



Dennis Byrne
Irish Industrial Explosives
Clonagh
Enfield
Co. Kildare

11th May 2022
Verde Ref: 50990

RE: QUARTERLY GROUNDWATER AND SURFACE WATER SAMPLING RESULTS AT IIE – Q1 2022

Dear Dennis,

Verde Environmental Consultants Ltd. (VEC) was commissioned by Irish Industrial Explosives Ltd (IIE) to undertake environmental monitoring and sampling of groundwater and surface water as part of the site's ongoing quarterly IPC compliance monitoring. The scope of monitoring each year includes three quarterly monitoring rounds and an annual monitoring round for a wider number of monitoring wells and parameters. An annual report is prepared each year in EPA report format. This summary report presents the results from Q1 monitoring conducted on the 5th of April 2022.

BACKGROUND INFORMATION

The IIE site covers a total of 50 hectares with the "working" site (red boundary Figure 2) as delineated by security fencing taking up c.50 hectares. The site is bounded on all sides by agricultural land which is used for light grazing. The facility has been manufacturing explosive products since 1967 and was granted an IPC Licence by the EPA in 1996. ONT & DNT were used in dynamite manufacture until discontinued in 2003 supplied in 200L drums which were rinsed and stacked in current areas of concern, along the western drain. Licensable activities ceased ca. 2007, the site remains active for non-licensable manufacturing activities. During 2013 the EPA informed IIE that they consider the site's licence to have lapsed and they will no longer be enforcing it with the exception of the Residuals Management Plan to include ongoing monitoring.

Detailed investigations completed 2012 – 2015 with on-going site monitoring and remediation works being carried out since 2014. A Detailed Quantitative risk Assessment (DQRA) was completed in April 2015 which concluded a very low risk to groundwater and key risk was to surface water in the "Western Drain". Remediation works were carried out in Q3 and Q4 of 2015 whereby bulk contamination was excavated from two main areas on site referred to Area A (adjacent to western drain) and Area B (drum hotspot area). Monitored natural attenuation has been subsequently undertaken in



Area A to reduce residual contamination levels in perched groundwater. A pumping system and containment trench with sumps were installed in 2018 to assist natural attenuation in localised areas adjacent to the western drain. Monitoring is ongoing and has included additional soil sampling (2018) and sediment sampling (2020) along the western drain in addition to quarterly groundwater and surface water monitoring.

In August 2021, Verde completed a further phase of investigation works the purpose of which was to further delineate the residual contamination across this part of the site under existing buildings, and to validate certain areas of the wider site which had not been investigated or sampled previously. Three distinct hotspots of 2,4 DNT, 2,6 DNT and of o-NT contamination were identified in shallow soils of 0-3m within the Garage and Store buildings. One distinct hotspot of NH4 contamination was identified in shallow soils within the Garage building.

The sampling in September 2021 of the new shallow monitoring wells in the buildings identified two distinct hotspots of 2,4-DNT and 2,6-DNT in shallow groundwater within the Store building and Garage building. Two distinct hotspots of o-NT contamination were identified in shallow groundwater in an area of the Store and Garage buildings. Two distinct hotspots of ammonia contamination were identified in shallow groundwater within the Garage and Store buildings. Additional site investigation works were conducted in February and April 2022 in order to further delineate these identified hotspots of contamination. These findings will be presented in a separate report.

Quarterly groundwater and surface water monitoring was carried out on 5th April 2022 (Q1). The following presents the monitoring results.

2022 QUARTER 1 MONITORING RESULTS

Groundwater Monitoring & Results

Groundwater monitoring focused on groundwater wells where residual contamination is being observed at the western-side of the site. Monitoring on selected deeper groundwater wells was also proposed to confirm the findings of the DQRA that risks to the groundwater aquifer remain very low. Groundwater wells were purged prior to sample collection. Samples were taken from locations GW7, GW8a, GW9a, GW14 (bedrock), GW15 (bedrock) and pump outlet. This pump outlet sample represents water that is being pumped from sumps between the garage building and western drain to help reduce contamination level in the area. This pumped water is being combined with recycled rainwater and re-used to dissolve ammonium nitrate in emulsion manufacture on site.

Groundwater analytical results are presented in Tables 1 and 2 where they are compared against site specific remedial target concentrations (RTCs where available) and generic assessment criteria (GAC). For comparison purposes the relevant environmental standards and previous monitoring results are also presented in graphs. Groundwater logs are presented in Appendix A and Laboratory certificates are presented in Appendix B.



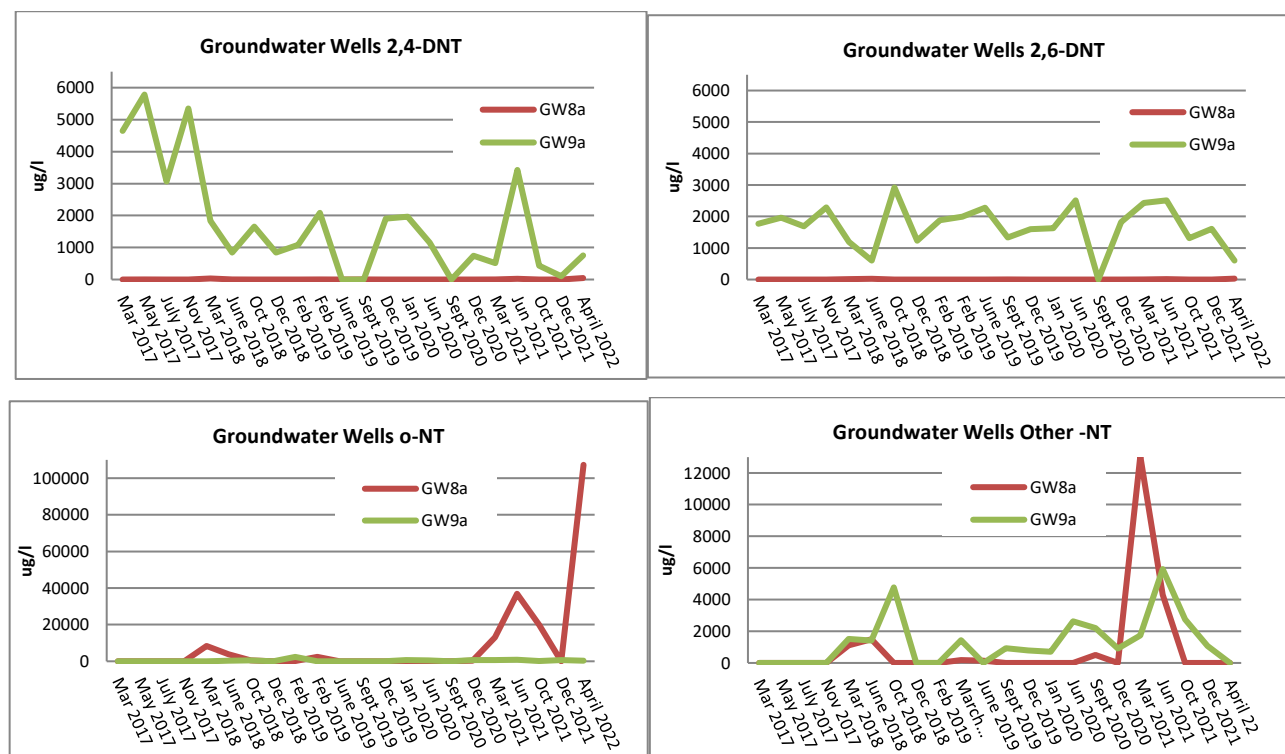
Perched Groundwater Analytical Results (Overburden Wells GW7, GW8a & GW9a)

Explosives / SVOCs

The Nitrotoluene compounds of potential concern (2,4 DNT, 2,6 DNT and o-NT) were analysed in the shallow overburden wells GW7, GW8a and GW9a. Wells located in the Garage/Store area beside the western drain had reasonably high concentrations of Nitrotoluene compounds historically. The following observations were made from the recent Q4 2021 groundwater sample results and graphs included below:

- GW7 reported below laboratory detection limits for 2,4 DNT and 2,6 DNT.
- Concentrations of 2,4 DNT and 2,6 DNT were detected in low concentrations of 46ug/l and 28ug/l respectively in GW8a. 2,4-DNT and 2,6-DNT were undetected in this well in Q3 and Q4 2021. In Q1 2022 a marked increase in o-NT concentrations (107,280ug/l) in this well (GW8a) was noted. In Q3 2021 a decrease in o-NT (19,949ug/l) was noted in comparison to Q2 2021 (36,903ug/l).
- GW9a detected 2,4 DNT (751ug/l), representing an increase from Q4 2021 while still showing a significant reduction from the Q3 2021 result of (3,423ug/l). There is a reduction compared to historic monitoring rounds. Concentrations of 2,6 DNT (604ug/l) show a significant decrease from previous monitoring rounds. A decreased concentration of o-NT (306ug/l) was recorded since the last round of monitoring. DNT concentrations remain significantly above RTCs for the garage/store area.

Graph 1.1 – Nitrotoluenes (ug/l) in Groundwater Wells GW8a and GW9a

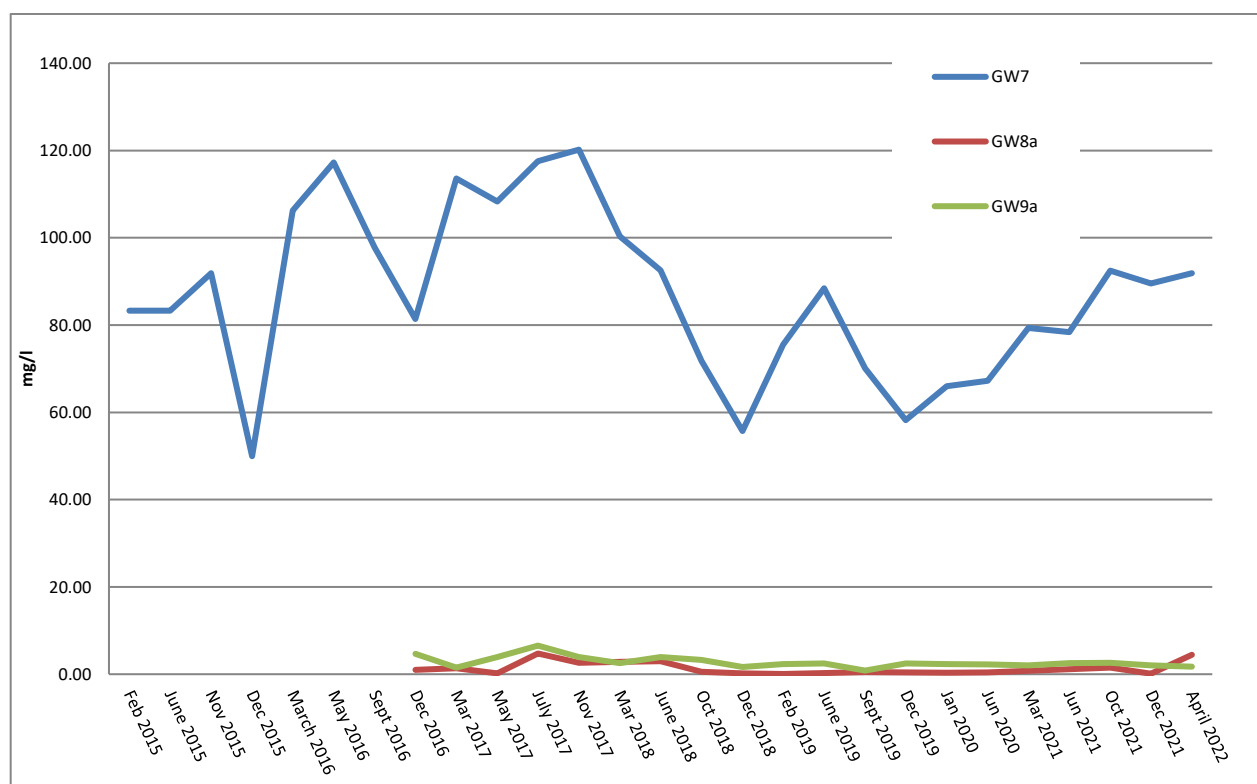




Ammoniacal Nitrogen, Nitrate and Nitrite

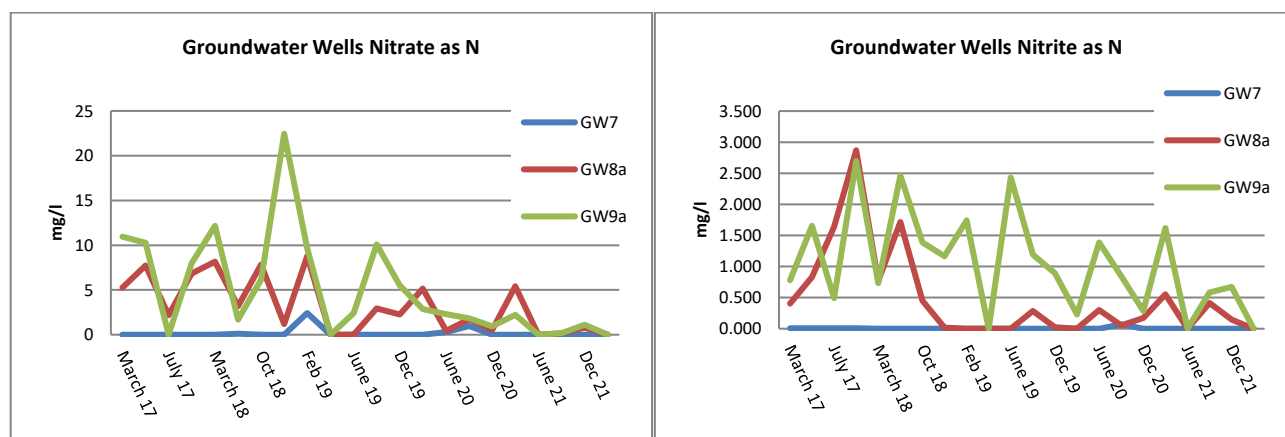
- A site specific RTC is available for ammoniacal nitrogen (0.179 mg/l). GW7 levels remains high, 91.91mg/l, and is consistent with Q3 and Q4 2021. The concentration of ammoniacal nitrogen increased between Q2 and Q3 2021 as shown in Graph 1.2.
- Concentrations of ammoniacal nitrogen in other wells are significantly lower at 4.4mg/l (GW8a) and 1.72 (GW9a) however both exceeded the RTC.
- There are no calculated RTCs for Nitrate and Nitrite but comparison of concentrations with generic groundwater GACs suggest that concentrations are generally low and within acceptable criteria with occasional variations. GW9a recorded 0.16mg/l of Nitrite which is below the compliance criteria of 0.375 based on Groundwater Threshold Values European Communities Environmental Objectives Regulation 2010. Historical Nitrate and Nitrite results are presented in Graphs 1.3 with an overall downward trend over the years for these wells.

Graph 1.2 Ammoniacal Nitrogen as N in GW7, GW8a and GW9a.





Graph 1.3 – Nitrate and Nitrite in GW7, GW8a and GW9a.



pH, Conductivity & Various Parameters

- The pH results were as follows 7.46 (GW7), 7.36 (GW8a) and 7.13 (GW9a), these are within acceptable ranges.
- Conductivity measurements ranged from 751.9 μ S/cm in GW7, 361.3 μ S/cm in GW8a and 448.3 μ S/cm in GW9a. All readings are under the groundwater GAC of 1,875 μ S/cm and consistent with recent rounds of monitoring.
- PAHs, Phenols and Phthalates were all below detection limits.

Groundwater Analytical Results (Bedrock Wells – GW14 and GW15)

Explosives / SVOCs

- No explosive compound or any other SVOCs (including o-NT) were detected in bedrock monitoring wells GW14 or GW15, which is consistent with previous monitoring rounds.

Ammoniacal Nitrogen, Nitrite and Nitrate

- Nitrate and Nitrite concentration for both wells were below the detection limit of the laboratory.
- Ammoniacal Nitrogen was recorded below the groundwater limit value of 0.175mg/l for both wells with 0.06mg/l recorded for GW14 and 0.12mg/l recorded for GW15.
- Total Nitrogen was recorded at 0.7mg/l in GW14 and was below the detection limit for GW15.

pH, Conductivity and Various Parameters

- pH was recorded as 7.52 and 7.74 for GW14 and GW15 respectively and is within acceptable ranges.
- Electrical conductivity was recorded as 442 μ S/cm and 428 μ S/cm for GW14 and GW15 respectively.
- Groundwater quality is generally good and no additional contamination trends are observed.

Surface Water Monitoring Results

Eight monitoring locations, SW1 – 6 and WD1-2 were sampled in Q1 2022. WD1 and WD2 surface water sampling locations occur in the western drain opposite the garage building area were added in Q3 2021 to provide more information to this environmental receptor. Table 3 and 4 attached to this report shows all surface water results and



Appendix A includes the SW logs. All pH and EC results were within the acceptable ranges.

Upstream Monitoring Points – SW1, SW2 & SW3

- Nitrate levels have decreased at SW1 from 8.33mg/l in Q4 2021 to 1.67mg/l in Q4 2022 and remain well below the IGV of 50mg/l for both monitoring rounds.
- Nitrate levels have decreased from 66.16mg/l in Q4 2021 to 26.90mg/l below the IGV of 50mg/l in Q1 2022.
- Nitrate levels recorded at SW3 (12.99mg/l) showed an increase from Q4 2021 (1.35mg/l) but is not elevated.
- Ammoniacal Nitrogen concentrations were 0.17mg/l, 4.09mg/l and 0.03mg/l for SW1, SW2 and SW3 respectively which when converted to Ammoniacal Nitrogen as NH_3 exceed the surface water regulations standard in SW1 & SW2.

Downstream Monitoring Points – SW4, SW5 and SW6

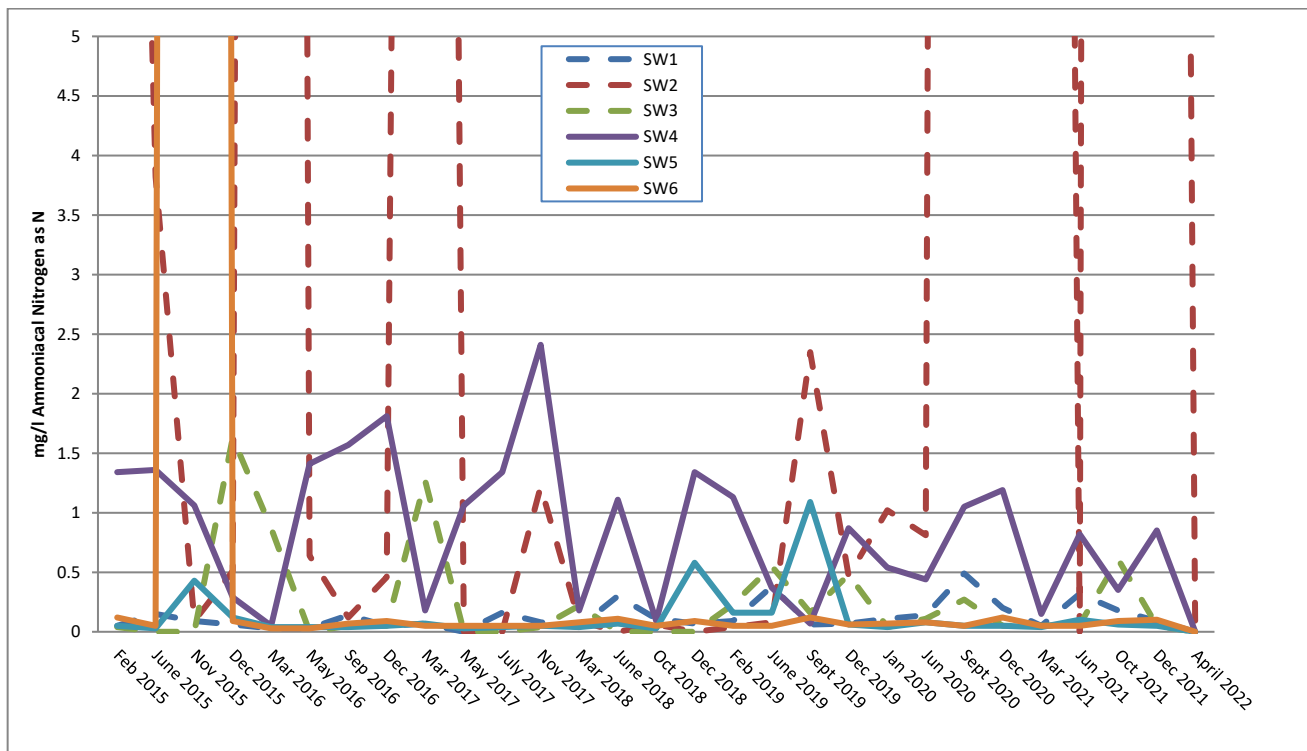
- Nitrotoluenes concentrations were undetected in all surface water samples in Q1 2022, showing an improvement from Q4 2021 during which concentrations of 2,4DNT and 2,6DNT were recorded at 1.8ug/l and 23ug/l respectively in SW4.
- Ammoniacal Nitrogen concentrations in SW4 was 0.45mg/l, SW5 was below the laboratory detection limit and SW6 was 0.05mg/l.

Surface Water Trends

Concentrations of Ammoniacal Nitrogen have varied historically in SW2, SW3 and SW4. As SW2 and SW3 are up-gradient of site activities it indicates Ammoniacal Nitrogen influences from off-site agricultural or forestry sources. SW4 Ammoniacal Nitrogen results appear seasonally influenced and influenced by up-gradient off-site sources. Concentrations in most down gradient SW5 and SW6 are generally low and have remained steady over the sampling period. This is illustrated in Graph 1.4 below.

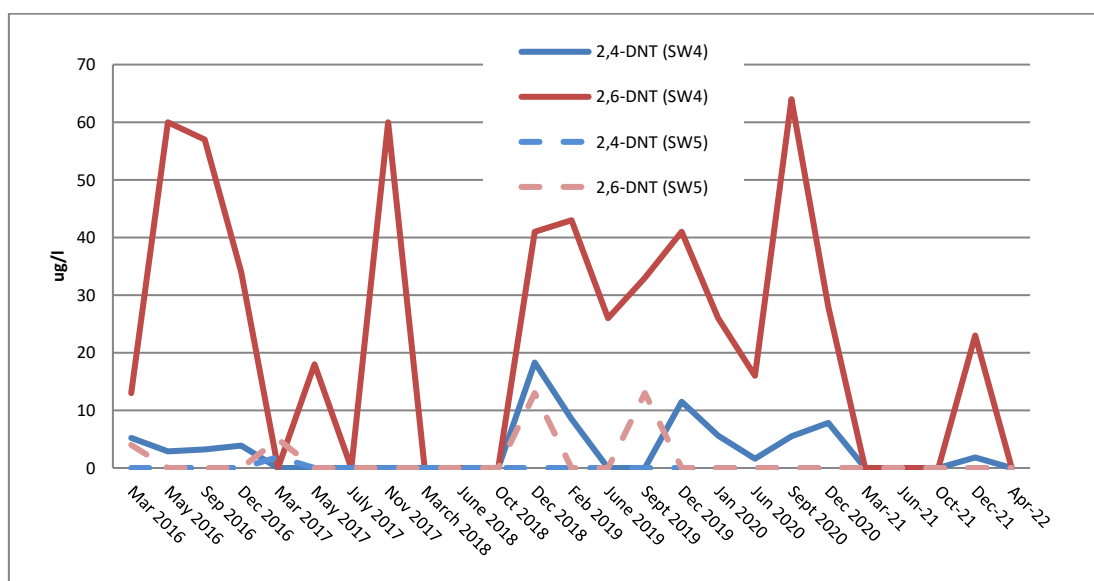


Graph 1.4 – Ammoniacal Nitrogen Trends in Surface Water



Nitrotoluenes were not detected in downstream surface water sample locations SW4 to SW6 or in the additional two western drain samples WD1 & WD2 in April Q1 2022. Concentrations in SW4 & SW5 have fluctuated in recent years and have been generally low since 2021, as presented in Graph 1.5.

Graph 1.5 – Nitrotoluene Trends in the Western Drain



Monitoring of the new western drain sampling points (WD1 & WD2) located opposite the garage building did not detect nitrotoluenes in Q1 2022 similar to the Q3 and Q4 2021 monitoring rounds and in the samples taken in August and



September 2021 as part of additional site investigation work.

Additional Monitoring (Pump Outlet)

In 2021 and 2022 the pump outlet has been included as part of the quarterly monitoring. Results show there are high levels of 2,4 DNT, 2,6 DNT and o-NT (536ug/l, 1,485ug/l and 457ug/l respectively). Ammoniacal Nitrogen was recorded at 1.08mg/l. This water poses no environmental risk as it is recycled in manufacturing operations on site. The presence of contamination indicates that the sumps installed on site are effectively removing Nitrotoluenes and other contaminants from the perched groundwater in the shallow subsoils which is seen to be present beneath the garage and store buildings from recent site investigation works.

SUMMARY CONCLUSIONS

Monitoring undertaken during Q1 2022 and historical rounds may be summarised as follows:

- Nitrotoluene contamination remains detected in the shallow groundwater well GW9a. Ammoniacal Nitrogen was detected in the three overburden wells and levels remain high in GW7 and is consistent with historical trends.
- No Nitrotoluene compounds are being detected in bedrock monitoring wells, consistent with historical results.
- No nitrotoluene contamination was recorded in any of the surface water samples including the additional WD1 & WD2 western drain samples located opposite the Garage Building area.

Ongoing monitoring at the site indicates that localised contamination exists in shallow perched groundwater near the western drain which is seen to be present beneath the garage and store buildings from recent site investigation works. Contaminant trends are stable or decreasing; however, nitrotoluene contamination remains elevated above remedial target concentrations in localised areas around GW8a and GW9a.

A separate report on the recent further site investigation of the soil and perched groundwater quality beneath the Garage and Store Building areas will present the findings and recommendations for remediation to target these hotspot source areas of identified nitrotoluene and ammonia contamination.

Yours sincerely,

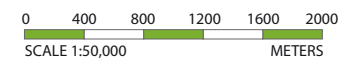
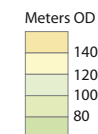
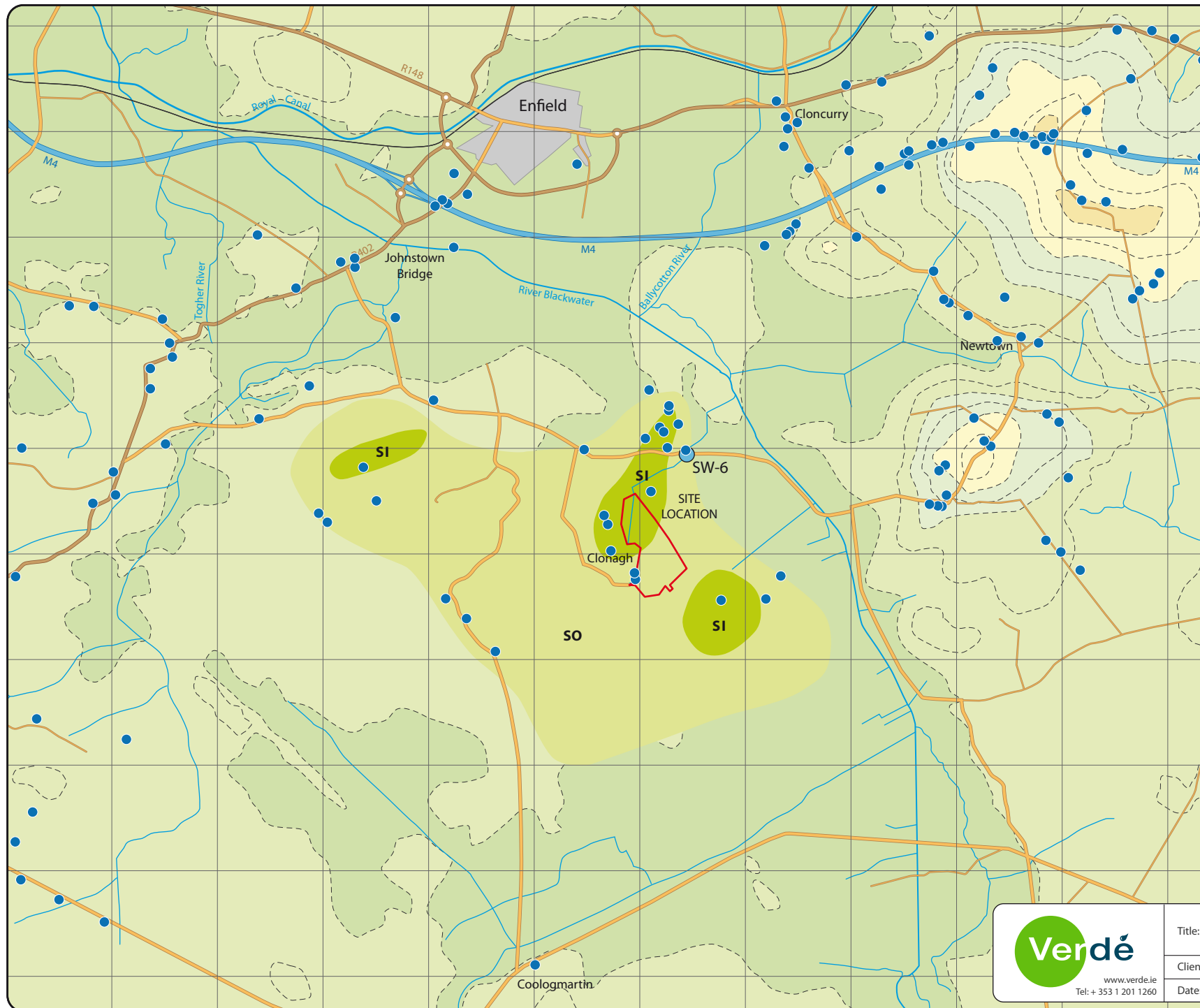
Donal Hogan
Senior Hydrogeologist

Kevin Cleary
Project Director



FIGURES





LEGEND

- Site Boundary
- Surface Water
- SW-6 Sampling Location
- Private Wells
- Source Protection Zones Around Local Authority Wells*
- SI - Inner Protection Area
- SO - Outer Protection Area



Title: Site Location

Client: IIE

Date: Oct. 2015

Job Ref: 50559

Figure 1



TABLES



Table 1A - Shallow Groundwater Analysis - COPCs



		ID:	GW7	GW8A	GW9A
Analyte	Well:	Strata:	Made ground / Overburden		
	Units	Compliance Criteria	05/04/2022	05/04/2022	05/04/2022
Nitrogen - based compounds					
Nitrate as N	mg/l	37.5**	<0.05	0.43	1.16
Nitrite as N	mg/l	0.375**	<0.006	<0.006	0.16
Ammonical Nitrogen as N	mg/l	0.179	91.91	4.46	1.72
Ammonical Nitrogen as NH4	mg/l	-	118.56	5.75	2.22
Total Nitrogen	mg/l	-	90.3	1.5	12.8
Explosives					
2,4-DNT	ug/l	1.42	<0.5	46.2	751.3
2,6-DNT	ug/l	1.04	<1	28	604
o-NT	ug/l	2.52	NA	107280	306
Other nitrotoluenes	ug/l	-	ND	ND	ND

Notes:

NA - Not Analysed

ND - Not Detected

* Compliance Criteria Level 3 RTCs quoted in DQRA - March 2015, For wells on site the most appropriate conservative RTC has been used.

** Compliance Criteria is based on Schedule 5 Groundwater Threshold Values European Communities Environmental Objectives (GROUNDWATER) Regulations, 2010

* Bedrock limit values are based on S.1. 366 of 2016 for groundwater

* Other nitrotoluenes includes: 3 Nitrotoluene, 4 Nitrotoluene, 3,4-Dinitrotoluene & 2,3-DNT

Table 1B - Bedrock Groundwater Analysis - COPCs



		ID:	GW14	GW15
Analyte	Well:	Strata:	Bedrock	
	Units	Compliance Criteria	05/04/22	05/04/22
Nitrogen - based compounds				
Nitrate as N	mg/l	8.5	<0.05	<0.05
Nitrite as N	mg/l	-	<0.006	<0.006
Ammonical Nitrogen as N	mg/l	-	0.05	0.09
Ammonical Nitrogen as NH4	mg/l	0.175	0.06	0.12
Total Nitrogen	mg/l	-	0.7	<0.5
Explosives				
2,4-DNT	ug/l	1.3	<0.5	<0.5
2,6-DNT	ug/l	1	<1	<1
o-NT	ug/l	1.9	ND	ND
Other nitrotoluenes	ug/l	-	ND	ND

Notes

NA - Not Analysed

ND - Not Detected

* Bedrock limit values are based on S.1. 366 of 2016 for groundwater



Table 2 - Groundwater Analysis - General Parameters

Analyte	IGV	S.I. 122 of 2014 (DW)	S.I. 366 of 2016 (GW)	ID:	GW7	GW8A	GW9A	GW14	GW15
				Strata:	Made ground / Overburden			Bedrock	
				Units	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22
Dissolved Aluminium	200	200	150	ug/l	NA	NA	NA	NA	NA
Dissolved Arsenic	10	10	7.5	ug/l	NA	NA	NA	NA	NA
Dissolved Barium	-	-	-	ug/l	NA	NA	NA	NA	NA
Dissolved Calcium	-	-	-	mg/l	NA	NA	NA	NA	NA
Total Dissolved Iron	200	200	-	ug/l	NA	NA	NA	NA	NA
Dissolved Manganese	50	50	-	ug/l	NA	NA	NA	NA	NA
Dissolved Sodium	150	200	-	mg/l	NA	NA	NA	NA	NA
Nitrate as N	50	50	37.5	mg/l	<0.05	0.43	1.16	<0.05	<0.05
Nitrite as N	0.5	0.5	375	mg/l	<0.006	<0.006	0.16	<0.006	<0.006
Ammonical Nitrogen as N	-	-	-	mg/l	91.91	4.46	1.72	0.05	0.09
Ammonical Nitrogen as NH4	0.15	0.3	0.175	mg/l	118.56	5.75	2.22	0.06	0.12
Total Nitrogen	-	-	-	mg/l	90.3	1.5	12.8	0.7	<0.5
Total Alkalinity as CaCO3	-	-	-	mg/l	-	-	-	-	-
pH #	6.5 - 9.5	6.5 - 9.5	-	pH units	7.46	7.36	7.13	7.52	7.74
Electrical Conductivity #	1000	2500	1875	uS/cm	751.9	361.3	448.3	441.7	428.3
Phenols (various)	-	-	-	ug/l	<LOD	<LOD	<LOD	<LOD	<LOD
PAHs (various)	-	-	-	ug/l	<LOD	<LOD	<LOD	<LOD	<LOD
Phthalates (various)	-	-	-	ug/l	<LOD	<LOD	<LOD	<LOD	<LOD

Notes

NA - Not Analysed

ND - Not Detected

<LOD - below the limit of detection

"#" = field reading

S.I. 122 of 2014 (Drinking Water Regulations)

S.I. 366 of 2016 (Groundwater Regulations)

IGV taken from EPA Interim Guideline Values 2003



Table 3 - Surface Water Analysis - COPCs

Analyte	PVL	IGV	Units	SW1	SW2	SW3	SW4	SW5	SW6	WD1	WD2
				05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022
Field Parameters											
pH #	4.5-9.0	5.5-9.0	-	7.59	7.29	7.59	7.36	7.76	7.84	8.01	8.05
Electrical Conductivity #	1000	1000	uS/cm	385.3	388.8	372.4	562.3	560.2	352.8	404.5	365.2
Dissolved Oxygen #	>3	9 mg/l *	mg/l	5.12	2.06	5.09	8.38	10.79	8.97	2.9	7.23
Oxidation Reduction Potential #	-	-	mV	64.2	60	69.4	197.3	217.6	71.2	59.3	50.6
Nitrotoluenes											
2,4-DNT	-	-	ug/l	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-DNT	-	-	ug/l	NA	NA	NA	<1	<1	<1	<1	<1
O-Nitrotoluene	-	-	ug/l	NA	NA	NA	ND	ND	ND	ND	ND
Other Nitrotoluenes	-	-	ug/l	NA	NA	NA	ND	ND	ND	ND	ND
SVOCs (various additional)											
Phenols (various)	-	-	ug/l	NA	NA	NA	<LOD	<LOD	<LOD	<LOD	<LOD
PAHs (various)	-	-	ug/l	NA	NA	NA	<LOD	<LOD	<LOD	<LOD	<LOD
Phthalates (various)	-	-	ug/l	NA	NA	NA	<LOD	<LOD	<LOD	<LOD	<LOD

Notes

"#" = field reading

NA - Not Analysed

ND - Not Detected

PVL taken from EU Surface Water (Amendments) Regulations 2019; Annual Average - EQS for inland surface waters

IGV taken from- EPA Discussion Document "Environmental Quality Objectives and Environmental Quality Standards, The Aquatic Environment" 1997

*For copper and zinc, the standard quoted is for soft water ≤ 10 mg/l CaCO₃, a higher standard applies for hard water

LOD = limit of detection ; various individual SVOCs are not listed here when below LOD. Full laboratory laboratory certificates are included in appendices



Table 4 - Surface Water Analysis - Various Parameters

Analyte	PVL	IGV	Units	SW1	SW2	SW3	SW4	SW5	SW6	WD1	WD2
				05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22
pH #	4.5-9.0	5.5-9.0	-	7.59	7.29	7.59	7.36	7.76	7.84	8.01	8.05
E. Conductivity #	1000	1000	uS/cm	385.3	388.8	372.4	562.3	560.2	352.8	404.5	365.2
Dissolved O2 #	>3	9 mg/l *	mg/l	5.12	2.06	5.09	8.38	10.79	8.97	2.90	7.23
Nitrate as N	-	50	mg/l	1.67	26.90	12.99	2.56	2.12	2.04	0.61	0.60
Nitrite as N	-	-	mg/l	<0.006	0.20	0.04	0.03	<0.006	<0.006	0.01	<0.006
Ammonical Nitrogen as N	-	-	mg/l	0.17	4.09	0.03	0.45	<0.03	0.05	0.08	0.05
Ammoniacal Nitrogen as NH3	≤ 0.04 or ≤ 0.065	0.02	mg/l	0.21	4.97	0.04	0.55	<0.03	0.06	0.10	0.06
Total Nitrogen	-	-	mg/l	10.70	32.90	15.20	9.60	3.10	2.70	1.40	1.50

Notes

PVL taken from EU Surface Water Regulations (Amendment) 2019


IGV taken from- EPA Discussion Document "Environmental Quality Objectives and Environmental Quality Standards, The Aquatic Environment" 1997


* guideline value of 9 mg/l demonstrates high oxygen saturation

"#" = Field reading

APPENDIX A

GW AND SW SAMPLING LOGS

			GROUNDWATER SITE LOG SHEET									
			Client:		IIE				Job Ref:		50990	
			Date:		5 & 6 April 2022				Log by:		Ronan Doyle	
			Site:		Clonagh Enfield				Weather:		Overcast, cool, breezy	
Sample ID	pH	Temp (°C)	EC (µS/cm)	DO, mg/l	ORP, mV	Water Level, mBTOC	Well Depth, mBTOC	Purge Vol (L)	Recharge Notes	Odour	Visual Notes	
GW-7	7.46	8.87	781.7	2.33	-107.9	0.97	-	-	-	None	Brown tint	
GW-8A	7.32	8.91	362.6	4.19	152.1	2.16	-	-	-	None	Brownish	
GW-9A	7.13	8.79	448.6	2.89	73.7	2.21	-	-	-	Slight almond	Brown tint	
GW-14	7.51	10.82	441.8	4.02	35.4	0.3	26.61	-	-	None	Brown tint	
GW-15	7.68	10.38	425.5	4.44	126.6	3.18	-	-	-	None	Brown tint	
Pump Outlet	7.67	9.98	407.4	8.37	163.2	-	-	-	-	-	-	
Notes												

		SURFACE WATER SITE LOG SHEET						
		Client: IIE					Job Ref: 50990	
		Date: 5th April 2022					Log by: Donncha McCarthy	
		Site: Clonagh, Enfield					Weather: Overcast, cool, breezy	
Sample ID	pH	Temp (°C)	EC (µS/cm)	DO, mg/l	ORP, mV	Odour	Flow	Visual Notes
SW1	7.59	10.1	385.3	5.12	64.2	None	Stagnant	Clear, frequent brown suspended solids, a lot of vegetation present
SW2	7.29	9.3	388.8	2.06	60	None	Stagnant	Clear, some dark suspended solids, some vegetation present
SW3	7.59	9.6	372.4	5.09	69.4	None	Stagnant	Clear, some dark suspended solids, some vegetation present
SW4	7.36	10.1	562.7	8.35	200.05	None	Stagnant	Yellow tint
SW5	7.76	9.94	560.9	10.86	208.3	None	Stagnant	Yellow Tint
SW6	7.84	10.9	352.8	8.97	71.2	None	Fast	Yellow tint, shallow water, gravel and stone bed, some vegetation present
WD1	8.01	9.8	404.5	2.9	59.3	None	Very slow	Clear water, some dark suspended solids, shallow water, silty bed, some vegetation present
WD2	8.05	10	365.2	7.23	50.6	None	Very slow	Clear water, some dark suspended solids, shallow water, silty bed, some vegetation present
General Notes: All drainage ditches on site were stagnant.								

APPENDIX B

LABORATORY CERTIFICATES

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



Attention : Donal Hogan
Date : 25th April, 2022
Your reference : 50990
Our reference : Test Report 22/5885 Batch 1
Location :
Date samples received : 8th April, 2022
Status : Final Report
Issue : 1

Fourteen samples were received for analysis on 8th April, 2022 of which fourteen 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:



Liza Klebe

Project Co-ordinator

Please include all sections of this report if it is reproduced

QF-PM 3.1.2 v11

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

2 of 16

Element Materials Technology

Client Name: Verde Environmental Consultants
Reference: 50990
Location:
Contact: Donal Hogan
EMT Job No: 22/5885

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	31-34	35-38	39-42	43-45							Please see attached notes for all abbreviations and acronyms		
Sample ID	SW-6	WD-1	WD-2	PUMP OUTLET									
Depth													
COC No / misc													
Containers	H H N P G	H H N P G	H H N P G	H P G									
Sample Date	05/04/2022	05/04/2022	05/04/2022	05/04/2022									
Sample Type	Surface Water	Surface Water	Surface Water	Ground Water									
Batch Number	1	1	1	1									
Date of Receipt	08/04/2022	08/04/2022	08/04/2022	08/04/2022									
Dissolved Aluminium [#]	<20	<20	<20	-							<20	ug/l	TM30/PM14
Dissolved Antimony [#]	<2	<2	<2	-							<2	ug/l	TM30/PM14
Dissolved Arsenic [#]	<2.5	<2.5	<2.5	-							<2.5	ug/l	TM30/PM14
Dissolved Barium [#]	70	117	117	-							<3	ug/l	TM30/PM14
Dissolved Boron	<12	<12	<12	-							<12	ug/l	TM30/PM14
Dissolved Cadmium [#]	<0.5	<0.5	<0.5	-							<0.5	ug/l	TM30/PM14
Dissolved Calcium [#]	127.5	141.2	142.7	-							<0.2	mg/l	TM30/PM14
Total Dissolved Chromium [#]	<1.5	<1.5	<1.5	-							<1.5	ug/l	TM30/PM14
Dissolved Copper [#]	<7	<7	<7	-							<7	ug/l	TM30/PM14
Total Dissolved Iron [#]	188	<20	<20	-							<20	ug/l	TM30/PM14
Dissolved Lead [#]	<5	<5	<5	-							<5	ug/l	TM30/PM14
Dissolved Manganese [#]	80	45	10	-							<2	ug/l	TM30/PM14
Dissolved Nickel [#]	3	<2	<2	-							<2	ug/l	TM30/PM14
Dissolved Selenium [#]	<3	<3	<3	-							<3	ug/l	TM30/PM14
Dissolved Sodium [#]	7.3	9.6	9.7	-							<0.1	mg/l	TM30/PM14
Dissolved Zinc [#]	<3	5	<3	-							<3	ug/l	TM30/PM14
SVOC TICs	ND	ND	ND	See Attached								None	TM16/PM30
Ortho Phosphate as PO4 [#]	<0.06	<0.06	<0.06	-							<0.06	mg/l	TM38/PM0
Nitrate as N [#]	2.04	0.61	0.60	-							<0.05	mg/l	TM38/PM0
Nitrite as N [#]	<0.006	0.007	<0.006	-							<0.006	mg/l	TM38/PM0
Ammoniacal Nitrogen as N [#]	0.05	0.08	0.05	1.08							<0.03	mg/l	TM38/PM0
Total Nitrogen	2.7	1.4	1.5	-							<0.5	mg/l	TM38/TM125/PM0

Element Materials Technology

Client Name: Verde Environmental Consultants
Reference: 50990
Location:
Contact: Donal Hogan
EMT Job No: 22/5885

SVOC Report : Liquid

EMT Sample No.	1-3	4-6	7-10	11-13	14-16	23-26	27-30	31-34	35-38	39-42	Please see attached notes for all abbreviations and acronyms		
Sample ID	GW- 7	GW- 8A	GW- 9A	GW- 14	GW- 15	SW-4	SW-5	SW-6	WD-1	WD-2			
Depth	24.5	18.3	8.30										
COC No / misc Containers	H P G	H P G	H H N P G	H P G	H P G	H H N P G	H H N P G	H H N P G	H H N P G	H H N P G			
Sample Date	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022	05/04/2022			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	LOD/LOR	Units	Method No.
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	46.2 _{AA}	751.3 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	28 _{AA}	604 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Carbazole #	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Isophorone #	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<10.0 _{AA}	<10.0 _{AA}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1	<20 _{AA}	<20 _{AA}	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	113	115 _{AA}	123 _{AA}	125	127	107	118	121	117	100	<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	137	95 _{AA}	120 _{AA}	132 ^{SV}	134 ^{SV}	112	123	128	124	106	<0	%	TM16/PM30

Element Materials Technology

Client Name: Verde Environmental Consultants
Reference: 50990
Location:
Contact: Donal Hogan
EMT Job No: 22/5885

SVOC Report : Liquid

EMT Sample No.	43-45										Please see attached notes for all abbreviations and acronyms		
Sample ID	PUMP OUTLET												
Depth													
COC No / misc													
Containers	H P G												
Sample Date	05/04/2022												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	08/04/2022												
SVOC MS													
Phenols													
2-Chlorophenol #	<20 ^{AA}										<1	ug/l	TM16/PM30
2-Methylphenol #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
2-Nitrophenol	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<20 ^{AA}										<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<20 ^{AA}										<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
4-Methylphenol	<20 ^{AA}										<1	ug/l	TM16/PM30
4-Nitrophenol	<200 ^{AA}										<10	ug/l	TM16/PM30
Pentachlorophenol	<20 ^{AA}										<1	ug/l	TM16/PM30
Phenol	<20 ^{AA}										<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene #	<20 ^{AA}										<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<20 ^{AA}										<1	ug/l	TM16/PM30
Naphthalene #	<20 ^{AA}										<1	ug/l	TM16/PM30
Acenaphthylene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Acenaphthene #	<20 ^{AA}										<1	ug/l	TM16/PM30
Fluorene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Phenanthrene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Anthracene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Fluoranthene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Pyrene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Chrysene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<20 ^{AA}										<1	ug/l	TM16/PM30
Benzo(a)pyrene	<20 ^{AA}										<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<20 ^{AA}										<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<10.0 ^{AA}										<0.5	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<100 ^{AA}										<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<20 ^{AA}										<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<30.0 ^{AA}										<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<20 ^{AA}										<1	ug/l	TM16/PM30
Diethyl phthalate #	<20 ^{AA}										<1	ug/l	TM16/PM30
Dimethyl phthalate	<20 ^{AA}										<1	ug/l	TM16/PM30

Please see attached notes for all abbreviations and acronyms

Client Name: Verde Environmental Consultants
 Reference: 50990
 Location:
 Contact: Donal Hogan
 EMT Job No: 22/5885

SVOC Report : Liquid

EMT Sample No.	43-45										Please see attached notes for all abbreviations and acronyms		
Sample ID	PUMP OUTLET												
Depth													
COC No / misc													
Containers	H P G												
Sample Date	05/04/2022												
Sample Type	Ground Water												
Batch Number	1										LOD/LOR	Units	Method No.
Date of Receipt	08/04/2022												
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene #	<20 _{AA}										<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<20 _{AA}										<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<20 _{AA}										<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<20 _{AA}										<1	ug/l	TM16/PM30
2-Nitroaniline	<20 _{AA}										<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	535.6 _{AA}										<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	1485 _{AA}										<1	ug/l	TM16/PM30
3-Nitroaniline	<20 _{AA}										<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<20 _{AA}										<1	ug/l	TM16/PM30
4-Chloroaniline	<20 _{AA}										<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<20 _{AA}										<1	ug/l	TM16/PM30
4-Nitroaniline	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
Azobenzene #	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<20 _{AA}										<1	ug/l	TM16/PM30
Carbazole #	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
Dibenzofuran #	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<20 _{AA}										<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<20 _{AA}										<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<20 _{AA}										<1	ug/l	TM16/PM30
Hexachloroethane #	<20 _{AA}										<1	ug/l	TM16/PM30
Isophorone #	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<10.0 _{AA}										<0.5	ug/l	TM16/PM30
Nitrobenzene #	<20 _{AA}										<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	121 _{AA}										<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	107 _{AA}										<0	%	TM16/PM30

Element Materials Technology

Job number:	22/5885
Sample number:	6
Sample identity:	GW- 8A
Sample depth:	18.3
Sample Type:	Ground Water
Units:	ug/l

Method: SVOC
Matrix: Liquid

Note: Only samples with TICs (if requested) are reported. If TICs were requested but no compounds found they are not reported.

[illegible]

Element Materials Technology

Job number:	22/5885
Sample number:	10
Sample identity:	GW- 9A
Sample depth:	8.30
Sample Type:	Ground Water
Units:	ug/l

Method: SVOC
Matrix: Liquid

Note: Only samples with TICs (if requested) are reported. If TICs were requested but no compounds found they are not reported.

[illegible]

Element Materials Technology

Job number:	22/5885	Method:	SVOC
Sample number:	45	Matrix:	Liquid
Sample identity:	PUMP OUTLET		
Sample depth:			
Sample Type:	Ground Water		
Units:	ug/l		

Method: SVOC
Matrix: Liquid

Note: Only samples with TICs (if requested) are reported. If TICs were requested but no compounds found they are not reported.

[illegible]

Matrix : Liquid

Reference: 50990

Location:

Contact: Donal Hogan

[illegible]

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.: 22/5885

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 overestimate 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
AA	x20 Dilution

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: 22/5885

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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			
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				
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			
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: 2013!	PM0	No preparation is required.	Yes			
TM38/TM125	Total Nitrogen/Organic Nitrogen by calculation	PM0	No preparation is required.				