



APPENDIX D

SOIL ENGINEERING TEST RESULTS

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LABORATORY REPORT

CONTRACT NUMBER: CCG-C-21-12809

CONTRACT TITLE: BERSE ROAD, NEW BROUGHTON

CLIENT: CAULMERT

DATE RECEIVED: 24/01/22
DATE COMMENCED: 27/01/22
DATE COMPLETED: 16/02/22
REPORT DATE: 17/02/22

Test Description	Qty
Determination of Moisture Content BS 1377-2:1990 (a)	5
Determination of Liquid & Plastic Limits BS 1377-2:1990 (a)	5
Particle Size Distribution BS 1377-2:1990 (a)	6
Dry Density / Moisture Content Relationship BS1377-4:1990 (#)	1

Notes: Observations and interpretations are not accredited by UKAS
All testing undertaken at laboratory permanent facilities
denotes non-accredited test
a denotes UKAS accredited test
s denotes test undertaken by approved subcontractor
Test results only relate to the samples tested

This report is issued in accordance with the requirements of the United Kingdom Accreditation Services and EN ISO/IEC 17025:2017. The results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories: Chris Bolan (Managing Director) – Daniel Kerfoot (Laboratory Manager)

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
TP4	B	1.00	1.00	-	-	-	-	-	-	-	-	-	Y	Brown silty sandy GRAVEL with high cobble content. Gravel and cobbles are subangular to subrounded sandstone. (BS1377Pt2:9.2)
TP5	B	1.00	1.00	-	-	-	-	-	-	-	-	-	Y	Dark brown very sandy silty GRAVEL with medium cobble content. Gravel and cobbles are subangular to subrounded sandstone. (BS1377Pt2:9.2)
TP6	B	0.85	0.85	17	-	-	-	27	17	10	92	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular sandstone and coal. (BS1377Pt2:3.2,4,4,5)
TP6	B	1.20	1.20	15	-	-	-	27	16	11	95	CL	Y	Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular sandstone and coal. (BS1377Pt2:3.2,4,4,5)
TP7	B	0.50	0.50	-	-	-	-	-	-	-	-	-	Y	Brown very sandy silty GRAVEL with low cobble content. Gravel and cobbles are subangular to subrounded sandstone and mudstone. (BS1377Pt2:9.2)
TP7	B	1.20	1.20	-	-	-	-	-	-	-	-	-	Y	Brown very gravelly silty fine to coarse SAND. Gravel is fine to coarse subangular to subrounded sandstone, mudstone, coal. (BS1377Pt2:9.2)

SITE: BERSE ROAD, NEW BROUGHTON (CCG-C-21-12809)
CLIENT: CAULMERT

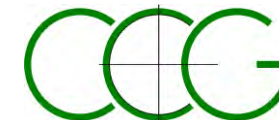
DATE: 15.02.22

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



12809 RES TP.xls

SUMMARY OF LABORATORY SOIL TEST RESULTS

BH / TP / WS Number	Sample Type	Depth From (m)	Depth To (m)	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Shear Strength (kN/m ²)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Soil Classification	UKAS accredited test (Y/N)	Description / Test Method Samples described in accordance with BS EN ISO 14688-2 2004
SA1	B	1.50	1.50	-	-	-	-	-	-	-	-	-	Y	Brown gravelly slightly sandy silty CLAY. Gravel is fine to coarse subangular sandstone. (BS1377Pt2:9.2)
SA2	B	1.50	1.50	-	-	-	-	-	-	-	-	-	Y	Dark brown very sandy silty GRAVEL with high cobble content. Gravel and cobbles are subangular to subrounded sandstone. (BS1377Pt2:9.2)
SA3	B	0.50	0.50	16	-	-	-	-	-	-	63	NP	Y	Brown very clayey very gravelly fine to medium SAND. Gravel is fine to coarse sandstone and coal. (BS1377Pt2:3.2,4.4,5)
SA3	B	1.00	1.00	17	-	-	-	36	19	17	51	CI	Y	Brown gravelly slightly sandy silty CLAY. Gravel is fine to coarse subangular sandstone. (BS1377Pt2:3.2,4.4,5)
SA3	B	1.80	1.80	13	-	-	-	24	15	9	78	CL	Y	Reddish brown sandy slightly gravelly silty CLAY. Gravel is fine to medium subangular sandstone. (BS1377Pt2:3.2,4.4,5)

SITE: BERSE ROAD, NEW BROUGHTON (CCG-C-21-12809)
CLIENT: CAULMERT

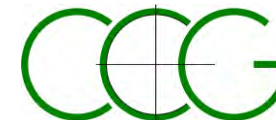
DATE: 15.02.22

Key:- BD = Bulk Disturbed; SD = Small Disturbed; U100 = Undisturbed 100mm; WS = Window Sample

CL = Low Plasticity; CI = Intermediate; CH = High; CV = Very high; CE = Extremely high; NP = Non-plastic

(* Denotes Hand Shear Vane test result)

Sample description not accredited by UKAS



12809 RES SA.xls



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PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-21-12809

Borehole/Pit No.

TP4

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No.

1

Specimen
Description

Brown silty sandy GRAVEL with high cobble content

Depth, m

1.00

Specimen
Reference

Specimen
Depth

m

Sample Type

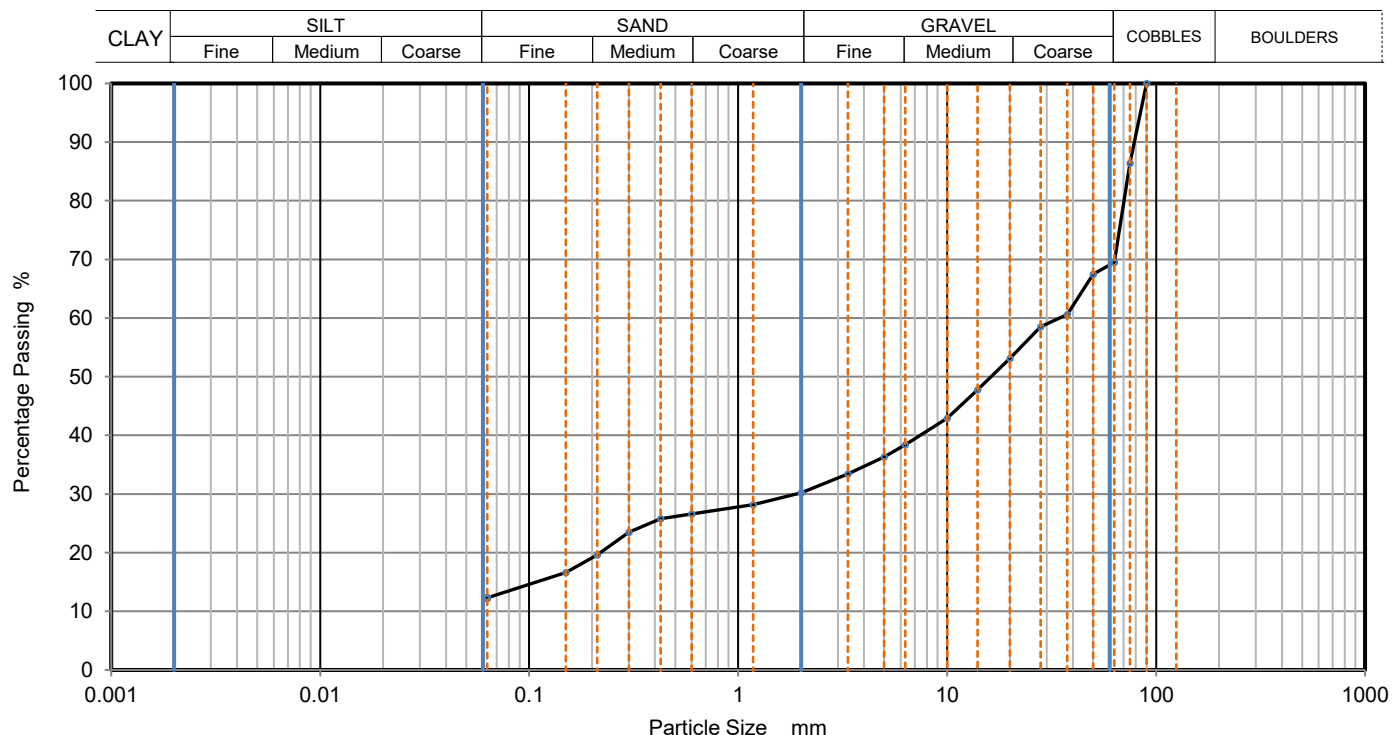
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL202202100



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
90	100		
75	86		
63	70		
50	68		
37.5	61		
28	59		
20	53		
14	48		
10	43		
6.3	38		
5	36		
3.35	33		
2	30		
1.18	28		
0.6	27		
0.425	26		
0.3	24		
0.212	20		
0.15	17		
0.063	12		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	31
Gravel	39
Sand	18
Fines <0.063mm	12

Grading Analysis		
D100	mm	90
D60	mm	34.6
D30	mm	1.89
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator

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Fig 1

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PARTICLE SIZE DISTRIBUTION

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Borehole/Pit No.

TP5

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No.

1

Specimen Description

Dark brown very sandy silty GRAVEL with medium cobble content

Depth, m

1.00

Specimen Reference

Specimen Depth

m

Sample Type

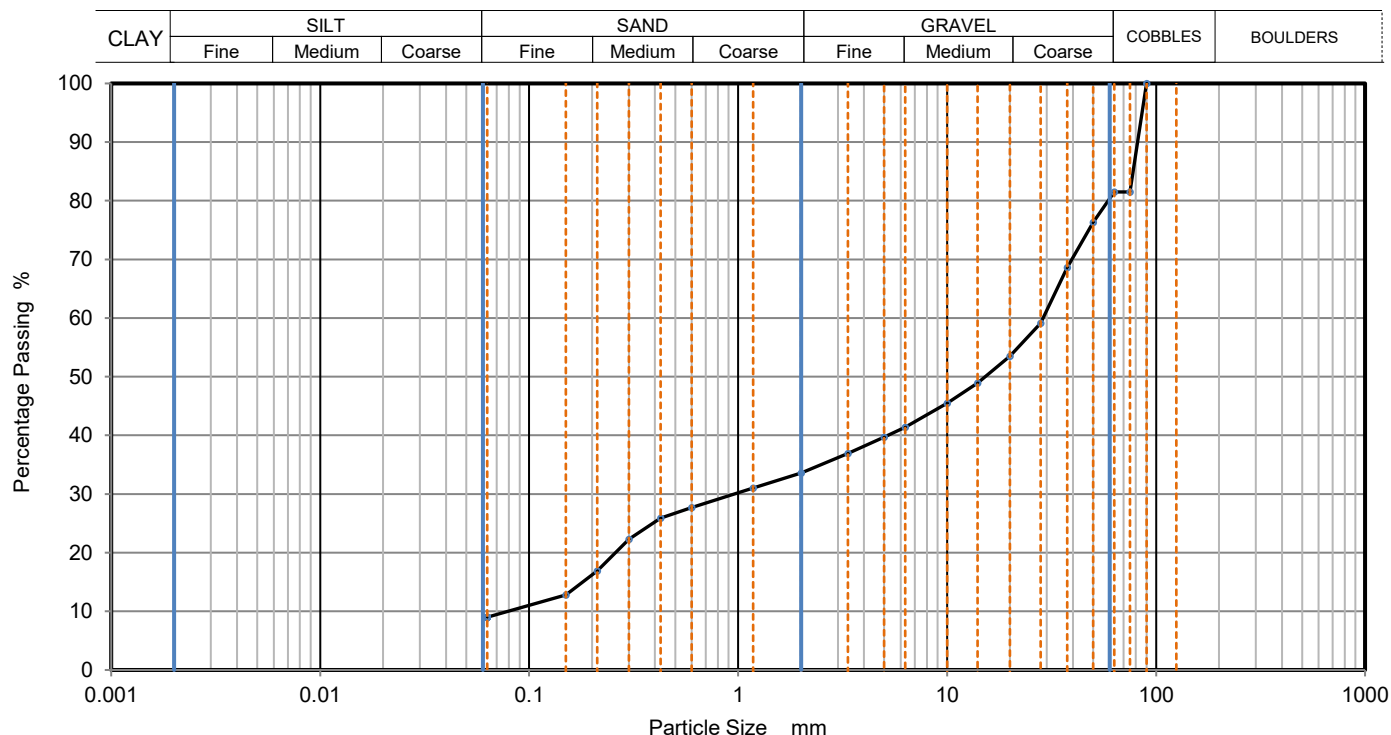
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL202202101



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
90	100		
75	82		
63	82		
50	76		
37.5	69		
28	59		
20	54		
14	49		
10	46		
6.3	41		
5	40		
3.35	37		
2	34		
1.18	31		
0.6	28		
0.425	26		
0.3	22		
0.212	17		
0.15	13		
0.063	9		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	19
Gravel	48
Sand	25
Fines <0.063mm	9

Grading Analysis		
D100	mm	90
D60	mm	28.8
D30	mm	0.968
D10	mm	0.0786
Uniformity Coefficient		370
Curvature Coefficient		0.41

Remarks

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Fig 1

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Borehole/Pit No.

TP7

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No.

1

Specimen
Description

Brown very sandy silty GRAVEL with low cobble content

Depth, m

0.50

Specimen
Reference

Specimen
Depth

m

Sample Type

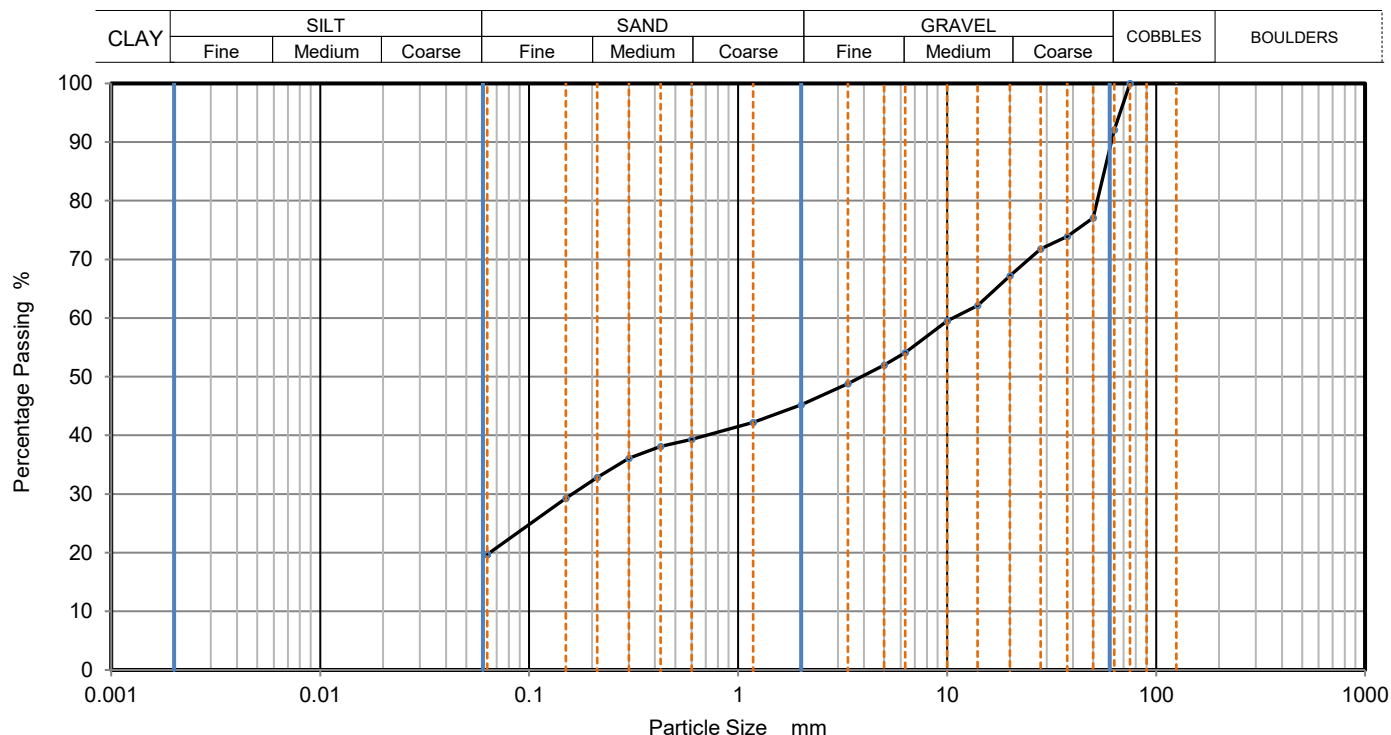
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL202202104



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	92		
50	77		
37.5	74		
28	72		
20	67		
14	62		
10	60		
6.3	54		
5	52		
3.35	49		
2	45		
1.18	42		
0.6	39		
0.425	38		
0.3	36		
0.212	33		
0.15	29		
0.063	20		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	8
Gravel	47
Sand	26
Fines <0.063mm	20

Grading Analysis		
D100	mm	75
D60	mm	10.6
D30	mm	0.161
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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Fig 1

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Borehole/Pit No.

TP7

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No.

1

Specimen
Description

Brown very gravelly silty fine to coarse SAND

Depth, m

1.20

Specimen
Reference

Specimen
Depth

m

Sample Type

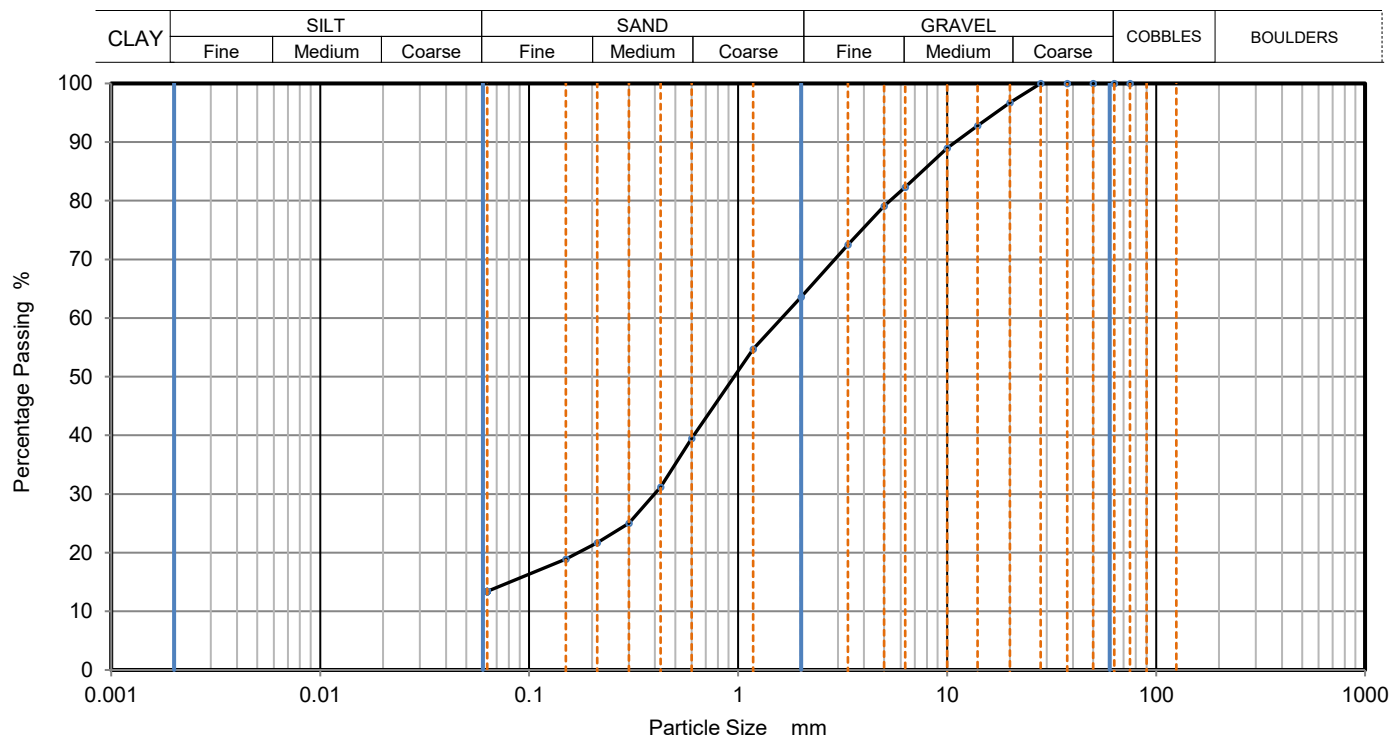
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL202202105



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	93		
10	89		
6.3	82		
5	79		
3.35	73		
2	64		
1.18	55		
0.6	40		
0.425	31		
0.3	25		
0.212	22		
0.15	19		
0.063	13		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	36
Sand	50
Fines <0.063mm	13

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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PARTICLE SIZE DISTRIBUTION

Job Ref

CCG-C-21-12809

Borehole/Pit No.

SA1

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No.

1

Specimen
Description

Brown gravelly slightly sandy silty CLAY

Depth, m

1.50

Specimen
Reference

Specimen
Depth

m

Sample Type

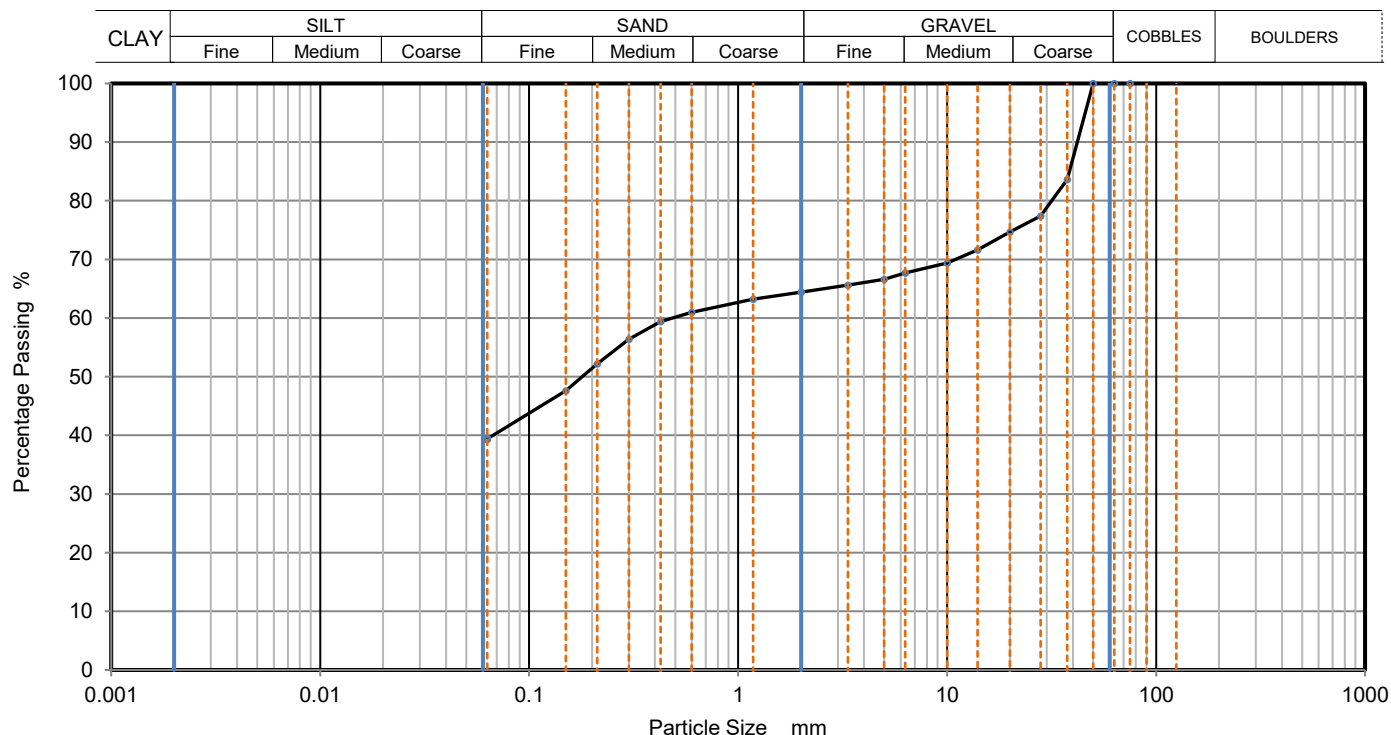
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL202202106



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	84		
28	77		
20	75		
14	72		
10	69		
6.3	68		
5	67		
3.35	66		
2	64		
1.18	63		
0.6	61		
0.425	59		
0.3	56		
0.212	52		
0.15	48		
0.063	39		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	0
Gravel	36
Sand	25
Fines <0.063mm	39

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Remarks

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PARTICLE SIZE DISTRIBUTION

Job Ref

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Borehole/Pit No.

SA2

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No.

1

Specimen
Description

Dark brown very sandy silty GRAVEL with high cobble content

Depth, m

1.50

Specimen
Reference

Specimen
Depth

m

Sample Type

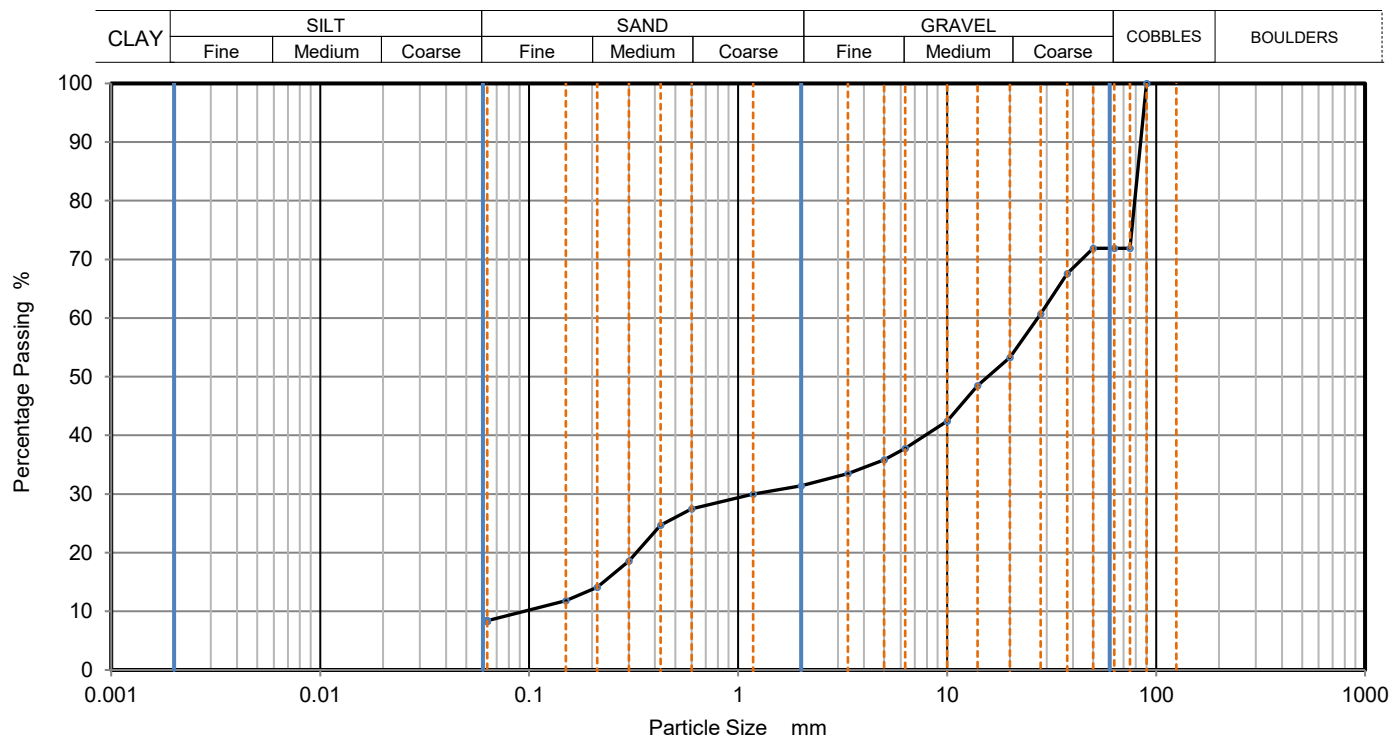
B

Test Method

BS1377:Part 2:1990, clause 9.2

KeyLAB ID

CCGL202202107



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
90	100		
75	72		
63	72		
50	72		
37.5	68		
28	61		
20	53		
14	49		
10	42		
6.3	38		
5	36		
3.35	34		
2	31		
1.18	30		
0.6	28		
0.425	25		
0.3	19		
0.212	14		
0.15	12		
0.063	8		

Dry Mass of sample, g

Sample Proportions	% dry mass
Very coarse	28
Gravel	40
Sand	23
Fines <0.063mm	8

Grading Analysis		
D100	mm	90
D60	mm	27.1
D30	mm	1.18
D10	mm	0.0937
Uniformity Coefficient		290
Curvature Coefficient		0.55

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator

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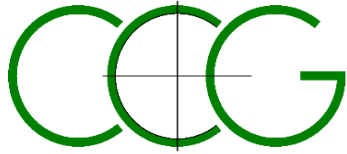
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Fig 1

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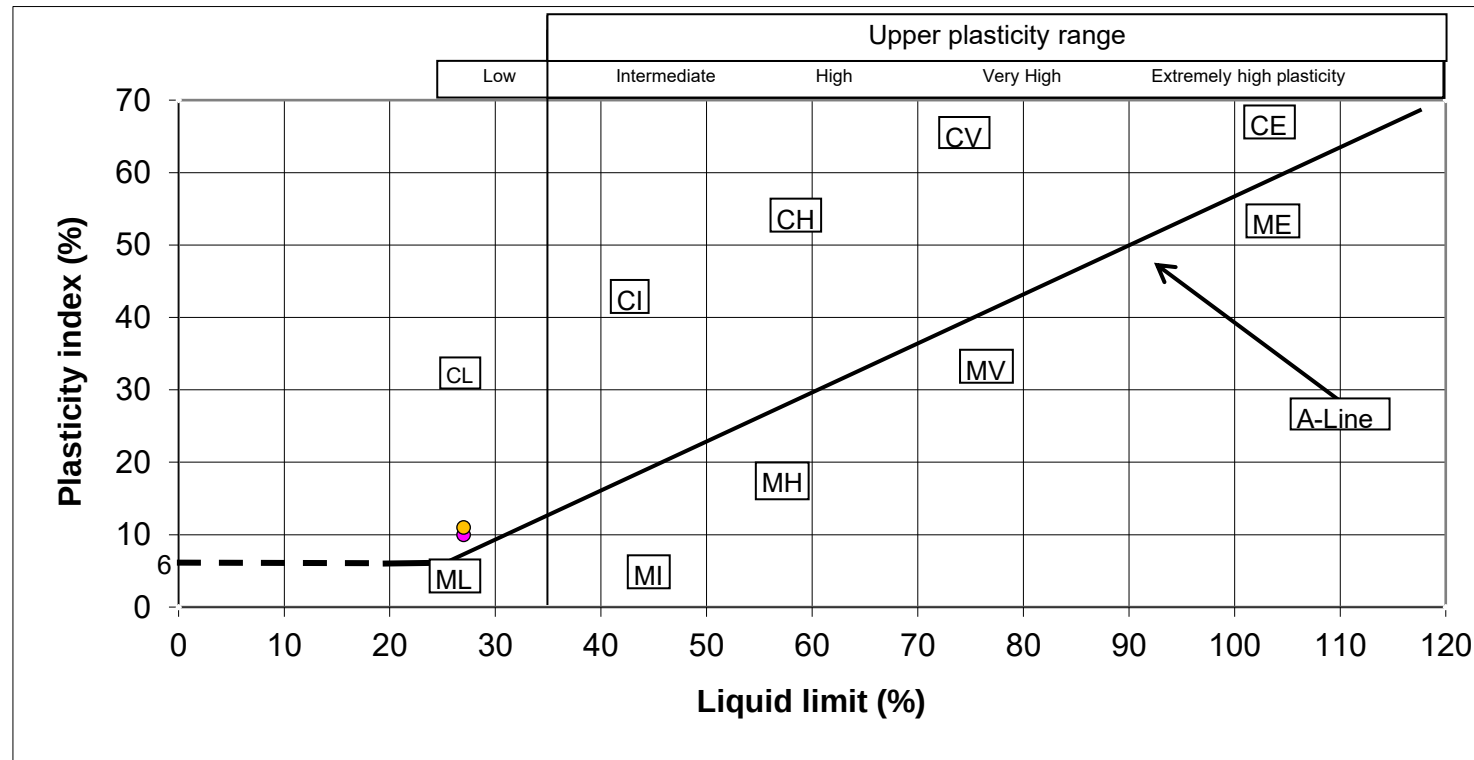
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ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



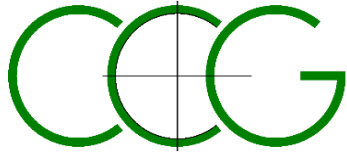
BH	Sample Depth	Liquid limit	Plasticity index
TP6	0.85	27.0	10.0
TP6	1.20	27.0	11.0



4514

APPROVED BY	DK
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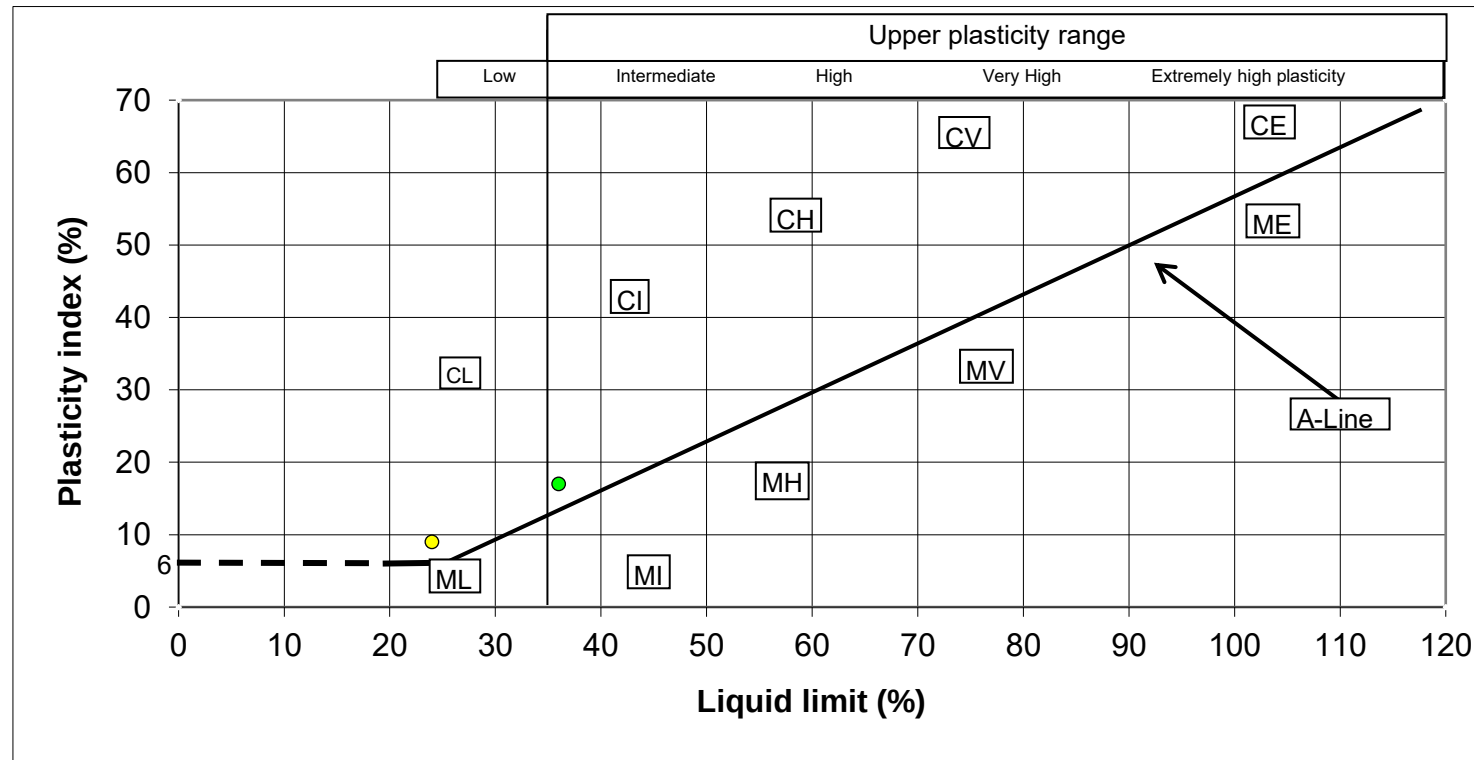
CLIENT: CAULMERT	SITE: BERSE ROAD, NEW BROUGHTON (CCG-C-21-12809)
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ATTERBERG TEST RESULT SHEET

BS 1377:Part 2:1990:cl 4.4,5

SILT (M-SOIL), M plots below A-Line , CLAY,C, plots above A-Line, M and C may be combined as FINE SOIL, F.



BH	Sample Depth	Liquid limit	Plasticity index
SA3	1.00	36.0	17.0
SA3	1.80	24.0	9.0



4514

APPROVED BY	DK
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CLIENT: CAULMERT	SITE: BERSE ROAD, NEW BROUGHTON (CCG-C-21-12809)
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Dry Density / Moisture Content Relationship Light Compaction

Job Ref

CCG-C-21-12809

Borehole / Pit No

TP7

Site Name

BERSE ROAD, NEW BROUGHTON

Sample No

1

Soil Description

Brown very gravelly silty fine to coarse SAND

Depth

1.20 m

Specimen Ref.

Specimen Depth

m

Sample Type

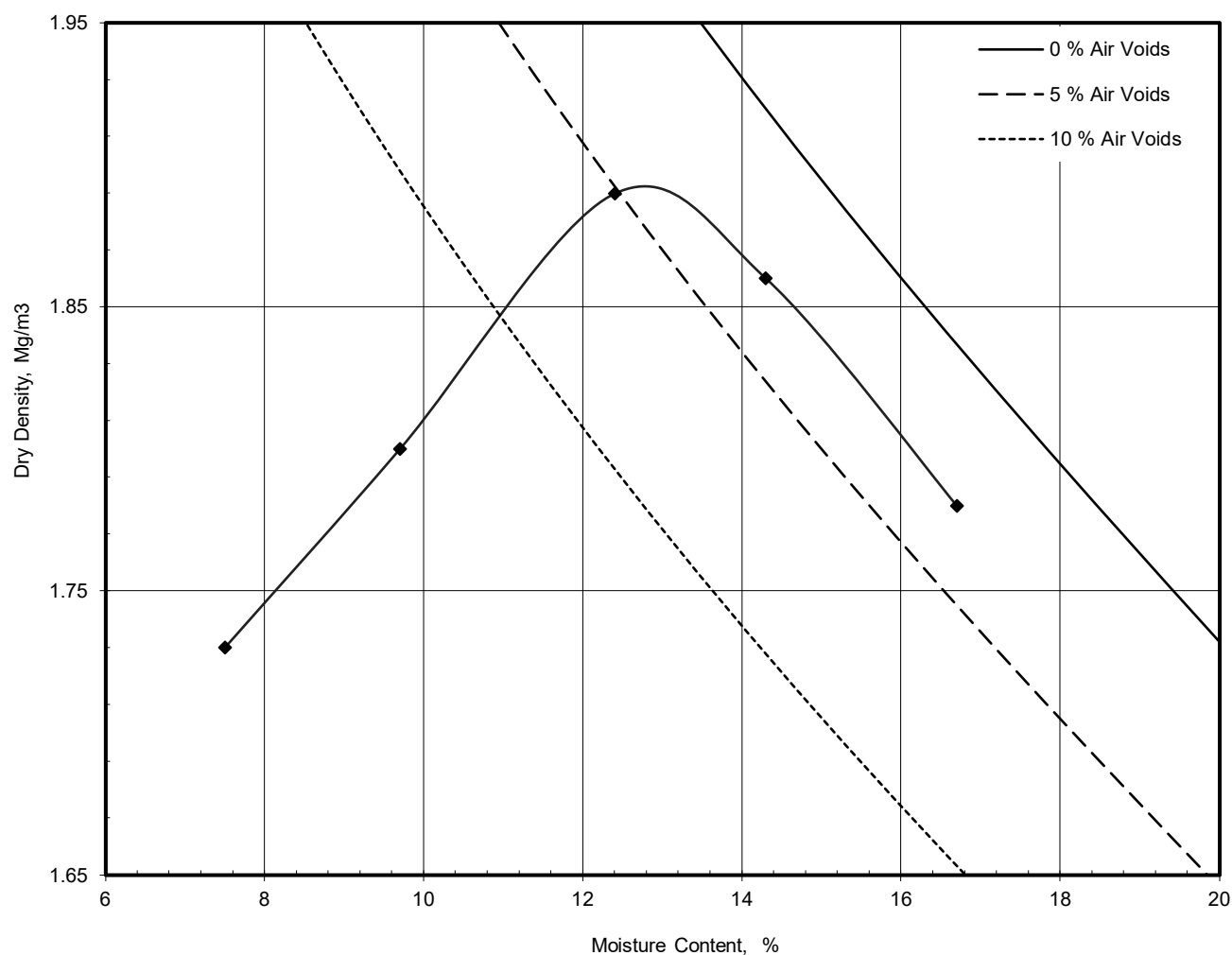
B

Test Method

BS1377:1990:Part 4 3.4.4.2

Keylab ID

Compaction Test Reference/No.



Preparation	
Mould Type	1 litre
Samples Used	1
Material Retained on 37.5 mm Sieve	% 0
Material Retained on 20.0 mm Sieve	% 3
Particle Density -	Mg/m³ 2.65

Maximum Dry Density	Mg/m³	1.89
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Optimum Moisture Content	%	12
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Operator

Checked

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Remarks

Fig

MH

DK

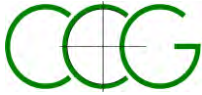
DK

Sheet 1 of 1



APPENDIX E

TRL DCP TEST RESULTS



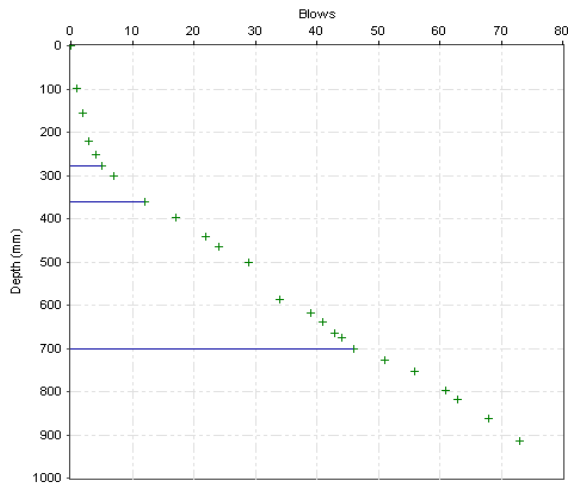
Dynamic Cone Penetrometer Strength Analysis Report

Site: Berse Road, New Broughton
 Location: DCP1
 Cone Angle: 60 degrees
 Zero Error: 45
 Test Date: 19/01/2022

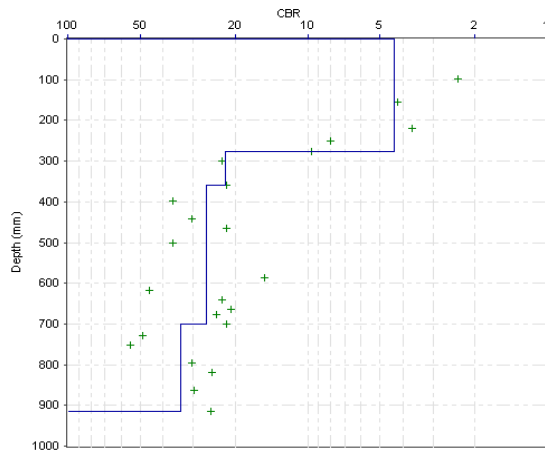
Job Number: CCG-C-21-12809
 Surface Type: -
 Thickness (mm): -

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)
1	0	0	45	0	21	5	61	842	8.8
2	1	1	143	98.0	22	2	63	863	10.5
3	1	2	200	57.0	23	5	68	908	9.0
4	1	3	265	65.0	24	5	73	960	10.4
5	1	4	296	31.0					
6	1	5	322	26.0					
7	2	7	345	11.5					
8	5	12	405	12.0					
9	5	17	442	7.4					
10	5	22	486	8.8					
11	2	24	510	12.0					
12	5	29	547	7.4					
13	5	34	632	17.0					
14	5	39	662	6.0					
15	2	41	685	11.5					
16	2	43	710	12.5					
17	1	44	721	11.0					
18	2	46	745	12.0					
19	5	51	773	5.6					
20	5	56	798	5.0					

Layer Boundaries: Chainage 1.000



Layer Boundaries Chart



CBR Chart

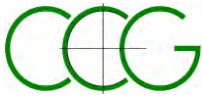
Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	4	277	277	322	
2	22	83	360	405	
3	26	340	700	745	
4	34	215	915	960	

CBR Derived by TDR equation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{penetration rate})$$

Remarks Surface material description: Grassed TOPSOIL



Dynamic Cone Penetrometer Strength Analysis Report

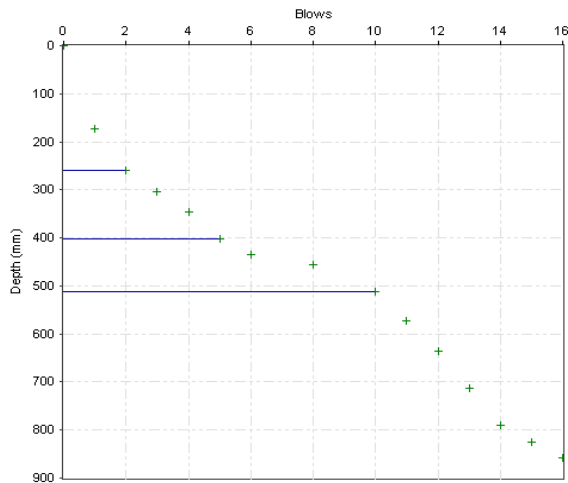
Site: Berse Road, New Broughton
 Location: DCP2
 Cone Angle: 60 degrees
 Zero Error: 100
 Test Date: 19/01/2022

Job Number: CCG-C-21-12809
 Surface Type: -
 Thickness (mm): -

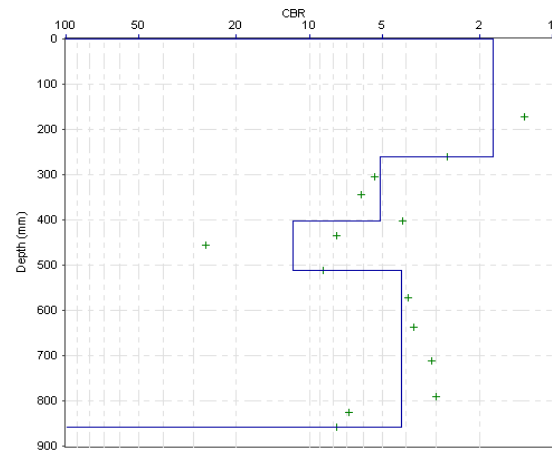
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)
1	0	0	100	0
2	1	1	273	173.0
3	1	2	360	87.0
4	1	3	405	45.0
5	1	4	445	40.0
6	1	5	503	58.0
7	1	6	535	32.0
8	2	8	555	10.0
9	2	10	612	28.5
10	1	11	673	61.0
11	1	12	737	64.0
12	1	13	812	75.0
13	1	14	890	78.0
14	1	15	926	36.0
15	1	16	958	32.0

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)

Layer Boundaries: Chainage 2.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	2	260	260	360	
2	5	143	403	503	
3	12	109	512	612	
4	4	346	858	958	

CBR Derived by TDR equation

$$\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{penetration rate})$$

Average (mean) CBR% 100-958mmbgl = 6%

Remarks Surface material description: Grassed TOPSOIL

Dynamic Cone Penetrometer Strength Analysis Report

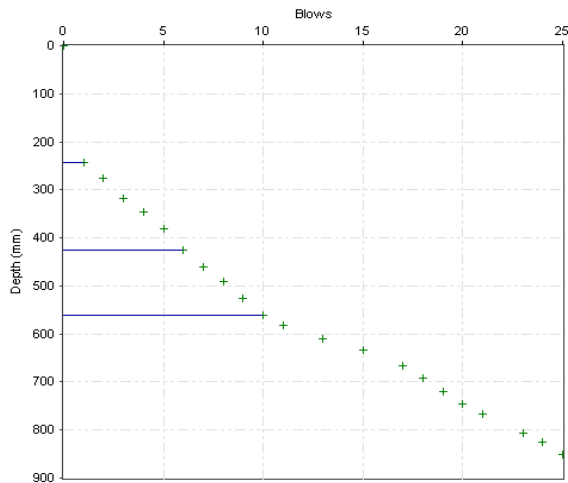
Site: Berse Road, New Broughton
Location: DCP3
Cone Angle: 60 degrees
Zero Error: 100
Test Date: 19/01/2022

Job Number: CCG-C-21-12809
Surface Type: -
Thickness (mm): -

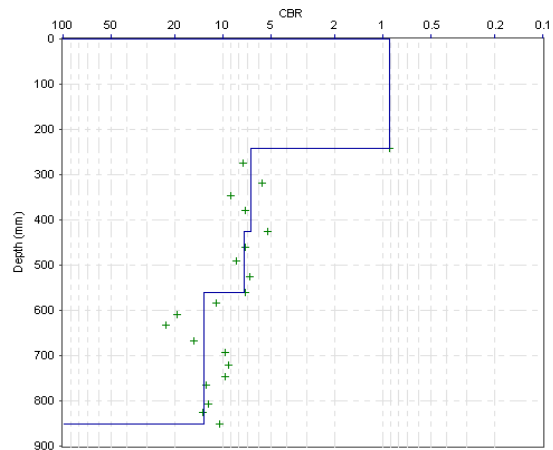
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm / b)
1	0	0	100	0
2	1	1	342	242.0
3	1	2	375	33.0
4	1	3	418	43.0
5	1	4	446	28.0
6	1	5	480	34.0
7	1	6	526	46.0
8	1	7	560	34.0
9	1	8	590	30.0
10	1	9	626	36.0
11	1	10	660	34.0
12	1	11	683	23.0
13	2	13	710	13.5
14	2	15	733	11.5
15	2	17	767	17.0
16	1	18	793	26.0
17	1	19	820	27.0
18	1	20	846	26.0
19	1	21	866	20.0
20	2	23	907	20.5

[illegible]

Layer Boundaries: Chainage 3.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	1	242	242	342	
2	7	184	426	526	
3	7	134	560	660	
4	13	290	850	950	

CBR Derived by TDR equation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{penetration rate})$$

Average (mean) CBR% 100-950mmbgl = 7%

Remarks	Surface material description: Grassed TOPSOIL
---------	---

Dynamic Cone Penetrometer Strength Analysis Report

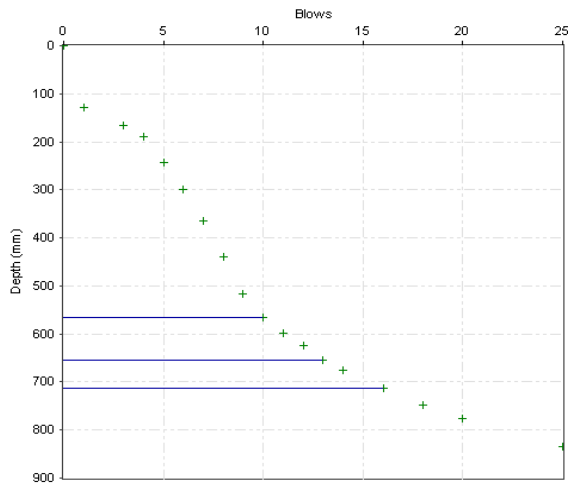
Site: Berse Road, New Broughton
Location: DCP4
Cone Angle: 60 degrees
Zero Error: 115
Test Date: 19/01/2022

Job Number: CCG-C-21-12809
Surface Type: -
Thickness (mm): -

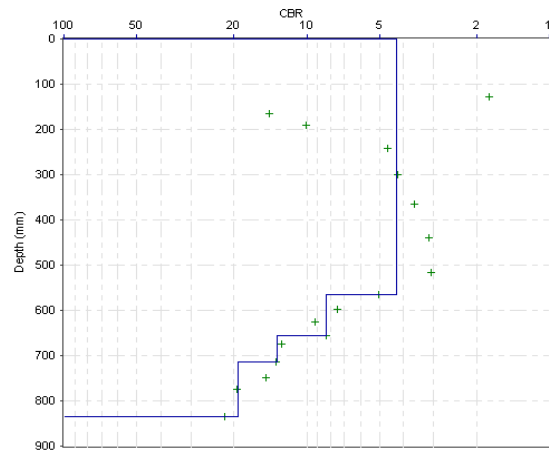
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)
1	0	0	115	0
2	1	1	244	129.0
3	2	3	280	18.0
4	1	4	305	25.0
5	1	5	357	52.0
6	1	6	414	57.0
7	1	7	480	66.0
8	1	8	555	75.0
9	1	9	632	77.0
10	1	10	680	48.0
11	1	11	713	33.0
12	1	12	740	27.0
13	1	13	770	30.0
14	1	14	790	20.0
15	2	16	828	19.0
16	2	18	863	17.5
17	2	20	890	13.5
18	5	25	950	12.0

[illegible]

Layer Boundaries: Chainage 4.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	4	565	565	680	
2	8	90	655	770	
3	13	58	713	828	
4	19	122	835	950	

CBR Derived by TDR equation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{penetration rate})$$

Average (mean) CBR% 115-950mmbgl = 11%

Remarks	Surface material description: Grassed TOPSOIL
---------	---

Dynamic Cone Penetrometer Strength Analysis Report

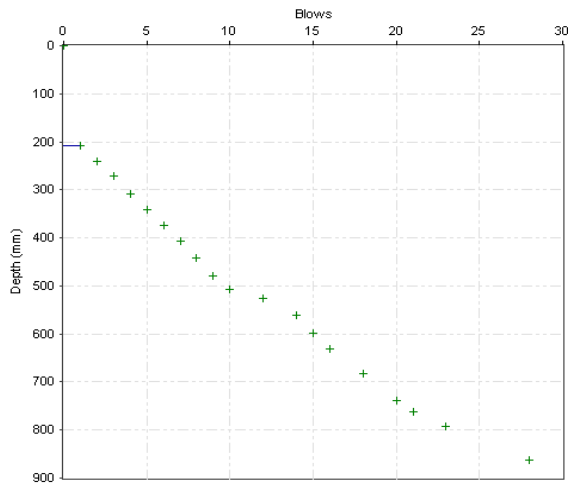
Site: Berse Road, New Broughton
Location: DCP5
Cone Angle: 60 degrees
Zero Error: 73
Test Date: 19/01/2022

Job Number: CCG-C-21-12809
Surface Type: -
Thickness (mm): -

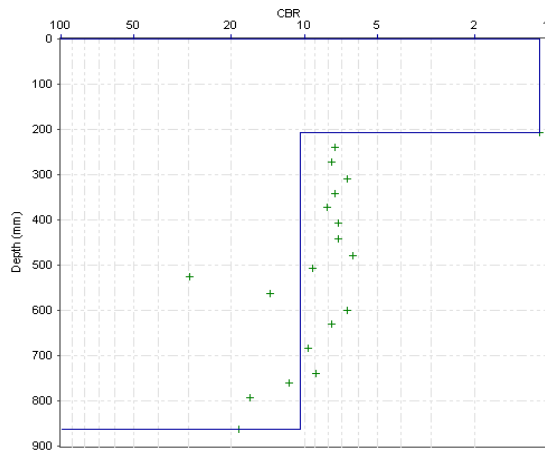
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm / b)
1	0	0	73	0
2	1	1	280	207.0
3	1	2	313	33.0
4	1	3	345	32.0
5	1	4	382	37.0
6	1	5	415	33.0
7	1	6	446	31.0
8	1	7	480	34.0
9	1	8	514	34.0
10	1	9	553	39.0
11	1	10	580	27.0
12	2	12	598	9.0
13	2	14	635	18.5
14	1	15	672	37.0
15	1	16	704	32.0
16	2	18	756	26.0
17	2	20	812	28.0
18	1	21	834	22.0
19	2	23	865	15.5
20	5	28	935	14.0

[illegible]

Layer Boundaries: Chainage 5.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	1	207	207	280	
2	10	655	862	935	

CBR Derived by TDR equation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{penetration rate})$$

Average (mean) CBR% 73-935mmbgl = 6%

Remarks	Surface material description: Grassed TOPSOIL
---------	---

Dynamic Cone Penetrometer Strength Analysis Report

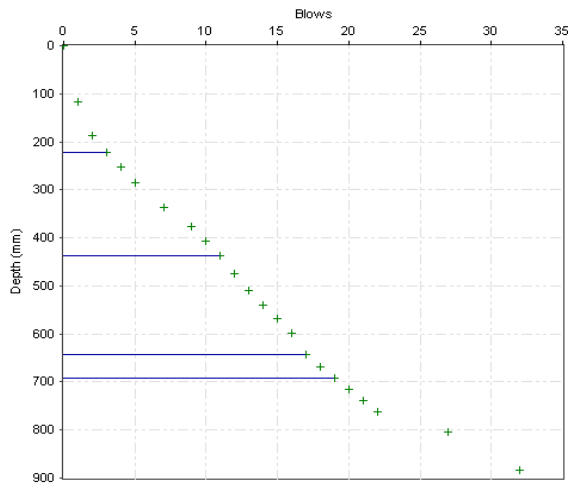
Site: Berse Road, New Broughton
Location: DCP6
Cone Angle: 60 degrees
Zero Error: 77
Test Date: 19/01/2022

Job Number: CCG-C-21-12809
Surface Type: -
Thickness (mm): -

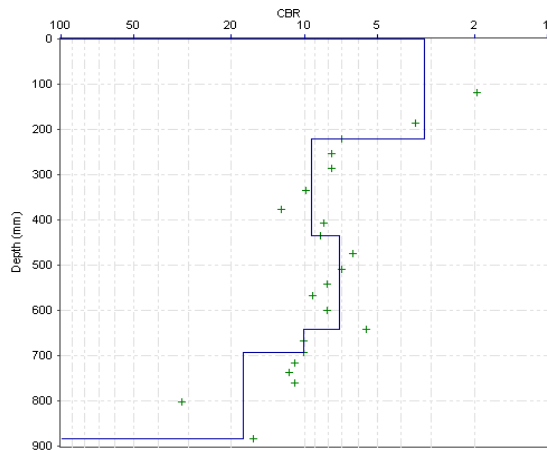
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)
1	0	0	77	0
2	1	1	195	118.0
3	1	2	263	68.0
4	1	3	298	35.0
5	1	4	330	32.0
6	1	5	362	32.0
7	2	7	413	25.5
8	2	9	454	20.5
9	1	10	484	30.0
10	1	11	513	29.0
11	1	12	552	39.0
12	1	13	587	35.0
13	1	14	618	31.0
14	1	15	645	27.0
15	1	16	676	31.0
16	1	17	720	44.0
17	1	18	745	25.0
18	1	19	770	25.0
19	1	20	793	23.0
20	1	21	815	22.0

[illegible]

Layer Boundaries: Chainage 6.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	3	221	221	298	
2	9	215	436	513	
3	7	207	643	720	
4	10	50	693	770	
5	18	190	883	960	

CBR Derived by TDR equation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{penetration rate})$$

Average (mean) CBR% 77-960mmbgl = 9%

Remarks	Surface material description: Grassed TOPSOIL
---------	---

Dynamic Cone Penetrometer Strength Analysis Report

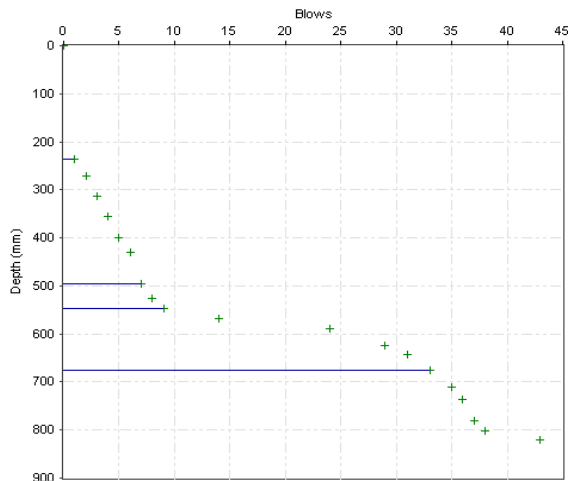
Site: Berse Road, New Broughton
Location: DCP7
Cone Angle: 60 degrees
Zero Error: 110
Test Date: 19/01/2022

Job Number: CCG-C-21-12809
Surface Type: -
Thickness (mm): -

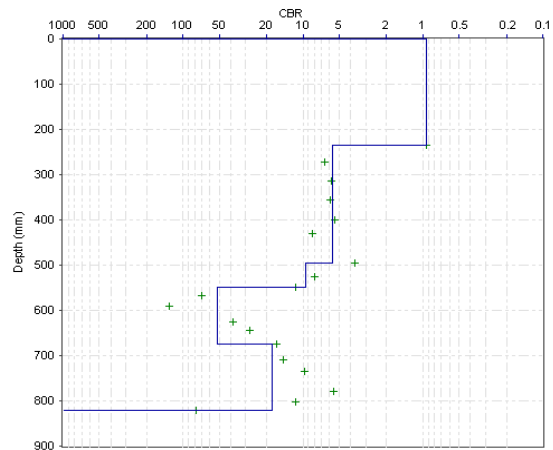
No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)
1	0	0	110	0
2	1	1	345	235.0
3	1	2	382	37.0
4	1	3	424	42.0
5	1	4	465	41.0
6	1	5	510	45.0
7	1	6	540	30.0
8	1	7	605	65.0
9	1	8	636	31.0
10	1	9	658	22.0
11	5	14	678	4.0
12	10	24	700	2.2
13	5	29	735	7.0
14	2	31	754	9.5
15	2	33	785	15.5
16	2	35	820	17.5
17	1	36	846	26.0
18	1	37	890	44.0
19	1	38	912	22.0
20	5	43	930	3.6

[illegible]

Layer Boundaries: Chainage 7.000



Layer Boundaries Chart



CBR Chart

Layer Properties

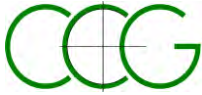
No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	1	235	235	345	
2	6	266	495	605	
3	9	53	548	658	
4	52	127	675	785	
5	18	145	820	930	

CBR Derived by TDR equation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10}(\text{penetration rate})$$

Average (mean) CBR% 10-930mmbgl = 17%

Remarks	Surface material description: Grassed TOPSOIL
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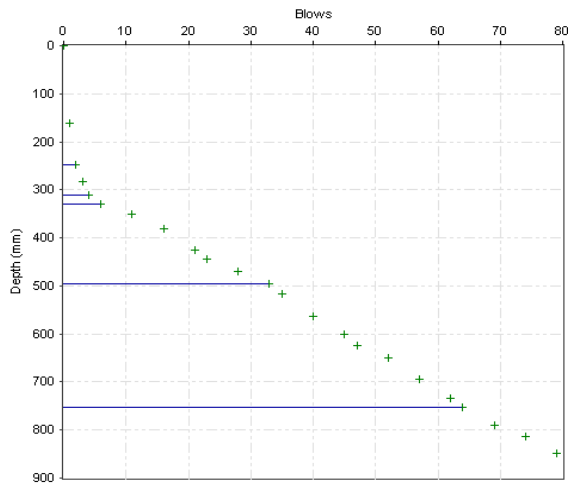
Dynamic Cone Penetrometer Strength Analysis Report

Site: Berse Road, New Broughton
Location: DCP8
Cone Angle: 60 degrees
Zero Error: 75
Test Date: 19/01/2022

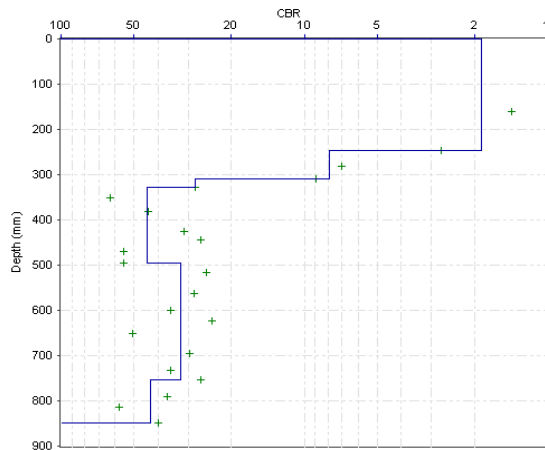
Job Number: CCG-C-21-12809
Surface Type: -
Thickness (mm): -

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/b)
1	0	0	75	0	21	5	69	865	7.4
2	1	1	236	161.0	22	5	74	889	4.8
3	1	2	322	86.0	23	5	79	923	6.8
4	1	3	357	35.0					
5	1	4	385	28.0					
6	2	6	404	9.5					
7	5	11	426	4.4					
8	5	16	457	6.2					
9	5	21	500	8.6					
10	2	23	520	10.0					
11	5	28	545	5.0					
12	5	33	570	5.0					
13	2	35	591	10.5					
14	5	40	638	9.4					
15	5	45	676	7.6					
16	2	47	698	11.0					
17	5	52	725	5.4					
18	5	57	770	9.0					
19	5	62	808	7.6					
20	2	64	828	10.0					

Layer Boundaries: Chainage 8.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	CBR value	Thickness	Depth	Depth (mmbgl)	Strength Coefficient
1	2	247	247	322	
2	8	63	310	385	
3	28	19	329	404	
4	44	166	495	570	
5	32	258	753	828	
	43	95	848	923	

CBR Derived by TDR equation

$$\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{penetration rate})$$

Average (mean) CBR% 75-923mmbgl = 26%

Remarks Surface material description: Grassed TOPSOIL



APPENDIX F

SOAKAWAY TEST DATA



SOIL INFILTRATION DATA

allowance for infiltration through soakaway base: 100%

available on-site infiltration test results: ☒ Yes ☐ No

use soakage trial pit table below

internal surface area of trial pit 'a_{p50}' [m²] = 5.86storage volume between 75-25% 'V_p' [m³] = 1.16time for water to fall from 75-25% 't_p' [min] = 32.14

soil infiltration rate 'f' [m/s] = 1.02E-04

SOAKAGE TRIAL PIT DATA

soakage trial pit width 'W_t' [m] = 0.70soakage trial pit length 'L_t' [m] = 2.00total depth from ground level 'D_{tb}' [m] = 2.15depth to pipe invert level 'D_{tp}' [m] = 0.50soakage trial pit effective depth 'D_{teff}' [m] = 1.65

free volume in infill aggregate [%] = 100

NOTE: faces of excavation assumed to be vertical

Soil Description

0.00 - 0.30mbgl - Grassed TOPSOIL

0.40 - 2.15mbgl - Brown gravelly slightly sandy silty CLAY

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

water level measurement N ^o :		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Soakage Trial 1	time [min] =	0	20	40	60	90	120	180	240											
	depth to water [m] =	0.50	0.59	0.66	0.70	0.76	0.80	0.88	0.95											
Soakage Trial 2	time [min] =																			
	depth to water [m] =																			
Soakage Trial 3	time [min] =																			
	depth to water [m] =																			



SOIL INFILTRATION DATA

allowance for infiltration through soakaway base: 100%

available on-site infiltration test results: ☒ Yes ☐ No

use soakage trial pit table below

internal surface area of trial pit ' a_{p50} ' [m^2] = 3.97storage volume between 75-25% ' V_p ' [m^3] = 0.67time for water to fall from 75-25% ' t_p ' [min] = 78.28soil infiltration rate ' f ' [m/s] = 3.57E-05

SOAKAGE TRIAL PIT DATA

soakage trial pit width ' W_t ' [m] = 0.70soakage trial pit length ' L_t ' [m] = 2.00total depth from ground level ' D_{tb} ' [m] = 2.10depth to pipe invert level ' D_{tp} ' [m] = 1.15soakage trial pit effective depth ' D_{teff} ' [m] = 0.95

free volume in infill aggregate [%] = 100

NOTE: faces of excavation assumed to be vertical

Soil Description

0.00 - 0.30mbgl - Grassed TOPSOIL

0.30 - 2.10mbgl - Brown silty very sandy GRAVEL

NOTE: Soakaway collapsed to 1.80mbgl during first charge. Water soaking away faster than pit can be filled to 0.50mbgl

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

water level measurement N ^o :		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Soakage Trial 1	time [min] =	0	10	20	30	60														
	depth to water [m] =	1.15	1.38	1.50	1.60	1.80														
Soakage Trial 2	time [min] =	0	10	30	60	100														
	depth to water [m] =	1.00	1.20	1.52	1.57	1.63														
Soakage Trial 3	time [min] =																			
	depth to water [m] =																			



SOIL INFILTRATION DATA

allowance for infiltration through soakaway base: 100%

available on-site infiltration test results: ☒ Yes ☐ No

use soakage trial pit table below

internal surface area of trial pit ' a_{p50} ' [m^2] = 6.13storage volume between 75-25% ' V_p ' [m^3] = 1.20time for water to fall from 75-25% ' t_p ' [min] = 206.00soil infiltration rate ' f ' [m/s] = 1.58E-05

SOAKAGE TRIAL PIT DATA

soakage trial pit width ' W_t ' [m] = 0.70soakage trial pit length ' L_t ' [m] = 2.50total depth from ground level ' D_{tb} ' [m] = 2.00depth to pipe invert level ' D_{tp} ' [m] = 0.63soakage trial pit effective depth ' D_{teff} ' [m] = 1.37

free volume in infill aggregate [%] = 100

NOTE: faces of excavation assumed to be vertical

Soil Description

0.00 - 0.40mbgl - Grassed TOPSOIL

0.40 - 0.70mbgl - Brown very clayey very gravelly cobbly SAND

0.70 - 1.50mbgl - Brown gravelly slightly sandy CLAY

1.50 - 2.00mbgl - Reddish brown sandy slightly gravelly silty CLAY

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

water level measurement N ^o :		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Soakage Trial 1	time [min] =	0	5	10	20	30	40	65	125	195	230	300								
	depth to water [m] =	0.63	0.65	0.67	0.72	0.77	0.82	0.90	1.05	1.15	1.19	1.24								
Soakage Trial 2	time [min] =																			
	depth to water [m] =																			
Soakage Trial 3	time [min] =																			
	depth to water [m] =																			



APPENDIX G

TRIAL PIT AND SOAKAWAY PHOTOGRAPHS



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Site	Berse Road, Wrexham	Trial Pit Number	SA1
Job Number:	CCG-C-21-12809	Plate Number	1



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	SA1
Plate Number	2



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Site	Berse Road, Wrexham	Trial Pit Number	SA1
Job Number:	CCG-C-21-12809	Plate Number	3



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	SA2
Plate Number	1



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Site	Berse Road, Wrexham	Trial Pit Number	SA2
Job Number:	CCG-C-21-12809	Plate Number	2



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Consulting Geotechnical and Geoenvironmental Engineers



Site	Berse Road, Wrexham	Trial Pit Number	SA2
Job Number:	CCG-C-21-12809	Plate Number	3



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Consulting Geotechnical and Geoenvironmental Engineers



Site	Berse Road, Wrexham	Trial Pit Number	SA3
Job Number:	CCG-C-21-12809	Plate Number	1



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	SA3
Plate Number	2



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Site	Berse Road, Wrexham	Trial Pit Number	SA3
Job Number:	CCG-C-21-12809	Plate Number	3



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP1
Plate Number	1
Notes	Measuring staff starts at 1.90m



Site	Berse Road, Wrexham	Trial Pit Number	TP1	Notes	Measuring staff starts at 1.90m
Job Number:	CCG-C-21-12809	Plate Number	2		



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Site	Berse Road, Wrexham	Trial Pit Number	TP1	Notes	Measuring staff starts at 1.90m
Job Number:	CCG-C-21-12809	Plate Number	3		



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP2
Plate Number	1
Notes	Measuring staff starts at 1.90m



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Site	Berse Road, Wrexham	Trial Pit Number	TP2	Notes	Measuring staff starts at 1.90m
Job Number:	CCG-C-21-12809	Plate Number	2		



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Site	Berse Road, Wrexham	Trial Pit Number	TP2	Notes	Measuring staff starts at 1.90m
Job Number:	CCG-C-21-12809	Plate Number	3		



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP3
Plate Number	1
Notes	Measuring staff starts at 1.90m



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Site	Berse Road, Wrexham	Trial Pit Number	TP3	Notes	Measuring staff starts at 1.90m
Job Number:	CCG-C-21-12809	Plate Number	2		



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Site	Berse Road, Wrexham	Trial Pit Number	TP3	Notes	Measuring staff starts at 1.90m
Job Number:	CCG-C-21-12809	Plate Number	3		



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP4
Plate Number	1
Notes	Measuring staff starts at 0.90m



Site	Berse Road, Wrexham	Trial Pit Number	TP4	Notes	Measuring staff starts at 0.90m
Job Number:	CCG-C-21-12809	Plate Number	2		



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Site	Berse Road, Wrexham	Trial Pit Number	TP4	Notes	Measuring staff starts at 0.90m
Job Number:	CCG-C-21-12809	Plate Number	3		



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Site	Berse Road, Wrexham	Trial Pit Number	TP5
Job Number:	CCG-C-21-12809	Plate Number	1



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP5
Plate Number	2



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Site	Berse Road, Wrexham	Trial Pit Number	TP5
Job Number:	CCG-C-21-12809	Plate Number	3



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP6
Plate Number	1



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Site	Berse Road, Wrexham	Trial Pit Number	TP6
Job Number:	CCG-C-21-12809	Plate Number	2



CC GEOTECHNICAL LIMITED

Consulting Geotechnical and Geoenvironmental Engineers



Site	Berse Road, Wrexham	Trial Pit Number	TP6
Job Number:	CCG-C-21-12809	Plate Number	3



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP7
Plate Number	1



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP7
Plate Number	2



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Site	Berse Road, Wrexham	Trial Pit Number	TP7
Job Number:	CCG-C-21-12809	Plate Number	3



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP8
Plate Number	1



Site	Berse Road, Wrexham
Job Number:	CCG-C-21-12809
Trial Pit Number:	TP8
Plate Number	2



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Consulting Geotechnical and Geoenvironmental Engineers



Site	Berse Road, Wrexham	Trial Pit Number	TP8
Job Number:	CCG-C-21-12809	Plate Number	3



CC GEOTECHNICAL LIMITED
Consulting Geotechnical and Geoenvironmental Engineers

APPENDIX H

ENVIRONMENTAL LABORATORY REPORT



Unit A2
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THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 22-38329

Issue: 1

Date of Issue: 03/02/2022

Contact: Sam Parry

Customer Details: CC Geotechnical Ltd
Unit 1 & 2 Deltic Place
Deltic Way
Liverpool
Merseyside L33 7BA

Quotation No: Q14-00045

Order No: Not Supplied

Customer Reference: CCG-C-21-12809

Date Received: 28/01/2022

Date Approved: 03/02/2022

Details: Berse Road, New Broughton

Approved by: 

Mike Varley, General Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

This report may only be reproduced in full



Sample Summary

Report No.: 22-38329, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
265604	TP5 1.00	19/01/2022	28/01/2022	Sandy silty loam	
265605	TP7 0.50	19/01/2022	28/01/2022	Sandy loam	
265606	SA1 0.50	19/01/2022	28/01/2022	Sandy silty loam	
265607	SA1 1.50	19/01/2022	28/01/2022	Sandy silty loam	
265608	SA2 0.50	19/01/2022	28/01/2022	Sandy loam	
265609	SA3 0.50	19/01/2022	28/01/2022	Sandy silty loam	
265610	SA3 1.80	19/01/2022	28/01/2022	Sandy silty loam	



Results Summary

2683

Report No.: 22-38329, issue number 1

ELAB Reference				265604	265605	265606	265607	265608
Customer Reference								
Sample ID								
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				TP5	TP7	SA1	SA1	SA2
Sample Depth (m)				1.00	0.50	0.50	1.50	0.50
Sampling Date				19/01/2022	19/01/2022	19/01/2022	19/01/2022	19/01/2022
Determinand	Codes	Units	LOD					
Soil sample preparation parameters								
Moisture Content	N	%	0.1	10.4	11.1	13.1	14.0	10.9
Material removed	N	%	0.1	45.0	35.1	20.2	11.7	12.4
Description of Inert material removed	N		0	Stones	Stones	Stones	Stones	Stones
Anions								
Water Soluble Sulphate	M	mg/l	20	< 20	< 20	< 20	< 20	< 20
Miscellaneous								
pH	M	pH units	0.1	8.3	8.1	8.0	7.8	8.0



Results Summary

2683

Report No.: 22-38329, issue number 1

ELAB Reference	265609	265610
Customer Reference		
Sample ID		
Sample Type	SOIL	SOIL
Sample Location	SA3	SA3
Sample Depth (m)	0.50	1.80
Sampling Date	19/01/2022	19/01/2022

Determinand	Codes	Units	LOD		
Soil sample preparation parameters					
Moisture Content	N	%	0.1	13.9	10.6
Material removed	N	%	0.1	12.0	11.2
Description of Inert material removed	N		0	Stones	Stones
Anions					
Water Soluble Sulphate	M	mg/l	20	< 20	< 20
Miscellaneous					
pH	M	pH units	0.1	7.5	7.9



Method Summary

Report No.: 22-38329, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	03/02/2022	113	Electromeric
Water soluble anions	M	Air dried sample	01/02/2022	172	Ion Chromatography

Report Information

Report No.: 22-38329, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

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



APPENDIX I

NOTES ON LIMITATIONS

Notes on Limitations For Geoenvironmental and Geotechnical Consultancy Services

General

This document has been prepared by CC GEOTECHNICAL LTD within the terms of the contract, scope of work, and resources agreed in writing with the client. The limitations of liability of CC GEOTECHNICAL LTD for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

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The findings and opinions provided in this document are made in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined in this document.

The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date. In particular, seasonal groundwater levels, with the effects of precipitation, may affect the conditions found during the investigation. The report should be read in conjunction with the further Notes on Limitations included in Appendix A.

Where opinions expressed in this report are based on current available guidance and legislation, no liability can be accepted by CC GEOTECHNICAL LTD for the effects of any future changes to such guidelines and legislation. Additional information, improved practices, new guidance, changes in legislation, or amendments to design proposals, may necessitate this report having to be reviewed in whole or in part after that date. Opinions and interpretations are not accredited by UKAS.

Factual data contained in this report may have been obtained from enquiries with reputable third parties, the results of which are relied on unless indicated to be inaccurate by contradictory information.

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CC GEOTECHNICAL LTD accepts no responsibility or liability for:

1. the consequences of this document being used for any purpose or project other than for which it was commissioned and/or
2. the consequences of use of this document by any party with whom an agreement has not been executed.

Phase I Environmental Audits / Desk Studies

The work undertaken to provide the basis of a Phase 1 Desk Study report comprises a study of available documented information from a variety of sources (including the client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in a Desk Study report have been dictated by finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in the report, CC GEOTECHNICAL LTD reserves the right to review such information and to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits

The investigation of the site has been carried out with the intention of providing sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated to potential human targets, building materials, the environment (including adjacent land), and surface and groundwater.

The amount of exploratory work and chemical testing undertaken may have been restricted by the timescale available, and the locations of the exploratory holes may have been restricted to areas unoccupied by the building(s) on the site, and further restricted by the existence of buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For those reasons, if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of site conditions. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

Geoenvironmental Ground Investigations

The investigation of the site has been carried out to provide sufficient information within the agreed scope of the investigation, under the general headings of type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions, to provide a reasonable assessment of the environmental risks together with engineering and development implications.

If costs have been included in relation to the site remediation, these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, investigate only a small volume of the ground in relation to the size of the site, and can only provide a general indication of the site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions present on the site which have not been disclosed by this investigation, and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal, weather, or other effects.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

APPENDIX 4

Chemical Laboratory Testing



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Caulmert Ltd
St. Asaph Office
Unit 14,
St. Asaph Business Park
St. Asaph
Denbighshire
LL17 0LJ

Attention: David Kitching

CERTIFICATE OF ANALYSIS

Date of report Generation:	28 January 2022
Customer:	Caulmert Ltd
Sample Delivery Group (SDG):	220120-129
Your Reference:	5073
Location:	Berse Road, New Broughton, Wrexham
Report No:	631278
Order Number:	16843

We received 15 samples on Thursday January 20, 2022 and 15 of these samples were scheduled for analysis which was completed on Friday January 28, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278
Location: Berse Road, New Broughton, Wrexham

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25678959	TP01	ES	0.40	19/01/2022
25678960	TP02	ES	0.20	19/01/2022
25678961	TP02	ES	0.50	19/01/2022
25678962	TP03	ES	0.20	19/01/2022
25678963	TP03	ES	0.60	19/01/2022
25678964	TP04	ES	0.20	19/01/2022
25678965	TP04	ES	0.80	19/01/2022
25678967	TP05	ES	0.20	19/01/2022
25678968	TP05	ES	0.50	19/01/2022
25678969	TP06	ES	0.20	19/01/2022
25678970	TP06	ES	0.50	19/01/2022
25678971	TP07	ES	0.10	19/01/2022
25678972	TP07	ES	0.70	19/01/2022
25678973	TP08	ES	0.20	19/01/2022
25678974	TP08	ES	0.70	19/01/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278
Location: Berse Road, New Broughton, Wrexham

Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
-----------	----------	------	-----------------	--------	-------------	--------	------------	-------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
25678959	TP01	0.40	Light Brown	Sandy Loam	Stones	None
25678960	TP02	0.20	Dark Brown	Sandy Loam	Stones	Vegetation
25678961	TP02	0.50	Light Brown	Sandy Clay	Stones	None
25678962	TP03	0.20	Dark Brown	Sandy Loam	Stones	Vegetation
25678963	TP03	0.60	Light Brown	Sandy Clay Loam	Stones	Vegetation
25678964	TP04	0.20	Dark Brown	Sandy Silt Loam	Stones	Vegetation
25678965	TP04	0.80	Light Brown	Sandy Loam	Stones	None
25678967	TP05	0.20	Dark Brown	Sandy Loam	Stones	None
25678968	TP05	0.50	Light Brown	Loamy Sand	Stones	None
25678969	TP06	0.20	Dark Brown	Sandy Loam	Stones	None
25678970	TP06	0.50	Light Brown	Sandy Clay	Stones	None
25678971	TP07	0.10	Dark Brown	Sandy Loam	Stones	Vegetation
25678972	TP07	0.70	Light Brown	Sandy Loam	Stones	None
25678973	TP08	0.20	Light Brown	Sandy Loam	Stones	None
25678974	TP08	0.70	Light Brown	Sandy Loam	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278

Superseded Report:

Location: Berse Road, New Broughton, Wrexham

Results Legend			Customer Sample Ref.		TP01	TP02	TP02	TP03	TP03	TP04
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.flit Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*\$@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.40 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678959 ES	0.20 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678960 ES	0.50 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678961 ES	0.20 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678962 ES	0.60 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678963 ES	0.20 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678964 ES
Component	LOD/Units	Method								
Moisture Content Ratio (% of as received sample)	%	PM024			13	17	14	15	12	18
Phenol	<0.01 mg/kg	TM062 (S)			<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M
Cresols	<0.01 mg/kg	TM062 (S)			<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M
Xylenols	<0.015 mg/kg	TM062 (S)			<0.015 M	<0.015 M	<0.015 M	<0.015 M	<0.015 M	<0.015 M
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)			<0.035 M	<0.035 M	<0.035 M	<0.035 M	<0.035 M	<0.035 M
Soil Organic Matter (SOM)	<0.35 %	TM132			0.822 #	6.15 #	0.419 #	3.59 #	0.44 #	10.9 #
pH	1 pH Units	TM133			6.89 M	7.19 M	7.79 M	7.36 M	7.81 M	7.29 M
Chromium, Hexavalent	<0.6 mg/kg	TM151			<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #
Cyanide, Free	<1 mg/kg	TM153			<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
TPH >C6-C40	<10 mg/kg	TM154			<10	60.6	<10	53.4	<10	98.3
TPH >C6-C10	<10 mg/kg	TM154			<10	<10	<10	<10	<10	<10
TPH >C10-C25	<10 mg/kg	TM154			<10	17.9	<10	14.4	<10	28.7
TPH >C25-C40	<10 mg/kg	TM154			<10	42.7	<10	38.9	<10	68.9
Chromium, Trivalent	<0.9 mg/kg	TM181			6.55	9.73	6.79	8.31	7.84	7
Arsenic	<0.6 mg/kg	TM181			9.77 M	12.4 M	4.55 M	10.2 M	8.38 M	14.2 M
Beryllium	<0.01 mg/kg	TM181			0.646 M	0.645 M	0.243 M	0.528 M	0.524 M	0.446 M
Cadmium	<0.02 mg/kg	TM181			0.533 M	0.456 M	0.0941 M	0.299 M	0.158 M	0.446 M
Chromium	<0.9 mg/kg	TM181			6.55 M	9.73 M	6.79 M	8.31 M	7.84 M	7 M
Copper	<1.4 mg/kg	TM181			15.5 M	28.3 M	6.88 M	21.9 M	19.2 M	19.8 M
Lead	<0.7 mg/kg	TM181			59 M	136 M	22 M	100 M	41.6 M	111 M
Mercury	<0.1 mg/kg	TM181			<0.1 M	0.18 M	<0.1 M	0.126 M	<0.1 M	0.119 M
Nickel	<0.2 mg/kg	TM181			27 M	16.5 M	10.8 M	19.9 M	20.3 M	19.4 M
Selenium	<1 mg/kg	TM181			1.55 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vanadium	<0.2 mg/kg	TM181			19.2 #	23.7 #	17.2 #	21.2 #	41.7 #	16.9 #
Zinc	<1.9 mg/kg	TM181			47 M	105 M	47 M	82.1 M	61 M	105 M
Boron, water soluble	<1 mg/kg	TM222			1.27 M	2.49 M	1.47 M	<1 M	<1 M	1.31 M



CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278
Location: Berse Road, New Broughton, Wrexham

Superseded Report:

Results Legend			Customer Sample Ref.		TP04	TP05	TP05	TP06	TP06	TP07
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.fltr Dissolved / filtered sample. tot.unfltr Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-4*5@ Sample deviation (see appendix)			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.80 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678965 ES	0.20 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678967 ES	0.50 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678968 ES	0.20 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678969 ES	0.50 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678970 ES	0.10 Soil/Solid (S) 19/01/2022 20/01/2022 220120-129 25678971 ES
Component	LOD/Units	Method								
Moisture Content Ratio (% of as received sample)	%	PM024			9.4	14	9.8	17	14	18
Phenol	<0.01 mg/kg	TM062 (S)			<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M
Cresols	<0.01 mg/kg	TM062 (S)			<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M
Xylenols	<0.015 mg/kg	TM062 (S)			<0.015 M	<0.015 M	<0.015 M	<0.015 M	<0.015 M	<0.015 M
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)			<0.035 M	<0.035 M	<0.035 M	<0.035 M	<0.035 M	<0.035 M
Soil Organic Matter (SOM)	<0.35 %	TM132			0.602 #	2.65 #	1.27 #	2.74 #	0.65 #	5.47 #
pH	1 pH Units	TM133			7.97 M	8.41 M	8.54 M	8.23 M	8.13 M	7.71 M
Chromium, Hexavalent	<0.6 mg/kg	TM151			<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #
Cyanide, Free	<1 mg/kg	TM153			<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
TPH >C6-C40	<10 mg/kg	TM154			21.1	35.3	<10	97.9	11.2	103
TPH >C6-C10	<10 mg/kg	TM154			<10	<10	<10	<10	<10	<10
TPH >C10-C25	<10 mg/kg	TM154			<10	<10	<10	35.2	<10	26
TPH >C25-C40	<10 mg/kg	TM154			12.4	26.4	<10	62.7	<10	77.1
Chromium, Trivalent	<0.9 mg/kg	TM181			<0.9	9.82	6.61	7.02	10.6	9.65
Arsenic	<0.6 mg/kg	TM181			8.18 M	7.85 M	8.42 M	8.19 M	7.96 M	10.7 M
Beryllium	<0.01 mg/kg	TM181			0.723 M	0.509 M	0.445 M	0.74 M	0.533 M	0.715 M
Cadmium	<0.02 mg/kg	TM181			0.351 M	0.209 M	0.142 M	0.227 M	0.0994 M	0.403 M
Chromium	<0.9 mg/kg	TM181			<0.9 M	9.82 M	6.61 M	7.02 M	10.6 M	9.65 M
Copper	<1.4 mg/kg	TM181			11.9 M	15.1 M	15.7 M	16.5 M	17.9 M	24.5 M
Lead	<0.7 mg/kg	TM181			52.8 M	61.3 M	47.3 M	95.5 M	27.6 M	128 M
Mercury	<0.1 mg/kg	TM181			0.133 M	<0.1 M	<0.1 M	<0.1 M	<0.1 M	0.255 M
Nickel	<0.2 mg/kg	TM181			27.8 M	15.3 M	19.2 M	12.7 M	20.9 M	16.1 M
Selenium	<1 mg/kg	TM181			<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Vanadium	<0.2 mg/kg	TM181			19.8 #	17 #	16 #	19.8 #	22.4 #	27.4 #
Zinc	<1.9 mg/kg	TM181			44.4 M	50.7 M	47.9 M	56.7 M	50.3 M	88.5 M
Boron, water soluble	<1 mg/kg	TM222			<1 M	1.74 M	<1 M	1.12 M	2.21 M	1.67 M



CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278
Location: Berse Road, New Broughton, Wrexham

Superseded Report:

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERTS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*\$@ Sample deviation (see appendix)

Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP01ES 0.40 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678959 TM048	24/01/2022 James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP02ES 0.20 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678960 TM048	24/01/2022 Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP02ES 0.50 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678961 TM048	24/01/2022 Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP03ES 0.20 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678962 TM048	24/01/2022 Joanne Furnivall	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP03ES 0.60 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678963 TM048	24/01/2022 Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP04ES 0.20 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678964 TM048	24/01/2022 Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP04ES 0.80 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678965 TM048	24/01/2022 Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP05ES 0.20 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678967 TM048	24/01/2022 Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129

Report Number: 631278

Superseded Report:

Client Ref.: 5073

Location: Berse Road, New Broughton, Wrexham

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Asbestos Actinolite	Asbestos Anthophyllite	Asbestos Tremolite	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP05ES 0.50 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678968 TM048	24/01/2022	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP06ES 0.20 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678969 TM048	24/01/2022	Joanne Furnivall	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP06ES 0.50 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678970 TM048	24/01/2022	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP07ES 0.10 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678971 TM048	24/01/2022	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP07ES 0.70 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678972 TM048	24/01/2022	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP08ES 0.20 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678973 TM048	24/01/2022	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TP08ES 0.70 SOLID 19/01/2022 00:00:00 20/01/2022 09:15:00 220120-129 25678974 TM048	24/01/2022	Joanne Furnivall	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278
Location: Berse Road, New Broughton, Wrexham

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM154	In - house Method	Determination of Petroleum Hydrocarbons by EZ Flash GC-FID in the Carbon range C6- C40
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:Soil) by ICP OES.

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220120-129
Client Ref.: 5073

Report Number: 631278
Location: Berse Road, New Broughton, Wrexham

Superseded Report:

Test Completion Dates

Lab Sample No(s)	25678959	25678960	25678961	25678962	25678963	25678964	25678965	25678967	25678968	25678969
Customer Sample Ref.	TP01	TP02	TP02	TP03	TP03	TP04	TP04	TP05	TP05	TP06
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.40	0.20	0.50	0.20	0.60	0.20	0.80	0.20	0.50	0.20
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022
Boron Water Soluble	25-Jan-2022	25-Jan-2022	25-Jan-2022	26-Jan-2022	26-Jan-2022	26-Jan-2022	26-Jan-2022	25-Jan-2022	28-Jan-2022	26-Jan-2022
Chromium III	25-Jan-2022	26-Jan-2022	26-Jan-2022	25-Jan-2022	25-Jan-2022	26-Jan-2022	25-Jan-2022	26-Jan-2022	28-Jan-2022	25-Jan-2022
Cyanide Comp/Free/Total/Thiocyanate	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
Hexavalent Chromium (s)	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
Metals in solid samples by OES	25-Jan-2022	26-Jan-2022	26-Jan-2022	25-Jan-2022	25-Jan-2022	26-Jan-2022	25-Jan-2022	26-Jan-2022	28-Jan-2022	25-Jan-2022
PAH by GCMS	25-Jan-2022	25-Jan-2022	25-Jan-2022	24-Jan-2022	25-Jan-2022	24-Jan-2022	24-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
pH	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022
Phenols by HPLC (S)	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
Sample description	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022
Total Organic Carbon	27-Jan-2022	26-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	26-Jan-2022	28-Jan-2022	27-Jan-2022
TPH c6-40 Value of soil	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022

Lab Sample No(s)	25678970	25678971	25678972	25678973	25678974
Customer Sample Ref.	TP06	TP07	TP07	TP08	TP08
AGS Ref.	ES	ES	ES	ES	ES
Depth	0.50	0.10	0.70	0.20	0.70
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022
Boron Water Soluble	25-Jan-2022	26-Jan-2022	26-Jan-2022	25-Jan-2022	25-Jan-2022
Chromium III	26-Jan-2022	25-Jan-2022	25-Jan-2022	26-Jan-2022	26-Jan-2022
Cyanide Comp/Free/Total/Thiocyanate	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
Hexavalent Chromium (s)	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
Metals in solid samples by OES	26-Jan-2022	25-Jan-2022	25-Jan-2022	26-Jan-2022	26-Jan-2022
PAH by GCMS	25-Jan-2022	24-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
pH	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022	24-Jan-2022
Phenols by HPLC (S)	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022	25-Jan-2022
Sample description	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022	21-Jan-2022
Total Organic Carbon	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	26-Jan-2022
TPH c6-40 Value of soil	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022	27-Jan-2022



CERTIFICATE OF ANALYSIS

SDG:	220120-129	Client Reference:	5073	Report Number:	631278
Location:	se Road, New Broughton, Wrexh	Order Number:	16843	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX 5

GAC Assessment

Berse Road							
Human Health	Residential with plant uptake (1%SOM)						
Chemical of Potential Concern	Generic Criterion (mg/kg)	Basis for Generic Criterion	No. Samples	Min. (mg/kg)	Max. (mg/kg)	No. Samples Equal to, or Greater Than, Generic Criterion	US95 (mg/kg)
Arsenic	37	C4SL	15	4.55	14.2	0	11.77
Beryllium	51	LQM/CIEH + CLEA 1.06	15	0.243	0.74	0	0.69
Boron	290	LQM/CIEH + CLEA 1.06	0	0	0	0	#DIV/0!
Cadmium	26	C4SL	15	0.0941	0.533	0	0.43
Chromium (III)	630	LQM/CIEH + CLEA 1.06	15	0.9	10.6	0	10.07
Chromium (VI)	21	C4SL	15	0.6	0.6	0	0.60
Copper	2300	LQM/CIEH + CLEA 1.06	15	6.88	28.3	0	23.81
Lead	200	C4SL	15	22	136	0	115.67
Mercury, inorganic	170	SGV report + CLEA 1.06	15	0.1	0.255	0	0.18
Nickel	130	SGV report + CLEA 1.06	15	10.8	27.8	0	23.88
Selenium	350	SGV report + CLEA 1.06	15	1	1.55	0	1.20
Vanadium	74	LQM/CIEH + CLEA 1.06	15	16	41.7	0	28.52
Zinc	3700	LQM/CIEH + CLEA 1.06	15	41.6	105	0	88.92
Cyanide (free)	750	Caulmert + CLEA 1.06	15	1	1	0	1.00
Phenol (total)	180	SGV report + CLEA 1.06	15	0.01	0.01	0	0.01
Acenaphthene	210	LQM/CIEH + CLEA 1.06	15	0.008	0.008	0	0.01
Acenaphthylene	170	LQM/CIEH + CLEA 1.06	15	0.012	0.012	0	0.01
Anthracene	2300	LQM/CIEH + CLEA 1.06	15	0.016	0.0226	0	0.02
Benz(a)anthracene	3.1	LQM/CIEH + CLEA 1.06	15	0.014	0.0898	0	0.05
Benzo(a)pyrene	5	C4SL	15	0.015	0.0938	0	0.06
Benzo(b)fluoranthene	5.6	LQM/CIEH + CLEA 1.06	15	0.015	0.124	0	0.08
Benzo(ghi)perylene	44	LQM/CIEH + CLEA 1.06	15	0.024	0.0651	0	0.05
Benzo(k)fluoranthene	8.5	LQM/CIEH + CLEA 1.06	15	0.014	0.0482	0	0.03
Chrysene	6	LQM/CIEH + CLEA 1.06	15	0.01	0.101	0	0.06
Dibenz(a,h)anthracene	0.76	LQM/CIEH + CLEA 1.06	15	0.023	0.023	0	0.02
Fluoranthene	260	LQM/CIEH + CLEA 1.06	15	0.017	0.186	0	0.10
Fluorene	160	LQM/CIEH + CLEA 1.06	15	0.01	0.01	0	0.01
Indeno(1,2,3,cd)pyrene	3.2	LQM/CIEH + CLEA 1.06	15	0.018	0.0617	0	0.04
Naphthalene	1.5	LQM/CIEH + CLEA 1.06	15	0.009	0.009	0	0.01
Phenanthrene	92	LQM/CIEH + CLEA 1.06	15	0.015	0.0901	0	0.05
Pyrene	560	LQM/CIEH + CLEA 1.06	15	0.015	0.164	0	0.09
Plant Life							
Chemical of Potential Concern	Generic Criterion (mg/kg)	Basis for Generic Criterion	No. Samples	Min. (mg/kg)	Max. (mg/kg)	No. Samples Equal to, or Greater Than, Generic Criterion	US95 (mg/kg)
Arsenic	250	MAFF 1998	15	4.55	14.2	0	11.77
Boron	3	New Zealand timber 1997	0	0	0	0	#DIV/0!
Chromium (III)	400	MAFF 1998 (Cr(T))	15	0.9	10.6	0	10.07
Chromium (VI)	25	ICRCL 70/90 1990	15	0.6	0.6	0	0.60
Copper	135	BS3882 2007	15	6.88	28.3	0	23.81
Nickel	75	BS3882 2007	15	10.8	27.8	0	23.88
Zinc	300	BS3882 2007	15	41.6	105	0	88.92

APPENDIX 6

Groundwater and Ground Gas Monitoring Results

	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	Bal (%v/v)	H2S (ppm)	CO (ppm)	Rel pressure	Atm (mBar)	Flow (l/hr)	<i>if results flow n</i>	Dip mbgl	Tip base (mbgl)	Observations
Amb	0.1	<0.1	20.9	78.9	0	0		1030					
WS1	<0.1	0.9	20.3	78.7	0	0		1030	0		2.32	3.98	
WS2	<0.1	0.2	21.1	78.7	0	0		1030	0		2.8	3.96	
WS4	<0.1	0.1	20.1	78.7	0	0		1030	0		2.94	3.9	
WS5	<0.1	1.5	19.5	78.8	0	0		1030	0		2.88	2.98	
WS10	<0.1	1.3	19.9	78.8	0	0		1030	0		1.7	2.66	
WS11	<0.1	0.1	21.2	78.5				1030	-0.1		1.22	1.7	

Results corrected to field calibration.

18.03.22

Weather - Sunny, windy
approx 12C

	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	Bal (%v/v)	H2S (ppm)	CO (ppm)	Rel pressure	Atm (mBar)	Flow (l/hr)	<i>if results flow n</i>	Dip mbgl	Tip base (mbgl)	Observations
Amb	<0.1	<0.1	20.9	79.1	0	0		994					Atm dropped then rose to 997 through monitoring
WS1	<0.1	0.1	22	78	0	0	-0.36	994	0		2.89	3.98	
WS2	<0.1	0.1	21.6	78.7	0	0	0.02	994	0		2.19	3.96	
WS4	<0.1	0.1	20.2	79.7	0	0	0.03	994	-0.1		3.02	3.9	
WS5	<0.1	0.1	21.9	78	0	0	-0.12	994	-0.1		2.82	2.98	
WS10	<0.1	0.1	20.8	79.1	0	0	0.03	994	-0.2		1.72	2.66	
WS11	<0.1	0.1	22	77.9	0	0	-0.24	994	-0.1		1.36	1.7	

Results corrected to field calibration.

14.02.22

Weather - Wet, stormy, windy
approx 10C

	CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	Bal (%v/v)	H2S (ppm)	CO (ppm)	Rel pressure	Atm (mBar)	Flow (l/hr)	<i>if results flow n</i>	Dip mbgl	Tip base (mbgl)	Observations
Amb	<0.1	<0.1	21.7		0	0		1014					
WS1	<0.1	0.1	21.6	78.3	0	0		1014	-1.4		1.13	3.98	
WS2	<0.1	0.1	21.6	78.3	0	0		1014	0		2.26	3.96	
WS4	<0.1	0.1	21.3	78.4	0	0		1014	0		1.93	3.9	
WS5	<0.1	0.1	21.6	78.3	0	0		1014	0		2.16	2.98	
WS10	<0.1	0.1	21.2	78.7	0	0		1014	0		0.38	2.66	
WS11								1014			0.81	1.7	

Results corrected to field calibration.

21.02.22

Weather - Sunny, stormy, windy
approx 10C



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