Ref: 4083/23

Report on Subsoil Investigations at Land to South of Cranbrook Road, Frittenden, Kent TN17 2DB.

September 2023

R. Carr Geotechnical Services, 9 The Mallows, Maidstone, Kent ME14 2PX

[redacted]

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Land to South of Cranbrook Road, Frittenden, Kent TN17 2DB.

1. Introduction

1.1 This report has been prepared on behalf of A B Canham & Son Ltd, prospective developers of land located to the south of Cranbrook Road, Frittenden.

1.2 The proposed development comprises residential units with associated areas of vehicular parking and gardens.

1.3 Contained within the report are details of ground conditions that prevail beneath the site in order to provide parameters for the design of appropriate foundations for the development. An analysis of soil contaminants is also provided. This information has been obtained from trial pit investigations and subsequent laboratory tests undertaken on samples of soil obtained from the site.

2. Topography

2.1 The site is located to the south of Cranbrook Road at approximate OS Land Ranger map reference TQ 812 407. At this point ground level is sloping gently downhill from northwest to southeast.

2.2 At the time of the investigation the main area of the site comprised overgrown former grazing land. A roughly square-shaped, steel barn was located on the site's northeast corner, the barn being scheduled for demolition as part of the development.

2.3 The site was enclosed by deciduous hedgerows which included immature Oak trees. Several mature White Poplars were present on the west boundary. A small pond was located on the central area of the site.

3. Geology

3.1 Reference to the local Geological Survey sheet (no. 304: Tenterden) has indicated

that the site is underlain by Weald Clay.

3.2 The Weald Clay consists of dark grey shales and mudstones with subordinate sandstones, shelly limestones and clay ironstones, which weather in their upper regions to form mottled yellow and brown clays. In the local area, the formation is recorded as being approximately 250m thick. The clays are well known for their susceptibility to shrink and swell following fluctuations in moisture content as a result of water abstraction by tree roots, in which case the depth of soil moisture deficit can extend to much greater depths. Foundations constructed within zones of clay that have become desiccated are prone to the effects of differential settlement. Conversely, when trees are removed from a site, the desiccated clay can gradually swell following gradual moisture reabsorption. This process is known as heave and can take place over a period of many years, with resulting damage to structures founded within the formerly desiccated soil.

4. Subsoil Investigations

4.1 Five trial pits were excavated with a 360° excavator to a maximum depth of 2.2m (TP1-TP5), the locations of the pits being denoted on the accompanying site plan. Pocket penetrometer tests were undertaken on the trimmed faces of the excavations and disturbed samples of soil were recovered for laboratory testing. Details of the encountered soils are provided in strata logs appended with the report, but can be conveniently summarised as follows:

Depth	Stratum
Ground level – 0.3m/0.4m	Turf over silty topsoil with localised fine gravel and tile fragments
0.3m/0.4m – 2.2m+	Weathered WEALD CLAY – stiff becoming very stiff and laminated with depth, locally silty CLAY

4.2 Groundwater was not encountered and the sides of the excavations remained stable throughout the duration of the investigation.

5. Laboratory Tests

Geotechnical Tests

5.1 Atterberg classification tests carried out on samples of the Weald Clay obtained from the excavations at depths between 1m and 2m have categorised the subsoil as being generally clay of high plasticity (CH), with clay of intermediate plasticity determined at 2m in TP3 (CI) and clay of very high plasticity (CV) recorded at 1m in TP5. Such soils may exhibit shrinkage and swelling following changes in moisture content, particularly at the higher end of the plasticity scale.

5.2 Soil pH of 6.6 to 8.1 with water soluble sulphate content of 0.07 to 0.12 g/L has been determined from representative soil samples recovered from the trial pits at depths of 1.5m and 2m (Class DS-1).

5.3 California Bearing Ratio tests (CBRs) undertaken on recompacted bulk samples of soil obtained in the areas of proposed access road have provided the following design parameters:

Reference	Top	Base	Average
CBR1 (0.5m)	9.4	10	9.8
CBR2 (0.5m)	14	16	15
CBR3 (0.5m)	19	15	N/A

Contamination Tests

5.4 Samples of soil obtained from each trial pit at a depth of 0.25m have been analysed for a suite of common contaminants including speciated polynuclear aromatic hydrocarbons (PAH), petroleum hydrocarbon fractions (TPH/CWG) and presence of

asbestos. The results of the tests have been compared with the following soil screening criteria for residential development:

- Contaminated Land Exposure Assessment model (CLEA) 2015
- LQM/CIEH S4ULs for Human Health Risk Assessment 2015
- SP1010 Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document 2014

5.5 Concentrations of contaminants detected within the samples fall well within the utilised soil screening values for residential development. PAH, TPH and BTEX were below laboratory detection levels and no evidence of asbestos was observed within the samples.

5.6 Waste Acceptance Criteria testing carried out on a sample of soil obtained at 0.5m in TP3 has classified the soil suitable for disposal as inert waste.

6. Discussion/Recommendations

6.1 The investigation has confirmed the existence of Weald Clay beneath the site, overlain by a superficial layer of topsoil extending 0.3m to 0.4m below site surface level. Groundwater was not encountered within 2.2m of the site surface and is not anticipated to occur for some depth, though the hydrogeology of the site may vary throughout the year.

Foundations

6.2 It is essential that foundations should extend below the depth of any compressible soil and penetrate competent, load-bearing material. For conventional trench-fill foundations an acceptable bearing pressure of 120 kN/m² is applicable within the Weald Clay at a minimum depth of 1m. Due to the presence of trees around the site recommendations provided by NHBC publication Chapter 4.2 should be adhered to with regard to the depth and design of foundations in clay soils where trees are (or have been) present. The precise depth of the foundations will therefore be dictated by the proximity of trees to the new structures. NHBC classification: High Volume Change Potential.

6.3 The results of the sulphate determinations are indicative that special precautions would not be necessary within a subterranean concrete mix placed upon the site (see BS 8500-1:2015+A2:2019).

6.4 For the design of retaining structures an internal friction angle of 23° is applicable to the Weald Clay.

6.5 The results of the CBR tests should be treated with some caution as the upper regions of the Weald Clay were desiccated at the time of the investigation due a prolonged period of dry weather. CBR values of 5% to 10% are typical for clay soils.

Surface Water Drainage

6.6 Due to the presence of impermeable clay soil beneath the site the use of soakaways would be ineffective for the disposal of surface water. It is therefore recommended that an alternative form of rainwater disposal is utilised for the development.

Contamination

6.7 The site comprises undeveloped land which has not been subjected to any previous industrial use and no evidence of excessive contaminative substances has been detected beneath the site surface at the investigated locations. The results of the contamination tests have indicated that the site presents a low risk to receptors including human health, plant life and groundwater. Remediation is considered unnecessary other than the removal of excavated soil to an appropriately licensed waste facility. Any topsoil imported onto the site for use in garden areas should be tested for contamination in order to ensure that it is suitable for its proposed use.

6.8 In the event that contamination not detected by the investigation is encountered during the course of the development, the nature of the contamination should be adequately assessed and dealt with in an appropriate manner. Evidence of potential contamination may include discoloured or malodorous soil and foreign debris such as ash, clinker and/or asbestos.

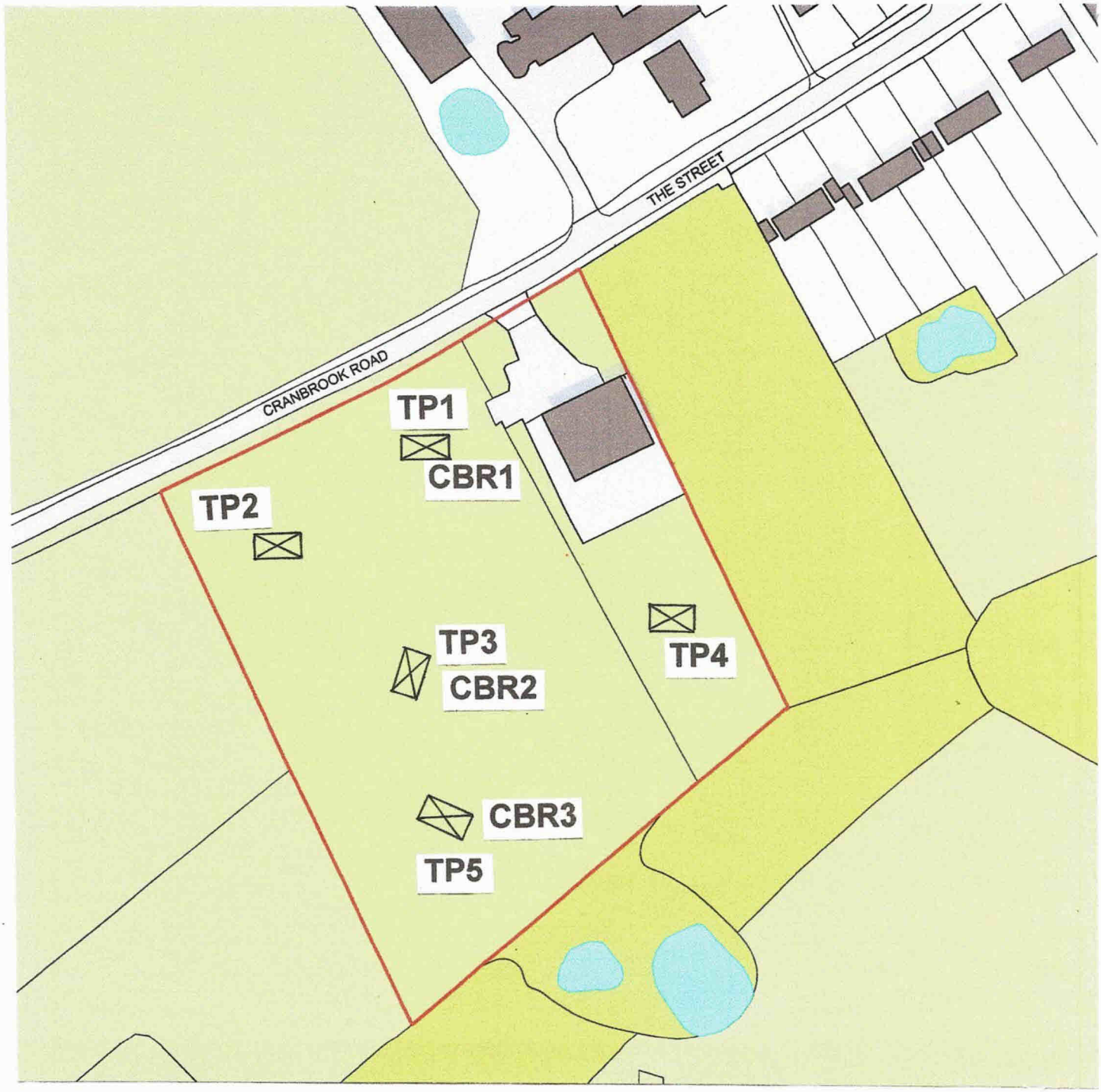
6.9 The results of the waste acceptance criteria test indicate that excavated soil removed from the site can be disposed of as inert waste.

6.10 This report has been prepared from information obtained at representative locations of the site. Whilst no significant variations in ground conditions are anticipated, no responsibility can be accepted for any such variations that may exist beneath the site in hitherto uninvestigated areas.

R. Carr BA (Hons) FGS
September 2023

Appendix A

Subsoil Investigations



Land South of Cranbroork Road, Frittenden.

Plan showing locations of Trial Pits and CBR tests.

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: **CRANBROOK ROAD, FRITTENDEN** No. TP1

Method of excavation: **360^0 Excavator** Date: 06.09.23

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
●	0.25		Turf over light brown silty topsoil with rootlets and scarce fine gravel
	0.30		
	0.50		Stiff orange-mottled grey-buff locally silty CLAY (Weathered WEALD CLAY)
●	1.00		Scarce very fine rootlets evident to 0.8m
●	1.50		Abundant horizons of buff silt present between 1.3m and 1.7m
●	2.00		Becoming very stiff and laminated at 2m
	2.20		
	2.50	End	Pit dry, Sides of pit stable ● = Disturbed sample
	3.00		
	3.50		
	4.00		
	4.50		

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: **CRANBROOK ROAD, FRITTENDEN** No. TP2

Method of excavation: **360^0 Excavator** Date: 06.09.23

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
●	0.25		Turf over light brown silty topsoil many fine rootlets
	0.35		
	0.50		Stiff orange-mottled grey-buff locally silty CLAY
			(Weathered WEALD CLAY)
●	1.00		Scarce very fine rootlets evident to 1.4m
	1.00		
●	1.50		Becoming very stiff, laminated and very silty at 1.9m
	1.50		
●	2.00		
	2.00		
	2.10		
		End	Pit dry on completion. Sides of pit stable
	2.50		● = Disturbed sample
	3.00		
	3.50		
	4.00		
	4.50		

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: **CRANBROOK ROAD, FRITTENDEN** No. TP3

Method of excavation: **360^0 Excavator** Date: 06.09.23

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
●	0.25		Turf over light brown silty topsoil with rootlets and scarce tile fragments
	0.30		
●	0.50	0.50	Stiff orange-mottled grey-buff locally silty CLAY
			(Weathered WEALD CLAY)
●	1.00	1.00	Scarce fine rootlets evident to 1m
●	1.50	1.50	Becoming very stiff and laminated at 1.7m
●	2.00	2.00	
		End	Pit dry, Sides of pit stable
			● = Disturbed sample
		2.50	
		3.00	
		3.50	
		4.00	
		4.50	

R. CARR GEOTECHNICAL SERVICES

STRATA LOG

Job: **CRANBROOK ROAD, FRITTENDEN** No. TP4

Method of excavation: **360^0 Excavator** Date: 06.09.23

SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
●	0.25		Turf over light brown silty topsoil with fine rootlets
	0.30		
	0.50		Stiff orange-mottled grey-buff locally silty CLAY
			(Weathered WEALD CLAY)
●	1.00		Scarce fine rootlets evident to 0.9m
	1.00		
●	1.50		Becoming very stiff and laminated at 1.7m
	1.50		
●	2.00		
	2.00	End	Pit dry, Sides of pit stable
			● = Disturbed sample
	2.50		
	3.00		
	3.50		
	4.00		
	4.50		

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STRATA LOG

Job: **CRANBROOK ROAD, FRITTENDEN** No. TP5

Method of excavation: **360^0 Excavator** Date: 06.09.23

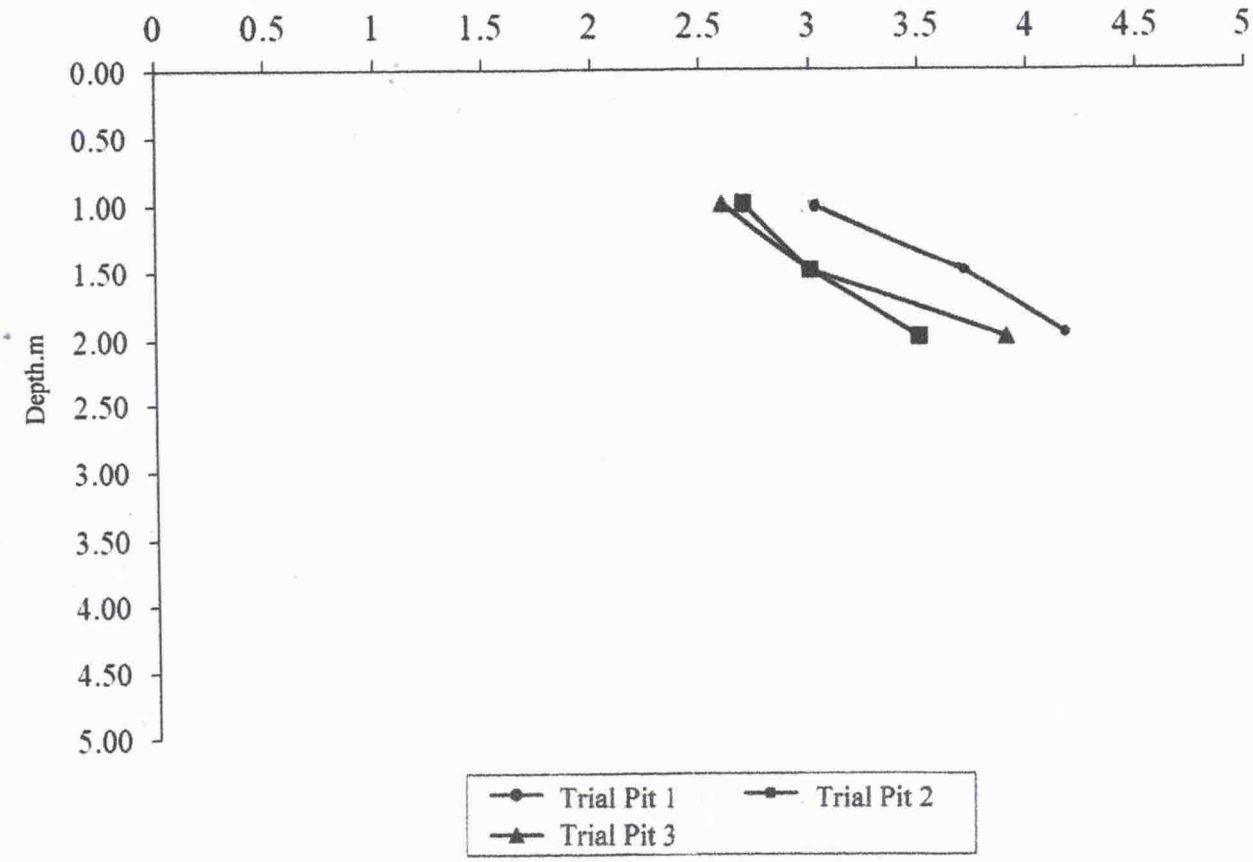
SAMPLE	DEPTH m.	G.L.	DESCRIPTION OF SOIL
●	0.25		Turf over light brown silty topsoil with rootlets
	0.40		
	0.50		Stiff orange-mottled grey-buff locally silty CLAY (Weathered WEALD CLAY)
●	1.00		
	1.00		Scarce very fine rootlets evident to 1.3m
●	1.50		
	1.50		
●	2.00		
	2.00		
	2.20	End	Pit dry, Sides of pit stable ● = Disturbed sample
	2.50		
	3.00		
	3.50		
	4.00		
	4.50		

R. CARR GEOTECHNICAL SERVICES

Cranbrook Road, Frittenden

Hand Penetrometer Profile

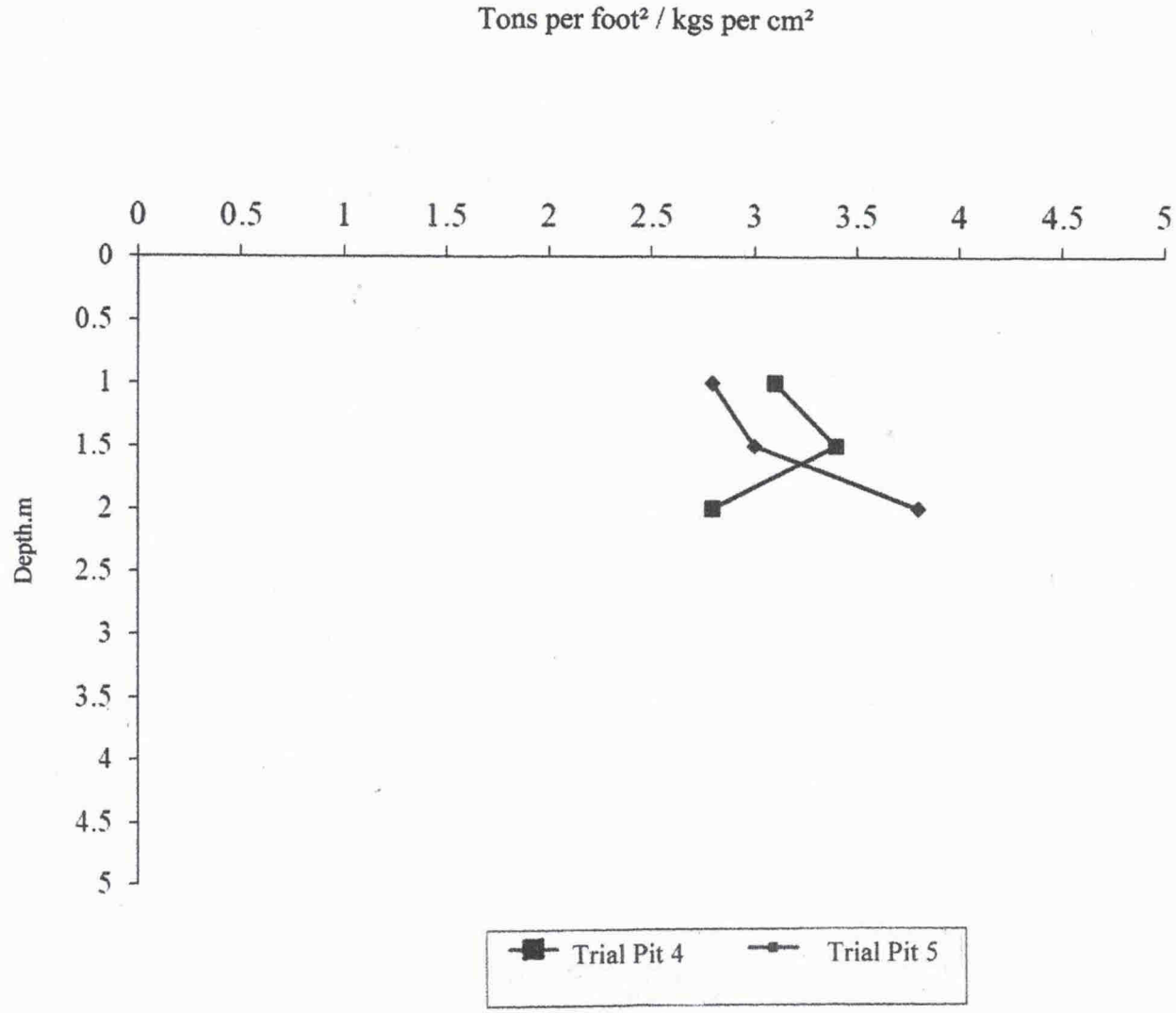
Tons per foot² / kgs per cm²



R. CARR GEOTECHNICAL SERVICES

Cranbrook Road, Frittenden

Hand Penetrometer Profile



Appendix B

Laboratory Test Results

Peter Baxter Associates Laboratories
A subsidiary of Peter Baxter Associates
Kestner Works
Bredgar Road
Gillingham
Kent
ME8 6PL

www.peterbaxterassociates.co.uk
E info@peterbaxterassociates.co.uk
T +44 (0) 1634 234332 / 717974

UKAS TESTING 4295

Summary of Water Content & Liquid and Plastic Limit Tests (BS EN 17892-1:2014 & BS EN 17892-12:2018)

Project No.	Project Name		
1591/29	Land South of Cranbrook Road, Frittenden		
Client Ref	Client	Sampled by	Client
N/A	Ron Carr Geotechnical Services	Date received	08/09/2023
		Date Tested	08/09/2023

Hole No.	Sample				Soil Description	Sample Condition	Test Type	w	Pass 425µm	LL	PL	PI	Particle density	Remarks
	Ref	Top	Base	Type				%	%	%	%	%	Mg/m³	
TP1	1	1.00		D	Pale brown mottled grey CLAY	1	1	23.7	100	63	26	37		
TP1	3	2.00		D	Brown CLAY	1	1	25.2	100	57	22	35		
TP2	4	1.50		D	Brown CLAY	1	1	24.2	100	62	28	34		
TP3	5	1.00		D	Orange brown mottled grey CLAY	1	1	22.0	100	62	23	39		
TP3	7	2.00		D	Orange brown mottled grey CLAY	1	1	17.5	100	47	23	24		
TP4	8	1.50		D	Orange brown mottled grey CLAY	1	1	28.7	100	66	28	38		
TP5	10	1.00		D	Orange brown mottled grey CLAY	1	1	26.4	100	71	26	45		
TP5	11	2.00		D	Orange brown mottled grey CLAY	1	1	23.4	100	56	24	32		

Key

Sample Condition:
1 - As Received
2 - Washed & dried at 50°C
3 - >425µm removed by hand

Test Type:
1 - 1 point 80g / 30°
2 - 4 point 80g / 30°
3 - Non Plastic

Date Printed	Approved By	Table
18/09/2023	kb/pb	sheet

Peter Baxter Associates Laboratories
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Summary of Geotechnical Chemical Test Results (BS 1377-3:2018)

Project No.	Project Name		
1591/29	Land South of Cranbrook Road, Frittenden		
Client Ref	Client	Sampled by	Client
N/A	Ron Carr Geotechnical Services	Date received	08/09/2023
		Date tested	15/09/2023

Hole No.	Sample Ref	Top	Base	Type	Soil Description	Org %	LOI %	pH	Sulphate as SO_4 Total acid sol. %	Sulphate as SO_4 2:1 water :soil g/l	Sulphate as SO_4 ground water g/l	Chloride, Cl water sol. %	Chloride, Cl acid sol. %	CO_2 %	TDS mg/l	<2mm %	Remarks
TP1	2	1.50		D	Brown CLAY			8.1		0.07						100	
TP3	6	1.50		D	Orange brown mottled pale grey CLAY			6.6		0.09						100	
TP4	9	2.00		D	Grey brown CLAY			7.2		0.12						100	

Remarks
The results relate only to the items tested

Key	Date Printed	Approved By	Table
Tests performed in accordance with BS 1377-3:2018 unless annotated otherwise Org Organic matter content LOI Mass loss on ignition at 440°C Cl Chloride content CO_2 Carbonate content (rapid titration) TDS Total Dissolved Solids	18/09/2023	kb	sheet

California Bearing Ratio (CBR)

Site Name	Land South of Cranbrook Road, Frittenden			Sample No.	14
Project No.	1591/29	Client	Peter Baxter Ass	Depth Top	0.50 m
Soil Description	Light brown slightly sandy silty CLAY with roots and rootlets			Depth Base	- m
				Sample Type	D
				Samples received	14/09/2023
				Schedules received	13/09/2023
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	15/09/2023
				Date Tested	20/09/2023
				Job Ref	34062
				Borehole/Pit No.	CBR3

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0 %

Initial Specimen details:

Bulk density	1.92	Mg/m3
Dry density	1.59	Mg/m3
Moisture content	21	%

Soaking details: Not soaked

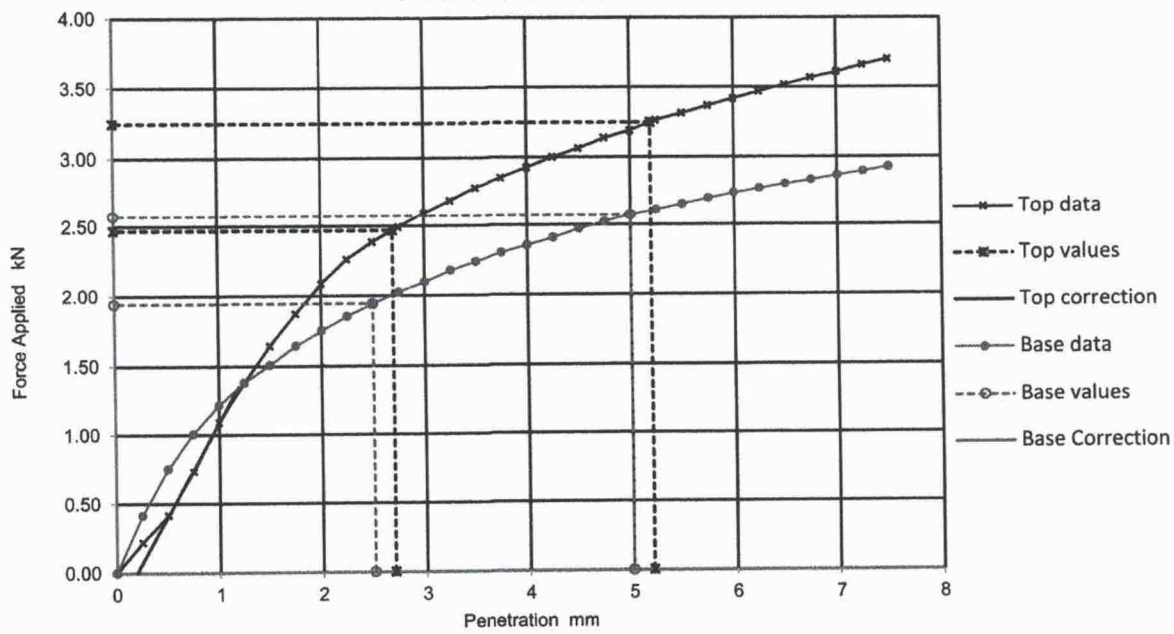
Period of soaking: - days

Time to surface: - days

Amount of swell recorded: - mm

Surcharge applied: 6 kg, 4 kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average	Moisture Content %
TOP	Yes	19	16	19	N/A	19
BASE	No	15	13	15		20

Remarks

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials: J.P

Date: 21/09/2023

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

MSF-5-R16

California Bearing Ratio (CBR)

Job Ref	34062				
Borehole/Pit No.	CBR1				
Site Name	Land South of Cranbrook Road, Frittenden			Sample No.	12
Project No.	1591/29	Client	Peter Baxter Ass	Depth Top	0.50 m
Soil Description	Grey slightly mottled light brown and orangish brown slightly sandy silty CLAY with roots and rootlets			Depth Base	- m
				Sample Type	D
				Samples received	14/09/2023
				Schedules received	13/09/2023
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	15/09/2023
				Date Tested	20/09/2023

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0 %

Initial Specimen details:

Bulk density	1.89	Mg/m3
Dry density	1.50	Mg/m3
Moisture content	26	%

Soaking details: Not soaked

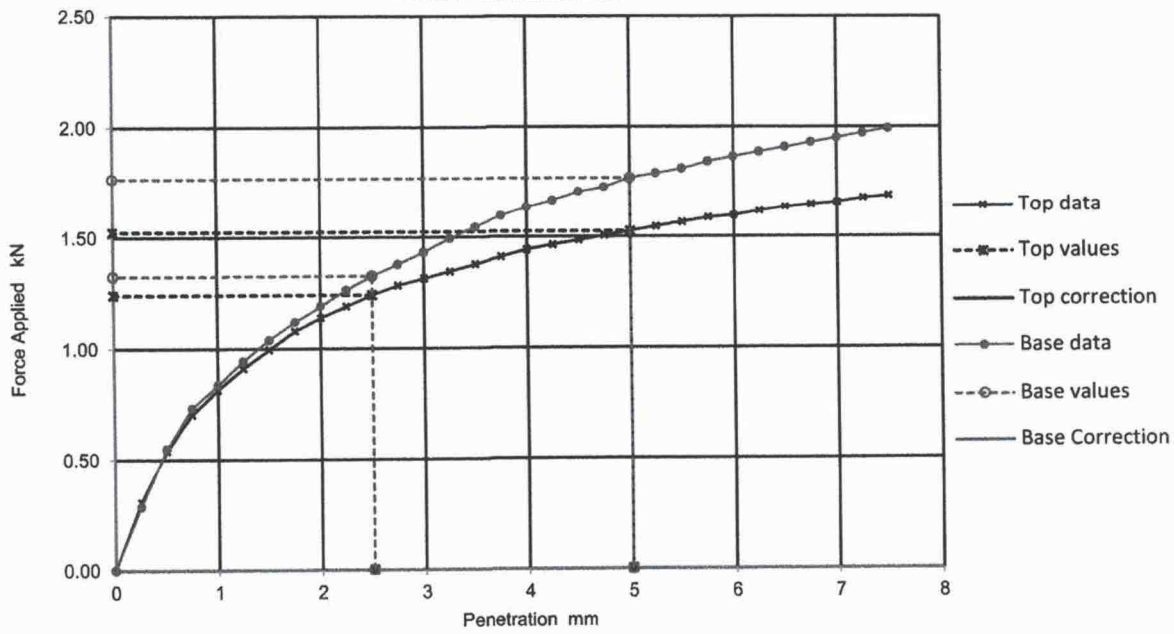
Period of soaking: - days

Time to surface: - days

Amount of swell recorded: - mm

Surcharge applied: 6 kg / 4 kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average
TOP	No	9.4	7.6	9.4	9.8
BASE	No	10	8.9	10	

Moisture Content %
25
26

Remarks

1

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials: J.P

Date: 21/09/2023

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

California Bearing Ratio (CBR)

Job Ref	34062				
Borehole/Pit No.	CBR2				
Site Name	Land South of Cranbrook Road, Frittenden			Sample No.	13
Project No.	1591/29	Client	Peter Baxter Ass	Depth Top	0.50 m
Soil Description	Light brown slightly mottled grey and orangish brown slightly sandy silty CLAY with roots and rootlets			Depth Base	- m
				Sample Type	D
				Samples received	14/09/2023
				Schedules received	13/09/2023
Test Method	BS1377 : Part 4 : 1990, clause 7			Project Started	15/09/2023
				Date Tested	20/09/2023

Specimen Preparation

Condition: REMOULDED

Details: Recompacted with specified standard effort using 2.5kg rammer

Material retained on 20mm sieve removed: 0 %

Initial Specimen details:

Bulk density	1.92	Mg/m3
Dry density	1.60	Mg/m3
Moisture content	20	%

Soaking details: Not soaked

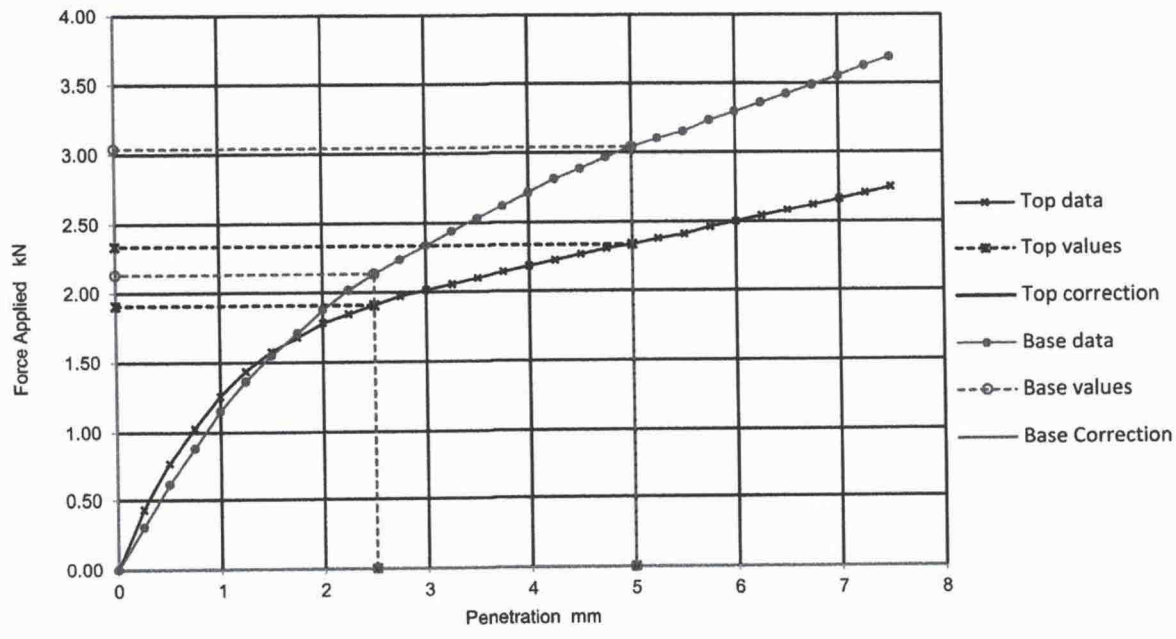
Period of soaking: - days

Time to surface: - days

Amount of swell recorded: - mm

Surcharge applied: 6 kg / 4 kPa

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, % 2.5mm	5mm	Highest	Average
TOP	No	14	12	14	15
BASE	No	16	15	16	

Moisture Content %
19
20

Remarks

1

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU

Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials: J.P

Date: 21/09/2023

UKAS TESTING 2519

Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr)

DETS

UKAS TESTING
4480

Ron Carr
R Carr Geotechnical Services
9 The Mallows
Maidstone
Kent
ME14 2PX

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-11338

Site Reference:	Cranbrook Road. Frittenden
Project / Job Ref:	4083
Order No:	4083
Sample Receipt Date:	08/09/2023
Sample Scheduled Date:	08/09/2023
Report Issue Number:	1
Reporting Date:	14/09/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

For Topsoil and WAC analysis the expanded uncertainty measurement should be considered while evaluating results against compliance values.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
DETS Report No: 23-11338	Date Sampled	06/09/23	06/09/23	06/09/23	06/09/23	06/09/23
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Cranbrook Road, Frittenden	TP / BH No	TP1	TP2	TP3	TP4	TP5
Project / Job Ref: 4083	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 4083	Depth (m)	0.25	0.25	0.25	0.25	0.25
Reporting Date: 14/09/2023	DETS Sample No	673761	673762	673763	673764	673765

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.3	5.5	6.1	6.9	6.8
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	< 200	MCERTS	411	414	419	379	274
Total Sulphate as SO_4	%	< 0.02	MCERTS	0.04	0.04	0.04	0.04	0.03
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5
Organic Matter (SOM)	%	< 0.1	MCERTS	1.7	1.8	3.4	3.4	2.2
TOC (Total Organic Carbon)	%	< 0.1	MCERTS	1	1.1	2	2	1.3
Arsenic (As)	mg/kg	< 2	MCERTS	11	16	16	15	14
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	21	24	28	24	22
Copper (Cu)	mg/kg	< 4	MCERTS	14	21	23	21	18
Lead (Pb)	mg/kg	< 3	MCERTS	19	26	44	35	28
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	9	11	14	14	16
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	53	50	59	63	53
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6	< 6	21	17	< 6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 23-11338	Date Sampled	06/09/23				
R Carr Geotechnical Services	Time Sampled	None Supplied				
Site Reference: Cranbrook Road, Frittenden	TP / BH No	TP3				
Project / Job Ref: 4083	Additional Refs	None Supplied				
Order No: 4083	Depth (m)	0.50				
Reporting Date: 14/09/2023	DETS Sample No	673766				

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025					
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 1	NONE					
Total Sulphate as SO_4	mg/kg	< 200	MCERTS					
Total Sulphate as SO_4	%	< 0.02	MCERTS					
Sulphide	mg/kg	< 5	NONE					
Organic Matter (SOM)	%	< 0.1	MCERTS					
TOC (Total Organic Carbon)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS					
Mercury (Hg)	mg/kg	< 1	MCERTS					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 2	MCERTS					
Zinc (Zn)	mg/kg	< 3	MCERTS					
Total Phenols (monohydric)	mg/kg	< 2	NONE					
EPH (C10 - C40)	mg/kg	< 6	MCERTS					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 23-11338	Date Sampled	06/09/23	06/09/23	06/09/23	06/09/23	06/09/23
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Cranbrook Road, Frittenden	TP / BH No	TP1	TP2	TP3	TP4	TP5
Project / Job Ref: 4083	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 4083	Depth (m)	0.25	0.25	0.25	0.25	0.25
Reporting Date: 14/09/2023	DETS Sample No	673761	673762	673763	673764	673765

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-11338	Date Sampled	06/09/23	06/09/23	06/09/23	06/09/23	06/09/23
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Cranbrook Road, Frittenden	TP / BH No	TP1	TP2	TP3	TP4	TP5
Project / Job Ref: 4083	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 4083	Depth (m)	0.25	0.25	0.25	0.25	0.25
Reporting Date: 14/09/2023	DETS Sample No	673761	673762	673763	673764	673765

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-11338	Date Sampled	06/09/23				
R Carr Geotechnical Services	Time Sampled	None Supplied				
Site Reference: Cranbrook Road, Frittenden	TP / BH No	TP3				
Project / Job Ref: 4083	Additional Refs	None Supplied				
Order No: 4083	Depth (m)	0.50				
Reporting Date: 14/09/2023	DETS Sample No	673766				

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE					
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE					
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS					
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS					
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS					
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS					
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS					
Aliphatic (C5 - C34)	mg/kg	< 21	NONE					
Aromatic >C5 - C7	mg/kg	< 0.01	NONE					
Aromatic >C7 - C8	mg/kg	< 0.05	NONE					
Aromatic >C8 - C10	mg/kg	< 2	MCERTS					
Aromatic >C10 - C12	mg/kg	< 2	MCERTS					
Aromatic >C12 - C16	mg/kg	< 2	MCERTS					
Aromatic >C16 - C21	mg/kg	< 3	MCERTS					
Aromatic >C21 - C35	mg/kg	< 10	MCERTS					
Aromatic (C5 - C35)	mg/kg	< 21	NONE					
Total >C5 - C35	mg/kg	< 42	NONE					

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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 23-11338	Date Sampled	06/09/23	06/09/23	06/09/23	06/09/23	06/09/23
R Carr Geotechnical Services	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Cranbrook Road, Frittenden	TP / BH No	TP1	TP2	TP3	TP4	TP5
Project / Job Ref: 4083	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 4083	Depth (m)	0.25	0.25	0.25	0.25	0.25
Reporting Date: 14/09/2023	DETS Sample No	673761	673762	673763	673764	673765

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 23-11338	**Date Sampled**	06/09/23	
R Carr Geotechnical Services	**Time Sampled**	None Supplied	
Site Reference: Cranbrook Road, Frittenden	**TP / BH No**	TP3	
Project / Job Ref: 4083	**Additional Refs**	None Supplied	
Order No: 4083	**Depth (m)**	0.50	
Reporting Date: 14/09/2023	**DETS Sample No**	673766	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	0.5	3%	5%	6%
Loss on Ignition[MU]	%	< 0.01	4.10	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	7.0	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1	--	To be evaluated	To be evaluated

Eluate Analysis	**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]	< 0.02	< 0.02		< 0.1	20	100	300
Cadmium[U]	< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]	< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]	< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]	< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum[U]	< 0.001	< 0.001		< 0.1	0.5	10	30
Nickel[U]	< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]	< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]	< 0.005	< 0.005		< 0.05	0.06	0.7	5
Selenium[U]	< 0.005	< 0.005		< 0.05	0.1	0.5	7
Zinc[U]	0.023	0.037		0.7	4	50	200
Chloride[U]	3	4		64	800	15000	25000
Fluoride[U]	< 0.5	< 0.5		< 1	10	150	500
Sulphate[U]	7	3		59	1000	20000	50000
TDS	47	27		498	4000	60000	100000
Phenol Index[U]	< 0.01	< 0.01		< 0.5	1	-	-
DOC[U]	11.6	12.7		230	500	800	1000

Leach Test Information						
Sample Mass (kg)	0.10					
Dry Matter (%)	84.1					
Moisture (%)	19					
Stage 1						
Volume Eluate L2 (litres)	0.16					
Filtered Eluate VE1 (litres)	0.04					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-11338	
R Carr Geotechnical Services	
Site Reference: Cranbrook Road, Frittenden	
Project / Job Ref: 4083	
Order No: 4083	
Reporting Date: 14/09/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
673761	TP1	None Supplied	0.25	10.4	Light brown sandy clay with vegetation
673762	TP2	None Supplied	0.25	11.3	Light brown sandy clay
673763	TP3	None Supplied	0.25	14.5	Light brown sandy clay with vegetation
673764	TP4	None Supplied	0.25	12.1	Light brown sandy clay with vegetation
673765	TP5	None Supplied	0.25	10.6	Light brown sandy clay
673766	TP3	None Supplied	0.50	15.4	Light brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-11338
R Carr Geotechnical Services
Site Reference: Cranbrook Road, Frittenden
Project / Job Ref: 4083
Order No: 4083
Reporting Date: 14/09/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-11338
R Carr Geotechnical Services
Site Reference: Cranbrook Road, Frittenden
Project / Job Ref: 4083
Order No: 4083
Reporting Date: 14/09/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethar	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	10.4	%
Loss on Ignition	Soil	BS EN 12457	16.9	%
BTEX	Soil	BS EN 12457	14.0	%
Sum of PCBs	Soil	BS EN 12457	21.1	%
Mineral Oil	Soil	BS EN 12457	9.0	%
Total PAH	Soil	BS EN 12457	17.9	%
pH	Soil	BS EN 12457	0.282	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18.0	%
Arsenic	Leachate	BS EN 12457	19.5	%
Barium	Leachate	BS EN 12457	12.2	%
Cadmium	Leachate	BS EN 12457	17.2	%
Chromium	Leachate	BS EN 12457	20.7	%
Copper	Leachate	BS EN 12457	14.1	%
Mercury	Leachate	BS EN 12457	16.7	%
Molybdenum	Leachate	BS EN 12457	13.3	%
Nickel	Leachate	BS EN 12457	14.0	%
Lead	Leachate	BS EN 12457	12.1	%
Antimony	Leachate	BS EN 12457	16.1	%
Selenium	Leachate	BS EN 12457	15.5	%
Zinc	Leachate	BS EN 12457	14.0	%
Chloride	Leachate	BS EN 12457	15.7	%
Fluoride	Leachate	BS EN 12457	19.1	%
Sulphate	Leachate	BS EN 12457	27.6	%
TDS	Leachate	BS EN 12457	10.0	%
Phenol Index	Leachate	BS EN 12457	12.9	%
DOC	Leachate	BS EN 12457	20.4	%
Clay Content	Soil	BS 3882: 2015	15.0	%
Silt Content	Soil	BS 3882: 2015	14.0	%
Sand Content	Soil	BS 3882: 2015	13.0	%
Loss on Ignition	Soil	BS 3882: 2015	16.9	%
pH	Soil	BS 3882: 2015	0.282	Units
Carbonate	Soil	BS 3882: 2015	12.0	%
Total Nitrogen	Soil	BS 3882: 2015	12.0	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24.0	%
Potassium (Extractable)	Soil	BS 3882: 2015	20.0	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26.0	%
Zinc	Soil	BS 3882: 2015	19.8	%
Copper	Soil	BS 3882: 2015	23.2	%
Nickel	Soil	BS 3882: 2015	32.6	%
Available Sodium	Soil	BS 3882: 2015	23.0	%
Available Calcium	Soil	BS 3882: 2015	23.0	%
Electrical Conductivity	Soil	BS 3882: 2015	10.0	%