

# MEMO

Date: 14 January 2021  
 To: Andrew Grime (Arup Senior Engineer)  
 From: Alan Foley  
 Pages: 9 inc. this page excluding attachments  
 Regarding: Surface water quality – Event 5 summary

Level 2, 27-31 Troode Street  
 West Perth WA 6005  
 T +61 8 9211 1111

## Fremantle Swan River Crossing – Surface Water Quality Monitoring Event #5

### Background

Arup on behalf of Main Roads Western Australia (MRWA), has commissioned RPS Australia West Pty Ltd (RPS) to provide environmental services to support the Swan River Crossing (SRC) project development. The works include the replacement of the Fremantle Traffic Bridge and the improvement/duplication of the Fremantle Rail Bridge. As detailed within the Preliminary Environmental Impact Assessment (MRWA, 2020), surface water quality has the potential to be impacted during new bridge construction and demolition of the old structure. As such, a baseline assessment of the surface water quality is being completed to inform a future Construction Environment Management Plan (CEMP) monitoring program. The sampling program is initially scoped to be undertaken monthly for five months. This memo provides details on the surface water monitoring Event #5, completed in December 2020.

### Sampling locations

The program includes collection of surface water samples from five locations. Further details on sampling locations are presented in Figure A and Table 1.

*For previous sampling events, Event #1 (August 2020) and Event #2 (September 2020), the program was reduced to four locations with background location WS-5 excluded due to the project awaiting Department Biodiversity, Conservation and Attractions (DBCA) access approval. Approval was received for sampling within the Swan River DBCA control area on 5 October 2020. As such, all sampling locations have been included from Event #3.*

A copy of the DBCA approval, 2020-1928 Permit P12652, has been included in Appendix A.

**Table 1: Surface water sampling locations summary**

Sampling point	Swan River Bathymetry <sup>1,2</sup> (m)	Commentary
WS1	~4.0-6.0 <sup>1</sup>	<ul style="list-style-type: none"> <li>Central channel (northern side)</li> <li>Sample collected from Fremantle Traffic Bridge northern access point</li> </ul>
WS2	~4.0-6.0 <sup>1</sup>	<ul style="list-style-type: none"> <li>Central channel (southern side)</li> <li>Sample collected from Fremantle Traffic Bridge southern access point</li> </ul>
WS3	~2.0-4.0 <sup>1</sup>	<ul style="list-style-type: none"> <li>Northern shoreline</li> </ul>
WS4	~4.0-5.0 <sup>1</sup>	<ul style="list-style-type: none"> <li>Southern shoreline</li> </ul>

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

Sampling point	Swan River Bathymetry <sup>1,2</sup> (m)	Commentary
WS5	~2.0-6.0 <sup>2</sup>	<ul style="list-style-type: none"><li>Small craft pen jetty</li><li>Southern shoreline</li><li>Public jetty</li><li>Background location</li></ul>

Notes: 1. Results of a geophysical survey of the portions of the site was undertaken in 2012 (Marine & Earth Sciences, 2012), which was used inform the Arup reports (Arup, 2013a and 2013b)

2. Swan and Canning Rivers navigation chart 1:25,000. April 2014, Edition 7. Department of Transport  
[https://www.transport.wa.gov.au/imarine/coastaldata/nauticalcharts/pdfs/WA898\\_swans\\_and\\_canning\\_rivers.pdf](https://www.transport.wa.gov.au/imarine/coastaldata/nauticalcharts/pdfs/WA898_swans_and_canning_rivers.pdf).

## Sampling program schedule overview

The proposed SWQS sampling program schedule is presented in Table 2.

**Table 2: Sampling program**

Event	Sampling locations	Event Date	Date Completed	Status
Event 1	WS2, WS4	August 2020	7/08/2020	Completed
Event 2	WS1-WS4	September 2020	10/09/2020	Completed
Event 3	WS1-WS5	October 2020	7/10/2020	Completed
Event 4	WS1-WS5	November 2020	5/11/2020	Completed
Event 5	WS1-WS5	December 2020	3/12/2020	Completed – this round
Event 6	WS1-WS5	January 2021	-	TBC
Event 7	WS1-WS5	February 2021	-	TBC
Event 8	WS1-WS5	March 2021	-	TBC

Notes: To be completed (TBC)

## Surface water sampling methodology

Surface water sampling was conducted in accordance with the following relevant guidance:

- Department of Water and Environmental Regulation, *Assessment and Management of Contaminated Sites – Contaminated Sites Guidelines* (DER, 2014)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, *Schedule B – General Guidelines for the Assessment of Site Contamination* (NEPC, 2013)
- Water Quality—Sampling. Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples* (Standards Australia, 1998. AS/NZS 5667.1:1998)
- Water Quality—Sampling. Part 6: Guidance on sampling of rivers and streams* (Standards Australia, 1998. AS/NZS 5667.6:1998)
- Water Quality—Sampling. Part 9: Guidance on sampling from marine waters* (Standards Australia, 1998. AS/NZS 5667.9:1998)
- Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan, Version 2.0* (HEPA, 2020).

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

Each Swan River surface water sample was collected using a Niskin Flask or surface water sampling pole depending upon water column depth as detailed below:

- Where the water column was >2 m, the following two depths were targeted:
  - Sample 1 (shallow sample): collected at ~1 m below surface level
  - Sample 2 (deep sample): collected ~1 m above riverbed level.
- Where the water column was <2 m (WS3), the sample was collected in the middle of the water column, using a surface water pole sampler.

Field observations were collected during each sampling event and included commentary on weather conditions, tides and vessel movement within the Fremantle port and surrounding waters.

## Analysis Program

All samples were analysed for the following analytical suite:

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silicon, silver, and zinc.
- Total metals: aluminium and iron.
- Major anions: sulfate ( $\text{SO}_4^{2-}$ ), chloride ( $\text{Cl}^-$ ), fluoride ( $\text{F}^-$ ), alkalinity (hydroxide  $\text{OH}^-$ , carbonate  $\text{CO}_3^{2-}$ , bicarbonate  $\text{HCO}_3^-$ ).
- Major cations: sodium, potassium, calcium, magnesium.
- Nutrients: total and reactive phosphorus, total nitrogen, total Kjeldahl nitrogen (TKN), total ammonia ( $\text{NH}_4\text{-N} + \text{NH}_3\text{-N}$ ), nitrates and nitrites ( $\text{NO}_x\text{-N}$ ).
- Sulfide ( $\text{S}^{2-}$ )
- Total dissolved solids (TDS) and Total suspended solids (TSS)
- Turbidity
- Hydrocarbons: Total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAH)
- Organochlorine Pesticides (OCP)
- Per- and poly-fluoroalkyl substances (PFAS)
- Dissolved organic carbon (DOC)
- Chlorophyll-A and Phaeophytin-A.

Water column profiles for temperature, salinity (electrical conductivity (EC)), pH and dissolved oxygen (DO) were also collected at each sampling location.

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Surface water assessment levels

All analytes were compared against relevant Water Quality Australia 2019 guidelines, nominally (95% species protection) as follows:

- Water Quality Australia (WQA, 2019)
  - Marine Water Guidelines (MWG) 95% species protection level
    - Estuary water (for nutrients and pH only).
- Recreational Water Guidelines (RWG)
- PFAS National Environmental Management Plan (HEPA, 2020).
  - Marine Guidelines 99% species protection level<sup>1</sup>
  - Recreational Water
- Treatment and management of soil and water in acid sulfate soil landscapes (DER, June 2015b).
  - Guideline levels for ASS surface water quality (ASS)

## Site conditions

Site conditions noted during the monitoring Event #5 are summarised within Table 3.

**Table 3: Site conditions**

Items	Commentary
<b>Weather conditions (during sampling event)</b>	Sunny, with south-south-easterly winds in the morning, turning south-westerly in the afternoon 9-17 km/h, maximum temperature of 29°C.
<b>Rainfall (noted during the previous week)</b>	A total of 8.8 mm of rain was measured at the Perth Station (Number: 9225) in the week prior to sampling
<b>Tide condition and direction</b>	<ul style="list-style-type: none"><li>• Incoming tide.</li><li>• Closest peak:<ul style="list-style-type: none"><li>– Low tide (7:42 am / 0.44 m)</li><li>– High tide (10:18 pm / 1.10 m)</li></ul></li></ul>
<b>Fremantle Port and Swan River vessel activities</b>	<ul style="list-style-type: none"><li>• WS1: Low general harbour / river traffic during sampling. No ship movement in harbour</li><li>• WS2: Low general harbour / river traffic during sampling.</li><li>• WS3: Low general harbour / river traffic during sampling.</li><li>• WS4: Two tugboats located adjacent to sampling location on small craft jetty. Low general river traffic during sampling.</li><li>• WS5: No boat traffic during sampling.</li></ul>

<sup>1</sup> The 99% species protection value is considered to most appropriate as PFAS is known bioaccumulate in aquatic organisms.

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Monitoring Results Discussion

Results have been tabulated and are presented in Tables A to E, with laboratory reporting presented in Appendix B. Further commentary on specific analytes is provided below.

Due to insufficient sampling bottles being provided, total acidity could not be completed during this sampling event.

### Field parameters

Field parameters were measured throughout the water column prior to sampling at each location. The water column profiles are presented in surface water sampling logs at the rear of the report (Appendix C), with field parameters of sampling depths summarised in Table 4.

**Table 4: Sampling location field parameters**

Sample Location	Depth (m)	Temp (°C)	pH	EC ( $\mu\text{S}/\text{cm}$ )	Redox (mV)	DO (%sat)
WS1-S	1.00	21.0	8.08	49,503	178	86
WS1-D	3.00	20.4	8.08	49,803	178	87
WS2-S	1.00	21.0	8.06	48,338	145	78
WS2-D	3.50	21.0	8.06	48,410	155	74
WS3-S	0.05	22.0	8.11	49,569	184	98
WS4-S	1.00	20.8	7.94	48,677	105	85
WS4-D	3.00	20.8	7.98	48,630	115	83
WS5-S	1.00	21.0	8.10	49,008	166	109
WS5-D	6.00	20.9	8.09	49,116	175	103

Physical parameters were noted to be relatively consistent throughout the profile i.e. alkaline, saline and in an oxidising state. These conditions are consistent with the significant flushing that occurs as a result of daily tidal movement of marine waters. RPS did note the following minor trends and guideline exceedances:

- Trends:
  - Redox marginally increased with depth at all locations. Marginal increases of pH with depth were observed at WS1 and WS4. Marginal decreases of pH with depth were observed at WS2 and WS5.
  - Dissolved oxygen decreased with depth at all locations.
- Guideline exceedances:
  - DO percentage saturation (%sat) did not comply with the MWG (90-110%sat) in all samples except WS3-S, WS5-S and WS5-D. DO percentage saturation did not comply with the RWG (>80%sat) in two of the nine samples (WS2-S and WS2-D). DO percentage saturations were comparable to previous events with values ranging from 74%sat (WS2-D) to 109%sat (WS5-S).

### Acid sulfate soil parameters

Acid sulfate soil (ASS) parameters observed during Event #5 can be summarised as follows:

- Total acidity was not measured as insufficient sampling bottles were provided however given the observed pH values, no significant changes in the acidity would be anticipated from previous events.

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

- Sulfide concentrations exceeded the ASS guideline (>0.5 mg/L) in all locations except WS1-S and WS3-S (both <0.5 mg/L) with a maximum concentration of 3.8 mg/L observed at WS4-D. The sulfide concentrations observed at WS4-D (3.8 mg/L) and WS5-D (2 mg/L) were significantly higher than previous sampling events. The concentrations at all other locations were comparable with previous events.
- Sulfate concentrations exceeded the recreational water guideline (500 mg/L) at all locations with a mean of 2,700 mg/L and a maximum of 2,800 mg/L observed at WS1-D. These concentrations are consistent with previous events and is typical of water quality at the mouth of the Swan River.
- Total alkalinity results were relatively consistent throughout all locations with a mean concentration of 126 mg/L and a range of 110-130 mg/L observed. All results were consistent with previous events.

## Solids

- TDS concentrations were relatively consistent over all locations and ranged from 35,000 mg/L (WS2-D) to 38,000 mg/L (WS3-S). All results were consistent with previous events.
- TSS was below the LOR (<5 mg/L) at all locations with the exception of WS3-S (19 mg/L), WS4-D (7 mg/L), WS5-S (7 mg/L) and WS5-D (6 mg/L). These results are relatively consistent with previous events, except for an increase in concentration was noted within WS3-S. This variation with previous events is potentially due to shallow nature of the location and the potential to mobilise sediment during sampling.
- Turbidity results ranged from 0.7 (WS2-S) to 2.4 (WS3-S) NTU<sup>2</sup>. A marginal increase in turbidity was observed across all sampling locations.

## Nutrients

Nutrient analytical results observed during Event #5 can be summarised as follows:

- Reactive phosphorus (RP) marginally exceeded the MWG (0.005 mg/L) in two samples; WS3-S and WS5-D (0.006 mg/L). A marginal decrease in concentration was noted within WS1-S with all other samples relatively stable.
- Total nitrogen exceeded the MWG (0.75 mg/L) in three locations; WS2-S, WS2-D and WS3-S with a concentration of 0.8 mg/L observed at each location. A marginal increase in total nitrogen concentration was observed at all locations.
- All other nitrogen and phosphorus species were at or below relevant MWG and RWG assessment criteria.

## Chlorophyll

All Chlorophyll "A" sample results were below the MWG (0.003 mg/L) with a concentration range of 0.0011 mg/L (WS1-D) to 0.0022 mg/L (WS2-S) observed. All results were consistent with previous events.

Low concentrations of Phaeophytin "A" were detected within all surface water samples with concentrations ranging from 0.0004 mg/L (WS1-D) to 0.0011 mg/L (WS3-S). All results were consistent with previous events.

---

<sup>2</sup> NTU: Nephelometric Turbidity unit, i.e. the unit used to measure the turbidity of a fluid or the presence of suspended particles in water.

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Metals and metalloids

Metal analytical results observed during Event #5 can be summarised as follows:

- Dissolved metals:
  - The concentration of nickel marginally exceeded the RWG (0.02 mg/L) at one location; WS5-D with a concentration of 0.022 mg/L. This result is a significant increase when compared to previous sampling events. All other locations were below the LOR.
  - All other dissolved metal results were below adopted criteria for all samples.
  - Antimony, cadmium, cobalt, copper, mercury, lead and selenium were below their relevant LOR for all samples.
  - A marginal increase in the concentration of aluminium, chromium, iron, nickel and zinc was observed at WS5-D. All other results were consistent with previous events.
- Total metals:
  - Total aluminium concentrations were relatively consistent for all locations with a mean of 0.04 mg/L and a range of 0.02-0.07 mg/L observed.
  - All total iron concentrations were significantly below the MWG (1 mg/L) with a mean of 0.04 mg/L and a maximum of 0.09 mg/L (WS3-S) observed.
  - All results were relatively consistent with previous events.

## Hydrocarbons

All hydrocarbon results (BTEX, TRH and PAH) were below their relevant LOR and as such, adopted criteria in all samples analysed.

## Pesticides

All organochlorine pesticides results were below their relevant LOR and as such, adopted criteria in all samples analysed.

## PFAS

PFAS analytical results observed during Event #5 can be summarised as follows:

- Perfluorooctanesulfonate (PFOS) exceeded the 99% species protection MWG (0.00023 µg/L) in all samples, ranging from 0.0024 µg/L (WS1-S) to 0.0084 µg/L (WS3-S) with a mean of 0.0042 µg/L observed, which is marginally higher than the historical average (0.0027 µg/L). However, all concentrations were still significantly below the 95% species protection guideline (0.13 µg/L).
- Minor detections of Perfluorohexanesulfonic acid (PFHxS), Perfluorohexanoic acid, Perfluorohexanoic acid and Perfluorooctanoic acid (PFOA) were observed marginally above their relevant LOR. However, all concentrations were significantly below all relevant guidelines or no guidelines are available.
- Total PFAS were relatively consistent between all locations and ranged from 0.0079 µg/L (WS1-S) to 0.0180 µg/L (WS3-S) with a mean of 0.0092 µg/L observed, which is marginally higher than the historical mean 0.0069 mg/L.

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Quality Control and Quality Assurance

To maintain a high level of Quality Control and Quality Assurance (QAQC) sampling and analysis was undertaken with reference to relevant guidelines (DER, 2014, NEPC, 2013 and HEPA, 2020) and *Australian Standard 4482.1:1997* (Standards Australia, 2005). Strict hygiene procedures were applied throughout to assure a high level of sample integrity and quality was maintained, including the decontamination of all sampling equipment between sampling locations to prevent possible cross-contamination.

In accordance with HEPA (2020) guidance, one field duplicate was collected per 10 primary samples. In addition, one field blank, trip blank and field rinsate was collected per day of sampling. The results are presented in Tables F to N and summarised as follows:

- A total of 115 of the 119 (97%) analyte tests performed on the field duplicate sample had a Relative Percentage Difference (RPD) within 30% of the original samples indicating the sampling and analysis procedures applied by RPS and the laboratory were generally reproducible.
- Three of the five duplicate RPD failures (DOC) were considered insignificant as both the primary and duplicate results were less than 5 x LOR. In such instances the elevated RPD merely indicates that analytical precision decreases as concentrations approach the LOR.
- The two remaining exceedances (perfluoroheptanoic acid and total aluminium) were considered significant as the concentration of either the primary or secondary sample was greater than 5 x LOR. The failures are likely due to minor differences in water quality when sampling. The duplicate sample concentration was higher for perfluoroheptanoic acid and as such was used for the data assessment. Neither exceedance was considered to have affected the water quality assessment.
- The concentrations of copper, iron, lead, zinc, turbidity and several PFAS compounds above LOR were observed within the rinsate blank. Minor detections above LOR are potentially associated with remnant particulate matter following decontamination or a reflection of the quality of deionised water utilised for rinsate collection.
- With the exception of turbidity all field blank samples were below their relevant LOR. Minor exceedances of acceptance criteria (>LOR) are potentially a reflection of the quality of deionised water used for the blank collection.
- All trip blank samples were below their respective LORs.
- All internal laboratory QAQC procedures (method blanks, matrix spikes, laboratory control standards, internal duplicates) were within acceptable limits.
- All samples were analysed within the recommended holding time for each analyte with the exception of Chlorophyll "A" and Phaeophytin "A" which were noted to exceed holding time criteria however, this was due to extract or analysis dates not being provided. As such, the holding times could not be calculated.

The conclusion of the QAQC assessment indicates that sampling and analysis was generally reproducible and complied with accepted standards. As such, the data collected is considered representative of the site and suitable for the data assessment undertaken.

## Conclusions

Surface water monitoring Event #5 was completed on 3 December 2020. Samples were collected from all five of the sampling locations (Figure A). A shallow and deep sample were collected at each sampling point utilising the defined Niskin flask methodology, with the exception of WS3. Due to the shallow nature of WS3 (water column depth approximately ~0.10 m) a shallow sample was collected utilising a surface water sampling pole from a central point in the water column (~0.05 m).

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

A review of the analytical data collected indicates that the site waters were alkaline, saline and in an oxidising state. Minor exceedances of the field and ASS parameters assessment criteria were noted (DO and sulfide), however, these conditions are consistent with the marine environment present at the mouth of the Swan River.

All samples were below the adopted TP MWG during Event #5. Minor exceedances of reactive phosphorus MWG (0.005 mg/L) were observed in two samples WS3-S and WS5-D (both 0.006 mg/L). Total nitrogen exceeded the MWG (0.75 mg/L) in three locations; WS2-S, WS2-D and WS3-S with a concentration of 0.8 mg/L observed at each location. With the exception of a marginal increase in total nitrogen concentrations all nutrient concentrations were consistent with historical data.

The concentration of nickel exceeded the MWG (0.02 mg/L) at one location, WS5-D. All other metal and metalloid concentrations were below adopted guidelines, with concentrations predominantly below their relevant LORs. Metal concentrations at WS5-D were higher than the historical average. All other results were relatively consistent with previous events.

All hydrocarbon and organochlorine pesticides results were below their relevant LOR and as such, adopted criteria in all samples analysed.

Minor detections of PFAS (PFHxS, PFOS and PFOA), were detected within all samples. The 99% species protection PFOS MWG (0.00023 mg/L) was exceeded in all samples, however, was significantly below the 95% species protection MWG (0.13 mg/L). No exceedances of any other relevant MWG or RWG were noted. PFAS concentrations were marginally higher than historical data.

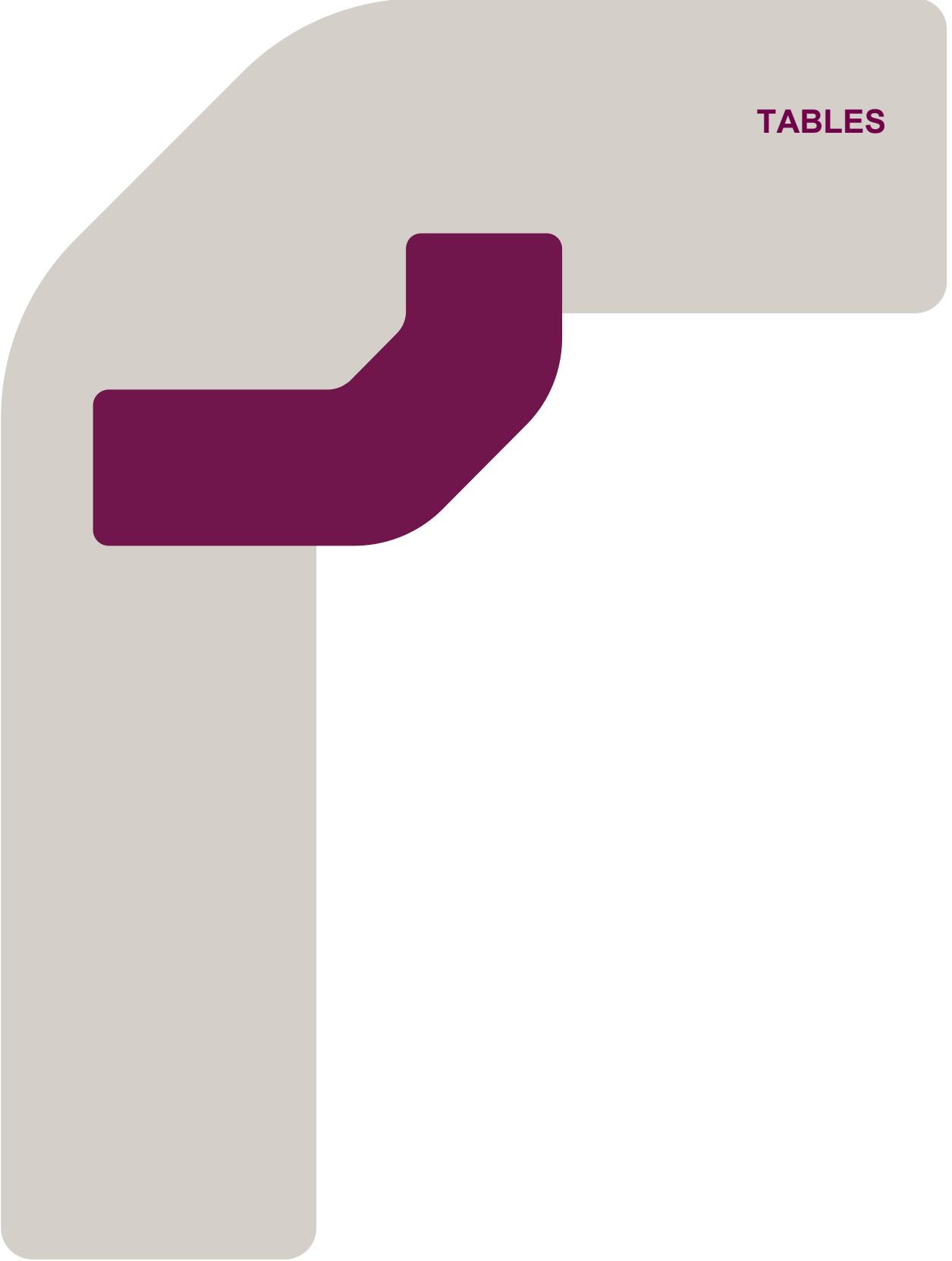
We trust that this is to your satisfaction, should you have any queries please contact Alan Foley or the undersigned.



## Alan Foley

Principal Scientist - Contamination and Acid Sulfate Soils  
[alan.foley@rpsgroup.com.au](mailto:alan.foley@rpsgroup.com.au)  
+61 9288 0836

Enc. Tables  
Figure A - Water quality sampling locations  
Appendix A – DBCA approval  
Appendix B – Laboratory reports  
Appendix C – Surface water sampling logs



## TABLES

**Table A**  
**Surface Water Results: Field Parameters, ASS, Cations, Nutrients and Miscellaneous**

**Definitions:**

MWG (Marine Water Estuary Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines), ASS (Acid Sulfate Soils) Standing Advice from DWER on dewatering trigger values taken from ASS Guideline Series (2015),  
 - (No Guideline), --- not tested, LOR (Limit of Reporting), # duplicate value

**Notes:**

Guideline values have been adopted from the following guidance documentation:

- Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER 2015b)
- Assessment and Management of Contaminated Sites (DER 2014)
- Freshwater and Marine Water Quality Guidelines Chapter 3 (ANZECC/ARMCANZ 2000)

All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts), turbidity (NTU) and EC ( $\mu$ S/cm)

a) Values for estuary environments - Table 3.3.6 ANZECC/ARMCANZ 2000 Freshwater and Marine WQ Guidelines Chapter 3

c) Values based on Australian Government, National Health and Medical Research Council, Guideline for Managing Risks in Recreational Water (NHMRC, 2008)

d) Recreational water guideline values based on drinking water guidelines NHMRC & ARMCANZ (2011) Australian Drinking Water Guidelines

e) TKN concentration calculated (TKN = TN-NOx-N)

Denotes less than LOR

Sample ID	Date	Trigger	Field Parameters				Acid Sulfate Soil Parameters and Anions								ASS Ratios		Cations				Nutrients				Miscellaneous						
			pH	E.C.	Redox	DO	Total Acidity (CaCO <sub>3</sub> )	Total Alkalinity (CaCO <sub>3</sub> )	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Fluoride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN <sup>e</sup>	NH <sub>3</sub> -N	NO <sub>x</sub> -N	Dissolved Organic Carbon (DOC)	Chlorophyll "A"	Phaeophytin "A"	
			Units	pH units	$\mu$ S/cm	mV	%sat	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	-	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
			MWG	7.5-8.5	-	-	90-110	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03 <sup>a</sup>	0.005 <sup>a</sup>	0.75 <sup>a</sup>	-	0.62 <sup>b</sup>	0.045 <sup>a</sup>	-	0.003 <sup>a</sup>	-		
			RWG	6.5-8.5 <sup>c</sup>	-	-	>80 <sup>c</sup>	-	-	-	-	-	500 <sup>d</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			ASS	<6	-	-	-	>40	-	-	-	-	-	>0.5	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-	-		
			LOR	-	-	-	-	5	5	5	0.1	0.5	1	1	0.1	-	-	0.5	0.5	0.5	0.5	0.01	0.005	0.1	0.005	0.005	1	0.0001	0.0002		
WS1 - S	10/09/2020			8.18	50,919	80	104	9	120	36,000	<5	0.5	<0.5	2,400	18,000	---	0.08	0.13	390	1200	360	11000	0.03	0.006	0.2	0.2	0.009	<0.005	2	0.0012	0.0006
WS1 - S	7/10/2020			8.25	52,200	134	106	7	120	37,000	<5	0.4	0.6	2,300	17,000	<5	0.06	0.14	400	1300	380	10000	0.03	0.007	0.2	0.2	<0.005	<0.005	2	0.0009	0.0005
WS1 - S	5/11/2020			8.11	51,108	128	82	<5	120	37,000	<5	0.7	<0.5	2,800	20,000	<5	0.04	0.14	350	1200	310	10000	0.02	0.006	0.2	0.2	0.007	<0.005	3	0.0015	0.0006
WS1 - S	3/12/2020			8.08	49,503	178	86	---	120	37,000	<5	0.8	<0.5	2,700	19,000	<5	0.14	410	1300	390	12000	0.02	<0.005	0.6	0.6	<0.005	0.005	3	0.0014	0.0005	
WS1 - D	10/09/2020			8.20	50,935	91	107	9	120	36,000	<5	0.7	<0.5	2,400	18,000	---	0.08	0.13	390	1200	360	11000	0.03	0.005	0.2	0.2	0.008	<0.005	2	0.0008	0.0006
WS1 - D	7/10/2020			8.29	53,399	131	104	7	120	37,000	<5	0.5	0.6	2,500	18,000	<5	0.06	0.14	420	1300	400	11000	0.04	0.005	0.1	0.1	0.006	0.007	2	0.0008	0.0004
WS1 - D	5/11/2020			8.12	51,230	125	80	<5	130	37,000	<5	0.7	<0.5	2,800	20,000	<5	0.04	0.14	350	1200	310	11000	0.02	0.006	0.2	0.2	0.009	<0.005	3	0.0012	0.0005
WS1 - D	3/12/2020			8.08	497,803	178	87	---	130	37,000	<5	0.8	0.6	2,800	20,000	<5	0.14	410	1300	390	12000	0.02	0.005	0.6	0.6	<0.005	0.005	2	0.0011	0.0004	
WS2-S	7/08/2020			8.70	50,710	181	105	6	120	39,000	9	0.6	0.9	2,800	20,000	---	0.05	0.14	420	1300	370	12000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0004	0.0005
WS2-S	10/09/2020			8.11	50,645	60	110	9	120	36,000	<5	0.6	<0.5	2,400	19,000	---	0.08	0.13	410	1300	360	11000	0.03	<0.005	0.2	0.2	0.007	0.009	2	0.0010	0.0005
WS2-S	7/10/2020			8.16	49,541	94	102	6	120	34,000	<5	0.6	0.7	2,300	17,000	<5	0.05	0.14	380	1200	360	9700	0.04	<0.005	0.2	0.2	<0.005	0.017	2	0.0019	0.0006
WS2-S	5/11/2020			8.07	49,927	60	79	7	120	36,000	<5	0.6	<0.5	2,700	19,000	<5	0.06	0.14	330	1100	300	10000	0.02	0.007	0.2	0.2	0.007	0.017	3	0.0017	0.0006
WS2-S	3/12/2020			8.06	48,338	145	78	---	130	36,000	<5	0.7	0.6	2,700	19,000	<5	0.14	400	1300	380	12000	0.02	<0.005	0.8	0.8	<0.005	0.01	3	0.0022	0.0006	
WS2-D	7/08/2020			8.19	50,966	179	105	7	120	39,000	5	0.5	0.8	2,800	20,000	---	0.06	0.14	410	1300	360	11000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0005	0.0005
WS2-D	10/09/2020			8.19	50,453	79	110	9	120	35,000	<5	0.6	<0.5	2,400	18,000	---	0.08	0.13	380	1200	350	11000	0.03	<0.005	0.2	0.2	0.006	0.009	2	0.0011	0.0004
WS2-D	7/10/2020			8.23	50,511	97	100	7	120	35,000	<5	0.5	0.6	2,400	17,000	<5	0.06	0.14	400	1200	380	10000	0.04	<0.005	0.3	0.3	<0.005	0.022	2	0.0017	0.0006
WS2-D	5/11/2020			8.09	50,009	68	78	6	130	36,0																					

## Table B

### Surface Water Results: Metals

#### Definitions:

MWG (Marine Water Estuary Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines), ASS (Acid Sulfate Soils) Standing Advice from DWER on dewatering trigger values taken from ASS Guideline Series (2015).  
 - (No Guideline), --- not tested, LOR (Limit of Reporting), \* value for hexavalent chromium, # duplicate value

#### Notes:

Guideline values have been adopted from the following guidance documentation:

- Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER 2015b)
- Assessment and Management of Contaminated Sites (DER 2014)
- Freshwater and Marine Water Quality Guidelines Chapter 3 (ANZECC/ARMCANZ 2000)

All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts), turbidity (NTU) and EC (µS/cm)

a) Chemicals for which possible bioaccumulation and secondary poisoning should be considered

b) Recreational water guideline values based on drinking water guidelines NHMRC & ARMCANZ (2011) Australian Drinking Water Guidelines

Denotes less than LOR

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																Total Metals		
			Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			MWG	-	-	-	-	0.001	-	0.0013	-	0.0001 <sup>a</sup>	-	-	-	0.0044	-	-	0.0014	-	-
WS1 - S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	0.00006	0.002	0.02	0.02
WS1 - S	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.5	0.00005	0.003	<0.02	0.02
WS1 - S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.014	<0.002	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03
WS1 - S	3/12/2020		0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	0.011	0.012	<0.002	<0.002	<0.002	<1	0.0001	0.006	0.03	0.03
WS1 - D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	0.00006	0.003	0.03	0.04
WS1 - D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.5	<0.00005	0.002	0.02	<0.02
WS1 - D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.03
WS1 - D	3/12/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<1	<0.0001	0.004	0.02	0.02
WS2-S	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02
WS2-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	<0.00005	0.003	0.02	0.02
WS2-S	7/10/2020		<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	0.002	<0.01	<0.00005	<0.005	0.011	<0.001	<0.001	<0.001	0.7	<0.00005	0.003	<0.02	<0.02
WS2-S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.04
WS2-S	3/12/2020		0.04	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<1	0.0002	0.0099	0.07	0.02
WS2-D	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	---	<0.0001	0.007	0.03	0.02
WS2-D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	0.00006	0.003	0.02	0.02
WS2-D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	0.7	<0.00005	0.003	<0.02	<0.02
WS2-D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.04
WS2-D	3/12/2020		0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<1	<0.0001	0.005	0.03	0.04
WS3-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	<0.00005	0.003	0.05	0.08
WS3-S	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.013	<0.001	<0.001	<0.001	<0.5	<0.00005	0.003	0.02	0.2
WS3-S	5/11/2020		0.07	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<0.5	<0.0001	0.034	0.06	0.05
WS3-S	3/12/2020		0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.014	<0.002	<0.002	<0.002	<1	<0.0001	0.008	0.05	0.09
WS4-S	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	---	0.0002	0.004	0.02	0.03
WS4-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	<0.00005	0.002	0.02	0.02
WS4-S	7/10/202																				

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																	Total Metals		
			Aluminum	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron	
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			MWG	-	-	-	-	0.001	-	0.0013	-	0.0001 <sup>a</sup>	-	-	0.0044	-	-	0.0014	-	-	1 <sup>b</sup>	
WS4-S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.04	
WS4-S	3/12/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<1	<0.0001	0.004	0.03	0.03	
WS4-D	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02
WS4-D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.001	---	<0.00005	0.002	0.02	0.02
WS4-D	7/10/2020		<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	<0.001	0.001	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	0.6	<0.00005	0.003	<0.02	<0.02	
WS4-D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.015	<0.002	<0.002	<0.002	<0.5	<0.0001	0.004	0.04	0.04	
WS4-D	3/12/2020		0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<1	<0.0001	0.003	0.03	0.03	
WS5-S	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.002	<0.01	<0.00005	<0.005	0.024	<0.001	<0.001	<0.001	0.8	<0.00005	0.004	<0.02	0.02	
WS5-S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.5	<0.0001	0.005	0.04	0.04	
WS5-S	3/12/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<1	<0.0001	0.004	0.03	0.03	
WS5-D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.5	<0.00005	0.002	<0.02	<0.02	
WS5-D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.04	
WS5-D	3/12/2020		0.04	<0.002	0.002	<0.0002	<0.002	0.005	<0.002	0.04	<0.00005	<0.01	0.013	0.022	<0.002	<0.002	<1	<0.0001	0.019	0.03	0.03	

**Table C**  
**Surface Water Results: MTBE, BTEX and TRH**

**Definitions:**

MWG (Marine Water Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines)  
LOR (Limits of Reporting), '-' denotes no guideline. '---' denotes not tested.

**Notes:**

All values in mg/L unless specified otherwise

All guideline values are adopted from:

- National Environment Protection (Assessment of Site Contamination) Measure 1999, Guideline on Investigation Levels for Soil and Groundwater (NEPC 2013)
- Assessment and Management of Contaminated Sites (DWER 2014)
- Health screening for petroleum hydrocarbons in soil and groundwater Part 2: Application document (CRC Care 2011)

a) Value may not protect key test species from chronic toxicity, refer to chapter eight of ANZECC & ARMCANZ (2000)

b) Recreational water guideline values based on drinking water guidelines NHMRC & ARMCANZ (2011) Australian Drinking Water Guidelines

Table uses colour coding for data interpretation, avoid black and white reproduction.

Denotes <LOR

Sample ID	Date	Trigger	MTBE		BTEX						TRH						Polycyclic Aromatic Hydrocarbons													
					Benzene	Toluene	Ethylbenzene	m+p-xylene	o-xylene	F1: C6-C10 minus BTEX	F2: C>10-C16 minus N	F3: C>16-C34	F4: C>34-C40	Naphthalene	Aceanaphthylene	Aceanaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Total Carcinogenic PAHs	Total Positive PAHs
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			MWG	-	0.50 <sup>a</sup>	-	-	-	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			RWG	-	0.001 <sup>b</sup>	0.8 <sup>b</sup>	0.3 <sup>b</sup>	-	0.6 <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00001 <sup>b</sup>	-	-	-	-	
			LOR	0.001	0.001	0.001	0.001	0.002	0.001	0.01	0.05	0.1	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0005	0.0001	
WS1 - S	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	5/11/2020		<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS1 - S	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS1 - D	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS1 - D	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS1 - D	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-S	7/08/2020		<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-S	10/09/2020		<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-S	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-S	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-S	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-D	7/08/2020		<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001			
WS2-D	10/09/2020		<0.001	<0.001	<0.00																									

## Table D

### Surface Water Results - OC/OP Pesticides

#### Definitions:

MWG (Marine Water Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines)

- denotes no guideline. --- denotes not tested.

#### Notes:

All values in mg/L unless specified otherwise

All guideline values are adopted from:

- National Environment Protection (Assessment of Site Contamination) Measure 1999, Guideline on Investigation Levels for Soil and Groundwater (NEPC 2013)

- Assessment and Management of Contaminated Sites (DWER 2014)

a) Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered. Refer to section 8.3.3.4 and 8.3.5.7 of ANZECC & ARMCANZ (2000)

b) Recreational water guideline values based on drinking water guidelines NHMRC & ARMCANZ (2011) Australian Drinking Water Guidelines

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR

Sample ID	Date	Trigger	Organochlorine Pesticides																				Dieldrin		a-Endosulfan		b-Endosulfan		Endosulfan sulphate		Endrin		Heptachlor		Heptachlor epoxide		Hexachlorobenzene		Methoxychlor			
			Aldrin + Dieldrin		a-BHC		b-BHC		d-BHC		g-BHC (Lindane)		a-Chlordane		g-Chlordane		DDD		DDE		DDT		DDD + DDE + DDT		Dieldrin		a-Endosulfan		b-Endosulfan		Endosulfan sulphate		Endrin		Heptachlor		Heptachlor epoxide		Hexachlorobenzene		Methoxychlor	
			MWG	RWG							0.01 <sup>b</sup>		0.002 <sup>b</sup>										0.000005 <sup>a</sup>						0.000004 <sup>a</sup>													
			LOR	0.00001	0.00002	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00001	0.00001	0.00001	0.00001	0.00001	0.00006	0.00003	0.00001	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002										
WS1 - S	10/09/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001									
WS1 - S	7/10/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001										
WS1 - S	5/11/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001										
WS1 - S	3/12/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001										
WS1 - D	10/09/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WS1 - D	7/10/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WS1 - D	5/11/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WS1 - D	3/12/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WS2-S	7/08/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WS2-S	10/09/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WS2-S	7/10/2020		<0.00001	<0.00002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001</td																												

**Table E**  
**Surface Water Results: Per- and Poly-Fluoroalkyl Substances**

**Definitions:**  
LOR (Limits of Reporting), MWG (Marine Water Guideline) -99 (99% species protection level) -95 (95% species protection level), RWG (Recreational Water Guidelines)  
- (No Guideline). --- not tested. LOR (Limit of Reporting).\* value for hexavalent chromium. # duplicate value

Notes

All values in  $\mu\text{g/l}$ , unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

All guideline values are adopted from

- PFAS National Environment

Denotes <LOR

**Table F**  
**Surface Water QAQC Results (RPD Assessment): ASS, Cations, Nutrients and Miscellaneous**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denotes not calculated.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)
denotes <5x LOR (primary laboratory)
denotes exceedance of acceptance criteria (30%) where samples <5x LOR
denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR

Sample ID	Sample Type	Date	Trigger	Acid Sulfate Soil Parameters												Cations					Nutrients					Miscellaneous		
				Total Acidity (CaCO <sub>3</sub> )	Total Alkalinity (CaCO <sub>3</sub> )	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Fluoride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN	NH <sub>3</sub> -N	NO <sub>x</sub> -N	Dissolved Organic Carbon (DOC)	Chlorophyll "a"	Phaeophytin "a"			
				Units	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
RPD %				15	0	0	40	0	12	0	0	#	0	0	0	9	0	0	0	2	25	0	0	22	50			
WS2-S	Primary	7/08/2020		6	120	39,000	9	0.6	0.9	2800	20,000	--	420	1300	370	12000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0004	0.0005			
WZ1	Duplicate			7	120	39,000	6	0.6	0.8	2800	20,000	--	420	1300	370	11000	<0.05	<0.005	0.1	0.1	0.009	<0.005	<1	0.0005	0.0003			
RPD %				15	0	0	40	0	12	0	0	#	0	0	0	9	0	0	0	2	25	0	0	22	50			
WS1-S	Primary	10/09/2020		9	120	36,000	<5	0.5	<0.5	2400	18,000	--	390	1200	360	11000	0.03	0.006	0.2	0.19	0.009	<0.005	2	0.0012	0.0006			
WZ1	Duplicate			9	120	36,000	6	0.7	<0.5	2300	18,000	--	400	1300	360	11000	0.03	<0.005	0.2	0.19	0.008	<0.005	2	0.0012	0.0005			
RPD %				0	0	0	18	33	0	4	0	#	3	8	0	0	0	18	0	1	12	0	0	0	18			
WS3-S	Primary	7/10/2020		7	120	37,000	8	1.6	0.8	2400	18,000	<5	420	1300	400	11000	0.05	0.006	0.2	0.18	0.018	0.043	1	0.0019	0.0009			
WZ1	Duplicate			7	130	37,000	33	0.9	0.7	2400	18,000	<5	410	1300	390	11000	0.05	0.005	0.1	0.10	<0.005	<0.005	1	0.0011	0.0008			
RPD %				0	8	0	122	56	13	0	0	0	2	0	3	0	0	18	67	63	113	158	0	53	12			
WS2-D	Primary	5/11/2020		6	130	36,000	<5	0.8	<0.5	2700	19,000	<5	330	1100	290	9700	0.02	0.006	0.2	0.19	0.006	0.01	3	0.0016	0.0007			
WZ1	Duplicate			7	130	36,000	<5	1	<0.5	2700	19,000	<5	360	1200	320	11000	0.02	0.006	0.2	0.19	0.006	0.01	2	0.0015	0.0006			
RPD %				15	0	0	0	22	0	0	0	0	9	9	10	13	0	0	0	0	0	0	40	6	15			
WS2-S	Primary	3/12/2020		---	130	36,000	<5	0.7	0.6	2700	19,000	<5	400	1300	380	12000	0.02	<0.005	0.8	0.79	<0.005	0.01	3	0.0022	0.0006			
WZ1	Duplicate			---	130	36,000	<5	0.9	0.7	2700	19,000	<5	400	1300	380	12000	0.02	<0.005	0.7	0.69	<0.005	0.011	3	0.0018	0.0006			
RPD %				---	0	0	0	25	15	0	0	0	0	0	0	0	0	0	13	14	0	10	0	20	0			

## Table G

### Surface Water QAQC Results (RPD Assessment): Metals

#### Definitions:

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denoted not calculated.

#### Notes:

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

	denotes <LOR (primary laboratory)
	denotes <5x LOR (primary laboratory)
	denotes exceedance of acceptance criteria (30%) where samples <5x LOR
	denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR

Sample ID	Sample Type	Date	Trigger	Dissolved Metals & Metalloids																	Total Metals	
				Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron
																					Units	mg/L
																					LOR	0.01
WS2-S	Primary	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	---	<0.0001	0.004	0.03	0.02
RPD %				0	0	0	0	0	0	0	0	0	8	0	0	0	#	0	29	40	0	0
WS1-S	Primary	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	---	0.00006	0.002	0.02	0.02
WZ1	Duplicate			<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.013	<0.001	<0.001	<0.001	---	<0.00005	0.003	0.02	0.03
RPD %				0	0	0	0	0	0	0	0	0	0	8	0	0	0	#	18	40	0	40
WS3-S	Primary	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.013	<0.001	<0.001	<0.001	<5	<0.00005	0.003	0.02	0.04
WZ1	Duplicate			<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<5	<0.00005	0.004	<0.02	0.2
RPD %				0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	29	0	133
WS2-D	Primary	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.04
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<0.5	<0.0001	0.005	0.03	0.04
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0
WS2-S	Primary	3/12/2020		0.04	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<1	0.0002	0.0099	0.07	0.02
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<0.002	<0.002	<1	<0.0001	0.005	<0.02	0.02
RPD %				67	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	66	111	0

**Table H**  
**Surface Water QAQC Results (RPD Assessment): MTBE, BTEX and TRP**

## Definitions:

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denotes not calculated.

#### **Notes:-**

All values in mg/l unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <1 LOB (primary laboratory)

denotes <LOD (primary laboratory)

denotes <5x LOR (primary laboratory)

denotes exceedance of acceptance criteria (30%) where samples <5x LOR

**Table I**  
**Surface Water QAQC Results (RPD Assessment): OC/OP Pesticides**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denoted not calculated.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.


Sample ID	Sample type	Date	Trigger	Organochlorine Pesticides																																							
				Aldrin		a-BHC		b-BHC		d-BHC		g-BHC (Lindane)		a-Chlordane		g-Chlordane		DDD		DDE		DDT		DDD + DDE + DDT		Dieldrin		a-Endosulfan		b-Endosulfan		Endosulfan sulphate		Endrin		Heptachlor		Heptachlor epoxide		Hexachlorobenzene		Methoxychlor	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L										
				LOR	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002											
WS2-S	Primary	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001													
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS1-S	Primary	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001													
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS3-S	Primary	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001													
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS2-D	Primary	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
WS2-S	Primary	3/12/2020		<0.00001	<0.00005	<0.00005	<0.0000																																				

**Table J**  
**Surface Water QAQC Results (RPD Assessment): Per- and Poly-Fluoroalkyl Substances**

## Definitions

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denotes not calculated.

Notes

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction

	denotes <LOR (primary laboratory)
	denotes >5x LOR (primary laboratory)
	denotes exceedance of acceptance criteria (30%) where samples <5x LOR
	denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR

**Table K**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): Metals and Turbidity**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

Sample ID	Sample Type	Date	Trigger	Dissolved Metals & Metalloids																Total Metals	Turbidity		
				Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	Silicon	Silver	Zinc			
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
				LOR	0.01	0.001	0.001	0.0001	0.001	0.001	0.01	0.00005	0.005	0.001	0.001	0.001	0.001	0.1	0.00005	0.001	0.01	0.01	
<b>Rinsates</b>																							
WR1	Water	7/08/2020		<0.01	<0.001	<0.001	0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.2
WR1	Water	10/09/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.1
WR1	Water	7/10/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.02	<0.1
WR1	Water	5/11/2020		<0.01	<0.001	<0.001	0.0002	<0.001	<0.001	0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	0.3	<0.00005	0.005	<0.01	<0.01	0.3
WR1	Water	3/12/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	0.008	0.01	<0.00005	<0.005	<0.001	<0.001	0.021	<0.001	---	<0.00005	0.015	<0.01	0.02	0.5
<b>Field Blank</b>																							
WB1	Water	7/08/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.2
WB1	Water	10/09/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.1
WB1	Water	7/10/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.02	<0.1
WB1	Water	5/11/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	0.3	<0.00005	<0.001	<0.01	<0.01	0.2
WB1	Water	3/12/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	<0.001	<0.01	<0.01	0.1

**Table L**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): MTBE, BTEX and TRH**

## Definitions:

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested.

#### **Notes:-**

All values in mg/l unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <1 LOB (primary laboratory).

denotes exceedance of acceptance criteria > LOB

**Table M**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): OC/OP Pesticides**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

Sample ID	Sample type	Date	Trigger	Organochlorine Pesticides																							
				Aldrin	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)		a-Chlordane	g-Chlordane	DDD	DDE	DDT	DDD + DDE + DDT	Dieldrin	a-Endosulfan	b-Endosulfan	Endosulfan sulphate	Endrin	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor			
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
				LOR	0.00001	0.00005	0.00005	0.00005	0.00005	0.00001	0.00001	0.00001	0.00001	0.00006	0.00003	0.00001	0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			
<b>Rinsates</b>																											
WR1	Water	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				
WR1	Water	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002				
WR1	Water	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002				
WR1	Water	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002				
WR1	Water	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002				
<b>Field Blank</b>																											
WB1	Water	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				
WB1	Water	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				
WB1	Water	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				
				<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				
WB1	Water	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				
WB1	Water	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002				

**Table N**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): Per- and Poly-Fluoroalkyl Substances**

## Definitions:

LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

## Notes

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

**FIGURE**





**Figure A**  
**Swan River crossing**  
**Water quality sampling locations**

Document Path: G:\Jobs\C\_Jobs\Jobs\C20078 - MRWA SR Bridge\Figures C20078-004\C20078-004\_G\_001\_Fig A Proposed WQ Sampling\_200629.mxd

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Appendix A DBCA Approval

2020/1928  
PERMIT P12652

Pursuant to Part 4 (Regulation 29) of the Swan and Canning Rivers Management Regulations 2007, this is to certify that a permit is issued to the person(s) or organisation described hereunder as permit holder and that person(s) or organisation is permitted to carry out the authorised works, acts or activities for the duration specified, subject to the conditions listed below.

Permit holder: Main Roads Western Australia (John Braid)

Authorised works, acts or activities: Swan River Crossings Project – In-river scientific investigations – sampling suite includes contaminants, water quality, benthic habitat and sediment analysis

Location of works, acts or activities: Swan River between Fremantle Traffic Bridge and Stirling Bridge, Fremantle; and Lot 2010 on Plan 18598 and Lot 1941 on Plan 213981

Approval date: 2 October 2020

Expiry date: 31 December 2021

## CONDITIONS

1. The applicant shall notify the Department of Biodiversity, Conservation and Attractions in writing not less than three (3) days prior to the commencement of works (see **Advice Note 1**).
2. The applicant shall ensure that all contractors and personnel involved in the investigations approved by the Department of Biodiversity, Conservation and Attractions are familiar with the conditions and requirements of this approval at all times.
3. The works shall take place in accordance with the methodologies provided in the *Swan River Crossings Project-Environmental (in-river) Surveys September 2020 V6.0*, unless modified by a condition of this approval.
4. The results of the benthic habitat surveys, once collated, shall be provided to the Department of Biodiversity, Conservation and Attractions (see **Advice Note 1**).
5. Further to **Condition 4**, the applicant shall undertake any necessary additional sampling and/or modify the scientific investigation methodologies as required by the Department of Biodiversity, Conservation and Attractions on review of the results of the benthic habitat surveys and deduced potential impacts to known benthic habitat and communities.
6. The applicant shall ensure that all equipment is visually inspected for any traces of aquatic organisms and shall remove the organisms prior to the equipment entering the Swan Canning Development Control Area.
7. The applicant shall monitor all works and ensure that appropriate measures are implemented to contain turbidity and prevent sediment plumes spreading and shall have a silt curtain readily available to deploy in order to contain any turbidity and sediment plumes that are uncontrolled or move beyond the immediate area of works (see **Advice Note 2**).
8. Water-based activities shall cease if a dolphin comes within 50 metres of any water vessel involved in the approved activities and shall not recommence until any dolphin has moved away more than 200 metres or has not been observed for 20 minutes.
9. Any refuelling shall take place outside of the Swan Canning Development Control Area or at a licensed refuelling facility.

**2020/1928  
PERMIT P12652**

10. A spill kit shall be maintained on all vessels and shall be utilised to contain and clean up any spills that occur.
11. The applicant shall take all precautions to ensure no damage to the foreshore, riverbank or waterway (including infrastructure and vegetation) occurs as a result of the works. Should any inadvertent damage occur, the applicant is required to notify the Department of Biodiversity, Conservation and Attractions within 48 hours of that damage occurring (see **Advice Note 2**).
12. The applicant shall rectify at its expense any damage to the foreshore, riverbank or waterway (including infrastructure and vegetation) that occurs as a result of the works.
13. Within 24 hours of the completion of the activities, the applicant shall remove all waste materials, equipment and machinery.
14. An electronic copy of the report, addressing the findings of the scientific investigations approved under this permit shall be forwarded to the Department of Biodiversity, Conservation and Attractions prior to the expiration of this permit (see **Advice Note 1**).

**ADVICE TO APPLICANT**

1. Notifications and information can be emailed to [rivers.planning@dbca.wa.gov.au](mailto:rivers.planning@dbca.wa.gov.au).
2. In the event of spills, waste materials impacting the river or turbidity or sediment plumes, the Department of Biodiversity, Conservation and Attractions' Duty Officer (Riverpark) can be contacted on 9278 0981 (24 hrs) or Pollution Response Officer (Marine) on 9480 9924 (24 hrs).
3. The Department of Transport (DoT) Navigational Safety advises the applicant that:
  - Main Roads Western Australia (MRWA) and/or its contractors are to develop a communication plan with Commercial Ferry Operators and are to consult with commercial operators to gain comment and support for the Vessel Management Plan [Regarding 4.2 Legislative and Other Provisions (page 13 of the Vessel Management Plan): Should also include the '*Western Australian Marine Act 1982*' and the '*Marine Safety (Domestic Commercial Vessel) National Law Act 2012*'];
  - MRWA and/or its contractors are to monitor VHF Channel 16 during operating hours;
  - The works area and any hazards should be marked with yellow special marker buoys, approximately 1 metre in height equipped with flashing yellow lights;
  - All vessels taking part in the works must display shapes and lights in accordance with the Prevention of Collisions at Sea Regulations 1983 at all times;
  - Should diving operations be conducted between the Fremantle Rail Bridge and Fremantle Traffic Bridge, a closure of the respective navigation span will be required;
  - Navigational channels are to remain open wherever possible and only one navigation span is to be impeded at any one time;
  - Any anchor points which encroach the channel should be marked;
  - A Temporary Notice to Mariners (TNTM) must be issued by DoT outlining the scope of the works, the works area, navigational marking (lighting) and dates of the works, prior to commencement. MRWA and/or its contractors are to provide notification of the works to DoT a minimum of 21 days prior to the works commencing to enable a TNTM to be published, by email to: [navigational.safety@transport.wa.gov.au](mailto:navigational.safety@transport.wa.gov.au);
  - MRWA and/or its contractors are to provide sufficient notification of any ad hoc day closures of navigational channels so that a TNTM can be published to alert mariners; and



**2020/1928  
PERMIT P12652**

- MRWA and/or its contractors are to seek approval from Fremantle Ports Authority for any works to the west of the Fremantle Traffic and Rail Bridges.
4. The applicant is advised that the proposed works are located in a high to moderate and moderate to low acid sulphate soils risk area. The Acid Sulfate Soils Guideline Series for guidance on the identification, assessment and management of acid sulphate soils in Western Australia is available from the Department of Water and Environmental Regulation website at [www.dwer.wa.gov.au](http://www.dwer.wa.gov.au). If any acid sulfate soils are exposed during the works the Department of Water and Environmental Regulation should be contacted for further advice.
5. The applicant is advised that this approval does not negate the need to obtain any other approval from relevant agencies, or from the Department of Biodiversity, Conservation and Attractions.

**PERMIT APPROVED**

Signed:  Date: 02/10/20

Jacey Mills  
Manager, Statutory Assessments  
As delegate of CEO  
Under Section 38 of the SCRM Act 2006

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Appendix B Laboratory reports

## **CHAIN OF CUSTODY**

Level 2, 27-31 Troode Street  
West Perth WA 6005  
Tel: (618) 9211 1111  
Fax: (618) 9211 1122

Page number: 1 of 1

**Turnaround time:** Standard

Quote number: 20P194v2

**Remarks**

Site: Fremantle Traffic Bridge			Analytical suites												Level 2, 27-31 Troode Street West Perth WA 6005 Tel: (618) 9211 1111 Fax: (618) 9211 1122					
Project reference: EEC20078.004			Monthly water suite metals, turbidity, TRH/BTEX, PAH, OCP, PFAS	BTEX, TRH (C6-C9), PFAS only	Si	F									Page number: 1 of 1 Turnaround time: Standard Quote number: 20P194v2 Remarks					
Scientist(s) SMW & ZL																				
Sample type(s) Water																				
Report to: Alan Foley & Shae Miller-White																				
Invoice to: west.accountspayable@rpsgroup.com																				
Sample I.D.	Date collected	Number of jars / bottles / bags																		
WS1-S	3/12/2020	As per quote			X		X	X												
WS1-D	3/12/2020				X			X	X											
WS2-S	3/12/2020				X			X	X											
WS2-D	3/12/2020				X			X	X											
WS3-S	3/12/2020				X			X	X											
WS4-S	3/12/2020				X			X	X											
WS4-D	3/12/2020				X			X	X											
WS5-S	3/12/2020				X			X	X											
WS5-D	3/12/2020				X			X	X											
WZ1	3/12/2020				X			X	X											
WR1	3/12/2020					X		X												
WB1	3/12/2020					X		X												
WTB1	3/12/2020						X													
Total number of bottles/bags/jars																				
Primary destination:	MPL	Received by: GM													Secondary destination:	Received by:				
Relinquished by:	Shae Miller-White	Organisation: MPL													Relinquished by:	Organisation:				
Organisation:	RPS	Date: 3/12/2020													Organisation:	Date:				
Date:	3/12/2020	Time: 15:30													Time:	Time:				
Time:															Time:	Time:				

## CERTIFICATE OF ANALYSIS 254153

### **Client Details**

<b>Client</b>	RPS Australia West Pty Ltd
<b>Attention</b>	Alan Foley
<b>Address</b>	Level 2, 27-31 Troode St, WEST PERTH, WA, 6005

### **Sample Details**

<b>Your Reference</b>	<b><u>EEC20078.004 - Fremantle Traffic Bridge</u></b>
<b>Number of Samples</b>	13 Waters
<b>Date samples received</b>	03/12/2020
<b>Date completed instructions received</b>	03/12/2020

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.  
Samples were analysed as received from the client. Results relate specifically to the samples as received.  
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.  
**Please refer to the last page of this report for any comments relating to the results.**

### **Report Details**

<b>Date results requested by</b>	17/12/2020
<b>Date of Issue</b>	17/12/2020
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

### Results Approved By

Heram Halim, Operations Manager  
Huong Tran, Chemist  
Travis Carey, Organics - Team Leader

### Authorised By



Michael Kubiak, Laboratory Manager

Miscellaneous Inorganics							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Total Dissolved Solids (grav)	mg/L	5	37,000	37,000	36,000	35,000	38,000
Total Suspended Solids	mg/L	5	<5	<5	<5	<5	19
Turbidity	NTU	0.1	0.8	0.8	0.7	1	2.4
Dissolved Organic Carbon	mg/L	1	3	2	3	3	2
Sulphide in water*	mg/L	0.5	<0.5	0.6	0.6	0.5	<0.5
Fluoride	mg/L	0.1	<5	<5	<5	<5	<5

Miscellaneous Inorganics							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Total Dissolved Solids (grav)	mg/L	5	37,000	37,000	36,000	37,000	36,000
Total Suspended Solids	mg/L	5	<5	7	7	6	<5
Turbidity	NTU	0.1	0.8	1.1	1.1	1.4	0.9
Dissolved Organic Carbon	mg/L	1	3	3	2	2	3
Sulphide in water*	mg/L	0.5	0.8	3.8	0.6	2.0	0.7
Fluoride	mg/L	0.1	<5	<5	<5	<5	<5

Miscellaneous Inorganics				
Our Reference	UNITS	PQL	254153-11	254153-12
Your Reference			WR1	WB1
Date Sampled			03/12/2020	03/12/2020
Type of sample			Water	Water
Date prepared	-		04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020
Turbidity	NTU	0.1	0.5	0.1

Ionic Balance							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Calcium - Dissolved	mg/L	0.5	410	410	400	400	380
Potassium - Dissolved	mg/L	0.5	390	390	380	380	370
Magnesium - Dissolved	mg/L	0.5	1,300	1,300	1,300	1,300	1,200
Sodium - Dissolved	mg/L	0.5	12,000	12,000	12,000	12,000	12,000
Bicarbonate HCO <sub>3</sub> as CaCO <sub>3</sub>	mg/L	5	120	130	130	130	110
Carbonate CO <sub>3</sub> <sup>2-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Hydroxide OH <sup>-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	120	130	130	130	110
Chloride	mg/L	1	19,000	20,000	19,000	19,000	19,000
Sulphate	mg/L	1	2,700	2,800	2,700	2,700	2,700
Ionic Balance	%		4.5	3.9	4.0	4.0	3.7
Hardness as CaCO <sub>3</sub>	mg/L	3	6,400	6,400	6,200	6,200	5,900

Ionic Balance							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Calcium - Dissolved	mg/L	0.5	400	400	410	410	400
Potassium - Dissolved	mg/L	0.5	380	380	390	400	380
Magnesium - Dissolved	mg/L	0.5	1,200	1,200	1,300	1,300	1,300
Sodium - Dissolved	mg/L	0.5	12,000	12,000	12,000	12,000	12,000
Bicarbonate HCO <sub>3</sub> as CaCO <sub>3</sub>	mg/L	5	130	130	130	120	130
Carbonate CO <sub>3</sub> <sup>2-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Hydroxide OH <sup>-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	130	130	130	120	130
Chloride	mg/L	1	19,000	19,000	19,000	19,000	19,000
Sulphate	mg/L	1	2,700	2,600	2,700	2,700	2,700
Ionic Balance	%		3.2	4.4	4.5	5.4	3.2
Hardness as CaCO <sub>3</sub>	mg/L	3	6,100	6,100	6,300	6,300	6,100

<b>Nutrients in Water</b>							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Total Nitrogen	mg/L	0.1	0.6	0.6	0.8	0.8	0.8
NOx as N	mg/L	0.005	0.005	<0.005	0.01	0.015	<0.005
Ammonia as N	mg/L	0.005	<0.005	0.006	<0.005	0.005	<0.005
Total Phosphorus	mg/L	0.01	0.02	0.02	0.02	0.03	0.03
Phosphate as P	mg/L	0.005	<0.005	0.005	<0.005	<0.005	0.006

<b>Nutrients in Water</b>							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Total Nitrogen	mg/L	0.1	0.6	0.7	0.6	0.7	0.7
NOx as N	mg/L	0.005	0.010	0.008	0.012	0.009	0.011
Ammonia as N	mg/L	0.005	<0.005	<0.005	0.006	<0.005	<0.005
Total Phosphorus	mg/L	0.01	0.02	0.02	0.02	0.02	0.02
Phosphate as P	mg/L	0.005	<0.005	<0.005	0.005	0.006	<0.005

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

Total Metals in water							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date digested	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Date analysed	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Aluminium-Total	mg/L	0.01	0.03	0.02	0.07	0.03	0.05
Iron-Total	mg/L	0.01	0.03	0.02	0.02	0.04	0.09

Total Metals in water							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date digested	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Date analysed	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Aluminium-Total	mg/L	0.01	0.03	0.03	0.03	0.03	<0.02
Iron-Total	mg/L	0.01	0.03	0.03	0.03	0.03	0.02

Total Metals in water				
Our Reference	UNITS	PQL	254153-11	254153-12
Your Reference			WR1	WB1
Date Sampled			03/12/2020	03/12/2020
Type of sample			Water	Water
Date digested	-		08/12/2020	08/12/2020
Date analysed	-		08/12/2020	08/12/2020
Aluminium-Total	mg/L	0.01	<0.01	<0.01
Iron-Total	mg/L	0.01	0.02	<0.01

Dissolved Metals in Water							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Date analysed	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Silver-Dissolved Ultra Low	mg/L	0.00005	0.0001	<0.0001	0.0002	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	0.03	<0.02	0.04	0.02	0.03
Arsenic-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	0.011	<0.01	<0.01	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	0.012	0.012	0.012	0.013	0.014
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.006	0.004	0.0099	0.005	0.008
Silicon - Dissolved	mg/L	0.1	<1	<1	<1	<1	<1

Dissolved Metals in Water							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Date analysed	-		08/12/2020	08/12/2020	08/12/2020	08/12/2020	08/12/2020
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	<0.02	0.02	<0.02	0.04	<0.02
Arsenic-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	0.002	<0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	0.005	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	0.04	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	0.013	0.012	0.012	0.013	0.013
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	0.022	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.004	0.003	0.004	0.019	0.005
Silicon - Dissolved	mg/L	0.1	<1	<1	<1	<1	<1

<b>Dissolved Metals in Water</b>				
Our Reference	UNITS	PQL	254153-11	254153-12
Your Reference			WR1	WB1
Date Sampled			03/12/2020	03/12/2020
Type of sample			Water	Water
Date prepared	-		07/12/2020	07/12/2020
Date analysed	-		07/12/2020	07/12/2020
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.00005	<0.00005
Aluminium-Dissolved	mg/L	0.01	<0.01	<0.01
Arsenic-Dissolved	mg/L	0.001	<0.001	<0.001
Cadmium-Dissolved	mg/L	0.0001	<0.0001	<0.0001
Cobalt-Dissolved	mg/L	0.001	<0.001	<0.001
Chromium-Dissolved	mg/L	0.001	<0.001	<0.001
Copper-Dissolved	mg/L	0.001	0.008	<0.001
Iron-Dissolved	mg/L	0.01	0.01	<0.01
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.005	<0.005
Molybdenum-Dissolved	mg/L	0.001	<0.001	<0.001
Nickel-Dissolved	mg/L	0.001	<0.001	<0.001
Lead-Dissolved	mg/L	0.001	0.021	<0.001
Antimony-Dissolved	mg/L	0.001	<0.001	<0.001
Selenium-Dissolved	mg/L	0.001	<0.001	<0.001
Zinc-Dissolved	mg/L	0.001	0.015	<0.001
Silicon - Dissolved	mg/L	0.1	<0.1	<0.1

vTRH(C6-C10)/MBTEXN in water							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	<50	<50	<50	<50	<50
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	<50	<50	<50	<50	<50
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	10	<50	<50	<50	<50	<50
MTBE	µg/L	1	<3	<3	<3	<3	<3
Benzene	µg/L	1	<3	<3	<3	<3	<3
Toluene	µg/L	1	<3	<3	<3	<3	<3
Ethylbenzene	µg/L	1	<3	<3	<3	<3	<3
m+p-xylene	µg/L	2	<6	<6	<6	<6	<6
o-xylene	µg/L	1	<3	<3	<3	<3	<3
Naphthalene	µg/L	1	<3	<3	<3	<3	<3
Surrogate Dibromofluoromethane	%		104	99	103	102	100
Surrogate toluene-d8	%		101	96	100	100	97
Surrogate 4-BFB	%		99	96	101	96	97

vTRH(C6-C10)/MBTEXN in water							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	<50	<50	<50	<50	<50
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	<50	<50	<50	<50	<50
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	10	<50	<50	<50	<50	<50
MTBE	µg/L	1	<3	<3	<3	<3	<3
Benzene	µg/L	1	<3	<3	<3	<3	<3
Toluene	µg/L	1	<3	<3	<3	<3	<3
Ethylbenzene	µg/L	1	<3	<3	<3	<3	<3
m+p-xylene	µg/L	2	<6	<6	<6	<6	<6
o-xylene	µg/L	1	<3	<3	<3	<3	<3
Naphthalene	µg/L	1	<3	<3	<3	<3	<3
Surrogate Dibromofluoromethane	%		97	98	97	98	100
Surrogate toluene-d8	%		93	95	91	96	97
Surrogate 4-BFB	%		94	95	94	96	98

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

vTRH(C6-C10)/MBTEXN in water					
Our Reference	UNITS	PQL	254153-11	254153-12	254153-13
Your Reference			WR1	WB1	WTB1
Date Sampled			03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water
Date analysed	-		04/12/2020	04/12/2020	04/12/2020
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	<10	<10	<10
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	<10	<10	<10
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	10	<10	<10	<10
MTBE	µg/L	1	<1	<1	<1
Benzene	µg/L	1	<1	<1	<1
Toluene	µg/L	1	<1	<1	<1
Ethylbenzene	µg/L	1	<1	<1	<1
m+p-xylene	µg/L	2	<2	<2	<2
o-xylene	µg/L	1	<1	<1	<1
Naphthalene	µg/L	1	<1	<1	<1
Surrogate Dibromofluoromethane	%		105	101	102
Surrogate toluene-d8	%		103	99	100
Surrogate 4-BFB	%		98	97	98

<b>svTRH(C10-C40) in water</b>							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		07/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020
Date analysed	-		07/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> -C <sub>16</sub> less N (F2)	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%		91	87	85	80	76

<b>svTRH(C10-C40) in water</b>							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		07/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020
Date analysed	-		07/12/2020	07/12/2020	07/12/2020	07/12/2020	07/12/2020
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> -C <sub>16</sub> less N (F2)	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%		82	89	81	85	80

svTRH(C10-C40) in water				
Our Reference	UNITS	PQL	254153-11	254153-12
Your Reference			WR1	WB1
Date Sampled			03/12/2020	03/12/2020
Type of sample			Water	Water
Date extracted	-		07/12/2020	07/12/2020
Date analysed	-		07/12/2020	07/12/2020
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	<100	<100
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less N (F2)	µg/L	50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	<100	<100
Surrogate o-Terphenyl	%		86	83

PAHs in Water							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-D <sub>14</sub>	%		77	75	69	89	68

PAHs in Water							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-D <sub>14</sub>	%		75	72	85	77	78

PAHs in Water				
Our Reference	UNITS	PQL	254153-11	254153-12
Your Reference			WR1	WB1
Date Sampled			03/12/2020	03/12/2020
Type of sample			Water	Water
Date extracted	-		04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020
Naphthalene	µg/L	0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1
Dibeno(a,h)anthracene	µg/L	0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1
Surrogate p-Terphenyl-D <sub>14</sub>	%		83	76

Low Level OCP in water							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		73	77	61	88	60

Low Level OCP in water							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020	04/12/2020	04/12/2020	04/12/2020
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		77	63	89	71	76

Low Level OCP in water				
Our Reference	UNITS	PQL	254153-11	254153-12
Your Reference			WR1	WB1
Date Sampled			03/12/2020	03/12/2020
Type of sample			Water	Water
Date extracted	-		04/12/2020	04/12/2020
Date analysed	-		04/12/2020	04/12/2020
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		65	69

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-		14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	<0.0004	0.0004	0.0005	0.0005	0.0007
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	0.0020	0.0020	0.0021	0.0022	0.0028
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0024	0.0026	0.0045	0.0039	0.0084
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	0.0009	0.0009	0.001	0.001	0.001
Perfluoroheptanoic acid	µg/L	0.0004	0.002	0.002	0.002	0.002	0.0040
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0006	0.0006	0.0008	0.0009	0.0008
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		98	114	102	103	108
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		96	102	107	100	104
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		78	105	104	98	99
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		84	99	95	93	92
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		58	55	54	57	51
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		81	75	82	79	79

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		82	97	102	101	99
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		109	86	83	80	81
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		88	97	98	94	95
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		92	102	93	94	92
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		91	106	101	97	95
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		60	71	67	70	68
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		45	49	48	52	48
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		42	39	36	39	37
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		47	49	49	53	47
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		85	115	130	117	117
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		80	130	132	120	116
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		57	85	82	82	79
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		49	62	61	64	61
Extracted ISTD d <sub>3</sub> N MeFOSA	%		42	36	36	35	35
Extracted ISTD d <sub>5</sub> N EtFOSA	%		49	28	28	30	28
Extracted ISTD d <sub>7</sub> N MeFOSE	%		48	47	46	46	49
Extracted ISTD d <sub>9</sub> N EtFOSE	%		46	45	46	50	49
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		37	62	60	60	59
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		36	53	53	59	51
Total Positive PFHxS & PFOS	µg/L	0.0002	0.0044	0.0046	0.0066	0.0061	0.011
Total Positive PFOS & PFOA	µg/L	0.0002	0.0030	0.0032	0.0053	0.0048	0.0092
Total Positive PFAS	µg/L	0.0002	0.0079	0.0085	0.011	0.010	0.018

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Date analysed	-		14/12/2020	14/12/2020	14/12/2020	14/12/2020	14/12/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	0.0024	0.0022	0.0021	0.0020	0.0022
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0042	0.0038	0.0034	0.0047	0.0038
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	0.001	0.001	0.001	0.001	0.001
Perfluoroheptanoic acid	µg/L	0.0004	0.003	0.002	0.002	0.003	0.003
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0008	0.0009	0.0007	0.0007	0.0009
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		105	106	107	106	109
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		102	104	110	105	107
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		101	97	100	94	98
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		92	87	90	88	93
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		54	54	55	50	54
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		78	76	82	69	74

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		100	96	103	93	98
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		82	78	85	77	84
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		96	92	99	89	93
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		94	90	92	87	90
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		92	91	93	89	94
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		59	69	68	61	67
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		49	53	53	49	50
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		37	41	40	43	39
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		45	44	48	37	50
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		121	113	119	103	119
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		122	114	114	103	113
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		74	79	72	71	87
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		60	61	62	58	63
Extracted ISTD d <sub>3</sub> N MeFOSA	%		36	36	34	34	38
Extracted ISTD d <sub>5</sub> N EtFOSA	%		27	28	28	29	31
Extracted ISTD d <sub>7</sub> N MeFOSE	%		50	51	49	51	55
Extracted ISTD d <sub>9</sub> N EtFOSE	%		48	52	49	48	51
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		60	61	61	63	66
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		53	57	56	60	61
Total Positive PFHxS & PFOS	µg/L	0.0002	0.0066	0.0060	0.0055	0.0067	0.0060
Total Positive PFOS & PFOA	µg/L	0.0002	0.0050	0.0047	0.0041	0.0054	0.0047
Total Positive PFAS	µg/L	0.0002	0.012	0.010	0.0097	0.012	0.011

PFAS in water TRACE Extended					
Our Reference	UNITS	PQL	254153-11	254153-12	254153-13
Your Reference			WR1	WB1	WTB1
Date Sampled			03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water
Date prepared	-		14/12/2020	14/12/2020	14/12/2020
Date analysed	-		14/12/2020	14/12/2020	14/12/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	0.0008	<0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	0.0046	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.016	<0.0002	<0.0002
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	0.0009	<0.0004	<0.0004
Perfluoroheptanoic acid	µg/L	0.0004	0.0004	<0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0008	<0.0002	<0.0002
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	0.0006	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		111	96	103
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		98	95	97
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		98	81	81
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		94	87	87
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		81	67	55
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		92	101	103

PFAS in water TRACE Extended					
Our Reference	UNITS	PQL	254153-11	254153-12	254153-13
Your Reference			WR1	WB1	WTB1
Date Sampled			03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		98	86	87
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		88	114	117
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		96	88	92
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		101	96	94
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		104	96	93
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		100	73	63
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		81	58	50
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		52	51	42
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		54	23	28
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		106	95	103
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		128	95	102
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		114	75	62
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		70	61	54
Extracted ISTD d <sub>3</sub> N MeFOSA	%		44	41	36
Extracted ISTD d <sub>5</sub> N EtFOSA	%		38	42	38
Extracted ISTD d <sub>7</sub> N MeFOSE	%		64	60	53
Extracted ISTD d <sub>9</sub> N EtFOSE	%		61	54	51
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		66	57	50
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		72	47	42
Total Positive PFHxS & PFOS	µg/L	0.0002	0.021	<0.0002	<0.0002
Total Positive PFOS & PFOA	µg/L	0.0002	0.017	<0.0002	<0.0002
Total Positive PFAS	µg/L	0.0002	0.024	<0.0002	<0.0002

<b>Chlorophyll a &amp; Phaeophytin a</b>							
Our Reference	UNITS	PQL	254153-1	254153-2	254153-3	254153-4	254153-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	1.4	1.1	2.2	1.7	1.3
Phaeophytin a	µg/L	0.2	0.5	0.4	0.6	0.8	1.1

<b>Chlorophyll a &amp; Phaeophytin a</b>							
Our Reference	UNITS	PQL	254153-6	254153-7	254153-8	254153-9	254153-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			03/12/2020	03/12/2020	03/12/2020	03/12/2020	03/12/2020
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	1.6	1.6	1.7	1.3	1.8
Phaeophytin a	µg/L	0.2	0.6	0.6	0.6	0.6	0.6

Method ID	Methodology Summary
Ext-058	Analysed by The Marine and Freshwater Research Laboratory, accreditation number 10603
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition, Method 2320-B. Soils reported from a 1:5 water extract unless otherwise specified.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-022	Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130 B.
INORG-040	Ion Balance Calculation: Cations in water by ICP-OES; Anions in water by IC; Alkalinity in water by Titration using APHA methods.
INORG-051	Determination of sulphide by titration and/or colourimetric determination. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
INORG-055	NOx - determined colourimetrically. Soils are analysed from a water extract.
INORG-057	Ammonia by colourimetric analysis based on APHA latest edition 4500-NH3 F.
INORG-060	Phosphate- determined colourimetrically. Soils are analysed from a water extract.
INORG-060	Total Phosphorus by colourimetric analysis based on APHA latest edition 4500-P J.
INORG-081	Anions - a range of anions are determined by Ion Chromatography based on APHA latest edition Method 4110-B. Soils and other sample types reported from a water extract unless otherwise specified (standard soil extract ratio 1:5).
INORG-110	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Dissolved/Total Carbon and Dissolved/Total Organic and Inorganic Carbon by high temperature catalytic combustion with NDIR
METALS-008	Hardness calculated from Calcium and Magnesium as per APHA latest edition 2340B.
METALS-020	Determination of various metals by ICP-AES.
METALS-021	Determination of Mercury by Cold Vapour AAS.
METALS-022	For urine samples total Mercury is determined, however, mercury in urine is almost entirely in the inorganic form (CDC). Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM draft B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-029	<p>Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.</p> <p>Analysis is undertaken with LC-MS/MS.</p> <p>PFAS results include the sum of branched and linear isomers where applicable.</p> <p>Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.</p> <p>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.</p>

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2	
Date prepared	-			04/12/2020	1	04/12/2020	04/12/2020		04/12/2020	04/12/2020	
Date analysed	-			04/12/2020	1	04/12/2020	04/12/2020		04/12/2020	04/12/2020	
Total Dissolved Solids (grav)	mg/L	5	INORG-018	<5	1	37000	37000	0	100	[NT]	
Total Suspended Solids	mg/L	5	INORG-019	<5	1	<5	<5	0	96	[NT]	
Turbidity	NTU	0.1	INORG-022	<0.1	1	0.8	0.8	0	113	[NT]	
Dissolved Organic Carbon	mg/L	1	INORG-110	<1	1	3	3	0	103	101	
Sulphide in water*	mg/L	0.5	INORG-051	<0.5	1	<0.5	[NT]		96	[NT]	
Fluoride	mg/L	0.1	INORG-081	<0.1	1	<5	<5	0	91	[NT]	

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date prepared	-			[NT]	11	04/12/2020	04/12/2020		[NT]	[NT]	
Date analysed	-			[NT]	11	04/12/2020	04/12/2020		[NT]	[NT]	
Turbidity	NTU	0.1	INORG-022	[NT]	11	0.5	0.5	0	[NT]	[NT]	

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: Ionic Balance					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			04/12/2020	1	04/12/2020	04/12/2020		04/12/2020	[NT]
Date analysed	-			04/12/2020	1	04/12/2020	04/12/2020		04/12/2020	[NT]
Calcium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	410	410	0	102	[NT]
Potassium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	390	390	0	103	[NT]
Magnesium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	1300	1300	0	102	[NT]
Sodium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	12000	12000	0	101	[NT]
Bicarbonate HCO <sub>3</sub> as CaCO <sub>3</sub>	mg/L	5	INORG-006	<5	1	120	[NT]		99	[NT]
Carbonate CO <sub>3</sub> <sup>2-</sup> as CaCO <sub>3</sub>	mg/L	5	INORG-006	<5	1	<5	[NT]		99	[NT]
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	INORG-006	<5	1	120	[NT]		99	[NT]
Chloride	mg/L	1	INORG-081	<1	1	19000	19000	0	90	[NT]
Sulphate	mg/L	1	INORG-081	<1	1	2700	2700	0	92	[NT]
Hardness as CaCO <sub>3</sub>	mg/L	3	METALS-008	<3	1	6400	6400	0	[NT]	[NT]

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: Nutrients in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2
Date prepared	-			04/12/2020	1	04/12/2020	04/12/2020		04/12/2020	04/12/2020
Date analysed	-			04/12/2020	1	04/12/2020	04/12/2020		04/12/2020	04/12/2020
Total Nitrogen	mg/L	0.1	INORG-110	<0.1	1	0.6	0.6	0	114	91
NOx as N	mg/L	0.005	INORG-055	<0.005	1	0.005	<0.005	0	105	104
Ammonia as N	mg/L	0.005	INORG-057	<0.005	1	<0.005	<0.005	0	95	117
Total Phosphorus	mg/L	0.01	INORG-060	<0.01	1	0.02	0.02	0	94	97
Phosphate as P	mg/L	0.005	INORG-060	<0.005	1	<0.005	<0.005	0	103	125

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: Total Metals in water						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2	
Date digested	-			07/12/2020	1	08/12/2020	08/12/2020		07/12/2020	07/12/2020	
Date analysed	-			07/12/2020	1	08/12/2020	08/12/2020		07/12/2020	07/12/2020	
Aluminium-Total	mg/L	0.01	METALS-022	<0.01	1	0.03	0.03	0	96	106	
Iron-Total	mg/L	0.01	METALS-022	<0.01	1	0.03	0.04	29	109	117	

QUALITY CONTROL: Total Metals in water						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date digested	-			[NT]	11	08/12/2020	08/12/2020		[NT]	[NT]	
Date analysed	-			[NT]	11	08/12/2020	08/12/2020		[NT]	[NT]	
Aluminium-Total	mg/L	0.01	METALS-022	[NT]	11	<0.01	0.01	0	[NT]	[NT]	
Iron-Total	mg/L	0.01	METALS-022	[NT]	11	0.02	0.02	0	[NT]	[NT]	

QUALITY CONTROL: Dissolved Metals in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2
Date prepared	-			07/12/2020	1	08/12/2020	08/12/2020		07/12/2020	07/12/2020
Date analysed	-			07/12/2020	1	08/12/2020	08/12/2020		07/12/2020	07/12/2020
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	<0.00005	1	0.0001	<0.0001	0	101	90
Aluminium-Dissolved	mg/L	0.01	METALS-022	<0.01	1	0.03	0.03	0	86	114
Arsenic-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	99	104
Cadmium-Dissolved	mg/L	0.0001	METALS-022	<0.0001	1	<0.0002	<0.0002	0	96	97
Cobalt-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	98	93
Chromium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	98	100
Copper-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	97	88
Iron-Dissolved	mg/L	0.01	METALS-022	<0.01	1	<0.02	<0.02	0	115	115
Mercury-Dissolved	mg/L	0.00005	METALS-021	<0.00005	1	<0.00005	<0.00005	0	100	86
Manganese-Dissolved	mg/L	0.005	METALS-022	<0.005	1	0.011	0.011	0	92	95
Molybdenum-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.012	0.012	0	100	109
Nickel-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	98	90
Lead-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	97	80
Antimony-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	103	91
Selenium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	106	98
Zinc-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.006	0.005	18	96	100
Silicon - Dissolved	mg/L	0.1	METALS-020	<0.1	1	<1	<1	0	104	[NT]

QUALITY CONTROL: Dissolved Metals in Water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	07/12/2020	07/12/2020		[NT]	[NT]
Date analysed	-			[NT]	11	07/12/2020	07/12/2020		[NT]	[NT]
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	[NT]	11	<0.00005	<0.00005	0	[NT]	[NT]
Aluminium-Dissolved	mg/L	0.01	METALS-022	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Arsenic-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Cadmium-Dissolved	mg/L	0.0001	METALS-022	[NT]	11	<0.0001	<0.0001	0	[NT]	[NT]
Cobalt-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Chromium-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Copper-Dissolved	mg/L	0.001	METALS-022	[NT]	11	0.008	0.008	0	[NT]	[NT]
Iron-Dissolved	mg/L	0.01	METALS-022	[NT]	11	0.01	0.01	0	[NT]	[NT]
Mercury-Dissolved	mg/L	0.00005	METALS-021	[NT]	11	<0.00005	<0.00005	0	[NT]	[NT]
Manganese-Dissolved	mg/L	0.005	METALS-022	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
Molybdenum-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Nickel-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Lead-Dissolved	mg/L	0.001	METALS-022	[NT]	11	0.021	0.021	0	[NT]	[NT]
Antimony-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Selenium-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Zinc-Dissolved	mg/L	0.001	METALS-022	[NT]	11	0.015	0.016	6	[NT]	[NT]
Silicon - Dissolved	mg/L	0.1	METALS-020	[NT]	11	<0.1	<0.1	0	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/MBTEXN in water							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date analysed	-			04/12/2020	[NT]	[NT]	[NT]	[NT]	04/12/2020	[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	92	[NT]
MTBE	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	90	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	106	[NT]
Surrogate toluene-d8	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	105	[NT]
Surrogate 4-BFB	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	101	[NT]

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: svTRH(C10-C40) in water							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2
Date extracted	-			07/12/2020	1	07/12/2020	07/12/2020		07/12/2020	07/12/2020
Date analysed	-			07/12/2020	1	07/12/2020	07/12/2020		07/12/2020	07/12/2020
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	Org-020	<50	1	<50	<50	0	88	83
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	86	74
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	87	82
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	Org-020	<50	1	<50	<50	0	89	80
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	87	76
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	Org-020	<100	1	<100	<100	0	99	83
Surrogate o-Terphenyl	%		Org-020	92	1	91	83	9	105	82

QUALITY CONTROL: PAHs in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/12/2020	[NT]	[NT]	[NT]	[NT]	04/12/2020	[NT]
Date analysed	-			04/12/2020	[NT]	[NT]	[NT]	[NT]	04/12/2020	[NT]
Naphthalene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-D <sub>14</sub>	%		Org-022/025	80	[NT]	[NT]	[NT]	[NT]	92	[NT]

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: Low Level OCP in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/12/2020	[NT]	[NT]	[NT]	[NT]	04/12/2020	[NT]
Date analysed	-			04/12/2020	[NT]	[NT]	[NT]	[NT]	04/12/2020	[NT]
Hexachlorobenzene (HCB)	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-BHC	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	82	[NT]
Lindane (g-BHC)	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
b-BHC	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	87	[NT]
Heptachlor	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	76	[NT]
d-BHC	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	81	[NT]
Heptachlor Epoxide	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	79	[NT]
g-Chlordane	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-Chlordane	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-Endosulfan	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	96	[NT]
Dieldrin	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endrin	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	89	[NT]
b-Endosulfan	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.006	Org-022/025	<0.006	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	79	[NT]
Methoxychlor	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022/025	70	[NT]	[NT]	[NT]	[NT]	79	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2
Date prepared	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Date analysed	-			14/12/2020	1	14/12/2020	14/12/2020		14/12/2020	14/12/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	109	112
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	103	95
Perfluorohexanesulfonic acid	µg/L	0.0002	Org-029	<0.0002	1	0.0020	0.0020	0	106	100
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	103	109
Perfluorooctanesulfonate PFOS	µg/L	0.0002	Org-029	<0.0002	1	0.0024	0.0026	8	109	120
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	93	78
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	105	109
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	107	105
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	1	0.0009	0.001	11	95	93
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	1	0.002	0.002	0	109	101
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	1	0.0006	0.0007	15	110	115
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	90	93
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	95	98
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	99	123
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	101	126
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	75	143
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	103	94
4:2 FTS	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	107	108
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	106	114
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	101	114
10:2 FTS	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	124	114
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	96	89
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	117	146
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	110	138
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	99	144
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	90	106
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	127	159
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	104	128
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		Org-029	98	1	98	99	1	104	109
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		Org-029	100	1	96	95	1	102	104
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		Org-029	93	1	78	84	7	93	93

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		Org-029	83	1	84	89	6	83	91
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		Org-029	65	1	58	59	2	65	52
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		Org-029	92	1	81	87	7	92	78
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		Org-029	93	1	82	87	6	93	99
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		Org-029	86	1	109	116	6	86	84
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		Org-029	90	1	88	95	8	90	95
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		Org-029	88	1	92	100	8	88	92
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		Org-029	96	1	91	93	2	96	96
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		Org-029	77	1	60	61	2	77	68
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		Org-029	70	1	45	46	2	70	41
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		Org-029	58	1	42	38	10	58	36
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		Org-029	32	1	47	43	9	32	46
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		Org-029	96	1	85	94	10	96	110
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		Org-029	116	1	80	94	16	116	112
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		Org-029	86	1	57	56	2	86	75
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		Org-029	72	1	49	52	6	72	57
Extracted ISTD d <sub>3</sub> N MeFOSA	%		Org-029	37	1	42	40	5	37	31
Extracted ISTD d <sub>5</sub> N EtFOSA	%		Org-029	32	1	49	46	6	32	25
Extracted ISTD d <sub>7</sub> N MeFOSE	%		Org-029	67	1	48	47	2	67	44
Extracted ISTD d <sub>9</sub> N EtFOSE	%		Org-029	63	1	46	44	4	63	45

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	254153-2	
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		Org-029	67	1	37	39	5	67	52	
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		Org-029	74	1	36	38	5	74	48	

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	14/12/2020	14/12/2020		[NT]	[NT]
Date analysed	-			[NT]	11	14/12/2020	14/12/2020		[NT]	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	[NT]	11	0.0008	<0.0004	67	[NT]	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Perfluorohexanesulfonic acid	µg/L	0.0002	Org-029	[NT]	11	0.0046	0.001	129	[NT]	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Perfluorooctanesulfonate PFOS	µg/L	0.0002	Org-029	[NT]	11	0.016	0.0040	120	[NT]	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	[NT]	11	0.0009	0.0005	57	[NT]	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	[NT]	11	0.0004	0.0004	0	[NT]	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	[NT]	11	0.0008	0.0006	29	[NT]	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
4:2 FTS	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
6:2 FTS	µg/L	0.0004	Org-029	[NT]	11	0.0006	0.0007	15	[NT]	[NT]
8:2 FTS	µg/L	0.0004	Org-029	[NT]	11	<0.0004	<0.0004	0	[NT]	[NT]
10:2 FTS	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	Org-029	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	Org-029	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	Org-029	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	Org-029	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		Org-029	[NT]	11	111	109	2	[NT]	[NT]
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		Org-029	[NT]	11	98	102	4	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		Org-029	[NT]	11	98	97	1	[NT]	[NT]

**Client Reference: EEC20078.004 - Fremantle Traffic Bridge**

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		Org-029	[NT]	11	94	91	3	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		Org-029	[NT]	11	81	76	6	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		Org-029	[NT]	11	92	89	3	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		Org-029	[NT]	11	98	95	3	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		Org-029	[NT]	11	88	87	1	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		Org-029	[NT]	11	96	91	5	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		Org-029	[NT]	11	101	93	8	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		Org-029	[NT]	11	104	106	2	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		Org-029	[NT]	11	100	92	8	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		Org-029	[NT]	11	81	72	12	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		Org-029	[NT]	11	52	49	6	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		Org-029	[NT]	11	54	39	32	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		Org-029	[NT]	11	106	100	6	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		Org-029	[NT]	11	128	116	10	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		Org-029	[NT]	11	114	98	15	[NT]	[NT]
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		Org-029	[NT]	11	70	64	9	[NT]	[NT]
Extracted ISTD d <sub>3</sub> N MeFOSA	%		Org-029	[NT]	11	44	43	2	[NT]	[NT]
Extracted ISTD d <sub>5</sub> N EtFOSA	%		Org-029	[NT]	11	38	35	8	[NT]	[NT]
Extracted ISTD d <sub>7</sub> N MeFOSE	%		Org-029	[NT]	11	64	56	13	[NT]	[NT]
Extracted ISTD d <sub>9</sub> N EtFOSE	%		Org-029	[NT]	11	61	55	10	[NT]	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		Org-029	[NT]	11	66	64	3	[NT]	[NT]
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		Org-029	[NT]	11	72	64	12	[NT]	[NT]

## Result Definitions

<b>NT</b>	Not tested
<b>NA</b>	Test not required
<b>INS</b>	Insufficient sample for this test
<b>PQL</b>	Practical Quantitation Limit
<	Less than
>	Greater than
<b>RPD</b>	Relative Percent Difference
<b>LCS</b>	Laboratory Control Sample
<b>NS</b>	Not specified
<b>NEPM</b>	National Environmental Protection Measure
<b>NR</b>	Not Reported

## Quality Control Definitions

<b>Blank</b>	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
<b>Duplicate</b>	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
<b>Matrix Spike</b>	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
<b>LCS (Laboratory Control Sample)</b>	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
<b>Surrogate Spike</b>	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOP Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

## **Report Comments**

#1-10: TRHC6-C10/BTEX: PQL has been raised as the sample/s were foamy and required dilution.

Note: Some results have raised pqls. In these cases the sample's high TDS required the sample to be diluted prior to analysis.

PFAS analysis conducted by Envirolab Services. Report 257713.

257713-2 Matrix spike recovery for MeFOSA (146%), MeFOSA (144%) and EtFOSAA (159%) are outside the global acceptance criteria (60-140%). However an acceptable recovery was obtained for the LCS.

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

PFAS in water TRACE Extended - PFTeDA, MeFOSA and EtFOSAA Extracted Internal Standard is outside of global acceptance criteria (50-150%) for (LCS and/or MB) but within analyte specific acceptance criteria.

Chlorophyll a and Phaeophytin a analysis conducted by Marine and Freshwater Research Laboratory. Report MPL20-30.



## DATA QUALITY ASSESSMENT SUMMARY

### Report Details

Envirolab Report Reference	<u>254153</u>
Client ID	RPS Australia West Pty Ltd
Project Reference	EEC20078.004 - Fremantle Traffic Bridge
Date Issued	17/12/2020

### QC DATA

All laboratory QC data was within the Envirolab Group's specifications.

### HOLDING TIME COMPLIANCE EVALUATION

All preservation / holding times (based on AS/ASPH/ISO/NEPM/USEPA reference documents and standards) are compliant except:

### Holding Time Exceedances

Analysis	Sample No	Date Sampled	Date Extracted	Date Analysed	Accepted
<b>Chlorophyll a &amp; Phaeophytin a</b>					
Chlorophyll a	254153-1	03/12/2020			##
Phaeophytin a	254153-1	03/12/2020			##
Chlorophyll a	254153-2	03/12/2020			##
Phaeophytin a	254153-2	03/12/2020			##
Chlorophyll a	254153-3	03/12/2020			##
Phaeophytin a	254153-3	03/12/2020			##
Chlorophyll a	254153-4	03/12/2020			##
Phaeophytin a	254153-4	03/12/2020			##
Chlorophyll a	254153-5	03/12/2020			##
Phaeophytin a	254153-5	03/12/2020			##
Chlorophyll a	254153-6	03/12/2020			##
Phaeophytin a	254153-6	03/12/2020			##
Chlorophyll a	254153-7	03/12/2020			##
Phaeophytin a	254153-7	03/12/2020			##
Chlorophyll a	254153-8	03/12/2020			##
Phaeophytin a	254153-8	03/12/2020			##
Chlorophyll a	254153-9	03/12/2020			##
Phaeophytin a	254153-9	03/12/2020			##
Chlorophyll a	254153-10	03/12/2020			##
Phaeophytin a	254153-10	03/12/2020			##

### Holding Table Comments

## No Extract or Analysed Dates were provided. Holding Times cannot be calculated.



Certain analyses have had their recommended technical holding times elongated by filtering and/or freezing on receipt at the laboratory (e.g. BOD, chlorophyll/Pheophytin, nutrients and acid sulphate soil tests).

### **COMPLIANCE TO QC FREQUENCY (NEPM)**

Internal laboratory QC rate complies with NEPM requirements (LCS/MB/MS 1 in 20, Duplicates 1 in 10 samples). Note, samples are batched together with other sample consignments in order to assign QC sample frequency.

#### **QC Evaluation**

Duplicate(s) was performed as per NEPM frequency	✓
Laboratory Control Sample(s) were analysed with the samples received	✓
A Method Blank was performed with the samples received	✓
Matrix spike(s) was performed as per NEPM frequency (Not Applicable for Air samples)	✓

Refer to Certificate of Analysis for all Quality Control data.

# MEMO

Date: 12 January 2021  
Regarding: Surface water quality – Event 5 summary

## Appendix C Surface water sampling logs

# MULTI-PARAMETER METER CALIBRATION RECORD



Project number: EEC20078.004

**Site location:** Fremantle Ports

Multi-parameter meter details		Solution	Batch / lot	Expiry date	Zobell B solution, for Ag/AgCl saturated KCl electrode				Calibration notes:
Manufacturer:	YSI	pH 4 buffer			T °C	mV	T °C	mV	D.O probe was difficult to calibrate. Results may be overestimations.
Model number:		pH 7 buffer			5	273	20	240	
Serial number:		EC buffer			10	262	25	229	
		Zobell B	---	---	15	251	30	218	

## **SURFACE WATER SAMPLING LOG**



Project number: EEC20078.004	Sampling method:	Nisken Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter	Yes
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky):	Yes
Sampling location: WS1	QAQC samples:	---
Scientist: Zak Langtry	Tide (High/Low):	Low
Date: 03/12/2020	Tide Height (m):	0.44 - 1.10
Weather: Fine / Overcast	Water Column (m):	4

### **Additional details / comments**

**Other:** Minor general boat traffic

## **SURFACE WATER SAMPLING LOG**



Project number: EEC20078.004	Sampling method:	Nisken Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter	Yes
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky):	Yes
Sampling location: WS2	QAQC samples:	WZ1 taken at WS2-S
Scientist: Zak Langtry	Tide (High/Low):	Low
Date: 03/12/2020	Tide Height (m):	0.44 - 1.10
Weather: Fine / Overcast	Water Column (m):	4.45

**Additional details / comments:**

**Other:** Swing and rope ladder have been set up next to sampling location. Low general boat traffic during sampling.

## **SURFACE WATER SAMPLING LOG**



Project number: EEC20078.004	Sampling method:	Nisken Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter	Yes
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky):	Yes
Sampling location: WS3	QAQC samples:	---
Scientist: Zak Langtry	Tide (High/Low):	Low
Date: 03/12/2020	Tide Height (m):	0.44 - 1.10
Weather: Fine / Overcast	Water Colomn (m):	0.1

**Additional details / comments:**

**Other:** Minor general boat traffic

## **SURFACE WATER SAMPLING LOG**



Project number: EEC20078.004	Sampling method:	Nisken Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter	Yes
Sampling area: Fremantle Port - Jetty	Sample preservation (ice/esky):	Yes
Sampling location: WS4	QAQC samples:	---
Scientist: Zak Langtry	Tide (High/Low):	Low
Date: 03/12/2020	Tide Height (m):	0.44 - 1.10
Weather: Fine / Overcast	Water Column (m):	3.9

**Additional details / comments:**

**Other:** Some general boat traffic. Two pilot boats on small craft jetty.

## **SURFACE WATER SAMPLING LOG**



Project number: EEC20078.004	Sampling method:	Nisken Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter	Yes
Sampling area: Fremantle Port - Jetty	Sample preservation (ice/esky):	Yes
Sampling location: WS5	QAQC samples:	---
Scientist: Zak Langtry	Tide (High/Low):	Low
Date: 03/12/2020	Tide Height (m):	0.44 - 1.10
Weather: Fine / Overcast	Water Column (m):	7.05

### **Additional details / comments**

**Other:** No boat traffic during sampling