Verde Environmental Consultants

December 2022 Quarterly Monitoring Report

Veolia Environmental Services Technical Solutions,

Corrin, Fermoy,

Co. Cork

March 2023

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APPENDICES

DOCUMENT CONTROL

Project Title:	December 2022 Quarterly Monitoring Report
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Project No.:	50370
Report Ref.:	March 2023
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Client:	Veolia Environmental Services Technical Solutions Ltd.
Site Details:	Hazardous Waste Transfer Facility
Issued By:	Verde Environmental Consultants Ltd.

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	Name	**Signature**	**Date**	**Position**
Created By	Jacqui O'Shea		24th March 2023	Environmental Scientist
Checked & Approved by	Kevin Cleary		24th March 2023	Project Director

LIMITATIONS

This report represents the results of the site inspection and site investigation works conducted at the above referenced site(s). Best practice was followed at all times and within the limitations stated; works were undertaken according to budgetary considerations. This report is the property of Verde Environmental Consultants Limited and cannot be used, copied or given to any third party without the explicit prior approval or agreement of Verde Environmental Consultants Limited.

1. INTRODUCTION

Verdé Environmental Consultants Ltd. (Verde), on behalf of Veolia Environmental Services Technical Solutions Limited (Veolia), carried out groundwater and surface water monitoring at their facility in Fermoy, which is a requirement of the site's Waste Licence (No. W0050-02).

Sampling was undertaken by a Verde Environmental Scientist on 7th December 2022 when three on-site wells were sampled and two surface water samples were taken. Sampling was undertaken as part of a quarterly monitoring programme at the facility.

2. SITE MONITORING AND RESULTS

All water sampling was undertaken as per best practice and sampling guidelines where by samples were obtained using laboratory supplied sampling containers and stored in cool boxes prior to dispatch to an appropriately accredited laboratory. The sampling logs and field water quality readings are presented in Appendix A.

This quarterly monitoring round was undertaken at the three on-site wells and two stream locations upgradient and downgradient of the site, as presented in Figure 1. Additional bacteriological analysis is being undertaken for all monitoring rounds since 2018, as agreed with the EPA due to the detection of coliforms in the groundwater wells on site on occasion historically.

The water samples were sent to Element Materials Technology Environmental Laboratory, an independent accredited laboratory, for chemical analysis. Samples for time dependant bacteriological and Biological Oxygen Demand (BOD) analysis of the three groundwater samples and two surface water samples were sent to Eurofins Environmental Testing Ltd. in Cork. The groundwater and surface water sample results for December 2022 are presented in Appendix B.

2.1. Groundwater Sampling

The three groundwater wells (BH-1, BH-2 and BH-3) on-site have dedicated submersible pumps which are used to purge the wells in order to take representative groundwater samples from the sandstone bedrock aquifer. As required by the site's licence requirements the samples were tested for the following;

- physical observations and field measured water quality parameters (EC, pH, temperature)
- quarterly analysis including for total ammonia, chloride, sodium, potassium, hydrocarbons, total oxidised nitrogen, total organic carbon, residue on evaporation, aluminium, mercury, zinc and nickel.

The groundwater sample results for December 2022 are presented in Appendix B with concentrations very similar to the

previous monitoring rounds.

Total coliforms were detected in BH2 (>2420mpn/100ml) and in BH3 (66mpn/100ml) with E.coli detected in BH2 (5mpn/100ml) and BH3 (16mpn/100ml) in December 2022. There was no detection of enterococci in the three monitoring wells in September and December 2022. There was no detection of E.Coli in the three monitoring wells in March or June 2022. Additional bacteriological analysis was undertaken onsite and surrounding wells in November and December 2022. Bacteriological E.Coli results are tabulated in Table 2.1 below.

Table 2.1: Groundwater Bacteriological E.Coli Results

Parameter	Well ID / Sampling Date	BH1	BH2	BH3
E. Coli	Mar-18	0	0	0
	Jun-18	0	-	-
	Jul-18	-	**>100**	**>80**
	Aug-18	0	0	0
	Sep-18	0	**>100**	0
	Dec-18	0	0	0
	Mar-19	0	0	0
	Jun-19	0	0	0
	Sep-19	0	**1**	**1**
	Dec-19	0	0	0
	Mar-20	0	0	0
	Jun-20	0	0	0
	Sep-20	0	0	0
	Jan-21	0	0	0
	Mar-21	0	0	0
	Sep-21	0	0	0
	Dec-21	0	0	0
	Mar-22	0	0	0
	Jun-22	0	0	0
	Sep-22	0	**25**	0
	Oct-22	-	**29.6**	-
	Nov-22	0	**7.2**	0
	Dec-22	0	**5**	**16**

Hydrocarbons were not detected in December 2022 similar to recent years of groundwater monitoring. The metal and inorganic analyses are similar to previous monitoring rounds. Ammoniacal nitrogen was not detected above laboratory detection limits in December 2022, similar to recent years of groundwater monitoring.

Field measurements of pH, electrical conductivity (EC) and temperature were carried out with calibrated water quality

meter. pH readings for the bedrock groundwater wells were all within the EPA Interim Guideline Value (IGV) standard range of between 6.5 and 9.5. Field EC ranged from 489.6µS/cm to 603.4µS/cm in the groundwater wells, which is below the EPA IGV value of 1,000µS/cm. Groundwater temperatures recorded on-site in all wells ranged from 11.2°C to 11.9°C, which is generally within the typical range of groundwater temperatures in Ireland of 9°C to 12°C.

DO readings ranged from 3.06mg/l to 3.49mg/l in December 2022 with ORP readings from 157.3mV to 167.9mV indicating slightly oxidising groundwater conditions in the bedrock aquifer beneath the site.

Overall the December 2022 samples are consistent with recent monitoring rounds.

2.2. Surface Water Sampling

The two surface water monitoring points (WSP1 & WSP2) were sampled using a sampling pole and analysed for:

- physical observations and field measured water quality parameters (EC, pH, temperature).
- total ammonia, chloride, BOD and suspended solids.

Photo 1: Upstream surface water sampling location WSP1 (December 2022)

Photo 2: Downstream surface water sampling location WSP2 (December 2022)

The surface water upstream and downstream sample results for December 2022 are presented in Appendix B with concentrations very similar to the previous monitoring rounds.

Field measurements of pH ranged from 7.13 to 7.67 for both surface water samples with EC ranging from 301.6µS/cm to 324.6µS/cm. Water temperature is colder than groundwater as expected with readings from 9.8°C to 10.1°C. The surface water shows slightly oxygenated waters in the stream with DO ranging from 6.67mg/l to 6.89mg/l.

3. SUMMARY AND CONCLUSIONS

Verdé carried a round of groundwater and surface water monitoring on 7th December 2022 as part of a quarterly monitoring programme at the facility.

The December 2022 groundwater and surface water monitoring round was generally consistent with previous monitoring rounds with the exception of E. coli detected in BH2 (5mpn/100ml) and BH3 (16mpn/100ml). Additional monitoring was carried out on onsite wells and surrounding wells in November and December 2022.

Overall it can be seen that site operations at the Veolia site are not causing any contamination impacts to the underlying bedrock aquifer or nearby surface waters.

Figure


LEGEND
BH
Groundwater well location
WSP
Surface water monitoring location
Stream
Culvert
Site boundary
WSP1
M8
BH2
BH3
BH1
WSP2
M8
R639
N
0
100
200
300
400
500
Scale Bar (at A4 size)
Metres
Verdé
www.verde.ie
Tel: + 353 1 201 1260
Title: Site Layout Map with Monitoring Locations
Client: Veol ia Environmental Services, Fermoy.
Date: July 2014
Job Ref: 50370
Figure No. 1

Appendix A

Groundwater and Surface Water Sampling Logs December 2022

Groundwater Monitoring Well Sampling Logs			
Well Name	BH1	**Site**	Veolia Fermoy
Static Water Level (meters below refrence point)	Well Pumping	**Project Reference**	50370
Water Level Reference Point		**Coordinates**	581318, 595258
Well Depth (m)		**Sampler**	Jacqui O'Shea
Well Diamter (m)	0.15	**Date**	7th December 2022
Screen Interval (m)		**Sampling Method**	Tap in laboratory
Well Volume (m)		**Containers Used**	0.5l glass, 0.5l plastic, 2x 100ml plastic, 2x 40ml glas vials, 1 x sterile
Purge Volume (litres)	>1,000	**Preservative Used**	H_2SO_4 for ammonia, HNO3 for metals
Well Head Condition	Metal Cover	**Weather**	cold, dry

Physical Observations		Field Water Quality Readings	
Colour	Clear	**pH**	7.04
Odour	None	**EC (µS/cm)**	567,8
Well Recovery Rate		**Temperature (^oC)**	11.2
Comments		**DO (mg/l)**	3.06
		ORP (mV)	167.9

Groundwater Monitoring Well Sampling Logs			
Well Name	BH2	**Site**	Veolia Fermoy
Static Water Level (meters below refrence point)	Well Pumping	**Project Reference**	50370
Water Level Reference Point	Below top of casing	**Coordinates**	581374, 595378
Well Depth (m)		**Sampler**	Jacqui O'Shea
Well Diamter (m)	0.15	**Date**	7th December 2022
Screen Interval (m)		**Sampling Method**	Discharge Hosing
Well Volume (m)		**Containers Used**	0.5l glass, 0.5l plastic, 2x 100ml plastic, 2x 40ml glas vials, 1 x sterile
Purge Volume (litres)		**Preservative Used**	H_2SO_4 for ammonia, HNO3 for metals
Well Head Condition	Metal cover	**Weather**	cold, dry

Physical Observations		Field Water Quality Readings	
Colour	Clear	**pH**	7.56
Odour	None	**EC (µS/cm)**	603.4
Well Recovery Rate		**Temperature (°C)**	11.3
Comments		**DO (mg/l)**	3.49
		Redox (mV)	158.0

Groundwater Monitoring Well Sampling Logs			
Well Name	BH3	**Site**	Veolia Fermoy
Static Water Level (meters below refrence point)	Well pumping	**Project Reference**	50370
Water Level Reference Point		**Coordinates**	581425, 595259
Well Depth (m)		**Sampler**	Jacqui O'Shea
Well Diamter (m)	0.15	**Date**	7th December 2022
Screen Interval (m)		**Sampling Method**	Discharge Hosing
Well Volume (m)		**Containers Used**	0.5l glass, 0.5l plastic, 2x 100ml plastic, 2x 40ml glas vials, 1 x sterile
Purge Volume (litres)	>1,000	**Preservative Used**	H_2SO_4 for ammonia, HNO3 for metals
Well Head Condition		**Weather**	cold, dry

Physical Observations		Field Water Quality Readings	
Colour	Clear	**pH**	7.23
Odour	None	**EC (µS/cm)**	489.6
Well Recovery Rate		**Temperature (°C)**	11.9
Comments		**DO (mg/l)**	3.45
		ORP (mV)	157.3

Surface Water Sampling Logs			
Well Name	WSP1 - Upstream	**Site**	Veolia Fermoy
Static Water Level		**Project Reference**	50370
Water Level Reference Point		**Coordinates**	581417, 595856
		Sampler	Jacqui O'Shea
		Date	7th December 2022
		Sampling Method	Sampling Pole
		Containers Used	2 x 0.5l plastic, 1 x 100ml plastic
		Preservative Used	H_2SO_4 for ammonia
		Weather	cold, dry

Physical Observations		Field Water Quality Readings	
Colour	Clear water	**pH**	7.13
Odour	None	**EC (µS/cm)**	324.6
Comments	Low flow, sand & gravel bed, some weeds & vegetation present	**Temperature (°C)**	9.8
		DO (mg/l)	6.67
		ORP (mV)	236.8

Surface Water Sampling Logs			
Well Name	WSP2 - Downstream	**Site**	Veolia Fermoy
Static Water Level		**Project Reference**	50370
Water Level Reference Point		**Coordinates**	581795, 595138
		Sampler	Jacqui O'Shea
		Date	7th December 2022
		Sampling Method	Sampling Pole
		Containers Used	2 x 0.5l plastic, 1 x 100ml plastic
		Preservative Used	H_2SO_4 for ammonia
		Weather	cold, dry

Physical Observations		Field Water Quality Readings	
Colour	Clear	**pH**	7.67
Odour	None	**EC (µS/cm)**	301.6
Comments	Low flow, sand & gravel bed, shallow, lots of vegetation present	**Temperature (°C)**	10.1
		DO (mg/l)	6.89
		ORP (mV)	235.7

Appendix B

Independent Laboratory Reports December 2022

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

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F: +44 (0) 1244 833781
W: www.element.com

Verde Environmental Consultants
Unit 3 Airport E.Business & Technology Park
Farmers Cross
Cork

Attention :	Jacqui O'Shea
Date :	20th December, 2022
Your reference :	50370
Our reference :	Test Report 22/20312 Batch 1
Location :	
Date samples received :	9th December, 2022
Status :	Final Report
Issue :	1

Nine samples were received for analysis on 9th December, 2022 of which nine were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Client Name: Verde Environmental Consultants
Reference: 50370
Location:
Contact: Jacqui O'Shea
EMT Job No: 22/20312

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-3	4-6	7-13	14-20	21-27	28-35,60	36-43,61	44-51,62	52-59,63		LOD/LOR	Units	Method No.
Sample ID	WSP-1	WSP-2	BH01	BH02	BH03	Hollywell	H1	H2	N1				
Depth										Please see attached notes for all abbreviations and acronyms			
COC No / misc													
Containers	H P	H P	V H HN P G	V H HN P G	V H HN P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G				
Sample Date	07/12/2022	07/12/2022	07/12/2022	07/12/2022	07/12/2022	06/12/2022	06/12/2022	06/12/2022	06/12/2022				
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022				
Dissolved Aluminium #	-	-	<20	611	<20	<20	<20	<20	<20		<20	ug/l	TM30/PM14
Dissolved Cadmium #	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5		<0.5	ug/l	TM30/PM14
Dissolved Calcium #	-	-	-	-	-	86.2	101.2	83.7	15.4		<0.2	mg/l	TM30/PM14
Dissolved Copper #	-	-	-	-	-	<7	<7	<7	48		<7	ug/l	TM30/PM14
Total Dissolved Iron #	-	-	-	-	-	<20	40	<20	<20		<20	ug/l	TM30/PM14
Dissolved Lead #	-	-	-	-	-	<5	<5	<5	<5		<5	ug/l	TM30/PM14
Dissolved Magnesium #	-	-	-	-	-	4.3	4.6	3.7	3.7		<0.1	mg/l	TM30/PM14
Dissolved Manganese #	-	-	-	-	-	<2	<2	<2	<2		<2	ug/l	TM30/PM14
Dissolved Mercury #	-	-	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	TM30/PM14
Dissolved Nickel #	-	-	<2	<2	<2	<2	<2	<2	2		<2	ug/l	TM30/PM14
Dissolved Potassium #	-	-	0.5	2.9	0.7	1.4	0.6	1.0	1.5		<0.1	mg/l	TM30/PM14
Dissolved Sodium #	-	-	20.5	15.7	9.0	15.2	8.9	9.8	11.6		<0.1	mg/l	TM30/PM14
Dissolved Zinc #	-	-	89	4	<3	<3	<3	13	35		<3	ug/l	TM30/PM14
Total Chromium	-	-	-	-	-	<1.5	<1.5	11.7	<1.5		<1.5	ug/l	TM30/PM14
Total Phosphorus	-	-	-	-	-	19	25	230	<5		<5	ug/l	TM30/PM14
PAH MS													
Naphthalene #	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1		<0.1	ug/l	TM4/PM30
Acenaphthylene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Acenaphthene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Fluorene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Phenanthrene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Anthracene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Fluoranthene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Pyrene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Chrysene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	-	-	-	-	-	<0.008	<0.008	<0.008	<0.008		<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005		<0.005	ug/l	TM4/PM30
PAH 16 Total #	-	-	-	-	-	<0.173	<0.173	<0.173	<0.173		<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	-	-	-	-	-	<0.008	<0.008	<0.008	<0.008		<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	-	-	-	-	-	<0.008	<0.008	<0.008	<0.008		<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	-	-	-	-	-	73	77	76	73		<0	%	TM4/PM30
GRO (>C4-C8) #	-	-	-	-	-	<10	<10	<10	<10		<10	ug/l	TM36/PM12
GRO (>C8-C12) #	-	-	-	-	-	<10	<10	<10	<10		<10	ug/l	TM36/PM12
GRO (>C4-C12) #	-	-	-	-	-	<10	<10	<10	<10		<10	ug/l	TM36/PM12
EPH (C8-C40) #	-	-	<10	<10 SV	<10	<10	<10	<10	<10		<10	ug/l	TM5/PM30
Mineral Oil (C10-C40)	-	-	<10	<10	<10	<10	<10	<10	<10		<10	ug/l	TM5/PM16/PM30

Element Materials Technology

Client Name: Verde Environmental Consultants
Reference: 50370
Location:
Contact: Jacqui O'Shea
EMT Job No: 22/20312

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

EMT Sample No.	1-3	4-6	7-13	14-20	21-27	28-35,60	36-43,61	44-51,62	52-59,63		LOD/LOR	Units	Method No.
Sample ID	WSP-1	WSP-2	BH01	BH02	BH03	Hollywell	H1	H2	N1				
Depth										Please see attached notes for all abbreviations and acronyms			
COC No / misc													
Containers	H P	H P	V H HN P G	V H HN P G	V H HN P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G				
Sample Date	07/12/2022	07/12/2022	07/12/2022	07/12/2022	07/12/2022	06/12/2022	06/12/2022	06/12/2022	06/12/2022				
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022	09/12/2022				
Fluoride	-	-	-	-	-	<0.3	<0.3	<0.3	<0.3		<0.3	mg/l	TM173/PM0
Chloride #	23.5	23.6	24.5	29.9	21.7	-	-	-	-		<0.3	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	-	-	-	-	-	<0.06	<0.06	<0.06	<0.06		<0.06	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	-	-	2.0	6.4	9.5	5.9	4.9	2.6	5.7		<0.2	mg/l	TM38/PM0
Total Cyanide #	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01		<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N #	<0.03	0.03	<0.03	<0.03	<0.03	-	-	-	-		<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH3 #	-	-	-	-	-	<0.030	<0.030	<0.030	<0.030		<0.030	mg/l	TM38/PM0
COD (Settled) #	-	-	<7	<7	<7	-	-	-	-		<7	mg/l	TM57/PM0
Free/Residual Chlorine	-	-	-	-	-	<0.02	0.03	0.04	<0.02		<0.02	mg/l	TM66/PM0
pH #	-	-	-	-	-	8.18	8.24	8.23	7.91		<0.01	pH units	TM73/PM0
Total Organic Carbon #	-	-	3	<2	<2	<2	<2	<2	2		<2	mg/l	TM60/PM0
Total Solids #	-	-	247	302	379	281	305	327	159		<5	mg/l	TM20/PM0
Total Suspended Solids #	<10	12	<10	14	<10	<10	<10	41	<10		<10	mg/l	TM37/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Verde Environmental Consultants
Reference: 50370
Location:
Contact: Jacqui O'Shea
EMT Job No: 22/20312

SVOC Report : **Liquid**

EMT Sample No.	28-35,60	36-43,61	44-51,62	52-59,63							LOD/LOR	Units	Method No.
Sample ID	Hollywell	H1	H2	N1									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	06/12/2022	06/12/2022	06/12/2022	06/12/2022									
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water									
Batch Number	1	1	1	1									
Date of Receipt	09/12/2022	09/12/2022	09/12/2022	09/12/2022									
SVOC MS													
Phenols													
2-Chlorophenol #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1	<1							<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1							<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1	<1							<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Phenol	<1	<1	<1	<1							<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5							<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5	<1.5							<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Other SVOCs													
1,2-Dichlorobenzene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1	<1	<1							<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1	<1	<1							<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1	<1	<1							<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1	<1	<1							<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5+	<0.5+	<0.5+	<0.5+							<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1	<1	<1	<1							<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	90	82	85	84							<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	92	83	88	86							<0	%	TM16/PM30

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Verde Environmental Consultants
Reference: 50370
Location:
Contact: Jacqui O'Shea
EMT Job No: 22/20312

VOC Report : **Liquid**

EMT Sample No.	28-35,60	36-43,61	44-51,62	52-59,63									
Sample ID	Hollywell	H1	H2	N1									
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	06/12/2022	06/12/2022	06/12/2022	06/12/2022									
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water									
Batch Number	1	1	1	1									
Date of Receipt	09/12/2022	09/12/2022	09/12/2022	09/12/2022									
VOC MS											LOD/LOR	Units	Method No.
Dichlorodifluoromethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	4	<3							<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5							<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1							<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4							<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	99	97	106	91							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	105	99	104	90							<0	%	TM15/PM10

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Verde Environmental Consultants

Matrix : Liquid

Reference: 50370

Location:

Contact: Jacqui O'Shea

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
22/20312	1	H2		44-51,62	VOC	Analysis taken from a previously sampled container.

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/20312

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/20312

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				

EMT Job No: 22/20312

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1985), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM66	Determination of Free Chlorine which reacts with DPD (N,N-diethyl-p-phenylenediamine) reagent and measured spectrophotometrically.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.				

Eurofins Environment Testing Ireland
Hoffman Park, Inchera
Cork
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IRELAND

Certificate Code: **AR-22-M3-032388-01**
Page Number: **Page 1 of 1**
PO reference:

Certificate of Analysis

Sample number	966-2022-00043374	Received on	07/12/2022
		Analysis started on	07/12/2022
Your sample reference	BH 1		
Sample Matrix	Ground water		
Sample Condition on Arrival	Satisfactory	Sample Date	07/12/2022
Time Sampled	10:00		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Total Viable Microorganisms 22°C E (Water) [IE Env] <1 >300 /ml (0) Y								
Total Viable Microorganisms 22°C	*	07/12/22 12:33		1		19	cfu/ml	C6
Total Viable Microorganisms 37°C E (Water) [IE Env] <1 >300 /1 ml (0								
Total Viable Microorganisms 37°C	*	07/12/22 12:33		1		20	cfu/1 ml	C6
Coliforms E (Water) [IE Env] <1 >2 420 /100 ml (0) Colilert-18-Q MDW								
Coliforms	*	07/12/22 12:33		1		<1	MPN/100 ml	C6
Escherichia Coli E (Water) [IE Env] <1 >2 420 /100 ml (0) Colilert-18-Q								
Escherichia coli	*	07/12/22 12:33		1		<1	MPN/100 ml	C6
Enterococci E (Water) [IE Env] <1 >100 /100 ml (0) SB Agar-F MREW-								
Enterococci	*	07/12/22 12:33		1		<1	cfu/100 ml	C6

[4] Accreditiation Information

C6: ISO/IEC 17025:2017 INAB 138-T

Signed: Emma Nicholl - 23/12/2022

NOTES

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5. "*" indicates the test was sub-contracted
6. No date of sampling was supplied, sample stability cannot be assessed, results may be compromised.
7A. This result is compromised as it was tested outside of stability times.
7C. Sample not received in appropriate containers, therefore results may be compromised.
7D. This result is comprised as the sample was received by the laboratory outside of the holding time.

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Certificate Code: **AR-22-M3-032379-01**
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PO reference:

Certificate of Analysis

Sample number	966-2022-00043375	Received on	07/12/2022
		Analysis started on	07/12/2022
Your sample reference	BH 2		
Sample Matrix	Ground water		
Sample Condition on Arrival	Satisfactory	Sample Date	07/12/2022
Time Sampled	10:15		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Total Viable Microorganisms 22°C E (Water) [IE Env] <1 >300 /ml (0) Y								
Total Viable Microorganisms 22°C	*	07/12/22 12:33		1		>300	cfu/ml	C6
Total Viable Microorganisms 37°C E (Water) [IE Env] <1 >300 /1 ml (0								
Total Viable Microorganisms 37°C	*	07/12/22 12:33		1		>300	cfu/1 ml	C6
Coliforms E (Water) [IE Env] <1 >2 420 /100 ml (0) Colilert-18-Q MDW								
Coliforms	*	07/12/22 12:33		1		>2420	MPN/100 ml	C6
Escherichia Coli E (Water) [IE Env] <1 >2 420 /100 ml (0) Colilert-18-Q								
Escherichia coli	*	07/12/22 12:33		1		5	MPN/100 ml	C6
Enterococci E (Water) [IE Env] <1 >100 /100 ml (0) SB Agar-F MREW-								
Enterococci	*	07/12/22 12:33		1		<1	cfu/100 ml	C6

[4] Accreditiation Information

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ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 138T

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Certificate Code: **AR-22-M3-032380-01**
Page Number: **Page 1 of 1**
PO reference:

Certificate of Analysis

Sample number	966-2022-00043376	Received on	07/12/2022
		Analysis started on	07/12/2022
Your sample reference	BH 3		
Sample Matrix	Ground water		
Sample Condition on Arrival	Satisfactory	Sample Date	07/12/2022
Time Sampled	10:30		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Total Viable Microorganisms 22°C E (Water) [IE Env] <1 >300 /ml (0) Y								
Total Viable Microorganisms 22°C	*	07/12/22 12:33		1		37	cfu/ml	C6
Total Viable Microorganisms 37°C E (Water) [IE Env] <1 >300 /1 ml (0								
Total Viable Microorganisms 37°C	*	07/12/22 12:33		1		47	cfu/1 ml	C6
Coliforms E (Water) [IE Env] <1 >2 420 /100 ml (0) Colilert-18-Q MDW								
Coliforms	*	07/12/22 12:33		1		66	MPN/100 ml	C6
Escherichia Coli E (Water) [IE Env] <1 >2 420 /100 ml (0) Colilert-18-Q								
Escherichia coli	*	07/12/22 12:33		1		16	MPN/100 ml	C6
Enterococci E (Water) [IE Env] <1 >100 /100 ml (0) SB Agar-F MREW-								
Enterococci	*	07/12/22 12:33		1		<1	cfu/100 ml	C6

[4] Accreditiation Information

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PO reference:

Certificate of Analysis

Sample number	966-2022-00043377	Received on	07/12/2022
		Analysis started on	08/12/2022
Your sample reference	WSP-1		
Sample Matrix	Surface water		
Sample Condition on Arrival	Satisfactory	Sample Date	07/12/2022
Time Sampled	08:30		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Biochemical Oxygen Demand (BOD) [M3003]								
Biochemical oxygen demand (BOD) 5d		08/12/22 08:43	EW001	1		<1	mg/l	C6

[4] Accreditiation Information

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Aoife de Barra -

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PO reference:

Certificate of Analysis

Sample number	966-2022-00043378	Received on	07/12/2022
		Analysis started on	08/12/2022
Your sample reference	WSP-2		
Sample Matrix	Surface water		
Sample Condition on Arrival	Satisfactory	Sample Date	07/12/2022
Time Sampled	08:30		

Test Code / Analyte	SUB [5]	Analysis Started	Method	LOQ [3]	SPEC [2]	Result	Units	ACCRED [4]
Biochemical Oxygen Demand (BOD) [M3003]								
Biochemical oxygen demand (BOD) 5d		08/12/22 08:43	EW001	1		<1	mg/l	C6

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