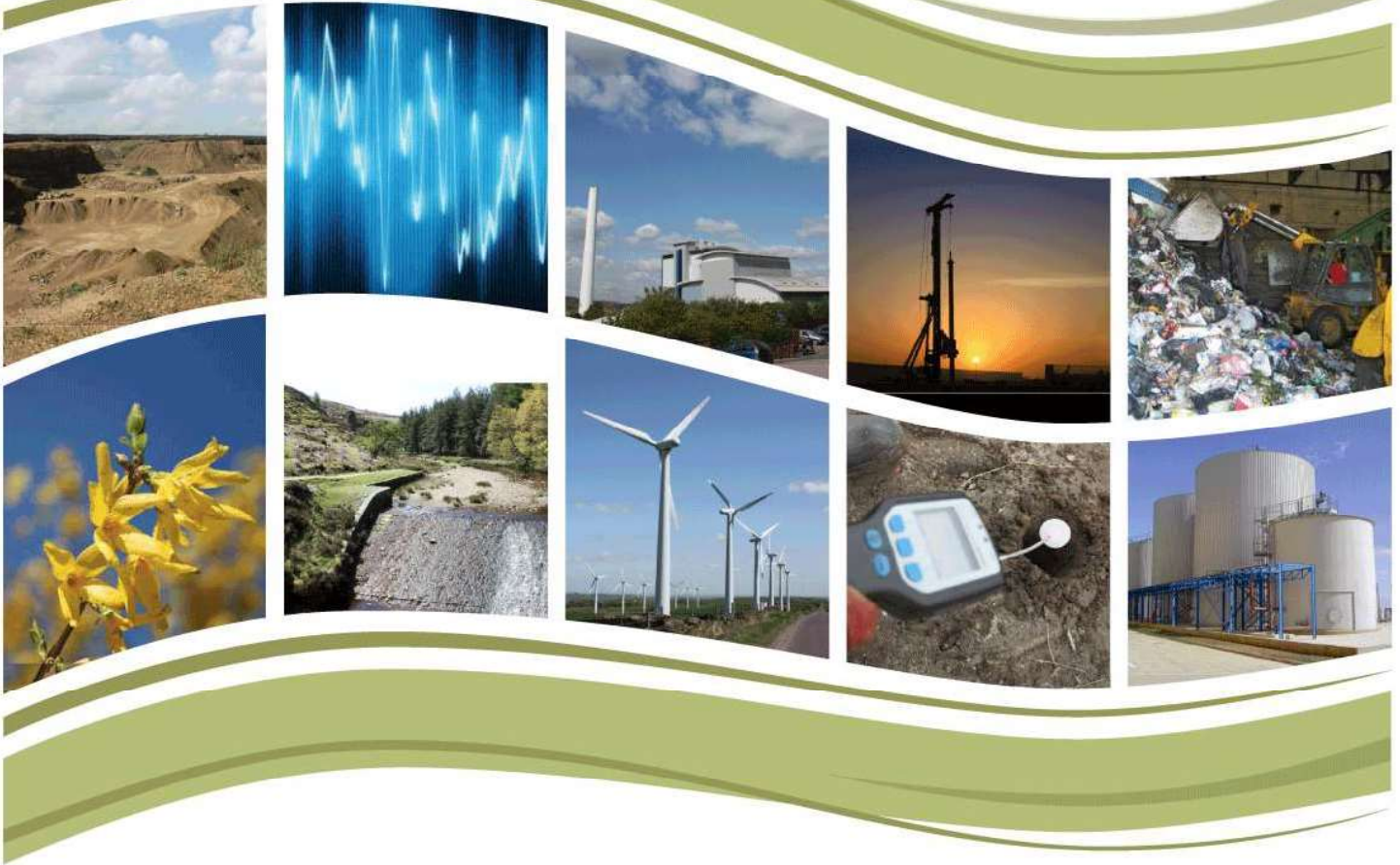




Remedial Methodology Verification

Battle Hospital, Portman Way, Reading, RG30 1AN

Bellway Homes Limited (Thames Valley)

CRM.1265.007.GE.R.003.A



Contact Details:

Enzygo Geoenvironmental Ltd. (Bristol Office)
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

tel: 01454 269237
email: steve.rhodes@enzygo.com
www: enzygo.com

Remedial Methodology

Project:	CRM.1265.007.GE.R.003.A
For:	Bellway Homes Limited (Thames Valley)
Status:	Revision A
Date:	March 2023
Author:	Richard Reece Environmental Consultant
Reviewer:	Steve Rhodes Director

Disclaimer:

This report has been produced by Enzygo Limited within the terms of the contract with the client and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

Enzygo Limited Registered in England No. 06525159 at Gresham House, 5-7 St. Pauls Street, Leeds, England, LS1 2JG

Contents

1.0 INTRODUCTION	3
1.1 Background.....	3
1.2 Previous Ground Investigations.....	3
1.3 Remediation Strategy	3
1.4 Supplementary Investigation.....	4
2.0 CONTROLLED WATERS REMEDIATION	5
2.1 General.....	5
2.2 Fuel Tanks.....	5
2.3 Attenuation Tank.....	5
2.4 Trial Pit TP11.....	5
2.5 Unforeseen Contamination	5
3.0 GROUND GAS	6
3.1 General.....	6
3.2 Verification	6
4.0 SOFT LANDSCAPING	7
4.1 General.....	7
4.2 Inspections	7
4.3 Chemical Testing	7
5.0 POTABLE WATER PIPES.....	8
5.1 Assessment.....	8
5.2 Confirmation	8
6.0 SUMMARY AND CONCLUSION.....	9
6.1 Summary Of Works Undertaken.....	9
6.2 Conclusion	9

Drawings and Appendices

Drawings.....	10
Appendix A - Supplementary Investigation Laboratory Results.....	11
Appendix B - Controlled Waters Remedial Targets	12
Appendix C - Validation of Source Removal	13
Fuel Tank Verification.....	14
Attenuation Tank Verification	15
Trial Pit 11 Verification	16
Appendix D - Gas Membrane Validation	17
Photographs	18
Certificates	46
Appendix E - Cover Soils Validation	47
Appendix F - GAC Values for Cover Soils	48
Appendix G – Waste Transfer Tickets.....	49
Appendix H - Imported Soils Tickets.....	50
Appendix I – Signed Statement	51

1.0 INTRODUCTION

1.1 Background

1.1.1 Enzygo Geo Environmental Limited were commissioned by Bellway Homes Limited (Thames Valley) to prepare a Remedial Methodology for the proposed re-development of a former hospital site, for residential use comprising a mixture of apartments with communal open space and residential houses with domestic gardens. The scheme also includes areas of public open space.

1.2 Previous Ground Investigations

1.2.1 Previous Phase I Desk Study and subsequent Phase II Intrusive Ground Investigations were undertaken at the site by RSK. An assessment of the risk to human health was undertaken by comparison to GAC values. This showed exceedances of Lead, Polycyclic Aromatic Hydrocarbons (PAH) and Asbestos within the Made Ground.

1.2.2 Concentrations of hydrocarbons were recorded in groundwater exceeding Environmental Quality Standards (EQS).

1.2.3 Ground gas and flow rates reported by RSK confirm that the central and northern areas of the site fall within Characteristic Situation 2 of CIRIA C665. The south eastern area of the site falls within Characteristic Situation 1 of CIRIA C665.

1.3 Remediation Strategy

1.3.1 In order to better assess the potential risk to controlled waters a Detailed Quantitative Risk Assessment (DQRA) was prepared by Enzygo Geo Environmental Limited and is incorporated into report CRM.1265.007.GE.R.001.

1.3.2 A Remedial Methodology was prepared by Enzygo Geo Environmental Limited providing details of the proposed remedial works. The Remedial Methodology incorporates the DQRA derived remedial targets for protection of controlled waters. The Remedial Methodology is presented in report CRM.1265.007.GE.R.002A which was submitted to the Local Planning Authority and was approved. The approved remediation strategy is summarised below:

- Above ground tanks to be removed together with any soils with contamination exceeding the DQRA derived remedial targets for protection of controlled waters;
- Ground Gas protective measures meeting the requirements of Characteristic Situation (CS)2 required to the ground floor slabs of selected buildings due to elevated ground gas risk. The extent of the gas protective measures is shown on Drawing CRM.1265.008.GE.D.002;
- Use of barrier pipe to potable water pipes;
- Use of buildings and hardstanding to break the potential pollutant linkage. Clean cover soils over a Geo Textile Barrier to soft landscape areas, to break the pollutant linkage between residual contaminants in the underlying soils and future site users.

1.3.3 None of the contaminants identified in groundwater by RSK exceeded the DQRA derived remedial target values and so the risk from groundwater below the site was dismissed.

1.4 Supplementary Investigation

- 1.4.1 In order to better assess the potential extent of source removal for controlled waters remediation and to supplement the previous investigation works undertaken by RSK, a supplementary investigation was undertaken on 13th March 2019 by Enzygo Geo Environmental Limited.
- 1.4.2 The supplementary investigation comprised twelve trial pits (TP1 to TP12) and was undertaken following removal of tanks and demolition of structures so allowing access into areas where RSK could not previously access. Locations of the trial pits are shown on Drawing CRM.1265.007.GE.D.003.
- 1.4.3 Chemical results from the supplementary investigation are included in Appendix A and confirmed exceedances of the DQRA values below the former tanks (TP1), and also identified another hotspot (TP11) located below a former building.

2.0 CONTROLLED WATERS REMEDIATION

2.1 General

- 2.1.1 The approved remedial methodology was to remove tanks and excavate hydrocarbon impacted soils, which exceeded the Controlled Waters Remedial Target values included in the Remedial Methodology and which are included in Appendix B.
- 2.1.2 Locations of the hydrocarbon areas remediated are shown on Drawing CRM.1265.007.GE.D.004 and details of the source areas, their remediation and validation are discussed in the sections below:

2.2 Fuel Tanks

- 2.2.1 Excavation below the heating oil tanks was undertaken during May and June 2019 and involved excavation of an area around the tanks. Excavation was undertaken down to the groundwater depth and the extent of the excavation is shown on Drawing CRM.1265.007.GE.D.004.
- 2.2.2 Following removal of soils, the sides and base of the excavation were sampled -HP East, HP West, HP North, HP South, HPB and HP Base 2. Locations of the samples are shown on Drawing CRM.1265.007.GE.D.004.
- 2.2.3 Laboratory tests confirm that hydrocarbon concentrations within residual soils in the base and sides of the excavation were below the Controlled Water Remedial target values. Results are included in Appendix C.

2.3 Attenuation Tank

- 2.3.1 An underground tank was encountered within the area of a proposed attenuation tank, the location of which is shown on Drawing CRM.1265.007.GE.D.004. The tank was removed.
- 2.3.2 An investigation was undertaken by Enzygo Geo Environmental Limited on 6 February 2019 with the excavation of eight trial pits (TPA to TPC and TPE to TPI) within the area of the proposed attenuation tank.
- 2.3.3 Locations of the pits are shown on Drawing CRM.1265.007.GE.D.004, and chemical results of the samples collected show no exceedances of the Controlled Water Remedial target values. Results are included in Appendix C.

2.4 Trial Pit TP11

- 2.4.1 The hydrocarbon hotspot encountered in Trial Pit TP11 was excavated during March 2019, the location and extent of the excavation is shown on Drawing CRM.1265.007.GE.D.004. The excavation was validated on 1st April 2019 with five samples (TP11A to TP11D and TP11 Base) being collected and tested.
- 2.4.2 The locations of the samples is shown on Drawing CRM.1265.007.GE.D.004.
- 2.4.3 Results of the chemical testing are included in Appendix C and the results show no exceedance of the Controlled Water Remedial target values.

2.5 Unforeseen Contamination

- 2.5.1 No other contamination sources were encountered during the site preparation works.

3.0 GROUND GAS

3.1 General

- 3.1.1 As Ground Gas was detected during the monitoring phase of the site investigation within the central and northern areas of the site, these areas fall into Characteristic Situation 2 of CIRIA C665.
- 3.1.2 Gas protection measures were proposed, comprising of a ventilated underfloor void, and installation of gas membranes within the effected structures to mitigate the presence of Methane. The south eastern area of the site falls within Characteristic Situation 1 of CIRIA C665, therefore no gas protection measures are required in this area. These areas are shown on drawing CRM.1265.007.GE.D.002.

3.2 Verification

- 3.2.1 Installation of the membrane was to be undertaken by a licenced contractor during the construction phase. As the installation was undertaken by experienced professionals, independent verification is not required.
- 3.2.2 Independent verification of the installation of the gas membrane would not be required, as the contractors undertaking the installation were to be suitably qualified to provide self-certification.
- 3.2.3 Photographs and certification of the Gas membrane installation are included in Appendix D.

4.0 SOFT LANDSCAPING

4.1 General

- 4.1.1 As the site is being re-developed for residential apartments with communal garden areas and private housing, remediation to areas of soft landscaping was proposed, due to the presence of Lead, Polycyclic Aromatic Hydrocarbons (PAH) and Hydrocarbons within Made Ground. Asbestos fibres were also detected.
- 4.1.2 Made Ground materials were to be removed to sub formation level, 400mm below finish level within communal garden areas, and 600mm below finish level within private gardens. A Geo Textile Membrane no dig barrier was then to be placed, to prevent new soils intermixing with any possible remaining contamination beneath, and covered with clean materials incorporating a minimum 150mm Topsoil, creating an effective capping system.

4.2 Inspections

- 4.2.1 As areas became available for testing during the construction phase, Hand Pits were to be excavated within the soft landscaping areas in the locations shown on attached drawing CRM.1265.007.GE.D.001 in line with the approved RMS. These Hand Pits would be used to show the depths of the soils placed, confirm the presence of the Geo Textile Membrane, and to retrieve samples for chemical testing to confirm the soils used meet the relevant GAC Values.
- 4.2.2 All Hand Pits excavated, showed sufficient depths within the respective areas – 600mm within private gardens and 400mm within areas of communal landscaping. Samples were recovered from the Hand Pits and submitted to the laboratories of I2 who are UKAS and MCERTS accredited for testing.

4.3 Chemical Testing

- 4.3.1 Soil samples from the validation pits were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that was cleaned at each sampling location.
- 4.3.2 Soil samples were tested for the CLEA metal suite, pH, sulphate, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH), organic carbon, Speciated Total Petroleum Hydrocarbon (TPH CWG) and Asbestos screen.
- 4.3.3 Verification letters CRM.1265.007.GE.L.001 – CRM.1265.007.GE.L.011 were produced following each verification inspection. These are shown in Appendix E.
- 4.3.4 Chemical results from the samples collected were compared to the relevant GAC values, which are shown in Appendix F. Throughout the verification process, no exceedances were identified.
- 4.3.5 All waste transfer tickets are shown in Appendix G.
- 4.3.6 All imported soils tickets are shown in Appendix H.

5.0 POTABLE WATER PIPES

5.1 Assessment

- 5.1.1 Chemical analysis results were provided to the local water authority for assessment in relation to the requirement for barrier pipe. It was determined that barrier pipe would be used for potable water to protect from any remaining or unforeseen contamination.

5.2 Confirmation

- 5.2.1 The client has confirmed that barrier pipe has been installed inline with the agreement with Thames Water.
- 5.2.2 A signed statement is included in Appendix I.

6.0 SUMMARY AND CONCLUSION

6.1 Summary Of Works Undertaken

- 6.1.1 During the demolition phase, contamination was encountered below the existing buildings, as expected from the original RSK investigation. Contamination was delineated and removed in accordance with the approved RMS.
- 6.1.2 Removal of material showing visual or olfactory evidence of gross contamination was undertaken, and the exposed excavation inspected and sampled in accordance with the agreed RMS and no changes were required or made to the remedial strategy.
- 6.1.3 All buildings requiring gas mitigation measures were installed with ventilated underfloor voids, and gas membranes.
- 6.1.4 Remediation to the soft landscaping areas was undertaken throughout the construction phase, and verified as areas were completed. No unforeseen contamination was identified, and soils tested meet the GAC Values detailed in the RMS.
- 6.1.5 Barrier pipe for potable water has been installed onsite in line with the agreement with Thames Water.

6.2 Conclusion

- 6.2.1 Based on the site inspections undertaken, information provided and chemical analysis results, it is considered that the remediation works undertaken on site are in line with the approved RMS.
- 6.2.2 This report has been prepared to discharge Conditions 19, 20 and 23 of planning application 180319 produced by Reading Borough Council.





- Key**
- Site Boundary
 - +
 Verification Pits in Communal Areas (HP)
(HP1 - HP8)
 - +
 Verification Pits in Gardens (HP)
(HPA - HPJ)



Samuel House, 6 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Bellway Homes Limited
(Thames Valley)

SCALE: **1:1,000@A3** PROJECT REF: **CRM.1265.007**

DRAWN: **NP** CHECKED: **SR** DATE: **July 2018**

PROJECT:
Portman Way, Reading

TITLE:
Site Location Plan

FIGURE NO:
CRM.1265.007.GE.D.001



Key

- Site Boundary
- Building Requiring Gas Protective Measures



Samuel House, 6 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Bellway Homes Limited
(Thames Valley)

SCALE: **1:1,000@A3** PROJECT REF: **CRM.1265.007**

DRAWN: **MG** CHECKED: **SR** DATE: **July 2018**

PROJECT:
Portman Way, Reading

TITLE:
Gas Protective Measures

FIGURE NO:
CRM.1265.007.GE.D.002



0 20 40 60 80 100m
Scale 1:1,000@A3

Key

- Site Boundary
- Trial Pit Locations (TP)
(TP1 - TP12)

Notes:

- Do not scale for construction purposes.
- All dimensions are in meters unless stated otherwise.
- This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
- All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Bellway Homes Limited
(Thames Valley)

SCALE: 1:1,000@A3 PROJECT REF: CRM.1265.007

DRAWN: MG CHECKED: SR DATE: Feb 2023

PROJECT:
Portman Way, Reading

TITLE:
Supplementary Investigation

FIGURE NO:
CRM.1265.007.GE.D.003



- Key**
- Site Boundary
 - Source Removal Area
 - Trial Pit Locations (TP)
 - Hand Pit Locations (HP)

- Notes:**
- Do not scale for construction purposes.
 - All dimensions are in meters unless stated otherwise.
 - This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
 - All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Bellway Homes Limited (Thames Valley)	
SCALE: 1:1,000@A3	PROJECT REF: CRM.1265.007
DRAWN: MG	CHECKED: SR
DATE: Feb 2023	
PROJECT: Portman Way, Reading	
TITLE: Source Removal Plan	
FIGURE NO: CRM.1265.007.GE.D.004	



Appendix A - Supplementary Investigation Laboratory Results



Steve Rhodes

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 19-33686

Project / Site name:	Battle Hospital Reading	Samples received on:	20/03/2019
Your job number:	CRM.1265.007	Samples instructed on:	20/03/2019
Your order number:		Analysis completed by:	26/03/2019
Report Issue Number:	1	Report issued on:	26/03/2019
Samples Analysed:	23 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 19-33686
Project / Site name: Battle Hospital Reading

Lab Sample Number				1181208	1181209	1181210	1181211	1181212
Sample Reference				TP1	TP1	TP2	TP2	TP3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60-2.70	3.40	1.50-2.20	2.70	0.80-2.40
Date Sampled				14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	45	25	42	65	45
Total mass of sample received	kg	0.001	NONE	0.47	0.50	0.51	0.40	0.46

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	2.1	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	35	< 1.0	32	19	28
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	710	< 2.0	44	24	39
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	2000	< 8.0	81	28	73
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	570	< 8.0	360	89	250
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	3300	< 10	520	160	390

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	20	< 1.0	21	9.8	22
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	400	< 2.0	19	9.9	18
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	820	< 10	44	19	56
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	200	< 10	160	58	210
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1400	< 10	240	97	310

Analytical Report Number: 19-33686
Project / Site name: Battle Hospital Reading

Lab Sample Number				1181213	1181214	1181215	1181216	1181217
Sample Reference				TP3	TP4	TP4	TP5	TP5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				3.00	1.30-2.40	2.70	1.70-2.80	3.20
Date Sampled				14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	50	50	40	31
Total mass of sample received	kg	0.001	NONE	0.50	0.45	0.43	0.49	0.48

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	14	< 1.0	34	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	24	< 2.0	60	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	37	< 8.0	99	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	150	< 8.0	430	26
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	220	< 10	620	26

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	34	4.9	22	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	29	8.3	71	5.3
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	87	27	620	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	250	65	970	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	400	110	1700	< 10

Analytical Report Number: 19-33686
Project / Site name: Battle Hospital Reading

Lab Sample Number				1181218	1181219	1181220	1181221	1181222
Sample Reference				TP6	TP6	TP7	TP8	TP8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.90-1.80	2.70	0.80-2.40	1.50-2.60	4.20
Date Sampled				14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	28	16	46	36	28
Total mass of sample received	kg	0.001	NONE	0.24	0.55	0.49	0.42	0.50

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	22	< 1.0	42	34	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	28	< 2.0	100	41	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	29	< 8.0	290	41	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	80	< 8.0	1100	210	24
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	160	< 10	1500	320	24

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	7.8	< 1.0	7.7	22	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	12	< 2.0	35	24	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	20	< 10	280	100	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	47	< 10	780	430	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	87	< 10	1100	580	< 10

Analytical Report Number: 19-33686
Project / Site name: Battle Hospital Reading

Lab Sample Number				1181223	1181224	1181225	1181226	1181227
Sample Reference				TP9	TP9	TP10	TP10	TP11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-1.80	3.20	0.00-0.90	2.00	0.70-2.20
Date Sampled				14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	14	16	15	15	45
Total mass of sample received	kg	0.001	NONE	0.49	0.54	0.50	0.47	0.46

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.1	15	57
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	2.2	30	320
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	32	780
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	59	45	1800
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	67	120	2900

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	1.0	10	19	21
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	3.8	18	33	550
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	11	< 10	40	53	2700
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	58	23	130	59	2100
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	69	34	200	160	5400

Analytical Report Number: 19-33686

Project / Site name: Battle Hospital Reading

Lab Sample Number				1181228	1181229	1181230		
Sample Reference				TP11	TP12	TP12		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				3.20	0.10-2.70	3.40		
Date Sampled				14/03/2019	14/03/2019	14/03/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Stone Content				%	0.1	NONE	< 0.1	< 0.1
Moisture Content				%	N/A	NONE	16	37
Total mass of sample received				kg	0.001	NONE	0.54	0.49

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	5.9	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	11	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	17	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	150	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	190	< 10		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	16	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	21	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	200	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	730	< 10		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	960	< 10		

Analytical Report Number : 19-33686

Project / Site name: Battle Hospital Reading

* These descriptions are only intended to act as a cross check if sample identities are questioned, The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1181208	TP1	None Supplied	0.60-2.70	Brown clay and sand with gravel.
1181209	TP1	None Supplied	3.40	Grey clay.
1181210	TP2	None Supplied	1.50-2.20	Black sludge. **
1181211	TP2	None Supplied	2.70	Brown clay.
1181212	TP3	None Supplied	0.80-2.40	Black sludge with vegetation.
1181213	TP3	None Supplied	3.00	Grey clay and gravel.
1181214	TP4	None Supplied	1.30-2.40	Brown clay and sand.
1181215	TP4	None Supplied	2.70	Brown clay.
1181216	TP5	None Supplied	1.70-2.80	Brown clay and sand with vegetation.
1181217	TP5	None Supplied	3.20	Grey clay.
1181218	TP6	None Supplied	0.90-1.80	Brown gravelly clay.
1181219	TP6	None Supplied	2.70	Light brown clay and sand with gravel.
1181220	TP7	None Supplied	0.80-2.40	Black clay and sand with gravel.
1181221	TP8	None Supplied	1.50-2.60	Black clay and sand with gravel.
1181222	TP8	None Supplied	4.20	Grey clay.
1181223	TP9	None Supplied	0.70-1.80	Brown loam and sand.
1181224	TP9	None Supplied	3.20	Beige clay with chalk.
1181225	TP10	None Supplied	0.00-0.90	Brown loam and clay with gravel.
1181226	TP10	None Supplied	2.00	Light brown clay and sand.
1181227	TP11	None Supplied	0.70-2.20	Brown sludge with vegetation. **
1181228	TP11	None Supplied	3.20	Light grey sandy clay with gravel.
1181229	TP12	None Supplied	0.10-2.70	Black loam and clay with gravel.
1181230	TP12	None Supplied	3.40	Grey loam and clay.

** Non MCERTS matrix.

Analytical Report Number : 19-33686

Project / Site name: Battle Hospital Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L0738-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Appendix B - Controlled Waters Remedial Targets

Contaminant	Remedial Target	
	Within Soils (mg/kg)	Within Groundwater (mg/l)
C ₈ -C ₁₀ Aliphatic	1650	770
C ₈ -C ₁₀ Aromatic	3320	1.76E ⁷
C ₁₀ -C ₁₂ Aliphatic	8800	17.3
C ₁₀ -C ₁₂ Aromatic	84.6	9.9E ⁴
C ₁₂ -C ₁₆ Aliphatic	1.76E ⁶	17.3
C ₁₂ -C ₁₆ Aromatic	300	4.27E ⁶
C ₁₆ -C ₂₁ Aliphatic	2.21E ⁷	17.3
C ₁₆ -C ₂₁ Aromatic	3880	355
C ₂₁ -C ₃₅ Aliphatic	2.22E ⁷	17.3
C ₂₁ -C ₃₅ Aromatic	2460	231
Benzo(a)Pyrene	1.75E ¹⁴⁷	No Impact

Appendix C - Validation of Source Removal



Fuel Tank Verification



Steve Rhodes

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-45937

Project / Site name:	Battle Hospital	Samples received on:	18/06/2019
Your job number:	CRM.1265.007	Samples instructed on:	18/06/2019
Your order number:		Analysis completed by:	20/06/2019
Report Issue Number:	1	Report issued on:	20/06/2019
Samples Analysed:	2 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-45937-1 Battle Hospital CRM.1265.007.XLS

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 4

Analytical Report Number: 19-45937

Project / Site name: Battle Hospital

Lab Sample Number				1246876	1246877			
Sample Reference				HP East	HP West			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.00-2.50	0.00-2.50			
Date Sampled				17/06/2019	17/06/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	23	14			
Total mass of sample received	kg	0.001	NONE	1.2	1.3			

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	1.2	< 0.001			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	12	2.2			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	730	160			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	2400	610			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	680	350			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	3800	1100			

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	19	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	210	180			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	2100	610			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	940	490			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	3300	1300			



Analytical Report Number : 19-45937

Project / Site name: Battle Hospital

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1246876	P North-Scrap	None Supplied	0.00-2.50	Grey clay and loam with stones and brick.
1246877	P South-Scrap	None Supplied	0.00-2.50	Grey clay and loam with stones.

Analytical Report Number : 19-45937

Project / Site name: Battle Hospital

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.



Steve Rhodes

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 19-45932

Project / Site name: Battle Hospital

Samples received on: 18/06/2019

Your job number: CRM.1265.007

Samples instructed on: 18/06/2019

Your order number:

Analysis completed by: 20/06/2019

Report Issue Number: 1

Report issued on: 20/06/2019

Samples Analysed: 1 soil sample

Signed:

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 19-45932

Project / Site name: Battle Hospital

Lab Sample Number				1246833				
Sample Reference				HP Base 2				
Sample Number				None Supplied				
Depth (m)				2.50-2.70				
Date Sampled				17/06/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	16				
Total mass of sample received	kg	0.001	NONE	1.3				

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	6.9				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	160				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	520				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	350				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	1000				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	5.6				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	190				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	660				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	520				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1400				



Analytical Report Number : 19-45932

Project / Site name: Battle Hospital

* These descriptions are only intended to act as a cross check if sample identities are questioned, The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types, Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1246833	HP Base 2	None Supplied	2,50-2,70	Grey clay and loam with gravel.

Analytical Report Number : 19-45932

Project / Site name: Battle Hospital

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L0738-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Steve Rhodes

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-45936

Project / Site name:	Battle Hospital	Samples received on:	18/06/2019
Your job number:	CRM.1265.007	Samples instructed on:	18/06/2019
Your order number:		Analysis completed by:	20/06/2019
Report Issue Number:	1	Report issued on:	20/06/2019
Samples Analysed:	3 soil samples		

Signed:

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-45936-1 Battle Hospital CRM.1265.007.XLS

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 4

Analytical Report Number: 19-45936

Project / Site name: Battle Hospital

Lab Sample Number				1246873	1246874	1246875		
Sample Reference				HP North	HP South	HPB		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-2.50	0.00-2.50	2.50-2.70		
Date Sampled				17/06/2019	17/06/2019	17/06/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	5.5	9.4	8.2		
Moisture Content	%	N/A	NONE	7.3	15	12		
Total mass of sample received	kg	0.001	NONE	1.4	1.4	1.2		

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.6	< 1.0	1.2		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	14	18	82		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	33	69	280		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	80	78	110		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	130	160	470		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	3.8	7.9		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.3	15	120		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	67	70	320		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	180	120	310		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	250	210	760		



Analytical Report Number : 19-45936

Project / Site name: Battle Hospital

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1246873	HP North	None Supplied	0.00-2.50	Grey loam and gravel with stones and vegetation.
1246874	HP South	None Supplied	0.00-2.50	Grey loam and clay with stones and chalk.
1246875	HPB	None Supplied	2.50-2.70	Grey loam and gravel with stones.

Analytical Report Number : 19-45936

Project / Site name: Battle Hospital

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Attenuation Tank Verification



Steve Rhodes

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-28213

Project / Site name:	Battle Hospital Reading	Samples received on:	08/02/2019
Your job number:	CRM.1265.007	Samples instructed on:	08/02/2019
Your order number:		Analysis completed by:	14/02/2019
Report Issue Number:	1	Report issued on:	14/02/2019
Samples Analysed:	8 soil samples		

Signed:

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 19-28213

Project / Site name: Battle Hospital Reading

Lab Sample Number	1151535	1151536	1151537	1151538	1151539
Sample Reference	TPA	TPB	TPC	TPE	TPF
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.00-0.75	0.00-0.75	0.00-0.75	0.00-0.75	0.00-0.75
Date Sampled	06/02/2019	06/02/2019	06/02/2019	06/02/2019	06/02/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	25	28
Total mass of sample received	kg	0.001	NONE	0.52	0.48

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-	Detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	< 0.001	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	2.1	4.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	19	29
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	19	21	57	120	220
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	12	40
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	19	25	66	150	250
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	19	25	66	160	290

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.4	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	11	9.6	2.3	13
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	23	140	200	84	360
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	100	450	510	330	1300
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	54	36	49	120
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	120	600	720	420	1700
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	120	660	760	460	1800

TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	11	11	4.4	17
TPH (C16 - C21)	mg/kg	1	MCERTS	24	140	210	100	390
TPH (C21 - C35)	mg/kg	1	MCERTS	120	470	570	450	1600
TPH (C35 - C44)	mg/kg	10	NONE	< 10	54	43	61	160
TPH Total C5 - C44	mg/kg	10	NONE	140	680	830	620	2100

Analytical Report Number: 19-28213

Project / Site name: Battle Hospital Reading

Lab Sample Number				1151540	1151541	1151542		
Sample Reference				TPG	TPH	TPI		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.00-0.75	0.00-0.75	0.00-0.75		
Date Sampled				06/02/2019	06/02/2019	06/02/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	18	20	27		
Total mass of sample received	kg	0.001	NONE	0.49	0.48	0.49		

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-		
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	2.0	3.8		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	21	54		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	32	140	440		
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	14	110		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	37	160	500		
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	37	170	610		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	8.0	14	29		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	130	210	490		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	470	820	2000		
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	100	110	280		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	600	1000	2500		
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	700	1200	2800		

TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH (C12 - C16)	mg/kg	4	MCERTS	8.0	16	32		
TPH (C16 - C21)	mg/kg	1	MCERTS	130	230	540		
TPH (C21 - C35)	mg/kg	1	MCERTS	500	960	2500		
TPH (C35 - C44)	mg/kg	10	NONE	100	130	390		
TPH Total C5 - C44	mg/kg	10	NONE	740	1300	3400		



Analytical Report Number: 19-28213
Project / Site name: Battle Hospital Reading
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1151538	TPE	0.00-0.75	116	Loose Fibres	Chrysotile	< 0.001	< 0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number : 19-28213

Project / Site name: Battle Hospital Reading

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1151535	TPA	None Supplied	0.00-0.75	Brown clay and loam with gravel and vegetation.
1151536	TPB	None Supplied	0.00-0.75	Brown loam and clay with gravel and vegetation.
1151537	TPC	None Supplied	0.00-0.75	Brown loam and clay with vegetation and gravel
1151538	TPE	None Supplied	0.00-0.75	Brown loam and clay with vegetation and gravel
1151539	TPF	None Supplied	0.00-0.75	Brown clay and loam with vegetation and gravel
1151540	TPG	None Supplied	0.00-0.75	Brown loam and clay with vegetation and gravel
1151541	TPH	None Supplied	0.00-0.75	Brown clay and sand with gravel.
1151542	TPI	None Supplied	0.00-0.75	Brown clay and sand with gravel.

Analytical Report Number : 19-28213

Project / Site name: Battle Hospital Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.



Trial Pit 11 Verification



Steve Rhodes

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 19-36610-2

Replaces Analytical Report Number: 19-36610, issue no. 1
Report format change

Project / Site name:	Battle Hospital Reading	Samples received on:	04/04/2019
Your job number:	CRM.1265.007	Samples instructed on:	04/04/2019
Your order number:		Analysis completed by:	11/04/2019
Report Issue Number:	2	Report issued on:	16/02/2023
Samples Analysed:	5 soil samples		

Signed:

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 19-36610-2

Project / Site name: Battle Hospital Reading

Lab Sample Number				1196466	1196467	1196468	1196469	1196470
Sample Reference				TP11 Base	TP11A	TP11B	TP11C	TP11D
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.70-3.00	0.40-2.40	0.30-3.00	0.40-2.00	0.40-1.90
Date Sampled				01/04/2019	01/04/2019	01/04/2019	01/04/2019	01/04/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	53	32	32	18	14
Total mass of sample received	kg	0.001	NONE	0.46	0.48	0.46	0.50	0.52

Monoaromatics & Oxygenates

Benzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	25	1.9	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	37	< 2.0	2.3	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	87	8.4	17	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	320	88	100	31	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	470	100	120	36	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	30	2.9	< 1.0	2.3	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	60	9.5	4.0	3.9	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	110	56	34	15	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	260	190	97	34	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	460	260	130	56	< 10