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E: admin@engage-es.com.au

M: 0478 362 005

**ENGAGE
ENVIRONMENTAL
SERVICES**

ABN 13 629 353 662

**GROUNDWATER
MONITORING**

**SCONE WASTE
FACILITY
NOBLET ROAD
SCONE NSW**



DOCUMENT CONTROL INFORMATION

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Prepared – Stephen Challinor

Reviewed By and Approved for Release By – STC/ CMM

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OFFICE
1/545 Main Rd
Glendale NSW 2285

Ph: 0478 362 005

Email: admin@engage-es.com.au

FIELD OFFICE
Unit 1, 104 George St
Singleton NSW 2330

Ph: 0478 364 588

Engage Environmental Services Pty Limited: ABN 13 629 353 662



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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 9th June 2021.

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
	Potassium¹	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
PHENOLS	Total phenolics	mg/L	0.32	Quarterly
OCP	Organochlorine Pesticide³ (OCP)	mg/L	0.00001	Quarterly
MISC. INORGANICS	pH	pH	6.5 – 8	Quarterly
	Sodium	mg/L	NA	Quarterly
	Ammonia²	mg/L	0.9	Quarterly
	Nitrate	mg/L	50	Quarterly
	Total organic	mg/L	4	Quarterly
	Electrical	µS/cm	NA	Quarterly

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 \pm 0.1 unit, electrical conductivity \pm 5%, temperature \pm 0.20, reduction-oxidation (redox) \pm 10%; and dissolved oxygen \pm 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 2021 sampling event, results are detailed in **Tables 2 to 6**. Comparisons have been made to the previous round of monitoring (March 2021). Refer to **Attachment 1** – Data Log and **Attachment 3** – NATA Accredited Laboratory Results.

There were no exceedances of the site criteria for March in MWA. There was one exceedance of the site criteria for June in MWA; TOC at 5mg/L. Refer to Table 2.

Table 2 – Quarterly Groundwater Results and Comparison March 2021–June 2021 (MWA)

	Analytes	Units	Site Criteria (mg/L)	MWA March 2021	MWA June 2021
IONS	Calcium	m	NA	610	430
	Alkalinity (total)	m	NA	520	500
	Chloride	m	NA	6800	6900
	Fluoride	m	NA	0.1	0.1
	Potassium¹	m	410	2.9	2
	Magnesium	m	NA	1300	840
	Sulphate	m	NA	55	58
HEAVY METALS	Iron	m	0.3	<LOR	<LOR
	Manganese	m	1.9	0.01	0.017
Phenols	Total phenolics	m	0.32	<LOR	<LOR
OCPs	OCP³	m	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	p	6.5 – 8	6.8	6.8
	Sodium	m	NA	2100	1800
	Ammonia²	m	0.9	0.006	0.023
	Nitrate	m	0.7	0.64	0.6
	Total Organic Carbon	m	4	3	5
	EC	µS	NA	19000	19000

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.

There was one exceedance of the site criteria for March in MWB; TOC at 5mg/L. There was one exceedance of the site criteria for June in MWB; TOC at 5mg/L. Refer to Table 3

**Table 3 – Quarterly Groundwater Results and Comparison March 2021–June 2021
(MWB)**

	Analytes	Units	Site Criteria (mg/L)	MWB March 2021	MWB June 2021
IONS	Calcium	mg/L	NA	480	410
	Alkalinity (total)	mg/L	NA	420	360
	Chloride	mg/L	NA	5100	4800
	Fluoride	mg/L	NA	0.2	0.3
	Potassium¹	mg/L	410	2.4	2
	Magnesium	mg/L	NA	720	520
	Sulphate	mg/L	NA	96	220
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	0.008	0.011
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7	6.6
	Sodium	mg/L	NA	1500	1400
	Ammonia²	mg/L	0.9	0.008	<0.01
	Nitrate	mg/L	0.7	0.55	<0.51
	Total Organic Carbon	mg/L	4	5	5
	EC	µS/cm	NA	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.

There were two exceedances of the site criteria for March in MWC; Manganese and TOC at concentrations of 3.2mg/L and 8mg/L respectively.

There were two exceedances of the site criteria for June in MWC; Manganese and TOC at concentrations of 4.7mg/L and 8mg/L respectively. Refer to Table 4.

Table 4 – Quarterly Groundwater Results and Comparison March 2021–June 2021 (MWC)

	Analytes	Units	Site Criteria (mg/L)	MWC March 2021	MWC June 2021
IONS	Calcium	mg/L	NA	360	290
	Alkalinity (total)	mg/L	NA	870	850
	Chloride	mg/L	NA	4200	4000
	Fluoride	mg/L	NA	0.2	0.2
	Potassium¹	mg/L	410	2	1
	Magnesium	mg/L	NA	560	390
	Sulphate	mg/L	NA	130	150
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	3.2	4.7
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7	6.9
	Sodium	mg/L	NA	1800	1600
	Ammonia²	mg/L	0.9	0.013	0.03
	Nitrate	mg/L	0.7	0.15	0.14
	Total Organic Carbon	mg/L	4	8	8
	EC	µS/cm	NA	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.

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. Refer to Table 5.

Table 5 – Quarterly Groundwater Results and Comparison March 2021–June 2021 (MWD)

	Analytes	Units	Site Criteri a (mg/L)	MWD (leachat e) March 2021	MWD (leachat e) June 2021
IONS	Calcium	mg/L	NA	160	140
	Alkalinity (total)	mg/L	NA	1600	1500
	Chloride	mg/L	NA	1400	1400
	Fluoride	mg/L	NA	0.2	0.3
	Potassium¹	mg/L	410	94	67
	Magnesium	mg/L	NA	160	120
	Sulphate	mg/L	NA	23	100
HEAVY METALS	Iron	mg/L	0.3	0.47	0.69
	Manganese	mg/L	1.9	0.42	0.5
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.5	7.3
	Sodium	mg/L	NA	860	720
	Ammonia²	mg/L	0.9	150	150
	Nitrate	mg/L	0.7	<LOR	<LOR
	Total Organic Carbon	mg/L	4	120	81
	EC	µS/cm	NA	7000	6600

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.

There was one exceedance of the site criteria for March in MWE, TOC at concentrations of 6 mg/L. There was two exceedances of the site criteria for June in MWE, Iron at concentrations of 0.45 mg/L and TOC at concentrations of 16 mg/L. Refer to Table 6.

Table 6 –Quarterly Groundwater Results and Comparison March 2021-June 2021 (MWE)

	Analytes	Units	Threshold Criteria (mg/L)	MWE March 2021	MWE June 2021
IONS	Calcium	mg/	NA	92	65
	Alkalinity (total)	mg/	NA	1100	1000
	Chloride	mg/	NA	800	520
	Fluoride	mg/	NA	0.4	0.5
	Potassium¹	mg/	410	1	1
	Magnesium	mg/	NA	110	67
	Sulphate	mg/	NA	190	110
HEAVY METALS	Iron	mg/	0.3	<LOR	0.45
	Manganese	mg/	1.9	0.33	1.3
PHENOLS	Total phenolics	mg/	0.32	<LOR	<LOR
OCP	OCP³	mg/	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.2	7.1
	Sodium	mg/	NA	790	560
	Ammonia²	mg/	0.9	0.006	0.005
	Nitrate	mg/	0.7	0.002	<0.00
	Total Organic Carbon	mg/	4	6	16
	EC	µS/c	NA	4400	3500

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

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 2021 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.

All reported analyte concentrations are consistent with previous monitoring data, apart from an increase in the TOC concentration (5mg/kg) which elevated the concentration above the adopted site criteria of 4mg/kg.

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 was exceedance of the site criteria. Changes at MWB include;

- The TOC concentration remained stable at 5mg/L, elevated over the site criteria of 4mg/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 increased turbidity compared to other wells 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:

- A concentration of Manganese (4.7 mg/L) was reported in MWC exceeding the Site Criteria (1.9 mg/L). This is an increase from the March reporting period (3.2 mg/L).

- A concentration of TOC (8 mg/L) was reported in MWC exceeding the Site Criteria (4 mg/L). This value remained stable as per March report.

All other analytes reported concentrations are consistent with the 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.

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

- Iron concentration of 0.47 mg/L in March report presented an increase to 0.69 mg/L;
- Ammonia has remained stable with a concentration of 150 mg/L;
- TOC has decreased from 120 mg/L in March to a concentration of 81 mg/L.

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:

- The iron concentration has risen from below the limit of reporting levels (LOR) in March to 0.45 mg/L, above the adopted site criteria;
- The TOC concentration has increased from 6mg/L in March to 16mg/L, persistently exceeding the adopted site criteria.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the June 2021 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWA, TOC in MWB, Manganese and TOC in MWC; Iron, Ammonia and TOC in MWD; Iron and TOC in MWE. Refer to **Attachment 1** – Data Log.

The leachate monitoring well (MWD) had elevated concentrations of Iron, Ammonia and TOC.

Site and Maintenance

No immediate maintenance required for the monitoring wells.

6.0 CONCLUSIONS

There are seasonal fluctuations observed with regional 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.

It is apparent that the previously observed fluctuations are beginning to settle with results obtained appearing more stable than previous monitoring periods. The current 12 months of monitoring occurred during a time of rain with some flooding and after drought. The results obtained during this monitoring period appear to be an accurate representation of the site health during stable times.

The results and discussion of the laboratory sample analysis from the Scone Waste Facility during the June 2021 quarterly sampling event displayed several ongoing exceedances of the Site Criteria from the previous monitoring period.

The following analytes exceeded the Site Criteria for the June 2021 sampling event; TOC in MWA, TOC in MWB, Manganese and TOC in MWC; Iron and TOC in MWE.

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 September 2021.

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



Legend

● Monitoring Well Location

Image: Google Maps 2019



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 A
DATALOG

ENGAGE ENVIRONMENTAL SERVICES			Threshold Criteria	NA	NA	NA	NA	0.3	NA		0.00001	NA	6.5–8	NA	0.9	0.7	NA	4	0.32	NA	
Sample ID	Lab Report	Date	Monitoring frequency	Units	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)
					Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
MWA	271494	09/06/2021			430	500	6900	0.1	<0.01	840	0.017	<0.0002	2	6.8	1800	0.023	0.6	58	5	<0.05	19000
MWB	271494	09/06/2021			410	360	4800	0.3	<0.01	520	0.011	<0.0002	2	6.6	1400	0.01	0.51	220	5	<0.05	14000
MWC	271494	09/06/2021			290	850	4000	0.2	<0.01	390	4.7	<0.0002	1	6.9	1600	0.03	0.14	150	8	<0.05	13000
MWD	271494	09/06/2021			140	1500	1400	0.3	0.69	120	0.5	<0.0002	67	7.3	720	150	0.01	100	81	<0.05	6600
MWE	271494	09/06/2021			65	1000	520	0.5	0.45	67	1.3	<0.0002	1	7.1	560	0.005	<0.005	110	16	<0.05	3500

ATTACHMENT B
YSI CALIBRATION CERTIFICATE

Multi Parameter Water Meter



airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument **YSI Quatro Pro Plus**
Serial No. **21B104020**

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad Display	Operation	✓	
	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		363696	PH 9.98
2. pH 7.00		pH 7.00		364212	pH 7.06
3. pH 4.00		pH 4.00		366070	pH 4.12
4. mV		238.4mV		365755/364219	238.4mV
5. EC		2.76mS		350510	2.74mS
6. D.O		0.00 ppm		10959	0.02ppm
7. Temp		18.7°C		MultiTherm	18.5°C

Calibrated by: Lauren Tompkins

Calibration date: **7/06/2021**

Next calibration due: **7/12/2021**

ATTACHMENT C
NATA ACCREDITED LABORATORY RESULTS



CERTIFICATE OF ANALYSIS 271494

Client Details

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

Sample Details

Your Reference	E04-Scone
Number of Samples	5 water
Date samples received	11/06/2021
Date completed instructions received	11/06/2021

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	21/06/2021
Date of Issue	21/06/2021

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By

Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Client Reference: E04-Scone

Organochlorine Pesticides in Water						
Our Reference		271494-1	271494-2	271494-3	271494-4	271494-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		09/06/2021	09/06/2021	09/06/2021	09/06/2021	09/06/2021
Type of sample		water	water	water	water	water
Date extracted	-	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021
Date analysed	-	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021
alpha-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
HCB	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
gamma-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
Endosulfan II	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
Endrin Aldehyde	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
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	%	86	82	84	72	71

Client Reference: E04-Scone

Total Phenolics in Water						
Our Reference		271494-1	271494-2	271494-3	271494-4	271494-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		09/06/2021	09/06/2021	09/06/2021	09/06/2021	09/06/2021
Type of sample		water	water	water	water	water
Date extracted	-	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021
Date analysed	-	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Client Reference: E04-Scone

HM in water - dissolved						
Our Reference		271494-1	271494-2	271494-3	271494-4	271494-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		09/06/2021	09/06/2021	09/06/2021	09/06/2021	09/06/2021
Type of sample		water	water	water	water	water
Date prepared	-	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021
Date analysed	-	17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Iron-Dissolved	µg/L	<10	<10	<10	690	450
Manganese-Dissolved	µg/L	17	11	4,700	500	1,300

Client Reference: E04-Scone

Ion Balance						
Our Reference		271494-1	271494-2	271494-3	271494-4	271494-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		09/06/2021	09/06/2021	09/06/2021	09/06/2021	09/06/2021
Type of sample		water	water	water	water	water
Date prepared	-	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
Date analysed	-	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
Calcium - Dissolved	mg/L	430	410	290	140	65
Potassium - Dissolved	mg/L	2	2	1	67	1
Sodium - Dissolved	mg/L	1,800	1,400	1,600	720	560
Magnesium - Dissolved	mg/L	840	520	390	120	67
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	500	360	850	1,500	1,000
Carbonate Alkalinity as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	500	360	850	1,500	1,000
Sulphate, SO ₄	mg/L	58	220	150	100	110
Chloride, Cl	mg/L	6,900	4,800	4,000	1,400	520
Ionic Balance	%	-10	-8.0	-7.0	-18	-6.0

Client Reference: E04-Scone

Miscellaneous Inorganics						
Our Reference		271494-1	271494-2	271494-3	271494-4	271494-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		09/06/2021	09/06/2021	09/06/2021	09/06/2021	09/06/2021
Type of sample		water	water	water	water	water
Date prepared	-	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
Date analysed	-	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
Ammonia as N in water	mg/L	0.023	0.01	0.030	150	0.005
Fluoride, F	mg/L	0.1	0.3	0.2	0.3	0.5
Total Organic Carbon	mg/L	5	5	8	81	16
Nitrate as N in water	mg/L	0.60	0.51	0.14	0.01	<0.005
pH	pH Units	6.8	6.6	6.9	7.3	7.1
Electrical Conductivity	µS/cm	19,000	14,000	13,000	6,600	3,500

Client Reference: E04-Scone

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-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-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.
Metals-020	Determination of various metals by ICP-AES.
Metals-022	Determination of various metals by ICP-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Client Reference: E04-Scone

QUALITY CONTROL: Organochlorine Pesticides in Water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			15/06/2021	[NT]	[NT]	[NT]	[NT]	15/06/2021	[NT]
Date analysed	-			15/06/2021	[NT]	[NT]	[NT]	[NT]	15/06/2021	[NT]
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	88	[NT]
HCB	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	81	[NT]
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	92	[NT]
delta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	95	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	98	[NT]
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	100	[NT]
Dieldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	96	[NT]
Endrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	86	[NT]
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	91	[NT]
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	92	[NT]
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	82	[NT]	[NT]	[NT]	[NT]	75	[NT]

Client Reference: E04-Scone

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			15/06/2021	1	15/06/2021	15/06/2021		15/06/2021	[NT]
Date analysed	-			15/06/2021	1	15/06/2021	15/06/2021		15/06/2021	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	101	[NT]

Client Reference: E04-Scone

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			15/06/2021	1	15/06/2021	15/06/2021		15/06/2021	[NT]
Date analysed	-			17/06/2021	1	17/06/2021	17/06/2021		17/06/2021	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	114	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	17	18	6	113	[NT]

Client Reference: E04-Scone

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			11/06/2021	1	11/06/2021	11/06/2021		11/06/2021	[NT]
Date analysed	-			11/06/2021	1	11/06/2021	11/06/2021		11/06/2021	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	430	440	2	93	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	2	2	0	89	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	1800	1700	6	85	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	840	860	2	94	[NT]
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	1	500	[NT]		[NT]	[NT]
Carbonate Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	1	<5	[NT]		[NT]	[NT]
Total Alkalinity as CaCO ₃	mg/L	5	Inorg-006	<5	1	500	[NT]		109	[NT]
Sulphate, SO ₄	mg/L	1	Inorg-081	<1	1	58	[NT]		113	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	6900	[NT]		99	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	-10	[NT]		[NT]	[NT]

Client Reference: E04-Scone

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			11/06/2021	[NT]	[NT]	[NT]	[NT]	11/06/2021	[NT]
Date analysed	-			11/06/2021	[NT]	[NT]	[NT]	[NT]	11/06/2021	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	104	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	[NT]	[NT]	114	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	101	[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.	
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 AIOH 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.

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

MISC_INORG: pH

Samples were out of the recommended holding time for this analysis.

The mass imbalance in sample #4 may be caused by other ions that have not been measured.

ATTACHMENT D
FIELD NOTES

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW A
Client: UHSC	Sampler: C and C
Site Address: Scone Waste Facility	Date: 9-6-21

Well Information			
Monument damaged:	YES / <input checked="" type="radio"/> NO / N/A	Well ID visible:	YES / <input checked="" type="radio"/> NO / N/A
Locked well casing:	YES / NO / <input checked="" type="radio"/> N/A	Cap on PVC casing:	<input checked="" type="radio"/> YES / NO / N/A
Cement footing damaged:	YES / <input checked="" type="radio"/> NO / N/A	Water in monument casing:	YES / <input checked="" type="radio"/> NO / N/A
Standing water, vegetation around monument:	YES / <input checked="" type="radio"/> NO / N/A	Internal obstruction in casing:	YES / <input checked="" type="radio"/> NO / N/A
Well Damaged:	YES / <input checked="" type="radio"/> NO / N/A	Odours from groundwater:	YES / <input checked="" type="radio"/> NO / N/A
Casing above ground:	m agl	Weather Conditions:	
Standing water level: <u>8</u>	m bgl	Temperature 15-20 <input checked="" type="checkbox"/>	20-25 <input type="checkbox"/>
Total well depth: <u>15.57</u>	m bgl	25-30 <input type="checkbox"/>	>30 <input type="checkbox"/>
Initial well volume:	L	Clear <input type="checkbox"/>	Partly cloudy <input type="checkbox"/>
Water level after purging: <u>8.9</u>	m bgl	Overcast <input checked="" type="checkbox"/>	
Volume of water purged: <u>8 bails</u>	L	Calm <input type="checkbox"/>	Slight breeze <input checked="" type="checkbox"/>
Water level at time of sampling:	m bgl	Modcrate breeze <input type="checkbox"/>	Windy <input type="checkbox"/>
Well purged dry:	YES / NO	Fine <input checked="" type="checkbox"/>	Showers <input type="checkbox"/>
Purging equipment: <u>bailer</u>		Rain <input type="checkbox"/>	

Note: 50mm internal diameter pipe = 1.96 l/m.

Water Quality Details:

Time am / pm	DO (mg/l.⁻³)	EC (µS cm⁻²)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
12:00	3	17540	6.51	320	19.9	11.59	
	6.98	17598	6.66	346	19.8	11.71	
	7.20	17436	6.67	394	20.5	11.74	
	7.37	16507	6.66	429	20.7	11.78	
	7.5	14954	6.67	432	20.8	11.8	

Water Quality and General Comments:

1st:	Cloudy,	no	sheen,	no	odour,	no	sediment
2nd	"	"	"	"	"	"	"
3rd	"	"	"	"	"	"	"
4th	"	"	"	"	"	"	"

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW B
Client: UHSC	Sampler: Cmg C
Site Address: Scone Waste Facility	Date: 9-6-21

Well Information			
Monument damaged:	YES / <input checked="" type="radio"/> NO / N/A	Well ID visible:	<input checked="" type="radio"/> YES / NO / N/A
Locked well casing:	YES / <input checked="" type="radio"/> NO / N/A	Cap on PVC casing:	<input checked="" type="radio"/> YES / NO / N/A
Cement footing damaged:	YES / <input checked="" type="radio"/> NO / N/A	Water in monument casing:	YES / <input checked="" type="radio"/> NO / N/A
Standing water, vegetation around monument:	YES / <input checked="" type="radio"/> NO / N/A	Internal obstruction in casing:	YES / <input checked="" type="radio"/> NO / N/A
Well Damaged:	YES / <input checked="" type="radio"/> NO / N/A	Odours from groundwater:	YES / <input checked="" type="radio"/> NO / N/A
Casing above ground:	m agl	Weather Conditions:	
Standing water level: <u>8.71</u>	m bgl	Temperature	15-20 <input checked="" type="checkbox"/> 20-25 <input type="checkbox"/>
Total well depth: <u>16.17</u>	m bgl		25-30 <input type="checkbox"/> >30 <input type="checkbox"/>
Initial well volume:	L	Clear <input type="checkbox"/>	Partly cloudy <input type="checkbox"/> Overcast <input checked="" type="checkbox"/>
Water level after purging:	m bgl	Calm <input type="checkbox"/>	Slight breeze <input checked="" type="checkbox"/> Moderate breeze <input type="checkbox"/>
Volume of water purged: <u>a bailer</u>	L	Windy <input type="checkbox"/>	
Water level at time of sampling:	m bgl	Fine <input checked="" type="checkbox"/>	Showers <input type="checkbox"/> Rain <input type="checkbox"/>
Well purged dry:	YES / NO		
Purging equipment: <u>bailer</u>			

Note: 50mm internal diameter pipe = 1.96 l/m.

Water Quality Details:

Time am / pm	DO (mg/L ⁻³)	EC (µS cm ⁻¹)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
12:35	6.7	2181287	6.85	237	17.3	8.47	
	6.71	12190	6.83	293.7	20	8.43	
	5.81	13196	6.76	291.7	20.1	8.95	
	6.7	12689	6.76	292	20.1	8.78	
	6.27	12199	6.77	292	20.2	8.45	

Water Quality and General Comments:

1 lightly cloudy, no sheen, no odour, no sed.

2 "

3 "

4 "

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW C
Client: UHSC	Sampler: C and C
Site Address: Scone Waste Facility	Date: 9-6-21

Well Information	
Monument damaged:	YES / <input checked="" type="radio"/> NO / N/A
Locked well casing:	YES / <input checked="" type="radio"/> NO / N/A
Cement footing damaged:	YES / <input checked="" type="radio"/> NO / N/A
Standing water, vegetation around monument:	YES / <input checked="" type="radio"/> NO / N/A
Well Damaged:	YES / <input checked="" type="radio"/> NO / N/A
Casing above ground:	m agl
Standing water level: <u>6.31</u>	m bgl
Total well depth: <u>12.63</u>	m bgl
Initial well volume:	L
Water level after purging:	m bgl
Volume of water purged: <u>a. bails</u>	L
Water level at time of sampling:	m bgl
Well purged dry:	YES / NO
Purging equipment: <u>bailer</u>	
Sample equipment:	Fine <input checked="" type="checkbox"/> Showers <input type="checkbox"/> Rain <input type="checkbox"/>

Weather Conditions:

Temperature	15-20 <input checked="" type="checkbox"/>	20-25 <input type="checkbox"/>
	25-30 <input type="checkbox"/>	>30 <input type="checkbox"/>
Clear	<input type="checkbox"/>	Partly cloudy <input type="checkbox"/>
Overcast	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Calm	<input type="checkbox"/>	Slight breeze <input checked="" type="checkbox"/>
Windy	<input type="checkbox"/>	Moderate breeze <input type="checkbox"/>
		Shower <input type="checkbox"/>
		Rain <input type="checkbox"/>

Note: 50mm internal diameter pipe = 1.96 L/m.

Water Quality Details:

Time am / pm	DO (mg/L ⁻¹)	EC (μ S cm ⁻¹)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
1:05	6.62	11752	6.77	189.7	19.3	7.56	
	3.5	11802	6.73	171.9	19.8	7.6	
	2.88	11110	6.75	179.1	20.0	7.63	
	2.91	11108	6.75	161.5	19.9	7.64	
	2.94	11174	6.75	134.6	20.3	7.63	

Water Quality and General Comments:

1 Clear, light sed, no s hem, no odour

2 Cloudy, light sed, no s hem, no odour

3 " " "

4

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW <u>D</u>
Client: UHSC	Sampler: <u>C and C</u>
Site Address: Scone Waste Facility	Date: <u>9.6.21</u>

Well Information	
Monument damaged:	YES / <input checked="" type="radio"/> NO / N/A
Locked well casing:	YES / <input checked="" type="radio"/> NO / N/A
Cement footing damaged:	YES / <input checked="" type="radio"/> NO / N/A
Standing water, vegetation around monument:	YES / <input checked="" type="radio"/> NO / N/A
Well Damaged:	YES / <input checked="" type="radio"/> NO / N/A
Casing above ground:	m agl
Standing water level: <u>9.68</u>	m bgl
Total well depth: <u>13.11</u>	m bgl
Initial well volume:	L
Water level after purging:	m bgl
Volume of water purged: <u>7 bails</u>	L
Water level at time of sampling:	m bgl
Well purged dry:	YES / NO
Purging equipment: <u>bailer</u>	
Sample equipment:	Fine <input checked="" type="checkbox"/> Showers <input type="checkbox"/> Rain <input type="checkbox"/>

Note: 50mm internal diameter pipe = 1.96 L/m.

Well ID visible:	YES / NO / N/A
Cap on PVC casing:	YES / NO / N/A
Water in monument casing:	YES / NO / N/A
Internal obstruction in casing:	YES / NO / N/A
Odours from groundwater:	YES / NO / N/A

Weather Conditions:

Temperature	15-20 <input checked="" type="checkbox"/>	20-25 <input type="checkbox"/>
	25-30 <input type="checkbox"/>	>30 <input type="checkbox"/>
Clear	<input type="checkbox"/>	Partly cloudy <input type="checkbox"/>
		Overcast <input checked="" type="checkbox"/>
Calm	<input type="checkbox"/>	Slight breeze <input checked="" type="checkbox"/>
		Moderate breeze <input type="checkbox"/>
		Windy <input type="checkbox"/>
	Fine <input checked="" type="checkbox"/>	Showers <input type="checkbox"/>
		Rain <input type="checkbox"/>

Water Quality Details:

Time am / pm	DO (mg/L ⁻¹)	EC (μ S cm ⁻¹)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
2:27	5.37	3611	6.91	-128	25.5	1.92	
	5.59	5260	7.02	-128	26.0	2.73	
	4.32	6165	7.06	-134	25.8	3.29	

Water Quality and General Comments:

1st : Green tinge med sed, strong sulfuric odour
 2nd "
 3rd
 4th

