0.0001	0.06	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.048	0.0001
20/11/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.064	0.0001
18/12/2018	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.021	0.0001
22/1/2019	0.0001	0.01	0.002	0.001	0.001	0.001	0.005	0.001	0.001	0.008	0.0001
19/2/2019	0.0001	0.03	0.002	0.001	0.004	0.001	0.004	0.001	0.001	0.015	0.0001
19/3/2019	0.0001	0.01	0.002	0.001	0.002	0.001	0.004	0.001	0.001	0.009	0.0001
16/4/2019	0.0001	0.02	0.002	0.001	0.002	0.001	0.004	0.001	0.001	0.008	0.0001
23/5/2019	0.0001	0.01	0.002	0.001	0.002	0.001	0.004	0.001	0.001	0.005	0.0001
20/6/2019	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.012	0.0001
23/7/2019											
26/8/2019											
17/9/2019	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.012	0.0001
17/10/2019											
21/11/2019	0.0001	0.01	0.002	0.001	0.002	0.001	0.003	0.001	0.001	0.01	0.0001
12/12/2019	0.0001	0.01	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.015	0.0001
14/1/2020	0.0001	0.36	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.072	0.0001
20/2/2020	0.0001	0.05	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.034	0.0001
26/3/2020	0.0001	0.02	0.002	0.001	0.002	0.001	0.004	0.001	0.001	0.015	0.0001
23/4/2020	0.0001	0.01	0.002	0.001	0.01	0.001	0.006	0.001	0.001	0.005	0.0001
21/5/2020	0.0001	0.01	0.003	0.001	0.013	0.001	0.006	0.001	0.001	0.005	0.0001
18/6/2020											
23/7/2020											
20/8/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
24/9/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
29/10/2020	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.044	0.0001
3/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
26/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
3/12/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/1/2021	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.082	0.0001
4/2/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.026	0.0001
11/3/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.007	0.0001
13/4/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011	0.0001
27/5/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
10/6/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/7/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
24/8/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/9/2021	0.0001	0.01	0.002	0.001	0.003	0.001	0.002	0.001	0.001	0.005	0.0001
28/10/2021	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow
18/11/2021	0.0001	0.02	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.026	0.0001
23/12/2021	0.0001	0.01	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.013	0.0001
13/1/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.019	0.0001
22/2/2022	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.084	0.0001
29/3/2022	0.0001	0.01	0.002	0.001	0.003	0.001	0.004	0.001	0.001	0.005	0.0001
20/4/2022	0.0001	0.01	0.003	0.001	0.003	0.001	0.005	0.001	0.001	0.006	0.0001
17/5/2022	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow

Table A 15: Total metal concentrations (mg/L) at NODH1. Results < LOR are reported as the LOR.

NODH1	Total metal concetrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.09	0.0001
10/5/2016	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.714	0.0001
9/6/2016											
21/7/2016											
25/8/2016											
27/9/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.484	0.0001
25/10/2016	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	1.15	0.0001
24/11/2016											
15/12/2016											
19/1/2017	0.0001	0.06	0.001	0.001	0.005	0.001	0.003	0.001	0.001	1.23	0.0001
23/2/2017	0.0001	0.13	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.826	0.0001
30/3/2017	0.0001	0.14	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.465	0.0001
27/4/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.002	0.002	0.785	0.0001
30/5/2017	0.0001	0.06	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.896	0.0001
22/6/2017	0.0001	0.12	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.2	0.0001
31/7/2017											
31/8/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.448	0.0001
21/9/2017	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.822	0.0001
24/10/2017	0.0001	0.31	0.003	0.001	0.011	0.001	0.007	0.002	0.002	0.47	0.0001
16/11/2017											
20/12/2017	0.0001	0.01	0.003	0.001	0.006	0.001	0.006	0.001	0.003	0.007	0.0001
18/1/2018	0.0001	0.02	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.012	0.0001
22/2/2018	0.0001	0.2	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.135	0.0001
22/3/2018	0.0001	0.12	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.115	0.0001
19/4/2018	0.0001	0.09	0.002	0.001	0.003	0.001	0.004	0.001	0.001	0.035	0.0001
17/5/2018	0.0001	0.03	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.028	0.0001
21/6/2018	0.0001	0.05	0.002	0.001	0.003	0.001	0.003	0.001	0.001	0.049	0.0001
19/7/2018	0.0001	0.53	0.004	0.001	0.01	0.001	0.005	0.001	0.001	0.261	0.0001
23/8/2018											
20/9/2018											
24/10/2018	0.0001	0.09	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.062	0.0001
20/11/2018	0.0001	0.33	0.001	0.001	0.006	0.002	0.001	0.002	0.001	0.166	0.0001
18/12/2018	0.0001	0.03	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.029	0.0001
22/1/2019	0.0001	0.02	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.012	0.0001
19/2/2019	0.0001	0.03	0.002	0.001	0.004	0.001	0.005	0.001	0.001	0.025	0.0001
19/3/2019	0.0001	0.02	0.002	0.001	0.003	0.001	0.005	0.001	0.001	0.016	0.0001
16/4/2019	0.0001	0.03	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.013	0.0001
23/5/2019	0.0001	0.03	0.003	0.001	0.001	0.001	0.004	0.002	0.001	0.01	0.0001
20/6/2019	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.018	0.0001
23/7/2019											
26/8/2019											
17/9/2019	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.03	0.0001
17/10/2019											
21/11/2019	0.0001	0.03	0.002	0.001	0.002	0.001	0.004	0.001	0.001	0.03	0.0001
12/12/2019	0.0001	0.01	0.001	0.001	0.003	0.001	0.003	0.002	0.001	0.01	0.0001
14/1/2020	0.0001	0.34	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.078	0.0001
20/2/2020	0.0001	0.26	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.056	0.0001
26/3/2020	0.0001	0.04	0.002	0.001	0.003	0.001	0.005	0.001	0.001	0.024	0.0001
23/4/2020	0.0001	0.03	0.003	0.001	0.017	0.001	0.006	0.001	0.001	0.012	0.0001
21/5/2020	0.0001	0.67	0.004	0.001	0.034	0.002	0.006	0.002	0.001	0.115	0.0001
18/6/2020											
23/7/2020											
20/8/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
24/9/2020	0.0001	0.13	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.069	0.0001
29/10/2020	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.046	0.0001
3/11/2020	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.039	0.0001
26/11/2020	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.039	0.0001
3/12/2020	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
21/1/2021	0.0001	0.07	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.085	0.0001
4/2/2021	0.0001	0.13	0.002	0.001	0.002	0.001	0.001	0.002	0.001	0.032	0.0001
11/3/2021	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.062	0.0004
13/4/2021	0.0001	0.01	0.001	0.001	0.012	0.001	0.001	0.001	0.001	0.02	0.0001
27/5/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.009	0.0001
10/6/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.007	0.0001
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.008	0.0001
24/8/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.007	0.0001
23/9/2021	0.0001	0.02	0.002	0.001	0.007	0.001	0.002	0.001	0.001	0.025	0.0001
28/10/2021	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow
18/11/2021	0.0001	0.1	0.001	0.001	0.006	0.001	0.002	0.001	0.001	0.076	0.0001
23/12/2021	0.0001	0.04	0.001	0.001	0.004	0.001	0.003	0.001	0.001	0.018	0.0001
13/1/2022	0.0001	0.47	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.064	0.0001
22/2/2022	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.093	0.0001
29/3/2022	0.0001	0.01	0.002	0.001	0.003	0.001	0.004	0.001	0.001	0.014	0.0001
20/4/2022	0.0001	0.01	0.003	0.001	0.005	0.001	0.006	0.001	0.001	0.013	0.0001
17/5/2022	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow	no flow

Table A 16: Filtered metal concentrations (mg/L) at ADP1. Results < LOR are reported as the LOR.

ADP1	Filtered metal concetrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.007	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.371	0.0001
9/06/2016											
21/07/2016											
25/08/2016											
27/09/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.358	0.0001
25/10/2016	0.0001	0.01	0.001	0.001	0.005	0.001	0.002	0.001	0.001	0.768	0.0001
24/11/2016											
15/12/2016											
19/01/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.817	0.0001
23/02/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.472	0.0001
30/03/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.65	0.0001
27/04/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.527	0.0001
30/05/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.667	0.0001
22/06/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.911	0.0001
31/07/2017											
31/08/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.438	0.0001
21/09/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.285	0.0001
24/10/2017	0.0001	0.01	0.004	0.001	0.01	0.001	0.008	0.001	0.001	0.005	0.0001
16/11/2017	0.0001	0.01	0.003	0.001	0.014	0.001	0.007	0.001	0.001	0.01	0.0001
20/12/2017	0.0001	0.01	0.003	0.001	0.004	0.001	0.006	0.001	0.001	0.005	0.0001
18/01/2018	0.0001	0.01	0.003	0.001	0.002	0.001	0.007	0.001	0.001	0.005	0.0001
22/02/2018											
22/03/2018											
19/04/2018	0.0001	0.01	0.004	0.001	0.002	0.001	0.006	0.001	0.001	0.007	0.0001
17/05/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.015	0.0001
21/06/2018	0.0001	0.01	0.002	0.001	0.002	0.001	0.003	0.001	0.001	0.007	0.0001
19/07/2018	0.0001	0.01	0.004	0.001	0.006	0.001	0.004	0.001	0.001	0.005	0.0001
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.007	0.0001
18/12/2018											
22/01/2019	0.0001	0.01	0.003	0.001	0.001	0.001	0.007	0.001	0.001	0.005	0.0001
19/02/2019	0.0001	0.01	0.003	0.001	0.006	0.001	0.008	0.001	0.001	0.005	0.0001
19/03/2019	0.0001	0.01	0.004	0.001	0.002	0.001	0.008	0.001	0.001	0.005	0.0001
16/04/2019	0.0001	0.01	0.003	0.001	0.003	0.001	0.007	0.001	0.001	0.005	0.0001
23/05/2019	0.0001	0.01	0.004	0.001	0.002	0.001	0.007	0.001	0.001	0.005	0.0001
20/06/2019											
23/07/2019											
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019	0.0001	0.01	0.003	0.001	0.003	0.001	0.007	0.001	0.001	0.005	0.0001
12/12/2019	0.0001	0.01	0.002	0.001	0.003	0.001	0.008	0.001	0.001	0.005	0.0001
14/01/2020	0.0001	0.01	0.003	0.001	0.007	0.001	0.007	0.001	0.001	0.005	0.0001
20/02/2020	0.0001	0.01	0.002	0.001	0.006	0.001	0.006	0.001	0.001	0.005	0.0001
26/03/2020	0.0001	0.01	0.003	0.001	0.003	0.001	0.006	0.001	0.001	0.005	0.0001
23/04/2020	0.0001	0.01	0.003	0.001	0.012	0.001	0.006	0.001	0.001	0.005	0.0001
21/05/2020	0.0001	0.01	0.004	0.001	0.016	0.001	0.006	0.001	0.001	0.005	0.0001
18/06/2020											
23/07/2020											
20/08/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.009	0.0001
24/09/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
29/10/2020											
3/11/2020											
26/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
3/12/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/01/2021											
4/02/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.01	0.0001
11/03/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
27/05/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
10/6/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
24/8/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/9/2021	0.0001	0.01	0.002	0.001	0.004	0.001	0.001	0.001	0.001	0.005	0.0001
28/10/2021	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow
18/11/2021	0.0001	0.01	0.002	0.001	0.007	0.001	0.005	0.001	0.001	0.005	0.0001
23/12/2021	0.0001	0.01	0.002	0.001	0.005	0.001	0.005	0.001	0.001	0.005	0.0001
13/1/2022	0.0001	0.01	0.003	0.001	0.008	0.001	0.005	0.001	0.001	0.005	0.0001
22/2/2022	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow
29/3/2022	0.0001	0.01	0.003	0.001	0.003	0.001	0.005	0.001	0.001	0.005	0.0001
20/4/2022	0.0001	0.01	0.003	0.001	0.003	0.001	0.005	0.001	0.001	0.005	0.0001
17/5/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001

Table A 17: Total metal concentrations (mg/L) at ADP1. Results < LOR are reported as the LOR.

ADP1	Total metal concetrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.03	0.001	0.001	0.01	0.001	0.001	0.001	0.001	1.08	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.596	0.0001
9/06/2016											
21/07/2016											
25/08/2016											
27/09/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.502	0.0001
25/10/2016	0.0001	0.02	0.001	0.001	0.005	0.001	0.002	0.001	0.001	1.27	0.0001
24/11/2016											
15/12/2016											
19/01/2017	0.0001	0.05	0.001	0.001	0.005	0.001	0.002	0.001	0.001	1.36	0.0001
23/02/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.456	0.0001
30/03/2017	0.0001	0.03	0.003	0.002	0.006	0.001	0.004	0.002	0.001	1.01	0.0006
27/04/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.886	0.0001
30/05/2017	0.0001	0.05	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.935	0.0001
22/06/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.02	0.0001
31/07/2017											
31/08/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.511	0.0001
21/09/2017	0.0001	0.03	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.848	0.0001
24/10/2017	0.0001	0.01	0.003	0.001	0.01	0.001	0.007	0.001	0.001	0.059	0.0001
16/11/2017	0.0001	0.02	0.003	0.001	0.018	0.001	0.006	0.001	0.002	0.152	0.0001
20/12/2017	0.0001	0.01	0.003	0.001	0.006	0.001	0.006	0.001	0.002	0.008	0.0001
18/01/2018	0.0001	0.02	0.003	0.001	0.004	0.001	0.006	0.001	0.001	0.064	0.0001
22/02/2018											
22/03/2018											
19/04/2018	0.0001	0.02	0.004	0.001	0.003	0.001	0.006	0.001	0.001	0.018	0.0001
17/05/2018	0.0001	0.05	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.014	0.0001
21/06/2018	0.0001	0.16	0.002	0.001	0.005	0.001	0.003	0.001	0.001	0.237	0.0001
19/07/2018	0.0001	0.09	0.004	0.001	0.009	0.001	0.005	0.001	0.001	0.088	0.0001
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
18/12/2018											
22/01/2019	0.0001	0.01	0.004	0.001	0.002	0.001	0.007	0.001	0.001	0.005	0.0001
19/02/2019	0.0001	0.02	0.004	0.001	0.007	0.001	0.008	0.001	0.001	0.005	0.0001
19/03/2019	0.0001	0.02	0.004	0.001	0.003	0.001	0.008	0.001	0.001	0.011	0.0001
16/04/2019	0.0001	0.01	0.004	0.001	0.003	0.001	0.009	0.001	0.001	0.005	0.0001
23/05/2019	0.0001	0.04	0.004	0.001	0.002	0.001	0.008	0.002	0.001	0.01	0.0001
20/06/2019											
23/07/2019											
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019	0.0001	0.02	0.003	0.001	0.003	0.001	0.007	0.001	0.001	0.005	0.0001
12/12/2019	0.0001	0.01	0.003	0.001	0.004	0.001	0.008	0.001	0.001	0.005	0.0001
14/01/2020	0.0001	0.01	0.003	0.001	0.011	0.001	0.007	0.001	0.001	0.075	0.0001
20/02/2020	0.0001	0.04	0.002	0.001	0.012	0.001	0.007	0.001	0.001	0.006	0.0001
26/03/2020	0.0001	0.06	0.003	0.001	0.004	0.001	0.006	0.001	0.001	0.012	0.0001
23/04/2020	0.0001	0.02	0.003	0.001	0.017	0.001	0.006	0.001	0.001	0.005	0.0001
21/05/2020	0.0001	0.1	0.004	0.001	0.024	0.001	0.006	0.001	0.001	0.011	0.0001
18/06/2020											
23/07/2020											
20/08/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.01	0.0001
24/09/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
29/10/2020											
3/11/2020											
26/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.0001
3/12/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.009	0.0001
21/01/2021											
4/02/2021	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.084	0.0001
11/03/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
27/05/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
10/6/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.017	0.0001
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.008	0.0001
24/8/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.008	0.0001
23/9/2021	0.0001	0.02	0.002	0.001	0.008	0.001	0.002	0.001	0.001	0.022	0.0001
28/10/2021	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow
18/11/2021	0.0001	0.02	0.003	0.001	0.01	0.001	0.005	0.001	0.001	0.014	0.0001
23/12/2021	0.0001	0.01	0.002	0.001	0.006	0.001	0.005	0.001	0.001	0.005	0.0001
13/1/2022	0.0001	0.02	0.003	0.001	0.011	0.001	0.005	0.001	0.001	0.005	0.0001
22/2/2022	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow	No flow
29/3/2022	0.0001	0.01	0.003	0.001	0.005	0.001	0.006	0.001	0.001	0.005	0.0001
20/4/2022	0.0001	0.01	0.004	0.001	0.005	0.001	0.007	0.001	0.001	0.016	0.0001
17/5/2022	0.0001	0.06	0.003	0.001	0.006	0.001	0.004	0.001	0.001	0.032	0.0001

Table A 18: Filtered and Total metal concentrations (mg/L) at ISCP. Results < LOR are reported as the LOR.

ISCP	Filtered metal concetrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.025	0.0001
21/7/2016	0.0001	0.08	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.045	0.0001
25/10/2016	0.0001	0.06	0.001	0.001	0.008	0.001	0.001	0.001	0.001	0.012	0.0001
19/1/2017	0.0001	0.22	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.017	0.0001
27/4/2017	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.028	0.0001
31/7/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.033	0.0001
24/10/2017	0.0001	0.03	0.001	0.001	0.005	0.001	0.001	0.002	0.001	0.067	0.0001
18/1/2018	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012	0.0001
19/4/2018	0.0001	0.05	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.036	0.0001
19/7/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
24/10/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/1/2019	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.029	0.0001
16/4/2019	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
23/7/2019	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.018	0.0001
17/10/2019	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.007	0.0001
14/1/2020	0.0001	0.11	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.055	0.0001
23/4/2020	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/7/2020	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.024	0.0001
29/10/2020	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.005	0.0001
3/11/2020											
21/1/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.052	0.0001
13/4/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
22/07/2021	0.0001	0.02	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.009	0.0001
28/10/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.0001
13/01/2022	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.023	0.0001
22/02/2022	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.014	0.0001
20/04/2022	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.011	0.0001

ISCP	Total metal concetrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.02	0.0001
21/7/2016	0.0001	0.04	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.055	0.0001
25/10/2016	0.0001	0.09	0.001	0.001	0.008	0.001	0.001	0.002	0.001	0.029	0.0001
19/1/2017	0.0001	0.22	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.028	0.0001
27/4/2017	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.046	0.0001
31/7/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.003	0.029	0.0001
24/10/2017	0.0001	0.05	0.001	0.001	0.006	0.001	0.001	0.003	0.001	0.1	0.0002
18/1/2018	0.0001	0.1	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.033	0.0001
19/4/2018	0.0001	0.08	0.001	0.001	0.003	0.001	0.001	0.002	0.001	0.071	0.0001
19/7/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011	0.0001
24/10/2018	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.008	0.0001
22/1/2019	0.0001	0.06	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.055	0.0001
16/4/2019	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.018	0.0001
23/7/2019	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.017	0.0001
17/10/2019	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.011	0.0001
14/1/2020	0.0001	0.15	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.148	0.0001
23/4/2020	0.0001	0.07	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.028	0.0001
23/7/2020	0.0001	0.01	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.021	0.0001
29/10/2020	0.0001	0.07	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.034	0.0001
3/11/2020											
21/1/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.047	0.0001
13/4/2021	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.025	0.0001
22/07/2021	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.023	0.0001
28/10/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012	0.0001
13/01/2022	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.061	0.0001
22/02/2022	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001
20/04/2022	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.02	0.0001

Table A 19: Filtered and Total metal concentrations (mg/L) at ILCP. Results < LOR are reported as the LOR.

ILCP	Filtered metal concetrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.003	0.002	0.001	0.005	0.0001
21/7/2016	0.0001	0.01	0.002	0.001	0.003	0.001	0.004	0.006	0.001	0.044	0.0001
25/10/2016											
19/1/2017	0.0001	1.29	0.001	0.008	0.008	0.001	0.001	0.022	0.001	0.618	0.0009
27/4/2017	0.0001	0.31	0.001	0.002	0.004	0.001	0.002	0.008	0.001	1.44	0.0002
31/7/2017											
24/10/2017	0.0001	1.43	0.001	0.018	0.015	0.001	0.002	0.045	0.001	1.3	0.0009
18/1/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.084	0.0001
19/4/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.038	0.0001
19/7/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
24/10/2018	0.0001	0.01	0.001	0.001	0.003	0.001	0.006	0.001	0.001	0.005	0.0001
22/1/2019	0.0001	0.05	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.005	0.0001
16/4/2019	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
23/7/2019	0.0001	0.03	0.001	0.001	0.004	0.001	0.003	0.002	0.001	0.005	0.0001
17/10/2019	0.0001	0.01	0.001	0.001	0.002	0.001	0.005	0.002	0.001	0.005	0.0001
14/1/2020	0.0001	0.02	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/4/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/7/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0002
29/10/2020	0.0001	0.01	0.001	0.001	0.003	0.001	0.004	0.001	0.001	0.005	0.0001
3/11/2020											
21/1/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
13/4/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
28/10/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.005	0.0001
13/1/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/2/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
20/4/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001

ILCP	Total metal concetrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/4/2016	0.0003	0.01	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.005	0.0001
21/7/2016	0.0001	0.04	0.003	0.001	0.006	0.001	0.005	0.009	0.001	0.15	0.0001
25/10/2016	Relining of Ponds										
19/1/2017	0.0001	1.55	0.001	0.008	0.01	0.001	0.002	0.025	0.001	0.592	0.0009
27/4/2017	0.0001	0.34	0.001	0.002	0.003	0.001	0.001	0.007	0.001	1.47	0.0001
31/7/2017	Pond Empty										
24/10/2017	0.0001	1.54	0.002	0.019	0.017	0.001	0.003	0.051	0.001	1.34	0.0009
18/1/2018	0.0001	0.04	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.029	0.0001
19/4/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
19/7/2018	0.0001	0.04	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.008	0.0001
24/10/2018	0.0001	0.02	0.001	0.001	0.003	0.001	0.005	0.001	0.001	0.005	0.0001
22/1/2019	0.0001	0.19	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.005	0.0001
16/4/2019	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/7/2019	0.0001	0.02	0.001	0.001	0.004	0.001	0.003	0.002	0.001	0.008	0.0001
17/10/2019	0.0001	0.03	0.001	0.001	0.002	0.001	0.005	0.001	0.001	0.005	0.0001
14/1/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/4/2020	0.0001	0.01	0.01	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/7/2020	0.0001	0.01	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.005	0.0001
29/10/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.003	0.001	0.001	0.005	0.0001
3/11/2020											
21/1/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
13/4/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/7/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
28/10/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.005	0.0001
13/1/2022	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/2/2022	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.005	0.0001
20/4/2022	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.0001

A.10 *E. coli*

Table A 20: *E. coli* concentrations at CIPS discharge monitoring sites.

E.coli -Monthly monitoring

	ADP1	NODH1	ADP2	SODH1
Units	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL
14/4/2016	<10	<10	41	10
10/5/2016	<1	<1	26	>2420
9/6/2016			<10	813
21/7/2016			20	<10
25/8/2016			31	<10
27/9/2016	<10	10	10	<10
25/10/2016	<10	<10	<10	24196
24/11/2016			10	20
15/12/2016			74	12262
19/1/2017	<10	63	121	
23/2/2017	<10	<10	74	
30/3/2017	<10	94	520	256
27/4/2017	<10	<10	4352	37
30/5/2017	<10	<10	30	
22/6/2017	<10	<10	20	
31/7/2017			187	<10
31/8/2017	<10	<10	41	<10
21/9/2017	<10	<10		
24/10/2017				
16/11/2017				
20/12/2017	<10	<10	31	
18/1/2018	<10	<10	624	366
22/2/2018	0	41	61	41
22/3/2018	0	1396	171	457
19/4/2018	<10	171	20	1236
17/5/2018	10	20	266	<10
21/6/2018	<10	30	85	
19/7/2018	10	17329		
23/8/2018				
20/9/2018				
24/10/2018		537		
20/11/2018	<10	2755		748
18/12/2018		432		
22/1/2019		86		
19/2/2019	<1			
19/3/2019	<10	<10		51
16/4/2019	<10	10		
23/5/2019	<10	290		
20/6/2019		640	>24196	
23/7/2019		880	30	<1
26/8/2019				
17/9/2019		2046		
17/10/2019				
21/11/2019	<10	<10		
12/12/2019	<10	<10		
14/1/2020	<1	219	517	435
20/2/2020	<1	>2046	411	1733
26/3/2020	<1	52		
23/4/2020	<1	<10		
21/5/2020	<1	30		
18/6/2020				<1
23/7/2020			3	<1
20/8/2020	<1	<1		
24/9/2020	<1	<1		
29/10/2020		35	12	63
3/11/2020				
26/11/2020	6	8	20	
3/12/2020	<1	1	6	
21/1/2021		44	23	35
4/2/2021	<1	<1	1046	866
11/3/2021	<1	3		<2420
13/4/2021	<1	<1		
27/5/2021	<1	<1		
10/6/2021	<1	<1	33	
22/7/2021	<1	<1		<1
24/8/2021	<1	<1		
23/9/2021	<1	<1		
28/10/2021				
18/11/2021	<1	77	25	<1
23/12/2021	<10	<10	20	
13/1/2022	<10	10	63	262
22/2/2022		16	22	55
29/3/2022	<1	1	41	2420
20/4/2022	<1	<1		
17/5/2022	<1			

*empty cells = no flow, no sampling

E.coli -Quarterly monitoring

	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
Units	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL
Guideline-Max			**200**	**200**	**200**	**200**
14/4/2016	288	10				
21/7/2016	63	31				
25/10/2016	233	0				
19/1/2017	41	<10	Sampling at these four sites were started on July 2018 under WDL 212-01			
27/4/2017	546	10				
31/7/2017	31	0				
24/10/2017	0	0				
18/1/2018	216	<10				
19/4/2018	0	0				
19/7/2018	2	1	<20	<20	<20	<20
24/10/2018	33	14	<20	<20	<20	<20
22/1/2019	6	1	<1	4	<1	<1
16/4/2019	31	<10	<1	<1	<1	1
23/7/2019	16	<1	10	<1	<1	<1
17/10/2019	8	<1	<1	2	<1	<1
14/1/2020	88	4	5	10	5	<1
23/4/2020	12	<1	<1	<1	<1	<1
23/7/2020	1	6	<1	<1	1	<1
29/10/2020	<1	63	5	1	<1	4
3/11/2020						
21/1/2021	2	4	1	5	1	<1
13/4/2021	14	5	4	<1	26	8
22/7/2021	107	10	<1	<1	<1	<1
28/10/2021	687	11	<1	<1	<1	<1
13/1/2022	86	<10	<1	<1	6	<1
22/2/2022	71	4	<1	<1	1	<1
20/4/2022	3	<1	<1	<1	<1	<1

A.11 Hydrocarbons - Sediment

Table A 21: Hydrocarbon concentrations (mg/kg) at SODH2. Results < LOR are reported as the LOR.

Chemical Name	C10 - C14 Fraction	>C10 - C16 Fraction	C15 - C28 Fraction	>C16 - C34 Fraction	C29 - C36 Fraction	>C34 - C40 Fraction	C10 - C36 Fraction (sum)	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene	C6 - C10 Fraction	C6 - C9 Fraction	C6 - C10 Fraction minus BTEX (F1)	Naphthalene	Benzene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Toluene
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR/EQL	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
14/4/2016	50	50	100	100	100	100	50	50	50	10	10	10	0.8	0.2	0.5	0.5	0.5	0.5	0.2	0.5
21/7/2016	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
25/10/2016	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
19/1/2017	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
27/4/2017	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
31/7/2017	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
24/10/2017	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
18/1/2018	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
19/4/2018	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
19/7/2018	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
24/10/2018	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
22/1/2019	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
16/4/2019	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
23/7/2019	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
17/10/2019	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
14/1/2020	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
23/4/2020	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
23/7/2020	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
29/10/2020	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
21/1/2021	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
13/4/2021	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
22/7/2021	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
28/10/2021	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
13/1/2022	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
22/2/2022	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5
20/4/2022	50	50	100	100	100	100	50	50	50	10	10	10	1	0.2	0.5	0.5	0.5	0.5	0.2	0.5

Table A 22: Hydrocarbon concentrations (mg/kg) at NODH2. Results < LOR are reported as the LOR.

Chemical Name	C10 - C14 Fraction	>C10 - C16 Fraction	C15 - C28 Fraction	>C16 - C34 Fraction	C29 - C36 Fraction	>C34 - C40 Fraction	C10 - C36 Fraction (sum)	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)	C6 - C10 Fraction	C6 - C9 Fraction	C6 - C10 Fraction minus BTEX (F1)	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
14/4/2016	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.8
21/7/2016	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
25/10/2016	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
19/1/2017	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
27/4/2017																				
31/7/2017	50	50	100	140	130	100	130	240	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
24/10/2017	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
18/1/2018	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
19/4/2018	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
19/7/2018	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
24/10/2018	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
22/1/2019	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
16/4/2019	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
23/7/2019	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
17/10/2019	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
14/1/2020	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
23/4/2020	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
23/7/2020	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
29/10/2020	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
21/1/2021	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
13/4/2021	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
22/7/2021	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
28/10/2021	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
13/1/2022	50	50	100	100	100	100	50	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
22/2/2022	50	50	110	100	100	100	110	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1
20/4/2022	50	50	110	100	100	100	100	50	50	10	10	10	0.2	0.5	0.5	0.5	0.5	0.5	0.2	1

APPENDIX B_ INCIDENT INVESTIGATION REPORT ISSUED ON 08 FEB 2022

REPORT TO NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

Incident Investigation Report - Channel Island Power Station WDL 212-02

Issued: 08 February 2022

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Document Control Form

TW Report:	Incident Investigation Report - Channel Island Power Station WDL 212-02 – 08 February 2022
Revision Number:	Version 1

Revision History

Revision Number	Date	Prepared By	Reviewed By	Approved By
Draft 1	04-Feb-2022	Dr Sandya Nanayakkara (Trop Water)	Daniel Lane (Trop Water)	
Draft 2	07- Feb-2022	Dr Sandya Nanayakkara (Trop Water)	Jeannie McInnes; (Territory Generation)	
Version 1	08- Feb-2022	Dr Sandya Nanayakkara (Trop Water)		Dr Kevin Boland (Trop water); Jeannie McInnes (Territory Generation)

Issue Register

Distribution List	Date Issued	Number of Copies Sent
NTEPA - waste@nt.gov.au	08 Feb 2022	1
Territory Generation - jeannie.mcinnes@territorygeneration.com.au	08 Feb 2022	1

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EXECUTIVE SUMMARY

- A Quarterly sampling event under Channel Island Power Station (CIPS) Waste Discharge Licence, WDL 212-02) was undertaken on 13 January 2022.

- Water and sediment quality (nutrients, metals, physical parameters) at Darwin Harbour monitoring sites (CIPS discharge receiving environment) were compared with the CIPS waste discharge licence, WDL 212-02 specified guidelines.

    - Total Phosphorus (TP) concentration at NODH3 (94 µg/L) and NODH4 (58 µg/L) exceeds the trigger value (30 µg/L) specified in the WDL 212-02.
    - Nitrite plus Nitrate (NOx) concentration at NODH3 (21 µg/L) and NODH4 (22 µg/L) exceeds the trigger (20 µg/L) value specified in the WDL 212-02.
    - Total Suspended Solids (TSS) concentration at NODH3 (102 mg/L) and NODH4 (94 mg/L) exceeds the trigger value (10 mg/L) specified in the WDL 212-02.
    - All other water and sediment quality results are under the trigger values specified in the WDL 212-02.

- Out of these exceedances, TP and TSS exceedances at NODH3 and TSS exceedance at NODH4 are non-compliances according to WDL 212-02 Condition 35.2. TP and TSS concentrations at NODH3 are three times or more the trigger values specified in the Water Monitoring Plan in the WDL 212-02.

- On behalf of Territory Generation, these non-compliances were notified to the NTEPA on 03 February 2022 by Trop Water Pty Ltd.

- This incident investigation report identified that storm water runoff and the sediment resuspension due to the weather conditions (tidal movement and wind-induced mixing) at the time of sampling at Darwin Harbour monitoring area are likely the major contributing factors for the non-compliances noted.

- It is unlikely that above non-compliances have imposed any negative impacts on the marine environment.

- Results of routine monthly and quarterly sampling events will be closely monitored. An additional quarterly sampling event for the month of February 2022 will be undertaken on 22/02/2022 (subject to change depending on the weather conditions) to verify results and determine appropriate corrective actions.

CONTENTS

LIST OF FIGURES

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1 INTRODUCTION

On behalf of Territory Generation, Trop Water Pty Ltd undertook the quarterly sampling event on 13 January 2022 at Channel Island Power Station (CIPS) under Waste Discharge Licence 212-02 (WDL212-02, 2020). Collected samples were analysed for in-situ, bacteriological and physico-chemical parameters. Laboratory analysis for bacteriological parameters and physico-chemical parameters were completed by DPIR Water Microbiology Darwin and Australian Laboratory Services (NATA accredited), respectively.

Laboratory results were compared to the trigger values specified in the WDL 212-02. It was identified that there were some exceedances and non-compliances. On 03 February 2022, Northern Territory Environment Protection Authority (NTEPA) was notified according to Condition 33 of the WDL 212-02. This report further addresses the Condition 33 and 34 of the WDL 212-02.

2 SAMPLING/SITE SPECIFIC OBSERVATIONS

Table 1 displays the sites sampled on 13 January 2022 and specific observations made at the site (if there any). Rainfall recorded at 0900 hrs on 12, 13 and 14 January 2022 at East Arm (BOM station ID: 14260) and wind speed data recorded at 0900 hrs and 1500hrs at Darwin Airport (BOM station ID: 014015, are shown in Table 2. On the day of sampling, approximately 14.0 mm of rainfall has recorded. However, localised rainfall and wind data could be different to the available BOM data. Low tide was 2.6 m at 0913 hrs and high tide was 5.56 m at 1606 hrs on 13 Jan 2022. Due to these weather conditions, turbulent conditions were observed, particularly at the northern side of the harbour surrounding CIPS (Figure 1). Figure 2 shows the locations of the CIPS monitoring sites.

Table 1: Sites sampled on 13 January 2022.

	Sample Site											
Sampling event	**SODH1**	**NODH1**	**ADP1**	**ADP2**	**ISCP**	**ILCP**	**SODH2 (sediment)**	**SODH3**	**SODH4**	**NODH2 (sediment)**	**NODH3**	**NODH4**
	Monthly Monitoring				Quarterly Monitoring							
Time (hrs)	1251	1149	1132	1215	1200	1209	1151	1145	1135	1224	1203	1213
13/01/2022	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site specific observations (if there any)					Water colour is light green	Water colour is light green/brown	Light brown sediment with grey streaks	Light blue-green water, low to moderate mangrove debris, Total depth=2.3 m	Light blue-green water, low to moderate mangrove debris, Total depth=2.8 m	Light brown sediment with grey streaks	Muddy brown water, low to moderate mangrove debris, Total depth=1.9 m	Muddy brown water, low to moderate mangrove debris, Total depth=3.8 m

✓-Sampled ✗ -Not sampled

Figure 1: Turbulent conditions at Darwin Harbour near CIPS boat ramp on 13 January 2022.

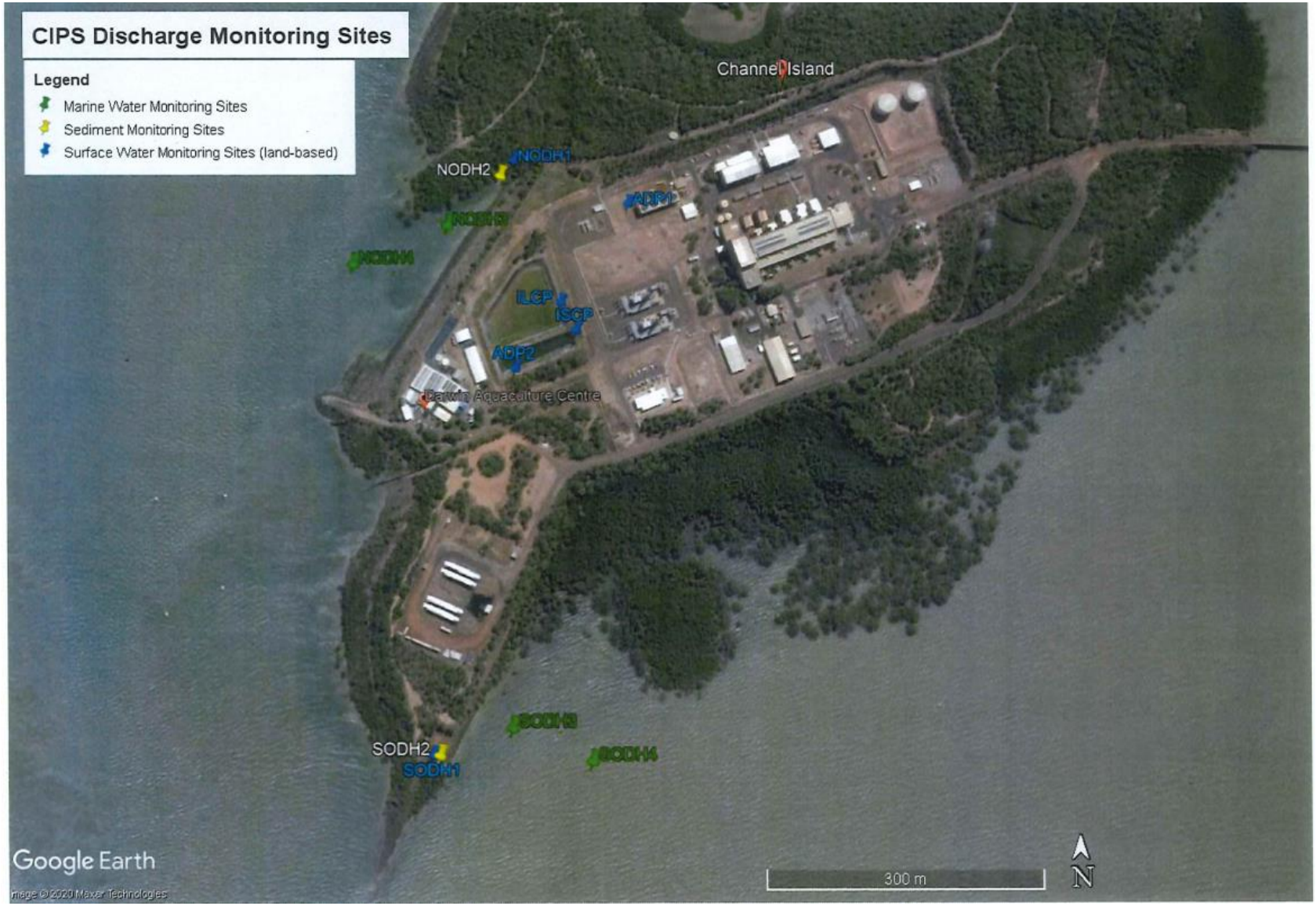

Figure 2: CIPS discharge monitoring sites (WDL 212-02, pg.18)

Table 2: Weather data from the nearest BOM weather station to CIPS

Date	BOM Station	12/01/2022	13/01/2022 (Sampling day)	14/01/2022
Rainfall (mm) at 0900 hrs	East Arm (ID: 14260)	31.0	0.0	14.0
Wind speed	Darwin Airport (ID: 014015)		- 19 km/hr (North-westerly) at 0900hrs - 11 km/hr (Northerly) at 1500hrs	

3 RESULTS AND DISCUSSION

3.1 WDL212-02 Quarterly Sampling Event – 13 January 2022

Table 3 shows results for nutrients, microbiological, *in-situ* measurements and physical parameters at Darwin Harbour water quality monitoring sites related to the 13 January 2022 sampling event. The results were compared with the trigger values specified in the WDL-212-02. Certificates of analysis are provided in Appendix 1. The concentrations higher than the WDL 212-02 are highlighted in red.

Table 3: Water quality at the Darwin Harbour quarterly sampling sites on 13 January 2022.

Parameter	Trigger Value	Unit	SODH3	SODH4	NODH3	NODH4
Nutrients						
Filterable Reactive Phosphorus	<10	µg/L	<1	<1	3	<1
Total Phosphorus	<30	µg/L	<5	<5	94	58
Total Nitrogen	<300	µg/L	182	159	286	216
NOx	<20	µg/L	7	4	21	22
Ammonia	<20	µg/L	<5	<5	<5	<5
Microbiological parameters						
E. coli	<200	cfu/100mL	<1	<1	6	<1
***In-situ* Measurements**						
pH	6.0-8.5	units	7.97	7.88	7.98	7.99
Dissolved Oxygen	>80	%	95	95.1	93.7	93.7
Physical Parameters						
Total Suspended Solids	<10	mg/L	<5	<5	102	94

Table 4 shows the metal concentrations on 13 January 2022 and trigger values imposed by WDL 212-02 for the two sediment monitoring sites located in the Darwin Harbour. All analytes are below the trigger values specified in WDL212-02.

Table 4: Metal concentrations at Darwin Harbour quarterly sediment sampling sites on 13 January 2022

Metals	Trigger Value	Units	SODH2	NODH2
Arsenic	20	mg/kg	13	10
Cadmium	1.5	mg/kg	<1	<1
Chromium	80	mg/kg	29	33
Copper	65	mg/kg	6	6
Lead	50	mg/kg	12	15
Nickel	21	mg/kg	8	10
Zinc	200	mg/kg	21	27
Mercury	0.15	mg/kg	<0.1	<0.1

3.2 Exceedances and Non-compliances

3.2.1 Exceedances

Monitoring results were compared with trigger values specified in WDL 212-02 (2020, pg. 17). As shown in the Table 3,

- Total Phosphorus (TP) concentration at NODH3 (94 µg/L) and NODH4 (58 µg/L) exceeds the trigger value (30 µg/L) specified in the WDL 212-02.
- Nitrite plus Nitrate (NOx) concentration at NODH3 (21 µg/L) and NODH4 (22 µg/L) exceeds the trigger (20 µg/L) value specified in the WDL 212-02.
- Total Suspended Solids (TSS) concentration at NODH3 (102 mg/L) and NODH4 (94 mg/L) exceeds the trigger value (10 mg/L) specified in the WDL 212-02.

3.2.2 Non-compliances

Out of the exceedances mentioned in Section 3.2.1, TP and TSS exceedances at NODH3 and TSS exceedance at NODH4 are non-compliances according to WDL 212-02 Condition 35.2. TP and TSS concentrations at NODH3 are three times or more the trigger values specified in the Water Monitoring Plan in the WDL 212-02. On behalf of Territory Generation, these non-compliances were notified to the NTEPA on 03 February 2022 by Trop Water Pty Ltd.

3.3 WDL 212-02 Condition 34

3.3.1 Condition 34.1

<u>When the non-compliance was detected and by whom:</u>

Non-compliances were detected on 02 February 2022 by Sandya Nanayakkara, Senior Scientist, Trop Water Pty Ltd.

3.3.2 Condition 34.2

<u>The date and time of the non-compliance:</u>

- Site NODH3 – 1203 hrs on 13 Jan 2022.
- Site NODH4 – 1213 hrs on 13 Jan 2022.

3.3.3 Condition 34.3

The actual and potential causes and contributing factors to the non-compliance:

In order to investigate the potential causes and contributing factors to the above-mentioned non-compliances, laboratory results at CIPS discharge sites are also presented. Table 5 shows the results of nutrients and TSS at CIPS discharge monitoring sites (land-based monitoring sites).

As the TSS concentration at ADP1 and NODH1 was <5 mg/L (Table 5), elevated TSS at NODH3 and NODH4 would not be due to the CIPS discharge from cooling tower. Sources of TSS at NODH3 and NODH4 could be suspended sediment (due to tidal movement) and suspended material washed off with the storm water runoff.

Early onset rainfall has saturated the ground (Total of 407 mm in December 2021 and 136.5 mm rainfall from 1 to 13 January 2022 were recorded at East Arm, BoM Station ID:14260) and it is highly likely the rainfall has generated increased overland flow (due to less infiltration), flowing into the Darwin Harbour proper. This overland flow would carry soil, plant debris and other organic matter washed off from the land into the harbour surrounding CIPS causing elevated TSS and nutrients. Visual observations (muddy brown water, see Table 1 and Figure 1) made by the Trop Water Pty Ltd on 13 Jan 2022 also confirms the influence of stormwater runoff/turbulent mixing on Darwin Harbour monitoring area. Electrical Conductivity (EC) measured at Darwin Harbour monitoring sites further reinforces the influence of storm water on Darwin Harbour. A reduction in EC at NODH3 (54500 µS/cm to 51100 µS/cm) and NODH4 (54400 µS/cm to 51300 µS/cm) was observed on 13 January 2022 compared to the previous monitoring events undertaken in the dry season on 28 October 2021 (

Table 6).

TP and NOx concentration at ADP1 (CIPS discharge) is higher than the trigger values (Table 5). However, irrespective of concentrations at ADP1, nutrient concentration at NODH1 and at Darwin Harbor downstream sites (NODH3 and NODH4) are influenced by the outside sources such as storm water runoff, rainfall, presence of cane toads, sediment resuspension due to tidal movement and wind effect (release nutrient into the water column) and presence mangrove debris (leaves, small tree branches etc.) on the water surface during the sampling. Presence of elevated TSS at NODH3 and NODH4 also indicates the influence of storm water runoff and/or resuspension of sediments. The presence of low to moderate amount of mangrove debris on the surface water at Darwin Harbour monitoring sites could also have contributed to elevated nutrients (Table 1). Hence, elevated nutrient concentration (TP and NOx) at NODH3 is a combined effect of CIPS discharge, rainfall, tidal and storm water influence, resuspension of sediments and presence mangrove debris (leaves, small tree branches etc.) on the water surface.

Daily outflow from cooling tower (Northern discharge point, ADP1) for the period starting from 01/01/2022 to 13/01/2022 is shown in Figure 3. The outflow from ADP1 was 31.78 kL on 13 January 2022 and average daily outflow for the noted period was 30.65 kL. As shown in Figure 1 of WDL 212-02, approximate discharge from the cooling tower (ADP1) is 80.3 kL/day. January daily outflow (01/01/2022 -14/01/2022) is less than the approximate discharge (80.3 kL/day) from the cooling tower (Figure 1, pg. 15, WDL 212-02). Hence, expected water quality impact on the Darwin Harbour receiving environment was minimal. An additional sampling event in February 2022 will be undertaken as a verification step due to the presence of relatively high TN and TP concentration at CIPS discharge site, ADP1 on 13 January 2022.

Water colour at SODH3 and SODH4 was observed to be 'natural light blue-green' and TSS concentration was < 5 mg/L at both sites. Turbidity at SODH3 and SODH4 was significantly less than that of at NODH3 and NODH4 (Table 6). On the sampling day, Trop Water Staff observed northerly/north-westerly wind at NODH3 and NODH4 while observing calm conditions at SODH3 and SODH4. Northerly/north-westerly winds would impact

northern shoreline only, with the island acting as a windbreak for the southern side. Observation of northerly/north-westerly wind on the sampling day can be confirmed with the nearest available BoM data at Darwin Airport (Table 2). These observations and analysis results indicate that less turbulent mixing was evident at southern side of the Darwin Harbour receiving environment compared to the northern side of the Darwin Harbour receiving environment. Exceedances are not recorded at SODH3 and SODH4 sites on 13 January 2022.

Table 5: Water quality results at the CIPS discharge monitoring sites on 13 January 2022.

Chemical Name	Units	SODH1	ADP2	NODH1	ADP1
Reactive Phosphorus as P	µg/L	30	<10	20	110
Total Phosphorus as P	µg/L	60	60	120	360
Total Nitrogen as N	µg/L	3600	3400	1600	4600
Nitrite + Nitrate as N	µg/L	610	230	1000	1550
Total Suspended Solids	mg/L	<5	15	<5	<5

Table 6: Electrical Conductivity and Turbidity at Darwin Harbour monitoring sites for the most recent three sampling events.

Date	Units	NODH3	NODH4	SODH3	SODH4
Electrical Conductivity					
22/07/2021 (dry season)	µS/cm	53300	53500	53600	53500
28/10/2021 (dry season)	µS/cm	54500	54400	54600	54700
13/01/2022 (wet season)	µS/cm	51100	51300	49700	49600
Turbidity					
13/01/2022	NTU	107	105	4.99	3.42

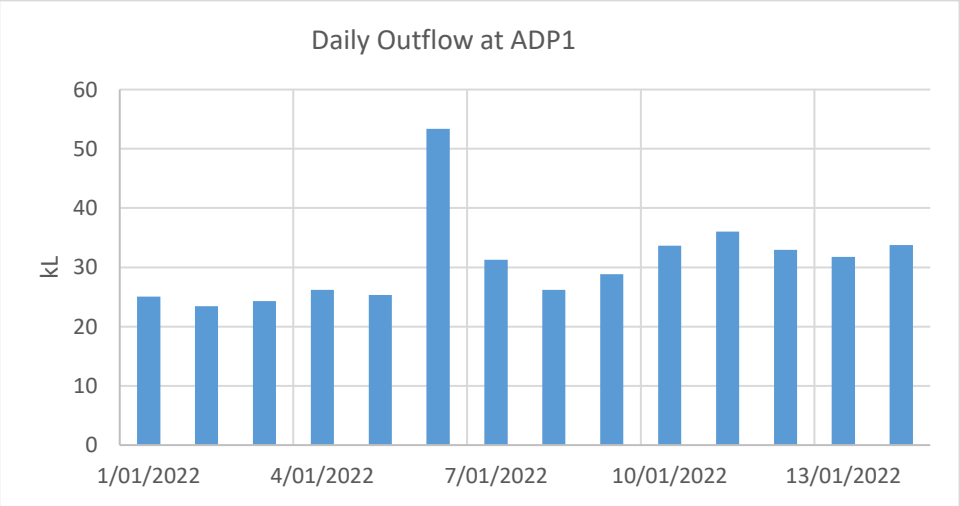

Figure 3: Daily outflow (kL) at ADP1 (CIPS Northern Discharge Point) for 01/01/2022 -14/01/2022.

3.3.4 Condition 34.4

The risk of environment harm arising from the non-compliance:

It is unlikely that above non-compliances have imposed any negative impacts on the marine environment. Exceedances of these trigger values only indicate 'potential risk' for environmental harm. Dissolved Oxygen concentrations (% Saturation) at NODH3 and NODH4 are over 80 % and marine sediment quality results are within the trigger values defined in the Sediment Quality Guidelines in WDL 212-02.

3.3.5 Condition 34.5 and Condition 34.6

The action(s)that have or will be undertaken to mitigate any environment harm arising from the non-compliance:

Corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur:

Results of routine monthly and quarterly sampling events will be closely monitored. An additional quarterly sampling event for the month of February 2022 will be undertaken. This event is currently scheduled for the 22/02/2022 (subject to change depending on the weather conditions).

3.3.6 Condition 34.7

If no action was taken, why no action was taken:

Above actions are proposed.

REFERENCES

WDL212-02, Waste Discharge Licence 212-02 (June 2020), Northern Territory Government.

APPENDIX 1- CERTIFICATES OF ANALYSIS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2201025**	Page	: 1 of 12
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Contact	: Customer Services ES
Address	: Unit 12 / 43 Berrimah Road Northern Territory Berrimah Darwin 0828	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 14-Jan-2022 08:00
Order number	: ----	Date Analysis Commenced	: 14-Jan-2022
C-O-C number	: ----	Issue Date	: 20-Jan-2022 10:16
Sampler	: JOHN DIMOS, Quentin Vander-Mower, SANDYA NANAYAKKARA, VICTOR CALDERON		
Site	: Channel Island Power Station		
Quote number	: SY/339/18 V2		
No. of samples received	: 12		
No. of samples analysed	: 12		

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Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
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General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP075(SIM): LOR raised due to the high amount of moisture present.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	13-Jan-2022 12:24	13-Jan-2022 11:51	----	----	----
Compound	CAS Number	LOR	Unit		ES2201025-005	ES2201025-006	--------	--------	--------
					Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		58.6	54.2	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		15000	13300	----	----	----
Cobalt	7440-48-4	2	mg/kg		6	5	----	----	----
Tin	7440-31-5	5	mg/kg		<5	<5	----	----	----
Arsenic	7440-38-2	5	mg/kg		10	13	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg		33	29	----	----	----
Copper	7440-50-8	5	mg/kg		6	6	----	----	----
Lead	7439-92-1	5	mg/kg		15	12	----	----	----
Nickel	7440-02-0	2	mg/kg		10	8	----	----	----
Zinc	7440-66-6	5	mg/kg		27	21	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.8	<0.8	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.8	<0.8	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.8	<0.8	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.8	<0.8	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.8	<0.8	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.8	<0.8	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.8	<0.8	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.8	<0.8	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.8	<0.8	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.8	<0.8	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		1.0	1.0	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	NODH2	SODH2	----	----	----
			Sampling date / time	13-Jan-2022 12:24	13-Jan-2022 11:51	----	----	----
Compound	CAS Number	LOR	Unit	ES2201025-005	ES2201025-006	--------	--------	--------
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.9**	**1.9**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**104**	**104**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**100**	**102**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**83.8**	**81.4**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**107**	**108**	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**113**	**114**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**99.6**	**99.9**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	13-Jan-2022 12:24	13-Jan-2022 11:51	----	----	----
Compound	CAS Number	LOR	Unit		ES2201025-005	ES2201025-006	--------	--------	--------
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**109**	**73.6**	**----**	**----**	**----**
Toluene-D8	2037-26-5	0.2	%		**121**	**75.5**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	0.2	%		**115**	**72.9**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SODH1	ADP1	NODH1	ADP2	NODH3
			Sampling date / time	13-Jan-2022 12:51	13-Jan-2022 11:32	13-Jan-2022 11:49	13-Jan-2022 12:15	13-Jan-2022 12:13
Compound	CAS Number	LOR	Unit	ES2201025-001	ES2201025-002	ES2201025-003	ES2201025-004	ES2201025-007
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	**15**	**102**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	**0.01**	**0.02**	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.005**	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	**0.008**	<0.001	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.019**	**0.038**	----
Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.08**	**0.02**	**0.47**	**0.05**	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.005**	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	**0.001**	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	**0.011**	**0.003**	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	**0.011**	<0.005	**0.064**	**0.060**	----
Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	----	----	----	----	<0.00004
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	----	----	----	----	<0.00004
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	----	----	----	----	<5
Arsenic	7440-38-2	0.5	µg/L	----	----	----	----	**1.4**
Cadmium	7440-43-9	0.2	µg/L	----	----	----	----	<0.2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH1	ADP1	NODH1	ADP2	NODH3
				Sampling date / time	13-Jan-2022 12:51	13-Jan-2022 11:32	13-Jan-2022 11:49	13-Jan-2022 12:15	13-Jan-2022 12:13
Compound	CAS Number	LOR	Unit		ES2201025-001	ES2201025-002	ES2201025-003	ES2201025-004	ES2201025-007
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		----	----	----	----	<0.5
Cobalt	7440-48-4	0.2	µg/L		----	----	----	----	<0.2
Copper	7440-50-8	1	µg/L		----	----	----	----	<1
Lead	7439-92-1	0.2	µg/L		----	----	----	----	<0.2
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	<0.5
Tin	7440-31-5	5	µg/L		----	----	----	----	<5
Zinc	7440-66-6	5	µg/L		----	----	----	----	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		----	----	----	----	**3080**
Arsenic	7440-38-2	0.5	µg/L		----	----	----	----	**3.1**
Cadmium	7440-43-9	0.2	µg/L		----	----	----	----	<0.2
Chromium	7440-47-3	0.5	µg/L		----	----	----	----	**6.6**
Cobalt	7440-48-4	0.2	µg/L		----	----	----	----	**1.4**
Copper	7440-50-8	1	µg/L		----	----	----	----	**1**
Lead	7439-92-1	0.2	µg/L		----	----	----	----	**1.6**
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	<0.5
Tin	7440-31-5	5	µg/L		----	----	----	----	<5
Zinc	7440-66-6	5	µg/L		----	----	----	----	**7**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.13**	**0.16**	**0.08**	**1.32**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	**0.02**	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.61**	**1.55**	**1.00**	**0.21**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.61**	**1.55**	**1.00**	**0.23**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**3.0**	**3.1**	**0.6**	**3.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**3.6**	**4.6**	**1.6**	**3.4**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.06**	**0.36**	**0.12**	**0.06**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.03**	**0.11**	**0.02**	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH1	ADP1	NODH1	ADP2	NODH3
				Sampling date / time	13-Jan-2022 12:51	13-Jan-2022 11:32	13-Jan-2022 11:49	13-Jan-2022 12:15	13-Jan-2022 12:13
Compound	CAS Number	LOR	Unit		ES2201025-001	ES2201025-002	ES2201025-003	ES2201025-004	ES2201025-007
					Result	Result	Result	Result	Result
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		----	----	----	----	<0.005
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		----	----	----	----	**0.002**
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		----	----	----	----	**0.019**
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		----	----	----	----	**0.021**
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		----	----	----	----	**0.265**
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		----	----	----	----	**0.286**
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		----	----	----	----	**0.094**
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		----	----	----	----	**0.003**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	**3**	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SODH3	NODH4	SODH4	ISCP	ILCP
			Sampling date / time	13-Jan-2022 11:45	13-Jan-2022 12:03	13-Jan-2022 11:35	13-Jan-2022 12:00	13-Jan-2022 12:09
Compound	CAS Number	LOR	Unit	ES2201025-008	ES2201025-009	ES2201025-010	ES2201025-011	ES2201025-012
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**94**	<5	**16**	<5
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	**0.02**	<0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	**0.001**	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	----	----	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	**0.002**	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	**0.023**	<0.005
Tin	7440-31-5	0.001	mg/L	----	----	----	<0.001	<0.001
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	**0.04**	**0.01**
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	**0.002**	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	----	----	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	**0.002**	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	**0.061**	<0.005
Tin	7440-31-5	0.001	mg/L	----	----	----	<0.001	<0.001
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	----	----
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	<0.0001
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	<5	<5	<5	----	----
Arsenic	7440-38-2	0.5	µg/L	**1.2**	**1.3**	**1.3**	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH3	NODH4	SODH4	ISCP	ILCP
				Sampling date / time	13-Jan-2022 11:45	13-Jan-2022 12:03	13-Jan-2022 11:35	13-Jan-2022 12:00	13-Jan-2022 12:09
Compound	CAS Number	LOR	Unit		ES2201025-008	ES2201025-009	ES2201025-010	ES2201025-011	ES2201025-012
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	<0.2	<0.2	----	----
Copper	7440-50-8	1	µg/L		<1	<1	<1	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Tin	7440-31-5	5	µg/L		<5	<5	<5	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	<5	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**170**	**2040**	**103**	----	----
Arsenic	7440-38-2	0.5	µg/L		**1.3**	**2.7**	**1.3**	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	**4.3**	<0.5	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	**0.9**	<0.2	----	----
Copper	7440-50-8	1	µg/L		<1	<1	<1	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	**1.0**	<0.2	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Tin	7440-31-5	5	µg/L		<5	<5	<5	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	<5	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	----	**1.16**	**0.76**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	----	**0.02**	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	**0.18**	**0.03**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	----	**0.20**	**0.03**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	----	----	**3.1**	**2.1**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	----	**3.3**	**2.1**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	----	**0.06**	**0.03**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	----	----	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	SODH3	NODH4	SODH4	ISCP	ILCP
				Sampling date / time	13-Jan-2022 11:45	13-Jan-2022 12:03	13-Jan-2022 11:35	13-Jan-2022 12:00	13-Jan-2022 12:09
					ES2201025-008	ES2201025-009	ES2201025-010	ES2201025-011	ES2201025-012
					Result	Result	Result	Result	Result
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		<0.005	<0.005	<0.005	----	----
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		<0.002	<0.002	<0.002	----	----
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		**0.007**	**0.022**	**0.004**	----	----
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		**0.007**	**0.022**	**0.004**	----	----
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		**0.175**	**0.194**	**0.155**	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		**0.182**	**0.216**	**0.159**	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	**0.058**	<0.005	----	----
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	**6**	<2

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

NORTHERN TERRITORY GOVERNMENT
Department of Industry, Tourism and Trade

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Certificate of Analysis

Project No: **D220150 Final Report**
Report Number: **83614** *Date Issued:* **17/01/2022**

NATA Accredited Laboratory
Accreditation Number 15606
Accredited for compliance with ISO/IEC17025 - Testing

Customer **Trop Water Pty Ltd**
Address: **12/43 Berrimah Road**
Berrimah NT 0828

Project Title: **CIPS-WDL**
Attention: **Sandya Nanayakkara**

Date Received: **13/01/2022**
Date Completed: **15/01/2022**

Number of Samples Received: **10**
Number of Samples Tested: **10**

The sample(s) referred to in this report were analysed by the following method(s):

Analyte	*Method Reference*	*Accreditation Status*	*Analyte*	*Method Reference*	*Accreditation Status*
E. coli (MPN)	AS 4276.21	NATA Accredited	E. coli (Membrane Filtration)	AS 4276.7	NATA Accredited

Lab Number	Sampling Point*	Customer Reference*	Free Cl (mg/L)*	Total Cl (mg/L)*	Sample Collection Temp (°C)*	Temp on Arrival (°C) #	Type of Sample
D220150-01	ILCP	-	0.02	Not supplied	29.90	22	Water
D220150-02	ISCP	-	0.04	Not supplied	31.95	22	Water
D220150-03	ADP1	-	1.25	Not supplied	28.66	22	Water
D220150-04	ADP2	-	0.04	Not supplied	29.33	22	Water
D220150-05	NODH1	-	0.03	Not supplied	29.57	22	Water
D220150-06	SODH1	-	0.06	Not supplied	34.12	22	Water
D220150-07	NODH3	-	0.07	Not supplied	31.01	22	Water
D220150-08	NODH4	-	0.04	Not supplied	31.73	22	Water
D220150-09	SODH3	-	0.03	Not supplied	30.80	22	Water
D220150-10	SODH4	-	0.04	Not supplied	30.74	22	Water

*Based on information supplied by customer ; **#** Reported arrival temperature reflects the approximate temperature of the group of samples when received by the laboratory. This measurement does not fall within the scope of the Laboratory's NATA Accreditation.

Holding Time

Max Holding Time is the maximum time permitted between sample collection and commencement of analysis. Reference: AS 2031.

^ indicates the sample has exceeded the maximum holding time permitted for the analysis. Affected results must be considered indicative only.

****Sample collection dates and times are reported as supplied by the customer and reported holding times are calculated from this information. While all due care is taken during transcription, the accuracy of this information is not guaranteed by the laboratory.

		E. coli Max Holding Time: 24 hrs		E. coli (MF) Max Holding Time: 24 hrs	
Lab Number	Sample Collected**	Date of Analysis	Analysed within**	Date of Analysis	Analysed within**
D220150-01	13/01/2022 12:09pm	13/01/2022 2:00pm	1h 51m		
D220150-02	13/01/2022 12:00pm	13/01/2022 2:00pm	2 hrs		
D220150-03	13/01/2022 11:32am	13/01/2022 2:00pm	2h 28m		
D220150-04	13/01/2022 12:15pm	13/01/2022 2:00pm	1h 45m		
D220150-05	13/01/2022 11:49am	13/01/2022 2:00pm	2h 11m		
D220150-06	13/01/2022 12:51pm	13/01/2022 2:00pm	1h 09m		
D220150-07	13/01/2022 12:13pm			13/01/2022 2:00pm	1h 47m
D220150-08	13/01/2022 12:03pm			13/01/2022 2:00pm	1h 57m
D220150-09	13/01/2022 11:45am			13/01/2022 2:00pm	2h 15m
D220150-10	13/01/2022 11:35am			13/01/2022 2:00pm	2h 25m

Results of Analysis

	E. coli MPN/100mL	E. coli (MF) cfu/100mL
D220150-01 ILCP	<10	
D220150-02 ISCP	86	
D220150-03 ADP1	<10	

	E. coli MPN/100mL	E. coli (MF) cfu/100mL
D220150-04 ADP2	63	
D220150-05 NODH1	10	
D220150-06 SODH1	262	
D220150-07 NODH3		6
D220150-08 NODH4		<1
D220150-09 SODH3		<1
D220150-10 SODH4		<1

The results in this report were authorised by:

Stephen Poole - Laboratory Manager

Measurement Uncertainty (MU) should be considered when assessing quantitative results. Contact the laboratory for current MU values.

Dates are reported in the format dd/mm/yyyy.

APPENDIX C_ INCIDENT INVESTIGATION REPORT ISSUED ON 15 MAR 2022

REPORT TO NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

Incident Investigation Report - Channel Island Power Station WDL 212-02

Issued: 15 March 2022

TROP WATER PTY LTD
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ISO 9001| ISO 14001| AS/NZS 4801

Document Control Form

TW Report:	Incident Investigation Report - Channel Island Power Station WDL 212-02 – 15 March 2022
Revision Number:	Version 1

Revision History

Revision Number	Date	Prepared By	Reviewed By	Approved By
Draft 1	14-Mar-2022	Dr Sandya Nanayakkara (Trop Water)	Daniel Lane (Trop Water)	
Draft 2	15- Mar-2022	Dr Sandya Nanayakkara (Trop Water)	Jeannie McInnes; (Territory Generation)	
Version 1	15- Mar-2022	Dr Sandya Nanayakkara (Trop Water)		Dr Kevin Boland (Trop water); Jeannie McInnes (Territory Generation)

Issue Register

Distribution List	Date Issued	Number of Copies Sent
NTEPA - waste@nt.gov.au	15 Mar 2022	1
Territory Generation - jeannie.mcinnes@territorygeneration.com.au	15 Mar 2022	1

Company Details

Company Name	Trop Water Pty Ltd
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ABN	89 638 479 080
Website	www.tropwater.com.au

EXECUTIVE SUMMARY

- On behalf of Territory Generation, Trop Water Pty Ltd performed the quarterly sampling event on 22 February 2022 at Channel Island Power Station (CIPS) under Waste Discharge Licence 212-02 (WDL212-02, 2020). This quarterly sampling event was undertaken in response to non-compliances reported at the Darwin Harbour monitoring sites on 13 January 2022 (See '*CIPS Incident Investigation Report for 13 Jan 2022_Final_Issued on 08 Feb 2022'* for more details on non-compliances reported on 13 January 2022).

- Water and sediment quality (nutrients, metals, physical parameters) at Darwin Harbour monitoring sites (CIPS discharge receiving environment) were compared with the CIPS waste discharge licence, WDL 212-02 (2020) specified guidelines.

    - Nitrite plus Nitrate (NOx) concentration at SODH3 (26 µg/L), SODH4 (26 µg/L), NODH3 (24 µg/L) and NODH4 (24 µg/L) exceed the trigger value (20 µg/L) specified in the WDL 212-02.
    - Dissolved Oxygen concentration (% Saturation) at SODH4 was 76.3 % and is outside the trigger value of > 80%.
    - All other water and sediment quality results are within the trigger values specified in the WDL 212-02.

- NOx concentration at NODH4 during last three sampling events were 22 µg/L (28/10/2021), 22 µg/L (13/01/2022) and 24 µg/L (22/2/2022) and exceed the trigger value of 20 µg/L specified in WDL 212-02. Hence, exceedance of NOx concentration trigger value at NODH4 on three consecutive occasions is a non-compliance according to WDL 212-02 Condition 35.2.

- On behalf of Territory Generation, this non-compliance was notified to the NTEPA on 09 March 2022 by Trop Water Pty Ltd.

- This incident investigation report identified that reported exceedances/non-compliance of NOx concentrations at NODH4 during last three quarterly monitoring events could be due to the influence of multiple factors/sources;
    - Storm water runoff from Channel Island catchment area during wet season.
    - Wind/tidal induced turbulent mixing of water column/resuspension of sediment.
    - CIPS discharge from ADP1.
    - Discharge from Darwin Aquaculture Centre (discharge information is unknown).

- It is unlikely that the aforementioned non-compliance has imposed any negative impacts on the marine environment.

- Results of routine monthly and quarterly sampling events will be closely monitored. Visual observations at the Darwin Harbour sites will be important to see any signs of excessive algae growth due to presence of nutrients.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

On behalf of Territory Generation, Trop Water Pty Ltd performed the quarterly sampling event on 22 February 2022 at Channel Island Power Station (CIPS) under Waste Discharge Licence 212-02 (WDL212-02, 2020). As there were non-compliances reported at Darwin Harbour monitoring sites on 13 January 2022 sampling event, a quarterly sampling event was organised to investigate potential causes and identify any harmful effects on the marine environment (See '*CIPS Incident Investigation Report for 13 Jan 2022_Final_Issued on 08 Feb 2022'* for more details on non-compliances reported on 13 January 2022).

Collected samples were analysed for in-situ, bacteriological and physico-chemical parameters. Laboratory analysis for bacteriological parameters and physico-chemical parameters were completed by DPIR Water Microbiology Darwin and Australian Laboratory Services (NATA accredited), respectively.

Laboratory results were compared to the trigger values specified in the WDL 212-02. It was identified that there were some exceedances and a non-compliance. On 09 March 2022, Northern Territory Environment Protection Authority (NTEPA) was notified according to Condition 33 of the WDL 212-02. This report further addresses the Condition 33 and 34 of the WDL 212-02.

2 SAMPLING/SITE SPECIFIC OBSERVATIONS

Table 1 displays the sites sampled on 22 February 2022 and specific observations made at the site (if there any). There was no flow at ADP1 (Northern discharge point) at 1035 hrs on 22 Feb 2022.

Rainfall data for the month of February 2022 at East Arm weather station (BoM station ID: 014260) is shown in Figure 1. On the day of sampling, 17.0 mm of rainfall at 0900 hrs was recorded (Figure 1). Total of 43.2 mm of rainfall was recorded during the week prior to sampling. East Arm is the nearest rain gauge to CIPS. Darwin Airport weather station (BOM station ID: 014015) is the nearest station which collects wind data (See Table 2 for wind data). Localised rainfall and wind at CIPS may not be appropriately represented by the available BOM data.

Low tide was 3.29 m at 1529 hrs and high tide was 6.8 m at 0943 hrs on 22 Feb 2022. Figure 2 shows the locations of the CIPS monitoring sites.

Table 1: Sites sampled on 22 February 2022.

	Sample Site											
Sampling event	**SODH1**	**NODH1**	**ADP1**	**ADP2**	**ISCP**	**ILCP**	**SODH2 (sediment)**	**SODH3**	**SODH4**	**NODH2 (sediment)**	**NODH3**	**NODH4**
	Monthly Monitoring				Quarterly Monitoring							
Time (hrs)	1153	1049	1035	1117	1100	1206	0944	0935	0926	1000	0955	0950
22/02/2022	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site specific observations (if there any)			No flow to sample		Water colour is light green	Water colour is light green /brown	Dark grey, small pebbles were present in the sediment, Total water depth=4.4 m, light Easterly wind	Light green water, low to moderate plant debris, Total water depth=5.3 m, light Easterly wind	Light green water, low to moderate mangrove debris, Total water depth=6.2 m, light Easterly wind	Brown/Grey sediment, Total water depth=4.0 m, light North-easterly wind	Light green water, Total water depth=4.0 m, light North-Easterly wind	Light green water, Total water depth=4.8 m, light North-Easterly wind

✓-Sampled × -Not sampled (no flow)

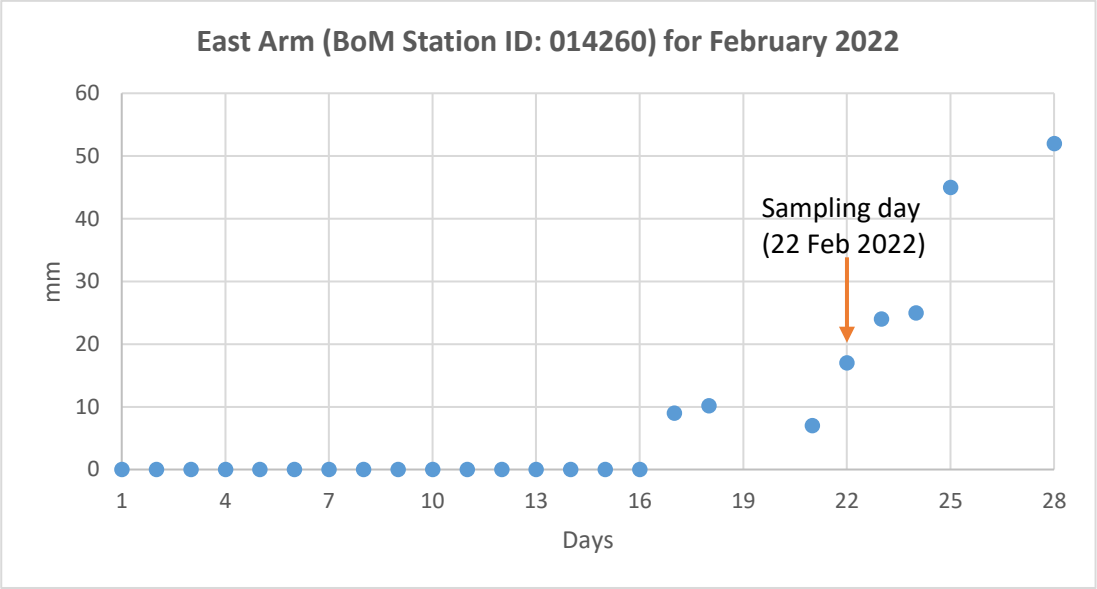

Figure 1: Rainfall recorded at East Arm weather station (BoM Station ID: 014260) for February 2022.

Table 2: Wind data from the nearest BOM weather station to CIPS.

Parameter	**BOM Station**	**22/02/2022** (Sampling day)
Wind speed	Darwin Airport (ID: 014015)	13 km/hr (North-North westerly) at 0900hrs 7 km/hr (West-South westerly) at 1500hrs

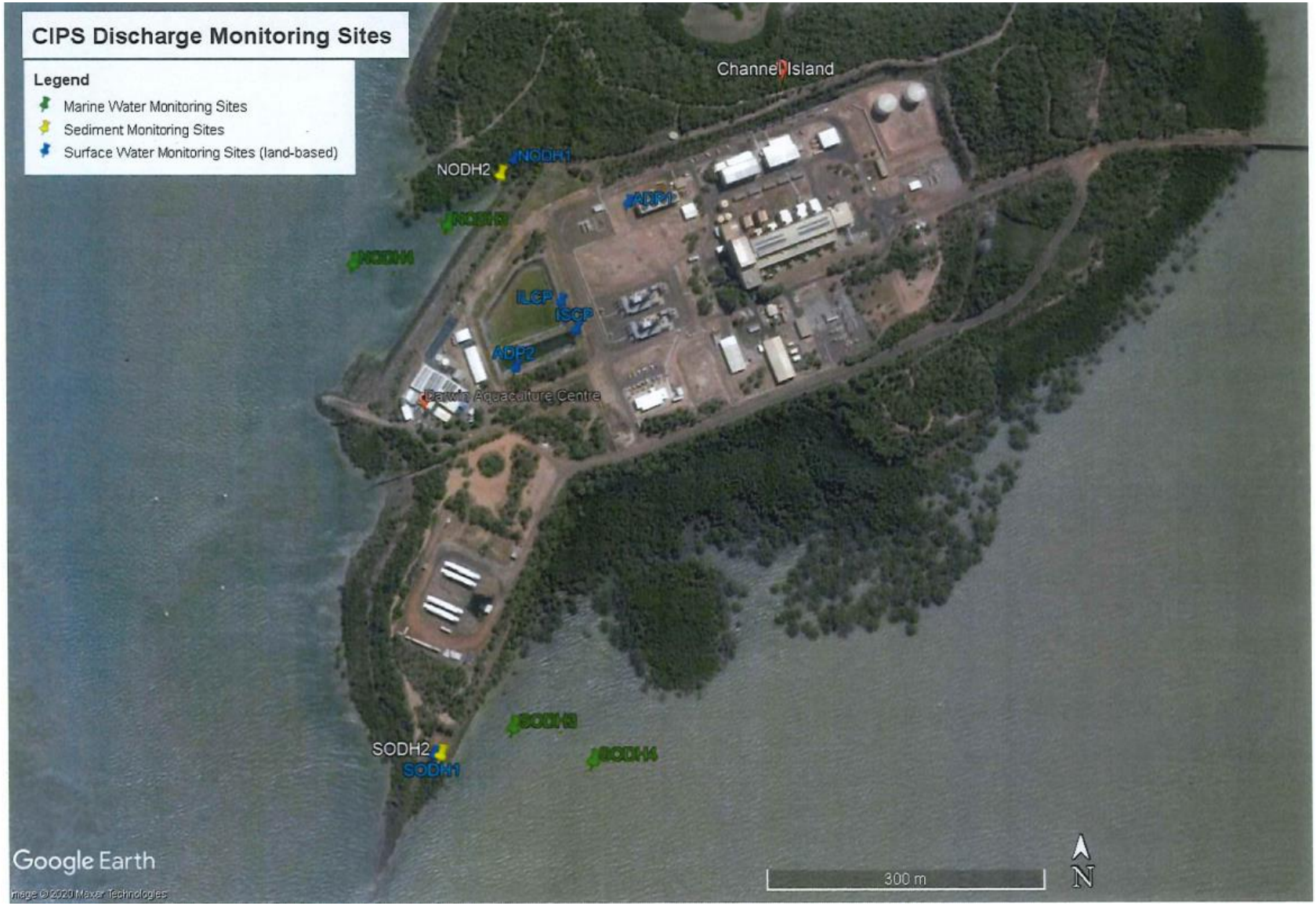

Figure 2: CIPS discharge monitoring sites (WDL 212-02, pg.18)

3 RESULTS AND DISCUSSION

3.1 WDL212-02 Quarterly Sampling Event – 22 February 2022

Table 3 shows results for nutrients, microbiological, *in-situ* measurements and physical parameters at Darwin Harbour water quality monitoring sites related to the 22 February 2022 sampling event. The results were compared with the trigger values specified in the WDL-212-02. Certificates of analysis are provided in Appendix 1. The concentrations higher than the WDL 212-02 specified trigger values are highlighted in red.

Table 3: Water quality at the Darwin Harbour quarterly sampling sites on 22 February 2022.

Parameter	Trigger Value	Unit	SODH3	SODH4	NODH3	NODH4
Nutrients						
Filterable Reactive Phosphorus	<10	µg/L	4	4	4	4
Total Phosphorus	<30	µg/L	<5	6	<5	<5
Total Nitrogen	<300	µg/L	<50	<50	<50	<50
NOx	<20	µg/L	26	26	24	24
Ammonia	<20	µg/L	<5	<5	<5	<5
Microbiological parameters						
E. coli	<200	cfu/100mL	<1	4	1	<1
***In-situ* Measurements**						
pH	6.0-8.5	units	7.74	7.60	7.89	7.81
Dissolved Oxygen	>80	%	80.1	76.3	81.3	91.3
Physical Parameters						
Total Suspended Solids	<10	mg/L	7	<5	6	5

Table 4 shows the metal concentrations on 22 February 2022 and trigger values imposed by WDL 212-02 for the two sediment monitoring sites located in the Darwin Harbour. All analytes are below the trigger values specified in WDL212-02.

Table 4: Metal concentrations at Darwin Harbour quarterly sediment sampling sites on 22 February 2022

Metals	Trigger Value	Units	SODH2	NODH2
Arsenic	20	mg/kg	11	13
Cadmium	1.5	mg/kg	<1	<1
Chromium	80	mg/kg	31	41
Copper	65	mg/kg	7	11
Lead	50	mg/kg	8	14
Nickel	21	mg/kg	10	14
Zinc	200	mg/kg	24	68
Mercury	0.15	mg/kg	<0.1	<0.1

3.2 Exceedances and Non-compliances

3.2.1 Exceedances

Monitoring results were compared with trigger values specified in WDL 212-02 (2020, pg. 17). As shown in the Table 3,

- Nitrite plus Nitrate (NOx) concentration at SODH3 (26 µg/L), SODH4 (26 µg/L), NODH3 (24 µg/L) and NODH4 (24 µg/L) exceed the trigger value (20 µg/L) specified in the WDL 212-02.
- Dissolved Oxygen concentration (% Saturation) at SODH4 was 76.3 % and is outside the trigger value of > 80%.

3.2.2 Non-compliances

NOx concentration at NODH4 during last three sampling events were 22 µg/L (28/10/2021), 22 µg/L (13/01/2022) and 24 µg/L (22/2/2022) and exceed the trigger value of 20 µg/L specified in WDL 212-02. Hence, exceedance of NOx trigger value at NODH4 for three consecutive occasions is a non-compliance according to WDL 212-02 Condition 35.2. On behalf of Territory Generation, this non-compliance was notified to the NTEPA on 09 March 2022 by Trop Water Pty Ltd.

3.3 WDL 212-02 Condition 34

3.3.1 Condition 34.1

When the non-compliance was detected and by whom:

Non-compliance was detected on 08 March 2022 by Trop Water Pty Ltd.

3.3.2 Condition 34.2

The date and time of the non-compliance:

- Site NODH4 – 0848 hrs on 22 Oct 2021, 1213 hrs on 13 Jan 2022 and 0950 hrs on 22 Feb 2022.

3.3.3 Condition 34.3

The actual and potential causes and contributing factors to the non-compliance:

In order to investigate the potential causes and contributing factors to the above-mentioned non-compliance, Nitrite plus Nitrate (NOx) results at CIPS northern discharge sites (ADP1 and NODH1) and northern Darwin Harbour monitoring sites (NODH3 and NODH4) for July 2018 to February 2022 period are presented in Figure 3 and Figure 4, respectively.

Quarterly event on 22 October 2021:

On 22 Oct 2021, there was no discharge from both ADP1 and NODH1 at the time of sampling (Figure 3). Total discharge from the ADP1 (cooling tower) was only 537 kL for the month of October 2021. However, NOx concentration at NODH3 and NODH4 were 20 µg/L and 22 µg/L (greater than trigger value of 20 µg/L), respectively. This indicates that there are external sources contributing to NOx concentration at NODH3/NODH4. Darwin Harbour receives wastewater discharges from sources other than CIPS. Darwin Aquaculture Centre (DAC) has been identified as one of them and its discharge information (water quality and discharge volumes) is unknown. During October 2021, there was no to minimum rainfall at CIPS, hence the influence of rainfall on NOx concentration is minimal. But tidal induced mixing of water column can resuspend the sediment and can release NOx into the water column causing elevated levels of NOx.

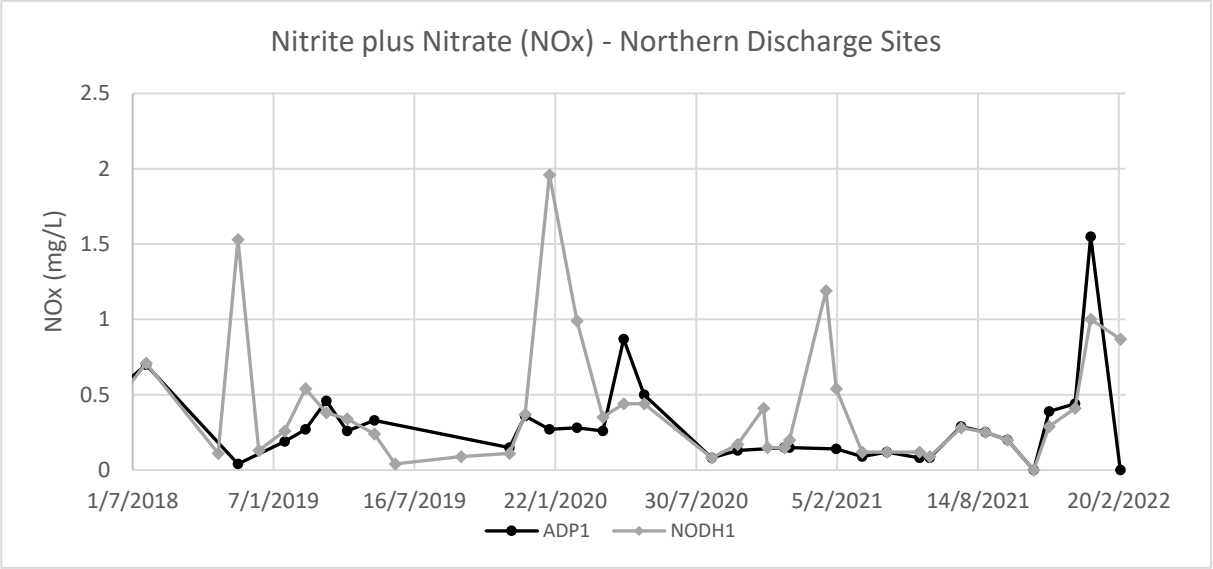

Figure 3: Nitrite plus Nitrate (NOx) concentration at discharge monitoring site ADP1 and NODH1 from Jul 2018 to Feb 2022.

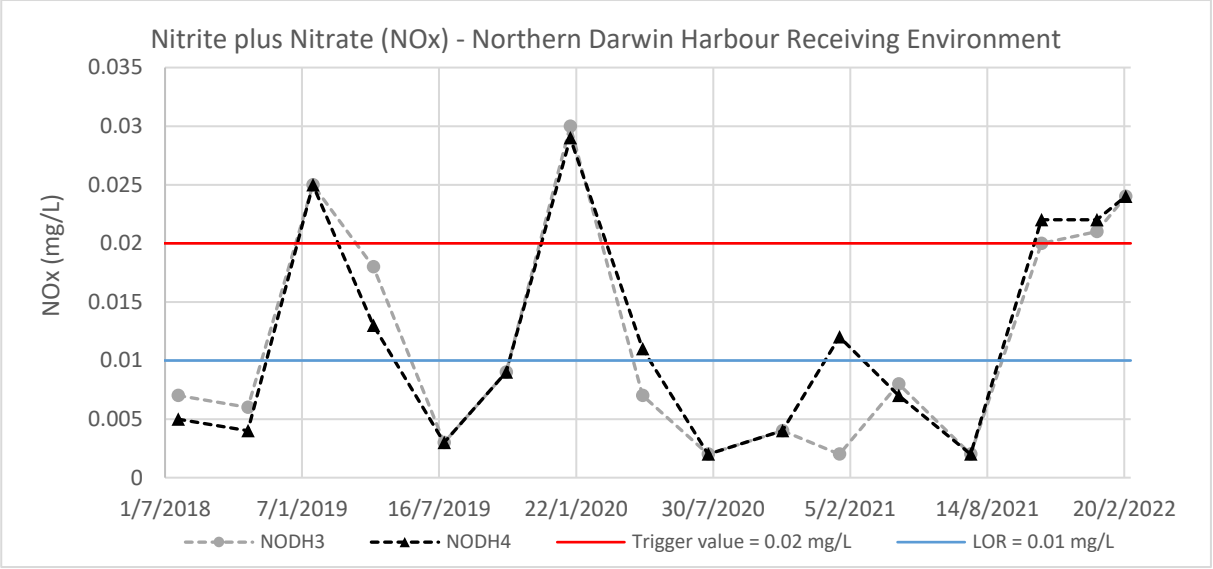

Figure 4: Nitrite plus Nitrate (NOx) concentration at Darwin Harbour monitoring site NODH3 and NODH4 from Jul 2018 to Feb 2022.

Quarterly event on 13 January 2022:

As shown in Figure 3, NOx concentration at ADP1 and NODH1 was 1550 µg/L and 1000 µg/L on 13 Jan 2022, respectively. On this day, NOx concentration at NODH3 and NODH4 was 21 µg/L and 22 µg/L, respectively and exceed the trigger value of 20 µg/L (Figure 4). The factors contributing to these exceedances are discussed in '*CIPS Incident Investigation Report for 13 Jan 2022_Final_Issued on 08 Feb 2022'.* See below for the copied text from '*CIPS Incident Investigation Report for 13 Jan 2022_Final_Issued on 08 Feb 2022'.*

"Early onset rainfall has saturated the ground (Total of 407 mm in December 2021 and 136.5 mm rainfall from 1 to 13 January 2022 were recorded at East Arm, BoM Station ID:14260) and it is highly likely the rainfall has generated increased overland flow (due to less infiltration), flowing into the Darwin Harbour proper. This overland flow would carry soil, plant debris and other organic matter washed off from the land into the harbour surrounding CIPS causing elevated TSS and nutrients. Visual observations (muddy brown water, see Table 1 and Figure 1) made by the Trop Water Pty Ltd on 13 Jan 2022 also confirms the influence of stormwater runoff/turbulent mixing on Darwin Harbour monitoring area.

Electrical Conductivity (EC) measured at Darwin Harbour monitoring sites further reinforces the influence of storm water on Darwin Harbour. A reduction in EC at NODH3 (54500 µS/cm to 51100 µS/cm) and NODH4 (54400 µS/cm to 51300 µS/cm) was observed on 13 January 2022 compared to the previous monitoring events undertaken in the dry season on 28 October 2021 (Table 6).

TP and NOx concentration at ADP1 (CIPS discharge) is higher than the trigger values (Table 5). However, irrespective of concentrations at ADP1, nutrient concentration at NODH1 and at Darwin Harbor downstream sites (NODH3 and NODH4) are influenced by the outside sources such as storm water runoff, rainfall, presence of cane toads, sediment resuspension due to tidal movement and wind effect (release nutrient into the water column) and presence mangrove debris (leaves, small tree branches etc.) on the water surface during the sampling. Presence of elevated TSS at NODH3 and NODH4 also indicates the influence of storm water runoff and/or resuspension of sediments. The presence of low to moderate amount of mangrove debris on the surface water at Darwin Harbour monitoring sites could also have contributed to elevated nutrients (Table 1). Hence, elevated nutrient concentration (TP and NOx) at NODH3 is a combined effect of CIPS discharge, rainfall, tidal and storm water influence, resuspension of sediments and presence mangrove debris (leaves, small tree branches etc.) on the water surface.

Daily outflow from cooling tower (Northern discharge point, ADP1) for the period starting from 01/01/2022 to 13/01/2022 is shown in Figure 3. The outflow from ADP1 was 31.78 kL on 13 January 2022 and average daily outflow for the noted period was 30.65 kL. As shown in Figure 1 of WDL 212-02, approximate discharge from the cooling tower (ADP1) is 80.3 kL/day. January daily outflow (01/01/2022 -14/01/2022) is less than the approximate discharge (80.3 kL/day) from the cooling tower (Figure 1, pg. 15, WDL 212-02). Hence, expected water quality impact on the Darwin Harbour receiving environment was minimal. An additional sampling event in February 2022 will be undertaken as a verification step due to the presence of relatively high TN and TP concentration at CIPS discharge site, ADP1 on 13 January 2022.

*Water colour at SODH3 and SODH4 was observed to be 'natural light blue-green' and TSS concentration was < 5 mg/L at both sites. Turbidity at SODH3 and SODH4 was significantly less than that of at NODH3 and NODH4 (Table 6). On the sampling day, Trop Water Staff observed northerly/north-westerly wind at NODH3 and NODH4 while observing calm conditions at SODH3 and SODH4. Northerly/north-westerly winds would impact northern shoreline only, with the island acting as a windbreak for the southern side. Observation of northerly/north-westerly wind on the sampling day can be confirmed with the nearest available BoM data at Darwin Airport (Table 2*Table 2*). These observations and analysis results indicate that less turbulent mixing was evident at southern side of the Darwin Harbour receiving environment compared to the northern side of the Darwin Harbour receiving environment. Exceedances are not recorded at SODH3 and SODH4 sites on 13 January 2022".*

Above discussion highlights the fact that storm water runoff from Channel Island catchment area, tidal movement and wind-induced mixing of the water column, presence of cane toads and CIPS discharge are likely contributing sources/factors to the elevated NOx concentrations at NODH3/NODH4 on 13 January 2022. In addition, discharge from DAC could influence the water quality at Darwin Harbour monitoring sites.

Quarterly event on 22 February 2022:

On 22 February 2022, there was no flow from ADP1 at the time of sampling. NOx concentration at NODH1 was 870 µg/L and hence confirms the presence of other nutrient sources such as storm water runoff and presence of cane toads at the sampling point.

As shown in Figure 1, there was 17 mm rainfall at the East Arm (BoM Station ID:14260) which further supports the accumulation of stormwater runoff into the discharge at NODH1 and can be an influential factor for the water quality at downstream sites NODH3 and NODH4. Reduction in Electrical conductivity at NODH3 and NODH4 on 22 Feb 2022 compared to previous events also confirms the presence of stormwater at the Darwin Harbour monitoring sites (Table 5). Assessment of long-term NOx concentrations at NODH3 and NODH4 (Jul 2018 – Feb 2022) was also revealed that the NOx peaks occurred in the wet seasons and were not correlated with peaks at ADP1, highlighting stormwater runoff as a major contributor for elevated NOx concentrations (Figure 4).

The daily discharge from ADP1 (cooling tower) from 01/02/2022 to 22/02/2022 is shown in Figure 5. The total discharge for this period was 2123 kL. Majority of the flow occurred in first 4 days of the month. There was no discharge from ADP1 for 5/02/2022 – 16/02/2022 period. From 17/02/2022 – 22/02/2022, discharge varied between 0.063 – 5.906 kL. Hence, the expected water quality impact on Darwin Harbour due to discharge from ADP1 on the sampling day is minimal.

Table 5: Electrical Conductivity at Darwin Harbour monitoring sites for the most recent three sampling events.

Date	Units	NODH3	NODH4	SODH3	SODH4
Electrical Conductivity					
28/10/2021 (dry season)	µS/cm	54500	54400	54600	54700
13/01/2022 (wet season)	µS/cm	51100	51300	49700	49600
22/02/2022 (wet season)	µS/cm	48600	49300	47100	47200

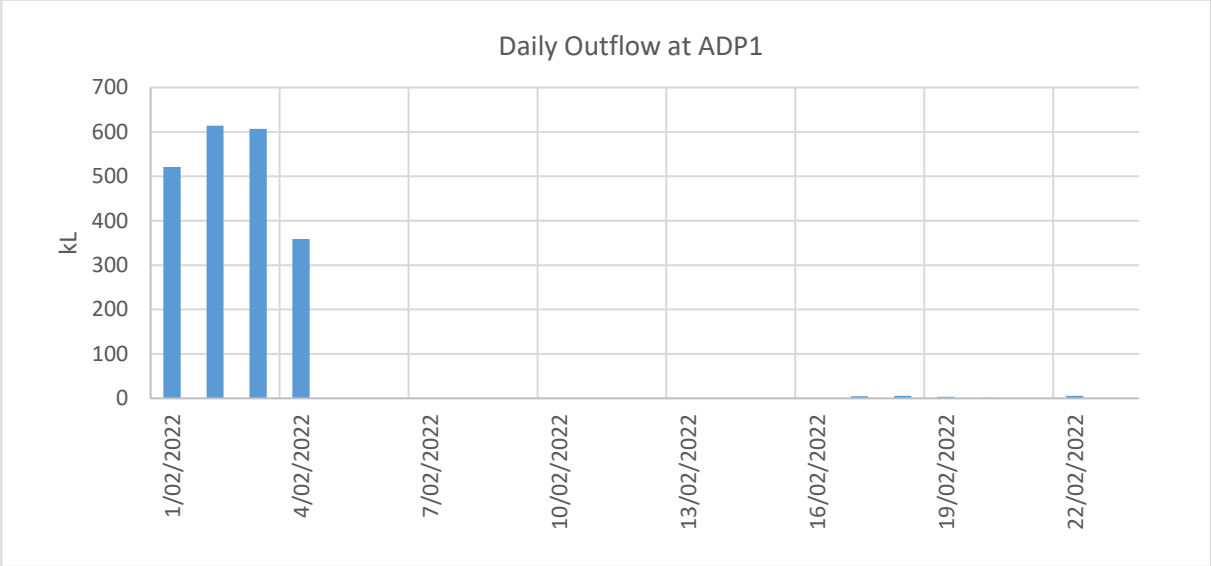

Figure 5: Daily outflow (kL) at ADP1 (CIPS Northern Discharge Point) for 01/02/2022 - 22/02/2022.

Summary

During last three quarterly monitoring events, reported exceedances/non-compliance of NOx concentrations at NODH4 could be due to the influence of multiple factors/sources;

- Storm water runoff from Channel Island catchment area during wet season.
- Wind/tidal induced turbulent mixing of water column/resuspension of sediment.
- CIPS discharge from ADP1.
- Discharge from Darwin Aquaculture Centre (discharge information is unknown).

3.3.4 Condition 34.4

The risk of environment harm arising from the non-compliance:

It is unlikely that above non-compliance has imposed any negative impacts on the marine environment. Exceedances of trigger values only indicate 'potential risk' for environmental harm. Dissolved Oxygen concentrations (% Saturation) at NODH3 and NODH4 are over 80 % and marine sediment quality results are within the trigger values defined in the Sediment Quality Guidelines in WDL 212-02.

3.3.5 Condition 34.5 and Condition 34.6

The action(s)that have or will be undertaken to mitigate any environment harm arising from the non-compliance:

Corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur:

Results of routine monthly and quarterly sampling events will be closely monitored. Visual observations at the Darwin Harbour sites will be important to see any signs of excessive algae growth due to presence of nutrients.

3.3.6 Condition 34.7

If no action was taken, why no action was taken:

Above actions are proposed.

REFERENCES

CIPS Incident Investigation report for 13 Jan 2022_Final_Issued on 08 Feb 2022, Report to Northern Territory Environment Protection Authority; Prepared by Trop Water Pty Ltd.

WDL212-02, Waste Discharge Licence 212-02 (June 2020), Northern Territory Government.

APPENDIX 1- CERTIFICATES OF ANALYSIS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2139012**	Page	: 1 of 11
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Contact	: Customer Services ES
Address	: Unit 12 / 43 Berrimah Road Northern Territory Berrimah Darwin 0828	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 29-Oct-2021 07:00
Order number	: ----	Date Analysis Commenced	: 29-Oct-2021
C-O-C number	: ----	Issue Date	: 05-Nov-2021 15:33
Sampler	: , DANIEL LANE, Quentin Vander-Mower		
Site	: Channel Island Power Station		
Quote number	: SY/339/18 V2		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG020/EG093: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	28-Oct-2021 09:09	28-Oct-2021 08:32	----	----	----
Compound	CAS Number	LOR	Unit		ES2139012-001	ES2139012-002	--------	--------	--------
					Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		60.9	38.8	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		22000	8210	----	----	----
Cobalt	7440-48-4	2	mg/kg		8	3	----	----	----
Tin	7440-31-5	5	mg/kg		<5	<5	----	----	----
Arsenic	7440-38-2	5	mg/kg		12	9	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg		41	16	----	----	----
Copper	7440-50-8	5	mg/kg		11	<5	----	----	----
Lead	7439-92-1	5	mg/kg		11	<5	----	----	----
Nickel	7440-02-0	2	mg/kg		12	5	----	----	----
Zinc	7440-66-6	5	mg/kg		34	11	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.8	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.8	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.8	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.8	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.8	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.8	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.8	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.8	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.8	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.8	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.8	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.8	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.8	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.8	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.8	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.8	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		1.0	0.6	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	NODH2	SODH2	----	----	----
			Sampling date / time	28-Oct-2021 09:09	28-Oct-2021 08:32	----	----	----
Compound	CAS Number	LOR	Unit	ES2139012-001	ES2139012-002	--------	--------	--------
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.9**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**89.3**	**94.5**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**89.0**	**94.2**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**84.0**	**87.8**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**94.8**	**100**	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**96.8**	**102**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**92.8**	**96.2**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	28-Oct-2021 09:09	28-Oct-2021 08:32	----	----	----
Compound	CAS Number	LOR	Unit		ES2139012-001	ES2139012-002	--------	--------	--------
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**81.9**	**87.3**	**----**	**----**	**----**
Toluene-D8	2037-26-5	0.2	%		**80.7**	**84.3**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	0.2	%		**81.5**	**79.5**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	NODH3	SODH3	NODH4	SODH4	ISCP
			Sampling date / time	28-Oct-2021 08:54	28-Oct-2021 08:18	28-Oct-2021 08:48	28-Oct-2021 08:28	28-Oct-2021 10:04
Compound	CAS Number	LOR	Unit	ES2139012-003	ES2139012-004	ES2139012-005	ES2139012-006	ES2139012-007
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	<5	<5
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	**0.01**
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	----	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	**0.006**
Tin	7440-31-5	0.001	mg/L	----	----	----	----	<0.001
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	<0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	**0.001**
Cobalt	7440-48-4	0.001	mg/L	----	----	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	**0.012**
Tin	7440-31-5	0.001	mg/L	----	----	----	----	<0.001
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	----
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	<5	<5	<5	<5	----
Arsenic	7440-38-2	0.5	µg/L	**1.6**	**1.7**	**1.5**	**1.5**	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NODH3	SODH3	NODH4	SODH4	ISCP
				Sampling date / time	28-Oct-2021 08:54	28-Oct-2021 08:18	28-Oct-2021 08:48	28-Oct-2021 08:28	28-Oct-2021 10:04
Compound	CAS Number	LOR	Unit		ES2139012-003	ES2139012-004	ES2139012-005	ES2139012-006	ES2139012-007
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	----
Copper	7440-50-8	1	µg/L		<1	**1**	<1	<1	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Tin	7440-31-5	5	µg/L		<5	<5	<5	<5	----
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**64**	**91**	**59**	**88**	----
Arsenic	7440-38-2	0.5	µg/L		**1.7**	**1.6**	**1.5**	**1.5**	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	----
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Tin	7440-31-5	5	µg/L		<5	<5	<5	<5	----
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	----	----	**1.79**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	----	----	**0.04**
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	----	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	----	----	**0.04**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	----	----	----	**3.3**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	----	----	**3.3**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	----	----	**0.07**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	----	----	----	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NODH3	SODH3	NODH4	SODH4	ISCP
				Sampling date / time	28-Oct-2021 08:54	28-Oct-2021 08:18	28-Oct-2021 08:48	28-Oct-2021 08:28	28-Oct-2021 10:04
Compound	CAS Number	LOR	Unit		ES2139012-003	ES2139012-004	ES2139012-005	ES2139012-006	ES2139012-007
					Result	Result	Result	Result	Result
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		**0.012**	**0.015**	**0.011**	**0.013**	**----**
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		<0.002	<0.002	<0.002	<0.002	**----**
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		**0.020**	**0.022**	**0.022**	**0.023**	**----**
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		**0.020**	**0.022**	**0.022**	**0.023**	**----**
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		**0.126**	**0.112**	**0.133**	**0.134**	**----**
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		**0.146**	**0.134**	**0.155**	**0.157**	**----**
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	**----**
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**----**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	<2	**2**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ILCP	----	----	----	----
				Sampling date / time	28-Oct-2021 10:13	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2139012-008	--------	--------	--------	--------
					Result	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		<5	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.001**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.002**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.002**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.001**	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.10**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ILCP	----	----	----	----
				Sampling date / time	28-Oct-2021 10:13	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2139012-008	--------	--------	--------	--------
					Result	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser - Continued									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.6**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**1.6**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.04**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	----	----	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2201025**	Page	: 1 of 12
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Contact	: Customer Services ES
Address	: Unit 12 / 43 Berrimah Road Northern Territory Berrimah Darwin 0828	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 14-Jan-2022 08:00
Order number	: ----	Date Analysis Commenced	: 14-Jan-2022
C-O-C number	: ----	Issue Date	: 20-Jan-2022 10:16
Sampler	: JOHN DIMOS, Quentin Vander-Mower, SANDYA NANAYAKKARA, VICTOR CALDERON		
Site	: Channel Island Power Station		
Quote number	: SY/339/18 V2		
No. of samples received	: 12		
No. of samples analysed	: 12		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP075(SIM): LOR raised due to the high amount of moisture present.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	13-Jan-2022 12:24	13-Jan-2022 11:51	----	----	----
Compound	CAS Number	LOR	Unit		ES2201025-005	ES2201025-006	--------	--------	--------
					Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		58.6	54.2	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		15000	13300	----	----	----
Cobalt	7440-48-4	2	mg/kg		6	5	----	----	----
Tin	7440-31-5	5	mg/kg		<5	<5	----	----	----
Arsenic	7440-38-2	5	mg/kg		10	13	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg		33	29	----	----	----
Copper	7440-50-8	5	mg/kg		6	6	----	----	----
Lead	7439-92-1	5	mg/kg		15	12	----	----	----
Nickel	7440-02-0	2	mg/kg		10	8	----	----	----
Zinc	7440-66-6	5	mg/kg		27	21	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.8	<0.8	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.8	<0.8	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.8	<0.8	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.8	<0.8	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.8	<0.8	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.8	<0.8	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.8	<0.8	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.8	<0.8	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.8	<0.8	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.8	<0.8	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.8	<0.8	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		1.0	1.0	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	NODH2	SODH2	----	----	----
			Sampling date / time	13-Jan-2022 12:24	13-Jan-2022 11:51	----	----	----
Compound	CAS Number	LOR	Unit	ES2201025-005	ES2201025-006	--------	--------	--------
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.9**	**1.9**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**104**	**104**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**100**	**102**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**83.8**	**81.4**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**107**	**108**	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**113**	**114**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**99.6**	**99.9**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	13-Jan-2022 12:24	13-Jan-2022 11:51	----	----	----
Compound	CAS Number	LOR	Unit		ES2201025-005	ES2201025-006	--------	--------	--------
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**109**	**73.6**	**----**	**----**	**----**
Toluene-D8	2037-26-5	0.2	%		**121**	**75.5**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	0.2	%		**115**	**72.9**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SODH1	ADP1	NODH1	ADP2	NODH3
			Sampling date / time	13-Jan-2022 12:51	13-Jan-2022 11:32	13-Jan-2022 11:49	13-Jan-2022 12:15	13-Jan-2022 12:13
Compound	CAS Number	LOR	Unit	ES2201025-001	ES2201025-002	ES2201025-003	ES2201025-004	ES2201025-007
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	**15**	**102**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	**0.01**	**0.02**	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.005**	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	**0.008**	<0.001	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.019**	**0.038**	----
Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**0.08**	**0.02**	**0.47**	**0.05**	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.005**	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	**0.003**	**0.001**	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	**0.011**	**0.003**	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	**0.011**	<0.005	**0.064**	**0.060**	----
Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	----	----	----	----	<0.00004
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	----	----	----	----	<0.00004
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	----	----	----	----	<5
Arsenic	7440-38-2	0.5	µg/L	----	----	----	----	**1.4**
Cadmium	7440-43-9	0.2	µg/L	----	----	----	----	<0.2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH1	ADP1	NODH1	ADP2	NODH3
				Sampling date / time	13-Jan-2022 12:51	13-Jan-2022 11:32	13-Jan-2022 11:49	13-Jan-2022 12:15	13-Jan-2022 12:13
Compound	CAS Number	LOR	Unit		ES2201025-001	ES2201025-002	ES2201025-003	ES2201025-004	ES2201025-007
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		----	----	----	----	<0.5
Cobalt	7440-48-4	0.2	µg/L		----	----	----	----	<0.2
Copper	7440-50-8	1	µg/L		----	----	----	----	<1
Lead	7439-92-1	0.2	µg/L		----	----	----	----	<0.2
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	<0.5
Tin	7440-31-5	5	µg/L		----	----	----	----	<5
Zinc	7440-66-6	5	µg/L		----	----	----	----	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		----	----	----	----	**3080**
Arsenic	7440-38-2	0.5	µg/L		----	----	----	----	**3.1**
Cadmium	7440-43-9	0.2	µg/L		----	----	----	----	<0.2
Chromium	7440-47-3	0.5	µg/L		----	----	----	----	**6.6**
Cobalt	7440-48-4	0.2	µg/L		----	----	----	----	**1.4**
Copper	7440-50-8	1	µg/L		----	----	----	----	**1**
Lead	7439-92-1	0.2	µg/L		----	----	----	----	**1.6**
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	<0.5
Tin	7440-31-5	5	µg/L		----	----	----	----	<5
Zinc	7440-66-6	5	µg/L		----	----	----	----	**7**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.13**	**0.16**	**0.08**	**1.32**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	**0.02**	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.61**	**1.55**	**1.00**	**0.21**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.61**	**1.55**	**1.00**	**0.23**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**3.0**	**3.1**	**0.6**	**3.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**3.6**	**4.6**	**1.6**	**3.4**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.06**	**0.36**	**0.12**	**0.06**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.03**	**0.11**	**0.02**	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH1	ADP1	NODH1	ADP2	NODH3
				Sampling date / time	13-Jan-2022 12:51	13-Jan-2022 11:32	13-Jan-2022 11:49	13-Jan-2022 12:15	13-Jan-2022 12:13
Compound	CAS Number	LOR	Unit		ES2201025-001	ES2201025-002	ES2201025-003	ES2201025-004	ES2201025-007
					Result	Result	Result	Result	Result
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		----	----	----	----	<0.005
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		----	----	----	----	**0.002**
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		----	----	----	----	**0.019**
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		----	----	----	----	**0.021**
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		----	----	----	----	**0.265**
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		----	----	----	----	**0.286**
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		----	----	----	----	**0.094**
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		----	----	----	----	**0.003**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	**3**	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SODH3	NODH4	SODH4	ISCP	ILCP
			Sampling date / time	13-Jan-2022 11:45	13-Jan-2022 12:03	13-Jan-2022 11:35	13-Jan-2022 12:00	13-Jan-2022 12:09
Compound	CAS Number	LOR	Unit	ES2201025-008	ES2201025-009	ES2201025-010	ES2201025-011	ES2201025-012
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	**94**	<5	**16**	<5
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	**0.02**	<0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	**0.001**	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	----	----	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	**0.002**	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	**0.023**	<0.005
Tin	7440-31-5	0.001	mg/L	----	----	----	<0.001	<0.001
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	**0.04**	**0.01**
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	**0.002**	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	----	----	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	**0.002**	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	**0.061**	<0.005
Tin	7440-31-5	0.001	mg/L	----	----	----	<0.001	<0.001
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	----	----
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	<0.0001
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	<5	<5	<5	----	----
Arsenic	7440-38-2	0.5	µg/L	**1.2**	**1.3**	**1.3**	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH3	NODH4	SODH4	ISCP	ILCP
				Sampling date / time	13-Jan-2022 11:45	13-Jan-2022 12:03	13-Jan-2022 11:35	13-Jan-2022 12:00	13-Jan-2022 12:09
Compound	CAS Number	LOR	Unit		ES2201025-008	ES2201025-009	ES2201025-010	ES2201025-011	ES2201025-012
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	<0.2	<0.2	----	----
Copper	7440-50-8	1	µg/L		<1	<1	<1	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Tin	7440-31-5	5	µg/L		<5	<5	<5	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	<5	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**170**	**2040**	**103**	----	----
Arsenic	7440-38-2	0.5	µg/L		**1.3**	**2.7**	**1.3**	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	**4.3**	<0.5	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	**0.9**	<0.2	----	----
Copper	7440-50-8	1	µg/L		<1	<1	<1	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	**1.0**	<0.2	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Tin	7440-31-5	5	µg/L		<5	<5	<5	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	<5	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	----	**1.16**	**0.76**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	----	**0.02**	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	**0.18**	**0.03**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	----	**0.20**	**0.03**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	----	----	**3.1**	**2.1**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	----	**3.3**	**2.1**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	----	**0.06**	**0.03**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	----	----	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	SODH3	NODH4	SODH4	ISCP	ILCP
				Sampling date / time	13-Jan-2022 11:45	13-Jan-2022 12:03	13-Jan-2022 11:35	13-Jan-2022 12:00	13-Jan-2022 12:09
					ES2201025-008	ES2201025-009	ES2201025-010	ES2201025-011	ES2201025-012
					Result	Result	Result	Result	Result
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		<0.005	<0.005	<0.005	----	----
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		<0.002	<0.002	<0.002	----	----
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		**0.007**	**0.022**	**0.004**	----	----
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		**0.007**	**0.022**	**0.004**	----	----
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		**0.175**	**0.194**	**0.155**	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		**0.182**	**0.216**	**0.159**	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	**0.058**	<0.005	----	----
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	**6**	<2

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2206069**	Page	: 1 of 13
Amendment	: **1**		
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Contact	: Customer Services ES
Address	: Unit 12 / 43 Berrimah Road Northern Territory Berrimah Darwin 0828	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 23-Feb-2022 07:30
Order number	: ----	Date Analysis Commenced	: 23-Feb-2022
C-O-C number	: ----	Issue Date	: 04-Mar-2022 14:54
Sampler	: LILLY FURLONGER, VICTOR CALDERON		
Site	: Channel Island Power Station		
Quote number	: SY/339/18 V2		
No. of samples received	: 11		
No. of samples analysed	: 11		

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Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG035: Poor matrix spike recovery was obtained for Mercury on sample EM2202680 # 2. Confirmed by re-analysis.
- EG093: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- EP075(SIM): LOR raised due to the high amount of moisture present.
- EP080: Surrogate recovery bias low due to sample matrix interferences, confirmed by re-extraction and re-analysis.
- Amendment (04/03/2022): This report has been amended following a change to the EA025 result reported for sample #9 , a full investigation will be detailed in corrective action request CAR22SYC020.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	NODH2	SODH2	----	----	----
			Sampling date / time	22-Feb-2022 10:01	22-Feb-2022 09:44	----	----	----
Compound	CAS Number	LOR	Unit	ES2206069-004	ES2206069-005	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**56.8**	**49.6**	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**19300**	**14600**	----	----	----
Cobalt	7440-48-4	2	mg/kg	**7**	**6**	----	----	----
Tin	7440-31-5	5	mg/kg	<5	<5	----	----	----
Arsenic	7440-38-2	5	mg/kg	**13**	**11**	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**41**	**31**	----	----	----
Copper	7440-50-8	5	mg/kg	**11**	**7**	----	----	----
Lead	7439-92-1	5	mg/kg	**14**	**8**	----	----	----
Nickel	7440-02-0	2	mg/kg	**14**	**10**	----	----	----
Zinc	7440-66-6	5	mg/kg	**68**	**24**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.8	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.8	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.8	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.8	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.8	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.8	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.8	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.8	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**1.0**	**0.6**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	22-Feb-2022 10:01	22-Feb-2022 09:44	----	----	----
Compound	CAS Number	LOR	Unit		ES2206069-004	ES2206069-005	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.9**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		**110**	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		**110**	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**85.7**	**85.4**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**93.3**	**93.0**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**92.5**	**89.0**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**109**	**109**	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**98.6**	**97.7**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**101**	**99.3**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	NODH2	SODH2	----	----	----
				Sampling date / time	22-Feb-2022 10:01	22-Feb-2022 09:44	----	----	----
Compound	CAS Number	LOR	Unit		ES2206069-004	ES2206069-005	--------	--------	--------
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**71.4**	**124**	**----**	**----**	**----**
Toluene-D8	2037-26-5	0.2	%		**72.0**	**125**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	0.2	%		**78.2**	**125**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SODH1	NODH1	ADP2	NODH3	SODH3
			Sampling date / time	22-Feb-2022 11:53	22-Feb-2022 10:49	22-Feb-2022 11:17	22-Feb-2022 09:55	22-Feb-2022 09:35
Compound	CAS Number	LOR	Unit	ES2206069-001	ES2206069-002	ES2206069-003	ES2206069-006	ES2206069-007
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	**21**	**6**	**7**
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	**0.02**	**0.02**	----	----
Arsenic	7440-38-2	0.001	mg/L	----	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	----	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	----	<0.001	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L	----	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	----	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	----	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	----	**0.084**	**0.011**	----	----
Tin	7440-31-5	0.001	mg/L	----	<0.001	<0.001	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	**0.09**	**0.03**	----	----
Arsenic	7440-38-2	0.001	mg/L	----	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	----	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	----	**0.002**	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L	----	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	----	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	----	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	----	**0.093**	**0.027**	----	----
Tin	7440-31-5	0.001	mg/L	----	<0.001	<0.001	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	----	----	<0.00004	<0.00004
Mercury	7439-97-6	0.0001	mg/L	----	<0.0001	<0.0001	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	----	----	<0.00004	<0.00004
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	<0.0001	<0.0001	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	----	----	----	<5	<5
Arsenic	7440-38-2	0.5	µg/L	----	----	----	**1.4**	**1.3**
Cadmium	7440-43-9	0.2	µg/L	----	----	----	<0.2	<0.2

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	SODH1	NODH1	ADP2	NODH3	SODH3
				Sampling date / time	22-Feb-2022 11:53	22-Feb-2022 10:49	22-Feb-2022 11:17	22-Feb-2022 09:55	22-Feb-2022 09:35
					ES2206069-001	ES2206069-002	ES2206069-003	ES2206069-006	ES2206069-007
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		----	----	----	<0.5	<0.5
Cobalt	7440-48-4	0.2	µg/L		----	----	----	<0.2	<0.2
Copper	7440-50-8	1	µg/L		----	----	----	<1	<1
Lead	7439-92-1	0.2	µg/L		----	----	----	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		----	----	----	**0.6**	<0.5
Tin	7440-31-5	5	µg/L		----	----	----	<5	<5
Zinc	7440-66-6	5	µg/L		----	----	----	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		----	----	----	**389**	**350**
Arsenic	7440-38-2	0.5	µg/L		----	----	----	**1.4**	**1.6**
Cadmium	7440-43-9	0.2	µg/L		----	----	----	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		----	----	----	**0.6**	<0.5
Cobalt	7440-48-4	0.2	µg/L		----	----	----	<0.2	<0.2
Copper	7440-50-8	1	µg/L		----	----	----	<1	<1
Lead	7439-92-1	0.2	µg/L		----	----	----	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		----	----	----	<0.5	<0.5
Tin	7440-31-5	5	µg/L		----	----	----	<5	<5
Zinc	7440-66-6	5	µg/L		----	----	----	<5	<5
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		<5	----	----	----	----
Arsenic	7440-38-2	0.2	µg/L		**0.2**	----	----	----	----
Cadmium	7440-43-9	0.05	µg/L		<0.05	----	----	----	----
Chromium	7440-47-3	0.2	µg/L		<0.2	----	----	----	----
Cobalt	7440-48-4	0.1	µg/L		**0.2**	----	----	----	----
Copper	7440-50-8	0.5	µg/L		**0.7**	----	----	----	----
Lead	7439-92-1	0.1	µg/L		<0.1	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		**0.6**	----	----	----	----
Tin	7440-31-5	0.2	µg/L		<0.2	----	----	----	----
Zinc	7440-66-6	1	µg/L		**8**	----	----	----	----
EG094T: Total metals in Fresh water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**230**	----	----	----	----
Arsenic	7440-38-2	0.2	µg/L		**0.5**	----	----	----	----
Cadmium	7440-43-9	0.05	µg/L		<0.05	----	----	----	----
Chromium	7440-47-3	0.2	µg/L		**0.5**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SODH1	NODH1	ADP2	NODH3	SODH3
			Sampling date / time	22-Feb-2022 11:53	22-Feb-2022 10:49	22-Feb-2022 11:17	22-Feb-2022 09:55	22-Feb-2022 09:35
Compound	CAS Number	LOR	Unit	ES2206069-001	ES2206069-002	ES2206069-003	ES2206069-006	ES2206069-007
				Result	Result	Result	Result	Result
EG094T: Total metals in Fresh water by ORC-ICPMS - Continued								
Cobalt	7440-48-4	0.1	µg/L	**0.3**	----	----	----	----
Copper	7440-50-8	0.5	µg/L	**1.0**	----	----	----	----
Lead	7439-92-1	0.1	µg/L	<0.1	----	----	----	----
Nickel	7440-02-0	0.5	µg/L	**0.8**	----	----	----	----
Tin	7440-31-5	0.2	µg/L	<0.2	----	----	----	----
Zinc	7440-66-6	1	µg/L	**16**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	**0.02**	**0.17**	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	----	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	----	**0.87**	**0.08**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	**0.87**	**0.08**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	**0.3**	**1.1**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	----	**1.2**	**1.2**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	----	**0.02**	**0.04**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	<0.01	<0.01	----	----
EK255A: Ammonia								
Ammonia as N	7664-41-7	0.005	mg/L	**0.027**	----	----	<0.005	<0.005
EK257A: Nitrite								
Nitrite as N	14797-65-0	0.002	mg/L	**0.004**	----	----	**0.006**	**0.005**
EK258A: Nitrate								
Nitrate as N	14797-55-8	0.002	mg/L	**1.15**	----	----	**0.018**	**0.021**
EK259A: Nitrite and Nitrate (NOx)								
Nitrite + Nitrate as N	----	0.002	mg/L	**1.15**	----	----	**0.024**	**0.026**
EK261A: Total Kjeldahl Nitrogen								
Total Kjeldahl Nitrogen as N	----	0.050	mg/L	**0.210**	----	----	<0.050	<0.050
EK262A: Total Nitrogen								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH1	NODH1	ADP2	NODH3	SODH3
				Sampling date / time	22-Feb-2022 11:53	22-Feb-2022 10:49	22-Feb-2022 11:17	22-Feb-2022 09:55	22-Feb-2022 09:35
Compound	CAS Number	LOR	Unit		ES2206069-001	ES2206069-002	ES2206069-003	ES2206069-006	ES2206069-007
					Result	Result	Result	Result	Result
EK262A: Total Nitrogen - Continued									
Total Nitrogen as N	----	0.050	mg/L		**1.36**	**----**	**----**	<0.050	<0.050
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		**0.015**	**----**	**----**	<0.005	<0.005
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		**0.015**	**----**	**----**	**0.004**	**0.004**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	NODH4	SODH4	ISCP	ILCP	----
			Sampling date / time	22-Feb-2022 09:50	22-Feb-2022 09:20	22-Feb-2022 11:09	22-Feb-2022 11:00	----
Compound	CAS Number	LOR	Unit	ES2206069-008	ES2206069-009	ES2206069-010	ES2206069-011	--------
				Result	Result	Result	Result	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	<5	----	----	----
Suspended Solids (SS)	----	5	mg/L	**5**	----	**6**	<5	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	**0.02**	<0.01	----
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	<0.001	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	----	----	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	**0.014**	<0.005	----
Tin	7440-31-5	0.001	mg/L	----	----	<0.001	<0.001	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	**0.02**	<0.01	----
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	<0.001	**0.003**	----
Cobalt	7440-48-4	0.001	mg/L	----	----	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	**0.022**	<0.005	----
Tin	7440-31-5	0.001	mg/L	----	----	<0.001	<0.001	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
Mercury	7439-97-6	0.0001	mg/L	----	----	<0.0001	<0.0001	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	<0.0001	<0.0001	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Aluminium	7429-90-5	5	µg/L	<5	<5	----	----	----
Arsenic	7440-38-2	0.5	µg/L	**1.3**	**1.0**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NODH4	SODH4	ISCP	ILCP	----
				Sampling date / time	22-Feb-2022 09:50	22-Feb-2022 09:20	22-Feb-2022 11:09	22-Feb-2022 11:00	----
Compound	CAS Number	LOR	Unit		ES2206069-008	ES2206069-009	ES2206069-010	ES2206069-011	--------
					Result	Result	Result	Result	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	<0.2	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	----	----	----
Tin	7440-31-5	5	µg/L		<5	<5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**532**	**357**	----	----	----
Arsenic	7440-38-2	0.5	µg/L		**1.9**	**1.5**	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		**1.0**	**1.0**	----	----	----
Cobalt	7440-48-4	0.2	µg/L		**0.3**	<0.2	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		**0.7**	**0.6**	----	----	----
Tin	7440-31-5	5	µg/L		<5	<5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	**0.25**	**0.09**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	**0.05**	**0.02**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	**0.05**	**0.02**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	----	**1.3**	**1.3**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	**1.4**	**1.3**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	----	**0.04**	**0.05**	----
EK071G: Reactive Phosphorus as P by discrete analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NODH4	SODH4	ISCP	ILCP	----
				Sampling date / time	22-Feb-2022 09:50	22-Feb-2022 09:20	22-Feb-2022 11:09	22-Feb-2022 11:00	----
Compound	CAS Number	LOR	Unit		ES2206069-008	ES2206069-009	ES2206069-010	ES2206069-011	--------
					Result	Result	Result	Result	----
EK071G: Reactive Phosphorus as P by discrete analyser - Continued									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	----	<0.01	<0.01	----
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		<0.005	<0.005	----	----	----
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		**0.006**	**0.005**	----	----	----
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		**0.018**	**0.021**	----	----	----
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		**0.024**	**0.026**	----	----	----
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		<0.050	<0.050	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		<0.050	<0.050	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	**0.006**	----	----	----
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		**0.004**	**0.004**	----	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	**2**	<2	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

APPENDIX D_ INCIDENT INVESTIGATION REPORT ISSUED ON 17 JUN 2022

REPORT TO NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

WDL212-02 Non-compliance Incident Investigation Report

Issued: 17 June 2022

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Document Control Form

TW Report:	WDL212-02 Non-compliance Incident Investigation Report – 17 June 2022
Revision Number:	Version 1

Revision History

Revision Number	Date	Prepared By	Reviewed By	Approved By
Draft 1	07 June 2022	Lillian Furlonger	Daniel Lane	
Version 1 Final	14 June 2022	Lillian Furlonger	Daniel Lane	Daniel Lane

Issue Register

Distribution List	Date Issued	Number of Copies Sent
Territory Generation – jeannie.mcinnes@territorygeneration.com.au	17 June 2022	1
Northern Territory Environment Protection Authority (NTEPA) – waste@nt.gov.au	17 June 2022	1

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EXECUTIVE SUMMARY

In accordance with the Monitoring Plan specified in Waste Discharge Licence (WDL212-02), a quarterly water and sediment monitoring event was undertaken by Trop Water Pty Ltd on 20 April 2022. For compliance assessment, Trigger Values specified in WDL212-02 are applicable to the following northern (associated with Authorised Discharge Point 1) and southern (associated with Authorised Discharge Point 2) Monitoring Points located in Darwin Harbour (external to Channel Island Power Station premises):

Northern Monitoring Points:

NODH2 – Vicinity of Northern Outlet to Darwin Harbour – Sediment
NODH3 – Northern Discharge Point Mixing Zone - Water
NODH4 – Northern Receiving Environment Monitoring Point – Water

Southern Monitoring Points:

SODH2 – Vicinity of Southern Outlet to Darwin Harbour – Sediment
SODH3 – Southern Discharge Point Mixing Zone – Water
SODH4 – Southern Receiving Environment Monitoring Point – Water

As required under WDL212-02 Licence Condition 33, notification of non-compliance was issued to Northern Territory Environment Protection Authority (the Administering Agency) on 9 May 2022 for the following non-compliances:

1. Total Suspended Solids at SODH3 at 1003 hrs on 20 April 2022 (Licence Condition 35.2 – an exceedance of three times or more a trigger value) – external to CIPS premises.
2. Total Suspended Solids at SODH4 at 0958 hrs on 20 April 2022 (Licence Condition 35.2 – an exceedance of three times or more a trigger value) – external to CIPS premises.
3. Nitrogen Oxides at NODH4 at 1015 hrs on 20 April 2022 (Licence Condition 35.1 – an exceedance of a trigger value on three consecutive sampling occasions) – external to CIPS premises.

The above Trigger Value exceedances were not caused by Channel Island Power Station waste discharge. Rather, elevated Nitrogen Oxides and Total Suspended Solids in the upper estuary of Darwin Harbour was likely driven by large tidal movements and wind induced mixing, in conjunction with inflows containing high organic loads from catchment runoff.

Sediment quality monitoring results in the vicinity of both the Northern and Southern Outlets to Darwin Harbour were within the relevant Trigger Values specified under WDL212-02 for Total Metals and Hydrocarbons.

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1 BACKGROUND

In accordance with the Monitoring Plan specified in *Waste Discharge Licence WDL212-02* (WDL212-02), a quarterly water and sediment monitoring event was undertaken by Trop Water Pty Ltd at Channel Island Power Station on 20 April 2022. All samples and field environmental data were collected in accordance with AS/NZS 5667 and ANZECC & ARMCANZ, where applicable. Monitoring samples for physico-chemical analysis were analysed by Australian Laboratory Services – Environmental Division Sydney (NATA Accreditation No. 825). Monitoring samples for microbiological analysis were analysed by Darwin Water Microbiology Laboratory (NATA Accreditation No. 15606).

Specified Trigger Values in WDL212-02 and the referenced document entitled *Water Quality Objectives for the Darwin Harbour Region – Background Document* (2010), are applicable to the following northern (associated with Authorised Discharge Point 1) and southern (associated with Authorised Discharge Point 2) Monitoring Points:

Northern Monitoring Points:

- NODH2 – Vicinity of Northern Outlet to Darwin Harbour – Sediment
- NODH3 – Northern Discharge Point Mixing Zone - Water
- NODH4 – Northern Receiving Environment Monitoring Point – Water

Southern Monitoring Points:

- SODH2 – Vicinity of Southern Outlet to Darwin Harbour – Sediment
- SODH3 – Southern Discharge Point Mixing Zone – Water
- SODH4 – Southern Receiving Environment Monitoring Point – Water

WDL212-02 Licence Condition 35 states:

> *A non-compliance with this licence includes:*
>
> *35.1 an exceedance of a trigger value as specified in the Water Monitoring Plan or Sediment Monitoring Plan, on three consecutive sampling occasions; or*
>
> *35.2 an exceedance of three times or more a trigger value as specified in the Water Monitoring Plan or Sediment Monitoring Plan.*

As required under WDL212-02 Licence Condition 33, notification of non-compliance was issued to NTEPA (the Administering Agency) on 9 May 2022 for the following non-compliances:

1. Total Suspended Solids at SODH3 at 1003 hrs on 20 April 2022 (Licence Condition 35.2 – an exceedance of three times or more a trigger value)
2. Total Suspended Solids at SODH4 at 0958 hrs on 20 April 2022 (Licence Condition 35.2 – an exceedance of three times or more a trigger value)
3. Nitrogen Oxides at NODH4 at 1015 hrs on 20 April 2022 (Licence Condition 35.1 – an exceedance of a trigger value on three consecutive sampling occasions)

The above non-compliances are described and discussed in this Incident Investigation Report, including:

- the actual and/or potential causes and contributing factors to the non-compliance, and
- the risk of environmental harm arising from the non-compliance

2 MONITORING POINTS

Monitoring points are presented in terms of 'northern monitoring points' (those associated with Authorised Discharge Point 1), and 'southern monitoring points' (those associated with Authorised Discharge Point 2). A summary of monitoring points, field observations and sample collection for the monitoring event undertaken on 20 April 2022 is provided in Table 1 (northern points) and Table 2 (southern points). An aerial view of Channel Island Power Station showing WDL212-02 monitoring points is provided in Figure 1.

Table 1: Northern monitoring points.

Northern Monitoring Points					
Monitoring Point	**Site Code**	**Site Description**	**Monitoring**	**Time (Hrs)**	**20 April 2022 – Field Notes**
Authorised Discharge Point 1	ADP1	Representative of cooling tower discharge that flows to Darwin Harbour via the Northern Discharge Outlet.	Monthly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1130	▪ Flowing ▪ Water sample/s collected ▪ In-situ (field) measurements recorded
Northern Outlet to Darwin Harbour	NODH1	Drain prior to mixing in receiving environment	Monthly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1150	▪ Flowing ▪ Water sample/s collected ▪ In-situ (field) measurements recorded
Northern Outlet to Darwin Harbour - Sediment	NODH2	Receiving environment within area of potential impact in Darwin Harbour, in the vicinity of the Northern Outlet to Darwin Harbour	Quarterly Sediment: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1028	▪ Total depth: 3.6 m ▪ Sediment sample collected
Northern Discharge Point Mixing Zone	NODH3	Northern Discharge Point Mixing Zone	Quarterly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1025	▪ Total depth: 3.7 m ▪ Water sample/s collected ▪ Field measurements recorded
Northern Receiving Environment Monitoring Point	NODH4	Northern Receiving Environment Monitoring Point	Quarterly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1015	▪ Total depth: 6.8 m ▪ Water sample/s collected ▪ Field measurements recorded ▪ Water colour was green with a shade of brown

Table 2: Southern monitoring points.

Southern Monitoring Points					
Monitoring Point	**Site Code**	**Site Description**	**Monitoring**	**Time (Hrs)**	**20 April 2022 – Field Notes**
Influent Large Cooling Pond	ILCP	Influent Large Cooling Pond	Quarterly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1210	▪ Water sample/s collected ▪ In-situ (field) measurements recorded
Influent Small Cooling Pond	ISCP	Influent Small Cooling Pond	Quarterly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1200	▪ Water sample/s collected ▪ In-situ (field) measurements recorded
Authorised Discharge Point 2	ADP2	Representative of cooling ponds discharge that flows to Darwin Harbour via the Southern Discharge Outlet.	Monthly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1215	▪ No flow
Southern Outlet to Darwin Harbour	SODH1	Drain prior to mixing in receiving environment	Monthly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1115	▪ No flow
Southern Outlet to Darwin Harbour - Sediment	SODH2	Receiving environment within area of potential impact in Darwin Harbour, in the vicinity of the Southern Outlet to Darwin Harbour	Quarterly Sediment: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	1006	▪ Total depth: 3.8 m ▪ Sediment sample collected
Southern Discharge Point Mixing Zone	SODH3	Southern Discharge Point Mixing Zone	Quarterly Water: ▪ Total and Filtered Metals ▪ Nutrients	1003	▪ Total depth: 5.2 m ▪ Water sample/s collected ▪ Field measurements recorded

Southern Monitoring Points					
Monitoring Point	**Site Code**	**Site Description**	**Monitoring**	**Time (Hrs)**	**20 April 2022 – Field Notes**
			▪ Microbiological ▪ Physical ▪ In-situ (field) measurements		
Southern Receiving Environment Monitoring Point	SODH4	Southern Receiving Environment Monitoring Point	Quarterly Water: ▪ Total and Filtered Metals ▪ Nutrients ▪ Microbiological ▪ Physical ▪ In-situ (field) measurements	0958	▪ Total depth: 6.3 m ▪ Water sample/s collected ▪ Field measurements recorded ▪ Water colour was brown ▪ Waves and fast current from the south

Figure 1: Aerial view of Channel Island Power Station showing WDL212-02 monitoring points.

3 RESULTS AND DISCUSSION

1.1 Weather and Climate

Daily rainfall recorded at East Arm (BOM Station ID 14260) for the period 1 July 2021 to 30 April 2022 is shown in Figure 2. On 19 May 2022, the day before the monitoring event, 3.0 mm of rainfall was recorded at East Arm and 2.6 mm was recorded at Darwin (BOM Station ID: 014015). Although no rainfall was recorded at either of these stations for 20 April 2022, 3.2 mm of rainfall was recorded at Darwin the following day, 21 April 2022.

On the day of the monitoring event, 11 km/h SE wind was recorded for Darwin at 0900 hrs, followed by 22 km/hr ESE at 1500 hrs. Maximum wind gust was 39 km/hr ESE at 1126 hrs. High tide in Darwin Harbour was 7.65 m at 0840 hrs, with a 2.33 m low tide at 1424 hrs. The tides were falling from the spring maximum of 7.76 m on 19 April 2022 (see Figure 3). Large tidal movements, high wind and rainfall around the time of monitoring likely caused catchment runoff inflows containing high organic loads, sediment resuspension and redistribution.

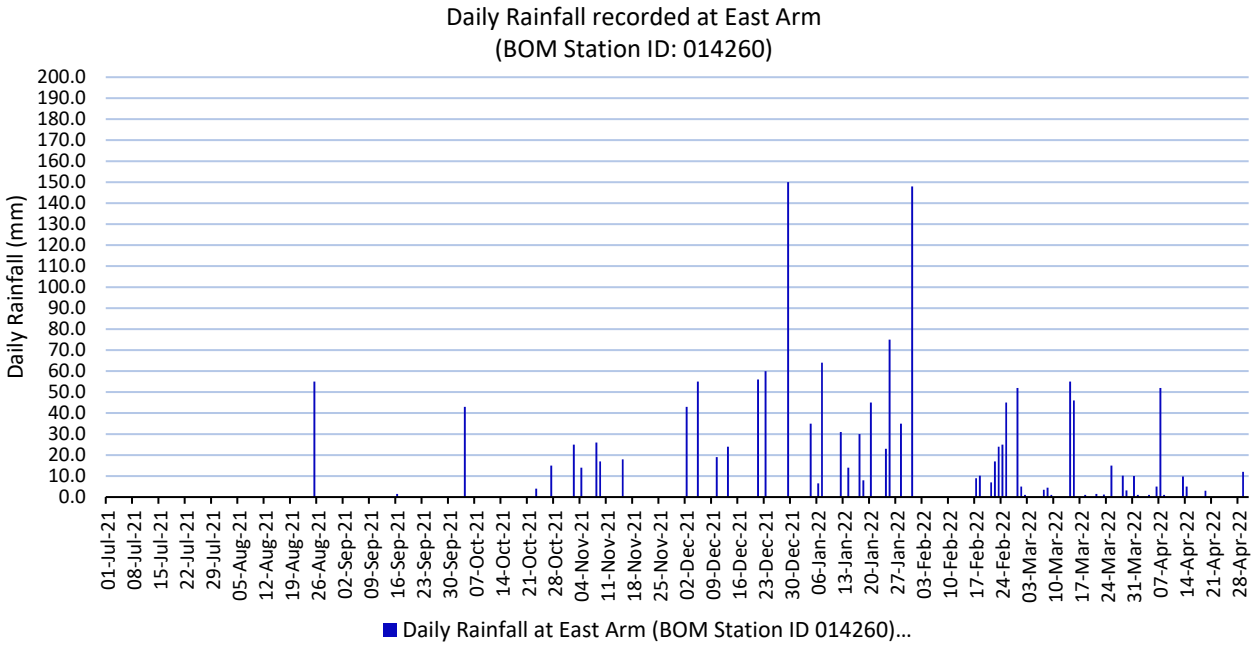

Figure 2: Daily rainfall recorded at East Arm (Bureau of Meteorology Station ID 014260) for the period 1 July 2021 to 30 April 2022.

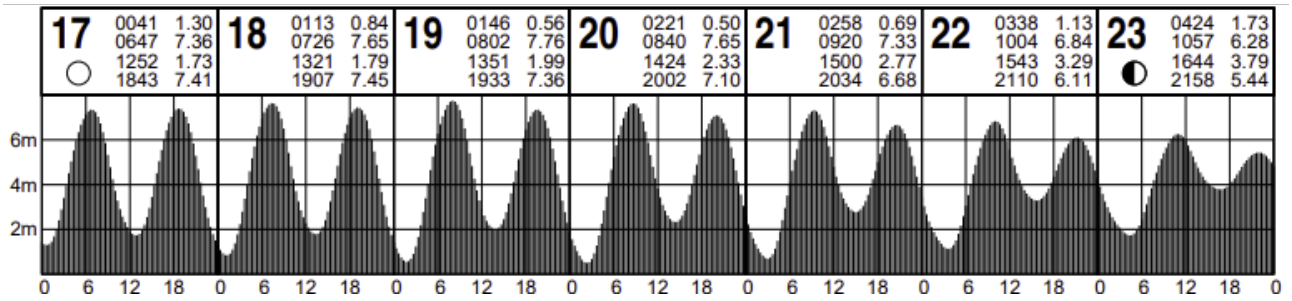

Figure 3: Tide predictions for Darwin Harbour 17 – 23 April 2022 (ACST), (NT Government, 2022).

1.2 WDL212-02 Water and Sediment Monitoring

1.2.1 Northern Water Monitoring Points where WDL212-02 Trigger Values are specified

Results of monitoring for the northern water monitoring points (those monitoring points associated with Authorised Discharge Point 1) on 20 April 2022 are presented in Table 3 (Nutrients), Table 4 (Physical and in-situ (field) measurements), and Table 5 (Microbiological). Trigger Values specified under WDL212-02, are also provided.

NOTE: Trigger Values are only applicable to NODH3 and NODH4 for WDL212-02 compliance assessment purposes.

Where results of monitoring exceed the relevant Trigger Value specified in WDL212-02 (whether or not the exceedance constitutes a "non-compliance" with WDL212-02), the result is shown in **Bold** font. Where results of monitoring exceed the relevant Trigger Value specified in WDL212-02 and has constituted a "non-compliance" with WDL212-02, the result is shown in **Bold Red** font.

Certificates of Analysis incorporating laboratory Limit of Reporting (LOR) and QA/QC information are provided in the Appendix. Where results are reported as less than (<) a value, this is less than the relevant laboratory LOR. Variations in LOR for the same parameter are generally related to sample matrix (e.g., saline water compared to non-saline water). Refer to the Appendix for further information relating to laboratory LOR.

Water quality monitoring results for 20 April 2022 showed the following:

Nutrients

- Nutrients (Filterable Reactive Phosphorus, Total Phosphorus, Total Nitrogen, Nitrogen Oxides and Ammonia) at ADP1 and NODH1 were more than eight times the relevant Trigger Values.
- Although the Trigger Values for nutrients were not exceeded in the mixing zone (NODH3), Nitrogen Oxide in the receiving environment (NODH4) was 21 µg/L; thus exceeding the Trigger Value by 5 %.
- As discussed in Section 1.1, large tidal movements, high wind speeds and rainfall around the time of monitoring are the likely cause of elevated Nitrogen Oxides due to sediment resuspension and redistribution, and catchment runoff containing organic loads.
- The concentration of Nitrogen Oxides at NODH3 and NODH4 have ranged from 20 – 24 µg/L (4 monitoring events) since the early onset of late build-up/early wet season rainfall (in late October 2021). Such concentrations of Nitrogen Oxides are likely driven by highly variable inflows to the northern mixing zone/receiving environment during the wet season.

Total Suspended Solids

- Total Suspended Solids at NODH3 (19 mg/L) and NODH4 (29 mg/L) exceeded the Trigger Value of 10 mg/L. As discussed in Section 1.1, large tidal movements, high wind speeds and rainfall around the time of monitoring are the likely cause of elevated Suspended Solids due to sediment resuspension and redistribution, and catchment runoff containing organic material.

Dissolved Oxygen (Saturation)

- Dissolved Oxygen (Saturation) at ADP1 and NODH1 was less than the required Trigger Value of > 80 %. Dissolved Oxygen downstream in the mixing zone/receiving environment was > 80 % as required. The discharge from ADP1 has not had a discernible effect on Dissolved Oxygen Saturation in the mixing zone/receiving environment.

pH

- pH at ADP1 (8.88) was outside the Trigger Value of 6.0 – 8.5. pH recorded at all downstream monitoring points were within the required range. The discharge from ADP1 has not had a discernible effect on pH in the mixing zone/receiving environment.

Table 3: Nutrients results for the northern water monitoring points on 20 April 2022.

Parameter	Units	ADP1	NODH1	NODH3	NODH4	WDL212-02 Trigger Value
Filterable Reactive Phosphorus	µg/L	**90**	**80**	3	2	<10
Total Phosphorus	µg/L	**290**	**280**	<5	6	<30
Total Nitrogen	µg/L	**3600**	**3500**	93	99	<300
Nitrogen Oxide (NOx)	µg/L	**640**	**590**	17	**21**	<20
Ammonia NH3-N	µg/L	**220**	**250**	<5	<5	<20

Table 4: Physical and in-situ (field) measurements results for the northern water monitoring points on 20 April 2022.

Parameter	Units	ADP1	NODH1	NODH3	NODH4	WDL212-02 Trigger Value
Total Suspended Solids	mg/L	8	<5	**19**	**29**	<10
Biochemical Oxygen Demand	µg/L	<2000	<2000	<2000	<2000	Site-Specific Trigger Value to be developed
Free Chlorine	mg/L	0.63	0.18	0.02	0.03	Site-Specific Trigger Value to be developed
Temperature	°C	29.82	31.26	30.88	30.02	Site-Specific Trigger Value to be developed
Electrical Conductivity	µS/cm	3440	2130	51300	51100	Site-Specific Trigger Value to be developed
Dissolved Oxygen (Saturation)	%	**60.9**	**68.8**	82.5	82.5	>80
Dissolved Oxygen	mg/L	4.6	5.06	4.85	5.06	Not Specified
pH	pH unit	**8.88**	8.31	7.98	8.01	6.0 - 8.5
Turbidity	NTU	2.61	3.06	10.4	10.6	Site-Specific Trigger Value to be developed

Table 5: Microbiological results for the northern water monitoring points on 20 April 2022.

Parameter	Units	ADP1	NODH1	NODH3	NODH4	WDL212-02 Trigger Value
E. coli	MPN/ 100mL	<1	<1			<200
	cfu/ 100mL			<1	<1	<200

1.2.2 Southern Water Monitoring Points where WDL212-02 Trigger Values are specified

Results of monitoring for the southern water monitoring points (those monitoring points associated with Authorised Discharge Point 2) on 20 April 2022 are presented in Table 6 (Nutrients), Table 7 (Physical and in-situ (field) measurements) and Table 8 (Microbiological). Trigger Values specified under WDL212-02, are also provided.

NOTE: Trigger Values are only applicable to SODH3 and SODH4 for WDL212-02 compliance assessment purposes.

Where results of monitoring exceed the relevant Trigger Value specified in WDL212-02 (whether or not the exceedance constitutes a "non-compliance" with WDL212-02), the result is shown in **Bold** font. Where results of monitoring exceed the relevant Trigger Value specified in WDL212-02 and has constituted a "non-compliance" with WDL212-02, the result is shown in **Bold Red** font.

Certificates of Analysis incorporating laboratory Limit of Reporting (LOR) and QA/QC information are provided in the Appendix. Where results are reported as less than (<) a value, this is less than the relevant laboratory LOR. Variations in LOR for the same parameter are generally related to sample matrix (e.g., saline water compared to non-saline water). Refer to the Appendix for further information relating to laboratory LOR.

Water quality monitoring results for 20 April 2022 showed the following:

Nutrients

- Nutrients (Total Phosphorus, Total Nitrogen, and Ammonia) at ILCP and nutrients (Total Phosphorus, Total Nitrogen, Nitrogen Oxides and Ammonia) at ISCP were more than double the relevant Trigger Values.
- Although the Trigger Value for Nitrogen Oxides was exceeded in the mixing zone (SODH3 – 22 µg/L) and the receiving environment (SODH4 – 24 µg/L), these exceedances are not related to discharge from ADP2 as there was no flow at ADP2.
- As discussed in Section 1.1, large tidal movements, high wind speeds and rainfall around the time of monitoring are the likely cause of elevated Nitrogen Oxides due to sediment resuspension and redistribution, and catchment runoff containing organic loads.
- The concentration of Nitrogen Oxides at SODH3 and SODH4 have ranged up to 26 µg/L (4 monitoring events) since the early onset of late build-up/early wet season rainfall (in late October 2021). Such concentrations of Nitrogen Oxides are likely driven by highly variable inflows to the southern mixing zone/receiving environment during the wet season.

Total Suspended Solids

- Total Suspended Solids at ILCP (16 mg/L) exceeded the Trigger Value of 10 mg/L. No flow was reported for ADP2.
- Although the Trigger Value for Total Suspended Solids was exceeded in the mixing zone (SODH3 – 50 mg/L) and the receiving environment (SODH4 – 32 mg/L), these exceedances are not related to discharge from ADP2 as there was no flow at ADP2.
- As discussed in Section 1.1, large tidal movements, high wind speeds and rainfall around the time of monitoring are the likely cause of elevated Suspended Solids due to sediment resuspension and redistribution, and catchment runoff containing organic material.

Dissolved Oxygen (Saturation)

- Dissolved Oxygen (Saturation) at ISCP was less than the required Trigger Value of > 80 %. No flow was reported for ADP2. Dissolved Oxygen downstream in the mixing zone/receiving environment was > 80 % as required.

pH

- pH at ILCP (9.77) and ISCP (9.67) were outside the Trigger Value of 6.0 – 8.5. No flow was reported for ADP2. pH recorded in the mixing zone/receiving environment were within the required range.

Table 6: Nutrients results for the southern water monitoring points on 20 April 2022.

Parameter	Units	ILCP	ISCP	ADP2	SODH1	SODH3	SODH4	WDL212-02 Trigger Value
Filterable Reactive Phosphorus	µg/L	<10	<10	No Flow	No Flow	2	3	<10
Total Phosphorus	µg/L	**60**	**50**	No Flow	No Flow	9	<5	<30
Total Nitrogen	µg/L	**1700**	**2300**	No Flow	No Flow	102	91	<300
Nitrogen Oxide (NOx)	µg/L	<10	**80**	No Flow	No Flow	**22**	**24**	<20
Ammonia NH3-N	µg/L	**50**	**650**	No Flow	No Flow	<5	<5	<20

Table 7: Physical and in-situ (field) measurements results for the southern water monitoring points on 20 April 2022.

Parameter	Units	ILCP	ISCP	ADP2	SODH1	SODH3	SODH4	WDL212-02 Trigger Value
Total Suspended Solids	mg/L	**16**	5	No Flow	No Flow	**50**	**32**	<10
Biochemical Oxygen Demand	µg/L	2000	<2000	No Flow	No Flow	<2000	<2000	Site-Specific Trigger Value to be developed
Free Chlorine	mg/L	0.01	0.02	No Flow	No Flow	0.01	0.05	Site-Specific Trigger Value to be developed
Temperature	°C	32.35	32.83	No Flow	No Flow	31.08	31.05	Site-Specific Trigger Value to be developed
Electrical Conductivity	µS/cm	1470	547	No Flow	No Flow	50500	50600	Site-Specific Trigger Value to be developed
Dissolved Oxygen (Saturation)	%	89.5	**73.0**	No Flow	No Flow	82.6	94.8	>80
Dissolved Oxygen	mg/L	6.45	5.63	No Flow	No Flow	5.11	5.62	Not Specified
pH	pH unit	**9.77**	**9.67**	No Flow	No Flow	7.97	7.95	6.0 - 8.5
Turbidity	NTU	8.79	4.18	No Flow	No Flow	12.2	10.9	Site-Specific Trigger Value to be developed

Table 8: Microbiological results for the southern water monitoring points on 20 April 2022.

Parameter	Units	ILCP	ISCP	ADP2	SODH1	SODH3	SODH4	WDL212-02 Trigger Value
E. coli	MPN/ 100mL	<1	3	No Flow	No Flow			<200
	cfu/ 100mL			No Flow	No Flow	<1	<1	<200

1.3 WDL212-02 Compliance Assessment and Reporting

Certificate of Analysis for samples collected on 20 April 2022 (quarterly sampling event as per the Water Monitoring Plan for WDL212-02) were issued by the analysing laboratory on Friday 29 April 2022. Trop Water Pty Ltd completed the preliminary assessment of the Certificate of Analysis and the supporting laboratory Quality Control Report and QA/QC Compliance Assessment documentation 4 May 2022.

As required under WDL212-02 Licence Condition 33, notification of non-compliance was issued to NTEPA (Administering Agency) on 9 May 2022. As required by WDL212-02 Licence Condition 34, the following information was provided in the notification of non-compliance issued on 9 May 2022:

Condition 34.1

The non-compliance was identified on 4 May 2022 by Trop Water Pty Ltd on completion of the preliminary assessment of the Certificate of Analysis and the supporting laboratory Quality Control Report and QA/QC Compliance Assessment documentation received from the analysing laboratory on Friday 29 April 2022.

Condition 34.2

Identified 'exceedance of a trigger value' (but not necessarily a non-compliance) are shown in the table below.

Parameter	Unit	Trigger Value	SODH3	SODH4	NODH3	NODH4
			Southern Discharge Point Mixing Zone	Southern Receiving Environment Monitoring Point	Northern Discharge Point Mixing Zone	Northern Receiving Environment Monitoring Point
Total Suspended Solids (TSS)	mg/L	<10	50	32	19	29
Nitrogen Oxide (NOx)	µg/L	<20	22	24	NOx at NODH3 did NOT exceed the trigger value.	21

Of the above identified 'exceedance of a trigger value', the following instances constitute a non-compliance:

1. TSS at SODH3 at 1003 hrs on 20 April 2022 (Licence Condition 35.2 – an exceedance of three times or more a trigger value)
2. TSS at SODH4 at 0958 hrs on 20 April 2022 (Licence Condition 35.2 – an exceedance of three times or more a trigger value)
3. NOx at NODH4 at 1015 hrs on 20 April 2022 (Licence Condition 35.1 – an exceedance of a trigger value on three consecutive sampling occasions)

Condition 34.3

1. No flow was recorded at ADP2 on 20 April 2022. Elevated TSS at SODH3 and SODH4 is likely caused by the resuspension of sediment and accumulated suspended material during tidal movement and weather conditions (wind-induced mixing).

2. NOx concentration at NODH4 ranged from 22 to 24 µg/L from October to April. The slight exceedance of the Trigger Value is likely influenced by catchment runoff and the associated transport of organic material during the wet season.

Condition 34.4

It is highly unlikely that the non-compliances have had a negative impact on the Darwin Harbour marine environment. An exceedance of the relevant Trigger Values is an indicator for potential risk of environmental harm. Dissolved Oxygen at SODH3, SODH4, NODH3 and NODH4 ranged from 82.5 – 94.8 % Saturation on 20 April 2022, which is within the specified Trigger Value. Further, marine sediment quality results were within the Trigger Values defined in the Sediment Quality Guidelines.

Condition 34.5

Results of scheduled monthly and quarterly sampling events will continue to be closely monitored.

Condition 34.6

Results of scheduled monthly and quarterly sampling events will continue to be closely monitored.

Condition 34.7

Not applicable. Actions were taken as per Condition 34.5 and 34.6 above.

Condition 34.8

An incident investigation report will be submitted to the NTEPA (Administering Agency) on or before 20 May 2022.

On 17 May 2022, NTEPA accepted an amendment to the proposed submission date for the incident investigation report of 17 June 2022.

As discussed in Sections 1.1 and 1.2, the Trigger Value exceedances were not caused by Channel Island Power Station waste discharge. Rather, elevated Nitrogen Oxides and Total Suspended Solids in the upper estuary of Darwin Harbour was likely driven by large tidal movements and wind induced mixing, in conjunction with inflows containing high organic loads from catchment runoff.

4 REFERENCES

ANZECC & ARMCANZ (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

NRETAS (2010). *Water Quality Objectives for the Darwin Harbour Region - Background Document*. Department of Natural Resources, Environment, The Arts and Sport – Aquatic Health Unit. Darwin, NT.

NT Government (2022). Tide Predictions for Darwin – April – 2022 Australian Central Standard Time. Retrieved 7 June 2022 from https://nt.gov.au/__data/assets/pdf_file/0013/1030432/darwin-tidal-graph-2022-april.pdf

WDL212-02, Waste Discharge Licence WDL212-02 (June 2020), Northern Territory Government.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2213490**	Page	: 1 of 12
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Contact	: Customer Services ES
Address	: Unit 12 / 43 Berrimah Road Northern Territory Berrimah Darwin 0828	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 21-Apr-2022 07:30
Order number	: ----	Date Analysis Commenced	: 21-Apr-2022
C-O-C number	: ----	Issue Date	: 29-Apr-2022 12:57
Sampler	: LENIN VILLAMAR, Quentin Vander-Mower		
Site	: Channel Island Power Station		
Quote number	: SY/339/18 V2		
No. of samples received	: 10		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP075(SIM): LOR raised due to the high amount of moisture present.
- EG093: Samples containing high levels of sulfate may precipitate barium under the acidic conditions of this method and may therefore bias results low.

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	NODH2 Received as NODH1	SODH2	----	----	----
			Sampling date / time	20-Apr-2022 10:28	20-Apr-2022 10:06	----	----	----
Compound	CAS Number	LOR	Unit	ES2213490-003	ES2213490-004	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**55.8**	**57.1**	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	**14700**	**10600**	----	----	----
Cobalt	7440-48-4	2	mg/kg	**7**	**5**	----	----	----
Tin	7440-31-5	5	mg/kg	<5	<5	----	----	----
Arsenic	7440-38-2	5	mg/kg	**11**	**10**	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**34**	**26**	----	----	----
Copper	7440-50-8	5	mg/kg	**7**	**6**	----	----	----
Lead	7439-92-1	5	mg/kg	**9**	**8**	----	----	----
Nickel	7440-02-0	2	mg/kg	**11**	**8**	----	----	----
Zinc	7440-66-6	5	mg/kg	**30**	**22**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.8	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.8	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.8	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.8	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.8	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.8	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.8	<0.8	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.8	<0.8	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.8	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.8	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.8	<0.8	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.8	<0.8	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.8	<0.8	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.8	<0.8	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.8	<0.8	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.8	<0.8	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**1.0**	**1.0**	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	NODH2 Received as NODH1	SODH2	----	----	----
			Sampling date / time	20-Apr-2022 10:28	20-Apr-2022 10:06	----	----	----
Compound	CAS Number	LOR	Unit	ES2213490-003	ES2213490-004	--------	--------	--------
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.9**	**1.9**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**77.0**	**69.9**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**86.5**	**82.0**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**81.2**	**75.2**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**90.0**	**88.6**	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**83.7**	**85.4**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**87.9**	**87.1**	----	----	----

Analytical Results

Sub-Matrix: **SEDIMENT** (Matrix: **SOIL**)			Sample ID	**NODH2 Received as NODH1**	**SODH2**	**----**	**----**	**----**
			Sampling date / time	20-Apr-2022 10:28	20-Apr-2022 10:06	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2213490-003**	**ES2213490-004**	**--------**	**--------**	**--------**
				Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**91.0**	**74.0**	**----**	**----**	**----**
Toluene-D8	2037-26-5	0.2	%	**79.0**	**79.3**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	0.2	%	**85.6**	**80.1**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	ADP1	NODH1	NODH3	SODH3	NODH4
				Sampling date / time	20-Apr-2022 11:30	20-Apr-2022 11:50	20-Apr-2022 10:25	20-Apr-2022 10:03	20-Apr-2022 10:15
					ES2213490-001	ES2213490-002	ES2213490-005	ES2213490-006	ES2213490-007
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**8**	<5	**19**	**50**	**29**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.005**	**0.005**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.003**	**0.003**	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.003**	**0.003**	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.006**	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.01**	**0.01**	----	----	----
Arsenic	7440-38-2	0.001	mg/L		**0.007**	**0.006**	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.004**	**0.003**	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.005**	**0.005**	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.016**	**0.013**	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		----	----	<0.00004	<0.00004	<0.00004
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		----	----	<0.00004	<0.00004	<0.00004
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		----	----	<5	<5	<5
Arsenic	7440-38-2	0.5	µg/L		----	----	**1.3**	**1.3**	**1.4**
Cadmium	7440-43-9	0.2	µg/L		----	----	<0.2	<0.2	<0.2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ADP1	NODH1	NODH3	SODH3	NODH4
				Sampling date / time	20-Apr-2022 11:30	20-Apr-2022 11:50	20-Apr-2022 10:25	20-Apr-2022 10:03	20-Apr-2022 10:15
Compound	CAS Number	LOR	Unit		ES2213490-001	ES2213490-002	ES2213490-005	ES2213490-006	ES2213490-007
					Result	Result	Result	Result	Result
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		----	----	<0.5	<0.5	<0.5
Cobalt	7440-48-4	0.2	µg/L		----	----	<0.2	<0.2	<0.2
Copper	7440-50-8	1	µg/L		----	----	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		----	----	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		----	----	<0.5	<0.5	<0.5
Tin	7440-31-5	5	µg/L		----	----	<5	<5	<5
Zinc	7440-66-6	5	µg/L		----	----	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		----	----	**287**	**432**	**303**
Arsenic	7440-38-2	0.5	µg/L		----	----	**1.7**	**1.8**	**1.6**
Cadmium	7440-43-9	0.2	µg/L		----	----	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		----	----	<0.5	**1.1**	**0.5**
Cobalt	7440-48-4	0.2	µg/L		----	----	<0.2	<0.2	<0.2
Copper	7440-50-8	1	µg/L		----	----	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		----	----	<0.2	**0.2**	<0.2
Nickel	7440-02-0	0.5	µg/L		----	----	<0.5	<0.5	<0.5
Tin	7440-31-5	5	µg/L		----	----	<5	<5	<5
Zinc	7440-66-6	5	µg/L		----	----	<5	<5	<5
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.22**	**0.25**	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.64**	**0.59**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.64**	**0.59**	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**3.0**	**2.9**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**3.6**	**3.5**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.29**	**0.28**	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.09**	**0.08**	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	ADP1	NODH1	NODH3	SODH3	NODH4
				Sampling date / time	20-Apr-2022 11:30	20-Apr-2022 11:50	20-Apr-2022 10:25	20-Apr-2022 10:03	20-Apr-2022 10:15
					ES2213490-001	ES2213490-002	ES2213490-005	ES2213490-006	ES2213490-007
					Result	Result	Result	Result	Result
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		----	----	<0.005	<0.005	<0.005
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		----	----	**0.004**	**0.007**	**0.006**
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		----	----	**0.013**	**0.015**	**0.015**
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		----	----	**0.017**	**0.022**	**0.021**
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		----	----	**0.076**	**0.080**	**0.078**
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		----	----	**0.093**	**0.102**	**0.099**
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		----	----	<0.005	**0.009**	**0.006**
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		----	----	**0.003**	**0.002**	**0.002**
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH4	ISCP	ILCP	----	----
				Sampling date / time	20-Apr-2022 09:58	20-Apr-2022 12:00	20-Apr-2022 12:10	----	----
Compound	CAS Number	LOR	Unit		ES2213490-008	ES2213490-009	ES2213490-010	--------	--------
					Result	Result	Result	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**32**	**5**	**16**	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	**0.04**	<0.01	----	----
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	**0.001**	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		----	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		----	**0.002**	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L		----	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		----	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		----	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		----	**0.011**	<0.005	----	----
Tin	7440-31-5	0.001	mg/L		----	<0.001	<0.001	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	**0.04**	**0.02**	----	----
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	**0.001**	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		----	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		----	**0.004**	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L		----	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		----	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		----	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		----	**0.020**	**0.006**	----	----
Tin	7440-31-5	0.001	mg/L		----	<0.001	<0.001	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	----	----	----	----
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	<0.0001	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	<0.0001	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		<5	----	----	----	----
Arsenic	7440-38-2	0.5	µg/L		**1.4**	----	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH4	ISCP	ILCP	----	----
				Sampling date / time	20-Apr-2022 09:58	20-Apr-2022 12:00	20-Apr-2022 12:10	----	----
Compound	CAS Number	LOR	Unit		ES2213490-008	ES2213490-009	ES2213490-010	--------	--------
					Result	Result	Result	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS - Continued									
Chromium	7440-47-3	0.5	µg/L		<0.5	----	----	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	----	----	----	----
Copper	7440-50-8	1	µg/L		<1	----	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	----	----	----	----
Tin	7440-31-5	5	µg/L		<5	----	----	----	----
Zinc	7440-66-6	5	µg/L		<5	----	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Aluminium	7429-90-5	5	µg/L		**314**	----	----	----	----
Arsenic	7440-38-2	0.5	µg/L		**1.6**	----	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	----	----	----	----
Chromium	7440-47-3	0.5	µg/L		**0.6**	----	----	----	----
Cobalt	7440-48-4	0.2	µg/L		<0.2	----	----	----	----
Copper	7440-50-8	1	µg/L		<1	----	----	----	----
Lead	7439-92-1	0.2	µg/L		**0.2**	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	----	----	----	----
Tin	7440-31-5	5	µg/L		<5	----	----	----	----
Zinc	7440-66-6	5	µg/L		<5	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	**0.65**	**0.05**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	**0.04**	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	**0.04**	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	**0.08**	<0.01	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	**2.2**	**1.7**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		----	**2.3**	**1.7**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	**0.05**	**0.06**	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	<0.01	<0.01	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SODH4	ISCP	ILCP	----	----
				Sampling date / time	20-Apr-2022 09:58	20-Apr-2022 12:00	20-Apr-2022 12:10	----	----
Compound	CAS Number	LOR	Unit		ES2213490-008	ES2213490-009	ES2213490-010	--------	--------
					Result	Result	Result	----	----
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L		<0.005	----	----	----	----
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L		**0.007**	----	----	----	----
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L		**0.017**	----	----	----	----
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L		**0.024**	----	----	----	----
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.050	mg/L		**0.067**	----	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.050	mg/L		**0.091**	----	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	----	----	----	----
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L		**0.003**	----	----	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	**2**	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2213490**	Page	: 1 of 15
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Contact	: Customer Services ES
Address	: Unit 12 / 43 Berrimah Road Northern Territory Berrimah Darwin 0828	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 21-Apr-2022
Order number	: ----	Date Analysis Commenced	: 21-Apr-2022
C-O-C number	: ----	Issue Date	: 29-Apr-2022
Sampler	: LENIN VILLAMAR, Quentin Vander-Mower		
Site	: Channel Island Power Station		
Quote number	: SY/339/18 V2		
No. of samples received	: 10		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4303268)									
ES2213419-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	7	8	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	9	12	30.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	17	40.8	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	160	161	0.7	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	11100	11400	2.4	0% - 20%
ES2213890-007	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	73	66	9.8	0% - 20%
		EG005T: Cobalt	7440-48-4	2	mg/kg	22	22	0.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	76	69	10.1	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	8	45.3	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	35	32	8.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	17	19	9.5	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	88	83	5.4	0% - 50%
		EG005T: Aluminium	7429-90-5	50	mg/kg	20700	18900	9.2	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4303271)									
ES2213490-003	NODH2 Received as NODH1	EA055: Moisture Content	----	0.1	%	55.8	58.9	5.5	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4303269)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4303269) - continued									
ES2213419-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2213890-007	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4300596)									
EW2201919-012	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EW2201919-003	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4300596) - continued									
EW2201919-003	Anonymous	EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4300597)									
EW2201919-012	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EW2201919-003	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4302129)									
ES2213811-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EW2201919-005	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4300597)									
EW2201919-012	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EW2201919-003	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4302129)									
ES2213811-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EW2201919-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 4302129)									
ES2213811-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EW2201919-005	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 4303964)									
ES2213490-001	ADP1	EA025H: Suspended Solids (SS)	----	5	mg/L	8	6	30.8	No Limit
ES2213669-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	8	12	48.1	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4304975)									
ES2212949-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.11	0.11	0.0	0% - 50%
ES2213489-007	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4305162)									
ES2213618-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.012	0.010	10.9	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.0	No Limit
ES2212949-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4305162) - continued									
ES2212949-001	Anonymous	EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.24	0.24	0.0	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 4298751)									
EM2207059-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	0.00017	0.00019	11.2	No Limit
ES2213490-006	SODH3	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4304976)									
ES2213489-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2213489-010	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 4298713)									
ES2213485-002	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.0	No Limit
ES2213485-025	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4305183)									
ES2212949-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2213490-010	ILCP	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 4298802)									
ES2213490-005	NODH3	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-F: Cobalt	7440-48-4	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.3	1.3	0.0	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.0	No Limit
		EG093A-F: Aluminium	7429-90-5	5	µg/L	<5	<5	0.0	No Limit
		EG093A-F: Tin	7440-31-5	5	µg/L	<5	<5	0.0	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.0	No Limit
ES2213578-007	Anonymous	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-F: Cobalt	7440-48-4	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.5	1.5	0.0	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	7	7	0.0	No Limit
		EG093A-F: Aluminium	7429-90-5	5	µg/L	<5	<5	0.0	No Limit
		EG093A-F: Tin	7440-31-5	5	µg/L	<5	<5	0.0	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.0	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 4298766)									
ES2213490-005	NODH3	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 4298766) - continued									
ES2213490-005	NODH3	EG093A-T: Cobalt	7440-48-4	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.7	1.6	7.2	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	0.6	0.0	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.0	No Limit
		EG093A-T: Aluminium	7429-90-5	5	µg/L	287	315	9.5	0% - 20%
		EG093A-T: Tin	7440-31-5	5	µg/L	<5	<5	0.0	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4304179)									
ES2213489-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	4.96	4.83	2.6	0% - 20%
ES2213489-010	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4297847)									
ES2213554-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.54	0.54	0.0	0% - 20%
ES2213588-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.29	0.30	3.7	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4304180)									
ES2213489-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.36	0.36	0.0	0% - 20%
ES2213489-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4304174)									
ES2213489-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.3	5.1	3.4	No Limit
ES2213489-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 4304173)									
ES2213489-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.62	0.60	3.0	0% - 20%
ES2213489-011	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 4297846)									
ES2213487-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2213588-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK255A: Ammonia (QC Lot: 4297477)									
ES2213578-007	Anonymous	EK255A-SW: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2213490-005	NODH3	EK255A-SW: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EK257A: Nitrite (QC Lot: 4297475)									
ES2213490-005	NODH3	EK257A-SW: Nitrite as N	14797-65-0	0.002	mg/L	0.004	0.004	0.0	No Limit
EK259A: Nitrite and Nitrate (NOx) (QC Lot: 4297474)									
ES2213578-007	Anonymous	EK259A-SW: Nitrite + Nitrate as N	----	0.002	mg/L	0.027	0.027	0.0	0% - 50%
ES2213490-005	NODH3	EK259A-SW: Nitrite + Nitrate as N	----	0.002	mg/L	0.017	0.017	0.0	No Limit
EK262A: Total Nitrogen (QC Lot: 4297902)									
ES2213490-005	NODH3	EK262PA-SW: Total Nitrogen as N	----	0.025	mg/L	0.093	0.086	7.9	No Limit
ES2213578-007	Anonymous	EK262PA-SW: Total Nitrogen as N	----	0.025	mg/L	0.113	0.126	10.8	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 4297901)									
ES2213490-005	NODH3	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.013	91.3	No Limit
ES2213578-007	Anonymous	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EK271A: Reactive Phosphorus (QC Lot: 4297476)									
ES2213578-007	Anonymous	EK271A-SW: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.004	0.004	0.0	No Limit
ES2213490-005	NODH3	EK271A-SW: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.003	0.003	0.0	No Limit
EP030: Biochemical Oxygen Demand (BOD) (QC Lot: 4297932)									
ES2213111-039	Anonymous	EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	<2	0.0	No Limit
ES2213490-008	SODH4	EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	<2	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4303268)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	15070 mg/kg	119	82.0	119
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	95.2	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	86.7	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	112	68.0	132
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	10.4 mg/kg	89.8	83.0	117
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	105	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	95.6	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	101	80.0	120
EG005T: Tin	7440-31-5	5	mg/kg	<5	----	----	----	----
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	90.8	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4303269)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	80.6	70.0	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4300596)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	112	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	95.3	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	109	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	104	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	113	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	110	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	106	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	103	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	107	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	104	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	104	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	100.0	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	94.9	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	101	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4300597)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	95.1	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	94.5	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	103	71.0	129

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4302129)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	92.6	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4300597)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	107	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	97.5	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	98.9	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4302129)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	93.9	68.4	128
EP080: BTEXN (QCLot: 4302129)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	100	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	101	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.7	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.2	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	101	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	99.7	63.0	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 4303964)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	96.7	83.0	129
				<5	1000 mg/L	96.7	82.0	110
				<5	835 mg/L	89.2	83.0	118
EG020F: Dissolved Metals by ICP-MS (QCLot: 4304975)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	87.9	80.0	116
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	89.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.1	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.5	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	88.5	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	88.3	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.8	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	86.7	82.0	112
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	90.6	77.0	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.9	81.0	117
EG020T: Total Metals by ICP-MS (QCLot: 4305162)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	82.0	120
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	86.0	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4305162) - continued								
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	104	84.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	103	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	84.0	116
EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	108	83.0	123
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 4298751)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	97.0	83.0	105
EG035F: Dissolved Mercury by FIMS (QCLot: 4304976)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	89.8	83.0	105
EG035T: Total Mercury by FIMS (QCLot: 4298713)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	98.0	85.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4305183)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	90.8	77.0	111
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 4298802)								
EG093A-F: Aluminium	7429-90-5	5	µg/L	<5	50 µg/L	99.6	76.0	122
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	103	76.0	134
EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	107	69.0	117
EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	98.6	76.0	122
EG093A-F: Cobalt	7440-48-4	0.2	µg/L	<0.2	10 µg/L	97.8	75.0	119
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	95.3	71.0	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	94.1	74.0	120
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	96.0	72.0	124
EG093A-F: Tin	7440-31-5	5	µg/L	<5	10 µg/L	95.3	71.0	129
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	103	70.0	126
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 4298766)								
EG093A-T: Aluminium	7429-90-5	5	µg/L	<5	50 µg/L	98.7	84.0	124
EG093A-T: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	100	89.0	125
EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	104	82.0	122
EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	100	85.0	123
EG093A-T: Cobalt	7440-48-4	0.2	µg/L	<0.2	10 µg/L	100	86.0	122
EG093A-T: Copper	7440-50-8	1	µg/L	<1	10 µg/L	110	84.0	128
EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	97.1	85.0	125
EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	95.9	85.0	125
EG093A-T: Tin	7440-31-5	5	µg/L	<5	10 µg/L	95.4	93.0	130
EG093A-T: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	112	82.0	128
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4304179)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	106	90.0	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4297847)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.8	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4304180)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.3	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4304174)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	98.7	69.0	101
				<0.1	1 mg/L	113	70.0	118
				<0.1	5 mg/L	102	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4304173)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	97.7	71.3	126
				<0.01	0.442 mg/L	104	71.3	126
				<0.01	1 mg/L	101	71.3	126
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 4297846)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	100	85.0	117
EK255A: Ammonia (QCLot: 4297477)								
EK255A-SW: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.1 mg/L	100	77.0	121
EK257A: Nitrite (QCLot: 4297475)								
EK257A-SW: Nitrite as N	14797-65-0	0.002	mg/L	<0.002	0.1 mg/L	91.7	91.0	127
EK259A: Nitrite and Nitrate (NOx) (QCLot: 4297474)								
EK259A-SW: Nitrite + Nitrate as N	----	0.002	mg/L	<0.002	0.1 mg/L	99.1	92.0	120
EK262A: Total Nitrogen (QCLot: 4297902)								
EK262PA-SW: Total Nitrogen as N	----	0.025	mg/L	<0.025	1 mg/L	106	81.0	111
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 4297901)								
EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.44 mg/L	99.2	88.0	112
EK271A: Reactive Phosphorus (QCLot: 4297476)								
EK271A-SW: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.1 mg/L	93.5	72.0	118
EP030: Biochemical Oxygen Demand (BOD) (QCLot: 4297932)								
EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	200 mg/L	93.0	74.0	112

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4303268)							
ES2213419-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	101	70.0	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4303268) - continued							
ES2213419-001	Anonymous	EG005T: Cadmium	7440-43-9	50 mg/kg	104	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	106	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	104	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	107	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	103	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	109	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4303269)							
ES2213419-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	94.9	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4300596)							
EW2201919-003	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	85.6	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	108	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4300597)							
EW2201919-003	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	78.4	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	90.5	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	100	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4302129)							
ES2213811-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	90.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4300597)							
EW2201919-003	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	80.8	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	95.7	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	106	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4302129)							
ES2213811-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	90.0	70.0	130
EP080: BTEXN (QCLot: 4302129)							
ES2213811-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	78.5	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	81.3	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	83.4	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	85.8	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	91.0	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.4	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4304975)							
ES2212949-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	93.9	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4304975) - continued							
ES2212949-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.25 mg/L	95.3	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	93.7	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	81.8	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	94.1	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	86.1	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	92.8	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	94.2	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4305162)							
ES2212949-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	100	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	101	70.0	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	99.9	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	106	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	99.3	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.2	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4298751)							
EM2207059-003	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	92.0	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4304976)							
ES2213489-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	80.6	70.0	130
EG035T: Total Mercury by FIMS (QCLot: 4298713)							
ES2213485-003	Anonymous	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	71.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4305183)							
ES2212949-004	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	85.4	70.0	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 4298802)							
ES2213490-006	SODH3	EG093A-F: Arsenic	7440-38-2	50 µg/L	97.6	70.0	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	98.4	70.0	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	93.3	70.0	130
		EG093A-F: Cobalt	7440-48-4	50 µg/L	94.2	70.0	130
		EG093A-F: Copper	7440-50-8	50 µg/L	92.5	70.0	130
		EG093A-F: Lead	7439-92-1	50 µg/L	88.0	70.0	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	92.3	70.0	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	91.7	70.0	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 4298766)							
ES2213490-006	SODH3	EG093A-T: Arsenic	7440-38-2	50 µg/L	104	70.0	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	105	70.0	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	98.2	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 4298766) - continued							
ES2213490-006	SODH3	EG093A-T: Cobalt	7440-48-4	50 µg/L	103	70.0	130
		EG093A-T: Copper	7440-50-8	50 µg/L	102	70.0	130
		EG093A-T: Lead	7439-92-1	50 µg/L	94.5	70.0	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	99.2	70.0	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	106	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4304179)							
ES2213489-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4297847)							
ES2213554-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	114	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4304180)							
ES2213489-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.7	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4304174)							
ES2213489-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.4	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4304173)							
ES2213489-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	103	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 4297846)							
ES2213487-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	104	70.0	130
EK255A: Ammonia (QCLot: 4297477)							
ES2213490-005	NODH3	EK255A-SW: Ammonia as N	7664-41-7	0.1 mg/L	78.0	70.0	130
EK257A: Nitrite (QCLot: 4297475)							
ES2213490-005	NODH3	EK257A-SW: Nitrite as N	14797-65-0	0.1 mg/L	93.9	70.0	130
EK259A: Nitrite and Nitrate (NOx) (QCLot: 4297474)							
ES2213490-005	NODH3	EK259A-SW: Nitrite + Nitrate as N	----	0.1 mg/L	105	70.0	130
EK262A: Total Nitrogen (QCLot: 4297902)							
ES2213490-005	NODH3	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	110	70.0	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 4297901)							
ES2213490-005	NODH3	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	99.3	70.0	130
EK271A: Reactive Phosphorus (QCLot: 4297476)							
ES2213490-005	NODH3	EK271A-SW: Reactive Phosphorus as P	14265-44-2	0.1 mg/L	102	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2213490**	Page	: 1 of 13
Client	: **TROPICAL WATER NORTHERN TERRITORY**	Laboratory	: Environmental Division Sydney
Contact	: SANDYA NANAYAKKARA	Telephone	: +61-2-8784 8555
Project	: CIPS WDL	Date Samples Received	: 21-Apr-2022
Site	: Channel Island Power Station	Issue Date	: 29-Apr-2022
Sampler	: LENIN VILLAMAR, Quentin Vander-Mower	No. of samples received	: 10
Order number	: ----	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	ES2213489--001	Anonymous	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**----**	----	----	**26-Apr-2022**	04-May-2022	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**26-Apr-2022**	17-Oct-2022	✓	**27-Apr-2022**	17-Oct-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**26-Apr-2022**	18-May-2022	✓	**27-Apr-2022**	18-May-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**27-Apr-2022**	04-May-2022	✓	**28-Apr-2022**	06-Jun-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**26-Apr-2022**	04-May-2022	✓	**26-Apr-2022**	04-May-2022	✓
Soil Glass Jar - Unpreserved (EP071)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**27-Apr-2022**	04-May-2022	✓	**28-Apr-2022**	06-Jun-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**26-Apr-2022**	04-May-2022	✓	**26-Apr-2022**	04-May-2022	✓
Soil Glass Jar - Unpreserved (EP071)							
NODH2 - Received as NODH1, SODH2	**20-Apr-2022**	**27-Apr-2022**	04-May-2022	✓	**28-Apr-2022**	06-Jun-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
NODH2 - Received as NODH1, SODH2	20-Apr-2022	26-Apr-2022	04-May-2022	✓	26-Apr-2022	04-May-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
ADP1, NODH1, NODH3, SODH3, NODH4, SODH4, ISCP, ILCP	20-Apr-2022	----	----	----	26-Apr-2022	27-Apr-2022	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-F)							
ADP1, NODH1, ISCP, ILCP	20-Apr-2022	----	----	----	27-Apr-2022	17-Oct-2022	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T)							
ADP1, NODH1, ISCP, ILCP	20-Apr-2022	27-Apr-2022	17-Oct-2022	✓	27-Apr-2022	17-Oct-2022	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035F-LL)							
NODH3, SODH3, NODH4, SODH4	20-Apr-2022	----	----	----	22-Apr-2022	18-May-2022	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035F)							
ADP1, NODH1, ISCP, ILCP	20-Apr-2022	----	----	----	27-Apr-2022	04-May-2022	✓
EG035T: Total Mercury by FIMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)							
NODH3, SODH3, NODH4, SODH4	20-Apr-2022	----	----	----	22-Apr-2022	18-May-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T)							
ADP1, NODH1, ISCP, ILCP	20-Apr-2022	----	----	----	27-Apr-2022	18-May-2022	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-F)							
NODH3, SODH3, NODH4, SODH4	20-Apr-2022	----	----	----	26-Apr-2022	17-Oct-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T)							
NODH3, NODH4, SODH3, SODH4	**20-Apr-2022**	**22-Apr-2022**	17-Oct-2022	✓	**26-Apr-2022**	17-Oct-2022	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
ADP1, ISCP, NODH1, ILCP	**20-Apr-2022**	**----**	----	----	**26-Apr-2022**	18-May-2022	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
ADP1, ISCP, NODH1, ILCP	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	22-Apr-2022	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
ADP1, ISCP, NODH1, ILCP	**20-Apr-2022**	**----**	----	----	**26-Apr-2022**	18-May-2022	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
ADP1, ISCP, NODH1, ILCP	**20-Apr-2022**	**26-Apr-2022**	18-May-2022	✓	**26-Apr-2022**	18-May-2022	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
ADP1, ISCP, NODH1, ILCP	**20-Apr-2022**	**26-Apr-2022**	18-May-2022	✓	**26-Apr-2022**	18-May-2022	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
ADP1, ISCP, NODH1, ILCP	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	22-Apr-2022	✓
EK255A: Ammonia							
Clear Plastic - Natural - for UT Nut. (EK255A-SW)							
NODH3, NODH4, SODH3, SODH4	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	21-Apr-2022	✓
EK257A: Nitrite							
Clear Plastic - Natural - for UT Nut. (EK257A-SW)							
NODH3, NODH4, SODH3, SODH4	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	21-Apr-2022	✓
EK259A: Nitrite and Nitrate (NOx)							
Clear Plastic - Natural - for UT Nut. (EK259A-SW)							
NODH3, NODH4, SODH3, SODH4	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	21-Apr-2022	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK262A: Total Nitrogen							
Clear Plastic Bottle - Frozen (AS) (EK262PA-SW)							
NODH3, SODH3, NODH4, SODH4	**20-Apr-2022**	**21-Apr-2022**	18-May-2022	✓	**21-Apr-2022**	18-May-2022	✓
EK267A: Total Phosphorus (Persulfate Digestion)							
Clear Plastic Bottle - Frozen (AS) (EK267PA-SW)							
NODH3, SODH3, NODH4, SODH4	**20-Apr-2022**	**21-Apr-2022**	18-May-2022	✓	**21-Apr-2022**	18-May-2022	✓
EK271A: Reactive Phosphorus							
Clear Plastic - Natural - for UT Nut. (EK271A-SW)							
NODH3, SODH3, NODH4, SODH4	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	21-Apr-2022	✓
EP030: Biochemical Oxygen Demand (BOD)							
Clear Plastic Bottle - Natural (EP030)							
ADP1, NODH1, NODH3, SODH3, NODH4, SODH4, ISCP, ILCP	**20-Apr-2022**	**----**	----	----	**21-Apr-2022**	22-Apr-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N - Ultra-Trace in Saline Waters	EK255A-SW	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP) - Continued							
Nitrite and Nitrate as N - Ultra-Trace in Saline Waters	EK259A-SW	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Ultra-Trace in Saline Waters	EK257A-SW	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P - Ultra-Trace in Saline Water	EK271A-SW	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	**25.00**	**9.52**	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N - Ultra-Trace in Saline Waters	EK255A-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N - Ultra-Trace in Saline Waters	EK259A-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Ultra-Trace in Saline Waters	EK257A-SW	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P - Ultra-Trace in Saline Water	EK271A-SW	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	**25.00**	**4.76**	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N - Ultra-Trace in Saline Waters	EK255A-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N - Ultra-Trace in Saline Waters	EK259A-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Ultra-Trace in Saline Waters	EK257A-SW	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P - Ultra-Trace in Saline Water	EK271A-SW	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	**25.00**	**4.76**	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N - Ultra-Trace in Saline Waters	EK255A-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N - Ultra-Trace in Saline Waters	EK259A-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Ultra-Trace in Saline Waters	EK257A-SW	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P - Ultra-Trace in Saline Water	EK271A-SW	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	4	**25.00**	**4.76**	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ammonia as N - Ultra-Trace in Saline Waters	EK255A-SW	WATER	In house: Referenced to APHA 4500-NH3 H. Ammonia is determined by direct colorimetry by FIA. This method is compliant with NEPM Schedule B(3)
Nitrite as N - Ultra-Trace in Saline Waters	EK257A-SW	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by FIA.
Nitrate as N - Ultra-Trace in Saline Waters	EK258A-SW	WATER	In house: Referenced to APHA 4500-NO3- I. Nitrate is reduced to nitrite by way of a cadmium reduction column followed by quantification by FIA. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N - Ultra-Trace in Saline Waters	EK259A-SW	WATER	In house: Referenced to APHA 4500-NO3- I. Combined oxidised Nitrogen (NO2+NO3) is determined by Cadmium Reduction and direct colourimetry by FIA.
TKN (Total N - NOx-N). (FIA - UT) in Saline Waters	EK261PA-SW	WATER	In house: Referenced to APHA 4500-P J. & 4500-NO3- I. Calculated by difference from total Nitrogen and NOx. Contributing method parameters are determined by FIA. This method is compliant with NEPM Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P - Ultra-Trace in Saline Water	EK271A-SW	WATER	In house: Referenced to APHA 4500-P E Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by FIA. This method is compliant with NEPM Schedule B(3)
Biochemical Oxygen Demand (BOD)	EP030	WATER	In house: Referenced to APHA 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, and a seed added to begin biological decay. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM Schedule B(3).

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Persulfate Digestion for UT Dissolved TN and TP for FIA fin	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM Schedule B(3)

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Certificate of Analysis

Project No: **D221133 Final Report**
Report Number: **87782** *Date Issued:* **22/04/2022**

NATA Accredited Laboratory
Accreditation Number 15606
Accredited for compliance with ISO/IEC17025 - Testing

Customer **Trop Water Pty Ltd**
Address: **12/43 Berrimah Road**
Berrimah NT 0828

Project Title: **CIPS - WDL**
Attention: **Sandya Nanayakkara**

Date Received: **20/04/2022**
Date Completed: **22/04/2022**

Number of Samples Received: **8**
Number of Samples Tested: **8**

The sample(s) referred to in this report were analysed by the following method(s):

Analyte	*Method Reference*	*Accreditation Status*	*Analyte*	*Method Reference*	*Accreditation Status*
E. coli (MPN)	AS 4276.21	NATA Accredited	E. coli (Membrane Filtration)	AS 4276.7	NATA Accredited

Lab Number	Sampling Point*	Customer Reference*	Free Cl (mg/L)*	Total Cl (mg/L)*	Sample Collection Temp (°C)*	Temp on Arrival (°C) #	Type of Sample
D221133-01	ILCP	-	0.01	Not supplied	32.35	21	Water
D221133-02	ISCP	-	0.02	Not supplied	32.83	21	Water
D221133-03	ADP1	-	0.63	Not supplied	29.84	21	Water
D221133-04	NODH1	-	0.18	Not supplied	31.26	21	Water
D221133-05	NODH3	-	0.02	Not supplied	30.88	21	Water
D221133-06	NODH4	-	0.03	Not supplied	30.02	21	Water
D221133-07	SODH3	-	0.01	Not supplied	31.08	21	Water
D221133-08	SODH4	-	0.05	Not supplied	31.05	21	Water

*Based on information supplied by customer ; **#** Reported arrival temperature reflects the approximate temperature of the group of samples when received by the laboratory. This measurement does not fall within the scope of the Laboratory's NATA Accreditation.

Holding Time

Max Holding Time is the maximum time permitted between sample collection and commencement of analysis. Reference: AS 2031.

^ indicates the sample has exceeded the maximum holding time permitted for the analysis. Affected results must be considered indicative only.

****Sample collection dates and times are reported as supplied by the customer and reported holding times are calculated from this information. While all due care is taken during transcription, the accuracy of this information is not guaranteed by the laboratory.

		E. coli Max Holding Time: 24 hrs		E. coli (MF) Max Holding Time: 24 hrs	
Lab Number	Sample Collected**	Date of Analysis	Analysed within**	Date of Analysis	Analysed within**
D221133-01	20/04/2022 12:10pm	20/04/2022 2:50pm	2h 40m		
D221133-02	20/04/2022 12:00pm	20/04/2022 2:50pm	2h 50m		
D221133-03	20/04/2022 11:30am	20/04/2022 2:50pm	3h 20m		
D221133-04	20/04/2022 11:50am	20/04/2022 2:50pm	3 hrs		
D221133-05	20/04/2022 10:25am			20/04/2022 2:50pm	4h 25m
D221133-06	20/04/2022 10:15am			20/04/2022 2:50pm	4h 35m
D221133-07	20/04/2022 10:03am			20/04/2022 2:50pm	4h 47m
D221133-08	20/04/2022 9:58am			20/04/2022 2:50pm	4h 52m

Results of Analysis

	E. coli MPN/100mL	E. coli (MF) cfu/100mL
D221133-01 ILCP	<1	
D221133-02 ISCP	3	
D221133-03 ADP1	<1	
D221133-04 NODH1	<1	

	E. coli MPN/100mL	E. coli (MF) cfu/100mL
D221133-05 NODH3		<1
D221133-06 NODH4		<1
D221133-07 SODH3		<1
D221133-08 SODH4		<1

The results in this report were authorised by:

Stephen Poole - Laboratory Manager

Comments:

Samples D221133-03,05,06,07,08 were received in excess of 3 hours from time of collection and outside the temperature range of 2-8 degrees Celsius, the test results may be affected by the temperature deviation.

Measurement Uncertainty (MU) should be considered when assessing quantitative results. Contact the laboratory for current MU values.

Dates are reported in the format dd/mm/yyyy.