



**PROJECT NUMBER – E04-0921
SEPTEMBER 2021**

Document Control Number - C01267

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

Project Name – Groundwater Monitoring – Scone Waste Facility –Quarterly Monitoring Round

Client - Upper Hunter Shire Council

Project Number – E04-0921

Prepared – Stephen Challinor

Reviewed By and Approved for Release By – STC/ CL

Document Control Number – C01267

Comments – Final Copy

Date – 5-10-2021

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



WAIVER/DISCLAIMER/LIMITATION

The information contained in these documents is confidential, privileged and only for the information of the intended recipient and may not be used, published or redistributed without the prior written consent of Engage Environmental Services Pty Limited (Engage). Engage undertakes all exercises with reasonable skill and professional attention in the provision of services, including advice to the Client.

The opinions expressed are in good faith and while every care has been taken in preparing these documents, Engage makes no representations and gives no warranties of whatever nature in respect of these documents, including but not limited to the accuracy or completeness of any information, facts and/or opinions contained therein.

Engage, the directors, employees and agents cannot be held liable for the use of and reliance of the opinions, estimates, assumptions and findings in these documents.

Responsibility and any liability arising from misinterpretation or misuse by third parties as to the contents of the reports are not Engage's responsibility and will not be liable.

Information supplied, in electronic form, print form or verbally expressed to Engage is not verified for accuracy, validity, completeness or comprehensiveness unless part of the project being undertaken is a third-party view. Information supplied is deemed to be complete and accurate.

Where site inspections, monitoring, or other fieldwork have taken place, the report is based on the information supplied by the client, observations, laboratory results and any discussions with regulatory authorities.



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



TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

General..... 1

Briefing..... 1

2.0 SITE CRITERIA AND SAMPLING FREQUENCY..... 2

3.0 SAMPLING METHODOLOGY 3

Groundwater Sampling..... 3

4.0 RESULTS 4

5.0 DISCUSSION 9

MWA..... 9

MWB..... 9

MWC..... 9

MWD 10

MWE..... 10

Site and Maintenance 10

6.0 CONCLUSIONS..... 11

REFERENCES 12

FIGURES

Figure 1 Site layout with sample locations

ATTACHMENTS

Attachment 1 Data log

Attachment 2 NATA Accredited Laboratory Results

Attachment 3 Groundwater Field Data Sheets

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 22nd September 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 September 2021 sampling event, results are detailed in **Tables 2 to 6**. Comparisons have been made to the previous round of monitoring (June 2021). Refer to **Attachment 1** – NATA Accredited Laboratory Results and **Attachment 3** – Data Log.

There were **no exceedances** of the site criteria for September in MWA. Refer to Table 2.

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

	Analytes	Units	Site Criteria (mg/L)	MWA June 2021	MWA Sept 2021
IONS	Calcium	mg/L	NA	430	540
	Alkalinity (total)	mg/L	NA	500	500
	Chloride	mg/L	NA	6900	6300
	Fluoride	mg/L	NA	0.1	0.1
	Potassium¹	mg/L	410	2	3
	Magnesium	mg/L	NA	840	990
	Sulphate	mg/L	NA	58	48
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	0.017	0.010
Phenols	Total phenolics	mg/L	0.32	<LOR	<LOR
OCPs	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.8	6.8
	Sodium	mg/L	NA	1800	2100
	Ammonia²	mg/L	0.9	0.023	0.068
	Nitrate	mg/L	0.7	0.6	0.6
	Total Organic Carbon	mg/L	4	5	3
	EC	µS/cm	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 September in MWB; **TOC at 6mg/L**. Refer to Table 3.

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

	Analytes	Units	Site Criteria (mg/L)	MWB June 2021	MWB Sept 2021
IONS	Calcium	mg/L	NA	410	480
	Alkalinity (total)	mg/L	NA	360	420
	Chloride	mg/L	NA	4800	4300
	Fluoride	mg/L	NA	0.3	0.2
	Potassium¹	mg/L	410	2	4
	Magnesium	mg/L	NA	520	600
	Sulphate	mg/L	NA	220	76
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	0.011	0.020
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.6	6.9
	Sodium	mg/L	NA	1400	1500
	Ammonia²	mg/L	0.9	<0.01	0.024
	Nitrate	mg/L	0.7	<0.51	0.6
	Total Organic Carbon	mg/L	4	5	6
	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 September in MWC; **Manganese and TOC at concentrations of 4.4mg/L and 9mg/L, respectively**. Refer to Table 4.

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

	Analytes	Units	Site Criteria (mg/L)	MWC June 2021	MWC Sept 2021
IONS	Calcium	mg/L	NA	290	330
	Alkalinity (total)	mg/L	NA	850	890
	Chloride	mg/L	NA	4000	3400
	Fluoride	mg/L	NA	0.2	0.2
	Potassium¹	mg/L	410	1	1
	Magnesium	mg/L	NA	390	440
	Sulphate	mg/L	NA	150	120
HEAVY METALS	Iron	mg/L	0.3	<LOR	<LOR
	Manganese	mg/L	1.9	4.7	4.4
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	6.9	6.8
	Sodium	mg/L	NA	1600	1700
	Ammonia²	mg/L	0.9	0.03	0.021
	Nitrate	mg/L	0.7	0.14	0.058
	Total Organic Carbon	mg/L	4	8	9
	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 June 2021–September 2021 (MWD)

	Analytes	Units	Site Criteri a (mg/L)	MWD (leachat e) June 2021	MWD (leachat e) Sept 2021
IONS	Calcium	mg/L	NA	140	170
	Alkalinity (total)	mg/L	NA	1500	1700
	Chloride	mg/L	NA	1400	1600
	Fluoride	mg/L	NA	0.3	0.2
	Potassium¹	mg/L	410	67	120
	Magnesium	mg/L	NA	120	170
	Sulphate	mg/L	NA	100	41
HEAVY METALS	Iron	mg/L	0.3	0.69	0.58
	Manganese	mg/L	1.9	0.5	0.59
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.3	7.5
	Sodium	mg/L	NA	720	970
	Ammonia²	mg/L	0.9	150	170
	Nitrate	mg/L	0.7	<LOR	<LOR
	Total Organic Carbon	mg/L	4	81	110
	EC	µS/cm	NA	6600	8400

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 **three exceedances** of the site criteria for September in MWE. **Iron at concentrations of 0.43 mg/L, Manganese at concentrations of 2mg/L and TOC at concentrations of 6 mg/L.** Refer to Table 6.

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

	Analytes	Units	Threshold Criteria (mg/L)	MWE June 2021	MWE Sept 2021
IONS	Calcium	mg/L	NA	65	100
	Alkalinity (total)	mg/L	NA	1000	1000
	Chloride	mg/L	NA	520	770
	Fluoride	mg/L	NA	0.5	0.4
	Potassium¹	mg/L	410	1	2
	Magnesium	mg/L	NA	67	110
	Sulphate	mg/L	NA	110	170
HEAVY METALS	Iron	mg/L	0.3	0.45	0.43
	Manganese	mg/L	1.9	1.3	2.0
PHENOLS	Total phenolics	mg/L	0.32	<LOR	<LOR
OCP	OCP³	mg/L	0.00001	<LOR	<LOR
MISC. INORGANICS	pH	pH	6.5 – 8	7.1	7.2
	Sodium	mg/L	NA	560	950
	Ammonia²	mg/L	0.9	0.005	0.52
	Nitrate	mg/L	0.7	<LOR	<LOR
	Total Organic Carbon	mg/L	4	16	6
	EC	µS/cm	NA	3500	4600

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 September 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 northwest 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 analytes concentrations are consistent with previous monitoring data, apart from a slightly decrease in the total carbon levels in comparison from the June sample.

MWB

MWB is located in the southwest 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 one exceedance of the site criteria. Changes at MWB, include;

- The TOC concentration remained increased (5mg/L), slightly over the site criteria of (4mg/L), and reduced from the June (6mg/L) sampling event.

All other analytes reported concentrations are 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 (4.4 mg/L) was reported in MWC. This is a slight decrease from the previous reporting period (4.7mg/L), still over the site criteria of (1.9mg/L).

- A concentration of TOC (9 mg/L) was reported in MWC exceeding the Site Criteria (4mg/L). This value remained steadily high, as per previous June report.

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.

The following changes occurred in the water quality of the landfill leachate well MWD, in comparison to the June's report:

- Iron concentration of 0.69 mg/L in June's report presented as a decrease to 0.58 mg/L;
- Ammonia has increased to a concentration of 170 mg/L;
- TOC has increased from 81 mg/L to a concentration of 110 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 MWE:

- The Iron concentration has risen from 0.45 mg/L to 0.47 mg/L in comparison to June's report, which is above the site criteria.
- The Manganese concentration has increased from 1.3 mg/L in June's report, which was below the site criteria, to 2.0 mg/L, which is above the site criteria.
- The TOC concentration has decreased from 16mg/L to 6mg/L, persistently exceeding the site criteria.

All other analytes reported concentrations consistent with previous monitoring data.

The following analytes exceeded the Threshold Criteria during the September 2021 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWB, Manganese and TOC in MWC; Iron, Manganese and TOC in MWE. Refer to **Attachment 3** – Data Log.

Site and Maintenance

No immediate maintenance required

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 quarterly analysis of monitoring periods occurred in an average year in terms of climate events, with no major changes in weather circumstances. 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 September 2021 quarterly sampling event displayed several ongoing exceedances of the Site Criteria from the previous monitoring period.

The following analytes exceeded the Threshold Criteria during the September 2021 sampling event, excluding the Leachate Monitoring well (MWD); TOC in MWB, Manganese and TOC in MWC; Iron, Manganese 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 the annual monitoring event which will be undertaken in December 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 1

DATA LOG

ENGAGE ENVIRONMENTAL SERVICES			Threshold Criteria	NA	NA	NA	NA	0.3	NA	0.0001	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	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	278893	22/09/2021	540	500	6300	0.1	<10	990	10	<0.0002	3	6.8	2100	0.068	0.6	48	3	<0.05	19000		
MWB	278893	22/09/2021	480	420	4300	0.2	<10	600	20	<0.0002	4	6.9	1500	0.024	0.66	76	6	<0.05	14000		
MWC	278893	22/09/2021	330	890	3400	0.2	10	440	4400	<0.0002	3	6.8	1700	0.021	0.058	120	9	<0.05	13000		
MWD	278893	22/09/2021	170	1700	1600	0.2	580	170	590	<0.0002	120	7.5	970	170	0.008	41	110	<0.05	8400		
MWE	278893	22/09/2021	100	1100	770	0.4	430	110	2000	<0.0002	2	7.2	950	0.52	<0.005	170	6	<0.05	4600		

Attachment 2

NATA ACCREDITED LAB RESULTS

CERTIFICATE OF ANALYSIS 278893

Client Details

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

Sample Details

Your Reference	<u>E04-0921-UHSC</u>
Number of Samples	5 water
Date samples received	24/09/2021
Date completed instructions received	24/09/2021

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.

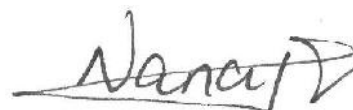
Report Details

Date results requested by	01/10/2021
Date of Issue	01/10/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Diego Bigolin, Inorganics Supervisor
 Giovanni Agosti, Group Technical Manager
 Priya Samarawickrama, Senior Chemist
 Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in Water						
Our Reference		278893-1	278893-2	278893-3	278893-4	278893-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		22/09/2021	22/09/2021	22/09/2021	22/09/2021	22/09/2021
Type of sample		water	water	water	water	water
Date extracted	-	27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
Date analysed	-	27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
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	%	101	98	88	83	95

Total Phenolics in Water						
Our Reference		278893-1	278893-2	278893-3	278893-4	278893-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		22/09/2021	22/09/2021	22/09/2021	22/09/2021	22/09/2021
Type of sample		water	water	water	water	water
Date extracted	-	27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
Date analysed	-	27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved						
Our Reference		278893-1	278893-2	278893-3	278893-4	278893-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		22/09/2021	22/09/2021	22/09/2021	22/09/2021	22/09/2021
Type of sample		water	water	water	water	water
Date prepared	-	27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
Date analysed	-	27/09/2021	27/09/2021	27/09/2021	27/09/2021	27/09/2021
Iron-Dissolved	µg/L	<10	<10	10	580	430
Manganese-Dissolved	µg/L	10	20	4,400	590	2,000

Ion Balance						
Our Reference		278893-1	278893-2	278893-3	278893-4	278893-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		22/09/2021	22/09/2021	22/09/2021	22/09/2021	22/09/2021
Type of sample		water	water	water	water	water
Date prepared	-	24/09/2021	24/09/2021	24/09/2021	24/09/2021	24/09/2021
Date analysed	-	24/09/2021	24/09/2021	24/09/2021	24/09/2021	24/09/2021
Calcium - Dissolved	mg/L	540	480	330	170	100
Potassium - Dissolved	mg/L	3	4	3	120	2
Sodium - Dissolved	mg/L	2,100	1,500	1,700	970	950
Magnesium - Dissolved	mg/L	990	600	440	170	110
Hydroxide Alkalinity (OH ⁻) as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Bicarbonate Alkalinity as CaCO ₃	mg/L	500	420	890	1,700	1,100
Carbonate Alkalinity as CaCO ₃	mg/L	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	500	420	890	1,700	1,100
Sulphate, SO ₄	mg/L	48	76	120	41	170
Chloride, Cl	mg/L	6,300	4,300	3,400	1,600	770
Ionic Balance	%	3.0	4.0	4.0	-9.0	9.0

Miscellaneous Inorganics						
Our Reference		278893-1	278893-2	278893-3	278893-4	278893-5
Your Reference	UNITS	MWA	MWB	MWC	MWD	MWE
Date Sampled		22/09/2021	22/09/2021	22/09/2021	22/09/2021	22/09/2021
Type of sample		water	water	water	water	water
Date prepared	-	24/09/2021	24/09/2021	24/09/2021	24/09/2021	24/09/2021
Date analysed	-	24/09/2021	24/09/2021	24/09/2021	24/09/2021	24/09/2021
Ammonia as N in water	mg/L	0.068	0.024	0.021	170	0.52
Fluoride, F	mg/L	0.1	0.2	0.2	0.2	0.4
Total Organic Carbon	mg/L	3	6	9	110	6
Nitrate as N in water	mg/L	0.60	0.66	0.058	0.008	<0.005
pH	pH Units	6.8	6.9	6.8	7.5	7.2
Electrical Conductivity	µS/cm	19,000	14,000	13,000	8,400	4,600

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: E04-0921-UHSC

QUALITY CONTROL: Organochlorine Pesticides in Water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	278893-5
Date extracted	-			27/09/2021	[NT]	[NT]	[NT]	[NT]	27/09/2021	27/09/2021
Date analysed	-			27/09/2021	[NT]	[NT]	[NT]	[NT]	27/09/2021	27/09/2021
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	91	88
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]	111	100
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]	86	86
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]	96	93
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	100	90
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]	90	90
Dieldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	106	106
Endrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	111	123
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]	89	89
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]	100	102
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	88	[NT]	[NT]	[NT]	[NT]	110	99

Client Reference: E04-0921-UHSC

QUALITY CONTROL: Total Phenolics in Water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	278893-2
Date extracted	-			27/09/2021	1	27/09/2021	27/09/2021		27/09/2021	27/09/2021
Date analysed	-			27/09/2021	1	27/09/2021	27/09/2021		27/09/2021	27/09/2021
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	1	<0.05	<0.05	0	93	71

Client Reference: E04-0921-UHSC

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/09/2021	1	27/09/2021	27/09/2021		27/09/2021	[NT]
Date analysed	-			27/09/2021	1	27/09/2021	27/09/2021		27/09/2021	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	1	<10	<10	0	95	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	10	10	0	100	[NT]

Client Reference: E04-0921-UHSC

QUALITY CONTROL: Ion Balance				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/09/2021	1	24/09/2021	24/09/2021		24/09/2021	[NT]
Date analysed	-			24/09/2021	1	24/09/2021	24/09/2021		24/09/2021	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	540	530	2	101	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	3	3	0	102	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	2100	2100	0	95	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	1	990	970	2	92	[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]		106	[NT]
Sulphate, SO ₄	mg/L	1	Inorg-081	<1	1	48	[NT]		86	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	1	6300	[NT]		86	[NT]
Ionic Balance	%		Inorg-040	[NT]	1	3.0	[NT]		[NT]	[NT]

Client Reference: E04-0921-UHSC

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	278893-2
Date prepared	-			24/09/2021	1	24/09/2021	24/09/2021		24/09/2021	24/09/2021
Date analysed	-			24/09/2021	1	24/09/2021	24/09/2021		24/09/2021	24/09/2021
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	0.068	[NT]		114	[NT]
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	1	0.1	[NT]		98	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	3	3	0	103	106
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	1	0.60	[NT]		106	[NT]
pH	pH Units		Inorg-001	[NT]	1	6.8	[NT]		103	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	19000	[NT]		104	[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

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

Attachment 3

GROUNDWATER FIELD DATA SHEETS

odour, colour, sheen, sediments

start 11:42

probe
display
conductivity
salinity
sul ppt
etc

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW A
Client: UHSC	Sampler: CL
Site Address: Scone Waste Facility	Date: 22.9.21

Well Information

Monument damaged: YES / NO / N/A - Well ID visible: YES / NO / N/A

Locked well casing: YES / NO / N/A - Cap on PVC casing: YES / NO / N/A

Cement footing damaged: YES / NO / N/A - Water in monument casing: YES / NO / N/A

Standing water, vegetation around monument: YES / NO / N/A - Internal obstruction in casing: YES / NO / N/A

Well Damaged: YES / NO / N/A Odours from groundwater: YES / NO / N/A

Casing above ground: m agl

Standing water level: 7.95 m bgl **Weather Conditions:**

Total well depth: 15.74 m bgl → Temperature 15-20 20-25

Initial well volume: L 25-30 >30

Water level after purging: m bgl Clear Partly cloudy Overcast

Volume of water purged: L

Water level at time of sampling: m bgl Calm Slight breeze Moderate breeze

Well purged dry: YES / NO Windy

Purging equipment:

Sample equipment: Fine Showers Rain

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

Water Quality Details:

Time am / pm	DO (mg/L ⁻¹)	EC (µS cm ⁻¹)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
11:42	6.23	14334	6.32	387	21.1	10.8	
	6.38	14724	6.45	394	21.1	10.8	
	5.44	14943	6.51	441	21.5	11.1	
	6.22	15001	6.7	468	21.7	11.3	

reading
3rd

see how close EC and pH are

Water Quality and General Comments:

Standing water level	1 st	cloudy	sediments	no od	no sheen
total well depth	2 nd	"	"	"	"
3 rd	"	"	"	"	"
4 th	"	"	"	"	"

fill bale after EC stabilises - 10% of 4-6K

Start: 11:00

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW B
Client: UHSC	Sampler: CL
Site Address: Scone Waste Facility	Date: 22.9.21

Well Information			
Monument damaged:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A	Well ID visible:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A
Locked well casing:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A	Cap on PVC casing:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A
Cement footing damaged:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A	Water in monument casing:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A
Standing water, vegetation around monument:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A	Internal obstruction in casing:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A
Well Damaged:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A	Odours from groundwater:	YES <input type="radio"/> NO <input checked="" type="radio"/> N/A
Casing above ground:	m agl	Weather Conditions:	
Standing water level: <u>7.56</u>	m bgl	Temperature 15-20 <input type="checkbox"/>	20-25 <input checked="" type="checkbox"/>
Total well depth: <u>16.18</u>	m bgl	25-30 <input type="checkbox"/>	>30 <input type="checkbox"/>
Initial well volume:	L	Clear <input checked="" type="checkbox"/>	Partly cloudy <input type="checkbox"/> Overcast <input type="checkbox"/>
Water level after purging:	m bgl	Calm <input checked="" type="checkbox"/>	Slight breeze <input type="checkbox"/> Moderate breeze <input type="checkbox"/>
Volume of water purged:	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:			
Sample equipment:			

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

Water Quality Details:

Time (am/pm)	DO (mg/L ⁻¹)	EC (μS cm ⁻¹)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
11:00	5.45	13347	7.20	609	20.9	7.98	
	4.68	13131	6.92	501	21.2	8.11	
	4.70	13193	6.64	472	20.8	8.32	
	6.08	13102	6.81	458	20.6	8.48	

Water Quality and General Comments:

1st	clear,	no odour,	no sheen,	sediments	
2nd					
3rd					
4th					

20.05
2

start = 9:49 am

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW C
Client: UHSC	Sampler: CL
Site Address: Scone Waste Facility	Date: 22.9.21

Well Information

Monument damaged: YES / NO / N/A
 Locked well casing: YES / NO / N/A
 Cement footing damaged: YES / NO / N/A
 Standing water, vegetation around monument: YES / NO / N/A
 Well Damaged: YES / NO / N/A

Casing above ground: m agl
 Standing water level: 6.26 m bgl
 Total well depth: 12.60 m bgl
 Initial well volume: L
 Water level after purging: m bgl
 Volume of water purged: L
 Water level at time of sampling: m bgl
 Well purged dry: YES / NO
 Purging equipment:
 Sample equipment: Fine

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 20-25
 25-30 >30
 Clear Partly cloudy Overcast
 Calm Slight breeze Moderate breeze
 Windy
 Showers Rain

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

20.5
3.70
11850
7.46
29.80

Water Quality Details:

Time am / pm	DO (mg/L ⁻¹)	EC (µS cm ⁻¹)	pH	Redox (mV)	Temp (°C)	Salinity (% Refract)	Comments
9:49	3.70	11850	6.8	187.6	20.5	8.25	
	3.36	11727	6.83	188.4	22.7	8.33	
	3.04	11789	6.7	178.9	20.8	8.45	
	2.49	11819	6.7	175.3	20.5	8.49	

Water Quality and General Comments:

1st	cloudy, no odour, no sheen, sediments
2nd	"
3rd	"
4th	"

- temp -
-
-
-
-
- ph -

E04-619

MWE

Sampler CL 22.9.21

MWE

MD - no

LWC - YES

CFD - no

SW reg. - YES

well damaged no

well visib ID no

cap on PVC casing YES

water in mon. casing no

internal obs - no

odours from GWT - no

sw level - 3.97

total depth - 9.32

T - 20-25

clear, calm, fine

Time	DO	EC	ph	redox	temp	salinity
12:42	5.45	2451	7.0	30.4	21.3	2.3
	6.20	2448	7.0	33.3	21.3	2.3
	6.48	2386	7.1	33.7	21.4	2.8
	6.83	2383	7.1	34.8	21.4	3.1

- 1 clear, sediments, light sulfur odour, no sheen
- 2 cloudy " " "
- 3 cloudy | | "
- 4 cloudy | | "

GROUNDWATER FIELD DATA SHEET

Project: E04-619	Sample ID: MW D
Client: UHSC	Sampler: CL
Site Address: Scone Waste Facility	Date: 22.9.21

Well Information			
Monument damaged:	YES / NO / <u>N/A</u>	Well ID visible:	YES / <u>NO</u> / N/A
Locked well casing:	YES / <u>NO</u> / N/A	Cap on PVC casing:	YES / <u>NO</u> / N/A
Cement footing damaged:	YES / NO / <u>N/A</u>	Water in monument casing:	YES / NO / <u>N/A</u>
Standing water, vegetation around monument:	<u>YES</u> / NO / N/A	Internal obstruction in casing:	YES / <u>NO</u> / N/A
Well Damaged:	YES / <u>NO</u> / N/A	Odours from groundwater:	YES / NO / N/A
Casing above ground:	m agl	Weather Conditions:	
Standing water level: <u>2.97</u>	m bgl	Temperature 15-20 <input type="checkbox"/>	20-25 <input checked="" type="checkbox"/>
Total well depth: <u>13.08</u>	m bgl	25-30 <input type="checkbox"/>	>30 <input type="checkbox"/>
Initial well volume:	L	Clear <input checked="" type="checkbox"/>	Partly cloudy <input type="checkbox"/>
Water level after purging:	m bgl	Overcast <input type="checkbox"/>	
Volume of water purged:	L	Calm <input checked="" type="checkbox"/>	Slight breeze <input type="checkbox"/>
Water level at time of sampling:	m bgl	Moderate breeze <input type="checkbox"/>	
Well purged dry:	YES / NO	Windy <input type="checkbox"/>	
Purging equipment:		Fine <input checked="" type="checkbox"/>	Showers <input type="checkbox"/>
Sample equipment:		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
13:32	3.38	3121	7.1	-35.4	24.9	2.61	
	3.35	3134	7.1	-35.4	25.1	2.45	
	3.44	3180	7.1	-37.9	25.1	2.74	
	3.80	3228	7.3	-41.4	26.0	3.31	

Water Quality and General Comments:

1	Grey opaque, sediments, sheen, strong sulfur odour
2	" " " "
3	" " " "
4	" " " "