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GROUNDWATER MONITORING

SCONE WASTE FACILITY
NOBLET ROAD
SCONE NSW

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ABBREVIATIONS

The following is a list of common abbreviations used in the Contamination Sector within environmental reports.

B(a)P	Benzo(a)Pyrene
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
CLM	Contaminated Land Management
CSM	Conceptual Site Model
DA	Development Application
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	Environment Protection Authority (NSW)
EPL	Environmental Protection License
ESL	Ecological Screening Level
LOR	Limit of Reporting
LOT	Allotment
MW	Monitoring Well
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environmental and Heritage
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCOC	Potential Contaminant of Concern
PCB	Polychlorinated Biphenyls
QA/QC	Quality Assurance and Quality Control
SAC	Site Acceptance Criteria
SEPP	State Environmental Planning Policy
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UHSC	Upper Hunter Shire Council
VOC	Volatile Organic Compounds
WHS	Work Health Safety

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1.0 INTRODUCTION

General

Under the requirements of the NSW EPA Environmental Protection Licence (EPL) 5863, Upper Hunter Shire Council (UHSC) is required to conduct quarterly and annual groundwater monitoring of the Scone Waste Facility located on Noblet Road, Scone, NSW, 2337.

The Quarterly Groundwater Monitoring Report provides a snapshot of the groundwater conditions at the Site in relation to the current Site Criteria and satisfies the groundwater monitoring requirements of the EPL.

The Scone Waste Facility is an active landfill, it has the potential to be a polluting activity or to adversely impact the groundwater within the immediate vicinity and down hydraulic gradient of the site if there was a leak within the landfill.

Engage Environmental Services (Engage) was commissioned by UHSC to undertake this quarterly round of groundwater monitoring at the site. The quarterly groundwater monitoring was carried out on 12th December 2019.

This report has been prepared utilising information supplied by the client, publicly accessible information, information obtained as part of the onsite fieldwork and analysis, information from Government bodies and from experience, knowledge, and current industry practice.

Briefing

The briefing provided by Upper Hunter Shire Council and contained within EPL 5863 indicates that quarterly groundwater monitoring is required at five locations on the site, monitoring wells A to E (MWA-MWE). Monitoring Well D is located within the landfill and the monitoring well accesses the perched water table (leachate) within the landfill. Comparisons against established criteria and historical data allow for trending of data. Trending of data can highlight seasonal variations, increases in analyte concentrations, decreases in analyte concentrations and fluctuations within the dataset. Over a time period the dataset can reveal increasing/decreasing trends highlighting potential site issues.

Refer to **Figure 1:** *Site Layout with Sample Locations*

2.0 SITE CRITERIA AND SAMPLING FREQUENCY

The groundwater analytical suite and sampling frequency were provided by UHSC and the EPL. Each of the wells have the same sampling regime and analytical suite for sample analysis. The site criterion are sourced from the Australian and New Zealand guidelines for fresh and marine water quality (ANZW 2018) 95% trigger values and National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 2013, unless otherwise stated.

Table 1: Analytes, Site Criteria and Sampling Frequency for Groundwater Monitoring Wells - Quarterly.

	Analytes/Pollutant	Units	Site Criteria NEPM 2013 and ANZW 2018 Fresh Water 95%	Sampling Frequency
IONS	**Calcium**	mg/L	NA	Quarterly
	Alkalinity (total)	mg/L	NA	Quarterly
	Chloride	mg/L	NA	Quarterly
	Fluoride	mg/L	NA	Quarterly
	Potassium[1]	mg/L	410	Quarterly
	Magnesium	mg/L	NA	Quarterly
	Sulphate	mg/L	NA	Quarterly
HEAVY METALS	**Iron**	mg/L	0.3	Quarterly
	Manganese	mg/L	1.9	Quarterly
	Arsenic III & V	mg/L	0.024 (III), 0.013 (V)	Yearly
	Aluminium	mg/L	0.055 (pH> 6.5)	Yearly
	Barium	mg/L	NA	Yearly
	Cadmium	mg/L	0.0002	Yearly
	Cobalt	mg/L	0.001[M]	Yearly
	Copper	mg/L	0.0014	Yearly
	Chromium VI	mg/L	0.001[D]	Yearly
	Chromium III	mg/L	27[M]	Yearly
	Lead	mg/L	0.0034	Yearly
	Mercury	mg/L	0.0006	Yearly
	Zinc	mg/L	0.008[D]	Yearly
PHENO	**Total phenolics**	mg/L	0.32	Quarterly
OCP	**Organochlorine Pesticide**[3] **(OCP)**	mg/L	0.00001	Quarterly
OPP	**OPPs**	mg/L	0.006[C]	Yearly

PCB	**PCBs**	mg/L	0.00001[A]	Yearly
Hydrocarbons	**TRH**	mg/L	0.26[I]	Yearly
	Benzene	mg/L	0.95	Yearly
	Toluene	mg/L	0.18[L]	Yearly
	Ethylbenzene	mg/L	0.3[P]	Yearly
	Xylene (o+p)	mg/l	0.35	Yearly
	PAHs	mg/L	0.016[B]	Yearly
CVCs/ VOCCs	**- Total**	mg/L	NA	Yearly
	Tetrachlorethene (TCE)	mg/L	NA	Yearly
	1,1,2-Trichloroethan e (TCA)	mg/L	6.5	Yearly
	Tetrachloroethene (PCE)	mg/L	0.05	Yearly
	1, 1-Dichloroethene	mg/L	0.03	Yearly
	Vinyl Chloride	mg/L	0.0003	Yearly
MISC. INORGANICS	**pH**	pH	6.5 – 8	Quarterly
	Sodium	mg/L	NA	Quarterly
	Ammonia[2]	mg/L	0.9	Quarterly
	Nitrate	mg/L	50	Quarterly
	Total organic carbon	mg/L	4	Quarterly
	Electrical conductivity (EC)	µS/cm	NA	Quarterly
	Total dissolved solids	mg/L	NA	Yearly
	Biochemical Oxygen Demand	mg/L	NA	Yearly
	Phosphate	mg/L	0.015[G]	Yearly

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.
2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.
3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

3.0 SAMPLING METHODOLOGY

Groundwater Sampling

The five well locations were identified on the site. The site map was cross-referenced to the markings on the monitoring wells to ensure the correct wells were being sampled. Purging and sampling of monitoring wells was conducted in accordance with the NEPM (NEPC, 2013) and the *Guidelines for the Assessment and Management of Groundwater Contamination* (NSW DECC, 2007).

Purging is the process of removing stagnant water from a well, immediately prior to sampling, causing its replacement by groundwater from the adjacent formation that is representative of actual aquifer conditions. In order to determine when a well has been adequately purged, the physical parameters (pH ± 0.1 unit, electrical conductivity ± 5%, temperature ± 0.20, reduction-oxidation (redox) ± 10%; and dissolved oxygen ± 10%.) are monitored while the groundwater is removed during purging.

The physical parameters were measured at regular intervals using a YSI Quatro Pro Plus Water Quality Meter. Stable conditions were indicated by monitoring for three consecutive readings of the physical parameters.

Collection of samples were direct into laboratory issued sampling containers for specific analytes. Samples were obtained using a disposable bailer. Care was taken so the bailer did not contact the sample container. All samples were collected and filled into the correct sample containers, a meniscus was formed on each sampling container prior to sealing to reduce or eliminate head space. The samples were placed immediately into a chilled esky to prevent the loss of potential volatile components.

Decontamination procedures between sampling events and sampling locations was undertaken. Sampling equipment was cleaned before and after sampling to prevent cross contamination. The cleaning procedure included:

- New nitrile disposable gloves for each well;
- Washing and wipe down with phosphate free laboratory grade detergent;
- Rinsing of brush before using brush on equipment;
- Using a brush on equipment if necessary;
- Rinsing with deionised water and wipe down with new wipe if necessary; and,
- New disposable bailer used for each well.

Appropriate decontamination procedures were appropriate during groundwater sampling.

4.0 RESULTS

The five groundwater monitoring wells were sampled during the June 2019 sampling event, results are detailed in **Tables 2** to **11**. Comparisons have been made to the previous round of monitoring (June 2019). Refer to **Attachment 1** – NATA Accredited Laboratory Results and **Attachment 3** – Data Log.

Table 2 – Quarterly Analytes Groundwater Results and Comparison (MWA)

	Analytes	Units	Site Criteria (mg/L)	MWA Mar 2019	MWA June 2019	MWA Sept 2019	MWA Dec 2019
IONS	Calcium	mg/L	NA	610	600	610	600
	Alkalinity (total)	mg/L	NA	510	520	490	510
	Chloride	mg/L	NA	6400	6500	6000	6900
	Fluoride	mg/L	NA	0.2	0.1	0.1	0.2
	Potassium[1]	mg/L	410	3.4	2.8	2.6	3.3
	Magnesium	mg/L	NA	1200	1100	1200	1100
	Sulphate	mg/L	NA	39	52	840	41
HEAVY METALS	Iron	mg/L	0.3	**1.8**	**0.64**	<LOR	<LOR
	Manganese	mg/L	1.9	0.07	0.038	0.009	0.007
Phenols	Total phenolics	mg/L	0.32	<LOR	<LOR	<LOR	<LOR
OCPs	OCP[3]	mg/L	0.00001	<LOR	<LOR	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.8	6.7	6.6	6.8
	Sodium	mg/L	NA	2500	2100	2700	1900
	Ammonia[2]	mg/L	0.9	0.02	<LOR	<LOR	<LOR
	Nitrate	mg/L	0.7	0.44	0.6	0.59	0.57
	Total Organic	mg/L	4	4	3	**6**	**5**
	EC	µS/cm	NA	20000	19000	18000	18000

Highlighted results exceed site criteria
<LOR = No Detection. Analyte is below the Laboratory LOR
1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.
2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.
3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 3 – Yearly Analytes Groundwater Results and Comparison Jan-Dec 2019 (MWA)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWA Jan 2019	MWA Jan 2019
Total dissolved solids	mg/L	NA	19000	13000
Biochemical Oxygen Demand (BOD)	mg/L	NA	ND	16
Phosphate	mg/L	0.015[G]	**0.082**	**0.064**
Arsenic III & V	mg/L	0.024 (III), 0.013 (V)	ND	0.001
Aluminium	mg/L	0.055 (pH> 6.5)	0.01	ND
Barium	mg/L	NA	0.59	0.57
Cadmium	mg/L	0.0002	ND	ND
Cobalt	mg/L	0.09[M]	ND	ND
Copper	mg/L	0.0014	ND	ND
Chromium VI	mg/L	0.001[D]	ND	ND
Chromium III	mg/L	27	0.002	0.002
Lead	mg/L	0.0034	ND	ND
Mercury	mg/L	0.0006	ND	0.00006
Zinc	mg/L	0.008[D]	0.007	**0.016**
TPH	mg/L	0.6[I]	ND	ND
Benzene	mg/L	0.95	ND	ND
Toluene	mg/L	0.18[L]	ND	ND
Ethylbenzene	mg/L	0.08[L]	ND	ND
Xylene				
CVCs/VOCCs:				
- **Total**	mg/L	NA	ND	ND
- **Tetrachlorethene (TCE)**	mg/L	NA	ND	ND
- **1,1,2-Trichloroethane (TCA)**	mg/L	6.500	ND	ND
- **Tetrachloroethene (PCE)**	mg/L	0.05[N]	ND	ND
- **1,1-Dichloroethene**	mg/L	0.03[P]	ND	ND
- **Vinyl Chloride**		0.0003[N]	ND	ND
PCBs	mg/L	0.00003[A]	ND	ND
PAHs	mg/L	0.016[B]	ND	ND
OPPs	mg/L	0.00002[C]	ND	ND

Table 4 – Quarterly Groundwater Results and Comparison (MWB)

	Analytes	Units	Site Criteria (mg/L)	MWB Mar 2019	MWB June 2019	MWB Sept 2019	MWB Dec 2019
IONS	Calcium	mg/L	NA	610	560	580	570
	Alkalinity (total)	mg/L	NA	430	420	400	410
	Chloride	mg/L	NA	5000	5200	4400	5200
	Fluoride	mg/L	NA	0.3	0.3	0.3	0.2
	Potassium[1]	mg/L	410	2.9	2.6	2.4	2.8
	Magnesium	mg/L	NA	770	740	720	690
	Sulphate	mg/L	NA	76	76	110	69
HEAVY METALS	Iron	mg/L	0.3	**2.1**	0.027	ND	ND
	Manganese	mg/L	1.9	0.067	ND	ND	0.007
OCP	OCP[3]	mg/L	0.00001	ND	ND	ND	ND
PHENOLS	Total phenolics	mg/L	0.32	ND	ND	ND	ND
MISC. INORGANICS	pH	pH	6.5 – 8	6.9	6.9	7	7
	Sodium	mg/L	NA	2000	1600	2100	1500
	Ammonia[2]	mg/L	0.9	ND	ND	0.017	0.15
	Nitrate	mg/L	0.7	**0.75**	**0.71**	**0.71**	**0.73**
	Total Organic Carbon	mg/L	4	**5**	**7**	**7**	**10**
	EC	µS/cm	NA	16000	15000	14000	14000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 5 – Yearly Analytes Groundwater Results and Comparison Jan-Dec 2019 (MWB)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWB Jan 2019	MWB Dec 2019
Total dissolved solids	mg/L	NA	10000	11000
Biochemical Oxygen Demand	mg/L	NA	ND	19
Phosphate	mg/L	0.015[G]	**0.035**	ND
Arsenic III & V	mg/L	0.024 (III), 0.013	0.001	0.001
Aluminium	mg/L	0.055 (pH> 6.5)	0.02	<0.010
Barium	mg/L	NA	0.47	0.42
Cadmium	mg/L	0.0002	ND	ND
Cobalt	mg/L	0.09[M]	ND	ND
Copper	mg/L	0.0014	ND	ND
Chromium VI	mg/L	0.001[D]	ND	ND
Chromium III	mg/L	27	0.002	0.003
Lead	mg/L	0.0034	ND	ND
Mercury	mg/L	0.0006	ND	ND
Zinc	mg/L	0.008[D]	0.005	0.023
TPH	mg/L	0.6[I]	ND	0.681
Benzene	mg/L	0.95	ND	ND
Toluene	mg/L	0.18[L]	ND	ND
Ethylbenzene	mg/L	0.08[L]	ND	ND
Xylene				
CVCs/VOCCs:				
- **Total**	mg/L	NA	ND	ND
- **Tetrachlorethene (TCE)**	mg/L	NA	ND	ND
- **1,1,2-Trichloroethane**	mg/L	6500 (1,1,2 TCA)	ND	ND
- **Tetrachloroethene (PCE)**	mg/L	0.05[N]	ND	ND
- **1,1-Dichloroethene**	mg/L	0.03[P]	ND	ND
- **Vinyl Chloride**		0.0003[N]	ND	ND
PCBs	mg/L	0.00003[A]	ND	ND
PAHs	mg/L	0.016[B]	ND	ND
OPPs	mg/L	0.00002[C]	ND	ND

Table 6 – Quarterly Groundwater Results and Comparison (MWC)

	Analytes	Units	Site Criteria (mg/L)	MWC Mar 2019	MWC June 2019	MWC Sept 2019	MWC Sept 2019
IONS	**Calcium**	mg/L	NA	370	370	380	400
	Alkalinity (total)	mg/L	NA	680	690	670	770
	Chloride	mg/L	NA	4000	4000	4200	4600
	Fluoride	mg/L	NA	0.3	0.3	0.2	0.3
	Potassium[1]	mg/L	410	2.2	2.1	1.8	2.4
	Magnesium	mg/L	NA	570	600	570	580
	Sulphate	mg/L	NA	150	160	170	140
HEAVY METALS	**Iron**	mg/L	0.3	**16**	**12**	ND	ND
	Manganese	mg/L	1.9	**10**	**5.8**	1.1	**5.4**
PHENOLS	**Total phenolics**	mg/L	0.32	ND	ND	ND	ND
OCP	**OCP[3]**	mg/L	0.00001	ND	ND	ND	ND
MISC. INORGANICS	**pH**	pH	6.5 – 8	6.8	6.8	7	6.9
	Sodium	mg/L	NA	2100	1700	2400	1700
	Ammonia[2]	mg/L	0.9	0.006	0.072	0.017	**1.2**
	Nitrate	mg/L	0.7	**2**	**2.2**	**1.8**	**1.7**
	Total Organic	mg/L	4	**11**	**80**	**18**	**13**
	EC	µS/c	NA	14000	13000	13000	13000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 7 – Yearly Analytes Groundwater Results and Comparison (MWC)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWC Jan 2019	MWC Dec 2019
Total dissolved solids	mg/L	NA	12000	9800
Biochemical Oxygen Demand	mg/L	NA	23	20
Phosphate	mg/L	0.015[G]	**0.081**	**0.02**
Arsenic III & V	mg/L	0.024	ND	ND
Aluminium	mg/L	0.055	0.01	ND
Barium	mg/L	NA	0.38	0.41
Cadmium	mg/L	0.0002	0.0001	ND
Cobalt	mg/L	0.09[M]	0.012	0.006
Copper	mg/L	0.0014	ND	ND
Chromium VI	mg/L	0.001[D]	ND	ND
Chromium (total)	mg/L	0.001	ND	ND
Lead	mg/L	0.0034	ND	ND
Mercury	mg/L	0.0006	ND	ND
Zinc	mg/L	0.008[D]	0.005	0.007
TPH	mg/L	0.6[I]	ND	ND
Benzene	mg/L	0.95	ND	ND
Toluene	mg/L	0.18[L]	ND	ND
Ethylbenzene	mg/L	0.08[L]	ND	ND
Xylene				
CVCs/VOCCs:				
- **Total**	mg/L	NA	ND	ND
- **Tetrachlorethene (TCE)**	mg/L	NA	ND	ND
- **1,1,2-Trichloroethane**	mg/L	6500	ND	ND
- **Tetrachloroethene**	mg/L	0.05[N]	ND	ND
- **1,1-Dichloroethene**	mg/L	0.03[P]	ND	ND
- **Vinyl Chloride**		0.0003[N]	ND	ND
PCBs	mg/L	0.00003[A]	ND	ND
PAHs	mg/L	0.016[B]	ND	ND
OPPs	mg/L	0.00002[C]	ND	ND

MWD is a leachate monitoring well which provides access to the perched landfill leachate water table. The Site Criteria for this particular well is only used as a general indicator of the leachate water quality.

Table 8 – Quarterly Groundwater Results and Comparison (MWD)

	Analytes	Units	Site Criteria (mg/L)			MWD (leachate) Sept 2019	MWD (leachate) Sept 2019
IONS	**Calcium**	mg/L	NA	72	79	94	130
	Alkalinity (total)	mg/L	NA	2700	2700	2500	2300
	Chloride	mg/L	NA	3000	2900	2700	3300
	Fluoride	mg/L	NA	0.3	0.3	0.3	0.3
	Potassium[1]	mg/L	410	210	190	220	220
	Magnesium	mg/L	NA	170	170	230	320
	Sulphate	mg/L	NA	46	40	29	30
HEAVY METALS	**Iron**	mg/L	0.3	**28**	**13**	**0.89**	**1.4**
	Manganese	mg/L	1.9	0.22	0.21	0.19	0.18
PHENOLS	**Total phenolics**	mg/L	0.32	ND	ND	ND	0.2
OCP	**OCP[3]**	mg/L	0.000	ND	ND	ND	ND
MISC. INORGANICS	**pH**	pH	6.5 – 8	7.7	7.6	7.8	7.7
	Sodium	mg/L	NA	2400	1900	2800	1900
	Ammonia[2]	mg/L	0.9	**290**	**290**	**300**	**340**
	Nitrate	mg/L	0.7	ND	ND	ND	ND
	Total Organic	mg/L	4	**410**	**170**	**280**	**330**
	EC	µS/c	NA	14000	13000	14000	13000

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs.

Table 9 – Yearly Analytes Groundwater Results and Comparison (MWD)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWD (leachate) Jan 2019	MWD (leachate) Dec 2019
Total dissolved solids	mg/L	NA	8500	8000
Biochemical Oxygen Demand	mg/L	NA	97	ND
Phosphate	mg/L	0.015[G]	0.83	0.61
Arsenic III & V	mg/L	0.024 (III),	0.013	0.012
Aluminium	mg/L	0.055 (pH> 6.5)	0.02	ND
Barium	mg/L	NA	1.1	1.1
Cadmium	mg/L	0.0002	ND	ND
Cobalt	mg/L	0.09[M]	0.027	0.026
Copper	mg/L	0.0014	ND	ND
Chromium VI	mg/L	0.001[D]	ND	ND
Chromium (total)	mg/L	27	0.033	0.036
Lead	mg/L	0.0034	ND	ND
Mercury	mg/L	0.0006	ND	ND
Zinc	mg/L	0.008[D]	0.012	0.015
TPH	mg/L	0.6[I]	**5.22**	**10.24**
Benzene	mg/L	0.95	ND	0.005
Toluene	mg/L	0.18[L]	ND	ND
Ethylbenzene	mg/L	0.08[L]	ND	0.013
Xylene				0.001
CVCs/VOCCs:				
- **Total**	mg/L	NA	0.025	ND
- **Tetrachlorethene (TCE)**	mg/L	NA	0.031	ND
- **1,1,2-Trichloroethane**	mg/L	6.5	ND	ND
- **Tetrachloroethene (PCE)**	mg/L	0.05[N]	ND	ND
- **1,1-Dichloroethene**	mg/L	0.03[P]	ND	ND
- **Vinyl Chloride**		0.0003[N]	ND	ND
PCBs	mg/L	0.00003[A]	ND	ND
PAHs	mg/L	0.016[B]	**0.017**	**0.057**
OPPs	mg/L	0.00002[C]	ND	ND

Table 10 –Quarterly Groundwater Results and Comparison (MWE)

	Analytes	Units	Threshold Criteria (mg/L)	MWE Mar 2019	MWE June 2019	MWE Sept 2019	MWE Dec 2019
IONS	**Calcium**	mg/	NA	53	53	65	70
	Alkalinity (total)	mg/	NA	1200	1200	630	1100
	Chloride	mg/	NA	270	310	420	530
	Fluoride	mg/	NA	0.6	0.6	0.6	0.6
	Potassium[1]	mg/	410	ND	0.5	2.1	0.6
	Magnesium	mg/	NA	59	57	69	73
	Sulphate	mg/	NA	110	130	130	140
HEAVY METALS	**Iron**	mg/	0.3	**10**	**9.4**	ND	ND
	Manganese	mg/	1.9	0.16	0.22	0.031	0.022
PHENOLS	**Total phenolics**	mg/	0.32	ND	ND	ND	ND
OCP	**OCP[3]**	mg/	0.00001	ND	ND	ND	ND
MISC. INORGANICS	**pH**	pH	6.5 – 8	7.4	7.2	7.6	7.3
	Sodium	mg/	NA	710	690	760	750
	Ammonia[2]	mg/	0.9	0.045	0.052	0.011	0.2
	Nitrate	mg/	0.7	ND	0.01	0.008	0.006
	Total Organic	mg/	4	**9**	**340**	**5**	**6**
	EC	µS/	NA	3100	3100	3500	3400

Highlighted results exceed site criteria

<LOR = No Detection. Analyte is below the Laboratory LOR

1 - World Health Organisation Guidelines for Drinking-water Quality 2009, Poor (acceptable) drinking water criteria.

2 - Criteria value may not protect key species from chronic toxicity, refer to ANZW 2018 for further guidance.

3 - A Trigger value for DDT is used in the absence of a criteria value for Total OCP. DDT has the lowest criteria of OCPs

Table 11 – Yearly Analytes Groundwater Results and Comparison (MWE)

Sampling Parameter	Units	Threshold Criteria (mg/L)	MWE Jan 2019	MWE Dec 2019
Total dissolved solids	mg/L	NA	2000	2100
Biochemical Oxygen Demand	mg/L	NA	6	16
Phosphate	mg/L	0.015[G]	**0.26**	0.1
Arsenic III & V	mg/L	0.024 (III), 0.013	0.005	0.004
Aluminium	mg/L	0.055 (pH> 6.5)	0.02	ND
Barium	mg/L	NA	0.039	0.048
Cadmium	mg/L	0.0002	0.0002	ND
Cobalt	mg/L	0.09[M]	0.004	0.004
Copper	mg/L	0.0014	0.001	ND
Chromium VI	mg/L	0.001[D]	ND	ND
Chromium (total)	mg/L	0.001	ND	ND
Lead	mg/L	0.0034	ND	ND
Mercury	mg/L	0.0006	ND	ND
Zinc	mg/L	0.008[D]	ND	0.004
TPH	mg/L	0.6[I]	ND	ND
Benzene	mg/L	0.95	ND	ND
Toluene	mg/L	0.18[L]	ND	ND
Ethylbenzene	mg/L	0.08[L]	ND	ND
Xylene			ND	ND
CVCs/VOCCs:				
- **Total**	mg/L	NA	ND	ND
- **Tetrachlorethene (TCE)**	mg/L	NA	ND	ND
- **1,1,2-Trichloroethane**	mg/L	6.5	ND	ND
- **Tetrachloroethene (PCE)**	mg/L	0.05[N]	ND	ND
- **1,1-Dichloroethene**	mg/L	0.03[P]	ND	ND
- **Vinyl Chloride**		0.0003[N]	ND	ND
PCBs	mg/L	0.00003[A]	ND	ND
PAHs	mg/L	0.016[B]	ND	ND
OPPs	mg/L	0.00002[C]	ND	ND

5.0 DISCUSSION

The inferred hydraulic gradient for the site is a down gradient towards Parsons Gully to the west. The location of the four wells surrounding the landfill place wells MWA, MWB and MWC down-hydraulic gradient and well MWE up-hydraulic gradient of the landfill. Well MWD is located within the perched landfill water table, this enables access to the leachate within the landfill.

The following is a summary of the significant results for June 2019 in relation to the Site Criteria. Key increasing trends, decreasing trends and exceedances of the threshold criteria are indicated.

MWA

MWA is located in the north west section of the site and is considered to be a down-hydraulic gradient monitoring well. There is farmland adjoining to the north and west of this location. The following changes have occurred in the water quality of MWA:

- Iron has decreased from 0.64mg/L (June 2019) to below the limit of reporting (September 2019);
- Total Organic Carbon has increased from 3mg/L (June 2019) to 6mg/L (September 2019 and now remains above the site criteria (4mg/L) at 5mg/L (December 2019); and,
- Sulphate has increased significantly decreased from 840mg/L to 81mg/L, no site criteria.
- Phosphate has decreased from 0.082mg/L to 0.064mg/L still above the criteria of 0.015mgL
- Zinc has increased from 0.007mg/L to 0.016mg/L, now above the site criteria of 0.008mg/L
- Mercury has had a detection in the December round of monitoring with a concentration of 0.00006mg/L which below the site criteria of 0.0006mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

MWB

MWB is located in the south west section of the site and is considered to be a down-hydraulic gradient monitoring well. There is farmland to the south and west of this location. The well has remained relatively stable. There are two exceedances of the site criteria:

- A concentration of TOC (10 mg/L) was reported in MWB exceeding the Site Criteria (4 mg/L). The TOC remains above the site criteria; and,

- Nitrate has remained relatively consistent with the previous sampling events with a concentration of 0.73mg/L, above the site criteria of 0.7mg/L.
- Hydrocarbons were detected in this well C6toC36 concentration was 0.681mg/L.
- Zinc concentration increased from 0.005mg/L to 0.023mg/L (December 2019) which is now above the site criteria of 0.008mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

MWC

MWC is located on the southern boundary of the site, down hydraulic gradient of the landfill and onsite dam. There is farmland to the south of well, along with a stand of vegetation immediately south of the well. This well has shown increasing turbidity with sedimentation in observations from the field. There were two concentrations which exceeded the site criteria. The following changes have occurred in the water quality of MWC:

- Concentration of Manganese has fluctuated throughout the last 4 sampling periods with 3 concentrations above site criteria (1.9mg/L) and one below site criteria (1.1mg/L). The concentration of the December sampling event (5.4mg/L) is similar to the September sampling event (5.8mg/L).
- A concentration of TOC (13 mg/L) was reported in MWC exceeding the Site Criteria (1.9 mg/L), which is a minor decrease from the previous reported concentration in September 2019 (18mg/L) and a large decrease from June 2019 (80 mg/L);
- A concentration of Nitrate (1.7 mg/L) was reported in MWC exceeding the Site Criteria (0.7 mg/L), which is a similar to the September 2019 (1.8mg/L) concentration;
- Ammonia has increased from 0.017mg/L to 1.2mg/L above the site criteria of 0.9mg/L; and,
- A concentration of Phosphate was detected at 0.02mg/L which is a significant decrease from January 2019 of 0.081mg/L, however is still above the site criteria of 0.015mg/L.

All other analytes reported concentrations consistent with previous monitoring data.

MWD

The water collected and analysed from well MWD is landfill leachate and as such the Site Criteria is not used to compare the results against. The results of MWD are used as an indicator of current

conditions within the landfill with trends and seasonal variations apparent. MWD is also to be used as a comparison to the external monitoring wells.

Well MWD was reported to contain no detection of Nitrate, giving no indication that the Nitrate in the affected wells is sourced from the landfill being as this well is located in the perched leachate water table. The Nitrate may be migrating onto the site from the farmland to the north through the local ground water.

The following changes occurred in the water quality of the landfill leachate well MWD:

- Ammonia has remained relatively steady at a concentration of 340 mg/L;
- Iron concentration has fluctuated throughout the year. The December concentration is 1.4mg/L.
- TOC has increased from 280 mg/L to a concentration of 330 mg/L
- Phosphate remains high after a small decrease to 0.61mg/L from 0.83mg/L in January 2019.
- Zinc remains evelated above site criteria with a concentration of 0.015mg/L
- There was an increase is TPH from 5.22mg/L to 10.24mg/L.
- Benezene was detected at a concentration of 0.005mg/L;
- Ethylbenzene was detected at a concentration of 0.013mg/L;
- Xylene was detected at a concentration of 0.001mg/L;
- PAHs were detected at a concentration of 0.057mg/L an increase from 0.017mg/L in January 2019.

MWE

MWE is located on the eastern boundary of the site and is considered to be an up-gradient groundwater monitoring well. There are a series of dams to the east of the well. The following changes have occurred in the water quality of MWC:

- A concentration of TOC (6 mg/L) was reported in MWE similar to the previous round of monitoring in September (5mg/L) and significantly decreasing from the June round of monitoring 340mg/l; and,
- -Iron has remained at a non-detection
- Phosphate is still above the site criteria (0.015mg/L), reducing from 0.26mg/L in January to 0.1mg/L in December.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the September 2019 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWA, MWB, MWC and MWE, and Nitrate in MWB and MWC. Refer to **Attachment 3** – Data Log.

Site and Maintenance

The area has been in drought for some time and may be factors influencing the groundwater concentrations of some analytes in wells.

The weather conditions (drought and rain events) and surrounding land uses are likely impacting the local groundwater conditions. The apparent anomalies in the June round of monitoring may have been influenced by the rain event preceding that sampling event. The area has been in significant drought for some time now.

The longevity of the drought means that the clay soils may be losing soil moisture at a greater depth..

The concrete surrounding the base of several of the wells are cracked. These can be easily maintained, which would also reset a barrier for surface migrating into the groundwater. The additional waste noted on the western side of the landfill has been somewhat cleaned up requires more attention.

6.0 CONCLUSIONS

There are seasonal fluctuations observed with regional groundwater conditions. The recent weather conditions of drought may have influenced the groundwater conditions. Trending of these analytes over time may indicate a seasonal fluctuation, an anomaly or highlight an issue on the site (or surrounding area). The trending of analytes occurs in the annual groundwater monitoring report with a running comparison in the quarterly monitoring reports.

The results and discussion of the laboratory sample analysis from the Scone Waste Facility during the December 2019 sampling event displayed several ongoing exceedances of the Site Criteria.

The following analytes exceeded the Site Criteria for the December 2019 sampling event; TOC in MWA, MWB, MWC and MWE; Nitrate in MWB and MWC; Zinc in MWA and MWB; Phosphate in MWB, MWC and MWE; Manganese in MWC; and Ammonia in MWC.

The well concrete bases should be fixed to stop any surface water from entering the wells.

The continuation of the drought may see fissures open up through the below ground strata layers or the creation of preferential pathways for surface waters or groundwater.

Continued sampling and data collection will allow robust trending and statistical analysis of data to occur.

The next water sampling event will be a quarterly monitoring event which will be undertaken in March 2020.

REFERENCES

- *Australian and New Zealand Guidelines for the Management of Contaminated Sites* (ANZECC/NHMRC 1992);
- *Australia and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZW, 2018);
- *Australian Drinking Water Guidelines, National Water Quality Management Strategy* 2011;
- *Contaminated Land Management Act 1997* (NSW);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA 2011);
- *Contaminated Sites: Guidelines on Duty to Report Contamination under the Contamination Land Management Act 1997* (NSW DECC, 2009);
- *Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination* (NSW DEC, 2007);
- *Contaminated Sites: Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report* (NSW EPA 1999);
- *Contaminated Sites: Sampling Design Guidelines* (NSW EPA 1995);
- *Environmental Guidelines: Solid Waste Landfills* (NSW EPA, 1996);
- *Environmental Guidelines Solid Waste Landfills* Second edition, (NSW EPA 2016);
- *Health - Based Soil Investigation Levels,* Imray, P & Langley, A*, National Environmental Health Forum Monographs, Soil Series No. 2 (2nd Ed), South Australian Health Commission* (NEHF 1998);
- *National Environment Protection (Assessment of Site Contamination) Measure (No.1)* (NEPM, 2013) as amended;
- *Storage and Handling of Dangerous Goods Code of Practice 2005*;
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

FIGURE 1

SITE LAYOUT AND SAMPLING LOCATIONS

Legend

Monitoring Well Location

Image: Google Maps 2019

N

ENGAGE Environmental Services Pty Limited
113 Reservoir Rd
Glendale NSW 2285
0478 362005

Title: Figure 1 - Site Layout and Well Locations

Client	Project No.	Figure No	Date
UHSC	E04-0619	1	17/6/2019
admin@engage-es.com.au	Scale: NA	Compiled: SC	Revision: 3

ATTACHMENT 1

NATA ACCREDITED LABORATORY RESULTS

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 233114

Client Details

Client	Engage Environmental Services
Attention	Stephen Challinor
Address	113 Reservoir Rd, GLENDALE, NSW, 2285

Sample Details

Your Reference	**E04-1219-UHSC**
Number of Samples	5 Water
Date samples received	13/12/2019
Date completed instructions received	13/12/2019

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

Date results requested by	20/12/2019
Date of Issue	19/12/2019

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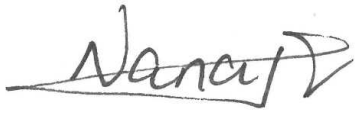
Results Approved By
Diego Bigolin, Team Leader, Inorganics
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Nick Sarlamis, Inorganics Supervisor
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

VHC's in water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	17/12/2019	17/12/2019	17/12/2019	17/12/2019	17/12/2019
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	2	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1

VHC's in water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	2	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	104	103	103	102	103
Surrogate toluene-d8	%	99	99	99	98	98
Surrogate 4-BFB	%	104	103	104	102	104

vTRH(C6-C10)/BTEXN in Water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	17/12/2019	17/12/2019	17/12/2019	17/12/2019	17/12/2019
TRH C_6 - C_9	µg/L	<10	<10	<10	42	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	59	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	41	<10
Benzene	µg/L	<1	<1	<1	5	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	13	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	1	<1
Naphthalene	µg/L	<1	<1	<1	7	<1
Surrogate Dibromofluoromethane	%	104	103	103	102	103
Surrogate toluene-d8	%	99	99	99	98	98
Surrogate 4-BFB	%	104	103	104	102	104

svTRH (C10-C40) in Water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	17/12/2019	17/12/2019	17/12/2019	17/12/2019	17/12/2019
TRH C_{10} - C_{14}	µg/L	<50	51	<50	1,700	<50
TRH C_{15} - C_{28}	µg/L	<100	400	<100	7,500	<100
TRH C_{29} - C_{36}	µg/L	<100	230	<100	1,000	<100
TRH >C_{10} - C_{16}	µg/L	<50	56	<50	2,500	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	56	<50	2,500	<50
TRH >C_{16} - C_{34}	µg/L	<100	550	<100	7,600	<100
TRH >C_{34} - C_{40}	µg/L	<100	240	<100	450	<100
Surrogate o-Terphenyl	%	102	114	103	#	129

PAHs in Water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Naphthalene	µg/L	<1	<1	<1	6	<1
Acenaphthylene	µg/L	<1	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	5.7	NIL (+)VE
Surrogate p-Terphenyl-d14	%	100	102	85	94	104

OCP in water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
HCB	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
alpha-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	94	98	80	85	99

OP Pesticides in water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Azinphos-methyl (Guthion)	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyriphos	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Diazinon	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dichlorvos	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	94	98	80	85	99

PCBs in Water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Aroclor 1016	µg/L	<2	<2	<2	<2	<2
Aroclor 1221	µg/L	<2	<2	<2	<2	<2
Aroclor 1232	µg/L	<2	<2	<2	<2	<2
Aroclor 1242	µg/L	<2	<2	<2	<2	<2
Aroclor 1248	µg/L	<2	<2	<2	<2	<2
Aroclor 1254	µg/L	<2	<2	<2	<2	<2
Aroclor 1260	µg/L	<2	<2	<2	<2	<2
Surrogate TCMX	%	94	98	80	85	99

Total Phenolics in Water						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	0.2	<0.05

HM in water - dissolved						
Our Reference	UNITS	233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference		MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Date analysed	-	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
Arsenic-Dissolved	µg/L	1	1	<1	12	4
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	2	3	<1	36	<1
Copper-Dissolved	µg/L	<1	<1	<1	<1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	0.06	<0.05	<0.05	<0.05	<0.05
Barium-Dissolved	µg/L	570	420	410	1,100	48
Zinc-Dissolved	µg/L	16	23	7	15	4
Iron-Dissolved	µg/L	<10	<10	<10	1,400	<10
Manganese-Dissolved	µg/L	7	7	5,400	180	220
Aluminium-Dissolved	µg/L	<10	<10	<10	<10	<10
Cobalt-Dissolved	µg/L	<1	<1	6	26	4

Miscellaneous Inorganics						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019
Date analysed	-	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019
pH	pH Units	6.8	7.0	6.9	7.7	7.3
Electrical Conductivity	µS/cm	18,000	14,000	13,000	13,000	3,400
BOD	mg/L	16	19	20	<5	16
Ammonia as N in water	mg/L	<0.005	0.15	1.2	340	0.20
Fluoride, F	mg/L	0.2	0.2	0.3	0.3	0.6
Total Dissolved Solids (grav)	mg/L	13,000	11,000	9,800	8,000	2,100
Total Organic Carbon	mg/L	5	10	13	330	6
Phosphate as P in water	mg/L	0.064	<0.005	0.020	0.61	0.10
Nitrate as N in water	mg/L	0.57	0.73	1.7	<0.050	0.006
Hexavalent Chromium, Cr^{6+}	mg/L	<0.005	<0.005	<0.005	<0.050	<0.005

Ion Balance						
Our Reference		233114-1	233114-2	233114-3	233114-4	233114-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		12/12/2019	12/12/2019	12/12/2019	12/12/2019	12/12/2019
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019
Date analysed	-	13/12/2019	13/12/2019	13/12/2019	13/12/2019	13/12/2019
Calcium - Dissolved	mg/L	600	570	400	130	70
Potassium - Dissolved	mg/L	3.3	2.8	2.4	220	0.6
Sodium - Dissolved	mg/L	1,900	1,500	1,700	1,900	750
Magnesium - Dissolved	mg/L	1,100	690	580	320	73
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	510	410	770	2,300	1,100
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	510	410	770	2,300	1,100
Sulphate, SO4	mg/L	41	69	140	30	140
Chloride, Cl	mg/L	6,900	5,200	4,600	3,300	530
Ionic Balance	%	1.0	-2.0	-2.0	-7.0	3.0

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically. Waters samples are filtered on receipt prior to analysis.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA latest edition, 4500-F-C.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-060	Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Inorg-091	BOD - Analysed in accordance with APHA latest edition 5210 D and in house INORG-091.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	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-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	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.

QUALITY CONTROL: VHC's in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			16/12/2019	[NT]	[NT]	[NT]	[NT]	16/12/2019	[NT]
Date analysed	-			17/12/2019	[NT]	[NT]	[NT]	[NT]	17/12/2019	[NT]
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VHC's in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-013	102	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate toluene-d8	%		Org-013	100	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-BFB	%		Org-013	102	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			16/12/2019	[NT]	[NT]	[NT]	[NT]	16/12/2019	[NT]
Date analysed	-			17/12/2019	[NT]	[NT]	[NT]	[NT]	17/12/2019	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	109	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	107	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	102	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate toluene-d8	%		Org-016	100	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-BFB	%		Org-016	102	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	233114-2
Date extracted	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Date analysed	-			16/12/2019	1	17/12/2019	17/12/2019		17/12/2019	17/12/2019
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	1	<50	<50	0	114	112
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	1	<100	<100	0	113	106
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	1	<100	<100	0	113	#
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	1	<50	<50	0	114	112
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	1	<100	<100	0	113	106
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	1	<100	<100	0	113	#
Surrogate o-Terphenyl	%		Org-003	91	1	102	96	6	110	114

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	233114-2
Date extracted	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Date analysed	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Naphthalene	µg/L	1	Org-012/017	<1	1	<1	<1	0	118	98
Acenaphthylene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Fluorene	µg/L	1	Org-012/017	<1	1	<1	<1	0	92	80
Phenanthrene	µg/L	1	Org-012/017	<1	1	<1	<1	0	96	84
Anthracene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-012/017	<1	1	<1	<1	0	94	84
Pyrene	µg/L	1	Org-012/017	<1	1	<1	<1	0	94	84
Benzo(a)anthracene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-012/017	<1	1	<1	<1	0	98	82
Benzo(b,j+k)fluoranthene	µg/L	2	Org-012/017	<2	1	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-012/017	<1	1	<1	<1	0	88	74
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-012/017	<1	1	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	84	1	100	96	4	100	92

QUALITY CONTROL: OCP in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	233114-2
Date extracted	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Date analysed	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
HCB	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	88	86
gamma-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	84	80
Heptachlor	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	84	88
delta-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Aldrin	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	92	92
Heptachlor Epoxide	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	96	98
gamma-Chlordane	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	78	78
Dieldrin	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	106	106
Endrin	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	98	120
pp-DDD	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	78	82
Endosulfan II	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endrin Aldehyde	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	94	98
Methoxychlor	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	74	1	94	90	4	87	78

QUALITY CONTROL: OP Pesticides in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	233114-2
Date extracted	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Date analysed	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Azinphos-methyl (Guthion)	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Bromophos ethyl	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Chlorpyriphos	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	92	88
Chlorpyriphos-methyl	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Diazinon	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Dichlorvos	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	102	86
Dimethoate	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ethion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	90	94
Fenitrothion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	80	80
Malathion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	87	88
Parathion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	112	126
Ronnel	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	76	72
Surrogate TCMX	%		Org-008	74	1	94	90	4	87	78

QUALITY CONTROL: PCBs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	233114-2
Date extracted	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Date analysed	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Aroclor 1016	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-006	<2	1	<2	<2	0	105	94
Aroclor 1260	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	74	1	94	90	4	87	78

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	[NT]
Date analysed	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	102	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	233114-2
Date prepared	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Date analysed	-			16/12/2019	1	16/12/2019	16/12/2019		16/12/2019	16/12/2019
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	97	98
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	95	99
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	108	104
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	106	95
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	107	100
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	0.06	0.06	0	86	89
Barium-Dissolved	µg/L	1	Metals-022	<1	1	570	570	0	106	#
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	16	16	0	97	92
Iron-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	116	99
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	7	6	15	98	95
Aluminium-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	96	102
Cobalt-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	107	97

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	233114-2
Date prepared	-			13/12/2019	1	13/12/2019	13/12/2019		13/12/2019	16/12/2019
Date analysed	-			13/12/2019	1	13/12/2019	13/12/2019		13/12/2019	16/12/2019
pH	pH Units		Inorg-001	[NT]	1	6.8	6.9	1	102	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	18000	18000	0	97	[NT]
BOD	mg/L	5	Inorg-091	<5	1	16	[NT]		90	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	<0.005	<0.005	0	109	75
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	1	0.2	0.1	67	105	113
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	1	13000	[NT]		89	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	5	[NT]		98	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	<0.005	1	0.064	0.068	6	110	113
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.57	0.60	5	112	115
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	<0.005	1	<0.005	<0.005	0	103	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	2	13/12/2019	13/12/2019		[NT]	[NT]
Date analysed	-			[NT]	2	13/12/2019	13/12/2019		[NT]	[NT]
pH	pH Units		Inorg-001	[NT]	2	7.0	[NT]		[NT]	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	[NT]	2	14000	[NT]		[NT]	[NT]
BOD	mg/L	5	Inorg-091	[NT]	2	19	[NT]		[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	[NT]	2	0.15	[NT]		[NT]	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	[NT]	2	0.2	[NT]		[NT]	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	[NT]	2	11000	11000	0	[NT]	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	[NT]	2	10	10	0	[NT]	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	[NT]	2	<0.005	[NT]		[NT]	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	[NT]	2	0.73	[NT]		[NT]	[NT]
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	[NT]	2	<0.005	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	233114-2
Date prepared	-			13/12/2019	1	13/12/2019	13/12/2019		13/12/2019	13/12/2019
Date analysed	-			13/12/2019	1	13/12/2019	13/12/2019		13/12/2019	13/12/2019
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	600	590	2	101	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	3.3	3.2	3	106	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1900	1800	5	109	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1100	1100	0	99	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	510	510	0	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	<5	<5	0	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	510	510	0	100	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	1	41	43	5	96	88
Chloride, Cl	mg/L	1	Inorg-081	<1	1	6900	7300	6	90	#
Ionic Balance	%		Inorg-040	[NT]	1	1.0	-4.0	-333	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	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.
Duplicate	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.
Matrix Spike	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.
LCS (Laboratory Control Sample)	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.
Surrogate Spike	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.

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.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

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

TRH Water(C10-C40) NEPM - # Percent recovery for the surrogate and matrix spike is not possible to report as the high concentration of analytes in sample 233114-4 and 2 have caused interference.

MISC_INORG:Hexavalent Chromium & Nitrate as N PQL has been raised due to matrix interferences. Samples were diluted and reanalysed however same results were achieved.

8 HM in water - dissolved - # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

pH has exceeded the recommended technical holding times, Envirolab Group form 347 "Recommended Preservation and Holding Times" can be provided on request (available on the Envirolab website)

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Combo1=TRH/BTEX/Pb
Combo2=TRH/BTEX/PAH/Pb
Combo3=TRH/BTEX/PAH/Met
Combo4=TRH/BTEX/PAH/Met/Phen
Combo5=TRH/BTEX/PAH/OC/PCB/Met
Combo6=TRH/BTEX/PAH/OC/OP/PCB/Met
Combo7=TRH/BTEX/PAH/OC/PCB/Met/Phen
Combo8=TRH/BTEX/PAH/OC/OP/PCB/Met/Phen
Combo9=TRH/BTEX/PAH/OC/PCB/Met/Phen/CN
Combo10=TRH/BTEX/PAH/OC/OP/PCB/Met/Phen/CN
Combo11=TRH/BTEX/PAH/OC/PCB/12met/Phen/CN
Combo12=TRH/BTEX/PAH/OC/PCB/Met/TCLP-PAH ,6 Met
Combo13=TRH/BTEX/PAH/OC/OP/PCB/Met/TCLP-PAH ,6Met

A Combo with an 'A' indicates Asbestos is also needed.

Client: Engage Environmental Services	**Client Project Name / Number / Site etc (ie report title):** E04-1219 - UHSC
Contact Person: Stephen Challinor	
Project Mgr: Stephen	**PO No.:**
Sampler: Stephen Challinor	**Envirolab Quote No. :**
Address: 113 Reservoir Rd, Glendale NSW 2285	**Date results required:** Or choose: STANDARD *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: 0478 362 005 **Mob:** 0478362005	**Report format:** esdat / equis /
Email: stephen.challinor@engage-es.com.au; admin@engage-es.com.au	**Lab Comments:**

Sample information					Tests Required														Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 8 with 12 metals: Fe, Mn, As, Al, Ba, Cd, Co, Cu, Cr, Pb, Hg, Zn	Cation suite: Ca, K, Na, Mg	Anions major: Chloride, Sulfate, alkalinity	Chromium Hexavalent	Ammonia	BOD	Chlorinated volatile compounds	Fluoride	TOC	TDS	Phosphate	Nitrate	EC	pH		Provide as much information about the sample as you can
	MWA		12/12/19	Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	MWB			Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	MWC			Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	MWD			Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X		leachate
	MWE			Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X		

Relinquished by (Company): Engage Environmental Services	**Received by (Company):** ELS	*Lab use only:*
Print Name: Stephen Challinor	**Print Name:** Michael Ogle	**Samples Received:** Cool or Ambient (circle one)
Date & Time: 13/12/19	**Date & Time:** 13.12.19 13:20	**Temperature Received at:** 16.2 (if applicable)
Signature:	**Signature:**	**Transported by:** Hand delivered / courier

White - Lab copy / Blue - Client copy / Pink - Retain in Book

Page No:

ENVIROLAB GROUP

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 233114

Date Received: 13.12.19
Time Received: 13:20
Received by: MO
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

ATTACHMENT 2

CALIBRATION CERTIFICATE

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 11E101629

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 10.00		pH 10.00		330738	pH 9.59
2. pH 7.00		pH 7.00		320613	pH 6.95
3. pH 4.00		pH 4.00		330734	pH 4.10
4. mV		229.6mV		337308/338782	230.4mV
5. EC		2.76mS		333787	2.74mS
6. Temp		21.6°C		MultiTherm	21.6°C
7. DO		0.00ppm		329994	0.03ppm

Calibrated by: Sarah Lian **Sarah Lian**

Calibration date: **10/12/2019**

Next calibration due: **9/01/2020**

ATTACHMENT 3

DATA LOG

ATTACHMENT 4

FIELD DATA SHEETS

ENGAGE ENVIRONMENTAL SERVICES			Threshold Criteria	NA	NA	NA	NA	0.3	NA	1.9	0.00001	NA	6.5–8	NA	0.9	0.7	NA	4	0.32	NA
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm
			Analytes	Calcium	Alkalinity	Chloride	Fluoride	Iron	Magnesium	Manganese	Organochlorine pesticides (OCP)	Potassium	pH	Sodium	Ammonia	Nitrate	Sulfate	Total organic carbon	Total phenolics	Electrical conductivity (EC)
			Monitoring frequency	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
MWA	210422	29/01/2019		600	510	6900	0.2	<10	1100	0.007	<0.2	3.3	6.8	1900	<0.005	0.57	41	5	<0.05	18000
MWB	210422	29/01/2019		570	410	5200	0.2	<10	690	0.007	<0.2	2.8	7	1500	0.15	0.73	69	10	<0.05	14000
MWC	210422	29/01/2019		400	770	4600	0.3	<10	580	5.4	<0.2	2.4	6.9	1700	1.2	1.7	140	13	<0.05	13000
MWD	210422	29/01/2019		130	2300	3300	0.3	1.4	320	0.18	<0.2	220	7.7	1900	340	<0.050	30	330	0.2	13000
MWE	210422	29/01/2019		70	1100	530	0.6	<10	73	0.22	<0.2	0.6	7.3	750	0.2	0.006	140	6	<0.05	3400

	NA	NA	0.015	0.024 (III) 0.013 (V)	0.055 (pH> 6.5)	NA	0.0002	0.09	0.0014	0.001	NA	0.0034	0.0006	0.008	0.016	0.26	0.95	0.18	0.08	0.35	NA	6500	0.05	0.03	0.0003	0.00003	0.00002
	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
	Total dissolved solids	Biochemical oxygen demand	Phosphate	Arsenic III & V	Aluminium	Barium	Cadmium	Cobalt	Copper	Chromium VI	Chromium (total)	Lead	Mercury	Zinc	PAHs	TRH	Benzene	Toluene	Ethylbenzene	total xylene	Tetrachloreth ene (TCE)	1,1,1-Trichloroetha ne (TCA)	Tetrachloroet hene (PCE)	1,2-Dichloroethen e	Vinyl Chloride	PCBs	OPPs
	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
MWA	13000	16	0.064	0.001	<0.010	0.57	<0.0001	<0.001	<0.001	<0.005	0.002	<0.001	0.00006	0.016	<0.001	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010	<0.002	<0.0002
MWB	11000	19	<0.005	0.001	<0.010	0.42	<0.0001	<0.001	<0.001	<0.005	0.003	<0.001	<0.00005	0.023	<0.001	0.681	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010	<0.002	<0.0002
MWC	9800	20	0.02	<0.001	<0.010	0.41	<0.0001	0.006	<0.001	<0.005	<0.001	<0.001	<0.00005	0.007	<0.001	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010	<0.002	<0.0002
MWD	8000	<5	0.61	0.012	<0.010	1.1	<0.0001	0.026	<0.001	<0.050	0.036	<0.001	<0.00005	0.015	0.057	10.242	0.005	<0.001	0.013	0.001	<0.01	<0.01	<0.01	<0.01	<0.100	<0.002	<0.0002
MWE	2100	16	0.1	0.004	<0.010	0.048	<0.0001	0.004	<0.001	<0.005	<0.001	<0.001	<0.00005	0.004	<0.001	<0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.010	<0.002	<0.0002